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Monograph

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Further additions to the knowledge of *Strumigenys* (Formicidae: Myrmicinae) within South East Asia, with the descriptions of 20 new species

Kit Lam TANG^{1,*} & Benoit GUÉNARD²

^{1,2}School of Biological Sciences, The University of Hong Kong, Kadoorie Biological Sciences
Building, Pok Fu Lam Road, Hong Kong SAR, China.

*Corresponding author: u3508935@connect.hku.hk

²Email: zeroben@gmail.com

¹urn:lsid:zoobank.org:author:89B25F7E-C455-49BE-A9E5-669E96001A3B

²urn:lsid:zoobank.org:author:3885FFD6-3FE4-428A-88BD-C5E88F2BC315

Abstract. The species of the ant genus *Strumigenys* Smith, 1860 from Southeast Asia are reviewed based on recent sampling efforts as well as unreported historical material from southern mainland China, Japan, Taiwan, Thailand and Vietnam. We report 42 new species records for these regions. A total of 20 species new to science are described: *S. anhdaoae* sp. nov., *S. claviseta* sp. nov., *S. crinigera* sp. nov., *S. decumbens* sp. nov., *S. delicata* sp. nov., *S. densissima* sp. nov., *S. doydeei* sp. nov., *S. fellowesi* sp. nov., *S. intermedia* sp. nov., *S. jaitrongi* sp. nov., *S. liuweii* sp. nov., *S. longidens* sp. nov., *S. mediocris* sp. nov., *S. rongi* sp. nov., *S. scutica* sp. nov., *S. strummeri* sp. nov., *S. xenopilus* sp. nov., *S. yamanei* sp. nov., *S. zanderi* sp. nov. and *S. zhenghunii* sp. nov. The descriptions of the existing species *S. elegantula* (Terayama & Kubota, 1989) and *S. nathistorisoc* Tang *et al.*, 2019 are revised. *Strumigenys formosensis* Forel, 1912 syn. nov. is synonymized with *S. feae* Emery 1895 in the light of recently collected specimens. Three species complexes are created within the *S. leptothrix*-group: *elegantula*-complex, *leptothrix*-complex and *zanderi*-complex, based on differences in dentition. A new species group, *S. nathistorisoc*-group, is introduced. The key to *Strumigenys* of East Asia (as *Pyramica*) by Bolton is partially revised to accommodate species from these species groups that were described since the publication of the key. Finally, the implication of our results to the region and the current limitation of species groups and complexes of the genus is discussed.

Keywords. Taxonomic review, miniature trap-jaw ants, new species, new records, species group revision.

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Introduction

The genus *Strumigenys* Smith, 1860 represents one of the most diverse ant genera, with 858 valid extant species described (Bolton 2022). New species are continuously discovered and described from various

Table 1. Species diversity of *Strumigenys* Smith, 1860 in function of the biogeographic realms, with global percentage indicated in parentheses (note that some species occur in more than one biogeographic realm). The species described in this article are not included. Biogeographic realms follow the definition of Holt *et al.* (2013).

Biogeographic realms	<i>Strumigenys</i> species richness (global %)
Afrotropical	139 (16.3)
Australian	56 (6.6)
Malagasy	93 (10.9)
Nearctic	76 (8.9)
Neotropical	174 (20.4)
Oceanian	105 (12.3)
Oriental	277 (32.5)
Palaearctic	25 (2.9)
Panamanian	114 (13.4)
Saharo-Arabian	7 (0.8)
Sino-Japanese	41 (4.8)
Global	853

regions of the world (e.g., Tang *et al.* 2019; Brassard *et al.* 2020; Dong & Kim 2020; Booher & Uhey 2020; Booher 2021; Booher & Hoenle 2021). The Oriental realm includes nearly a third of all species of *Strumigenys* described globally and is thus the most diverse biogeographic realm (Table 1), while the Sino-Japanese realm, which includes most of South China (except Hainan and Yunnan) and Japan, is less diverse with only 41 species recorded to date, but may, nonetheless, represent an important reservoir for new species discovery (Tang *et al.* 2019; Liu *et al.* 2020).

Strumigenys are typically found in the leaf-litter on the forest floor of primary and secondary forests, but may also be found in more open disturbed habitats, in particular for known tramp species (Kitahiro *et al.* 2014; Tang *et al.* 2019). Some species have also been associated with arboreal habitats (Nadkarni & Longino 1990; Lattke *et al.* 2018b) or collected using subterranean baiting traps (Brassard *et al.* 2020). Species of the genus are specialized predators of Collembola and opportunistic predators of other small arthropods (Masuko 1984, 2009a, 2009b), and are characterized by their small sizes (total length typically 1–5 mm), slow motion, the presence of areolate processes on the metasoma, and small colony sizes (Wilson 1959; Terayama *et al.* 2014).

The increased use of methods such as Winkler extractors has shown that *Strumigenys* is one of the most diverse and commonly encountered genera within leaf litter (Fisher 1999). The knowledge of *Strumigenys* within Southeast Asia (SEA) remains, however, limited as illustrated by the recent discoveries of new species and records in various regions such as Hong Kong (Tang *et al.* 2019), Macau (Brassard *et al.* 2020) or Yunnan (Liu *et al.* 2015, 2020). In this study, we use material collected in recent years in southern mainland China, Japan, Taiwan, Thailand, Vietnam as well as historical material collected between the late 1990s to the early 2000s from southern mainland China to provide an updated view of the diversity of *Strumigenys* in the region. As a result, we here present records for 58 species, including 42 new species records, and describe 20 new species (Table 2). We also revise the descriptions of *S. elegantula* (Terayama & Kubota, 1989) and *S. nathistorisoc* Tang *et al.*, 2019, focusing specifically on the dentition of the former species, and on both for their pilosity using newly defined terminologies

Table 2 (continued on next two pages). Species list of *Strumigenys* Smith, 1860 in South China and adjacent countries in the Oriental realm. (+) indicates presence, (-) indicates no record, (N) indicates new record or species from this study, (P) indicates potential presence as discussed in this study, (?) indicates dubious/verification needed. Asterisk (*) indicates known tramp species, caret (^) indicates indoor-introduced species.

Species	Country/Province/Region														Occurrence			
	Cambodia	Fujian	Guangdong	Guangxi	Guizhou	Hainan	Hunan	Hong Kong	Jiangxi	Laos	Macau	Myanmar	Taiwan	Thailand		Yunnan	Vietnam	Zhejiang
<i>S. adiastrata</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. ailaoshana</i> (Xu & Zhou, 2004)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1
<i>S. amnesia</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. anhdaoae</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	1
<i>S. arges</i> (Bolton, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. assamensis</i> De Andrade, 1994	-	-	-	-	-	-	-	-	-	-	-	P	-	-	+	N	-	2
<i>S. atropos</i> (Bolton, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. benten</i> (Terayama <i>et al.</i> , 1996)	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. benulia</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. brontes</i> (Bolton, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. canina</i> (Brown & Boisvert, 1979)	-	P	P	+	-	N	+	+	+	-	+	-	+	-	-	+	+	9
<i>S. caniophanes</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. chuchihensis</i> Lin & Wu, 2001	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	2
<i>S. claviseta</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	1
<i>S. confusatrix</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. crinigera</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	1
<i>S. dayui</i> (Xu, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1
<i>S. decumbens</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	1
<i>S. delicata</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	1
<i>S. densissima</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	1
<i>S. dipsas</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. doherlyi</i> Emery, 1897	P	-	P	+	-	N	-	-	-	P	-	+	-	+	-	+	-	5
<i>S. doriae</i> Emery, 1887	-	-	-	-	-	-	-	-	-	P	-	-	-	+	+	-	-	2
<i>S. doydeei</i> sp. nov.	P	-	-	-	-	-	-	-	-	P	-	-	-	N	N	N	-	3
<i>S. dyschima</i> (Bolton, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
<i>S. elegantula</i> (Terayama & Kubota, 1989)	-	P	?	?	-	-	-	+	-	P	-	-	+	+	-	P	-	3
<i>S. emeswangi</i> (Bolton, 2000)	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. emmae</i> Emery, 1890*	P	-	P	P	-	P	-	+	-	P	+	-	+	N	-	+	-	5
<i>S. exilirhina</i> Bolton, 2000	-	-	+	N	-	N	-	+	+	-	+	-	-	?	+	?	-	7
<i>S. feae</i> Emery, 1895	+	P	P	N	-	N	-	+	-	P	+	+	N	+	+	+	-	10
<i>S. fellowesi</i> sp. nov.	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. formosa</i> (Terayama <i>et al.</i> , 1995)	-	-	P	P	-	N	-	+	-	P	-	-	+	N	N	P	-	5
<i>S. formosimonticola</i> (Terayama <i>et al.</i> , 1996)	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. gnathosphax</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. godeffroyi</i> Mayr, 1866*	P	-	-	-	-	-	-	-	-	P	-	+	+	P	-	+	-	3
<i>S. heteropha</i> Bolton, 2000	-	-	P	P	-	N	-	+	-	-	-	-	-	-	-	N	-	3
<i>S. hexamera</i> (Brown, 1958)*	-	-	P	P	-	N	-	+	-	-	-	-	+	-	-	-	-	3
<i>S. hirashimai</i> (Ogata, 1990)	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. hirsuta</i> Tang <i>et al.</i> , 2019	-	-	P	P	-	N	-	+	-	-	-	-	-	-	-	-	-	2
<i>S. hispida</i> Lin & Wu, 1996	-	P	+	+	+	N	P	P	P	-	-	-	+	-	-	N	-	6
<i>S. incerta</i> (Brown, 1949)	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	2
<i>S. inhonesta</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	1
<i>S. intermedia</i> sp. nov.	-	-	P	-	-	N	-	N	-	-	N	-	-	-	-	-	-	3
<i>S. jacobsoni</i> Menozzi, 1939	P	-	-	-	-	-	-	-	-	-	-	-	-	P	-	N	-	1
<i>S. jaitrongi</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	1
<i>S. japonica</i> Ito, 1914	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	2

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<i>S. jiangxiensis</i> Zhou & Xu, 2003	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	1
<i>S. juliae</i> Forel, 1905	P	-	-	-	-	-	-	-	-	-	-	-	-	N	-	N	-	2
<i>S. kichijo</i> Terayama, Lin & Wu, 1996	-	+	-	-	-	-	+	+	-	-	-	-	+	+	+	+	-	7
<i>S. konteiensis</i> Lin & Wu, 2001	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. kraepelini</i> Forel, 1905	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. kumadori</i> Yoshimura & Onoyama, 2007	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. lachesis</i> (Bolton, 2000)	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. lacunosa</i> Lin & Wu, 1996	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. lantau</i> Tang <i>et al.</i> , 2019	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	1
<i>S. leptorhina</i> Bolton, 2000	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. leptothrix</i> Wheeler, 1929	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	2
<i>S. lewisi</i> Cameron, 1886*	-	+	+	+	+	P	+	-	P	-	-	+	+	-	+	+	+	10
<i>S. lichiaensis</i> Lin & Wu, 1996	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. liukueiensis</i> Terayama & Kubota, 1989	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. liuweii</i> sp. nov.	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. longidens</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	1
<i>S. lyroessa</i> (Roger, 1862)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1
<i>S. mazu</i> (Terayama <i>et al.</i> , 1996)	-	P	P	+	-	-	-	+	-	-	-	-	+	-	-	-	-	3
<i>S. mediocris</i> sp. nov.	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. membranifera</i> Emery, 1869*	P	+	+	P	-	P	-	+	-	P	+	P	+	P	+	N	-	7
<i>S. minutula</i> Terayama & Kubota, 1989^	-	P	P	-	-	N	-	+	-	-	+	-	+	-	-	-	-	4
<i>S. mitis</i> (Brown, 2000)	P	-	+	N	-	N	-	+	-	P	-	P	-	+	+	+	-	7
<i>S. mutica</i> (Brown, 1949)	P	P	P	+	P	N	+	+	P	P	-	-	+	P	+	N	-	7
<i>S. nankunshana</i> (Zhou, 2011)	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. nanzanensis</i> Lin & Wu, 1996	-	P	P	P	-	-	-	+	+	P	-	P	+	+	+	P	-	5
<i>S. nathistorisoc</i> Tang <i>et al.</i> , 2019	-	-	P	N	-	N	-	+	-	-	-	-	-	-	-	-	-	3
<i>S. natynion</i> Bolton, 2000	P	-	-	-	-	-	-	-	-	P	-	P	-	N	-	N	-	2
<i>S. nepalensis</i> De Andrade, 1994*	P	-	P	P	-	N	-	+	-	P	+	P	-	+	+	+	-	6
<i>S. nongba</i> (Xu & Zhou, 2004)	-	-	-	N	P	-	-	-	-	-	-	-	-	-	+	P	-	2
<i>S. nothomopyx</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. nytaxis</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. orchidensis</i> Lin & Wu, 2001	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. paraposta</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	2
<i>S. pilosa</i> Zhou, 2001	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	2
<i>S. rallarhina</i> Bolton, 2000	-	-	N	+	-	N	-	+	-	P	-	-	-	-	+	+	-	6
<i>S. rogeri</i> Emery, 1890*	P	-	-	-	-	-	-	+	-	P	-	-	+	N	-	+	-	4
<i>S. rongi</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	1
<i>S. rotogetys</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. sauteri</i> (Forel, 1912)	P	+	N	+	-	N	+	+	-	P	+	-	+	+	+	N	-	11
<i>S. scolopax</i> (Bolton, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. scutica</i> sp. nov.	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. signeae</i> Forel, 1905	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. sinensis</i> Bolton, 2000	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. solifontis</i> Brown, 1949^	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. stenorhina</i> Bolton, 2000	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. strummeri</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	1

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<i>S. strygax</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	2
<i>S. sublaminata</i> Brown, 1959	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	1
<i>S. subterranea</i> Brassard <i>et al.</i> , 2020	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	1
<i>S. sydorata</i> Bolton, 2000	P	-	P	P	-	N	-	+	-	P	-	-	-	+	+	+	-	5
<i>S. takasago</i> (Terayama <i>et al.</i> , 1995)	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. taphra</i> (Bolton, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	2
<i>S. terayamai</i> (Bolton, 2000)	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. tisiphone</i> Bolton, 2000	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	3
<i>S. trada</i> Lin & Wu, 1996	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	1
<i>S. tritomea</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	2
<i>S. trixodens</i> Bolton, 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	1
<i>S. wilsoniana</i> Baroni Urbani, 2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1
<i>S. xenopilus</i> sp. nov.	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. yamanei</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	1
<i>S. yangi</i> (Xu & Zhou, 2004)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1
<i>S. zanderi</i> sp. nov.	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	1
<i>S. zhenghuii</i> sp. nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	1
Existing species	1	6	9	11	2	0	9	24	4	0	9	4	32	31	24	13	4	
Existing introduced species	0	1	1	0	0	2	0	5	0	0	3	0	4	2	1	3	0	
New records	0	0	2	6	0	23	0	1	0	0	1	0	2	10	4	16	0	
Total	1	6	11	17	2	23	9	25	4	0	10	4	34	41	28	29	4	
Total (including potential records)	15	15	28	26	3	26	10	27	7	18	11	10	34	45	28	32	4	

for seta shapes. In addition, after examination of specimens originating from several populations, *S. formosensis* Forel, 1912 syn. nov. is here considered as a synonym of *S. feae* Emery, 1895. We review the existing *S. leptothrix*-group and create three new species complexes within the group, namely the *elegantula*-complex, *leptothrix*-complex and *zanderi*-complex, based on differences in dentition. We also introduce a new species group, *S. nathistorisoc*-group. The key to *Strumigenys* of East Asia (as *Pyramica*) by Bolton (2000) is partially revised to accommodate new species from these species groups that were described since the publication of the key.

Material and methods

The material examined in this study include 3793 specimens collected 1) throughout Hong Kong between 2014 and 2022, 2) from southern China (Hainan Province), northeastern (Bueng Kan, Kalasin and Sakon Nakhon provinces) and southern (Trang Province) Thailand, and southern Vietnam (Đắk Nông and Đồng Nai provinces) between 2015 and 2019, all by the members of the Insect Biodiversity and Biogeography Laboratory at the University of Hong Kong, 3) specimens lent by the Museo di Storia Naturale Firenze collected from northern Vietnam (Hòa Bình and Vĩnh Phúc provinces) in 2010 and 2013, 4) specimens lent by the Kagoshima University Museum collected from mainland China (Hong Kong, Macau, Yunnan), Japan (Satsunan Islands), Taiwan, Thailand and northern Vietnam (Lào Cai Province) between 1997 and 2020, and 5) historical material collected by Dr John Fellowes in Hong Kong, Guangxi, Guangdong and Hainan provinces of mainland China between 1992 and 2007 and

preserved in the Hong Kong Biodiversity Museum. Sampling methods used primarily include Winkler extractors, pitfall traps and hand collection. Leica DFC450 and Leica DMC5400 cameras mounted on Leica M205 C dissecting microscopes were used to take images. Image montages of the specimens were taken, stacked, enhanced and measured using the Leica Application Suite ver. 4.5 and Leica Application Suite X. To investigate dentition of specimens with fully closed mandibles, additional images were taken under microscope against backlight, by reflecting strong directed light behind specimens. Further photo editing was done using Adobe Photoshop CC.

Morphological measurements and indices follow Tang *et al.* (2019). Measurements are reported in millimeters to the nearest 2 significant figures.

Abbreviations of the measurements

CI	=	Cephalic Index. $HW / HL \times 100$
DPI	=	Dorsal Petiolar Index. $DPW / PL \times 100$
DPW	=	Dorsal Petiolar Width. The maximum width of the petiolar node in dorsal view. Areolate processes (spongiform tissues), if present, are ignored
EL	=	Eye Length. The maximum diameter of the eye
GL	=	Gaster Length. The maximum length of the gaster, measured in the same plane for which the PL measurement is taken (i.e., profile view), from the anterior margin to the posterior margin. Areolate processes (spongiform tissues) and sting, if present, are ignored
HL	=	Head Length. The length of the head capsule excluding the mandibles, measured in full-face view in a straight line from the midpoint of the anterior clypeal margin to the midpoint of the occipital margin. In species where one or both of these margins are concave, the measurement is taken from the midpoint of a transverse line that spans the apices of the projecting portions
HW	=	Head Width. The maximum width of the head in full-face view, excluding the eyes
LPI	=	Lateral Petiolar Index. $PH / PL \times 100$
MandL	=	Mandible Length. The straight-line length of the mandible at full closure, measured in the same plane for which the HL measurement is taken (i.e., full-face view), from the mandibular apex to the anterior clypeal margin, or to the transverse line connecting the anteriormost points when the margin is concave medially
MI	=	Mandibular Index. $MandL / HL \times 100$
ML	=	Mesosoma Length (= Weber's Length). The diagonal length of the mesosoma in profile from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron
OI	=	Ocular Index. $EL / HW \times 100$
PH	=	Petiolar Height. The maximum distance measured between two parallel lines, one tangent with the node apex and the other tangent with the ventralmost point of the petiole in profile. When the ventral margin is concave upward, then the lower line tangent to the uppermost portion of the curve. Areolate processes (spongiform tissues), if present, are ignored
PL	=	Petiolar Length. The maximum length of the petiole from the posterior petiolar margin to the point it is obscured by the posteroventral lobes of the propodeum in profile. Areolate processes (spongiform tissues), if present, are ignored
PPL	=	Postpetiole Length. The maximum length of the postpetiole, measured in the same plane for which the PL measurement is taken (i.e., profile view), from the anterior margin to the posterior margin. Areolate processes (spongiform tissues), if present, are ignored
PW	=	Pronotal Width. The maximum width of the pronotum in dorsal view. Projecting tubercles or other cuticular prominences at the pronotal humeral angles, if present, are ignored
SI	=	Scape Index. $SL / HW \times 100$

- SL = Scape Length. The maximum straight-line length of the scape, excluding the basal constriction or neck that occurs just distal of the condylar bulb. (In species with a hypertrophied subbasal lobe on the scape, SL is measured from the apex of the subbasal lobe to the scape apex.)
- TL = Total Length. The total length from the mandibular apex to the posterior margin of abdominal segment VII. Sum of MandL + HL + ML + PL + PPL + GL

Morphological description take reference from the terminologies established by Bolton (2000) and standardized terminology proposed in Silva & Feitosa (2019), while sculpture definitions follow Harris (1979). Following Lattke *et al.* (2018a), botanical terminologies used to describe leaf shapes are borrowed to describe derived seta shapes of *Strumigenys* more accurately. Terms that were established by Bolton (2000) and some newly borrowed terms (Radford *et al.* 1974) are also used. These terms for describing seta shapes are defined as follow (Fig. 1):

- Acicular – needle-like, long and narrow, without extensive parallel or subparallel sides; appressed and flattened (Fig. 1.6–1.7).
- Claviform – club-shaped; erect or overhanging a margin, not flattened (Fig. 1.25–1.26).
- Elliptic – acute or rounded at both ends, widest part close to the center; appressed and flattened (Fig. 1.9).
- Fine – thread-like, very narrow, apically-acute; appressed (Fig. 1.1).
- Linear – long and narrow, with extensive parallel or subparallel sides, apex acute or rounded, never truncated; appressed (Fig. 1.10).
- Oblanceolate – reversed egg-shaped, the widest part in the apical half; appressed and flattened (Fig. 1.16–1.17).
- Oblong – flattened, with considerable width and extensive parallel or subparallel sides, apex acute or rounded, never truncated; appressed.
- Obovate – broad teardrop-shaped, the widest part close to the apex; appressed and flattened (Fig. 1.18–1.20).
- Orbicular – circular or almost circular; appressed and flattened (Fig. 1.22).
- Ovate – broad reversed teardrop-shaped, the widest part close to the base; appressed and flattened.
- Plank-like – flattened, with considerable width and extensive parallel or subparallel sides, apex truncated; appressed (Fig. 1.4–1.5).
- Remiform – apical portion slightly swollen but not distinctly club-shaped; erect or overhanging a margin, not flattened (Fig. 1.23–1.24).
- Shoehorn-shaped – thickest part at most two times as thick as the narrowest part, narrower than spoon-shaped; overhanging a margin (Fig. 1.27).
- Spoon-shaped – thickest part much more than two times as thick as narrowest part; overhanging a margin (Fig. 1.28).
- Suborbicular – between obovate and orbicular; appressed and flattened (Fig. 1.21).
- Subspatulate – wedge-shaped, the widest part close to the apex, with straight sides; appressed and flattened (Fig. 1.12–1.13).
- Spatulate – flattened spoon-like, the widest part close to the apex, tapered towards the base, without straight sides; appressed (Fig. 1.14–1.15).
- Stout and truncated – flattened rod-shaped, apex truncated; appressed (Fig. 1.2–1.3).

The term ‘spatulate’ has been widely used in previous publications to loosely refer to appressed flattened setae that would be classified as acicular, elliptic, plank-like, stout and truncated, linear, oblong, subspatulate, spatulate, oblanceolate, obovate or ovate setae using the new definitions. We proposed to use the term ‘spatulatiform’ in the future when broadly referring to flattened setae. The term ‘spatulate’ in previous publications should not be treated as equivalent to the same term in this work without prior verification.

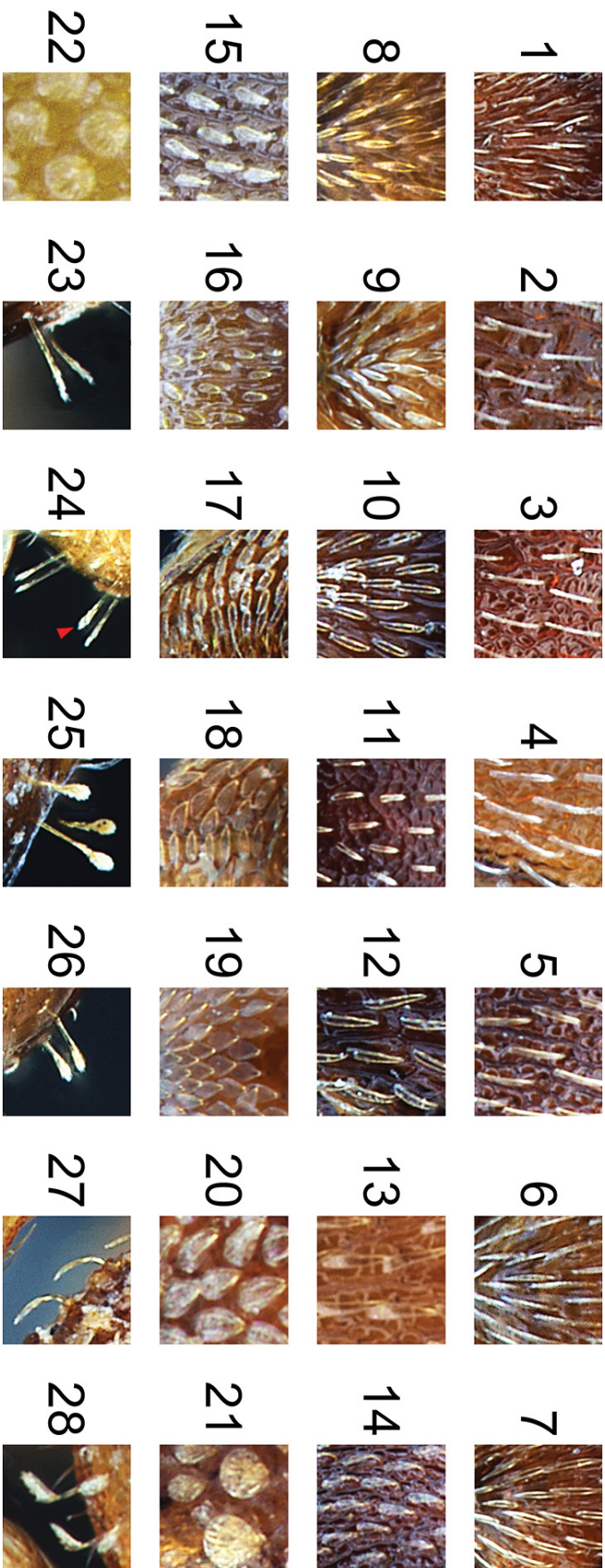


Fig. 1. Seta shape terminologies. **1.** Fine. **2–3.** Stout and truncated. **4–5.** Plank-like. **6–7.** Acicular. **8.** Narrowly elliptic. **9.** Elliptic. **10.** Linear. **11.** Short linear or short spatulate. **12–13.** Subspatulate. **14–15.** Spatulate. **16–17.** Oblanceolate. **18–19.** Small obovate. **20.** Large obovate. **21.** Suborbicular / orbicular. **22.** Orbicular. **23.** Reniform. **24.** Reniform / narrowly claviform (red arrow). **25–26.** Claviform. **27.** Shoehorn-shaped. **28.** Spoon-shaped.

Institutional abbreviations

HKBM	=	Hong Kong Biodiversity Museum, University of Hong Kong, Hong Kong SAR
IBBL	=	Insect Biodiversity and Biogeography Laboratory, University of Hong Kong, Hong Kong SAR
KUM	=	Kagoshima University Museum, Kagoshima University, Kagoshima, Japan
LKCNHM	=	Lee Kong Chian Natural History Museum, National University of Singapore, Singapore
MSNF	=	Museo di Storia Naturale Firenze, Università degli Studi di Firenze, Florence, Italy
NMNS	=	National Museum of Natural Science, Taichung, Taiwan
SWFC	=	Faculty of Conservation Biology, Southwest Forestry College, Kunming, Yunnan, mainland China

Results***Descriptions of species***

Class Insecta Linnaeus, 1758

Order Hymenoptera Linnaeus, 1758

Family Formicidae Latreille, 1809

Subfamily Myrmicinae Lepeletier de Saint-Fargeau, 1835

Genus *Strumigenys* Smith, 1860

After inspecting specimens of some of the species from Southeast Asia in the *Strumigenys leptothrix*-group, which was introduced by Bolton (2000), we found that they have several distinctive dentition patterns. Considering this, we introduce three new species complexes within the group, namely the *elegantula*-complex, *leptothrix*-complex and *zanderi*-complex, to accommodate these species, some of which have previously been described while others are firstly described in this study. We also introduce the *Strumigenys nathistorisoc*-group to accommodate the species described in Tang *et al.* (2019), which also shares some morphological similarities with the above species group. Worker diagnoses of the newly introduced species group and species complexes are provided below, adopting the format established by Bolton (2000). We urge other species considered to be a member of the *S. leptothrix*-group to be examined for their dentitions as we were unable to do so in this study. A full species group review is recommended to properly evaluate if the differences in dentitions between species of the *S. leptothrix*-group should lead to a splitting of the species group into several smaller species groups. Below, species with their designation confirmed will be listed separately from those that are uncertain.

We also raise caution concerning species having mandibles with the masticatory margins engaging across their entire length (i.e., without diastema or a gap between mandibles), that the determination of the dentition may be challenging without specimens in the appropriate conditions (opened mandibles and/or appressed setae along the inner margins of mandible abraded or absent). Depending solely on specimens with fully-closed mandibles and complete mandibular pilosity is prone to misidentification. For verification of species group designations, it is recommended to use specimens with clearly visible dentition. The technique used by Booher *et al.* (2021) to soften the specimen and manipulate its mandibles may also be helpful when specimens available are abundant. For species identification, when the dentition is not fully visible and the aforementioned technique is not applicable, it may be necessary to rely upon other morphological characters, and species from different species complexes (*elegantula*-complex, *leptothrix*-complex and *zanderi*-complex) should be considered in conjunction as candidates.

Strumigenys leptothrix-group

Species

Oriental and Sino-Japanese realms

- *Strumigenys ailaoshana* (Xu & Zhou, 2004)
- *Strumigenys alecto* (Bolton, 2000)
- *Strumigenys assamensis* De Andrade, 1994
- *Strumigenys benten* (Terayama *et al.*, 1996)
- *Strumigenys calvus* Dong & Kim, 2020
- *Strumigenys decumbens* sp. nov.
- *Strumigenys delicata* sp. nov.
- *Strumigenys densissima* sp. nov.
- *Strumigenys doydeei* sp. nov.
- *Strumigenys elegantula* (Terayama & Kubota, 1989)
- *Strumigenys euryale* (Bolton, 2000)
- *Strumigenys formosimonticola* (Terayama *et al.*, 1996)
- *Strumigenys intermedia* sp. nov.
- *Strumigenys jacobsoni* Menozzi, 1939
- *Strumigenys japonica* Ito, 1914
- *Strumigenys leptothrix* Wheeler, 1929
- *Strumigenys medusa* (Bolton, 2000)
- *Strumigenys megaera* (Bolton, 2000)
- *Strumigenys nankunshana* (Zhou, 2011)
- *Strumigenys rongi* sp. nov.
- *Strumigenys rudinodis* Stärcke, 1941
- *Strumigenys scolopax* (Bolton, 2000)
- *Strumigenys scylla* (Bolton, 2000)
- *Strumigenys stheno* (Bolton, 2000)
- *Strumigenys strummeri* sp. nov.
- *Strumigenys yamanei* sp. nov.
- *Strumigenys zanderi* sp. nov.
- *Strumigenys zhenghuii* sp. nov.

Comments

When the *Strumigenys leptothrix*-group was first introduced by Bolton (2000), only the Malagasy species were grouped into species complexes (*exiguaevitae*-complex and *khakaura*-complex). Worker diagnoses were also written primarily based on these species and their dentition patterns were described in detail. However, the phylogenetic analysis by Booher *et al.* (2021) revealed that the Malagasy species are not closely related to the Asian species of the group. Hence, we urge that a separate species group be created for the Malagasy species and the worker diagnosis of *S. leptothrix*-group be revised based on the remaining Asian species.

After a careful examination of the dentition of specimens with opened mandibles, it is determined that the existing Asian species in the *Strumigenys leptothrix*-group show more than one dentition pattern. *Strumigenys leptothrix* and several other species (*S. alecto*, *S. benten*, *S. calvus* and *S. formosimonticola*) share dentitions similar to that of the distantly-related Malagasy species, while some other species (*S. elegantula* and *S. jacobsoni*) have alternating short triangular teeth and long spiniform teeth as their principal dental row (Fig. 2A–D). In addition, *S. zanderi* sp. nov. and *S. strummeri* sp. nov. further show the third dentition pattern within the group, with alternating triangular and rounded teeth. Here, we introduce three new species complexes for the Asian species of the group based on their dentition patterns. Some of the existing species cannot be confidently placed within a particular species complex

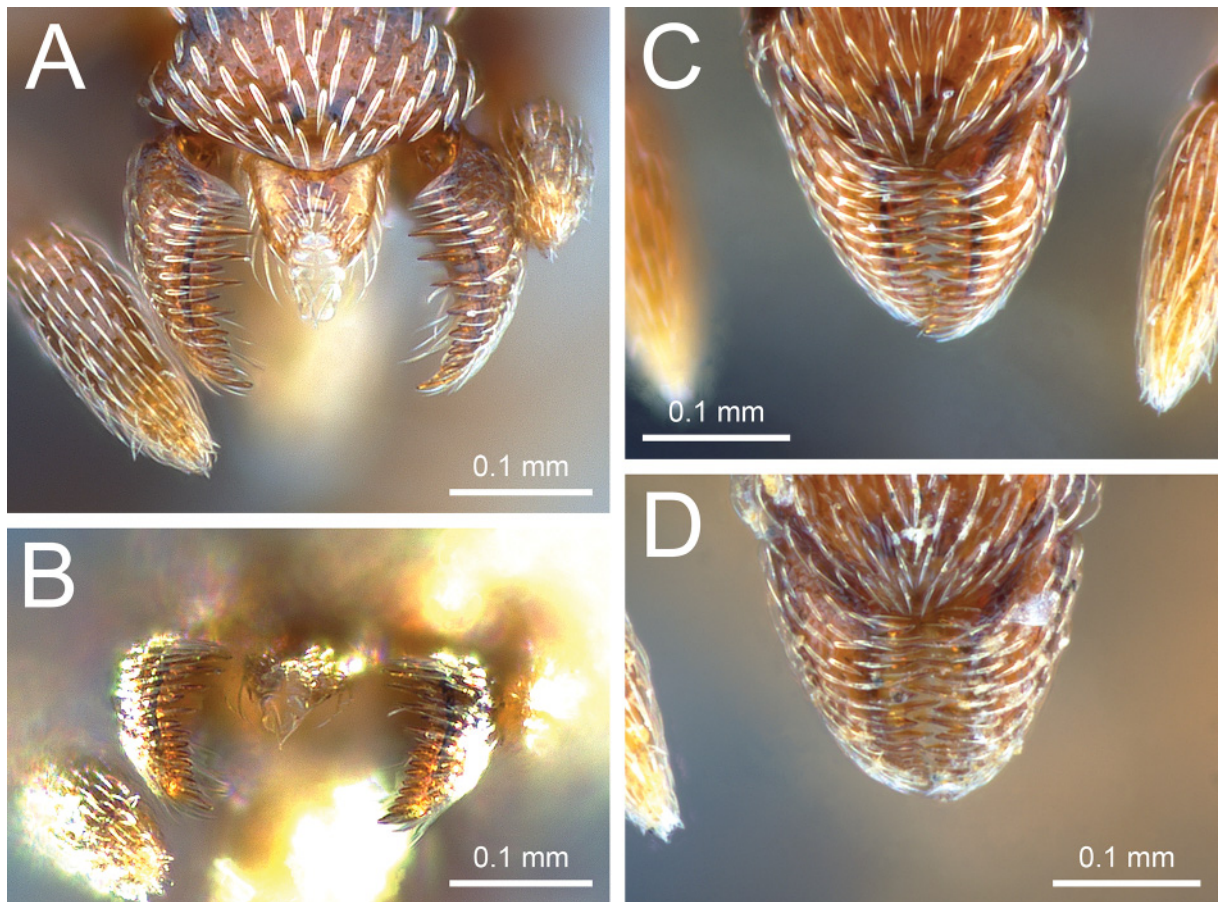


Fig. 2. Mandible close-ups of workers from the *elegantula*-complex in the *Strumigenys leptothrix*-group. **A–B.** *S. intermedia* sp. nov. (TT01353). **C.** *S. elegantula* (Terayama & Kubota, 1989) from Hong Kong (RHL00290). **D.** *S. jacobsoni* Menozzi, 1939 from Vietnam (ANTWEB1011973).

as their dentitions cannot be unambiguously determined based on available specimens, specimen photos or recent publications. These species should be checked for their dentitions in the future. Ultimately, a full species group revision is recommended.

This group shares a superficial resemblance with the *S. nathistorisoc*-group and *S. kichijo*-group, such as short and triangular mandibles, relatively elongated head ($CI < 85$) with well-developed occipital corners, and large eyes ($OI > 10$). It can be differentiated from the other groups by the combination of mandibles with the masticatory margins engaging throughout its length and its dentition. A gap between mandibles is present in the *S. nathistorisoc*- and *S. kichijo*-groups.

Placement uncertain

- *Strumigenys euryale* (Bolton, 2000)
- *Strumigenys japonica* Ito, 1914
- *Strumigenys medusa* (Bolton, 2000)
- *Strumigenys megaera* (Bolton, 2000)
- *Strumigenys rudinodis* Stärccke, 1941
- *Strumigenys scolopax* (Bolton, 2000)
- *Strumigenys scylla* (Bolton, 2000)
- *Strumigenys stheno* (Bolton, 2000)

elegantula-complex

- *Strumigenys decumbens* sp. nov.
- *Strumigenys densissima* sp. nov.
- *Strumigenys doydeei* sp. nov.
- *Strumigenys elegantula* (Terayama & Kubota, 1989)
- *Strumigenys intermedia* sp. nov.
- *Strumigenys jacobsoni* Menozzi, 1939

Provisional members

- *Strumigenys ailaoshana* (Xu & Zhou, 2004)
- *Strumigenys delicata* sp. nov.
- *Strumigenys nankunshana* (Zhou, 2011)
- *Strumigenys zhenghuii* sp. nov.

Principal dental row with eight alternating short triangular and long spiniiform teeth (i.e., four consecutive pairs of teeth, each pair consisting of a short tooth followed by a long tooth), the second and the third pairs subequal in size and longer than the other pairs (short tooth of one pair compares with short tooth of another pair only, same for the long tooth); followed by 3–4 small teeth and, at the down curvature in anterior view, a series of four minute denticles, terminating in a small apical tooth (Fig. 2). Total dental count of 16–17.

leptothrix-complex

- *Strumigenys alecto* (Bolton, 2000)
- *Strumigenys benten* (Terayama *et al.*, 1996)
- *Strumigenys calvus* Dong & Kim, 2020
- *Strumigenys formosimonticola* (Terayama *et al.*, 1996)
- *Strumigenys leptothrix* Wheeler, 1929

Provisional members

- *Strumigenys assamensis* De Andrade, 1994
- *Strumigenys rongi* sp. nov.
- *Strumigenys yamanei* sp. nov.

Principal dental row with seven teeth, the first, second and third teeth gradually increase in size, the third tooth the longest on the margin, the fourth tooth about the same size as the second tooth, the fifth tooth slightly longer than the fourth tooth, the six and seventh teeth smaller and about the same size as the first tooth; followed by two small teeth and, at the down curvature in anterior view, a series of four minute denticles, terminating in a small apical tooth. Total dental count of 14.

zanderi-complex

- *Strumigenys strummeri* sp. nov.
- *Strumigenys zanderi* sp. nov.

Principal dental row with an elongated-triangular tooth, followed by six alternating elongated-triangular teeth and rounded teeth; the second, fourth and sixth tooth elongated-triangular, longer than the first tooth and neighboring rounded teeth; the third, fifth and seventh teeth broad and rounded; apex of mandible at the down curvature, in anterior view, with an elongated-triangular small tooth, followed by a crowded series of six minute denticles, terminating in a small conical apical tooth. Total dental count of 15.

***Strumigenys nathistorisoc*-group**

Species

Oriental and Sino-Japanese realms

- *Strumigenys nathistorisoc* Tang *et al.*, 2019

Comments

The *Strumigenys nathistorisoc*-group currently contains a single member found in the Oriental and Sino-Japanese realms. One undescribed species from Guangdong province of mainland China (specimens have previously been examined by us) also shares the characteristic dentition and likely belong to the same species group.

This group shares superficial resemblance with the *S. leptothrix*-group and *S. kichijo*-group, such as short and triangular mandibles, relatively elongated head ($CI < 85$) with well-developed occipital corners, and large eyes ($OI > 10$). It can be easily differentiated from the other groups by the combination of a prominent gap between the mandibles at the basal half and its unique dentition of seven alternating long tapered teeth and reduced low and rounded teeth. A conspicuous gap between mandibles is absent in *S. leptothrix*-group, while *S. kichijo*-group's principal dental row is consistently triangular to elongated-triangular throughout the mandible, not alternating between two different tooth shapes.

Worker diagnosis

MANDIBLE. In full-face view, and at full closure short and elongated-triangular, MI 30–34; in profile view, robust with apical half enlarged and curving downwards; masticatory margins engaged only at apical half of their lengths, basal half with prominent gap between mandibles. Basal lamellae low and broadly triangular, not fully visible at full closure; trap-jaw mechanism most likely absent.

DENTITION. Principal dental row with seven alternating long tapered teeth and reduced low and rounded teeth, four basalmost teeth separated by basal gap between mandibles and following three teeth fully engaging their counterparts from opposing mandible with mandibles at full closure; diastema present between basal lamella and first tooth; first tooth small and triangular, follows by reduced tooth or small denticle, third tooth tapered and larger, fourth tooth reduced, low and rounded, fifth and seventh teeth both tapered, subequal in size and largest among all teeth, sixth tooth reduced, low and rounded, almost squircle in shape and larger than third tooth; apex of mandible at down curvature, in anterior view, with crowded series of around 10–11 minute denticles, terminating in small conical apical tooth. Total dental count of 18–19.

HEAD. Anterior clypeal margin broadly convex. Preocular carina conspicuous in full-face view; occipital carina present. Ventrolateral margin of head between eye and mandible usually marginate; postbuccal impression small.

ANTENNA. Scape short to moderate, SI 68–74, subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge.

MESOSOMA. In profile view, propodeal spines usually present; propodeal lamella may be present on declivity.

METASOMA. In profile view, petiole elongate and subclavate; petiolar peduncle may grade evenly into node, or node may have differentiated anterior face. Areolate processes (spongiform tissues) of metasoma well developed.

PILOSITY. Clypeal and mandibular dorsum usually with small appressed setae; upper scrobe margins, lateral and anterior clypeal margins usually with decumbent setae; leading edge of scape usually with

appressed to decumbent apically-directed setae. Hairwheel present at mesopleural excavation. Pilosity of head and body variable; in dorsal view, lateral margins of mesosoma usually with posteriorly-directed decumbent setae.

SCULPTURE. Basigastral costulae usually short, no more than one fourth in length of first gastral tergite.

Strumigenys ailaoshana (Xu & Zhou, 2004)

Table 2

Pyramica ailaoshana Xu & Zhou, 2004: 445, figs 19–20 (w.q.) CHINA (Yunnan). Indomalaya.

Strumigenys ailaoshana – Baroni Urbani & De Andrade 2007: 115.

Geographic range

Mainland China (Yunnan).

Comments

Based on photos of the holotype of the species (SWFC No. A1037), which has semi-opened mandibles, its dentition likely consists of alternating short triangular and long spiniform teeth, hence an indication that it is likely a member of the *elegantula*-complex in the *S. leptothrix*-group. Nonetheless, a direct verification on the specimens with fully-opened mandibles is still recommended.

Specimens CASENT0715042, CASENT0715043, CASENT0715044, CASENT0715045 from Xishuangbanna, Yunnan that were previously reported as *S. ailaoshana* on AntWeb are now re-identified as *S. doydeei* sp. nov. instead.

Strumigenys amnesia Bolton, 2000

Strumigenys amnesia Bolton, 2000: 838 (w.) WEST MALAYSIA. Indomalaya.

Material examined

THAILAND – **Trang Province** • 2 workers; Khao Chong; 7.54401° N, 99.80087° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 22 workers, 3 queens; Khao Chong; 7.54525° N, 99.79203° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 24 workers, 1 queen; same collection data as for preceding.

Measurements

Workers

TL 2.3–2.5, HL 0.62–0.66, HW 0.54–0.59, MandL 0.28–0.31, SL 0.34–0.38, EL 0.046–0.055, PW 0.24–0.28, ML 0.56–0.61, PL 0.22–0.26, PH 0.10–0.13, DPW 0.10–0.11, PPL 0.11–0.15, GL 0.49–0.54, CI 86–89, MI 45–47, SI 61–65, OI 8–10, LPI 47–50, DPI 40–47 (n=6).

Queens

TL 2.7, HL 0.63–0.66, HW 0.59–0.61, MandL 0.29–0.30, SL 0.34–0.37, EL 0.097–0.109, PW 0.31–0.33, ML 0.68–0.70, PL 0.27–0.28, PH 0.12–0.13, DPW 0.15, PPL 0.13–0.14, GL 0.64–0.67, CI 92–95, MI 43–46, SI 57–60, OI 16–18, LPI 43–47, DPI 53–57 (n=3).

Geographic range

Indonesia (Sumatra), Malaysia (Peninsular), Thailand (Trang).

Ecology

Collected in primary and old secondary forests.

Comments

Bolton (2000) noted that workers from Thailand and Sumatra (HL 0.64–0.69, MandL 0.28–0.33, SL 0.35–0.39) were slightly smaller than the type specimens from Malaysia (HL 0.72–0.76, MandL 0.34–0.36, SL 0.42–0.44). The workers from Thailand we measured (HL 0.63–0.66, MandL 0.29–0.30, SL 0.34–0.37) also had morphological measurements that fell within the typical range reported by Bolton.

Strumigenys anhdaoae sp. nov.

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Figs 3–4; Tables 2–3

Diagnosis

Strumigenys anhdaoae sp. nov. can be distinguished from other species in the *S. koningsbergeri*-group by a combination of the following characters: preapical tooth extremely reduced; in profile view, erect seta absent on pronotal dorsum; pronotal humeral seta present; side of propodeum densely areolate to areolate-rugulose; propodeal spines subtended by broad lamella; without visible femoral gland on hind leg in workers; HL 0.65–0.69, SI 50–56.

Etymology

The species is named after Dr Thi Anh Dao Tran, whose tremendous help and warm welcome during one of our journeys to Vietnam was invaluable and has led to the discovery of the species. The name was created by adding the singular Latin genitive case suffix -ae to the given name of a female person.

Type material

Holotype worker (Fig. 3)

VIETNAM • Đắk Nông Province, Nam Nung Reserve, Site 73; 12.23113° N, 107.83153° E; 907 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; mature forest; LKCNHM ANTWEB1011855 (collection code IBBL NN-S73-sp21).

Paratype workers

VIETNAM • 10 workers; same collection data as for holotype; HKBM ANTWEB1011857 to ANTWEB1011865, ANTWEB1011856 (collection code IBBL NN-S73-sp21).

Paratype queens (Fig. 4)

VIETNAM • 2 dealate queens; same collection data as for holotype; IBBL ANTWEB1011854, ANTWEB1011866 (collection code IBBL NN-S73-sp21).

Additional material examined

VIETNAM – **Đắk Nông Province** • 13 workers, 1 queen; Nam Nung Reserve; 12.20462° N, 107.75243° E; 885 m a.s.l.; 9 Jun. 2018; IBBL members legs.; Winkler; IBBL ANTWEB1011870 • 5 workers; Nam Nung Reserve; 12.19073° N, 107.75925° E; 883 m a.s.l.; 9 Jun. 2018; IBBL members legs.; Winkler; IBBL ANTWEB1011871 • 1 worker; Nam Nung Reserve; 12.18893° N, 107.76046° E; 890 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; same collection data as for preceding • 27 workers, 2 queens; Nam Nung Reserve; 12.18737° N, 107.76132° E; 888 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 8 workers; same collection data as for preceding • 1 worker; Nam Nung Reserve; 12.20555° N, 107.75305° E; 886 m a.s.l.; 9 Jun. 2018; IBBL members

leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.20579° N, 107.75476° E; 882 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 39 workers; Nam Nung Reserve; 12.19245° N, 107.75954° E; 892 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.16998° N, 107.7696° E; 897 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 2 workers; Nam Nung Reserve; 12.22927° N, 107.83662° E; 805 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 4 workers; Nam Nung Reserve; 12.23077° N, 107.83045° E; 911 m a.s.l.; 12 Jun. 2018; IBBL members legs.; Winkler; IBBL ANTWEB1011867 • 1 worker; same collection data as for preceding; IBBL ANTWEB1011868 • 15 workers, 1 queen; Nam Nung Reserve; 12.23113° N, 107.83153° E; 907 m a.s.l.; 12 Jun. 2018; IBBL members legs.; Winkler; IBBL ANTWEB1011869.

Measurements

Holotype worker

TL 2.6, HL 0.69, HW 0.62, MandL 0.31, SL 0.34, EL 0.054, PW 0.30, ML 0.65, PL 0.26, PH 0.13, DPW 0.12, PPL 0.12, GL 0.59, CI 91, MI 45, SI 55, OI 9, LPI 50, DPI 45.

Paratype workers

TL 2.4–2.6, HL 0.65–0.68, HW 0.58–0.61, MandL 0.30–0.31, SL 0.30–0.34, EL 0.048–0.057, PW 0.26–0.29, ML 0.59–0.64, PL 0.23–0.28, PH 0.11–0.13, DPW 0.10–0.13, PPL 0.11–0.17, GL 0.51–0.58, CI 87–93, MI 44–48, SI 50–56, OI 8–10, LPI 43–51, DPI 41–49 (n=10).

Paratype queens

TL 2.8–3.0, HL 0.67–0.69, HW 0.63–0.65, MandL 0.31–0.33, SL 0.32–0.35, EL 0.106–0.113, PW 0.36–0.38, ML 0.75–0.77, PL 0.29–0.31, PH 0.14–0.15, DPW 0.13–0.15, PPL 0.11–0.13, GL 0.69–0.76, CI 94, MI 47–48, SI 51–54, OI 16–18, LPI 47–50, DPI 46–48 (n=2).

Worker description

HEAD. In full-face view, occipital margin deeply, evenly concave; occipital corners well developed, forming continuous contour with lateral margin of occipital lobe, not angular; anterior clypeal margin

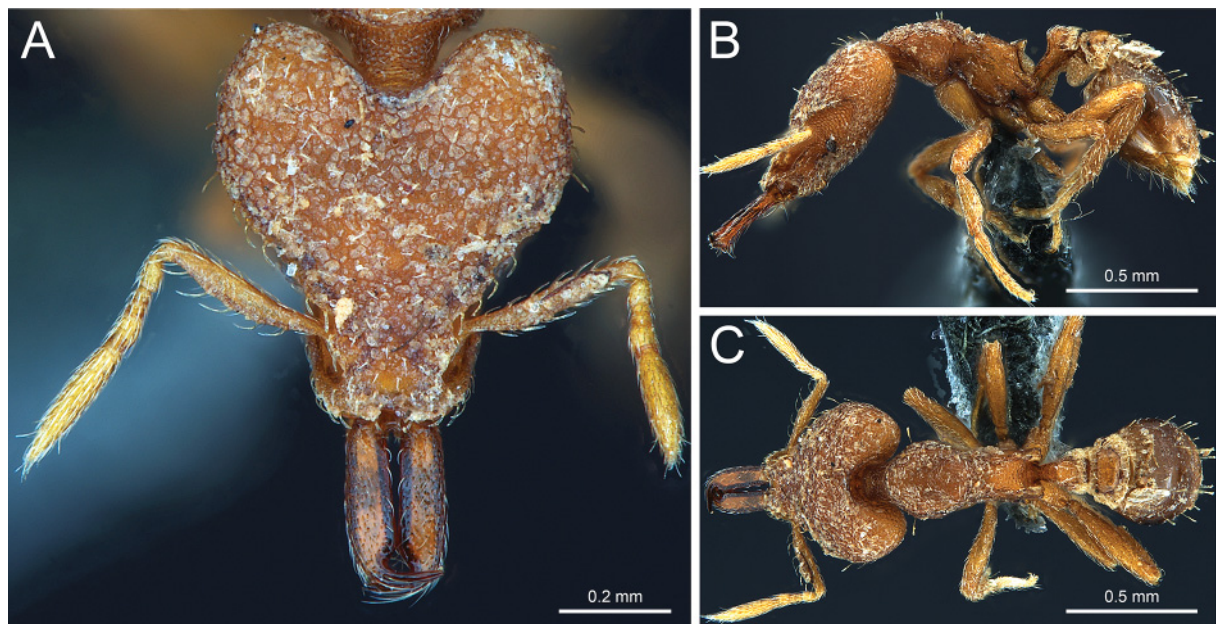


Fig. 3. Holotype worker (ANTWEB1011855) of *Strumigenys anhdaoae* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

broadly concave. Mandible with mostly straight outer margin; inner margin also mostly straight, subparallel to outer margin (slightly diverging), with distal one-fifth to one-quarter of mandible strongly concave with respect to previous line; extremely reduced preapical tooth (or rather remnant of one) present, which is merely small bulge from contour of mandible, located at proximal end of concave portion of inner margin (Fig. 4B). Antennal scape subcylindrical; apical antennomere not constricted basally. In profile view, transverse impression across vertex weakly developed; ventrolateral margin of head in front of eye deeply concave; eye with four ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum broadly convex, with slight depression at mesonotum; pronotum weakly margined dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal teeth triangular, armed at slightly upward angle, subtended on each side by broad lamella with concave posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well-developed. Femoral gland not visible in dorsal view.

METASOMA. In profile view, petiolar node high; petiolar peduncle not grading evenly into node, and slightly longer than node, around 1.1–1.2 times as long; petiolar node with differentiated anterior face. In dorsal view, petiolar node broader than long, around 1.3–1.5 times as long; disc of postpetiole broader than long, around two times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile and just reaching midpoint of node; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along posterior margin than on lateral and anterior margins.

PILOSITY. In full-face view, cephalic and clypeal dorsum sparsely with appressed, apically-acute setae pointed in random directions; mandibular dorsum with appressed short fine setae. Surface of scape covered with appressed setae; progressively finer setae densely covering funiculus. Lateral margin of occipital lobe, upper scrobe margin, lateral and anterior clypeal margins with decumbent shoehorn-shaped to narrowly spoon-shaped setae; leading edge of scape with similar, apically-directed setae.

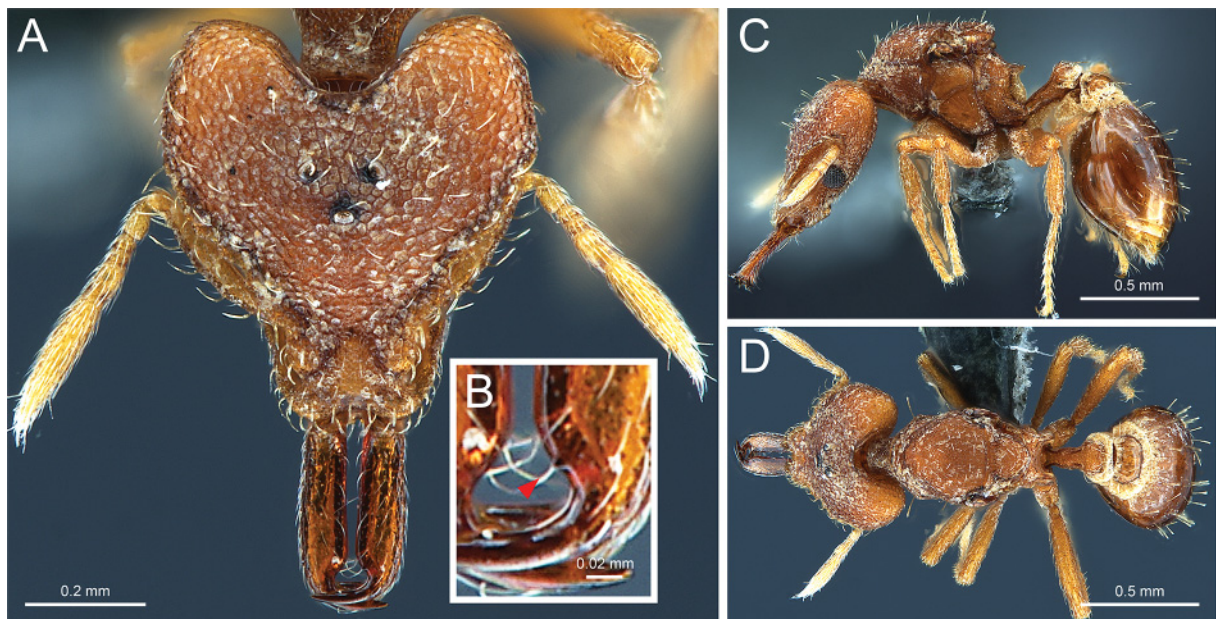


Fig. 4. Paratype queen (ANTWEB1011854) of *Strumigenys anhdaoae* sp. nov. **A.** Full-face view. **B.** Reduced preapical tooth (red arrow) close-up in full-face view. **C.** Profile view. **D.** Dorsal view.

Apicoscrobial seta short, stout, slightly curved to straight, slightly longer than other setae on upper scrobe margin. In dorsal view, dorsum of promesonotum and petiolar node sparsely covered with short, apically-acute appressed setae. Pronotal humeral seta weakly remiform and very slightly curved. In profile view, stout to weakly remiform erect setae present as single row of four setae along occipital margin (slightly curved), on mesonotal dorsum in a pair, and sparsely across gastral tergites; similar but decumbent setae present on disc of postpetiole in a pair; setae on gaster markedly longer than those on other parts of body; ventral surface of head with decumbent setae; gastral sternites densely with fine suberect to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of femora, tibiae and basitarsi with short, apically-acute appressed setae only.

SCULPTURE. Surface of head (including antennal scrobe), antennae, mesosoma, legs and petiole densely areolate to areolate-rugulose, except for katapisternum, which is mostly smooth and shining with vestiges of sculpture around margins. Mandibles with sparse weak punctate sculpture and weakly areolate basally, but otherwise mostly smooth. Disc of postpetiole mostly smooth and shining. Basigastral costulae short, around one fourth in length of first gastral tergite; rest of gaster smooth and shining.

Queen description

Similar in all points to the worker caste except for the reproductive caste morphological characters (presence of 3 ocelli, enlarged eyes and thorax), and the following: in profile view, promesonotal dorsum with numerous setae, a mix of simple, stout and weakly remiform in forms, ranging from decumbent, suberect to erect; anepisternum mostly smooth; femoral glands visible on all legs in dorsal view, small; petiolar peduncle does not grade evenly into node but anterior face of petiolar node much less distinctive than in worker caste.

Comments

Strumigenys anhdaoae sp. nov. is a member of the *koningsbergeri*-complex in the *S. koningsbergeri*-group and shares all its characters (Bolton 2000). It does not belong to the *ebbae*-complex as the preapical tooth is absent, and the remnant of the tooth is not at a right-angle to the long axis of the mandible.

Strumigenys anhdaoae sp. nov. can be distinguished from all other members of the *koningsbergeri*-complex by its extremely reduced preapical tooth, which is even smaller than a denticle; this remnant of the preapical tooth is merely a small bulge along the contour of the mandible, and is only observable under high-magnification.

Aside from *Strumigenys anhdaoae* sp. nov., there are nine other species in the *koningsbergeri*-complex (*S. amasara* Bolton, 2000, *S. blanda* Bolton, 2000, *S. ignota* Bolton, 2000, *S. koningsbergeri* Forel, 1905, *S. offina* Bolton, 2000, *S. perturba* Bolton, 2000, *S. seynoka* Bolton, 2000, *S. strygax* Bolton, 2000 and *S. vertigosa* Bolton, 2000) that also lack erect setae on the pronotal dorsum in profile (Table 3). *Strumigenys anhdaoae* lacks a visible femoral gland on the hind leg in workers (unlike *S. amasara*, *S. ignota*, *S. perturba* or *S. seynoka*); a pronotal humeral seta is present (unlike *S. offina*); the side of the propodeum is densely areolate to areolate-rugulose (instead of entirely unsculptured as in *S. koningsbergeri* or *S. strygax*); the propodeal lamellae are broad (instead of narrow as in *S. blanda* or *S. vertigosa*). *Strumigenys anhdaoae* does not have the characteristic head shape of *S. koningsbergeri*. It is also a smaller species (HL 0.65–0.69, HW 0.58–0.62) than *S. blanda* (HL 0.82–0.96, HW 0.70–0.82) or *S. perturba* (HL 0.81–0.91, HW 0.69–0.78), and has a relatively shorter scape (SI 50–56) than *S. vertigosa* (SI 65–69).

Geographic range

Vietnam (Đắk Nông).

Ecology

Collected in secondary and mature forest, and rarely in rubber plantation at elevations from 805 to 911 m.

Table 3. Diagnostic characters of *Strumigenys anhdaoae* sp. nov. in comparison with species from the *koningsbergeri*-complex of the *S. koningsbergeri*-group. Values indicate the presence (1) or absence (0) of a character.

Species	Characters						
	Transverse impression across vertex weakly developed	Preapical tooth extremely reduced	Pronotum lacks erect hair other than humeral hair	Pronotal humeral hair presents	Propodeal declivity with broad lamella	Side of propodeum fully sculptured	Femur femoral gland not visible on hind leg
<i>S. anhdaoae</i> sp. nov.	1	1	1	1	1	1	1
<i>S. amasara</i> Bolton, 2000	1	0	1	1	1	1	0
<i>S. amnesia</i> Bolton, 2000	1	0	0	1	0	1	1
<i>S. ataxia</i> Bolton, 2000	1	0	0	1	0	1	1
<i>S. blanda</i> Bolton, 2000	1	0	1	1	0	1	1
<i>S. chorosa</i> Bolton, 2000	1	0	0	1	1	1	1
<i>S. hyletha</i> Bolton, 2000	1	0	0	1	0	1	1
<i>S. ignota</i> Bolton, 2000	1	0	1	1	1	1	0
<i>S. koningsbergeri</i> Forel, 1905	0	0	1	1	1	0	1
<i>S. nergala</i> Bolton, 2000	1	0	0	1	1	1	1
<i>S. offina</i> Bolton, 2000	1	0	1	0	1	1	1
<i>S. perturba</i> Bolton, 2000	1	0	1	1	1	1	0
<i>S. seynoka</i> Bolton, 2000	1	0	1	1	1	1	0
<i>S. strygax</i> Bolton, 2000	1	0	1	1	1	0	1
<i>S. taraxis</i> Bolton, 2000	1	0	0	1	0	1	1
<i>S. vertigosa</i> Bolton, 2000	1	0	1	1	0	1	1

Strumigenys assamensis De Andrade, 1994
Fig. 5A–C; Table 2

Strumigenys assamensis De Andrade, 1994: 61, figs 35–36 (w.) INDIA. Indomalaya.

Smithistruma assamensis – Bolton 1995: 384.

Pyramica assamensis – Bolton 1999: 1673.

Strumigenys assamensis – Baroni Urbani & De Andrade 2007: 115.

Material examined

VIETNAM – **Hòa Bình Province** • 12 workers; Pa Co Hang Kia Nature Reserve; 900–1200 m a.s.l.; 9–12 Jun. 2013; L. Bartolozzi, S. Bambi, F. Cianferoni, G. Mazza and E. Orbach leg.; MSNF LSF1694 (“La Specola” Firenze Hymenoptera collection 1694).

Geographic range

Mainland China (Yunnan), India (Arunachal Pradesh, Meghalaya), Vietnam (Hòa Bình).

New record for Vietnam.

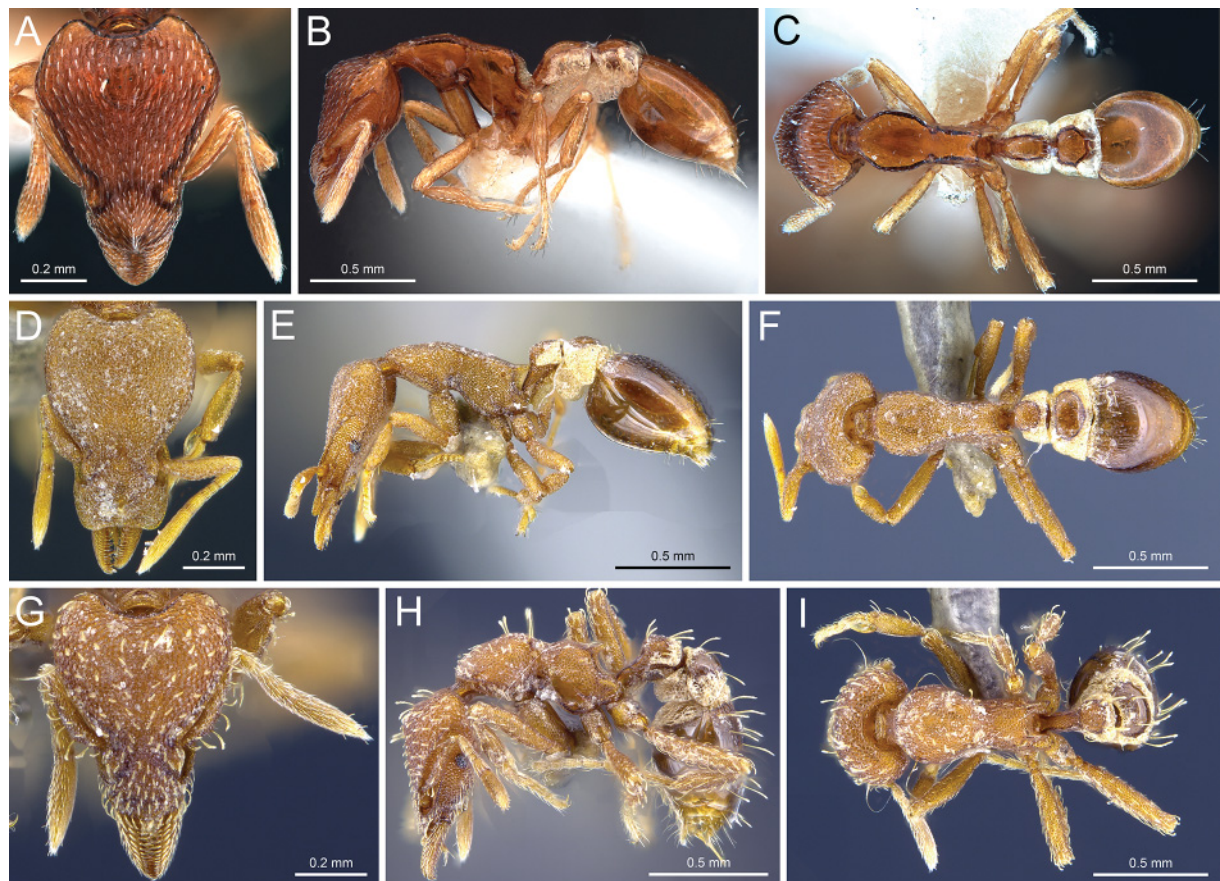


Fig. 5. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. A–C. Worker of *S. assamensis* De Andrade, 1994 from Vietnam (LSF1694). D–F. Worker of *S. canina* (Brown & Boisvert, 1979) from Hainan, mainland China (HNA-00095). G–I. Worker of *S. dohertyi* Emery, 1897 from Hainan, mainland China (HNA-0067).

Ecology

Collected at elevations from 900 to 1200 m.

Comments

The record of *S. assamensis* in northern Vietnam extends its native range south-eastward. Its presence in the states Assam and Nagaland in India and northern Myanmar is likely.

Following the revision of the *Strumigenys leptothrix*-group and the introduction of the species complexes within the group, *S. assamensis* likely belongs to the *leptothrix*-complex, but a formal assessment using specimens of opened mandibles is still recommended. All specimens in our hands have fully closed mandibles. Placing specimens against backlight suggests the observation of a principal dental row of around 7 teeth, followed by a series of small teeth and denticles, terminating in a small apical tooth.

Strumigenys benulia Bolton, 2000

Strumigenys benulia Bolton, 2000: 754 (w.) THAILAND. Indomalaya.

Material examined

THAILAND – **Sakon Nakhon Province** • 1 queen; 17.13524° N, 103.9944° E; 530 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Measurements

Queen

TL 2.7, HL 0.63, HW 0.49, MandL 0.24, SL 0.31, EL 0.104, PW 0.32, ML 0.73, PL 0.28, PH 0.14, DPW 0.18, PPL 0.16, GL 0.70, CI 78, MI 38, SI 64, OI 21, LPI 51, DPI 63 (n=1).

Geographic range

Thailand (Phetchaburi, Sakon Nakhon).

Ecology

Collected in secondary forests at an elevation of 530 m.

Comments

In addition to the previous records in the central to south provinces of Thailand, we now report its presence in the north-eastern province of Sakon Nakhon, extending the known range of this species by 500 km NE.

Strumigenys canina (Brown & Boisvert, 1979)

Fig. 5D–F; Table 2

Pentastruma canina Brown & Boisvert, 1979: 203, figs 2–4 (w.q.m.) JAPAN. Palearctic.

Pyramica canina – Bolton 1999: 1673.

Strumigenys canina – Baroni Urbani & De Andrade 2007: 116.

Material examined

MAINLAND CHINA – **Guangxi Province** • 1 worker; Dapingshan; 25 Sep. 1998; J. Fellowes leg.; HKBM • 1 queen; Huaping, Cujiang; 20 Aug. 1998; J. Fellowes leg.; HKBM • 1 worker; Nonggang, Dalong; 22 May 1998; J. Fellowes leg.; HKBM • 1 worker; Nonggang, Longshan (Longrui); 25 May

1998; J. Fellowes leg.; HKBM • 1 worker; same collection data as for preceding • 7 workers; Nonggang, Longshan (Longrui); 27 May 1998; J. Fellowes leg.; HKBM. – **Hainan Province** • 15 workers, 1 queen; Bawangling; 4 Apr. 1998; J. Fellowes leg.; HKBM • 1 worker; Diaoluoshan; 24 May 1999; J. Fellowes leg.; HKBM • 1 worker; Jiaxi; 700 m a.s.l.; 13 Jun. 1999; J. Fellowes leg.; HKBM • 1 worker; Jiaxi; 670 m a.s.l.; 13 Jun. 1999; J. Fellowes leg.; HKBM • 5 workers; Jiaxi; 940 m a.s.l.; 14 Jun. 1999; J. Fellowes leg.; HKBM • 1 queen; Wuzhishan; 9 Jun. 1999; J. Fellowes leg.; HKBM • 1 worker; Yinggeling; 1000 m a.s.l.; 28 Aug. 2005; J. Fellowes leg.; HKBM • 9 workers; Bawangling, Bawangling, BWLP1; 19.116178° N, 109.155232° E; 21 Jun. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 4 workers; same collection data as for preceding; 29 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 17 workers; Bawangling, BWLP10; 19.093997° N, 109.20246° E; 4 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 13 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLP12; 19.093236° N, 109.200057° E; 4 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 9 workers; Bawangling, BWLP2; 19.089495° N, 109.197922° E; 29 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 9 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLP3; 19.088238° N, 109.196806° E; 30 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 19 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 14 workers; Bawangling, BWLP4; 19.092172° N, 109.201698° E; 1 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 7 workers; same collection data as for preceding; 3 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 9 workers; Bawangling, BWLP5; 19.093956° N, 109.201012° E; 1 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 6 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLP6; 19.091482° N, 109.200411° E; 1 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 8 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLP7; 19.091340° N, 109.19848° E; 3 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLP7; same collection data as for preceding; Winkler, 12 random; IBBL • 9 workers; Bawangling, BWLP8; 19.091249° N, 109.201548° E; 3 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLS1; 19.118773° N, 109.163418° E; 22 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLS10; 19.118784° N, 109.155618° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLS11; 19.116776° N, 109.140029° E; 10 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 9 workers; Bawangling, BWLS2; 19.091928° N, 109.183894° E; 6 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 8 workers; Bawangling, BWLS3; 19.094367° N, 109.179854° E; 6 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 10 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 44 workers; Bawangling, BWLS6; 19.104226° N, 109.176078° E; 7 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLS7; 19.106426° N, 109.176035° E; 7 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLS8; 19.085592° N, 109.191281° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 4 workers; Bawangling, BWLS9; 19.089728° N, 109.191270° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 12 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 51 worker; Jianfengling, JFLFW2; 19.115° N, 109.159° E; 26 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 5 workers; Jianfengling, JFLFW3; 19.121° N, 109.118° E; 26 Dec. 2015; L. Wang leg.; Winkler, 12 random; IBBL • 21 worker; Jianfengling, JFLFW5, 18.697° N, 108.849° E; 4 Jan. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 3 workers; Yinggeling, YGLK10; 19.078737° N, 109.503146° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 5 workers; Yinggeling, YGLK10; 19.078737° N, 109.503146° E; 2 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 17 workers; Yinggeling, YGLK11; 19.078017° N, 109.504241° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 5 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 19 workers; Yinggeling, YGLK12; 19.084458° N, 109.504251° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners;

IBBL • 1 worker; same collection data as for preceding • 2 workers; same collection data as for preceding; Winkler, 12 random; IBBL.

HONG KONG • 2 workers; Lantau Island, Kwun Yum Shan; 22.36337° N, 114.21669° E; 260 m a.s.l.; 15 Nov. 1996; J. Fellowes leg.; HKBM • 4 workers; North District, Wang Shan Keuk; 2 Oct. 1996; J. Fellowes leg.; HKBM • 1 worker; Sai Kung District, Tit Kim Hang East; 22.405412554° N, 114.30225348° E; 90 m a.s.l.; 1 Aug. 1996; J. Fellowes leg.; HKBM • 1 worker; Sha Tin District, Ma On Shan; 15 Oct. 1996; J. Fellowes leg.; HKBM • 1 worker; Tai Po District, Kadoorie Farm and Botanic Garden; J. Fellowes leg.; IBBL ANTWEB1015019 • 1 worker; Tsuen Wan District, Shing Mun; 25 Jun. 1992; J. Fellowes leg.; HKBM.

Geographic range

Mainland China (Guangxi, Hainan, Hong Kong, Hubei, Hunan, Jiangsu, Jiangxi, Macau, Zhejiang), Japan, South Korea, Taiwan, Vietnam (northern region).

New record for Hainan.

Ecology

A frequently collected species in Hainan, found in primary forest, secondary forest and rubber plantations. Known elevation in South China from 90 m up to 1000 m.

Comments

A common species in its native range, which spans Japan (Kanto region), South Korea, the eastern provinces of mainland China, Taiwan and northeastern Vietnam. Records of this species in Hainan were predicted (Tang *et al.* 2019). Its presence in Fujian and Guangdong provinces is also very likely.

Strumigenys claviseta sp. nov.

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Figs 6–7; Tables 2, 4

Diagnosis

Strumigenys claviseta sp. nov. can be distinguished from other species in the *S. rostrata*-group by a combination of the following characters: cephalic dorsum with appressed obovate setae; eye reduced to one ommatidium; pronotal humeral seta long and claviform; in profile view, near occipital margin with two claviform erect setae; mesonotal dorsum, petiolar node and first gastral tergite with similar setae; entire surface of mesosoma smooth and shining except for mesonotal dorsum, which is areolate.

Etymology

The species is named after its club-like erect setae. The name was created by combining the prefix ‘*clavi*’ (meaning ‘club-shaped’) with the nominative singular of the Latin noun ‘*seta*’ (meaning ‘bristle’).

Type material

Holotype worker (Fig. 6)

VIETNAM • Đồng Nai Province, Cat Tien National Park, Site 36-2; 11.37623° N, 107.50349° E; 175 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; rubber plantation; LKCNHM ANTWEB1011993 (collection code IBBL CT-S36-ST-sp02).

Paratype workers

VIETNAM • 6 workers; same collection data as for holotype; HKBM ANTWEB1011956, ANTWEB1011988 to ANTWEB1011992 (collection code IBBL CT-S36-ST-sp02).

Paratype queen (Fig. 7)

VIETNAM • 1 dealate queen; Đồng Nai Province, Cat Tien National Park, Site 37; 11.37042° N, 107.50924° E; 175 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; rubber plantation; LKCNHM ANTWEB1011954 (collection code IBBL CT-S37-ST-sp02).

Measurements

Holotype worker

TL 2.1, HL 0.53, HW 0.39, MandL 0.11, SL 0.28, EL 0.023, PW 0.23, ML 0.53, PL 0.25, PH 0.13, DPW 0.12, PPL 0.16, GL 0.50, CI 74, MI 20, SI 72, OI 6, LPI 51, DPI 48.

Paratype workers

TL 2.0–2.1, HL 0.51–0.55, HW 0.38–0.40, MandL 0.10, SL 0.27–0.30, EL 0.020–0.030, PW 0.21–0.23, ML 0.51–0.57, PL 0.24–0.27, PH 0.13–0.14, DPW 0.12–0.13, PPL 0.13–0.16, GL 0.49–0.55, CI 72–75, MI 18–20, SI 71–77, OI 5–8, LPI 51–56, DPI 46–52 (n=6).

Paratype queen

TL 2.4, HL 0.56, HW 0.43, MandL 0.13, SL 0.30, EL 0.117, PW 0.28, ML 0.63, PL 0.30, PH 0.17, DPW 0.16, PPL 0.17, GL 0.66, CI 77, MI 23, SI 69, OI 27, LPI 56, DPI 54 (n=1).

Worker description

HEAD. In full-face view, occipital margin broadly concave; occipital corners well developed. Anterior clypeal margin broadly convex, with moderately-rounded anterolateral angle; posterior clypeal margin well-defined, converged at midpoint to form right angle (or just slightly smaller than right angle); preocular lamina wide. Scapes dorsoventrally flattened, converging anteriorly to form flange at leading edge; trailing edge shallowly concave. Mandibles in full-face view elongated-triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles. Eye reduced to only one ommatidium.

DENTITION (Fig. 6B–C). Principal dental row with five large teeth follows by two smaller teeth, first three teeth subequal in size, fourth tooth reduced, fifth tooth slightly smaller than first three teeth, all triangular except for fourth one; seventh tooth slightly longer than sixth tooth, both reduced; apex of mandible at

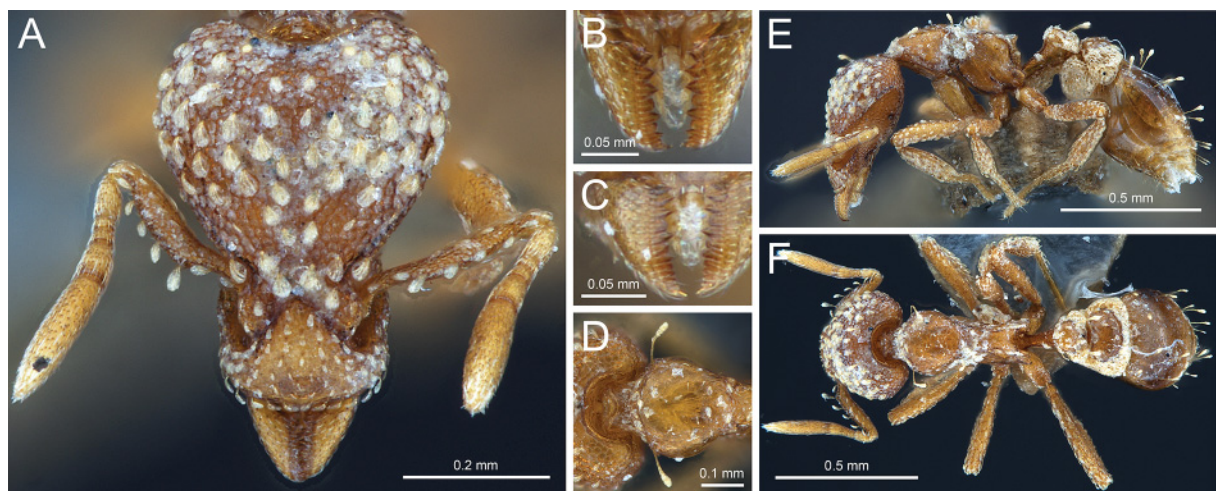


Fig. 6. Type specimens of *Strumigenys claviseta* sp. nov. **A, E–F.** Holotype worker (ANTWEB1011993). **B–D.** Paratype worker (ANTWEB1011956). **A.** Full-face view. **B–C.** Mandible close-ups. **D.** Promesonotum close-up in dorsal view. **E.** Profile view. **F.** Dorsal view.

down curvature, in anterior view, with series of four minute denticles, terminating in small apical tooth. Total dental count of 12.

MESOSOMA. In profile view, pronotum broadly, weakly convex, rest of mesosoma more or less flat; pronotum not margined dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal spines short, broadly triangular, subtended on each side by broad lamella with weakly convex posterior margin slightly narrowing basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar node high; petiolar peduncle not grading evenly into node, and longer than node, around 1.3–1.4 times as long; petiolar node with differentiated anterior face, subequal in length to posterior face. In dorsal view, petiolar node broader than long, around 1.4–1.6 times as long; disc of postpetiole broader than long, around 1.6–1.8 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum sparsely with appressed obovate setae, notably with one transverse row of such setae around level of antennal insertions; clypeal dorsum with small appressed oblanceolate setae; mandibular dorsum with appressed fine setae. Surface of scape sparsely with small appressed oblanceolate to subspatulate setae; funiculus densely covered with short fine setae. Laterally-projecting seta absent; lateral margin of occipital lobe with appressed setae; lateral and anterior clypeal margins with small spoon-shaped setae, medially-directed; leading edge of scape with row of projecting spoon-shaped setae, all curved except for third basalmost seta, posited on subbasal angle, mostly straight and longest of all; three setae immediately following straight seta basally-directed; all other setae apically-directed. In dorsal view, dorsum of pronotum close to anterior margin, mesonotum, petiolar node and disc of postpetiole with small appressed subspatulate to obovate setae. Pronotal humeral seta long and claviform, slightly curved (Fig. 6D). In profile view, immediately in front of occipital margin near midline with a pair of long, slightly curved claviform erect setae; similar setae also present on

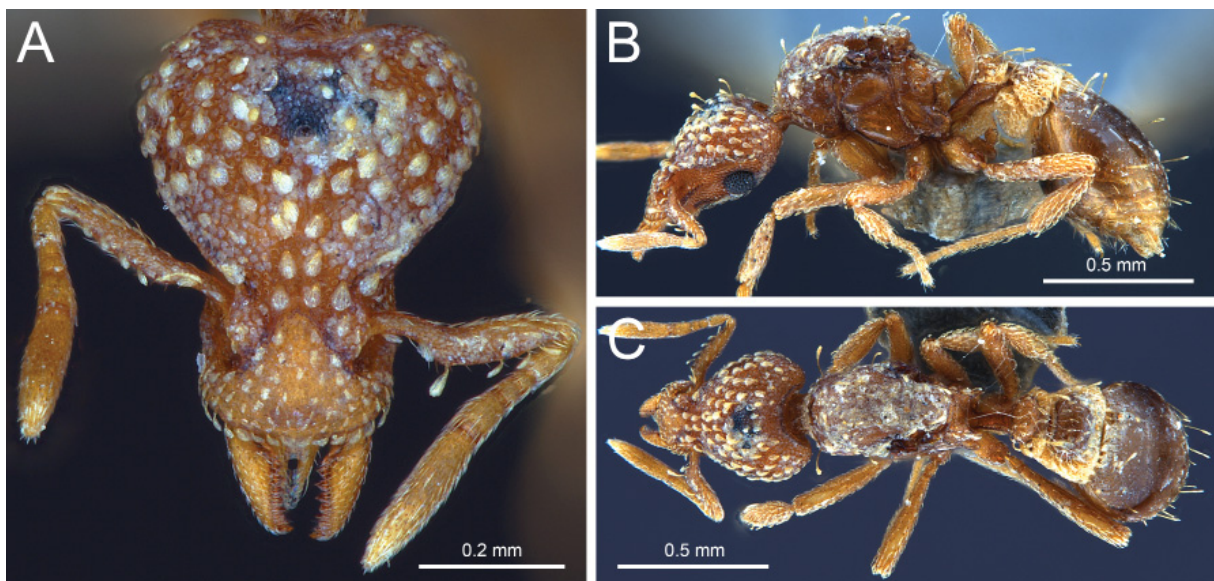


Fig. 7. Paratype queen (ANTWEB1011954) of *Strumigenys claviseta* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

Table 4. Diagnostic characters of *Strumigenys claviseta* sp. nov. and *Strumigenys jaitrongi* sp. nov. in comparison with species from the *S. rostrata*-group (excluding Nearctic species). Values indicate the presence (1) or absence (0) of a character.

Species	Characters					
	Antenna 6-segmented	Pronotal humeral hair flagellate	Pronotal humeral hair remiform or claviform	Propodeal dorsum unsculptured	Filiform to flagellate hairs present on 1 st gastral tergite	Remiform or claviform hairs present on 1 st gastral tergite
<i>S. claviseta</i> sp. nov.	1	0	1	1	0	1
<i>S. jaitrongi</i> sp. nov.	1	1	0	1	1	1
<i>S. ambatrix</i> (Bolton, 2000)	1	1	0	0	0	0
<i>S. atropos</i> (Bolton, 2000)	1	0	1	1	1	1
<i>S. emeswangi</i> (Bolton, 2000)	1	1	0	0	1	0
<i>S. fautrix</i> (Bolton, 2000)	1	0	0	1	0	0
<i>S. incerta</i> (Brown, 1949)	1	1	0	0	1	0
<i>S. nepalensis</i> De Andrade, 1994	0	0	0	0	0	0
<i>S. rostrataeformis</i> (Brown, 1949)	1	0	1	0	0	1
<i>S. subterranea</i> Brassard <i>et al.</i> , 2020	1	1	1	1	1	0
<i>S. symmetrix</i> (Bolton, 2000)	1	0	0	0	0	0
<i>S. victrix</i> (Bolton, 2000)	1	0	0	0	0	0

mesonotum in a pair, on petiolar node in a pair, and sparsely across first gastral tergite; second and third gastral tergites with smaller weakly claviform to remiform erect setae; gastral sternites with suberect to decumbent setae; ventral surface of head with appressed setae. Hairwheel present at the mesopleural excavation. Surfaces of femora, tibiae and basitarsi with appressed subspatulate to obovate setae; surfaces of middle and hind basitarsi without any projecting erect seta.

SCULPTURE. Surface of head (including antennal scrobe), antennae and legs areolate. Entire surface of mesosoma smooth and shining, except for mesonotal dorsum, weakly areolate. Dorsum of petiolar node and disc of postpetiole mostly smooth and shining. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Queen description

Similar in all points to worker caste except for reproductive caste morphological characters (presence of 3 ocelli, enlarged eyes and thorax), and following: in profile view, in front of occipital margin with two pairs of claviform erect setae instead of one, additional pair situated around ocelli; mesosomal dorsum with numerous claviform erect setae; claviform erect setae on gastral tergites restricted to anterior portion of first gastral tergite only, remaining erect setae on gaster remiform to weakly remiform; mesosomal dorsum densely areolate; side of mesosoma with vestiges of sculpture around the margins.

Comments

Strumigenys claviseta sp. nov. is a member of the *S. rostrata*-group and shares all its characters (Bolton 2000). It cannot be confidently assigned to either the *fautrix*-complex or *rostrata*-complex. *Strumigenys claviseta* has wide preocular laminae, similar to species of the *rostrata*-complex, but also has well-developed occipital lobes, similar to species of the *fautrix*-complex. The roundness of the anterolateral angles of the clypeus in *S. claviseta* falls between the norm of the two species complexes.

Strumigenys claviseta sp. nov. can be distinguished from other Oriental and Sino-Japanese species from the species group (*S. atropos* (Bolton, 2000), *S. emeswangi* (Bolton, 2000), *S. incerta* (Brown, 1949), *S. nepalensis* De Andrade, 1994, *S. jaitrongi* sp. nov., *S. rostrataeformis* (Brown, 1949), *S. subterranea* Brassard *et al.*, 2020) by the following characters (Table 4): antennae 6-segmented (instead of 4-segmented as in *S. nepalensis*); mandibles without gap between them (unlike *S. jaitrongi* or *S. subterranea*); eyes greatly reduced (unlike *S. emeswangi*, *S. incerta*, *S. nepalensis* or *S. rostrataeformis*); in profile view, cephalic dorsum of worker has two erect claviform setae (instead of four such setae as in *S. jaitrongi*, remiform as in *S. atropos* or *S. subterranea*, or completely absent as in other species); pronotal dorsum completely smooth and shining (unlike *S. nepalensis*, *S. emeswangi*, *S. incerta* or *S. rostrataeformis*); mesonotal dorsum weakly areolate (instead of smooth and shining as in *S. atropos*); pronotal humeral seta distinctly claviform (instead of stout as in *S. atropos* or *S. nepalensis*, or remiform as in *S. rostrataeformis*, or flagellate as in other species). Unlike all other species, the pilosity on the first gastral tergite of *S. claviseta* sp. nov. consists of claviform erect setae only.

Geographic range

Vietnam (Đồng Nai).

Ecology

Collected in rubber plantation at an elevation of 175 m.

Strumigenys criniger sp. nov.

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Figs 8–9; Tables 2, 5

Diagnosis

Strumigenys criniger sp. nov. can be distinguished from other species in the *S. caniophanes*-group by a combination of the following characters: preapical tooth present, elongated-triangular; dorsolateral margin of head with five laterally-projecting flagellate setae, including apicoscrobial seta; cephalic

dorsum and mesosoma with dense decumbent simple ground pilosity; pronotal humeral seta flagellate; mesosoma, including pleurae and side of propodeum, fully sculptured; propodeal teeth not subtended by lamella; petiolar node with differentiated anterior face, not claviform; gastral tergites with numerous long erect setae; dorsal and ventral surfaces of femur with erect setae; hind tibiae and basitarsi with long projecting flagellate setae.

Etymology

The species is named after its long and convoluted pilosity present across the body. The epithet '*crinigera*' is the nominative feminine singular of the Latin adjective '*criniger*' (meaning 'having long hair').

Type material

Holotype worker (Fig. 8)

VIETNAM • Đồng Nai Province, Cat Tien National Park, Site 13 (CT-S13-06); 11.45298° N, 107.36467° E; 174 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; mature forest; LKCNHM ANTWEB1011848 (collection code IBBL CT-S13-4m2-sp06).

Paratype worker

VIETNAM • 1 worker; same collection data as for holotype; HKBM ANTWEB1011849 (collection code IBBL CT-S13-4m2-sp06).

Paratype queens (Fig. 9)

VIETNAM • 2 alate queens; same collection data as for holotype; LKCNHM ANTWEB1011847, ANTWEB1011850 (collection code IBBL CT-S13-4m2-sp06).

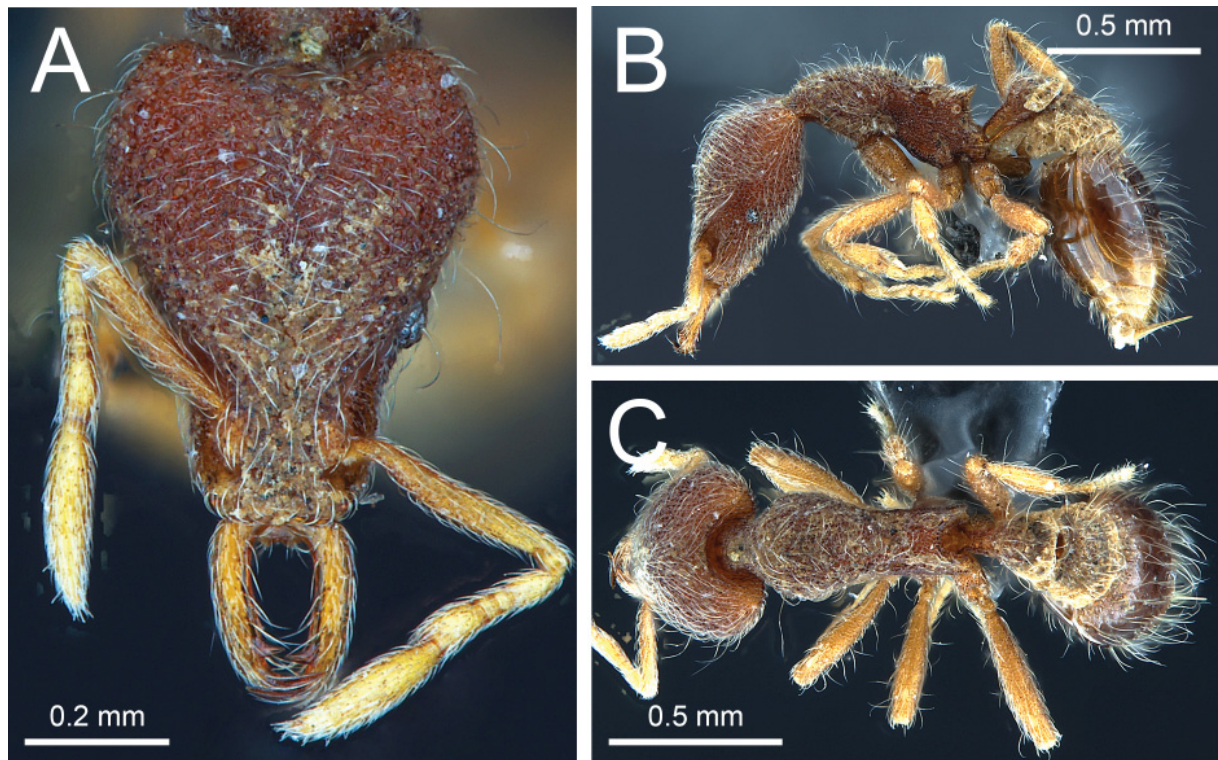


Fig. 8. Holotype worker (ANTWEB1011848) of *Strumigenys crinigera* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

Additional material examined

VIETNAM – **Đắk Nông Province** • 1 worker; Nam Nung Reserve, Site 48; 12.19245° N, 107.75954° E; 892 m a.s.l.; 9 Jun. 2018; IBBL members legs.; Winkler; IBBL ANTWEB1011853. – **Đồng Nai Province** • 2 workers, 1 queen; Cat Tien National Park, Site 18; 11.45688° N, 107.36958° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members legs.; Winkler, 4 corners; IBBL ANTWEB1011852 • 1 worker; same collection data as for preceding; IBBL ANTWEB1011851 • 1 worker; same collection data as for preceding; IBBL ANTWEB1011913 • 1 queen; Cat Tien National Park, Site 21; 11.48437° N, 107.38658° E; 165 m a.s.l.; 5 Jun. 2018; IBBL members legs.; Winkler, 4 corners; IBBL ANTWEB1011960.

Measurements

Holotype worker

TL 2.7, HL 0.64, HW 0.50, MandL 0.24, SL 0.33, EL 0.059, PW 0.30, ML 0.68, PL 0.29, PH 0.14, DPW 0.15, PPL 0.16, GL 0.64, CI 77, MI 38, SI 66, OI 12, LPI 47, DPI 52.

Paratype worker

TL 2.7, HL 0.65, HW 0.50, MandL 0.24, SL 0.32, EL 0.057, PW 0.29, ML 0.69, PL 0.27, PH 0.13, DPW 0.14, PPL 0.19, GL 0.64, CI 77, MI 37, SI 63, OI 11, LPI 47, DPI 51 (n=1).

Paratype queens

TL 2.7–2.9, HL 0.62–0.66, HW 0.48–0.53, MandL 0.24–0.25, SL 0.32, EL 0.103–0.109, PW 0.34–0.36, ML 0.72–0.74, PL 0.31–0.34, PH 0.15, DPW 0.16, PPL 0.18–0.19, GL 0.66–0.70, CI 78–80, MI 37–38, SI 61–66, OI 21, LPI 44–47, DPI 48–50 (n=2).

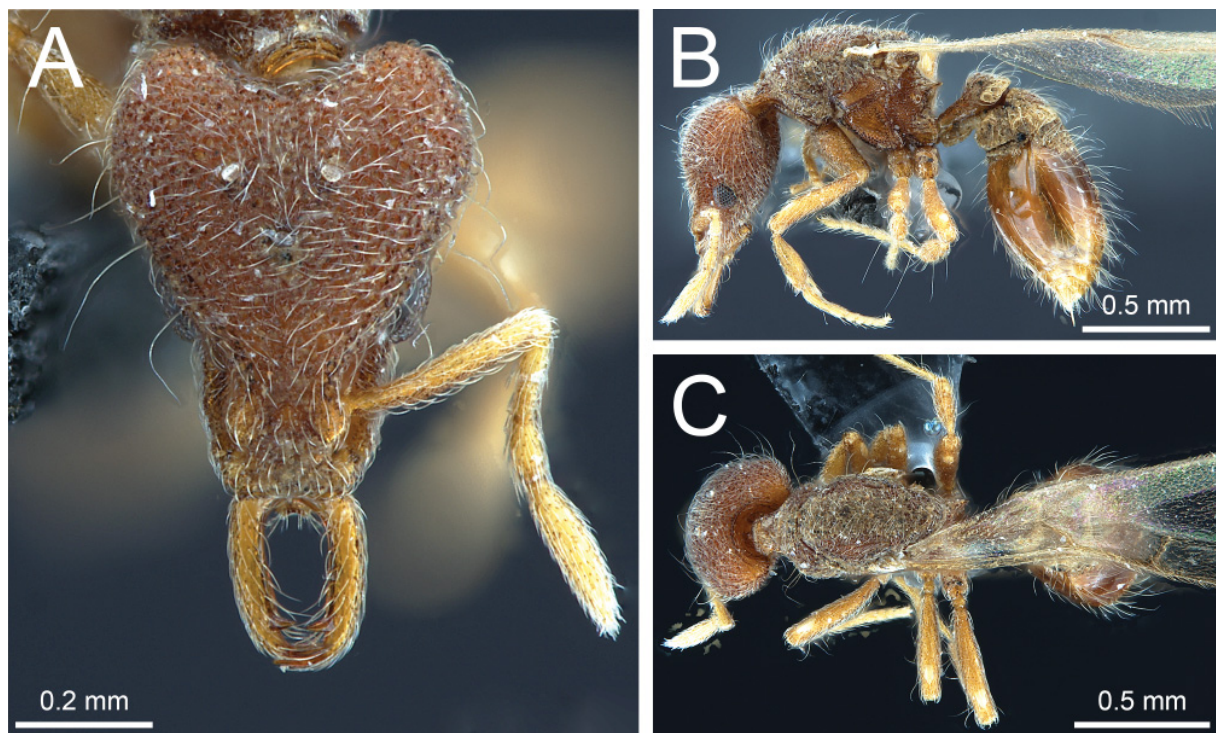


Fig. 9. Paratype queen (ANTWEB1011847) of *Strumigenys crinigera* sp. nov. A. Full-face view. B. Profile view. C. Dorsal view.

Worker description

HEAD. In full-face view, occipital margin evenly concave; occipital corners well developed; preocular lamina wide; anterior clypeal margin broadly, shallowly concave. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge; apical antennomere weakly constricted basally. Mandible curvilinear and long, with elongated-triangular preapical tooth located close to apicodorsal tooth; width of mandible fairly constant from basal portion to where preapical tooth first arose; preapical tooth subequal to slightly shorter than width of mandible at point where tooth arises. In profile view, eye with three ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum broadly convex, propodeum more or less flat transversely; pronotum at most very weakly marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal teeth elongated-triangular and acute, not subtended by lamella. Metapleural gland bulla well developed. Femoral glands small but visible on all legs, around 0.030–0.040 mm in length.

METASOMA. In profile view, petiole not claviform; petiolar node with anterior face differentiated from peduncle, petiolar peduncle about as long as node. In dorsal view, petiolar node about as broad as long; disc of postpetiole broader than long, around 1.4–1.6 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile; in dorsal view, processes present along posterior margin of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, dorsolateral margin of head with five pairs of long, laterally-projecting flagellate setae: two on upper scrobe margin, of which one posterior to level of eye and one directly above eye; one in apicoscrobial position, two posterior to this on lateral margin of occipital lobe. Antennae and mandibles covered with short appressed simple setae. Pronotal humeral seta long and flagellate. In profile view, cephalic dorsum, against ground pilosity of decumbent simple setae, sometimes with several suberect to erect setae between occipital margin and highest point of vertex but without erect setae anterior to this; ventral surface of head with shorter decumbent setae; mesosoma, petiolar node and postpetiole covered with numerous erect to suberect flagellate setae against shorter decumbent ground pilosity; gastral tergites with numerous filiform to flagellate erect setae; gastral sternites covered with much shorter, suberect curved simple setae. Hairwheel present at mesopleural excavation. Dorsal and ventral surfaces of femur each with row of long fine erect setae against ground pilosity of appressed setae; surfaces of middle and hind tibiae and basitarsi with long projecting flagellate setae.

SCULPTURE. Surface of head (including antennal scrobe) densely reticulate-rugulose; antennae and legs reticulate-punctate; mandibles with sparse weak punctate, but otherwise mostly smooth. Promesonotal dorsum, side of pronotum, petiolar node and disc of postpetiole densely reticulate-rugose; pleurae, dorsum and side of propodeum reticulate-punctate with sparse rugulae. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Queen description

Similar in all points to worker caste except for reproductive caste morphological characters (presence of 3 ocelli, enlarged eyes and thorax), and following: center of anepisternum and katepisternum each with patch of surface smooth and shining; femoral glands much larger than in worker caste, around 0.070–0.080 mm in length.

Comments

Strumigenys crinigera sp. nov. is a member of the *cygarix*-complex in the *S. caniophanes*-group and shares all its characters (Bolton 2000). It does not belong to the *caniophanes*-complex for having petiole

Table 5. Diagnostic characters of *Strumigenys crinigera* sp. nov. in comparison with species from the *cygarix*-complex of the *S. caniophanes*-group. Values indicate the presence (1) or absence (0) of a character.

Species	Characters					
	Preapical tooth presents	Preapical tooth elongated-triangular	Side of propodeum sculptured	Without areolate processes overgrowth	Erect hairs present on hind femur	Projecting hairs present on hind tibia and basitarsus
<i>S. crinigera</i> sp. nov.	1	1	1	1	1	1
<i>S. benulia</i> Bolton, 2000	1	1	0	1	1	1
<i>S. cygarix</i> Bolton, 2000	0	0	1	1	1	1
<i>S. dromica</i> Bolton, 2000	0	0	1	1	1	1
<i>S. lopotyle</i> Brown, 1969	1	1	1	0	0	1
<i>S. nothomopyx</i> Bolton, 2000	1	0	1	1	0	1
<i>S. tadyastes</i> Bolton, 2000	1	1	1	1	0	0

with a differentiated anterior face in profile instead of subclaviform or claviform in shape. It also does not belong to the *rhadina*-complex for not having cuticular lamella along the inner margin of mandible.

Strumigenys crinigera sp. nov. can be distinguished from other members of the species group (*S. benulia* Bolton, 2000, *S. cygarix* Bolton, 2000, *S. dromica* Bolton, 2000, *S. lopotyle* Brown, 1969, *S. nothomopyx* Bolton, 2000 and *S. tadyastes* Bolton, 2000) by the following characters (Table 5): preapical tooth present, elongated-triangular (instead of completely absent as in *S. cygarix* or *S. dromica*, or reduced to merely denticle as in *S. nothomopyx*); pleurae and side of propodeum are fully-sculptured in workers (unlike *S. benulia*); row of erect setae present on both dorsal and ventral surfaces of femur (unlike *S. lopotyle*, *S. nothomopyx* or *S. tadyastes*); hind tibiae and basitarsi have long projecting flagellate setae (unlike *S. tadyastes*). *Strumigenys crinigera* also lacks the characteristic overgrowths of the areolate processes on the petiole and postpetiole of *S. lopotyle*. *Strumigenys crinigera* (HL 0.64–0.65, ML 0.68–0.69) is a smaller species than *S. lopotyle* (HL 0.74–0.86, ML 0.76–0.90), *S. nothomopyx* (HL 0.73–0.75, ML 0.70–0.72) or *S. tadyastes* (HL 0.70–0.76, ML 0.73–0.76).

Geographic range

Vietnam (Đắk Nông, Đồng Nai).

Ecology

Collected in secondary and mature forest at elevations from 174 to 892 m.

Strumigenys decumbens sp. nov.

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Fig. 10; Tables 2, 6

Diagnosis

Strumigenys decumbens sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum with appressed plank-like to spatulate setae; clypeal dorsum with appressed spatulate to elliptic setae; without any laterally-projecting seta in full-face view; in profile view, cephalic dorsum without any erect seta; pronotum marginated dorsolaterally; in profile view, propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with decumbent to appressed setae, without erect seta.

Etymology

The species is named after the lack of erect setae both on the cephalic dorsum and the surface of legs. The epithet ‘*decumbens*’ is the nominative feminine singular present participle of the Latin verb ‘*decumbo*’ (meaning ‘to lie down’).

Type material

Holotype worker (Fig. 10)

THAILAND • Sakon Nakhon Province, Site 99; 17.12266° N, 104.00371° E; 443 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; secondary forest; LKCNHM ANTWEB1011974 (collection code IBBL SN-S99-ST-sp01).

Paratype workers

THAILAND • 10 workers; same collection data as for holotype; HKBM ANTWEB1011975 to ANTWEB1011984 (collection code IBBL SN-S99-ST-sp01).

Measurements

Holotype worker

TL 2.3, HL 0.57, HW 0.41, MandL 0.09, SL 0.29, EL 0.077, PW 0.21, ML 0.58, PL 0.31, PH 0.13, DPW 0.10, PPL 0.16, GL 0.60, CI 71, MI 15, SI 70, OI 19, LPI 42, DPI 33.

Paratype workers

TL 2.2–2.5, HL 0.57–0.64, HW 0.42–0.44, MandL 0.08–0.09, SL 0.29–0.33, EL 0.064–0.088, PW 0.20–0.23, ML 0.56–0.67, PL 0.27–0.32, PH 0.12–0.13, DPW 0.09–0.11, PPL 0.15–0.19, GL 0.59–0.70, CI 69–73, MI 13–15, SI 70–74, OI 15–21, LPI 39–44, DPI 30–37 (n=10).

Worker description

HEAD. In full-face view, occipital margin deeply concave; occipital corners well developed and bluntly angular; occipital carina present. Clypeus slightly broader than long, around 1.1–1.2 times as long, roughly resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins

engaged across entire length, without diastema or gap between mandibles; basal lamellae low and broadly triangular, not fully visible at full closure. In profile view, eye with four ommatidia in diameter.

DENTITION (Fig. 10B). Principal dental row with eight alternating short triangular and long spiniform teeth (i.e., four consecutive pairs of teeth, each pair consists of short tooth followed by long tooth), second and third pairs subequal in size and longer than other pairs (short tooth of one pair compares with short tooth of another pair only, same for long tooth); followed by 3–4 small teeth and, at down curvature in anterior view, series of four minute denticles, terminating in small apical tooth. Total dental count of 16–17.

MESOSOMA. In profile view, promesonotal dorsum slightly convex, propodeum more or less flat transversely; pronotum marginated dorsolaterally. In dorsal view, lateral margins of pronotum mostly straight (at most very weakly convex), only converge anteriorly to meet anterior margin and posteriorly to meet lateral margins of mesonotum. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with concave posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well-developed.

METASOMA. In profile view, petiolar peduncle grading evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around 1.4–1.6 times as long; disc of postpetiole slightly broader than long, around 1.1–1.3 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node in profile; in dorsal

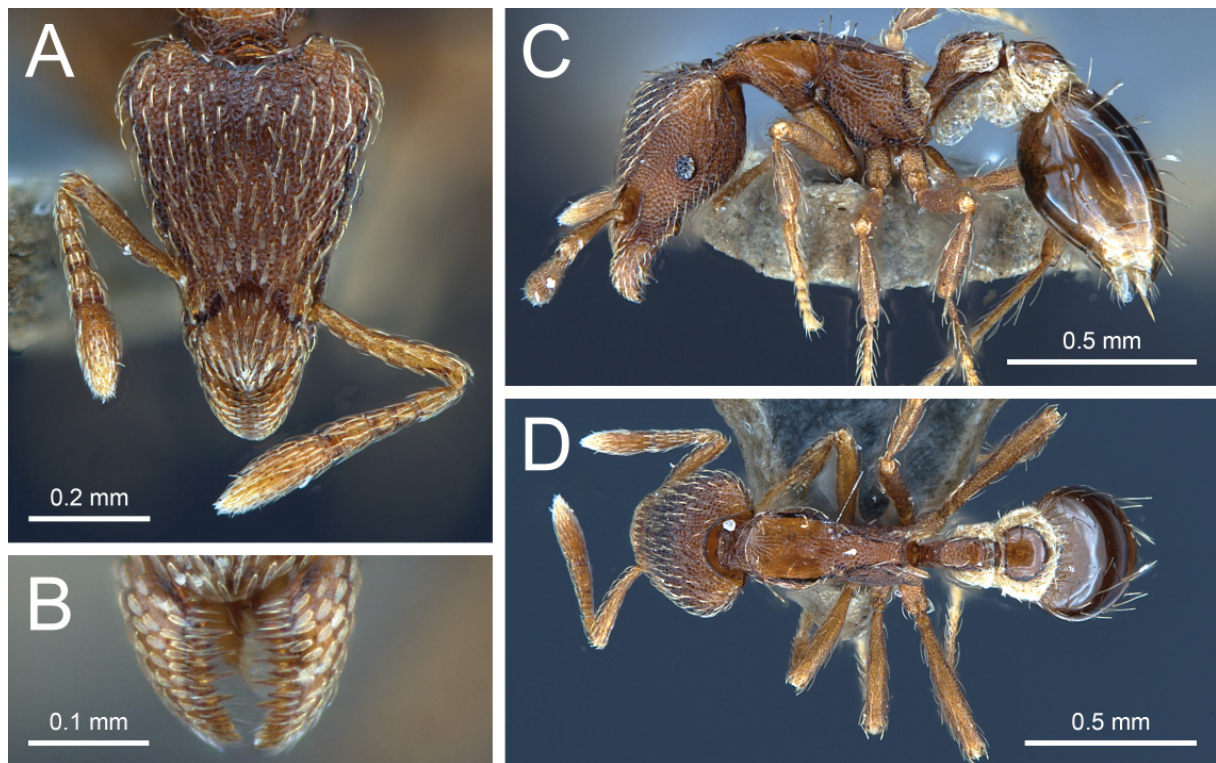


Fig. 10. Type specimens of *Strumigenys decumbens* sp. nov. **A, C–D.** Holotype worker (ANTWEB1011974). **B.** Paratype worker (ANTWEB1011984). **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum with appressed spatuliform setae, ranging from plank-like setae near occipital margin to spatulate setae near posterior clypeal margin; clypeal dorsum covered with short spatulate to elliptic setae; mandibular dorsum covered with small oblanceolate setae; masticatory margins each with row of fine medially-directed setae. Head without any laterally-projecting seta; decumbent setae present along dorsolateral margin of head, those along lateral margin of occipital lobe overlap with one another. Surface of scape covered with appressed subspatulate setae; funiculus (except for apical antennomere) covered with appressed acicular setae; progressively finer setae densely covering apical antennomere. In dorsal view, promesonotal dorsum sparsely with appressed subspatulate setae; posteriorly-directed decumbent setae present along lateral margins; appressed stout setae present along lateral margins of petiolar node and disc of postpetiole. Pronotal humeral seta straight and stout, longer than other setae on pronotal dorsum. In profile view, cephalic dorsum without any erect seta; erect stout setae present on mesonotal dorsum as three pairs, and all over gastral tergites; ventral surface of head with decumbent setae; gastral sternites sparsely with suberect to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of femora, tibiae and basitarsi with long stout decumbent to appressed setae.

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose; surface of antennal scrobe, antenna and legs densely areolate. Promesonotal dorsum predominantly densely areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; propodeal dorsum and dorsum of petiolar node densely areolate-rugulose. Side of pronotum mostly smooth and shining, weakly areolate-rugulose around margins; pleurae and side of propodeum densely areolate-rugulose. Disc of postpetiole smooth and shining. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys decumbens sp. nov. is a member of the *elegantula*-complex in the *S. leptothrix*-group and shares all its characters (Bolton 2000).

Aside from *Strumigenys decumbens* sp. nov., there are five other SEA species in the same species group (*S. doydeei* sp. nov., *S. japonica*, *S. megaera*, *S. rongi* sp. nov. and *S. scolopax*) that share the following characters: cephalic dorsum covered with appressed spatuliform (elliptic, plank-like, linear, subspatulate, spatulate, oblanceolate, obovate or ovate) setae only, head without laterally-projecting seta in full-face view (at most limited to 1–2 at occipital corner for *S. doydeei*) (Table 6). Unlike the three existing species and *S. rongi*, for *S. decumbens* and *S. doydeei* the propodeal spines are subtended by broad lamellae (instead of narrow lamellae or carinae).

Strumigenys decumbens sp. nov. shares a very similar cephalic pilosity with *S. doydeei* sp. nov., though unlike *S. doydeei*, these appressed setae markedly transit from spatulate to plank-like setae towards the occipital margin (instead of generally more consistent in shape across the cephalic dorsum). *Strumigenys decumbens* also only has decumbent to appressed setae on the femora, tibiae and tarsi (instead of laterally-projecting as in *S. doydeei*). See comments under *S. intermedia* sp. nov. for a detailed comparison between the newly described species and the existing species of the *S. leptothrix*-group.

Geographic range

Thailand (Sakon Nakhon).

Ecology

Collected in secondary forest, at an elevation of 443 m.

Table 6. Diagnostic characters of *Strumigenys decumbens* sp. nov., *Strumigenys delicata* sp. nov., *Strumigenys densissima* sp. nov., *Strumigenys doydeei* sp. nov., *Strumigenys intermedia* sp. nov., *Strumigenys rongi* sp. nov., *Strumigenys strummeri* sp. nov., *Strumigenys yamanei* sp. nov., *Strumigenys zanderi* sp. nov. and *Strumigenys zhenghunii* sp. nov. in comparison with Oriental and Sino-Japanese species from the *S. leptothrix*-group. Values indicate the presence (1) or absence (0) of a character.

Species	Characters											
	Appressed hairs only on cephalic dorsum in profile	Erect hairs only on cephalic dorsum in profile	Erect hairs restricted to behind the highest point of vertex only	Hairs on cephalic dorsum mostly simple (not spatuliform)	Simple and fine hairs on clypeal dorsum only	Lateral-projecting hair absent in full-face view	Projecting hairs present on tibiae	Pronotum margined	Side of mesosoma mostly sculptured	Propodeal spine presents	Propodeal declivity with broad lamella	Dorsum of petiolar node sculptured
<i>S. decumbens</i> sp. nov.	1	0	0	0	0	1	0	1	1	1	1	1
<i>S. delicata</i> sp. nov.	0	0	0	1	1	0	1	1	1	1	1	1
<i>S. densissima</i> sp. nov.	0	0	1	1	0	0	1	1	1	1	1	1
<i>S. doydeei</i> sp. nov.	1	0	0	0	0	1	1	1	1	1	1	1
<i>S. intermedia</i> sp. nov.	0	0	0	1	0	0	1	1	1	1	1	1
<i>S. rongi</i> sp. nov.	1	0	0	0	0	1	0	1	0	1	0	1
<i>S. strummeri</i> sp. nov.	0	1	0	1	0	0	1	1	1	1	1	1
<i>S. yamanei</i> sp. nov.	0	1	0	1	0	0	1	0	0	1	1	1
<i>S. zanderi</i> sp. nov.	1	0	0	0	0	1	0	1	0	1	1	1
<i>S. zhenghunii</i> sp. nov.	0	0	0	0	0	0	1	1	0	1	1	1
<i>S. ailaoshana</i> (Xu & Zhou, 2004)	0	0	1	0	0	0	1	1	1	1	1	1
<i>S. alecto</i> (Bolton, 2000)	0	0	0	0	0	0	1	0	0	1	1	1
<i>S. assamensis</i> De Andrade, 1994	1	0	0	0	0	1	0	1	0	0	1	0
<i>S. benten</i> (Terayama <i>et al.</i> , 1996)	1	0	0	0	0	0	0	0	0	1	1	1
<i>S. calvus</i> Dong & Kim, 2020	1	0	0	0	0	1	0	0	0	1	1	0
<i>S. elegantula</i> (Terayama & Kubota, 1989)	0	0	1	0	0	0	1	1	1	1	1	1
<i>S. euryale</i> (Bolton, 2000)	1	0	0	0	0	0	1	1	1	1	0	1
<i>S. formosimonticola</i> (Terayama <i>et al.</i> , 1996)	0	0	1	0	0	0	0	0	0	1	1	1
<i>S. jacobsoni</i> Menozzi, 1939	0	1	0	1	0	0	1	1	1	1	1	1
<i>S. japonica</i> Ito, 1914	1	0	0	0	0	1	0	0	1	1	0	1
<i>S. leptothrix</i> Wheeler, 1929	0	1	0	1	0	0	1	1	0	1	1	1
<i>S. medusa</i> (Bolton, 2000)	0	1	0	1	0	0	1	1	1	1	0	1
<i>S. megaera</i> (Bolton, 2000)	1	0	0	0	0	1	0	1	1	1	0	1
<i>S. nankunshana</i> (Zhou, 2011)	0	0	1	0	0	0	1	1	1	1	1	1
<i>S. rudinodis</i> Starcke, 1941	1	0	0	0	0	0	0	0	1	1	0	1
<i>S. scolopax</i> (Bolton, 2000)	1	0	0	0	0	1	0	1	1	1	0	1
<i>S. scylla</i> (Bolton, 2000)	0	0	0	0	0	0	1	1	1	1	0	1
<i>S. stheno</i> (Bolton, 2000)	0	1	0	1	0	0	1	1	1	1	0	1

Strumigenys delicata sp. nov.

urn:lsid:zoobank.org:act:856F2DE2-52DE-4D67-9C06-77446477FA34

Fig. 11; Tables 2, 6

Diagnosis

Strumigenys delicata sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic, clypeal and mandibular dorsum with appressed short fine setae; long laterally-projecting setae present in full-face view; in profile view, standing setae appeared sporadically across cephalic dorsum, not restricted to area between highest point of vertex and occipital margin; pronotum marginated dorsolaterally; in profile view, propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long fine erect setae.

Etymology

The species is named after its fine and apically-acute pilosity. The epithet ‘*delicata*’ is the nominative feminine singular of the Latin adjective ‘*delicatus*’.

Type material

Holotype worker (Fig. 11)

THAILAND • Trang Province, Khao Chong, Site 12 (KCW12-1); 7.5436° N, 99.8067° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; primary forest; LKCNHM ANTWEB1011999 (collection code IBBL KCW-S12-ST-sp2).

Measurements

Holotype worker

TL 2.5, HL 0.65, HW 0.46, MandL 0.09, SL 0.32, EL 0.082, PW 0.24, ML 0.66, PL 0.30, PH 0.14, DPW 0.12, PPL 0.17, GL 0.65, CI 70, MI 14, SI 71, OI 18, LPI 46, DPI 38.

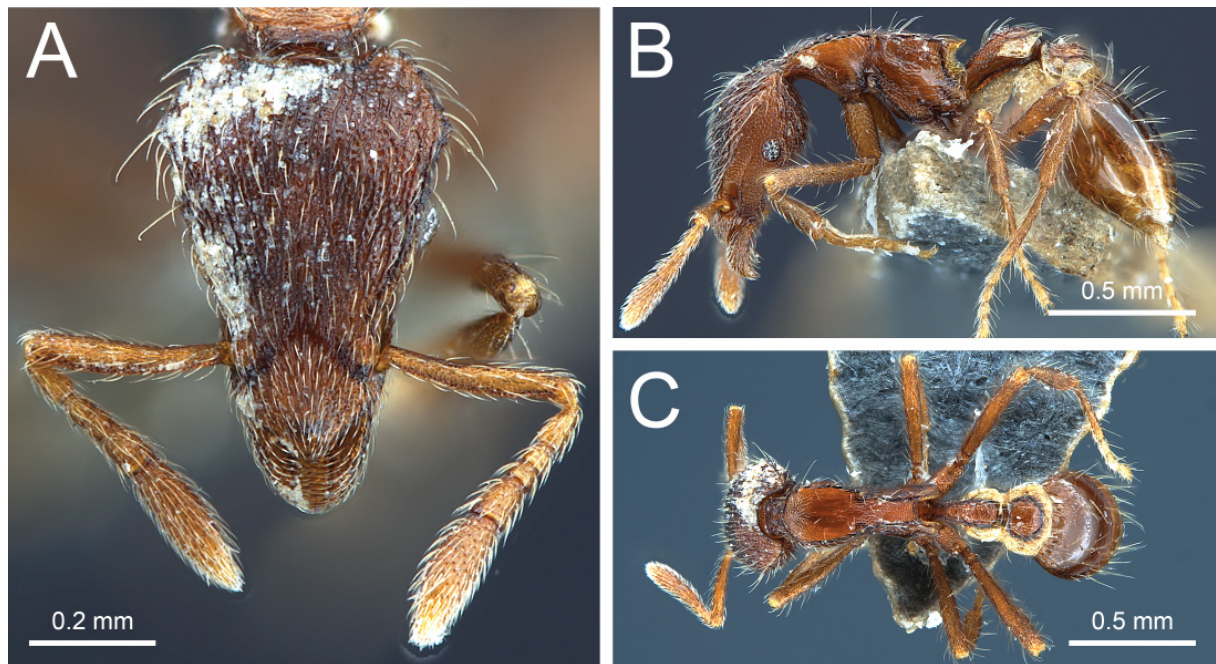


Fig. 11. Holotype worker (ANTWEB1011999) of *Strumigenys delicata* sp. nov. A. Full-face view. B. Profile view. C. Dorsal view.

Worker description

HEAD. In full-face view, occipital margin deeply concave; occipital corners well developed and bluntly angular; occipital carina present. Clypeus about as broad as long, roughly resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles. In profile view, eye with four ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum weakly convex, propodeum more or less flat transversely; pronotum marginated dorsolaterally. In dorsal view, lateral margins of pronotum broadly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with concave posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle grading evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around 1.6 times as long; disc of postpetiole slightly broader than long, around 1.2 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, short appressed fine setae present on cephalic, clypeal and mandibular dorsum, those on clypeal and mandibular dorsum shorter; masticatory margins each with row of medially-directed fine setae. Surface of antennae with decumbent to appressed short fine setae; decumbent fine setae also present along dorsolateral margin of head; long laterally-projecting fine setae present on lateral margin of occipital lobe; one similar seta also present on the upper scrobe margin behind level of eye. In dorsal view, promesonotal dorsum sparsely with appressed fine setae; posteriorly-directed decumbent setae present along lateral margins; pronotal humeral seta long and fine, mostly straight. In profile view, erect to suberect setae present sporadically throughout cephalic dorsum, not restricted to area between highest point of vertex and occipital margin; long fine erect to suberect setae also present on mesonotal dorsum in three pairs, on petiole, disc of postpetiole and all over gastral tergites, those on anterior portion of first gastral tergite coarser than those on rest of gaster; ventral surface of head and gaster with decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of middle and hind femora, tibiae and basitarsi with long fine erect setae.

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose; surface of antennal scrobe, antenna and legs densely areolate. Promesonotal dorsum predominantly areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; propodeal dorsum densely areolate-rugulose; dorsum of petiolar node transversely areolate-rugulose. Side of pronotum mostly smooth and shining, with weak rugulae around margins; pleurae and side of propodeum densely areolate-rugulose. Disc of postpetiole mostly smooth and shining. Basigastral costulae short, around one fourth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys delicata sp. nov. is a member of the *S. leptothrix*-group and shares all its characters (Bolton 2000), and very likely belongs to the *elegantula*-complex. The only specimen has fully-closed mandibles and observation is obscured by setae along the inner margin of the mandible, making an accurate assessment of the dentition difficult. Placing the specimen against backlight suggests the presence of a principal dental row of around eight alternating short and long teeth, followed by a series of smaller teeth and denticles, terminating in a small apical tooth.

Aside from *Strumigenys delicata* sp. nov., there are six other SEA species from the same species group (*S. ailaoshana*, *S. densissima* sp. nov., *S. elegantula*, *S. intermedia* sp. nov., *S. nankunshana* and *S. zhenghuii* sp. nov.) that share the following characters: both appressed and erect setae present on cephalic dorsum, pronotum marginate dorsolaterally, propodeal spines present and subtended by broad lamellae (Table 6). For *S. delicata*, its pronotum dorsum is areolate-rugulose (instead of predominantly longitudinally-striated as in *S. ailaoshana*, or predominantly transversely-striated as in *S. nankunshana*); erect setae are present sporadically across the cephalic dorsum (instead of restricted to the area between the highest point of the vertex and the occipital margin as in *S. densissima* or *S. elegantula*). Unlike all of the above six species, all the setae, including those on the cephalic dorsum, the clypeal dorsum, the mandibular dorsum, the surface of the legs, the petiole, postpetiole and gaster, are fine and apically-acute (instead of ranging from stout and truncated to various spatuliform in shape). See comments under *S. intermedia* for a detailed comparison between the newly described species and the existing species from *S. leptothrix*-group.

Geographic range

Thailand (Trang).

Ecology

Collected from primary forest.

Strumigenys densissima sp. nov.

urn:lsid:zoobank.org:act:A4D30AFB-F195-4666-9CDC-2CB0A81F760F

Fig. 12; Tables 2, 6

Diagnosis

Strumigenys densissima sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum with appressed stout and truncated setae; clypeal dorsum with appressed narrowly elliptic to acicular setae; in profile view, erect setae restricted to area between highest point of vertex and occipital margin; pronotum marginated dorsolaterally; in profile view, propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long erect setae.

Etymology

The species is named after its dense pilosity on the antennae. The epithet ‘*densissima*’ is the nominative feminine singular superlative of the Latin adjective ‘*densus*’ (meaning ‘dense’).

Type material

Holotype worker (Fig. 12)

MAINLAND CHINA • Yunnan Province, Jinghong; 7–12 Aug. 2006; S. Onoda leg.; SWFC ANTWEB1010908.

Paratype worker

MAINLAND CHINA • 1 worker; Yunnan Province, Dali; 29 Jul.–4 Aug. 2006; S. Onoda leg.; KUM ANTWEB1010907.

Measurements

Holotype worker

TL 2.6, HL 0.65, HW 0.48, MandL 0.11, SL 0.30, EL 0.075, PW 0.27, ML 0.67, PL 0.31, PH 0.15, DPW 0.11, PPL 0.20, GL 0.67, CI 74, MI 16, SI 62, OI 16, LPI 49, DPI 37.

Paratype worker

TL 2.8, HL 0.69, HW 0.49, MandL 0.10, SL 0.31, EL 0.073, PW 0.26, ML 0.69, PL 0.37, PH 0.17, DPW 0.12, PPL 0.20, GL 0.74, CI 72, MI 15, SI 64, OI 15, LPI 46, DPI 33 (n=1).

Worker description

HEAD. In full-face view, occipital margin deeply, broadly concave; occipital corners well developed and bluntly angular; occipital carina broad. Clypeus about as broad as long (or slightly broader than long), roughly resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles; basal lamellae low and broadly triangular, not fully visible at full closure. In profile view, eye with four ommatidia in diameter.

DENTITION (Fig. 12B). Principal dental row with eight alternating short triangular and long spiniform teeth (i.e., four consecutive pairs of teeth, each pair consists of short tooth followed by long tooth), second and third pairs subequal in size and longer than other pairs (short tooth of one pair compares with short tooth of another pair only, same for long tooth); followed by 3–4 small teeth and, at down curvature in anterior view, series of four minute denticles, terminating in small apical tooth. Total dental count of 16–17.

MESOSOMA. In profile view, promesonotal dorsum very weakly convex, propodeum more or less flat transversely; pronotum marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella

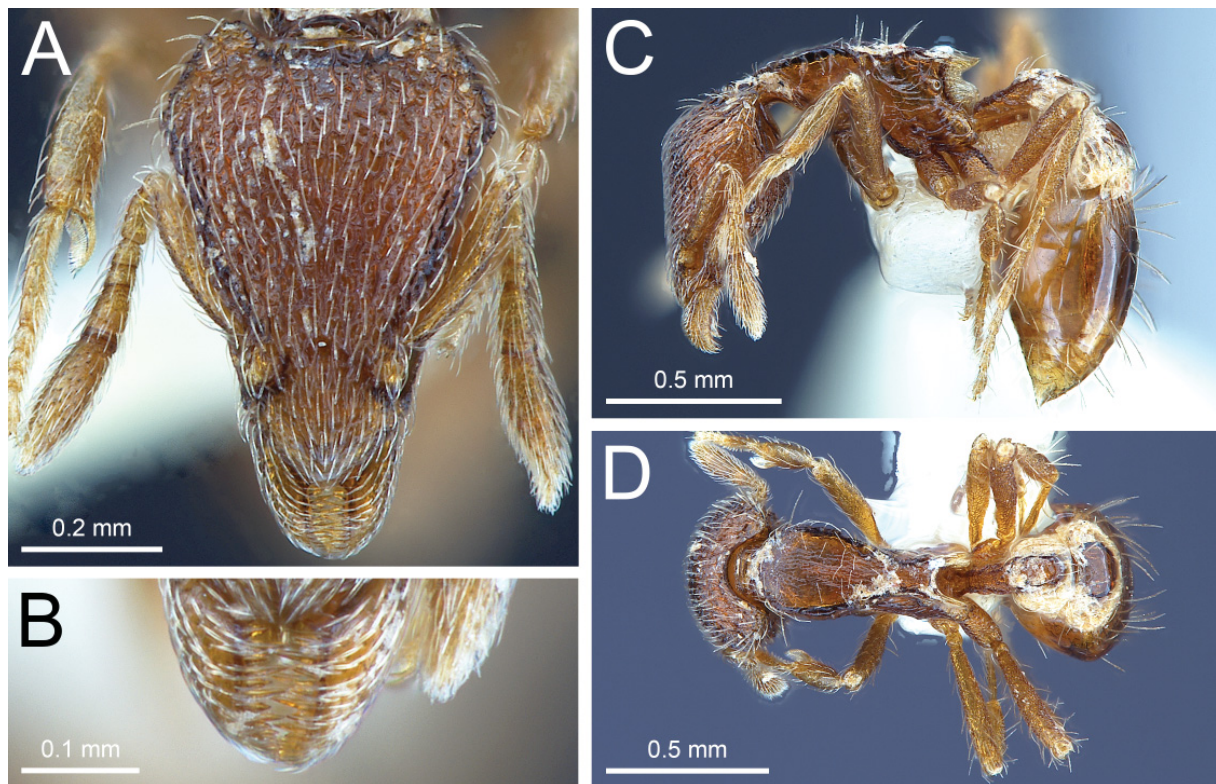


Fig. 12. Type specimens of *Strumigenys densissima* sp. nov. **A, C–D.** Holotype worker (ANTWEB1010908). **B.** Paratype worker (ANTWEB1010907). **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

with concave posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle grading evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around 1.6–1.7 times as long; disc of postpetiole broader than long, around 1.3–1.5 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of the petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum with long, appressed stout and truncated setae; clypeal dorsum covered with narrowly elliptic to acicular setae; mandibular dorsum covered with acicular setae; masticatory margins each with row of medially-directed fine setae. Surface of scape covered with appressed acicular setae; funiculus densely covered with long fine setae. Lateral margin of occipital lobe with 3–5 laterally-projecting setae; dorsolateral margin of head and leading edge of scape with decumbent setae; appressed setae present along occipital margin. In dorsal view, promesonotal dorsum sparsely with appressed stout and truncated setae; posteriorly-directed decumbent setae present along lateral margins. Pronotal humeral seta long, straight and stout. In profile view, erect setae on cephalic dorsum restricted to area between highest point of vertex and the occipital margin; suberect to erect setae also present on mesonotal dorsum in three pairs, on petiole in two pairs, on disc of postpetiole in one pair and all over gastral tergites; similar but suberect to decumbent setae also present on gastral sternites; ventral surface of head with decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of middle and hind femora, tibiae and basitarsi with long stout erect setae.

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose; surface of antennal scrobe, antenna and legs densely areolate. Mesosomal dorsum predominantly densely areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; dorsum of petiolar node areolate-rugulose. Side of pronotum mostly smooth and shining, with weak rugulae around margins; pleurae and side of propodeum densely areolate-rugulose. Disc of postpetiole mostly smooth and shining. Basigastral costulae short, around one third in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys densissima sp. nov. is a member of *elegantula*-complex in the *S. leptothrix*-group and shares all its characters (Bolton 2000).

Aside from *Strumigenys densissima* sp. nov., there are six other SEA species from the same species group (*S. ailaoshana*, *S. delicata* sp. nov., *S. elegantula*, *S. intermedia* sp. nov., *S. nankunshana* and *S. zhenghuii* sp. nov.) that share the following characters: both appressed and erect setae present on cephalic dorsum, pronotum marginate dorsolaterally, propodeal spines present and subtended by broad lamellae (Table 6). The pronotum dorsum of *S. densissima* is areolate-rugulose (instead of predominantly longitudinally-striated as in *S. ailaoshana*, or predominantly transversely-striated as in *S. nankunshana*); erect setae on the cephalic dorsum are restricted to the area between the highest point of the vertex and the occipital margin (instead of present sporadically across the cephalic dorsum as in *S. delicata*, *S. intermedia* or *S. zhenghuii*); appressed setae on the cephalic dorsum are all long, stout and truncated (instead of short, fine and apically-acute setae as in *S. delicata*, or mostly subspatulate setae as in *S. elegantula*).

Comparing with *S. elegantula*, the appressed setae of *S. densissima* sp. nov. on the clypeal dorsum are not drastically different from those on the cephalic dorsum in shape. In contrast, for *S. elegantula*, the

setae on the clypeal dorsum clearly transit into narrowly elliptic ones. The setae on the funiculus are also much finer and denser in *S. densissima* in comparison with *S. elegantula*. See comments under *S. intermedia* sp. nov. for a detailed comparison between the newly described species and the existing species of *S. leptothrix*-group.

Geographic range

Mainland China (Yunnan).

Ecology

Collected in forest. No other information available.

Strumigenys dohertyi Emery, 1897

Fig. 5G–I; Table 2

Strumigenys dohertyi Emery, 1897: 576 (w.) MYANMAR. Indomalaya.

Strumigenys inezae Forel, 1905: 12 (synonymized by Bolton 2000: 397).

Smithistruma (*Smithistruma*) *lamellignatha* Brown, 1953: 119, pl. 3 fig. 33 (synonymized by Bolton 2000: 397).

Strumigenys inezae var. *taipingensis* Forel, 1913: 83 (synonymized by Bolton 2000: 397).

Strumigenys (*Cephaloxys*) *dohertyi* – Emery 1924: 325.

Strumigenys (*Smithistruma*) *dohertyi* – Brown 1948: 105.

Pyramica dohertyi – Bolton 1999: 1673.

Strumigenys dohertyi – Baroni Urbani & De Andrade 2007: 118.

Material examined

MAINLAND CHINA – **Hainan Province** • 1 worker; Bawangling, BWLS6; 19.10423° N, 109.17608° E; 7 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 5 workers; Bawangling, BWLS8; 19.08559° N, 109.19128° E; 9 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 6 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL.

THAILAND – **Tak Province** • 2 workers, 1 queen; Thung Yai Naresuan Wildlife Sanctuary; 26 Feb. 2016; Sk. Yamane leg.; hand collection; KUM TH16-SKY-116. – **Trang Province** • 1 worker; Khao Chong; 7.54692° N, 99.79557° E; 30 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Measurements

Workers

TL 2.6, HL 0.62–0.64, HW 0.49–0.50, MandL 0.16–0.17, SL 0.31–0.32, EL 0.015–0.016, PW 0.23–0.24, ML 0.37–0.40, PL 0.18, PH 0.11, DPW 0.11–0.12, PPL 0.09–0.11, GL 0.35–0.39, CI 77–80, MI 26, SI 63–64, OI 13–14, LPI 59–60, DPI 62–63 (n=2).

Geographic range

Bhutan, mainland China (Guangxi, Hainan), Indonesia (Borneo, Java, Lesser Sunda Islands, Sumatra), Malaysia, Myanmar, Philippines, Thailand, Vietnam.

New record for Hainan.

Ecology

Collected in secondary forest.

Comments

Another common species in the Oriental and Sino-Japanese realms, which was also recorded in Guangxi Province, hence Hainan Province falls within the geographical range of the species. The presence in Guangdong Province of mainland China, as well as Cambodia and Laos, seems likely.

Strumigenys doriae Emery, 1887

Table 2

Strumigenys doriae Emery, 1887: 469, pl. 2 fig. 22 (w.) INDONESIA (Ambon I.). Australasia.

Strumigenys ulcerosa Brown, 1954a: 162 (synonymized by Bolton 2000: 774).

Material examined

THAILAND – **Phetchaburi Province** • 1 worker; Kaeng Krachan National Park; 370 m a.s.l.; 24 Jun. 2014; Sk. Yamane and M. Maruyama leg.; KUM TH14-SKY-21.

Geographic range

Mainland China (Yunnan), Indonesia (Borneo, Java, Lesser Sunda Islands, Maluku Islands, Sumatra), Malaysia, Thailand (Chiang Mai, Phetchaburi, Tak).

Ecology

Collected in forest at an elevation of 370 m.

Comments

A widespread species in the Oriental realm. In addition to the previous records in the north-eastern provinces of Thailand, we now report its presence in the central province of Phetchaburi. Its presence in Laos is likely.

Strumigenys doydeei sp. nov.

urn:lsid:zoobank.org:act:D7B231A9-7917-4DAA-ADD7-507635F5054D

Figs 13–15; Tables 2, 6

Diagnosis

Strumigenys doydeei sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum with appressed plank-like to spatulate setae; without laterally-projecting seta (at most 1–2 at occipital corner); in profile view, cephalic dorsum without any standing seta; pronotum marginated dorsolaterally; propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long erect setae.

Etymology

The species is named after Dr Puvadol Doydee for his support, kindness and hospitality during our journeys to Thailand. The name was created by adding the singular Latin genitive case suffix -i to the last name of a male person.

Type material

Holotype worker (Fig. 13)

VIETNAM • Đắk Nông Province, Nam Nung Reserve, Site 58; 12.17344° N, 107.77545° E; 895 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; rubber plantation; LKCNHMANTWEB1010892 (collection code IBBL NN-S58-sp01).

Paratype workers

VIETNAM • 6 workers; same collection data as for holotype; HKBM ANTWEB1010893 to ANTWEB1010898 (collection code IBBL NN-S58-sp01).

Paratype queen (Fig. 14)

VIETNAM • 1 alate queen; Đắk Nông Province, Nam Nung Reserve, Site 61; 12.17373° N, 107.76215° E; 905 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; rubber plantation; LKCNHM ANTWEB1010899 (collection code IBBL NN-S61-sp16).

Additional material examined

VIETNAM – **Đắk Nông Province** • 1 worker; Nam Nung Reserve, Site 61; 12.17373° N, 107.76215° E; 905 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 14 workers; Nam Nung Reserve, Site 60; 12.17097° N, 107.7708° E; 912 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker, 1 queen; Nam Nung Reserve, Site 62; 12.1731° N, 107.76395° E; 902 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL.

Measurements

Holotype worker

TL 2.6, HL 0.65, HW 0.47, MandL 0.10, SL 0.33, EL 0.079, PW 0.25, ML 0.62, PL 0.32, PH 0.14, DPW 0.09, PPL 0.17, GL 0.72, CI 73, MI 16, SI 69, OI 17, LPI 43, DPI 28.

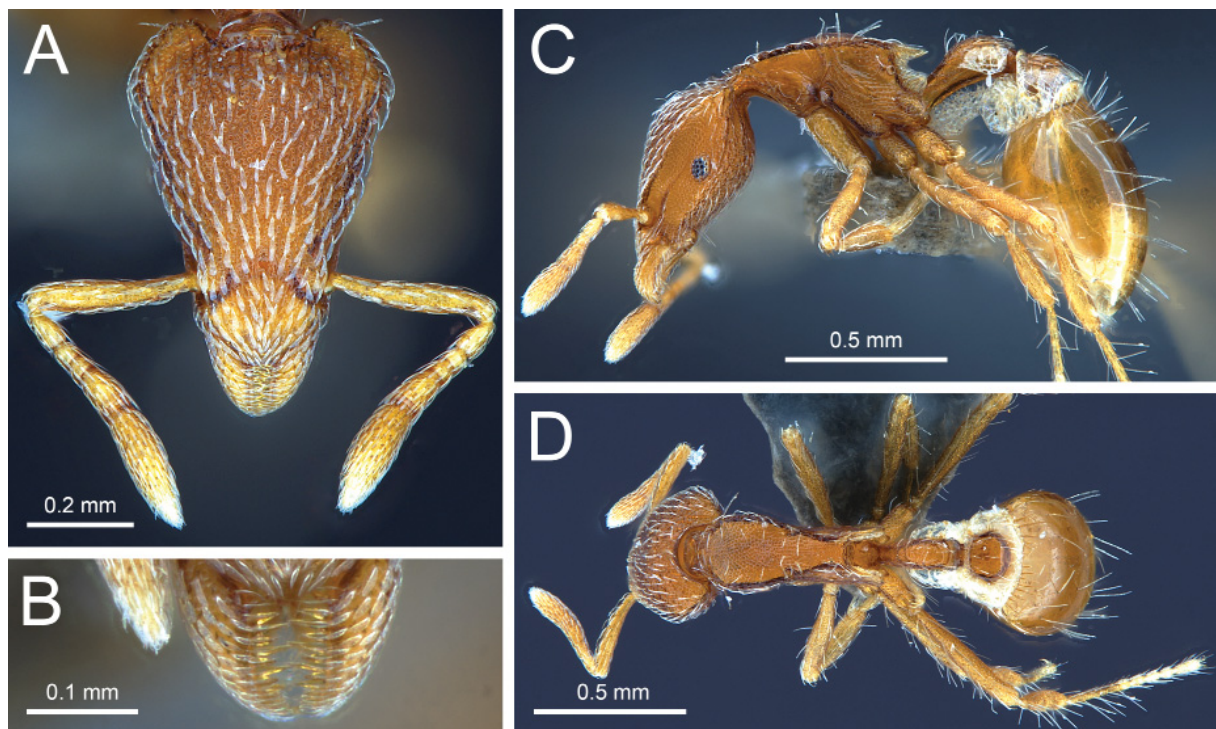


Fig. 13. Type specimens of *Strumigenys doydeei* sp. nov. **A, C–D.** Holotype worker (ANTWEB1010892). **B.** Paratype worker (ANTWEB1010897). **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

Paratype workers

TL 2.4–2.7, HL 0.60–0.65, HW 0.44–0.47, MandL 0.09–0.10, SL 0.30–0.32, EL 0.066–0.076, PW 0.23–0.27, ML 0.59–0.66, PL 0.29–0.37, PH 0.12–0.14, DPW 0.09–0.12, PPL 0.18–0.22, GL 0.65–0.75, CI 72–75, MI 13–16, SI 66–70, OI 15–17, LPI 38–47, DPI 29–32 (n=6).

Paratype queen

TL 3.1, HL 0.68, HW 0.54, MandL 0.15, SL 0.33, EL 0.136, PW 0.39, ML 0.85, PL 0.38, PH 0.18, DPW 0.12, PPL 0.20, GL 0.87, CI 79, MI 22, SI 62, OI 25, LPI 48, DPI 32 (n=1).

Worker description

HEAD. In full-face view, occipital margin deeply concave; occipital corners well developed and bluntly angular; occipital carina broad. Clypeus broader than long, around 1.3–1.4 times as long, roughly resembling inverted diamond. Scapes subcylindrical, margined but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles; basal lamellae low and broadly triangular, not fully visible at full closure. In profile view, eye with four ommatidia in diameter.

DENTITION (Fig. 13B). Principal dental row with eight alternating short triangular and long spiniform teeth (i.e., four consecutive pairs of teeth, each pair consists of short tooth followed by long tooth), second and third pairs subequal in size and longer than other pairs (short tooth of one pair compares with short tooth of another pair only, same for long tooth); followed by 3–4 small teeth and, at down curvature in anterior view, series of four minute denticles, terminating in small apical tooth. Total dental count of 16–17.

MESOSOMA. In profile view, mesosomal dorsum broadly convex; pronotum margined dorsolaterally. In dorsal view, lateral margins of the pronotum evenly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with deeply concave posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

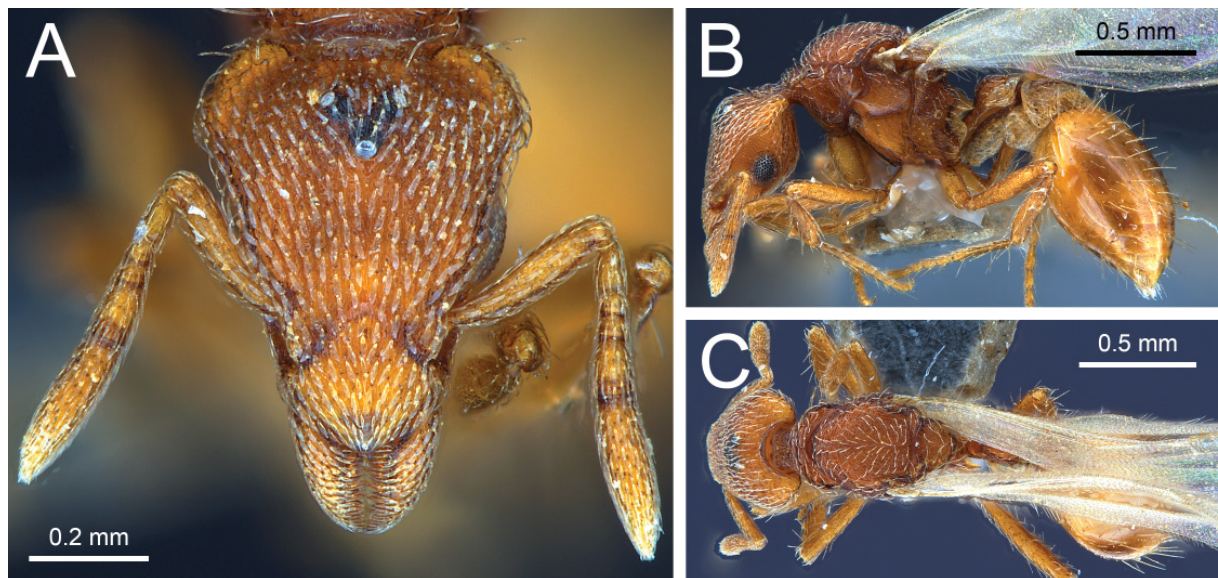


Fig. 14. Paratype queen (ANTWEB1010899) of *Strumigenys doydeei* sp. nov. A. Full-face view. B. Profile view. C. Dorsal view.

METASOMA. In profile view, petiolar peduncle grading evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around two times as long; disc of postpetiole slightly broader than long, around 1.1–1.2 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum with appressed spatuliform setae, ranging from plank-like setae near occipital margin to spatulate setae near posterior clypeal margin; clypeal dorsum covered with short spatulate to elliptic setae; mandibular dorsum covered with small ob lanceolate setae; masticatory margins each with row of medially-directed fine setae. Head without any laterally-projecting seta, at most 1–2 at the occipital corner; decumbent setae present along dorsolateral margin of head, those along lateral margin of occipital lobe overlap with one another. Surface of scape covered with appressed subspatulate setae; funiculus (except for apical antennomere) covered with appressed acicular setae; progressively finer setae densely covering apical antennomere. In dorsal view, promesonotal dorsum sparsely with appressed subspatulate setae; posteriorly-directed decumbent setae present along lateral margins; petiolar node and disc of postpetiole sparsely with appressed setae. Pronotal humeral seta straight and stout, longer than other setae on pronotal dorsum. In profile view, cephalic dorsum without any erect seta; erect stout setae present on mesonotal dorsum as three pairs, on petiole, on disc of postpetiole, and all over gastral tergites; ventral surface of head with decumbent setae; gastral sternites sparsely with suberect to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of middle and hind femora, tibiae and basitarsi with long stout erect setae.

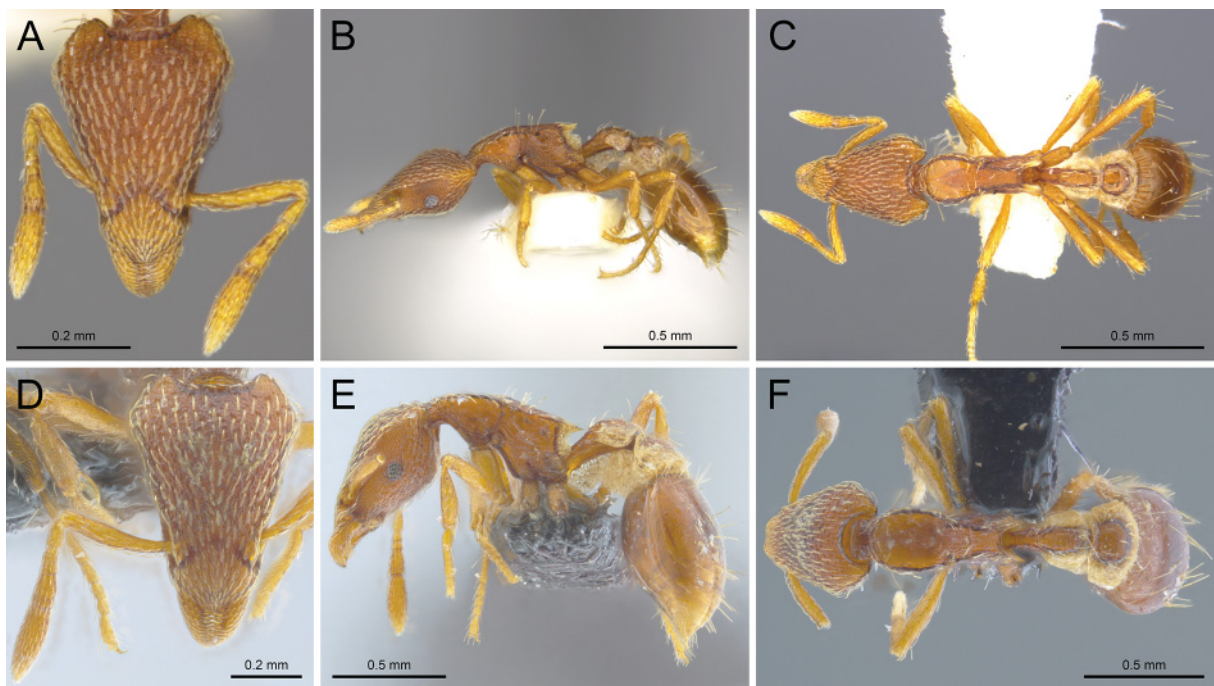


Fig. 15. Workers of *Strumigenys* cf. *doydeei* sp. nov. in full-face, profile and dorsal views. **A–C.** Worker from Thailand (CASENT0285186, taken by Cong Liu). **D–F.** Worker from Yunnan, mainland China (CASENT0715043, taken by Takumi Uchima, Environmental Science Section, OIST).

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose; surface of antennal scrobe, antenna and legs densely areolate. Promesonotal dorsum predominantly densely areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; propodeal dorsum and dorsum of petiolar node densely areolate-rugulose. Side of pronotum mostly smooth and shining, weakly areolate-rugulose around margins; pleurae and side of propodeum densely areolate-rugulose. Disc of postpetiole smooth and shining. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Queen description

Similar in all points to worker caste except for reproductive caste morphological characters (presence of 3 ocelli, enlarged eyes and thorax), and following: center of anepisternum and katepisternum each with patch of surface smooth and shining; promesonotal dorsum in profile densely covered with decumbent to appressed setae; petiolar node higher than in worker caste.

Comments

Strumigenys doydeei sp. nov. is a member of *elegantula*-complex in the *S. leptothrix*-group and shares all its characters (Bolton 2000).

Aside from *Strumigenys doydeei* sp. nov., there are five other SEA species from the same species group (*S. decumbens* sp. nov., *S. japonica*, *S. megaera*, *S. rongi* sp. nov. and *S. scolopax*) that share the following characters: cephalic dorsum covered with appressed spatuliform (elliptic, plank-like, linear, subspatulate, spatulate, oblanceolate, obovate or ovate) setae only, head without laterally-projecting seta in full-face view (at most limited to 1–2 at occipital corner for *S. doydeei*) (Table 6). Unlike the three existing species and *S. rongi*, for *S. decumbens* and *S. doydeei* the propodeal spines are subtended by broad lamellae (instead of narrow lamellae or carinae).

Strumigenys doydeei sp. nov. shares a very similar cephalic pilosity with *S. decumbens* sp. nov., though unlike *S. decumbens*, these appressed setae are generally more consistent in shape across the cephalic dorsum (instead of markedly transit from spatulate to plank-like setae towards the occipital margin). *Strumigenys doydeei* also has laterally-projecting setae on the middle and hind femora, tibiae and tarsi (instead of decumbent to appressed setae only as in *S. decumbens*). See comments under *S. intermedia* sp. nov. for a detailed comparison between the newly described species and the existing species from *S. leptothrix*-group.

Specimens from Yunnan Province of mainland China (CASENT0715042–CASENT0715045) (Fig. 15D–F) and Chaiyaphum Province of Thailand (CASENT0285186) (Fig. 15A–C) that were previously reported as *S. ailaoshana* and *S. elegantula*, respectively, are now re-identified as *S. cf. doydeei* instead based on specimen photos. The Yunnan specimen has narrower setae on its antennae than specimens from elsewhere (acicular vs subspatulate), no other morphological difference is observed. The Thai specimen appears to be smaller than the specimens from Vietnam. With the records from Yunnan Province of mainland China, central Thailand and southern Vietnam, this species is likely widely distributed within the Indochinese Peninsula. Future records in Cambodia and Laos seem likely.

Geographic range

Mainland China (Yunnan), Thailand (Chaiyaphum), Vietnam (Đắk Nông).

Ecology

Collected in rubber plantations at elevations from 895 to 912 m.

Strumigenys dyschima (Bolton, 2000)

Table 2

Pyramica dyschima Bolton, 2000: 451, fig. 264 (w.) BORNEO. Indomalaya.

Strumigenys dyschima – Baroni Urbani & De Andrade 2007: 119.

Geographic range

Indonesia (Borneo), Malaysia (East Malaysia).

Comments

The previous record from Yunnan (Liu *et al.* 2015) is now re-identified as *S. formosa* (Terayama *et al.*, 1995) instead. See *S. formosa* for a detailed discussion. With the correction, the native range of *S. dyschima* is once again limited to the Sundaic region (Borneo).

Strumigenys elegantula (Terayama & Kubota, 1989)

Figs 2C, 16; Table 2

Smithistruma elegantula Terayama & Kubota, 1989: 788, figs 23-27 (w.q.) TAIWAN. Indomalaya.

Pyramica elegantula – Bolton 1999: 1673.

Strumigenys elegantula – Baroni Urbani & De Andrade 2007: 119.

Diagnosis

Strumigenys elegantula can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum with appressed plank-like to subspatulate setae; laterally-projecting seta present in full-face view; in profile view, erect seta on cephalic dorsum restricted to area between highest point of the vertex and occipital margin; pronotum marginated dorsolaterally; propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long erect setae.

Material examined

HONG KONG • 1 worker; Lantau Island, Penny's Bay; 22.32589° N, 114.03385° E; 22 m a.s.l.; 10 Oct. 2017; M. Pierce leg.; pitfall trap; IBBL ANTWEB1009804 • 1 worker; same collection data as for preceding; 13 Oct. 2017; M. Pierce leg.; pitfall trap; IBBL ANTWEB1009733 • 4 workers; same collection data as for preceding; IBBL ANTWEB1011994 to ANTWEB1011997 • 1 worker; same collection data as for preceding; IBBL ANTWEB1009764 • 2 workers; North District, Lai Chi Wo; 22.527° N, 114.258° E; 8 May 2015; R.H. Lee leg.; Winkler; IBBL • 1 worker; Tsuen Wan District, Tai Lam Country Park; 22.38091° N, 114.05324° E; 8 Nov. 2017; R. Cheung and M. Pierce leg.; Winkler, 4 corners; IBBL ANTWEB1016431.

THAILAND – **Trang Province** • 5 workers; Khao Chong, Site 17 (KCW17); 7.26719° N, 99.65431° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011959 • 1 worker; same collection data as for preceding; IBBL ANTWEB1011998.

Measurements

Workers

TL 2.3–2.5, HL 0.57–0.63, HW 0.41–0.45, MandL 0.08–0.10, SL 0.27–0.32, EL 0.06–0.07, PW 0.20–0.25, ML 0.56–0.62, PL 0.29–0.32, PH 0.12–0.14, DPW 0.09–0.11, PPL 0.16–0.19, GL 0.61–0.77, CI 71–73, MI 13–17, SI 66–72, OI 14–16, LPI 40–43, DPI 30–35 (n=9).

Worker redescription

HEAD. In full-face view, occipital margin broadly concave; occipital corners well developed and bluntly angular; occipital carina broad. Clypeus slightly broader than long, around 1.1–1.3 times as long, roughly resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles; basal lamellae low and broadly triangular, not fully visible at full closure. In profile view, eye with four ommatidia in diameter.

DENTITION (Fig. 2C). Principal dental row with eight alternating short triangular and long spiniform teeth (i.e., four consecutive pairs of teeth, each pair consists of short tooth followed by long tooth), second and third pairs subequal in size and longer than other pairs (short tooth of one pair compares with short tooth of another pair only, same for long tooth); followed by 3–4 small teeth and, at down curvature in anterior view, series of four minute denticles, terminating in small apical tooth. Total dental count of 16–17.

MESOSOMA. In profile view, promesonotal dorsum broadly convex, propodeum more or less flat transversely; pronotum marginated dorsolaterally. In dorsal view, lateral margins of pronotum broadly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with concave posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle grading evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around two times as long; disc of postpetiole broader than long, around 1.4–1.5 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

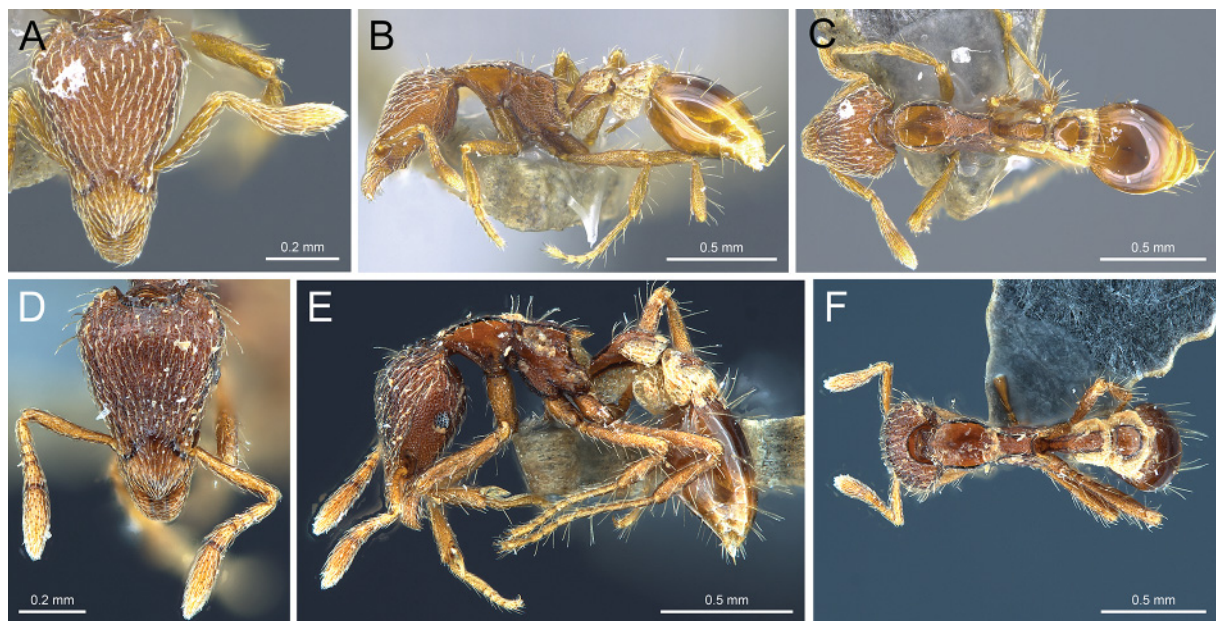


Fig. 16. Workers of *Strumigenys elegantula* (Terayama & Kubota, 1989) in full-face, profile and dorsal views. **A–C.** Worker from Hong Kong (ANTWEB1009804). **D–F.** Worker from Thailand (ANTWEB1011998).

PILOSITY. In full-face view, cephalic dorsum with appressed setae, ranging from plank-like setae near occipital margin to subspatulate setae near posterior clypeal margin; clypeal dorsum covered with short narrowly elliptic setae; mandibular dorsum covered with small narrowly elliptic to acicular setae; masticatory margins each with row of medially-directed fine setae. Lateral margin of occipital lobe with around 5–6 laterally-projecting setae; dorsolateral margin of head and leading edge of scape with decumbent setae; appressed setae present along occipital margin. Surface of scape covered with appressed acicular setae; funiculus covered with appressed, progressively finer setae. In dorsal view, promesonotal dorsum sparsely with appressed setae; posteriorly-directed decumbent setae present along lateral margins; petiolar node sparsely with appressed setae. Pronotal humeral seta straight and stout, longer than other setae on pronotal dorsum. In profile view, erect setae on cephalic dorsum restricted to area between highest point of vertex and occipital margin; erect stout setae present on mesonotal dorsum as three pairs, on petiole, on disc of postpetiole, and all over gastral tergites; ventral surface of head with decumbent setae; gastral sternites sparsely with suberect to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of middle and hind femora, tibiae and basitarsi with long stout erect setae.

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose; surface of antennal scrobe, antenna and legs densely areolate. Promesonotal dorsum predominantly, relatively weakly areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; propodeal dorsum densely areolate-rugulose; dorsum of petiolar node transversely rugulose. Side of pronotum mostly smooth and shining, with weak rugulae around margins; pleurae and side of propodeum densely areolate-rugulose. Disc of postpetiole smooth and shining. Basigastral costulae short, around one fourth in length of first gastral tergite; rest of gaster smooth and shining.

Geographic range

Mainland China (Guangdong, Guangxi, Hong Kong), Taiwan, Thailand (Chiang Mai, Mukdahan, Trang).

Ecology

Collected in Fengshui wood, semi-open forest, reclaimed land and rubber plantation.

Comments

After the description of *Strumigenys intermedia* sp. nov. and *Strumigenys doydeei* sp. nov., some of the specimens that were once recognized as *S. elegantula* are now re-identified accordingly. As such, we have revised the description of *S. elegantula*, based on photos of the type specimen from Taiwan, as well as the specimens from Hong Kong and Thailand. See *Strumigenys intermedia* for a detailed comparison between the species.

Specimens from Macau and the majority of those from Hong Kong are now re-identified as *S. intermedia* sp. nov., while CASENT0285186 from Chaiyaphum Province of Thailand (inspected by Bolton (2000) and currently recorded on AntWeb) (Fig. 15A–C) should be *S. cf. doydeei* sp. nov. instead. Specimens from Guangdong and Guangxi provinces of mainland China should be revisited to verify their identification. However, with the confirmation of its presence in Hong Kong (Fig. 16A–C) and Thailand (Fig. 16D–F), the geographic range of the species is unlikely to be drastically changed after the revision. Its presence in Fujian Province of mainland China, as well as Laos and Vietnam is likely.

After a careful examination of our specimens with opened mandibles, we have determined that *S. elegantula* has a different dentition pattern in comparison with *S. leptothrix* (Fig. 2C) and should be placed in a separate species complex. Specimens from Taiwan should be checked if they have the same dental morphology. See the species group section for detailed discussion.

Strumigenys emmae (Emery, 1890)

Fig. 17A–C; Table 2

Epitritus emmae Emery, 1890: 70, pl. 8 fig. 6 (w.) ANTILLES. Neotropic.

Epitritus clypeatus Szabó, 1909: 27, fig. 1 (synonymized by Brown, 1949a: 48).

Epitritus clypeatus var. *malesiana* Forel, 1913: 83 (synonymized by Brown, 1949a: 48).

Epitritus wheeleri Donisthorpe, 1916: 121 (synonymized by Brown, 1949a: 48).

Quadristruma emmae – Brown 1949: 48.

Strumigenys emmae – Bolton 1999: 1674.

Material examined

THAILAND – **Bueng Kan Province** • 4 workers; Site 88; 17.84684° N, 103.93899° E; 179 m a.s.l.; 20 Jun. 2018; IBBL members legs.; Winkler, 4 corners; IBBL ANTWEB1011939 • 1 queen; Site 92; 17.84931° N, 103.93221° E; 173 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL. – **Trang Province** • 3 workers; Khao Chong, Site 24; 7.25533° N, 99.71729° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

VIETNAM – **Đông Nai Province** • 1 worker; Cat Tien National Park; 11.36605° N, 107.49292° E; 170 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.37042° N, 107.50924° E; 175 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Geographic range

Native: Australia.

Introduced: Oriental realm (India; Indonesia: Borneo, Java, Sulawesi, Sumatra; Malaysia; Philippines; Sri Lanka; Singapore; Taiwan; Thailand: Bueng Kan, Trang; Vietnam), Sino-Japanese realm (mainland China: Hong Kong, Macau; Japan: Daito Islands, Okinawa, Ogasawara Islands). For a full global account refer to antmaps.org (Janicki *et al.* 2016; Guénard *et al.* 2017).

New record for Thailand.

Ecology

Collected in rubber plantations in both Thailand and Vietnam.

Comments

A widespread tramp species present in tropical and sub-tropical regions around the globe, including Malaysia and Vietnam. Its record in Thailand was expected. Its presence in Laos and Cambodia, as well as Guangdong, Guangxi and Hainan provinces of mainland China is likely.

Strumigenys exilirhina Bolton, 2000

Fig. 17D–F; Table 2

Strumigenys exilirhina Bolton 2000: 881 (w.q.) NEPAL. Indomalaya.

Material examined

MAINLAND CHINA – **Guangxi Province** • 1 worker; Dapingshan; 25 Sep. 1998; J. Fellowes leg.; IBBL ANTWEB1011908. – **Hainan Province** • 2 workers; Diaoluoshan; 24 May 1999; J. Fellowes

leg.; IBBL ANTWEB1011909 • 39 workers; BM6; 19.925° N, 110.261° E; 12 Aug. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; BM6; same collection data as for preceding; IBBL • 6 workers; BM6; same collection data as for preceding; Winkler, 12 random; IBBL • 2 workers; BM7; 19.194° N, 109.739° E; 23 Aug. 2015; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; BM7; same collection data as for preceding; Winkler, 4 corners; IBBL • 10 workers; Bawangling, BWLR2; 19.162828° N, 109.034511° E; 12 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLR3; 19.17547° N, 109.02785° E; 12 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 5 workers; Bawangling, BWLR4; 19.13014° N, 109.06585° E; 13 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 4 workers; Bawangling, BWLR6; 19.12737° N, 109.07055° E; 13 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLR7; 19.19498° N, 109.02010° E; 15 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLS1; 19.11877° N, 109.16342° E; 22 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 19 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLS10; 19.11878° N, 109.15562° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 10 workers; Bawangling, BWLS11; 19.11678° N, 109.14003° E; 10 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 20 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 1 worker; Huoshankou, HSK2; 5 Jul. 2015; L. Wang leg.;

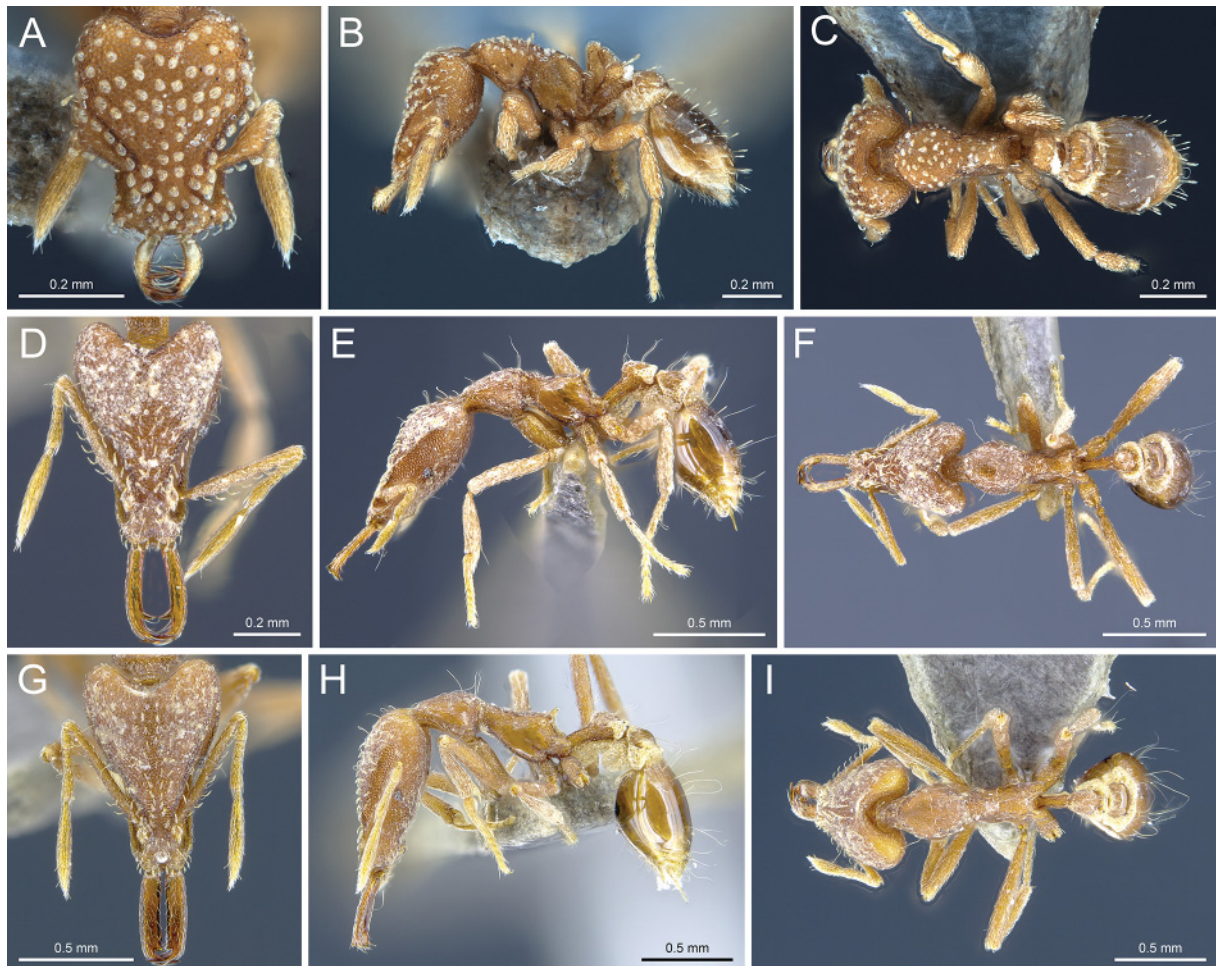


Fig. 17. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. **A–C.** Worker of *S. emmae* Emery, 1890 from Thailand (ANTWEB1011939). **D–F.** Worker of *S. exilirhina* Bolton, 2000 from Hainan, mainland China (HNA-00471). **G–I.** Worker of *S. feae* Emery, 1895 from Hainan, mainland China (HNA-01127).

Winkler, 4 corners; IBBL • 8 workers; Jianfengling, JFLFW1; 19.117° N, 109.152° E; 24 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; Jianfengling, JFLFW2; 19.115° N, 109.159° E; 26 Dec. 2015; L. Wang leg.; Winkler, 12 random; IBBL • 5 workers; Jianfengling, JFLFW3; 19.121° N, 109.118° E; 26 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 14 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 33 workers; Jianfengling, JFLFW5; 18.697° N, 108.849° E; 4 Jan. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 8 workers; Yinggeling, YGLK1; 19.03775° N, 109.39278° E; 30 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 33 workers; Yinggeling, YGLK10; 19.07874° N, 109.50318° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 12 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 5 workers; Yinggeling, YGLK11; 19.07802° N, 109.50424° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 3 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 3 workers; Yinggeling, YGLK12; 19.08446° N, 109.50425° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 20 workers; Yinggeling, YGLK13; 19.08432° N, 109.26697° E; 3 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 22 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 3 workers; Yinggeling, YGLK14; 19.10743° N, 109.25845° E; 3 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 11 workers; Yinggeling, YGLK15; 19.11494° N, 109.26105° E; 3 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 1 worker; Yinggeling, YGLK2; 19.03875° N, 109.39525° E; 30 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 3 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 16 workers; Yinggeling, YGLK3; 19.04399° N, 109.39297° E; 30 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 12 workers; Yinggeling, YGLK4; 19.07700° N, 109.52288° E; 31 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 5 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 2 workers; Yinggeling, YGLK5; 19.07558° N, 109.52462° E; 31 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 3 workers; Yinggeling, YGLK5; same collection data as for preceding; Winkler, 12 random; IBBL • 14 workers; Yinggeling, YGLK6; 19.07632° N, 109.52365° E; 31 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 3 workers; Yinggeling, YGLK7; 19.09177° N, 109.53691° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 5 workers; Yinggeling, YGLK9; 19.09269° N, 109.53455° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; same collection data as for preceding; Winkler, 12 random; IBBL.

HONG KONG • 1 worker, 1 queen; Sai Kung District, Tit Kim Hang East; 22.40541° N, 114.30226° E; 90 m a.s.l.; 1 Aug. 1996; J. Fellowes leg.; HKBM • 4 workers; Sai Kung District, Tit Kim Hang West; 22.40446° N, 114.30130° E; 60 m a.s.l.; 14 Nov. 1996; J. Fellowes leg.; HKBM.

Geographic range

Bhutan, mainland China (Guangdong, Guangxi, Hainan, Hong Kong, Jiangxi, Macau, Tibet, Yunnan), India (Meghalaya, Uttar Pradesh), Japan (Okinawa Prefecture), Nepal, Thailand.

New record for Guangxi and Hainan.

Ecology

Another frequently collected species in Hainan, which has been collected in primary and secondary forest, urban park, plantations and agro-rubber plantations. Indochinese specimens have also been collected in similar range of habitats, with known elevation from 174 to 911 m.

Comments

Species with widespread distribution across continental China and east to India. Its presence in Guangxi and Hainan provinces completes the known distribution range of this species within Southeast China.

Most specimens collected from southern Thailand and Vietnam, after a careful examination of the morphology of their mandibles, in particular the preapical tooth, were identified as closer to *S. feae* Emery, 1895 than *S. exilirhina* (Fig. 18F). Together with the remarks made by Bolton (2000) on the preapical tooth morphology of specimens from Thailand, it is possible that at least some of the *S. exilirhina* previously recorded in Thailand should be reconsidered, thus a re-examination of specimens is recommended. It is also possible that these Indochinese specimens constitute a separate species, though at the moment they cannot be delimited as a new species without ambiguity. Refer to *S. feae* for a detailed discussion.

Strumigenys feae Emery, 1895

Fig. 17G–I; Table 2

Strumigenys feae Emery 1895: 473 (w.q.) MYANMAR. Indomalaya.

Strumigenys feae var. *formosensis* Forel, 1912: 52. **Syn. nov.**

Material examined

MAINLAND CHINA – **Hainan Province** • 1 worker; Bawangling, BWLP8; 19.09125° N, 109.20155° E; 3 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLR7; 19.19498° N, 109.02010° E; 15 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLS11; 19.11678° N, 109.14003° E; 10 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 4 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 4 workers; Bawangling, BWLS12; 19.11796° N, 109.13055° E; 15 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 6 workers; Bawangling, BWLS2; 19.09193° N, 109.18389° E; 6 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLS4; 19.09674° N, 109.17778° E; 30 Jun. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 4 workers; Bawangling, BWLS5; 19.10036° N, 109.17835° E; 7 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLS9; 19.08973° N, 109.19127° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 4 workers; Jianfengling, JFLFW1; 19.117° N, 109.152° E; 24 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 1 worker; Jianfengling, JFLFW3; 19.121° N, 109.118° E; 26 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 3 workers; Jianfengling, JFLFW5; 18.697° N, 108.849° E; 4 Jan. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL.

HONG KONG • 1 worker; Tai Po District, Tai Om; 29 Sep. 2007; J. Fellowes leg.; HKBM.

JAPAN – **Satsunan Islands** • 2 workers; Yonaguni Jima, Mandabaru; 11 Mar. 2020; Sk. Yamane leg.; hand collection; KUM JP20-SKY-31.

THAILAND – **Bueng Kan Province** • 1 queen; 17.84663° N, 103.94113° E; 178 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; 17.84684° N, 103.93899° E; 179 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; 17.84731° N, 103.93766° E; 181 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 queen; 17.85925° N, 103.92703° E; 172 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL. – **Kalasin Province** • 1 queen; 16.80766° N, 103.88383° E; 525 m a.s.l.; 17 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL. – **Kanchanaburi Province** • 1 queen; Srinakarin Dam National Park; 150–200 m a.s.l.; 29 Jun. 2002; Sk. Yamane leg.; KUM. – **Sakon Nakhon Province** • 1 worker, 1 queen; 17.0907° N, 103.9799° E; 327 m a.s.l.; 18 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers, 1 queen; 17.11857° N, 104.00355° E; 405 m a.s.l.; 18 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 19 workers, 4 queens; 17.12902° N, 104.00193° E; 484 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 7 workers; 17.13092° N, 104.00115° E; 469 m a.s.l.; 21

Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 26 workers; same collection data as for preceding; IBBL. – **Trang Province** • 1 worker, 1 queen; Khao Chong; 7.25423° N, 99.71394° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 4 workers, 1 queen; Khao Chong; 7.25533° N, 99.71729° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 14 workers, 1 queen; Khao Chong; 7.26393° N, 99.66812° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.26806° N, 99.65777° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.27155° N, 99.65874° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 queen; Khao Chong; 7.27201° N, 99.65614° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.27201° N, 99.65614° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.54197° N, 99.79446° E; 30 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers; Khao Chong; 7.54246° N, 99.79651° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54309° N, 99.80029° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.5436° N, 99.8067° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.54395° N, 99.80502° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 6 workers; Khao Chong; 7.54496° N, 99.80184° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54525° N, 99.79203° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 4 workers; same collection data as for preceding; IBBL • 12 workers; Khao Chong; 7.54692° N, 99.79557° E; 30 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 6 workers; Khao Chong; 7.54765° N, 99.78864° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.55471° N, 99.78834° E; 1 Jan. 2019; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.55487° N, 99.7865° E; 1 Jan. 2019; Winkler, 4 corners; IBBL • 4 workers; Khao Chong; 7.55521° N, 99.79266° E; 1 Jan. 2019; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.55602° N, 99.78968° E; 1 Jan. 2019; Winkler, 4 corners; IBBL • 1 worker, 1 queen; Khao Chong; 7.55606° N, 99.78436° E; 1 Jan. 2019; Winkler, 4 corners; IBBL.

VIETNAM – **Đắk Nông Province** • 2 workers; Nam Nung Reserve; 12.22927° N, 107.83662° E; 805 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 8 workers; Nam Nung Reserve; 12.23025° N, 107.83087° E; 886 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 2 workers; Nam Nung Reserve; 12.23077° N, 107.83063° E; 909 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 2 workers, 1 queen; Nam Nung Reserve; 12.23113° N, 107.83153° E; 907 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 4 workers; Nam Nung Reserve; 12.23077° N, 107.83045° E; 911 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL. – **Đồng Nai Province** • 7 workers, 1 queen; Cat Tien National Park; 11.44912° N, 107.35963° E; 140 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.45298° N, 107.36467° E; 174 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Cat Tien National Park; 11.45683° N, 107.36852° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 queen; Cat Tien National Park; 11.36548° N, 107.49062° E; 170 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 queen; Cat Tien National Park; 11.36651° N, 107.49233° E; 169 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 queen; Cat Tien National Park; 11.370325° N, 107.513384° E; 172 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Cat Tien National Park; 11.45688° N, 107.36958° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Measurements

Workers

TL 3.0–3.5, HL 0.78–0.92, HW 0.52–0.60, MandL 0.37–0.41, SL 0.51–0.57, EL 0.054–0.072, PW 0.26–0.31, ML 0.78–0.90, PL 0.29–0.36, PH 0.13–0.16, DPW 0.12–0.14, PPL 0.16–0.21, GL 0.54–0.74, CI 64–66, MI 44–49, SI 92–100, OI 10–13, LPI 43–48, DPI 36–43 (n=13).

Geographic range

Cambodia, mainland China (Guangxi, Hainan, Hong Kong, Macau, Yunnan), Japan (Satsunan Islands), Myanmar, Pakistan, Taiwan, Thailand, Vietnam.

New record for Guangxi, Hainan, Japan and Taiwan.

Ecology

Collected in primary forest, secondary forest, mature forest and rubber plantation. Known elevation from 140 to 525 m.

Comments

The species status of *S. formosensis* syn. nov., which was initially raised from being a subspecies of *S. feae* to species level by Brown “arbitrarily” (1949: 19) and without examining any specimen of *S. feae*, was questioned in Tang *et al.* (2019) based on specimens from Hong Kong. Observable morphological differences between *S. feae* and *S. formosensis* syn. nov. from pictures of the type specimens is limited to the morphology of the preapical teeth; the same can also be applied to the revised descriptions by Bolton (2000). Here, we report that assessment of the specimens from Hainan resulted in a similar observation as in Tang *et al.* (2019). Morphotypes cannot be definitely delimited into one with a medially-directed preapical tooth and another one with a preapical tooth in line with the inner margin of the mandible. Instead, specimens collected from various locations in Hainan (and Hong Kong) presented a continuum between the two extremes (Fig. 18B–C). Preapical teeth with various sizes and mandibles with differences in morphology are also observed. Some individuals have slightly broader mandibles and more irregular outlines (Fig. 18B–C), while others have slightly narrower mandibles and straighter outlines (Fig. 18E–F). But these are not two distinct morphotypes, and, like preapical tooth morphology, there are intermediary forms in-between the two extremes. Hence, based on current evidence, *S. feae* is a species with a considerable variation in preapical tooth and mandible morphology. *Strumigenys formosensis* syn. nov. should be, once again, considered as a junior synonym of *S. feae*. Consequently, after this synonymization and the report of new records from Hainan Province of mainland China and Satsunan Islands of Japan, *S. feae* has an almost-continuous distribution within Asia ranging from Taiwan to Thailand and Myanmar, with only Fujian and Guangdong provinces of mainland China and Laos lacking records for this species, but it is very likely to be also present there.

Bolton (2000) mentioned that *S. exilirhina* “series from Thailand tend to have the preapical tooth slightly smaller and somewhat closer to the apicodorsal tooth than in material from elsewhere”. Our specimens collected from both northeast and southern Thailand as well as Vietnam display a similar morphology (Fig. 18G–H). In fact, upon close inspection and after direct comparison with specimens of *S. exilirhina* from southern China (Fig. 18I), in addition to the size and placement of the preapical tooth, there are other morphological differences between them. The overall inner margin of the mandible of *S. exilirhina*, before and after where the preapical tooth arises, shows a continuous contour; the preapical tooth is also well differentiated from the inner margin by an angle both in front and after the tooth. On the other hand, the inner margin of the mandible in specimens from the Indochinese Peninsula does not show a continuous contour due to a marked change in mandible width before and after where the tooth arises; the inner margin of the mandible evenly grading into the preapical tooth at the basal end, the tooth is only well differentiated from the inner margin by an angle at the apical end (Fig. 18G). Both of these put Indochinese specimens closer to *S. feae* than to *S. exilirhina*. In contrast to the distinctively curvilinear mandibles of *S. exilirhina* from southern China, Indochinese specimens have a rather straight inner margin of the mandible, similar to typical *S. feae*. Hence, they are closer to *S. feae* than to *S. exilirhina* considering their overall mandible morphology. We thus consider that it is more appropriate for Indochinese specimens to be temporarily considered as *S. feae* based on the current

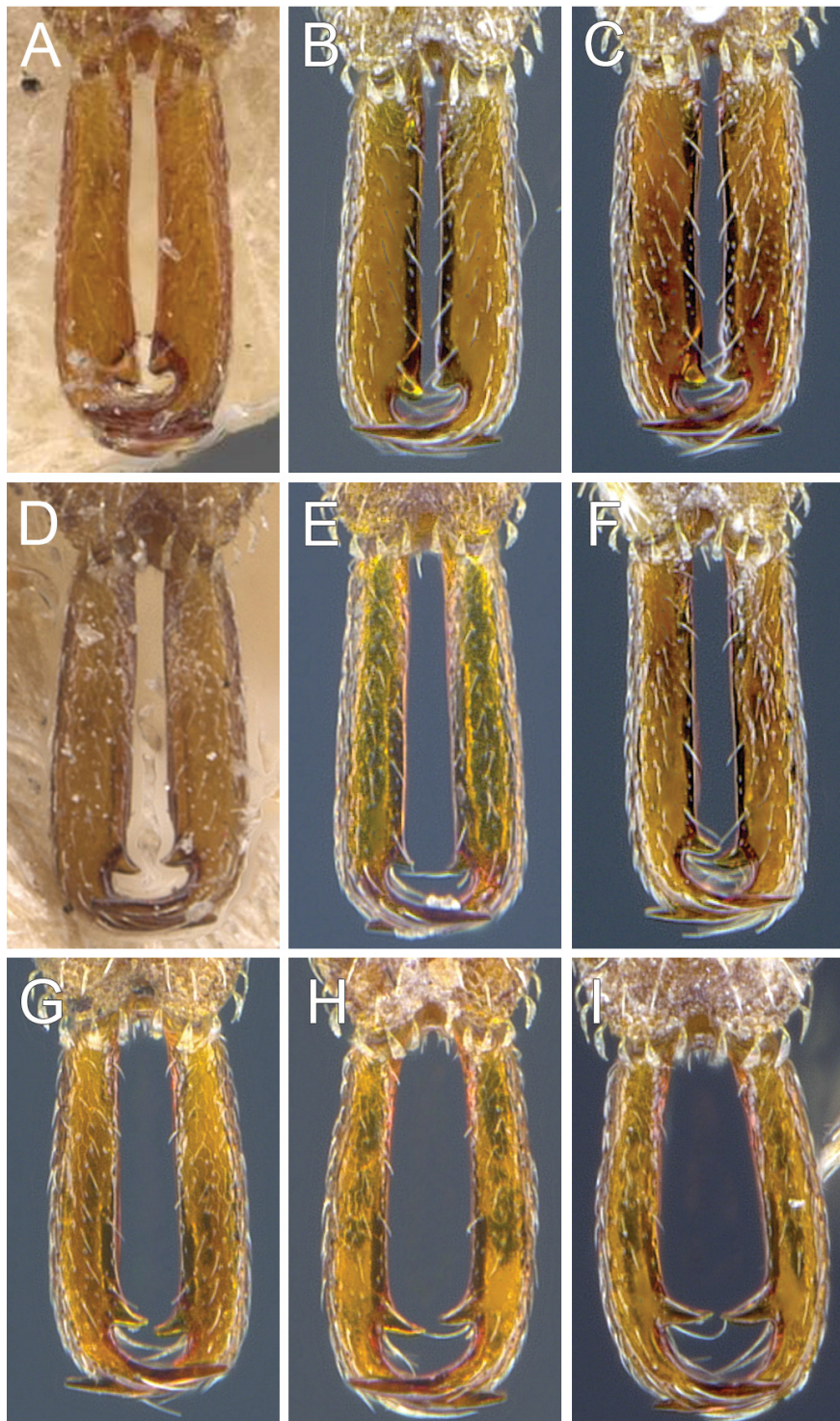


Fig. 18. Mandible close-ups of sibling species of *Strumigenys* Smith, 1860 from the *feae*-complex of the *S. mayri*-group. **A.** Syntype worker of *S. formosensis* syn. nov. before synonymization. **B–C, F.** Workers of *S. feae* Emery, 1895 from Hainan, mainland China. **D.** Syntype worker of *S. feae*. **E.** Worker of *S. feae* from Hong Kong. **G–H.** *S. cf. feae* from Vietnam. **I.** *S. exilirhina* from Hainan, mainland China. **A.** CASENT0909309, from AntWeb, taken by Zach Lieberman. **B.** HNA-01503. **C.** HNA-01127. **D.** CASENT0904951, from AntWeb, taken by Will Ericson. **E.** RHL01266. **F.** HNA-01520. **G.** CT-S13-4m2-sp15. **H.** NN-S69-sp18-W1. **I.** HNA-00471.

diagnosis of the species. It is possible that they constitute a separate species, but a delimitation based on mandible morphology solely appears to be difficult. The first challenge would be to clearly differentiate between *S. feae* (Fig. 18A–F) and *feae*-like Indochinese specimens (Fig. 18G). There are also a handful of Indochinese specimens (Fig. 18H) that bridge *feae*-like morphotypes and *S. exilirhina*, which further complicates the issue.

Strumigenys fellowesi sp. nov.

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Fig. 19; Tables 2, 7

Diagnosis

Strumigenys fellowesi sp. nov. can be distinguished from other species in the *S. godeffroyi*-group by a combination of the following characters: mandible slightly tapered distally, preapical tooth very close to apical fork of mandible; apicoscrobial seta and pronotal humeral seta flagellate; cephalic dorsum, promesonotal dorsum, petiolar node, disc of postpetiole and gaster with decumbent to erect spatulate to subspatulate setae; pronotal dorsum and side of mesosoma mostly smooth and shining; dorsum of petiolar node fully sculptured; propodeal spines subtended by broad lamellae; petiolar node high, with differentiated anterior face, not claviform; dorsal surface of femur without any erect seta; hind tibiae and basitarsi with long projecting flagellate setae.

Etymology

The species is named after Dr John R. Fellowes in recognition of his excellent early work on ants in South China, and his generosity in providing us his collection that led to the recognition of this new species. The name was created by adding the singular Latin genitive case suffix *-i* to the last name of a male person.

Type material

Holotype worker (Fig. 19)

CHINA • Guangxi Province, Jiuwanshan, JWS136; 25 Jul. 1998; J. Fellowes leg.; “STRUM cf#5(25.vii.98) JWS136” [original label]; LKCNHM ANTWEB1011894 (collection code IBBL JF0020).

Paratype worker

MAINLAND CHINA • 1 worker; same collection data as for holotype; HKBM ANTWEB1011893 (collection code IBBL JF0020).

Measurements

Holotype worker

TL 3.5, HL 0.80, HW 0.52, MandL 0.31, SL 0.54, EL 0.078, PW 0.32, ML 0.96, PL 0.39, PH 0.18, DPW 0.16, PPL 0.23, GL 0.78, CI 65, MI 39, SI 104, OI 15, LPI 46, DPI 40.

Paratype worker

TL 3.5, HL 0.79, HW 0.53, MandL 0.32, SL 0.54, EL 0.071, PW 0.32, ML 0.95, PL 0.37, PH 0.19, DPW 0.16, PPL 0.25, GL 0.83, CI 68, MI 41, SI 101, OI 13, LPI 50, DPI 43 (n=1).

Worker description

HEAD. In full-face view, occipital margin evenly, deeply concave; occipital corners well developed and bluntly angular; preocular lamina wide; posterior clypeal margin well-defined, converged at midpoint at an angle slightly smaller than a right angle; anterior clypeal margin mostly transverse. Mandible curvilinear but slightly tapered distally, with an elongated preapical tooth located very close to the apicodorsal

tooth, hence superficially resembles a mandible with three apical teeth; the preapical tooth distinctly longer than the width of mandible at the point where the tooth arises; apicodorsal tooth markedly longer than apicoventral tooth, with 2–3 intercalary denticles (Fig. 19B). Scapes subcylindrical, margined but not converging anteriorly to form a thin lamella at the leading edge; apical antennomere unconstricted basally, about as long as the mandible. In profile view, eye with 3–4 ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum broadly convex; propodeum more or less flat transversely, anterior part of propodeum with small bump; pronotum not margined dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal teeth present but inconspicuous, subtended on each side by broad lamella that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar node high, with dome-shaped outline and steep anterior face differentiated from peduncle; petiolar peduncle about as long as (or slightly longer than) node. In dorsal view, petiolar node about as broad as long (or slightly longer than broad); disc of postpetiole broader than long, around 1.3–1.4 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely small flap at posterolateral angle of node in profile and not reaching midpoint of node; anterior face of node with inconspicuous strip; in dorsal view, the processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum with small spatulate setae; clypeal dorsum with small subspatulate setae; mandibular dorsum with short appressed fine setae. Surface of scape with appressed stout setae; funiculus densely covered with short fine setae. Dorsolateral margin of head, lateral and anterior clypeal margins, and leading edge of scape with decumbent, narrowly spoon-shaped to shoehorn-shaped setae; those on leading edge of scape apically-directed. Apicoscrobal seta long and flagellate; dorsolateral margin of head without any other laterally-projecting seta. In dorsal view,

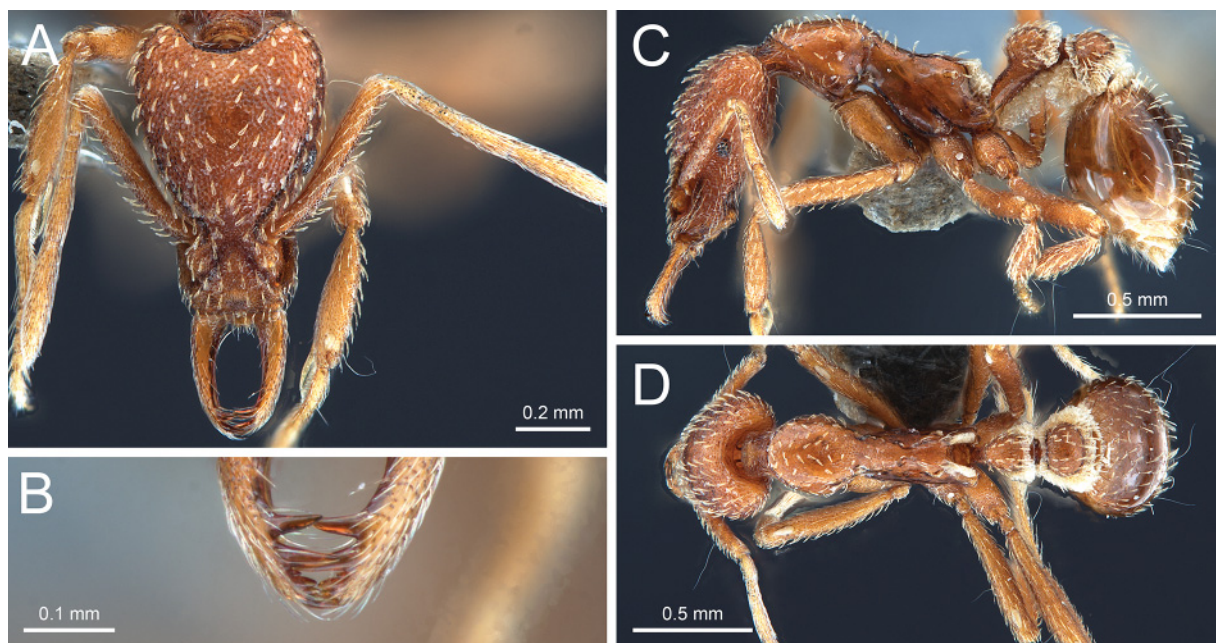


Fig. 19. Holotype worker (ANTWEB1011894) of *Strumigenys fellowesi* sp. nov. **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

Table 7. Diagnostic characters of *Strumigenys fellowesi* sp. nov. and *Strumigenys mediocris* sp. nov. in comparison with Oriental and Sino-Japanese species from the *smythiesii*-complex of the *S. godeffroyi*-group. Values indicate the presence (1) or absence (0) of a character, uncertainty indicates by (?).

Species	Characters							
	Apicoscrobial hair simple	Pronotal humeral hair presents	Pronotal humeral hair flagellate	Pronotal dorsum sculptured	Dorsum of petiolar node sculptured	Disc of postpetiole unsculptured	1st gastral tergite hairs predominantly simple	Erect hairs present on hind femur
<i>S. fellowesi</i> sp. nov.	0	1	1	0	1	1	0	0
<i>S. mediocris</i> sp. nov.	1	1	1	1	1	1	1	1
<i>S. chernovi</i> Dlussky, 1993	1	1	1	1	1	0	1	1
<i>S. choii</i> Lyu, 2007	?	1	1	0	0	1	0	?
<i>S. datryx</i> Bolton, 2000	0	1	1	1	0	1	0	0
<i>S. ekasura</i> Bolton, 2000	0	1	1	1	1	0	0	1
<i>S. habropilosa</i> Bolton, 2000	0	1	1	1	1	1	0	1
<i>S. hastur</i> Bolton, 2000	1	1	1	0	0	1	1	0
<i>S. hispida</i> Lin & Wu, 1996	1	1	0	1	1	1	0	0
<i>S. hypoturba</i> Bolton, 2000	0	1	1	1	1	1	1	0
<i>S. jepsoni</i> Mann, 1921	1	1	0	1	0	1	1	0
<i>S. lichiaensis</i> Lin & Wu, 1996	1	1	1	1	1	1	0	1
<i>S. liukueiensis</i> Terayama & Kubota, 1989	1	1	0	1	1	1	0	1
<i>S. panaulax</i> Bolton, 2000	0	1	1	1	1	0	0	0
<i>S. scelestia</i> Mann, 1921	0	0	0	1	1	1	1	0
<i>S. smythiesii</i> Forel, 1902	0	1	1	0	0	1	0	1
<i>S. solifontis</i> Brown, 1949	1	1	0	1	1	1	1	1
<i>S. tenitecta</i> Bolton, 2000	0	1	1	1	1	1	0	0
<i>S. trada</i> Lin & Wu, 1996	0	1	1	1	1	1	1	1

pronotal humeral seta also long and flagellate. In profile view, dorsal surface of head, dorsum and side of pronotum, dorsum of petiolar node and disc of postpetiole with numerous small decumbent, spatulate to subs spatulate setae; mesonotal dorsum with similar but suberect setae; propodeal dorsum only sparsely with appressed to decumbent stout setae; first and second gastral tergites with numerous short erect subs spatulate to remiform setae; remaining gastral tergites with a few long flagellate setae against short fine suberect ground pilosity; ventral surface of head with appressed simple setae; gastral sternites with

suberect short fine setae. Hairwheel present at mesopleural excavation. Dorsal surfaces of femora with appressed stout to acicular setae, lateral and ventral surfaces with decumbent subspatulate setae; femora without any erect seta; surfaces of tibiae with appressed subspatulate setae; surfaces of middle and hind tibiae and basitarsi with long projecting flagellate setae.

SCULPTURE. Surface of head (including antennal scrobe), antennae, legs and dorsum of petiolar node densely areolate; mandible with sparse weak punctate sculpture and weakly areolate basally, but otherwise mostly smooth. Mesonotal dorsum weakly areolate; pronotal dorsum, propodeal dorsum, side of mesosoma and disc of postpetiole mostly smooth and shining. Basigastral costulae short, around one fourth in length of the first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys fellowesi sp. nov. is a member of Subgroup A in the *S. godeffroyi*-group and shares all its characters (Bolton 2000), and could be assigned to the *smythiesii*-complex, which accommodates species that do not belong to the *godeffroyi*-complex or the *mjoebergi*-complex. *Strumigenys fellowesi* is well distinguished from all other species in the species group by the combination of its slightly tapered mandible, the preapical tooth and the apical fork of the mandible in close proximity, a predominantly spatulate to subspatulate pilosity, a smooth pronotal dorsum and a sculptured petiolar node (Table 7).

Aside from *Strumigenys fellowesi* sp. nov., there are ten other species in the *smythiesii*-complex that lack a second flagellate seta posterior to the apicoscrobial seta (flagellate or simple) as well as having flagellate pronotal humeral setae (*S. chernovi* Dlussky, 1993, *S. datryx* Bolton, 2000, *S. ekasura* Bolton, 2000, *S. hastur* Bolton, 2000, *S. lichiaensis* Lin & Wu, 1996, *S. mediocris* sp. nov., *S. panaulax* Bolton, 2000, *S. smythiesii* Forel, 1902, *S. tenitecta* Bolton, 2000, *S. trada* Lin & Wu, 1996). Among those species, only *S. smythiesii* and *S. hastur* have an unsculptured pronotum, similar to that of *S. fellowesi*. However, *S. hastur* has simple standing setae on various dorsal surfaces, while *S. smythiesii* has erect flagellate setae on the first gastral tergites, both of which are different from spatulate to subspatulate pilosity of *S. fellowesi*.

Strumigenys fellowesi sp. nov. can be distinguished from *S. choii*, a Korean species in the *S. godeffroyi*-group (likely also belonging to the *smythiesii*-complex) that also has a very similar pilosity, by having the dorsum of the petiolar node sculptured (instead of smooth as in *S. choii*), and the apical fork of the mandible with 2–3 intercalary denticles (instead of absent). *Strumigenys fellowesi* (HL 0.79–0.80, ML 0.95–0.96) is also a bigger species than *S. choii* (HL 0.57–0.67, ML 0.71–0.80).

Geographic range

Mainland China (Guangxi).

Strumigenys formosa (Terayama *et al.*, 1995)

Fig. 20; Table 2

Epitritus formosus Terayama *et al.*, 1995: 85, figs 1–4 (q.) TAIWAN. Indomalaya.

Pyramica formosa – Bolton 1999: 1672.

Strumigenys formosa – Baroni Urbani & De Andrade 2007: 120.

Material examined

MAINLAND CHINA – **Hainan Province** • 1 worker; Yinggeling, YGLK5; 19.075584° N, 109.524615° E; 31 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Yinggeling, YGLK9; 19.092689° N, 109.534550° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL.

HONG KONG • 1 alate queen; Kwai Tsing District, Tsing Yi Park; 22.35768° N, 114.1045° E; 27 m a.s.l.; 9–16 Aug. 2021; A. Ibanez leg.; Malaise trap; urban park; IBBL.

THAILAND – **Trang Province** • 1 worker; Khao Chong, Site 12-1 (KCW12-1); 7.5436° N, 99.8067° E; 27 Dec. 2018; IBBL members legs.; Winkler, 4 corners; primary forest; IBBL ANTWEB1011958.

Measurements

Workers

TL 1.4–1.5, HL 0.31–0.34, HW 0.35–0.37, MandL 0.11–0.12, SL 0.17–0.20, EL 0.014–0.016, PW 0.21–0.24, ML 0.35–0.40, PL 0.17–0.18, PH 0.10–0.11, DPW 0.10–0.12, PPL 0.09–0.11, GL 0.34–0.39, CI 108–113, MI 36–37, SI 50–56, OI 4, LPI 58–60, DPI 58–63 (n=3).

Queen

TL 1.8, HL 0.37, HW 0.39, MandL 0.13, SL 0.24, EL 0.060, PW 0.26, ML 0.47, PL 0.19, PH 0.10, DPW 0.13, PPL 0.09, GL 0.52, CI 108, MI 35, SI 61, OI 15, LPI 54, DPI 68 (n=1).

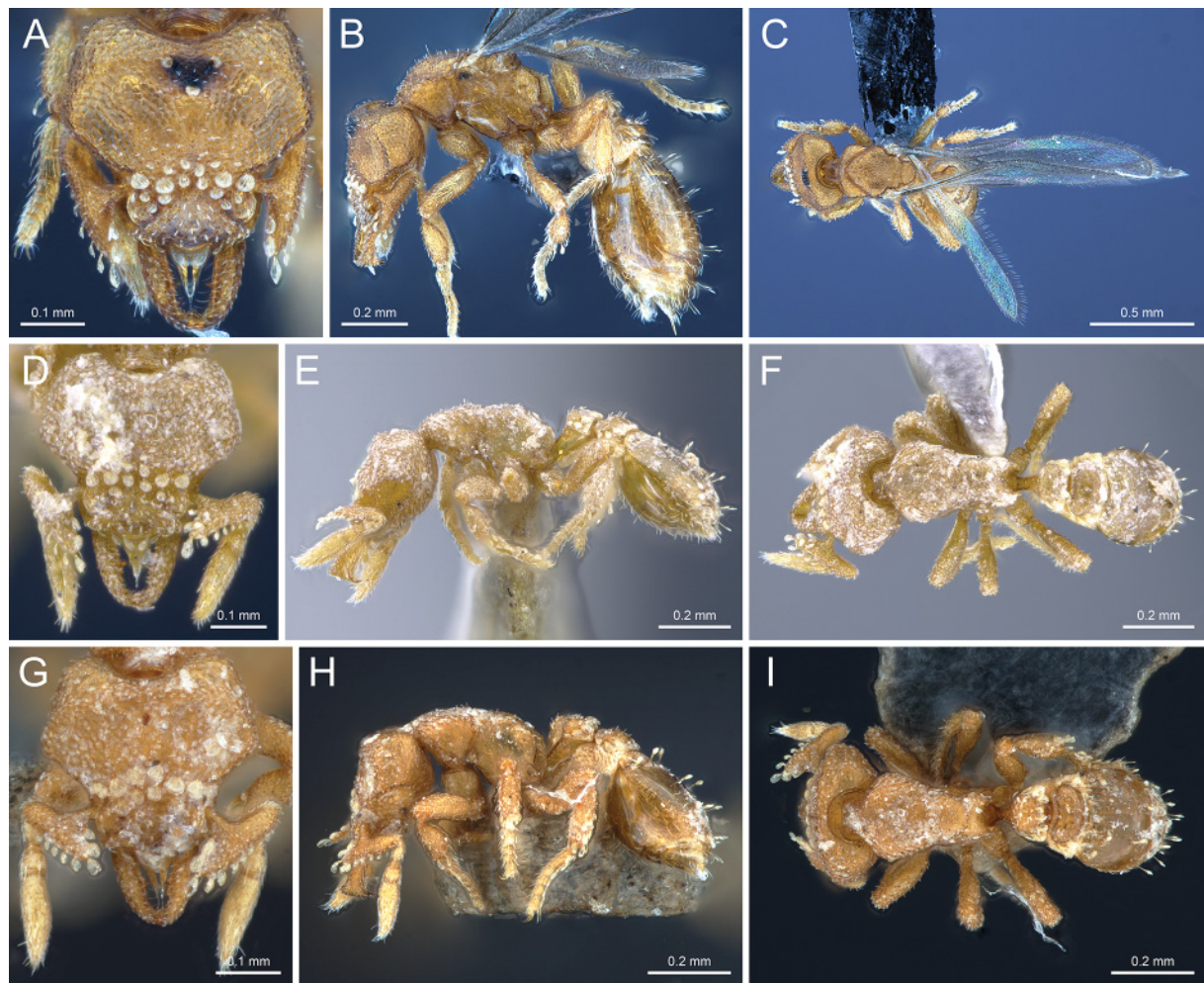


Fig. 20. Specimens of *Strumigenys formosa* (Terayama *et al.*, 1995) in full-face, profile and dorsal views. **A–C.** Alate queen from Hong Kong (TYIMI-11). **D–F.** Worker from Hainan, mainland China (HNA-00044). **G–I.** Worker from Thailand (ANTWEB1011958).

Geographic range

Mainland China (Hainan, Hong Kong, Yunnan), Taiwan, Thailand (Trang).

New record for Hainan, Yunnan and Thailand.

Ecology

Workers collected in rubber and agro-rubber plantations in Hainan, and primary forest in Thailand. Queen collected in urban park in Hong Kong.

Comments

The species was initially described from two queens from Taiwan in 1988, until one single worker was collected in Hong Kong and re-described in Tang *et al.* (2019). Here, we present a recently collected queen using a Malaise trap at Tsing Yi, Hong Kong, that can be identified as *S. formosa* (Fig. 20A–C), which supports the record of the species from Hong Kong. The specimens from Hainan (Fig. 20D–F) and Thailand (Fig. 20G–I) match the description of the worker from Hong Kong, with simple setae instead of spatuliform ones overhanging the inner margin of the mandible in full-face view.

The species is very similar to *S. dyschima*, except for the aforementioned character, and as its worker diagnosis was not available until 2019, it is prone to misidentification. Specimens from Yunnan that were reported previously by Liu *et al.* (2015) show simple setae in the inner margin of the mandible, which indicates it is *S. formosa* misidentified as *S. dyschima*.

This species was considered, for some time, endemic to Taiwan. With the recent records from Hong Kong, and here reported from southern Thailand and Hainan and Yunnan provinces of mainland China, it is in fact more widely distributed within Southeast Asia. Future records of this species in Guangdong and Guangxi provinces of mainland China, as well as Laos and Vietnam seem likely, while the recent record of this species from the northeast part of Sichuan Province (Luo & Zhou 2022) needs verification.

Strumigenys godeffroyi Mayr, 1866

Table 2

Strumigenys godeffroyi Mayr, 1866: 516 (w.) SAMOA. Oceania.

Material examined

VIETNAM – **Đông Nai Province** • 2 workers; Cat Tien National Park; 11.45822° N, 107.37488° E; 167 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Geographic range

Native: India (Meghalaya, West Bengal, Sikkim), Indonesia (Borneo, Java, Lesser Sunda Islands, Sumatra), Malaysia, Myanmar, Philippines, Singapore, Vietnam.

Introduced: Oriental realm (India: Karnataka, Kerala, Maharashtra; Pakistan; Sri Lanka; Taiwan). For a full global account refer to antmaps.org (Janicki *et al.* 2016; Guénard *et al.* 2017).

Ecology

Collected in secondary forest.

Comments

The widespread tramp species is native to the Oriental realm and was introduced to multiple states of India, Pakistan, Sri Lanka, Taiwan and numerous islands in the Indian and Pacific Oceans. Its native range is likely to include Cambodia, Laos and Thailand.

Strumigenys heteropha Bolton, 2000

Fig. 21A–C; Table 2

Strumigenys heteropha Bolton, 2000: 758 (w.) CHINA. Palearctic.

Material examined

MAINLAND CHINA – **Hainan Province** • 5 workers; Bawangling, BWLP3; 19.088238° N, 109.196806° E; 30 Jun. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLS13; 19.116989° N, 109.127111° E; 10 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLS2; 19.091928° N, 109.183894° E; 6 Jul. 2016; L. Wang leg.; Winkler, 12 random;

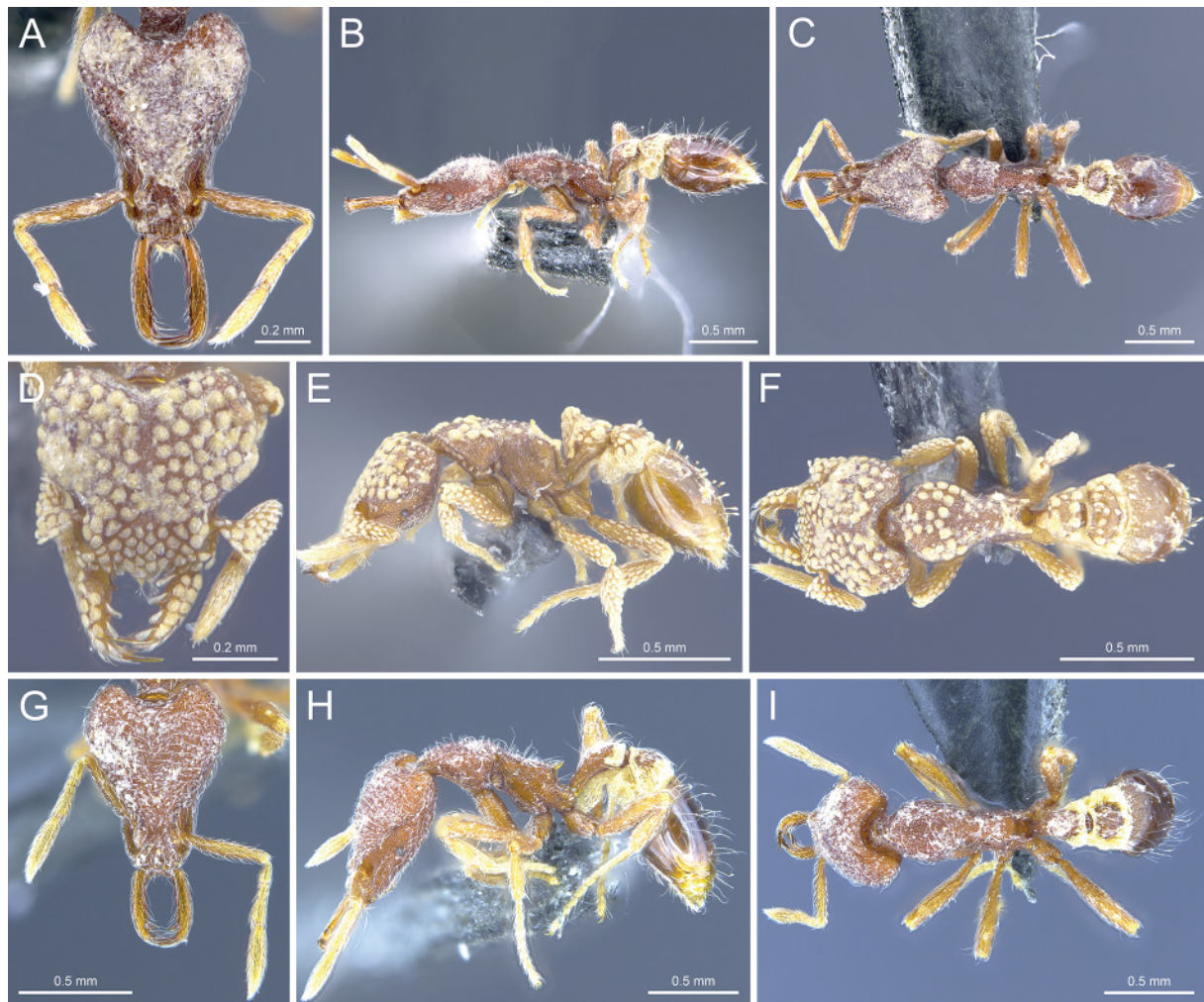


Fig. 21. New species records of *Strumigenys* Smith, 1860 from Hainan, mainland China in full-face, profile and dorsal views. **A–C.** Worker of *S. heteropha* Bolton, 2000 (HNA-01608). **D–F.** Worker of *S. hexamera* (Brown, 1958) (HNA-01556). **G–I.** Worker of *S. hirsuta* Tang *et al.*, 2019 (HNA-01573).

IBBL • 2 workers; Bawangling, BWLS5; 19.100364° N, 109.178352° E; 7 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 3 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 6 workers; Bawangling, BWLS7; 19.106426° N, 109.176035° E; 7 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; Bawangling, BWLS8; 19.085592° N, 109.191281° E; 9 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLS9; 19.089728° N, 109.191270° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Jianfengling, JFLFW2; 19.115° N, 109.159° E; 26 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL.

VIETNAM – **Vĩnh Phúc Province** • 1 worker; Tam Dao National Park; 950 m a.s.l.; 5–12 Jun. 2010; L. Bartolozzi and S. Bambi leg.; MSNF LSF2894 (“La Specola” n Mag. 2894).

Geographic range

Mainland China (Hainan, Hong Kong), Vietnam (Vĩnh Phúc).

New record for Hainan and Vietnam.

Ecology

Collected in primary forest, secondary forest and rubber plantations.

Comments

A widely-distributed species within Hong Kong, with its endemic status hypothesized to be the result of under-sampling in China rather than true endemism (Tang *et al.* 2019). This is now confirmed by its record in Hainan. Its presence in surrounding provinces of Guangdong and Guangxi in China can likely be confirmed through further sampling efforts. The record in northern Vietnam further extends its native range westward, indicated that it has a much wider range than what was previously known.

Strumigenys hexamera (Brown, 1958)

Fig. 21D–F; Table 2

Epitritus hexamerus Brown, 1958: 70, figs 1–3 (w.q.) JAPAN. Palearctic.

Pyramica hexamerus – Bolton 1999: 1672.

Strumigenys hexamera – Baroni Urbani & De Andrade 2007: 122.

Material examined

MAINLAND CHINA – **Hainan Province** • 1 worker; Bawangling, BWLP12; 19.093236° N, 109.200057° E; 4 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLR7; 19.194981° N, 109.020097° E; 15 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLS10; 19.118784° N, 109.155618° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLS12; 19.117962° N, 109.130545° E; 10 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLS9; 19.089728° N, 109.191270° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 6 workers; Huoshankou, HSK3; 5 Jul. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 3 workers; Jianfengling, JFLFW1; 19.117° N, 109.152° E; 24 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Yinggeling, YGLK10; 19.078737° N, 109.503146° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Yinggeling, YGLK11; 19.078017° N, 109.504241° E; 2 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; same collection data as for preceding; Winkler, 4 corners; IBBL.

Measurements

Workers

TL 2.1–2.4, HL 0.48–0.54, HW 0.49–0.55, MandL 0.18–0.21, SL 0.21–0.24, EL 0.031–0.038, PW 0.27–0.30, ML 0.56–0.62, PL 0.22–0.27, PH 0.11–0.13, DPW 0.15–0.17, PPL 0.15–0.18, GL 0.51–0.61, CI 101–104, MI 37–40, SI 42–44, OI 6–8, LPI 45–49, DPI 62–68 (n=4).

Geographic range

Native: Japan (mainland and Ryukyu Islands), South Korea, Taiwan.

Introduced: mainland China (Hainan, Hong Kong), Ogasawara Islands (Japan), United States.

New record for Hainan.

Ecology

Collected in primary forest, secondary forest, urban forest and rubber plantations.

Comments

This species has been tentatively classified as introduced for its record in Hong Kong due to its tramp characteristic (Tang *et al.* 2019). The new record in Hainan indicates that its presence in nearby Guangdong and Guangxi provinces is likely.

Strumigenys hirsuta Tang *et al.*, 2019

Fig. 21G–I; Table 2

Strumigenys hirsuta Tang *et al.*, 2019: 18, figs 6a–c, 7a–c (w.q.) CHINA (Hong Kong). Indomalaya.

Material examined

MAINLAND CHINA – **Hainan Province** • 2 workers; Bawangling, BWLS2; 19.091928° N, 109.183894° E; 6 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 4 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLS4; 19.096744° N, 109.177784° E; 30 Jun. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLS6; 19.104226° N, 109.176078° E; 7 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLS8; 19.085592° N, 109.191281° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Yinggeling, YGLK12; 19.084458° N, 109.504251° E; 2 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL.

Measurements

Workers

TL 3.3–3.5, HL 0.78–0.83, HW 0.60–0.62, MandL 0.34–0.36, SL 0.38–0.42, EL 0.051–0.078, PW 0.33–0.35, ML 0.88–0.93, PL 0.37–0.44, PH 0.14–0.16, DPW 0.16–0.18, PPL 0.20–0.25, GL 0.69–0.79, CI 72–77, MI 42–45, SI 63–68, OI 9–13, LPI 34–40, DPI 39–42 (n=7).

Geographic range

Mainland China (Hainan, Hong Kong).

New record for Hainan.

Ecology

Collected in secondary forest.

Comments

A recently described species, with its endemic status in Hong Kong also postulated to be due to under-sampling in China rather than true endemism due to its wide distribution within the territory (Tang *et al.* 2019). Specimens collected in Hainan were slightly bigger than those from Hong Kong, but all the measurement indices were still closer to *S. hirsuta* than to other species of the *caniophanes*-complex within the *S. caniophanes*-group, including the characteristic short antennal scape. It also clearly shares all other characters of the species. Its presence in nearby Guangdong and Guangxi provinces is likely.

Strumigenys hispida Lin & Wu, 1996

Fig. 22; Table 2

Strumigenys hispida Lin & Wu, 1996: 145, figs 15–19 (w.q.) TAIWAN. Indomalaya.

Material examined

MAINLAND CHINA – **Hainan Province** • 3 workers; Bawangling; 4 Apr. 1998; J. Fellowes leg.; IBBL ANTWEB1011897 to ANTWEB1011899 • 2 workers; Bawangling; 4 Apr. 1998; J. Fellowes leg.; IBBL ANTWEB1011911.

TAIWAN • 6 workers; Taipei, Yangmingshan, Old Trail; 450 m a.s.l.; 8 Jul. 2017; Sk. Yamane leg.; hand collection; KUM TW17-SKY-84.

VIETNAM – **Vĩnh Phúc Province** • 1 worker; Tam Dao National Park; 950 m a.s.l.; 1–4 Jun. 2013; L. Bartolozzi, S. Bambi, F. Cianferoni, G. Mazza and E. Orbach leg.; MSNF LSF1709 (“La Specola” Firenze Hymenoptera collection 1709).

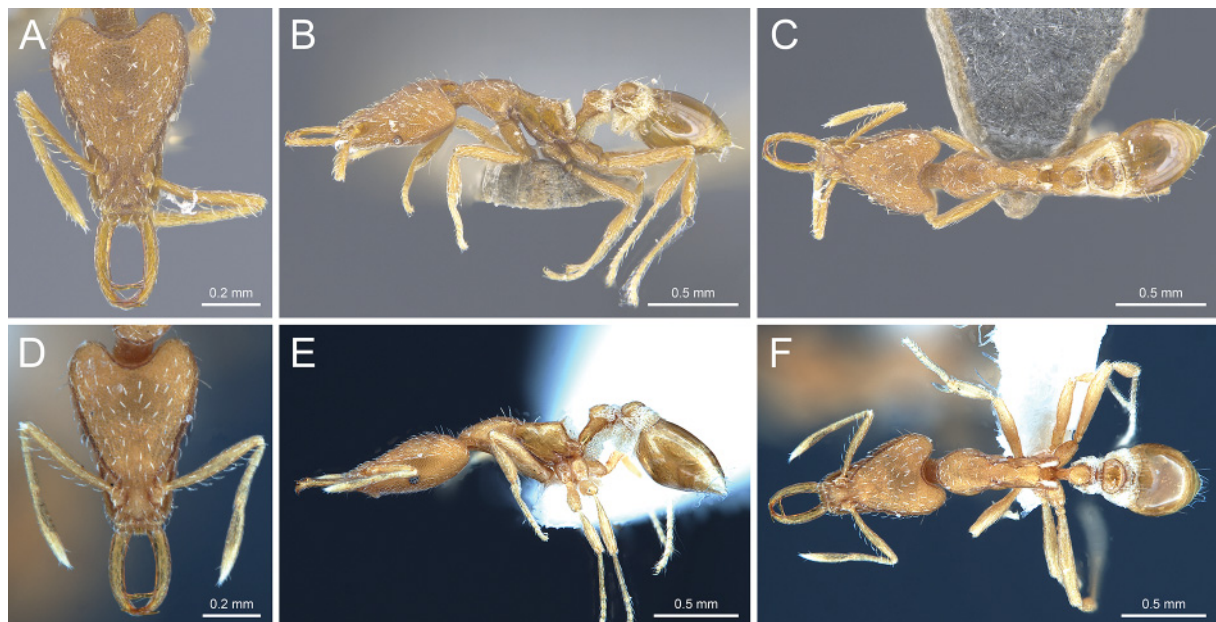


Fig. 22. New records of *Strumigenys hispida* Lin & Wu, 1996 in full-face, profile and dorsal views. **A–C.** Worker from Hainan, mainland China (ANTWEB1011899). **D–F.** Worker from Vietnam (LSF1709).

Measurements

Workers

TL 2.7–2.9, HL 0.68–0.71, HW 0.47–0.50, MandL 0.31–0.33, SL 0.39–0.41, EL 0.053–0.063, PW 0.25–0.28, ML 0.70–0.75, PL 0.29–0.33, PH 0.12–0.14, DPW 0.12–0.13, PPL 0.18–0.21, GL 0.53–0.64, CI 69–71, MI 45–47, SI 81–86, OI 11–13, LPI 39–46, DPI 39–42 (n=5).

Geographic range

Mainland China (Guangdong, Guangxi, Guizhou, Hainan, Henan), Taiwan, Vietnam (Vĩnh Phúc).

New record for Hainan and Vietnam.

Comments

The record in Hainan Province (Fig. 22A–C) fits in the current distribution of the species, while the record in northern Vietnam (Fig. 22D–F) extends its native range south-westward. Its presence in Hong Kong is also likely. The current disjunction in geographical range between Henan and the other southern provinces can be expected to be filled by further sampling efforts.

Strumigenys inhonesta Bolton, 2000

Fig. 23A–C; Table 2

Strumigenys inhonesta Bolton, 2000: 749 (w.) INDONESIA (Sulawesi). Indomalaya.

Material examined

THAILAND – **Trang Province** • 4 workers; Khao Chong, Site 34 (KCW34); 7.55521° N, 99.79266° E; 1 Jan. 2019; Winkler, 4 corners; IBBL ANTWEB1011944 to ANTWEB1011947.

Measurements

Workers

TL 2.2–2.3, HL 0.57–0.59, HW 0.45–0.48, MandL 0.14–0.16, SL 0.28–0.29, EL 0.040–0.048, PW 0.24–0.25, ML 0.59–0.61, PL 0.26–0.28, PH 0.12–0.13, DPW 0.11–0.13, PPL 0.16–0.19, GL 0.49–0.56, CI 79–81, MI 25–27, SI 61–63, OI 9–11, LPI 42–48, DPI 41–47 (n=4).

Geographic range

Indonesia (Borneo, Sulawesi), Malaysia (East Malaysia), Philippines, Thailand (Trang).

New record for Thailand.

Ecology

Collected in old secondary forest.

Comments

The record of *S. inhonesta* in Thailand extends its native range 1500 km eastward and represents the first record of this species within continental Asia. Its presence in other parts of the Indochinese Peninsula, such as Peninsular Malaysia is likely.



Fig. 23. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. **A–C.** Worker of *S. inhonesta* Bolton, 2000 from Thailand (ANTWEB1011945). **D–F.** Worker of *S. jacobsoni* Menozzi, 1939 from Vietnam (ANTWEB1011973). **G–I.** Worker of *S. juliae* Forel, 1905 from Thailand (KCW-S08-sp03).

***Strumigenys intermedia* sp. nov.**

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Figs 2A–B, 24–25; Tables 2, 6

Diagnosis

Strumigenys intermedia sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum with appressed stout and truncated setae; laterally-projecting seta present in full-face view; in profile view, erect setae present sporadically across cephalic dorsum, not restricted to area between highest point of vertex and occipital margin; pronotum marginated dorsolaterally; propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long erect setae.

Etymology

The species is named after its sporadic erect setae on the cephalic dorsum in comparison with other existing species from the same species group, *Strumigenys elegantula* and *Strumigenys jacobsoni*,

which have appressed setae only (except for area close to the occipital margin) and erect setae only, respectively. The epithet '*intermedia*' is the nominative feminine singular of the Latin adjective '*intermedius*' (meaning 'intermediate').

Type material

Holotype worker (Fig. 24)

HONG KONG • Lantau Island, Chep Lap Kok, AW14R72; 22.2939° N, 113.9331° E; 22 m a.s.l.; 1 Oct. 2015; B.M. Worthington leg.; Winkler, 12 random; secondary forest; LKCNHM ANTWEB1010888 (collection code IBBL BMW00363).

Paratype workers

HONG KONG • 3 workers; same collection data as for holotype; HKBM ANTWEB1010889 to ANTWEB1010891 (collection code IBBL BMW00363).

Additional material examined

MAINLAND CHINA – **Hainan Province** • 1 worker; Bawangling, BWLR8; 19.193492° N, 109.020000° E; 15 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Yinggeling, YGLK7; 19.091766° N, 109.536910° E; 1 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Yinggeling, YGLK8; 19.091036° N, 109.535279° E; 1 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Yinggeling, YGLK9; 19.092689° N, 109.534550° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL.

HONG KONG • 3 workers; Islands District, Tung Ping Chau; 22.5382° N, 114.4365° E; 2 Oct. 2017; R. Cheung and B. Morgan leg.; Winkler, 12 random; IBBL ANTWEB1016277 • 2 workers; Kwai Tsing

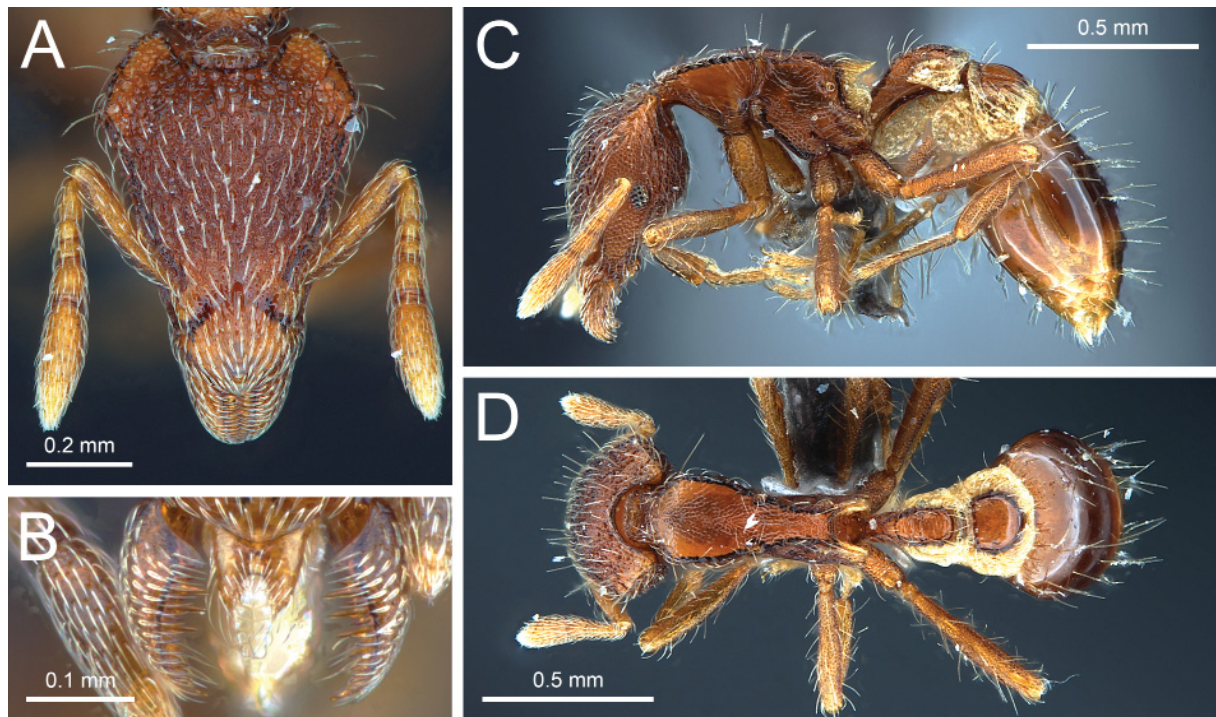


Fig. 24. Specimens of *Strumigenys intermedia* sp. nov. **A, C–D.** Holotype worker (ANTWEB1010888). **B.** Non-type worker (TT01353). **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

District, Tsing Yi Peak; 22.34312° N, 114.0999° E; 16 Mar. 2018; R. Cheung and M. Law leg.; Winkler, 4 corners; IBBL ANTWEB1016950 • 1 worker; Kwai Tsing District, Tsing Yi Peak; 22.34312° N, 114.0999° E; 16 Mar. 2018; R. Cheung and M. Law leg.; Winkler, 12 random; IBBL ANTWEB1016742 • 2 workers; Kwai Tsing District, Tsing Yi Peak; 22.34054° N, 114.10076° E; 16 Mar. 2018; R. Cheung and M. Law leg.; Winkler, 12 random; IBBL ANTWEB1016753 • 1 worker; Kwai Tsing District, Tsing Yi Peak; 22.33512° N, 114.10293° E; 16 Mar. 2018; R. Cheung and M. Law leg.; Winkler, 4 corners; IBBL ANTWEB1016764 • 1 worker; Lantau Island, Chep Lap Kok; 22.2939° N, 113.9331° E; 24 Mar. 2017; B.M. Worthington leg.; IBBL • 2 workers; Lantau Island, Chep Lap Kok; 22.2939° N, 113.9331° E; 20 m a.s.l.; 29 Jul. 2016; B.M. Worthington leg.; Winkler, 12 random; IBBL • 1 worker; Lantau Island, Penny's Bay; 22.32589° N, 114.03385° E; 22 m a.s.l.; 13 Oct. 2017; M. Pierce leg.; pitfall trap; IBBL • 1 worker; Lantau Island, Penny's Bay; 22.32589° N, 114.03385° E; 22 m a.s.l.; 13 Oct. 2017; M. Pierce leg.; pitfall trap; IBBL • 1 worker; Lantau Island, Sha Lo Wan; 22.2881° N, 113.9013° E; 6 May 2016; B.M. Worthington leg.; IBBL • 1 worker; Lantau Island, Shek Pik; 22.233° N, 113.888° E; 18 Aug. 2015; R.H. Lee leg.; pitfall trap; IBBL • 2 workers; Lantau Island, Shek Pik; 22.2309° N, 113.88606° E; 18 Aug. 2015; R.H. Lee leg.; IBBL • 1 worker; Tai Po District, Sha Lo Tung; 22.47708° N, 114.18195° E; 28 May 2015; R.H. Lee leg.; pitfall trap; IBBL • 1 worker; Tai Po District, Wu Kau Tang; 22.49645° N, 114.2441° E; 29 m a.s.l.; 28 Oct. 2015; T. Tsang leg.; IBBL • 1 worker; Tsuen Wan District, Tai Lam; 22.37564° N, 114.04408° E; 160 m a.s.l.; 3 Nov. 2017; M. Pierce leg.; pitfall trap; IBBL • 1 worker; Tsuen Wan District, Tai Lam; 22.37564° N, 114.04408° E; 160 m a.s.l.; 3 Nov. 2017; M. Pierce leg.; pitfall trap; IBBL • 2 workers; Tsuen Wan District, Tai Lam; 22.38109° N, 114.05457° E; 246 m a.s.l.; 11 Nov. 2017; M. Pierce and R. Cheung leg.; pitfall trap; IBBL • 2 workers; Tsuen Wan District, Tai Lam; 22.38109° N, 114.05457° E; 246 m a.s.l.; 11 Nov. 2017; M. Pierce and R. Cheung leg.; pitfall trap; IBBL • 1 worker; Tsuen Wan District, Tai Lam; 22.37579° N, 114.04408° E; 243 m a.s.l.; 14 Sep. 2016; R.H. Lee and M. Pierce leg.; Maxi Winkler; IBBL ANTWEB1009819 • 1 worker; Tsuen Wan District, Tai Lam; 22.37579° N, 114.04408° E; 243 m a.s.l.; 14 Sep. 2016; R.H. Lee and M. Pierce leg.; Maxi Winkler; IBBL ANTWEB1009821 • 1 worker; Tsuen Wan District, Tai Lam; 22.37579° N, 114.04408° E; 243 m a.s.l.; 14 Sep. 2016; R.H. Lee and M. Pierce leg.; Maxi Winkler; IBBL ANTWEB1009822 • 1 worker; Tsuen Wan District, Tai Lam; 22.37591° N, 114.04477° E; 225 m a.s.l.; 14 Sep. 2016; R.H. Lee and M. Pierce leg.; Maxi Winkler; IBBL ANTWEB1009844 • 13 workers; Tsuen Wan District, Tai Lam Country Park; 22.38091° N, 114.05324° E; 8 Nov. 2017; R. Cheung and M. Pierce leg.; Winkler, 12 random; IBBL • 80 workers; Tsuen Wan District, Tai Lam Country Park; 22.38109° N, 114.05511° E; 8 Nov. 2017; R. Cheung and M. Pierce leg.; Winkler, 12 random; IBBL ANTWEB1016468 • 1 worker; Yuen Long District, Lok Ma Chau; 22.51192° N, 114.06064° E; 31 May 2018; M. Wong leg.; pitfall trap; IBBL • 1 worker; Yuen Long District, Lok Ma Chau; 22.51378° N, 114.06301° E; 31 May 2018; M. Wong leg.; pitfall trap; IBBL • 1 worker; Yuen Long District, Mai Po Nature Reserve; 22.487° N, 114.039° E; 13 Sep. 1993; J. Fellowes leg.; pitfall trap; IBBL.

Measurements

Holotype worker

TL 2.8, HL 0.75, HW 0.55, MandL 0.11, SL 0.36, EL 0.078, PW 0.26, ML 0.65, PL 0.35, PH 0.14, DPW 0.12, PPL 0.21, GL 0.68, CI 73, MI 14, SI 65, OI 14, LPI 41, DPI 34.

Paratype workers

TL 2.5–2.6, HL 0.64–0.66, HW 0.46–0.48, MandL 0.08–0.09, SL 0.31–0.32, EL 0.074–0.077, PW 0.23–0.26, ML 0.63–0.65, PL 0.29–0.33, PH 0.13–0.14, DPW 0.11–0.12, PPL 0.17–0.21, GL 0.67–0.71, CI 71–73, MI 13–14, SI 66–67, OI 15–17, LPI 42–47, DPI 36–37 (n=3).

Worker description

HEAD. In full-face view, occipital margin deeply concave; occipital corners well developed and bluntly angular; occipital carina broad. Clypeus broader than long, around 1.2–1.4 times as long, roughly

resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles; basal lamellae low and broadly triangular, not fully visible at full closure. In profile view, eye with four ommatidia in diameter.

DENTITION (Fig. 24B). Principal dental row with eight alternating short triangular and long spiniform teeth (i.e., four consecutive pairs of teeth, each pair consists of short tooth followed by long tooth), second and third pairs subequal in size and longer than other pairs (short tooth of one pair compares with short tooth of another pair only, same for long tooth); followed by 3–4 small teeth and, at down curvature in anterior view, series of four minute denticles, terminating in small apical tooth. Total dental count of 16–17.

MESOSOMA. In profile view, mesosomal dorsum broadly, weakly convex; pronotum marginated dorsolaterally. In dorsal view, lateral margins of pronotum broadly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with deeply concave posterior margin broadening basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle grading evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around 1.6–1.9 times as long; disc of postpetiole slightly broader than long, around 1.1–1.2 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum and surface of scape covered with appressed stout and truncated setae; clypeal dorsum covered with appressed narrowly elliptic to acicular setae; mandibular dorsum covered with appressed acicular setae; masticatory margins each with row of medially-directed fine setae. Surface of funiculus covered with progressively finer setae. Lateral margin of occipital lobe with around 5–6 laterally-projecting setae, sometimes also 1–3 on upper scrobe margin; dorsolateral margin of head and leading edge of scape with decumbent setae; appressed setae present along occipital margin. In dorsal view, promesonotal dorsum sparsely with appressed setae; posteriorly-directed decumbent setae present along lateral margins; appressed setae present along margins of petiolar node and disc of postpetiole. Pronotal humeral seta long, straight and stout. In profile view, erect setae present sporadically across cephalic dorsum, not restricted to area between highest point of vertex and occipital margin; suberect to erect setae also present on mesonotal dorsum in three pairs, on petiole in two pairs, on disc of postpetiole as one pair and all over gastral tergites; ventral surface of head with decumbent setae; gastral sternites with suberect to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of middle and hind femora, tibiae and basitarsi with long stout erect setae.

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose; surface of antennal scrobe, antenna and legs densely areolate. Promesonotal dorsum predominantly, relatively weakly areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; propodeal dorsum densely areolate-rugulose; dorsum of petiolar node transversely rugulose. Side of pronotum mostly smooth and shining, with weak rugulae around margins; pleurae and side of propodeum densely areolate-rugulose. Disc of postpetiole smooth and shining. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys intermedia sp. nov. is a member of the *elegantula*-complex in the *S. leptothrix*-group and shares all its characters (Bolton 2000).

Aside from *Strumigenys intermedia* sp. nov., there are 12 other SEA species from the same species group (*S. ailaoshana*, *S. decumbens* sp. nov., *S. delicata* sp. nov., *S. densissima* sp. nov., *S. doydeei* sp. nov., *S. elegantula*, *S. jacobsoni*, *S. leptothrix*, *S. nankunshana*, *S. strummeri* sp. nov., *S. zanderi* sp. nov. and *S. zhenghuii* sp. nov.) that share the following characters: propodeal spines present and subtended by broad lamellae, pronotum marginate dorsolaterally (Table 6). *Strumigenys decumbens*, *S. doydeei* and *S. zanderi* can easily be differentiated from the other species for their complete lack of any erect to suberect seta on the cephalic dorsum in profile view. Among these three species, *S. zanderi* stands out for its further lack of any erect seta on the mesosomal dorsum, while there are at least a few pairs around the mesonotum in both *S. decumbens* and *S. doydeei*. *Strumigenys decumbens* can be differentiated from *S. doydeei* for all the setae on its middle and hind femora, tibiae and basitarsi are decumbent to appressed, while in *S. doydeei* there are numerous laterally-projecting erect setae.

Among the remaining 10 species that have erect to suberect setae on the cephalic dorsum (*S. ailaoshana*, *S. elegantula*, *S. delicata* sp. nov., *S. densissima* sp. nov., *S. intermedia* sp. nov., *S. jacobsoni*, *S. leptothrix*, *S. nankunshana*, *S. strummeri* sp. nov. and *S. zhenghuii* sp. nov.), *S. jacobsoni*, *S. leptothrix* and *S. strummeri* can easily be differentiated from the others for, in profile view, they have suberect to erect setae only on the cephalic dorsum and without any appressed seta. In *S. jacobsoni* and *S. leptothrix*, they also have long erect setae across the mesosomal dorsum, while in *S. strummeri*, erect setae are restricted to a few pairs around the mesonotum only. Refer to Bolton's comments under *S. jacobsoni* (Bolton 2000) for a detailed comparison between *S. jacobsoni* and *S. leptothrix*.

Strumigenys ailaoshana and *S. nankunshana* subsequently stand out from the remaining species with their distinct sculpture on the promesonotal dorsum. The promesonotal dorsum of *S. ailaoshana* is predominantly longitudinally-striated, whereas that of *S. nankunshana* is predominantly transversely-striated, while for the other five species this sculpture is areolate-rugulose, sometimes with additional weak longitudinal striations.

The remaining five species all have both appressed and erect setae on the cephalic dorsum in profile view. For *S. delicata* sp. nov., *S. intermedia* sp. nov. and *S. zhenghuii* sp. nov., erect setae appear sporadically throughout the cephalic dorsum, not limited to any particular region on their heads, while for *S. densissima* sp. nov. and *S. elegantula*, erect setae are restricted to the area between the highest point of the vertex and the occipital margin only. Comparing appressed setae on the cephalic and clypeal dorsum for *S. delicata*, *S. intermedia* and *S. zhenghuii*, for *S. delicata* they are all fine and apically acute; for *S. intermedia* those on the cephalic dorsum are stout and truncated, and those on the clypeal dorsum mostly narrowly elliptic; for *S. zhenghuii* those on the cephalic dorsum are mostly subspatulate, and those on the clypeal dorsum mostly linear to narrowly elliptic. Among the three species, *S. zhenghuii* further stands out for the side of the mesosoma completely smooth and shining (in comparison it is mostly sculptured in the other two species); *S. delicata* stands out for its numerous laterally-projecting setae on the dorsolateral margin in full-face view (in comparison there are only around 5–6 for the other two species).

Comparing the final pair, *S. densissima* sp. nov. and *S. elegantula*, appressed setae on both the cephalic and clypeal dorsum are fairly consistently stout and truncated for *S. densissima*, while for *S. elegantula*, they are plank-like to subspatulate on the cephalic dorsum, and narrowly elliptic on the clypeal dorsum. Setae on the funiculus are also comparatively finer and denser in *S. densissima* than in *S. elegantula*.

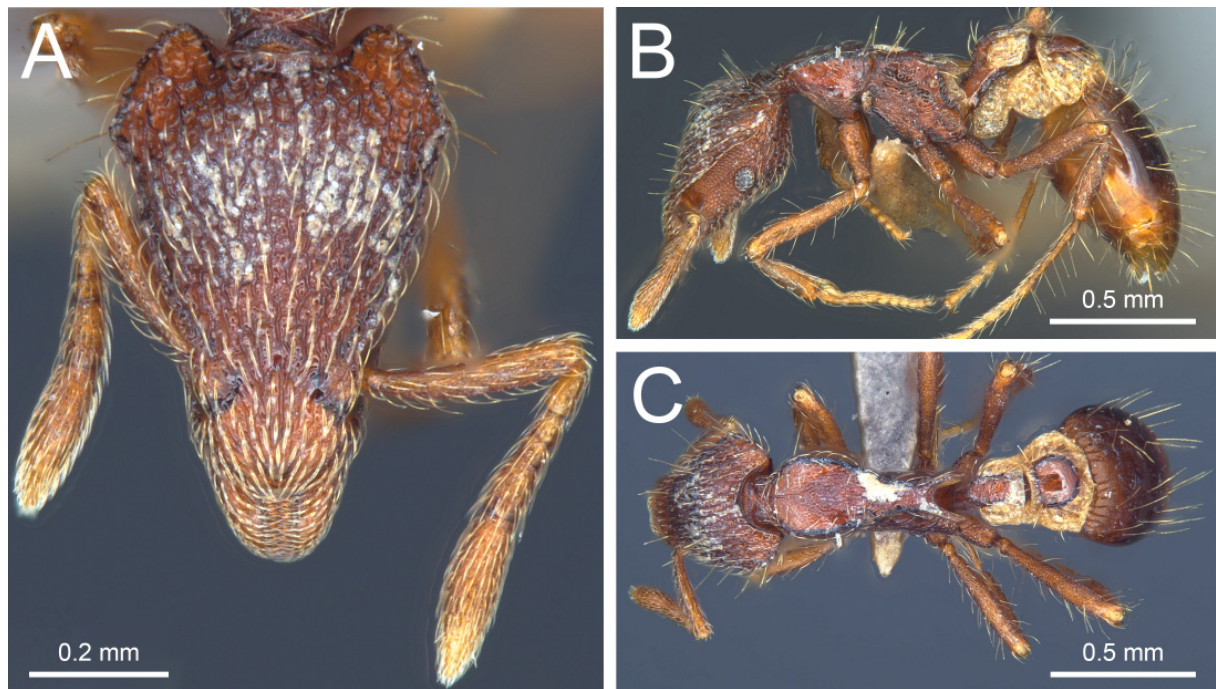


Fig. 25. Worker of *Strumigenys intermedia* sp. nov. from Hainan, mainland China (HNA-00188). A. Full-face view. B. Profile view. C. Dorsal view.

With the records from Hainan Province (Fig. 25), Hong Kong (Fig. 24) and Macau, this species is likely more widespread in southern mainland China. Its presence in Guangdong Province is very likely.

Geographic range

Mainland China (Hainan, Hong Kong, Macau).

Ecology

Collected from a wide range of habitats, including secondary forest, disturbed secondary forest, Fengshui wood, rubber plantation, mixed woodland, shrubland, grassland, managed grassland and reclaimed land.

***Strumigenys jacobsoni* Menozzi, 1939**

Figs 2D, 23D–F; Table 2

Strumigenys (*Cephaloxys*) *jacobsoni* Menozzi, 1939: 180, fig. 4 (w.) INDONESIA (Sumatra). Indomalaya.

Smithistruma jacobsoni – Brown 1948: 105.

Weberistruma jacobsoni – Brown 1949b: 8.

Pyramica jacobsoni – Bolton 1999: 1673.

Strumigenys jacobsoni – Baroni Urbani & De Andrade 2007: 122.

Material examined

VIETNAM – **Đắk Nông Province** • 1 worker; Nam Nung Reserve, Site 63; 12.1757° N, 107.76062° E; 907 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL.

Measurements

Worker

TL 2.8, HL 0.68, HW 0.48, MandL 0.10, SL 0.34, EL 0.074, PW 0.27, ML 0.65, PL 0.37, PH 0.16, DPW 0.10, PPL 0.21, GL 0.75, CI 70, MI 14, SI 71, OI 15, LPI 43, DPI 26 (n=1).

Geographic range

Indonesia (Borneo, Sumatra), Malaysia, Philippines, Vietnam (Đắk Nông).

New record for Vietnam.

Ecology

Collected in secondary forest, mature forest and rubber plantation.

Comments

The record of *S. jacobsoni* in southern Vietnam indicates that this species could be much more widespread throughout the Indochinese Peninsula than currently known. Its presence in neighboring countries such as Cambodia and Thailand is likely.

After careful examination of the species' dentition, using specimens with opened mandibles, we determined that *S. jacobsoni* belongs to the newly introduced *elegantula*-complex in the *S. leptothrix*-group (Fig. 2D). Specimens from other localities should be checked if they share similar morphology.

Strumigenys japonica Ito, 1914

Table 2

Strumigenys japonica Ito, 1914: 40 (w.) JAPAN. Palearctic.

Strumigenys (*Cephaloxys*) *japonica* – Emery 1924: 325.

Smithistruma (*Smithistruma*) *japonica* – Brown 1948: 105.

Weberistruma japonica – Brown 1953: 27.

Pyramica japonica – Bolton 1999: 1673.

Strumigenys japonica – Baroni Urbani & De Andrade 2007: 122.

Geographic range

Mainland China (Hubei, Hunan), Japan, South Korea, Taiwan.

Comments

With the re-identification of the specimens collected and reported by Bui & Eguchi (2003) in Lào Cai Province of Vietnam as *S. rongi* sp. nov., Vietnam is likely no longer part of the native range of *S. japonica*. If there are other specimens collected from Vietnam that have previously been identified as *S. japonica*, it is recommended to re-examine them to check if they are *S. rongi* instead.

Strumigenys jaitrongi sp. nov.

urn:lsid:zoobank.org:act:837012D2-8742-4566-B092-16D190593A07

Fig. 26; Tables 2, 4

Diagnosis

Strumigenys jaitrongi sp. nov. can be distinguished from other species in the *S. rostrata*-group by a combination of the following characters: cephalic dorsum with small appressed obovate setae; mandibles with small basal gap; eye reduced to one ommatidium; pronotal humeral seta flagellate; in

profile view, near occipital margin with four small claviform erect setae; mesonotal dorsum with a pair of similar setae; entire surface of mesosoma smooth and shining except for mesonotal dorsum, which is areolate.

Etymology

The species is named after Dr Weeyawat Jaitrong in recognition of his remarkable work on Thai ants, and his hospitality during our journeys to Thailand that led to the discovery of the species. The name was created by adding the singular Latin genitive case suffix *-i* to the last name of a male person.

Type material

Holotype worker (Fig. 26)

THAILAND • Trang Province, Khao Chong, Site 37 (KCW37); 7.55471° N, 99.78834° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; secondary forest; LKCNHM ANTWEB1011987 (collection code IBBL KCW-S37-sp2).

Paratype workers

THAILAND • 4 workers; same collection data as for holotype; HKBM ANTWEB1011948, ANTWEB1011949, ANTWEB1011985, ANTWEB1011986 (collection code IBBL KCW-S37-sp2).



Fig. 26. Type specimens of *Strumigenys jaitrongi* sp. nov. **A, C–D.** Holotype worker (ANTWEB1011987). **B.** Paratype worker (ANTWEB1011985). **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

Measurements

Holotype worker

TL 1.6, HL 0.43, HW 0.32, MandL 0.07, SL 0.20, EL 0.019, PW 0.20, ML 0.40, PL 0.19, PH 0.10, DPW 0.12, PPL 0.12, GL 0.38, CI 76, MI 17, SI 62, OI 6, LPI 53, DPI 61.

Paratype workers

TL 1.6–1.8, HL 0.42–0.43, HW 0.32–0.33, MandL 0.08, SL 0.19–0.21, EL 0.015–0.021, PW 0.16–0.21, ML 0.40–0.46, PL 0.19–0.23, PH 0.10–0.12, DPW 0.11, PPL 0.12–0.14, GL 0.39–0.44, CI 77–79, MI 18–19, SI 58–63, OI 5–6, LPI 53–56, DPI 50–59 (n=4).

Worker description

HEAD. In full-face view, occipital margin broadly concave; occipital corners well developed, bluntly angular. Anterior clypeal margin broadly, weakly convex, with narrowly to moderately-rounded anterolateral angle; posterior clypeal margin converged at midpoint to form right angle (or just slightly smaller than right angle); preocular lamina wide. Scapes dorsoventrally flattened, converging anteriorly to form flange at leading edge; trailing edge shallowly concave. Mandibles in full-face view elongated-triangular; masticatory margins engaged across entire length, without diastema; but basalmost 1–2 tooth too small to reach counterpart from opposite mandible, leaving small basal gap between mandibles. Eye reduced to only one ommatidium.

DENTITION (Fig. 26B). (Only partially visible with all type specimens having their mandibles fully closed and obscured by setae along the inner mandible margins.) Principal dental row with six alternating reduced low and rounded teeth and long elongated-triangular teeth; first, third and fifth teeth low, with increase in size from basal to distal; second, third and sixth teeth long, subequal in size; apex of mandible at down curvature, in anterior view, with series of at least five small teeth or minute denticles, apical tooth inconspicuous, either obscured or reduced and, hence, indistinguishable from preapical denticles when mandibles fully closed. Total dental count of around 11–12.

MESOSOMA. In profile view, promesonotum broadly convex; pronotum not marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal spines short, broadly triangular, subtended on each side by broad lamella with weakly convex posterior margin that narrowed slightly basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar node high; petiolar peduncle not grading evenly into node, and about as long as node; petiolar node with differentiated anterior face, shorter than posterior face. In dorsal view, petiolar node broader than long, around 1.2–1.4 times as long; disc of postpetiole broader than long, around 1.4–1.6 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at the posterolateral angle of node in profile view; in dorsal view, the processes present along the lateral and posterior margins of the petiolar node, and surrounding the disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum with small appressed obovate setae; clypeal dorsum also with appressed obovate setae, slightly smaller and more densely packed; mandibular dorsum with appressed fine setae. Surface of scape with appressed fine setae, and sparsely with a few small appressed oblanceolate setae near leading edge; funiculus densely covered with short fine setae. Laterally-projecting seta absent (one claviform seta around each occipital corner may appear so, but in fact originating from cephalic dorsum at angle instead of on dorsolateral margin of head, hence not truly laterally-projecting); lateral margin of occipital lobe with appressed spoon-shaped setae; lateral and anterior clypeal margins with small spoon-shaped setae, medially directed; leading edge of scape with row of projecting spoon-

shaped setae, all curved except for third basalmost seta, which posited on subbasal angle, mostly straight and is longest among all; three setae immediately following straight seta basally directed; all other setae apically directed. In dorsal view, promesonotal dorsum, petiolar node and disc of postpetiole with small appressed subspatulate to obovate setae. Pronotal humeral seta long and flagellate. In profile view, immediately in front of occipital margin near midline with two pair of long, slightly curved claviform erect setae; similar setae also present on mesonotum in a pair; disc of postpetiole with two pairs of remiform erect setae, a pair of similar setae also present on first gastral tergite near anterior margin; petiole and sparsely across gastral tergites with long erect or looped flagellate setae; gastral tergites also further with short appressed fine setae; gastral sternites with erect to suberect setae; ventral surface of head with appressed setae. Hairwheel present at mesopleural excavation. Surface of femora, tibiae and basitarsi with appressed subspatulate to plank-like setae; surfaces of middle and hind basitarsi with long projecting flagellate seta.

SCULPTURE. Surface of head (including antennal scrobe), antennae and legs areolate. Entire surface of mesosoma smooth and shining, except for mesonotal dorsum, which is weakly areolate. Dorsum of petiolar node and disc of postpetiole mostly smooth and shining. Basigastral costulae short, around one fourth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys jaitrongi sp. nov. is a member of the *S. rostrata*-group and shares all its characters (Bolton 2000). *Strumigenys jaitrongi*, as well as some other Oriental and Sino-Japanese species from the *S. rostrata*-group (e.g., *S. atropos*), have a dentition consisting of alternating short and long teeth, which is different from the dentition of other species within the species group (e.g., *S. claviseta* sp. nov., *S. nepalensis*). *Strumigenys jaitrongi* and these species may constitute a separate species group of their own due to their unique dentition.

Strumigenys jaitrongi sp. nov. can be distinguished from other Oriental and Sino-Japanese species in the species group by the following characters (Table 4): antennae are 6-segmented (instead of 4-segmented as in *S. nepalensis*); mandibles have a small basal gap between them (instead of having a prominent gap that spans almost their entire length as in *S. nepalensis*, or a complete absence of such a gap as in other species); eyes are greatly reduced (unlike *S. emeswangi*, *S. incerta*, *S. nepalensis* or *S. rostrataeformis*); in profile view, the cephalic dorsum of the worker has four erect claviform setae (instead of two such setae as in *S. claviseta* sp. nov., remiform as in *S. atropos* or *S. subterranea*, or completely absent as in the other species); the pronotal dorsum is completely smooth and shining (unlike *S. nepalensis*, *S. emeswangi*, *S. incerta* or *S. rostrataeformis*); the mesonotal dorsum is weakly areolate (instead of smooth and shining as in *S. atropos*); the pronotal humeral seta is flagellate (instead of stout as in *S. atropos* or *S. nepalensis*, or remiform as in *S. rostrataeformis*, or claviform as in *S. claviseta* sp. nov.).

Comparing *S. jaitrongi* sp. nov. with *S. claviseta* sp. nov. and *S. subterranea*, the first gaster tergite of *S. jaitrongi* has a mix of appressed setae, erect flagellate setae, and a pair of erect remiform setae close to the anterior margin (erect remiform seta is absent in *S. subterranea*, while there are erect claviform setae only in *S. claviseta*).

Geographic range

Thailand (Trang).

Ecology

Collected in secondary forest.

Strumigenys juliae Forel, 1905
Fig. 23G–I; Table 2

Strumigenys juliae Forel, 1905: 12 (w.) INDONESIA (Java). Indomalaya.

Material examined

THAILAND – **Trang Province** • 4 workers; Khao Chong; 7.54401° N, 99.80087° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers, 1 queen; same collection data as for preceding; IBBL • 1 worker; same collection data as for preceding; IBBL • 1 worker; same collection data as for preceding; IBBL • 1 worker; Khao Chong; 7.54309° N, 99.80029° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers, 1 queen; Khao Chong; 7.54251° N, 99.79813° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 8 workers, 1 queen; Khao Chong; 7.54246° N, 99.79651° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; IBBL • 1 worker; Khao Chong; 7.54204° N, 99.79298° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 10 workers, 1 queen; Khao Chong; 7.54525° N, 99.79203° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 16 workers, 2 queens; same collection data as for preceding; IBBL • 11 workers; Khao Chong; 7.54765° N, 99.78864° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 6 workers; Khao Chong; 7.5436° N, 99.8067° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54395° N, 99.80502° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 14 workers, 1 queen; Khao Chong; 7.26917° N, 99.66152° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.25423° N, 99.71394° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 6 workers; Khao Chong; 7.25533° N, 99.71729° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers; Khao Chong; 7.54381° N, 99.79488° E; 30 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 27 workers, 1 queen; Khao Chong; 7.55521° N, 99.79266° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.55519° N, 99.79115° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL • 9 workers, 1 queen; same collection data as for preceding; IBBL • 9 workers, 1 queen; Khao Chong; 7.55602° N, 99.78968° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL • 7 workers; Khao Chong; 7.55471° N, 99.78834° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL • 4 workers, 3 queens; Khao Chong; 7.55487° N, 99.7865° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers, 2 queens; Khao Chong; 7.55606° N, 99.78436° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL.

VIETNAM – **Đắk Nông Province** • 4 workers; Nam Nung Reserve; 12.2045° N, 107.75543° E; 883 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.18455° N, 107.76223° E; 878 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 25 workers, 4 queens; Nam Nung Reserve; 12.1757° N, 107.76062° E; 907 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.1666° N, 107.76752° E; 893 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.16745° N, 107.76682° E; 890 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 11 worker, 1 queen; Nam Nung Reserve; 12.23025° N, 107.83087° E; 886 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 4 workers; Nam Nung Reserve; 12.23077° N, 107.83045° E; 911 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.23077° N, 107.83063° E; 909 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 3 workers, 1 queen; Nam Nung Reserve; 12.23104° N, 107.83173° E; 891 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 2 workers; Nam Nung Reserve; 12.23113° N, 107.83153° E; 907 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 17 workers; same collection data as for preceding; IBBL • 1 worker; Nam Nung Reserve; 12.23036° N, 107.83293° E; 826 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker, 2 queens; Nam Nung Reserve; 12.22927° N, 107.83662° E; 805 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL.

Measurements

Workers

TL 1.9–2.4, HL 0.50–0.60, HW 0.35–0.44, MandL 0.22–0.28, SL 0.28–0.36, EL 0.043–0.066, PW 0.20–0.27, ML 0.47–0.63, PL 0.22–0.29, PH 0.10–0.12, DPW 0.09–0.13, PPL 0.12–0.17, GL 0.38–0.53, CI 68–75, MI 42–46, SI 74–86, OI 11–16, LPI 41–50, DPI 39–56 (n=14).

Geographic range

Borneo, Indonesia (Java and Lesser Sunda Islands), Malaysia (Peninsular), Philippines, Singapore, Thailand (Trang), Vietnam (Đắk Nông).

New record for Thailand and Vietnam.

Ecology

Collected in primary forest, secondary forest, mature forest and rubber plantation.

Comments

The new records in Thailand and Vietnam extend the species' geographical range more than 1000 km northward into the Indochinese Peninsula, and indicate that it may also be present in the nearby country of Cambodia.

Strumigenys lewisi Cameron, 1886

Table 2

Strumigenys lewisi Cameron, 1886: 229 (w.q.) JAPAN. Palearctic.

Strumigenys lewisi – Bingham 1903: 149 (revived status as species). — Brown 1949b: 16 (revived status as species).

non *Strumigenys godeffroyi* – Mayr 1887: 569 (footnote); 1897: 431. — Dalla Torre 1893: 146. — Emery 1895: 473; 1897: 575; 1924: 321. — Forel 1903: 707. — Wheeler 1906: 318; 1923: 4; 1928a: 27; 1928b: 115; 1930: 71; 1935: 33. — Yano 1910: 420. — Teranishi 1940: 36. — Azuma 1950: 35. — Chapman & Capco 1951: 108.

Material examined

MAINLAND CHINA – **Guangxi Province** • 1 worker; Damingshan; 13 May 1997; J. Fellowes leg.; HKBM • 2 workers; Dawangling, Longuo; 1180 m a.s.l.; 6 Aug. 1999; J. Fellowes leg.; HKBM • 1 worker; Dayaoshan, Luoxiang Cun; 23 Sep. 1998; J. Fellowes leg.; HKBM • 1 worker; Dayaoshan, Yinchan; 16 Sep. 1998; J. Fellowes leg.; HKBM • 3 workers; same collection data as for preceding; HKBM • 1 worker; Huaping, Cujiang; 19 Aug. 1998; J. Fellowes leg.; HKBM • 1 worker, 1 queen; Huaping, Cujiang; 20 Aug. 1998; J. Fellowes leg.; HKBM • 2 workers; Huaping, Hongtan; 17 Aug. 1998; J. Fellowes leg.; HKBM • 1 worker; Huaping; J. Fellowes leg.; HKBM ANTWEB1015018 • 1 worker; Longhushan; 16 Oct. 1998; J. Fellowes leg.; HKBM • 1 worker; Maoershan, Bajiaotian; 22 Aug. 1998; J. Fellowes leg.; HKBM • 2 workers; Nonggang, Dalong; 22 May 1998; J. Fellowes leg.; HKBM.

JAPAN – **Satsunan Islands** • 1 queen; Amami Ōshima, Takabachiyama; 480 m a.s.l.; 5 Mar. 2017; Sk. Yamane leg.; hand collection; KUM • 4 workers; Amami Ōshima, Yuwandake; 500–570 m a.s.l.; 25 Jun. 2016; K. Yamamuro leg.; KUM.

Geographic range

Native: mainland China, Japan, North Korea, Philippines, South Korea, Taiwan, Vietnam.

Introduced: Georgia, Hawaii, Malta (dubious, see comments below).

Ecology

Collected in both closed and open broadleaf forest, from elevations up to 1180 m.

Comments

One of the most widespread and well-documented species of *Strumigenys* in Asia, with its geographical range including central to northern provinces of mainland China (as far as Beijing) and North Korea, which are often void of any record of *Strumigenys*. Its presence in Chinese provinces such as Hainan, Hebei, Henan, Anhui, Jiangxi is likely. Records from Myanmar need confirmation (Bolton 2000), while past records from India have been excluded (Bharti *et al.* 2016). Similarly, several records of this species outside its native range such as in Malta and Georgia in Europe most likely represent misidentifications (Hamer *et al.* 2021). Records from the Philippines (Way *et al.* 1998) would also need to be confirmed.

Strumigenys liuweii sp. nov.

urn:lsid:zoobank.org:act:0D103932-48C3-47A3-A6B3-793A76F62781

Fig. 27; Tables 2, 8

Diagnosis

Strumigenys liuweii sp. nov. can be distinguished from other species in the *S. godeffroyi*-group by a combination of the following characters: mandible slightly tapered distally; apicoscrobial seta and pronotal humeral seta flagellate; pronotum and dorsum of petiolar node fully sculptured; pleurae, side of propodeum and disc of postpetiole mostly smooth and shining; propodeal spines subtended by broad lamellae; petiolar node with differentiated anterior face, not claviform; gastral tergites covered with erect or looped flagellate setae; dorsal surface of femur without any erect seta; hind tibiae and basitarsi without any long projecting flagellate seta; HL 0.71–0.73, MI 42–43, SI 97–100.

Etymology

The species is named after Liuwei Wang, Chase, who helped us collected important material from Hainan Province, China, including this new species. The name was created by adding the singular Latin genitive case suffix -i to the given name of a male person.

Type material

Holotype worker (Fig. 27)

MAINLAND CHINA • Hainan Province, Bawangling, BWLP11; 19.09188° N, 109.20321° E; 4 Jul. 2016; L. Wang leg.; Winkler, 4 corners; primary forest; LKCNHM ANTWEB1011876 (collection code IBBL HNA-00916).

Paratype worker

MAINLAND CHINA • 1 worker; same collection data as for holotype; HKBM ANTWEB1011875 (collection code IBBL HNA-00916).

Measurements

Holotype worker

TL 3.0, HL 0.73, HW 0.48, MandL 0.31, SL 0.47, EL 0.053, PW 0.27, ML 0.77, PL 0.28, PH 0.14, DPW 0.13, PPL 0.15, GL 0.72, CI 66, MI 42, SI 97, OI 11, LPI 50, DPI 44.

Paratype worker

TL 2.9, HL 0.71, HW 0.47, MandL 0.30, SL 0.47, EL 0.049, PW 0.26, ML 0.73, PL 0.31, PH 0.15, DPW 0.12, PPL 0.17, GL 0.72, CI 66, MI 43, SI 100, OI 10, LPI 48, DPI 39 (n=1).

Worker description

HEAD. In full-face view, occipital margin deeply concave; occipital corners well developed; preocular lamina wide; anterior clypeal margin mostly transverse. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge; apical antennomere unconstricted basally. Mandible curvilinear but slightly tapered distally; elongated preapical tooth located close to apicodorsal tooth; preapical tooth distinctly longer than width of mandible at point where tooth arises; apicodorsal tooth markedly longer than apicoventral tooth. In profile view, eye with 2–3 ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum broadly convex, propodeum more or less flat transversely; pronotum not marginated dorsolaterally. In dorsal view, lateral margins of pronotum broadly convex. Propodeal teeth short and triangular, subtended on each side by broad lamella with mostly transverse posterior margin that narrowed slightly basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiole not claviform; petiolar node with anterior face, differentiated from peduncle, petiolar peduncle about as long as node. In dorsal view, petiolar node about as broad as long; disc of postpetiole broader than long, around 1.7–1.8 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile; anterior face of node with remnant of process; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding the disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, apicoscrobal seta flagellate; laterally-projecting seta other than apicoscrobal seta along dorsolateral margin of head absent or abraded. Antennae and mandibles covered with short appressed simple setae; dorsolateral margin of head, lateral clypeal margins, leading and trailing edges of scape with decumbent stout setae; those on edges of scape apically directed; anterior clypeal margin

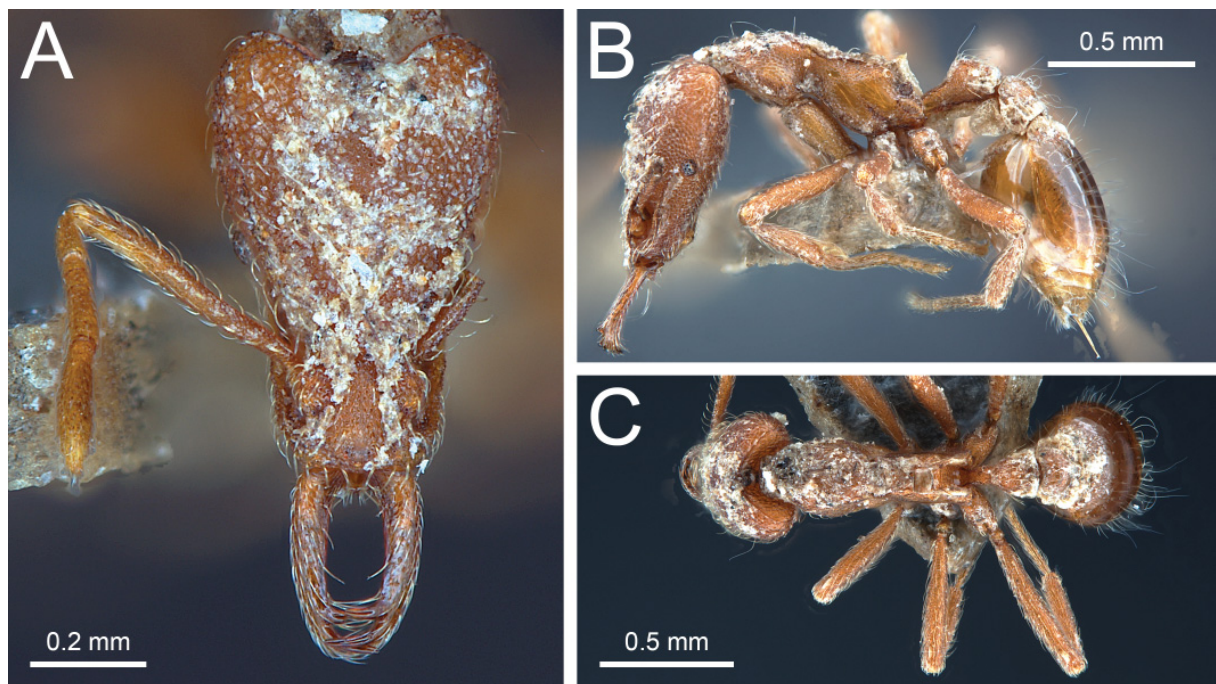


Fig. 27. Holotype worker (ANTWEB1011876) of *Strumigenys liuweii* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

with medially directed acicular setae. Pronotal humeral seta long and flagellate. In profile view, cephalic dorsum, promesonotal dorsum, dorsum of petiolar node and disc of postpetiole with simple appressed to decumbent ground pilosity; petiolar node and disc of postpetiole also with long suberect to erect flagellate setae against ground pilosity; gastral tergites with numerous long erect or looped flagellate setae; ventral surface of head with short decumbent setae; gastral sternites with short suberect simple setae. Hairwheel present at mesopleural excavation. Dorsal and ventral surfaces of femur without any erect seta against ground pilosity of appressed setae; surfaces of middle and hind tibiae or basitarsi without any projecting flagellate seta.

SCULPTURE. Surface of head (including antennal scrobe), antennae, side of pronotum, mesosomal dorsum, petiolar node and legs densely areolate; mandible with sparse weak punctate sculpture and weakly areolate basally, but otherwise mostly smooth; pleurae, side of propodeum and disc of postpetiole mostly smooth and shining, with vestiges of sculpture around margins. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys liuweii sp. nov. is a member of the *S. godeffroyi*-group and shares all its characters (Bolton 2000), and most likely belongs to the *rofocala*-complex of Subgroup B. It is possible that the lack of projecting flagellate setae on the tibiae and basitarsi in known specimens of *S. liuweii* (of which there are only two) is due to abrasion, hence it is also compared with species from Subgroup A of the *S. godeffroyi*-group below, focusing on other morphological characters. It can be confidently stated that *S. liuweii* does not belong to the *signeae*-complex of Subgroup B due to its flagellate pronotal humeral seta; it also does not belong to the *mjoebergi*-complex of Subgroup A due to its smooth side of the propodeum; it is unlikely to belong to the *godeffroyi*-complex of Subgroup A as it does not have an extensive lateral lobe of petiole.

Besides *Strumigenys liuweii* sp. nov., there are nine other species in the *smythiesii*-complex of Subgroup A that either also have a flagellate apicoscrobial seta (*S. datryx*, *S. ekasura*, *S. fellowesi* sp. nov., *S. habropilosa* Bolton, 2000, *S. hypoturba* Bolton, 2000, *S. panaulax*, *S. smythiesii* and *S. trada*) or uncertain (*S. choii* Lyu, 2007). For *S. liuweii*, its pronotal dorsum is sculptured (unlike *S. choii*, *S. fellowesi* or *S. smythiesii*); the dorsum of the petiolar node is sculptured (unlike *S. choii*, *S. datryx* or *S. smythiesii*); the disc of the postpetiole is smooth and shining (unlike *S. ekasura* or *S. panaulax*); the pilosity on the gaster is long and flagellate, erect or looped (instead of predominantly simple as in *S. hypoturba* or *S. trada*). *Strumigenys liuweii* lacks the characteristic spatuliform pilosity on the cephalic dorsum of *S. choii*, *S. fellowesi* or *S. hypoturba*. *Strumigenys liuweii* has a considerably longer scape (SI 97–100) than *S. datryx*, *S. ekasura* or *S. panaulax* (SI 68–83), and longer mandibles (MI 42–43) than *S. habropilosa* (MI 34). *Strumigenys liuweii* (HL 0.71–0.73, ML 0.73–0.77) is also a larger species than *S. habropilosa* (HL 0.62, ML 0.62) or *S. hypoturba* (HL 0.64, ML 0.69).

Strumigenys liuweii sp. nov. can be distinguished from other members of the *rofocala*-complex of Subgroup B (*S. baal* Bolton, 2000, *S. edaragona* Bolton, 2000, *S. frivola* Bolton, 2000 and *S. rofocala* Bolton, 2000) by the following characters (Table 8): disc of postpetiole is mostly smooth and shining (instead of sculptured as in *S. frivola*); the apical antennomere is not constricted basally (unlike *S. edaragona*); the side of the propodeum is mostly smooth and shining (unlike *S. baal*); the mandibles are tapered slightly apically (unlike *S. edaragona*, *S. frivola* or *S. rofocala*). *Strumigenys liuweii* (TL 2.9–3.0) is also a much larger species than *S. rofocala* (TL 1.8–1.9).

Geographic range

Mainland China (Hainan).

Table 8. Diagnostic characters of *Strumigenys liuweii* sp. nov. in comparison with Oriental and Sino-Japanese species from the *rofocala*-complex of the *S. godeffroyi*-group. Values indicate the presence (1) or absence (0) of a character.

Species	Characters			
	Apical antennomere unconstricted basally	Mandible slightly tapered apically	Side of the propodeum mostly unsculptured	Disc of postpetiole mostly unsculptured
<i>S. liuweii</i> sp. nov.	1	1	1	1
<i>S. baal</i> Bolton, 2000	1	1	0	1
<i>S. edaragona</i> Bolton, 2000	0	0	1	1
<i>S. frivola</i> Bolton, 2000	1	0	0	0
<i>S. rofocala</i> Bolton, 2000	1	0	1	1

Ecology

Collected in primary forest.

***Strumigenys longidens* sp. nov.**

urn:lsid:zoobank.org:act:31CFF836-D330-4153-9D13-46AE068D2A2A

Fig. 28; Tables 2, 9

Diagnosis

Strumigenys longidens sp. nov. can be distinguished from other species in the *S. murphyi*-group by a combination of the following characters: small suborbicular to orbicular setae restricted to clypeus and two rows immediately behind clypeus, absent in other parts of cephalic dorsum; inner margin of mandible with overhanging obovate setae; leading edge of scape with projecting spoon-shaped setae; mandible with six preapical teeth, all short except for fourth and sixth tooth, about as long as neighboring setae; apicodorsal tooth long and spiniform, overlapping outer margin of opposite mandible at full closure.

Etymology

The species is named after its long preapical dentition. The name was created by combining ‘*longi*’, the genitive masculine singular of Latin adjective ‘*longus*’ (meaning ‘long’), with the nominative singular of masculine Latin noun ‘*dens*’ (meaning ‘tooth’).

Type material

Holotype worker (Fig. 28)

VIETNAM • Đồng Nai Province, Cat Tien National Park, Site 19; 11.45683° N, 107.36852° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; secondary forest; LKCNHM ANTWEB1011950 (collection code IBBL CT-S19-4m2-sp12).

Paratype worker

VIETNAM • 1 worker; same collection data as for holotype; HKBM ANTWEB1011951 (collection code IBBL CT-S19-4m2-sp12).

Additional material examined

VIETNAM – **Đắk Nông Province** • 1 worker; Nam Nung Reserve; 12.18455° N, 107.76223° E; 878 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL ANTWEB1011874. – **Đồng Nai Province** • 1 worker; Cat Tien National Park; 11.45098° N, 107.36353° E; 160 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011872 • 1 worker; Cat Tien National Park; 11.45688° N, 107.36958° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011873.

Measurements

Holotype worker

TL 1.8, HL 0.39, HW 0.45, MandL 0.20, SL 0.21, EL 0.018, PW 0.26, ML 0.45, PL 0.19, PH 0.11, DPW 0.13, PPL 0.13, GL 0.43, CI 116, MI 51, SI 46, OI 4, LPI 59, DPI 69.

Paratype worker

TL 1.9, HL 0.41, HW 0.48, MandL 0.22, SL 0.22, EL 0.014, PW 0.26, ML 0.47, PL 0.22, PH 0.12, DPW 0.14, PPL 0.14, GL 0.46, CI 118, MI 53, SI 46, OI 3, LPI 54, DPI 62 (n=1).

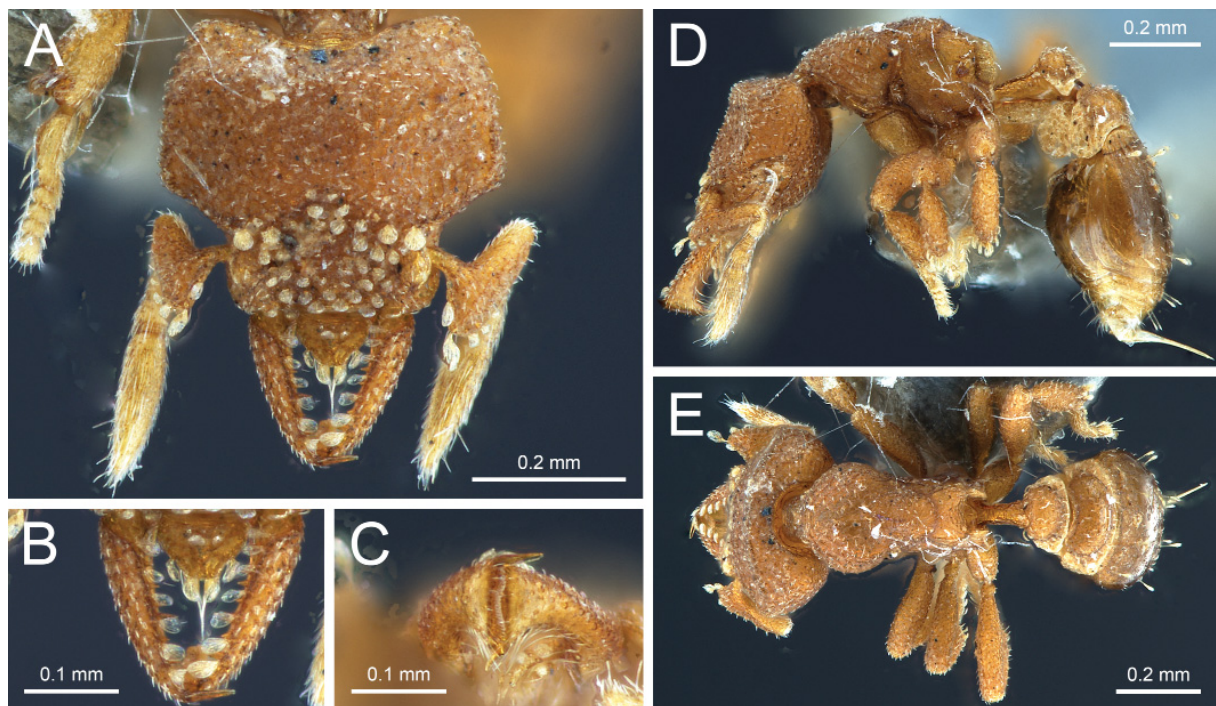


Fig. 28. Holotype worker (ANTWEB1011950) of *Strumigenys longidens* sp. nov. **A.** Full-face view. **B.** Mandible close-up. **C.** Mandible close-up in anterior view. **D.** Profile view. **E.** Dorsal view.

Worker description

HEAD. In full-face view, head wider than long; occipital margin broadly concave; occipital corner well developed; dorsolateral margins of head divergent on more than half of length, then abruptly converging towards center of head; anterior clypeal margin transverse. Scapes six-segmented, with well-developed subbasal lobe. Mandibles elongated and curvilinear, with six preapical teeth; all of them short and triangular to elongated-triangular, except for fourth and sixth teeth, longest and second longest respectively, spiniform and about as long as neighboring setae; apicodorsal tooth long and spiniform, overlapping outer margin of opposite mandible at full closure (Fig. 28B); basal lamellae low and broadly triangular, not fully visible at full closure. In anterior view of mandibles, enlarged extremity of mandibles composed of single apicodorsal tooth followed by series of very fine, compact, baleen-like mandibular setae, then single spiniform apicoventral tooth (Fig. 28C). Eye reduced to only one ommatidium.

MESOSOMA. In profile view, mesonotum forms conspicuous bulge, but not overhanging metanotal groove. In dorsal view, pronotum much wider than mesonotum and propodeum; anterior and lateral margins of pronotum convex. Propodeum unarmed, declivity on each side with broad lamella with weakly convex posterior margin narrowing slightly basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar node high; petiolar peduncle not grading evenly into node, and longer than node, around 1.3–1.5 times as long; petiolar node with differentiated anterior face. In dorsal view, petiolar node broader than long, around 1.3–1.5 times as long; disc of postpetiole broader than long, around two times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral margin than on anterior or posterior margin.

PILOSITY. In full-face view, cephalic dorsum (including along dorsolateral margin of head), clypeal dorsum, mandibles and surface of scape with very short appressed pubescence, those on cephalic dorsum mostly apically acute; small suborbicular to orbicular setae on head restricted to clypeus and two rows immediately behind clypeus, absent in other parts of cephalic dorsum. Anterior clypeal margin with six small appressed shoehorn-shaped to spoon-shaped setae, medially-directed; labrum and inner margin of mandible with overhanging obovate setae; leading edge of scape with row of projecting spoon-shaped setae, arranged in crescendo fashion; larger setae present on subbasal lobes, and progressively smaller setae present until about two-third of scape; mostly curved and apically directed, except for largest seta, posited on subbasal angle and anteriorly directed. In profile view, promesonotal dorsum, petiolar node, disc of postpetiole with short appressed pubescence, without any standing seta; ventral surface of head also with similar setae; first gastral tergites sparsely with erect claviform setae against short appressed pubescence, notably with one row close to anterior margin and another row close to posterior margin; remaining gastral tergites each with a pair of erect remiform setae; ventral surface of gaster with suberect to erect simple fine setae. Surface of legs with short decumbent pubescence; apical portion of tibiae bearing some spatulate to obovate setae. Hairwheel present at mesopleural excavation, well developed.

SCULPTURE. Surface of head (including antennal scrobe), mandibles, antennae, legs and petiole densely areolate. Side of pronotum and mesosomal dorsum areolate-rugulose, rugulae on pronotal dorsum directional towards midline. Pleurae, side of propodeum and disc of postpetiole mostly smooth and shining, with vestiges of sculpture around margins. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Table 9. Diagnostic characters of *Strumigenys longidens* sp. nov. in comparison with species from the *S. murphyi*-group. Values indicate the presence (1) or absence (0) of a character.

Species	Characters				
	Orbicular hairs present on cephalic dorsum	Cephalic orbicular hairs restricted to limited rows behind clypeus	Apicodorsal tooth long and spiniform	Longest preapical teeth as long as neighboring hairs	Longitudinal costulate absents on pronotal dorsum
<i>S. longidens</i> sp. nov.	1	1	1	1	1
<i>S. dyschima</i> (Bolton, 2000)	1	1	0	1	0
<i>S. formosa</i> (Terayama <i>et al.</i> , 1995)	1	1	0	0	1
<i>S. hemisobek</i> (Bolton, 2000)	0	0	0	0	1
<i>S. murphyi</i> (Taylor, 1968)	1	0	1	0	1
<i>S. nannosobek</i> (Bolton, 2000)	1	0	0	0	1

Comments

Strumigenys longidens sp. nov. is a member of the *S. murphyi*-group and shares all its characters (Bolton 2000). It can be distinguished from other members of the species group by the combination of a limited distribution of small orbicular setae on the cephalic dorsum, and long apicodorsal as well as preapical teeth (Table 9).

Apart from *Strumigenys longidens* sp. nov., there are two other species in the species group (*S. dyschima* (Bolton, 2000) and *S. formosa* (Terayama *et al.*, 1995)) that also share the character whereby orbicular setae on the cephalic dorsum are restricted to only a handful of rows immediately behind clypeus. In contrast, for *S. hemisobek* (Bolton, 2000), orbicular setae are completely absent; for *S. nannosobek* (Bolton, 2000), its orbicular setae are limited to the clypeal dorsum only; for *S. murphyi* (Taylor, 1968), its orbicular setae cover the entire area from behind the clypeus to the transverse crest on the vertex. *Strumigenys longidens* can be distinguished from *S. dyschima* and *S. formosa* by its long and spiniform

apicodorsal tooth (instead of short and not overlapping outer margin of opposite mandible at full closure). *Strumigenys longidens* also has areolate-rugulose sculpture on the pronotal dorsum (instead of longitudinal costulate as in *S. dyschima*). *Strumigenys longidens* (TL 1.8–1.9, HW 0.45–0.48) is a slightly larger species than *S. formosa* (TL 1.6, HW 0.38) or *S. dyschima* (TL 1.5, HW 0.37).

Strumigenys longidens sp. nov. can further be distinguished from *S. murphyi*, which also has a long and spiniform apicodorsal tooth, by its preapical teeth. For *S. longidens*, the longest preapical teeth are spiniform and about as long as the neighboring obovate setae that overhang the inner margin of the mandible (Fig. 28B), while in *S. murphyi*, the preapical teeth are all short and never comparable in length with the neighboring setae.

Geographic range

Vietnam (Đắk Nông, Đồng Nai).

Ecology

Collected in secondary forest at elevations from 160 to 878 m.

Strumigenys mazu (Terayama *et al.*, 1996)

Table 2

Smithistruma mazu Terayama *et al.*, 1996: 337, figs 26–27, 30–31 (w.) TAIWAN. Indomalaya.

Pyramica mazu – Bolton 1999: 1673.

Strumigenys mazu – Baroni Urbani & De Andrade 2007: 123.

Material examined

MAINLAND CHINA – **Guangxi Province** • 1 worker; Diding; 1110 m a.s.l.; 9 Jul. 1999; J. Fellowes leg.; HKBM.

Geographic range

Mainland China (Guangxi, Hong Kong), Japan, Taiwan

Ecology

Collected in closed broadleaf forest at an elevation of 1110 m.

Comments

The species' current records in Guangxi and Hong Kong show a disjunct geographical range, in southern China in particular. Its presence in Fujian and Guangdong provinces appears likely.

Strumigenys mediocris sp. nov.

urn:lsid:zoobank.org:act:B3C1039A-2E37-4102-97C9-BCB2B7D69C54

Fig. 29; Table 2

Diagnosis

Strumigenys mediocris sp. nov. can be distinguished from other species in the *S. godeffroyi*-group by a combination of the following characters: apicoscrobial seta simple; pronotal humeral seta flagellate; pronotum and dorsum of petiolar node fully sculptured; pleurae, side of propodeum and disc of postpetiole mostly smooth and shining; propodeal spines subtended by narrow lamellae; petiolar node

with differentiated anterior face, not claviform; gastral tergites with long erect simple setae; dorsal surface of femur with erect setae; hind tibiae and basitarsi with long projecting flagellate setae; SI 85–88.

Etymology

The species is named after its ordinary morphology. The epithet '*mediocris*' is the nominative feminine singular of the Latin adjective '*mediocris*' (meaning 'ordinary').

Type material

Holotype worker (Fig. 29)

MAINLAND CHINA • Hainan Province, Bawangling, BWLP1; 19.11618° N, 109.15523° E; 29 Jun. 2016; L. Wang leg.; Winkler, 12 random; primary forest; LKCNHM ANTWEB1011879 (collection code IBBL HNA-00988).

Paratype workers

MAINLAND CHINA • 2 workers; same collection data as for holotype; HKBM ANTWEB1011915 to ANTWEB1011916 (collection code IBBL HNA-00988).

Additional material examined

MAINLAND CHINA – **Hainan Province** • 2 queens; Bawangling, BWLP6; 19.09148° N, 109.20041° E; 1 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL ANTWEB1011878, ANTWEB1011914 • 1 worker; Bawangling, BWLP9; 19.0903° N, 109.20101° E; 3 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL ANTWEB1011880.

Measurements

Holotype worker

TL 2.7, HL 0.64, HW 0.46, MandL 0.31, SL 0.41, EL 0.061, PW 0.24, ML 0.68, PL 0.34, PH 0.14, DPW 0.10, PPL 0.17, GL 0.60, CI 72, MI 48, SI 88, OI 13, LPI 42, DPI 30.

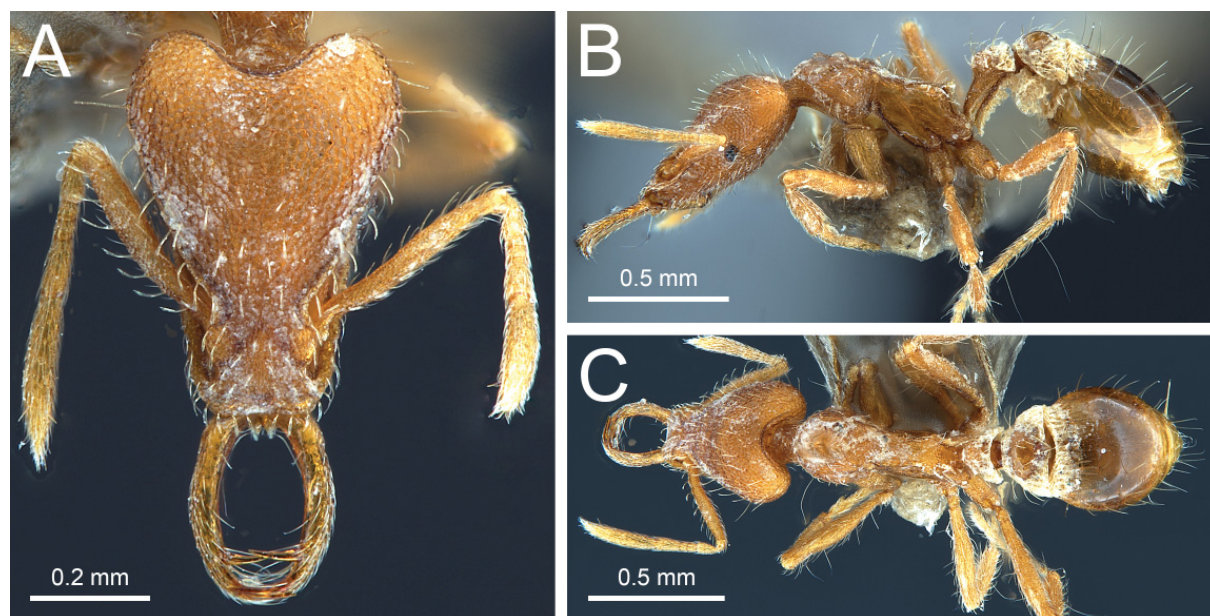


Fig. 29. Holotype worker (ANTWEB1011879) of *Strumigenys mediocris* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

Paratype workers

TL 2.7–2.8, HL 0.62–0.64, HW 0.45, MandL 0.30–0.31, SL 0.39, EL 0.055–0.063, PW 0.25–0.26, ML 0.66–0.72, PL 0.30–0.31, PH 0.12–0.13, DPW 0.10–0.12, PPL 0.16–0.19, GL 0.61–0.62, CI 70–73, MI 47–50, SI 85–87, OI 12–14, LPI 40–41, DPI 32–38 (n=2).

Worker description

HEAD. In full-face view, occipital margin evenly, deeply concave; occipital corners well developed; preocular lamina wide; posterior clypeal margin well defined, converged at midpoint to form right angle (or just slightly smaller than a right angle); anterior clypeal margin very broadly, shallowly concave. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge; apical antennomere unconstricted basally. Mandible curvilinear and long, with spiniform preapical tooth located close to apicodorsal tooth; width of mandible fairly constant from basal portion to where preapical tooth first arises; the preapical tooth in length at least 1.5 times width of mandible at point where tooth arises; apicodorsal tooth markedly longer than apicoventral tooth. In profile view, eye with three ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum convex, propodeum more or less flat transversely; pronotum not marginated dorsolaterally. In dorsal view, lateral margins of pronotum broadly convex. Propodeal teeth short and triangular, subtended on each side by narrow lamella with mostly transverse posterior margin, roughly parallel with margin of declivity. Metapleural gland bulla well developed.

METASOMA. In profile view, petiole not claviform; petiolar node with anterior face differentiated from peduncle, petiolar peduncle slightly longer than node, around 1.1–1.2 times as long. In dorsal view, petiolar node slightly broader than long, around 1.2–1.3 times as long; disc of postpetiole broader than long, around 1.4–1.6 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile; anterior face of node with inconspicuous strip; in dorsal view, processes present along posterior margin of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum only with handful of appressed setae close to clypeus; apicoscrobal seta simple, stout and straight; around 3–4 shorter setae present posterior to it on lateral margin of occipital lobe. Antennae and mandibles covered with short appressed simple setae; upper scrobe margin with short suberect seta, stout to acicular and slightly curved; lateral clypeal margins, leading and trailing edges of scape with suberect to decumbent stout setae; those on edges of scape apically directed; anterior clypeal margin with medially-directed acicular setae. Pronotal humeral seta long and flagellate. In profile view, cephalic dorsum, mesosomal dorsum, dorsum of petiolar node and disc of postpetiole with simple erect simple setae; those on cephalic dorsum denser than rest of body; petiolar node and disc of postpetiole also with posteriorly-directed decumbent simple setae; gastral tergites with numerous long erect simple setae; ventral surface of head with short decumbent setae; gastral sternites with short suberect simple setae. Hairwheel present at mesopleural excavation. Dorsal surface of femur with row of long fine erect setae against ground pilosity of appressed setae; surfaces of middle and hind tibiae and basitarsi with long projecting flagellate setae.

SCULPTURE. Surface of head (including antennal scrobe), antennae, side of pronotum, mesosomal dorsum, petiolar node and legs densely areolate; mandibles with sparse weak punctate sculpture and weakly areolate basally, but otherwise mostly smooth. Pleurae, side of propodeum and disc of postpetiole mostly smooth and shining, with vestiges of sculpture around margins. Basigastral costulae short, around one fourth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys mediocris sp. nov. is a member of Subgroup A in the *S. godeffroyi*-group and shares all its characters (Bolton 2000), and could be assigned to the *smythiesii*-complex, which accommodates species that do not belong to the *godeffroyi*-complex or the *mjoebergi*-complex. *Strumigenys mediocris* does not belong to the *godeffroyi*-complex as it does not have an extensive lateral lobe of the petiole, and its apicoscrobial seta is simple (instead of flagellate). It does not belong to the *mjoebergi*-complex, for its pleurae and side of propodeum are smooth and shining (instead of reticulate-punctate), and it has long erect setae on the dorsal surface of the hind femur.

Aside from *Strumigenys mediocris* sp. nov., there are eight other species in the *smythiesii*-complex that either also have a simple apicoscrobial seta (*S. chernovi*, *S. hastur*, *S. hispida*, *S. jepsoni* Mann, 1921, *S. lichiaensis*, *S. liukueiensis* Terayama & Kubota, 1989 and *S. solifontis* Brown, 1949) or unknown (*S. choii*) (Table 7). For *S. mediocris*, its pronotal humeral seta is flagellate (instead of simple as in *S. hispida*, *S. jepsoni*, *S. liukueiensis* or *S. solifontis*); setae on promesonotal dorsum and gastral tergites are simple (instead of spatuliform as in *S. choii* or *S. lichiaensis*, or subflagellate to flagellate as in *S. hispida* or *S. liukueiensis*); the pronotal dorsum is sculptured (unlike *S. choii* or *S. hastur*); the dorsum of the petiolar node is sculptured (unlike *S. choii*, *S. hastur* or *S. jepsoni*); the disc of the postpetiole is smooth and shining (unlike *S. chernovi*). *Strumigenys mediocris* also has a relatively shorter scape (SI 85–88) than *S. lichiaensis* (SI 98) or *S. trada* (SI 100).

Geographic range

Mainland China (Hainan).

Ecology

Collected in primary forest.

Strumigenys membranifera Emery, 1869

Fig. 30A–C; Table 2

Strumigenys (Trichoscapa) membranifera Emery, 1869: 24, fig. 11 (w.) ITALY. Palearctic.

Strumigenys (Cephaloxys) fochowensis Wheeler, 1928a: 28 (synonymized by Brown 1948: 114).

Strumigenys (Cephaloxys) membranifera var. *marioni* Wheeler, 1933: 276 (synonymized by Brown 1948: 114).

Strumigenys membranifera var. *santschii* Forel, 1904: 6 (synonymized by Brown 1948: 114).

Strumigenys silvestriana Wheeler, 1928a: 27 (synonymized by Brown 1948: 114).

Strumigenys membranifera r. *simillima* Emery, 1890: 69, pl. 8, fig. 5 (synonymized by Brown 1948: 114).

Strumigenys (Cephaloxys) vitiensis Mann, 1921: 461, fig. 22c (synonymized by Brown 1948: 114).

Strumigenys (Cephaloxys) membranifera var. *williamsi* Wheeler, 1933: 276 (synonymized by Brown 1948: 114).

Strumigenys (Cephaloxys) membranifera – Emery 1916: 205.

Trichoscapa membranifera – Brown 1948: 113.

Pyramica membranifera – Bolton 1999: 1673.

Strumigenys membranifera – Baroni Urbani & De Andrade 2007: 123.

Material examined

VIETNAM – **Đắk Nông Province** • 1 worker; Nam Nung Reserve; 12.17645° N, 107.77879° E; 896 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL. – **Đồng Nai Province** • 4 workers; Cat

Tien National Park; 11.37623° N, 107.50349° E; 175 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011955.

Geographic range

Native: Afrotropical realm (Ghana, Sierra Leone, South Africa).

Introduced: Oriental realm (mainland China: Yunnan; India; Singapore; Taiwan; Vietnam: Đắk Nông, Đồng Nai), Sino-Japanese realm (Bhutan, mainland China: Fujian, Guangdong, Hong Kong, Macau, Sichuan; Japan: Honshu, Kyushu, Ryukyu Islands, Shikoku; Nepal). For a full global account refer to antmaps.org (Janicki *et al.* 2016; Guénard *et al.* 2017).

New record for Vietnam.

Ecology

Collected in rubber plantations, at elevations from 175 to 896 m.

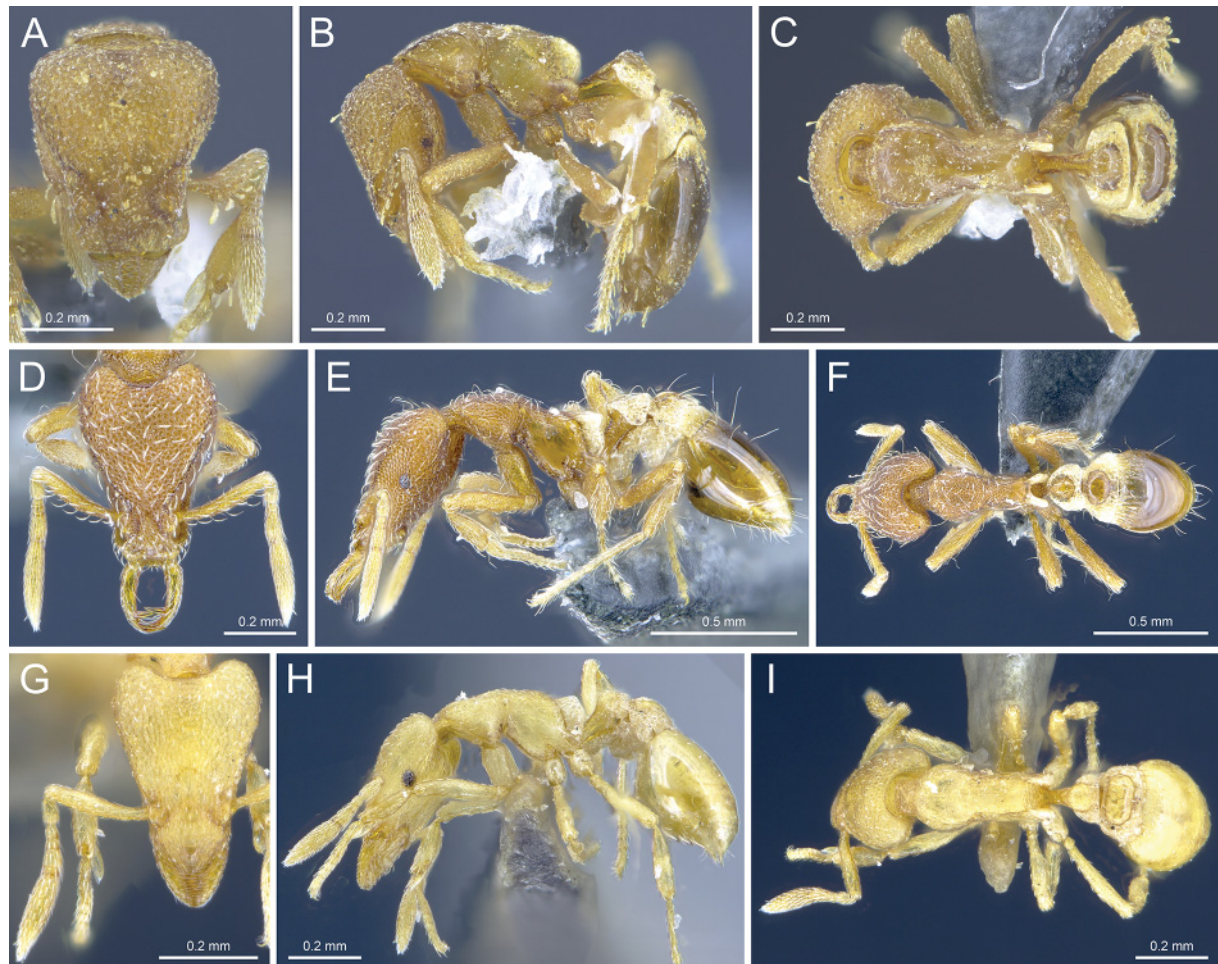


Fig. 30. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. **A–C.** Worker of *S. membranifera* Emery, 1869 from Vietnam (NN-S56-sp01). **D–F.** Worker of *S. minutula* Terayama & Kubota, 1989 from Hainan, mainland China (HNA-01641). **G–I.** Worker of *S. mitis* (Brown, 2000) from Hainan, mainland China (HNA-00275).

Comments

This record in southern Vietnam is the second in the Indochinese Peninsula, besides its recent collection in Singapore (Wang *et al.* 2022). Given the widespread distribution of this Afrotropical tramp species across almost all biogeographic realms, and its presence from India to Japan in the north, and from Indonesia (Lesser Sunda Islands) to the Solomon Islands in the south, this new record is not surprising. It also indicates the possibility of its presence in nearby countries such as Laos, Cambodia, Thailand and Myanmar, and Guangxi and Hainan provinces of mainland China.

Strumigenys minutula Terayama & Kubota, 1989

Fig. 30D–F; Table 2

Strumigenys minutula Terayama & Kubota, 1989: 782, figs 13–17 (w.q.) TAIWAN. Indomalaya.

Material examined

MAINLAND CHINA – **Hainan Province** • 2 workers; BM7; 19.194° N, 109.739° E; 23 Aug. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLR1; 19.14464° N, 109.0424° E; 12 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 5 workers; Bawangling, BWLR5; 19.12684° N, 109.06656° E; 13 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLR7; 19.19498° N, 109.0201° E; 15 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 5 workers; Bawangling, BWLR8; 19.19349° N, 109.02° E; 15 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 8 workers; Bawangling, BWLS11; 19.11678° N, 109.14003° E; 10 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 9 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLS12; 19.11796° N, 109.13055° E; 10 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLS13; 19.11699° N, 109.12711° E; 10 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLS2; 19.09193° N, 109.18389° E; 6 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Jianfengling, JFLFW5; 18.697° N, 108.849° E; 4 Jan. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 4 workers; same collection data as for preceding; IBBL • 1 worker; Yinggeling, YGLK1; 19.03775° N, 109.39278° E; 29 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 25 workers; Yinggeling, YGLK12; 19.08446° N, 109.50425° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 10 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 4 workers; Yinggeling, YGLK7; 19.09177° N, 109.53691° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 12 workers; Yinggeling, YGLK8; 19.09104° N, 109.53528° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Yinggeling, YGLK9; 19.09269° N, 109.53455° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL.

HONG KONG • 1 worker; Sha Tin District, Ma On Shan; 18 Oct. 1996; J. Fellowes leg.; HKBM.
MACAU • 1 worker; Hac Sa, Coloane Island; 25 Jun. 1999; Sk. Yamane leg.; KUM.

Geographic range

Mainland China (Hainan, Hong Kong, Macau), Japan (Ryukyu Islands), Taiwan.

New record for Hainan.

Ecology

Collected in primary forest, secondary forest, rubber and agro-rubber plantations.

Comments

This species has previously only been recorded from the Ryukyu Islands, Taiwan, Hong Kong and more recently in Macau (Brassard *et al.* 2020). This disjunct geographical range was proposed as an indication of its presence in other parts of southeast China, including Hainan (Tang *et al.* 2019). Hence, with more sampling efforts, it should be recorded in surrounding provinces such as Fujian and Guangdong.

Strumigenys mitis (Brown, 2000)

Figs 30G–I, 31; Table 2

Pyramica mitis Brown, 2000: 442, figs 267, 290 (w.q.) PHILIPPINES. Indomalaya.

Strumigenys mitis – Baroni Urbani & De Andrade 2007: 124.

Material examined

MAINLAND CHINA – **Guangdong Province** • 11 workers; Heishiding; 24 Apr. 1997; J. Fellowes leg.; HKBM. – **Guangxi Province** • 1 worker; Dayaoshan, Longan Cun; 18 Sep. 1998; J. Fellowes leg.; HKBM • 1 worker; Nonggang, Longshan (Longrui); 27 May 1998; J. Fellowes leg.; HKBM ANTWEB1011900 • 4 workers; same collection data as for preceding; HKBM. – **Hainan Province** • 1 worker; Bawangling, BWLS10; 19.11878° N, 109.15562° E; 9 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 4 workers; Bawangling, BWLS11; 19.11678° N, 109.14003° E; 10 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; same collection data as for preceding; Winkler, 4 corners; IBBL • 14 workers; Yinggeling, YGLK1; 19.03775° N, 109.39278° E; 30 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 61 workers; Yinggeling, YGLK11; 19.07802° N, 109.50424° E; 2 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 41 workers; Yinggeling, YGLK12; 19.08446° N, 109.50425° E; 2 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 3 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 98 workers; Yinggeling, YGLK14; 19.10743° N, 109.25845° E; 3 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 45 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 15 workers; Yinggeling, YGLK15; 19.11494° N, 109.26105° E; 3 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 4 workers; Yinggeling, YGLK2; 19.03875° N, 109.39525° E; 30 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Yinggeling, YGLK4; 19.077° N, 109.52288° E; 31 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Yinggeling, YGLK6; 19.07632° N, 109.52365° E; 31 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 19 workers; Yinggeling, YGLK7; 19.09177° N, 109.53691° E; 1 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 99 workers; Yinggeling, YGLK9; 19.09269° N, 109.53455° E; 1 Aug. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 7 workers; same collection data as for preceding; Winkler, 12 random; IBBL.

HONG KONG • 1 queen; Kwun Tong District, Jordan Valley Park; 22.32949° N, 114.22197° E; 113.4 m a.s.l.; 27 Jul.–2 Aug. 2021; A. Ibanez leg.; Winkler; IBBL • 2 workers; Lantau Island, Sheung Ling Pei; 22.27686° N, 113.93681° E; 40 m a.s.l.; 5 Dec. 1996; J. Fellowes leg.; HKBM • 1 worker; Lantau Island, Sunset Peak South; 22.25733° N, 113.96257° E; 670 m a.s.l.; 8 Oct. 1996; J. Fellowes leg.; HKBM • 3 workers; North District, Kuk Po San Uk Ha; 22.52977° N, 114.23475° E; 30 m a.s.l.; 28 Oct. 1996; J. Fellowes leg.; HKBM • 2 workers; Sai Kung District, Tit Kim Hang East; 22.40541° N, 114.30226° E; 90 m a.s.l.; 1 Aug. 1996; J. Fellowes leg.; HKBM • 1 worker; Sai Kung District, Tit Kim Hang West; 22.40446° N, 114.3013° E; 60 m a.s.l.; 14 Nov. 1996; J. Fellowes leg.; HKBM.

THAILAND – **Sakon Nakhon Province** • 2 workers, 1 queen; Site 104; 17.1326° N, 103.99685° E; 501 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers; same collection

data as for preceding; IBBL. – **Trang Province** • 23 workers; Khao Chong; 7.55602° N, 99.78968° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL.

VIETNAM – **Đắk Nông Province** • 2 workers; Nam Nung Reserve; 12.17617° N, 107.78055° E; 887 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.16998° N, 107.7696° E; 897 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.23025° N, 107.83087° E; 886 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 4 workers; Nam Nung Reserve; 12.22974° N, 107.83073° E; 896 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL. – **Đồng Nai Province** • 87 workers, 3 queens; Cat Tien National Park; 11.48379° N, 107.38651° E; 171 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 27 workers; Cat Tien National Park; 11.48493° N, 107.38533° E; 163 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers; Cat Tien National Park; 11.4843° N, 107.38571° E; 164 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Measurements

Queen

TL 2.2, HL 0.47, HW 0.36, MandL 0.09, SL 0.26, EL 0.108, PW 0.27, ML 0.64, PL 0.23, PH 0.15, DPW 0.12, PPL 0.12, GL 0.66, CI 76, MI 19, SI 74, OI 30, LPI 64, DPI 54 (n=1).

Geographic range

Brunei Darussalam, mainland China (Guangdong, Guangxi, Hainan, Hong Kong, Yunnan), India, Indonesia, Malaysia, New Guinea, Philippines, Singapore, Thailand, Vietnam.

New record for Guangxi and Hainan.

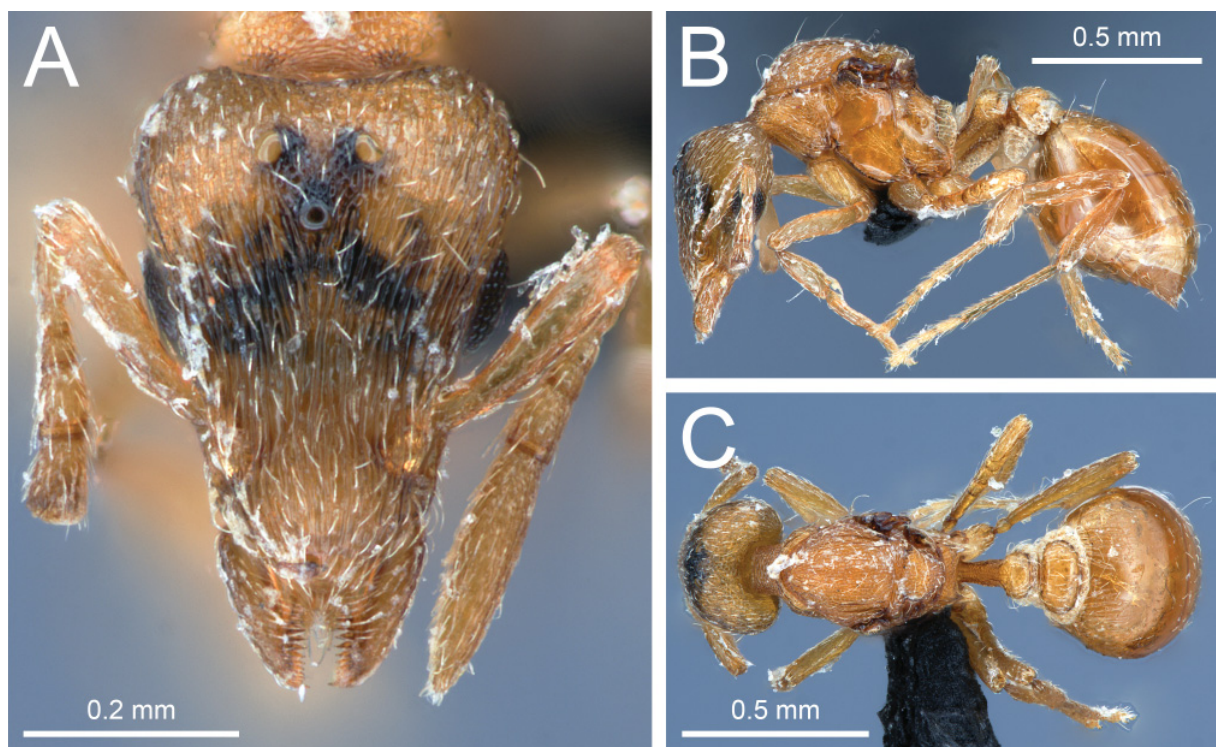


Fig. 31. Queen of *Strumigenys cf. mitis* (Brown, 2000) from Hong Kong (JV1T2W2). **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

Ecology

Collected in secondary forest, rubber and agro-rubber plantations in South China, and similar habits in Thailand and Vietnam. Known elevation from 30 to 897 m.

Comments

This species is widely distributed within the regions studied, including Guangdong and Yunnan provinces of mainland China as well as Vietnam. Its records in Hainan and Guangxi provinces were expected. Based on our current understanding of the distribution of this species, it seems likely to be also present in Cambodia, Laos, Myanmar, Bangladesh and some of the eastern states of India (Manipur, Meghalaya, Nagaland, Tripura).

It has been proposed by Bolton (2000) that *S. mitis* is not a single species, but a multitude of species that likely can only be morphologically differentiated from one another based on queen castes. A single queen has recently been collected in an urban park in Hong Kong (Fig. 31), which shows a morphology close to Queen morph B described by Bolton, but additionally, also presents a peculiar color pattern on the cephalic dorsum.

Strumigenys mutica (Brown, 1949)

Fig. 32A–F; Table 2

Kyidris mutica Brown, 1949b: 3, fig. 1 (w.) JAPAN. Palearctic.

Polyhomoa itoi Azuma, 1950: 36, figs. (synonymized by Brown & Yasumatsu 1951: 94).

Kyidris nuda Brown, 1949b: 23 (synonymized by Brown 1952: 124).

Pyramica mutica – Bolton 1999: 1672.

Strumigenys mutica – Baroni Urbani & De Andrade 2007: 124.

Material examined

MAINLAND CHINA – **Hainan Province** • 30 workers; Bawangling, BWLP4; 19.09217° N, 109.2017° E; 3 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL. – **Yunnan Province** • 5 workers; Dali; 29 Jul.–4 Aug. 2006; S. Onoda leg.; KUM • 2 workers; Jinghong; 7–12 Aug. 2006; S. Onoda leg.; KUM.

VIETNAM – **Đắk Nông Province** • 1 worker; Nam Nung Reserve; 12.2045° N, 107.75543° E; 883 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL. – **Đồng Nai Province** • 37 workers; Cat Tien National Park; 11.43382° N, 107.42485° E; 139 m a.s.l.; 3 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 11 workers; Cat Tien National Park; 11.4327° N, 107.25556° E; 137 m a.s.l.; 3 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011953.

Geographic range

Borneo, mainland China (Guangxi, Hainan, Hong Kong, Hunan, Sichuan, Yunnan), India, Indonesia (Borneo, Java, Lesser Sunda Islands), Japan, Malaysia, Singapore, South Korea, Taiwan, Vietnam (Đắk Nông, Đồng Nai).

New record for Hainan and Vietnam.

Ecology

Collected in primary and secondary forest, at elevations from 137 to 883 m.

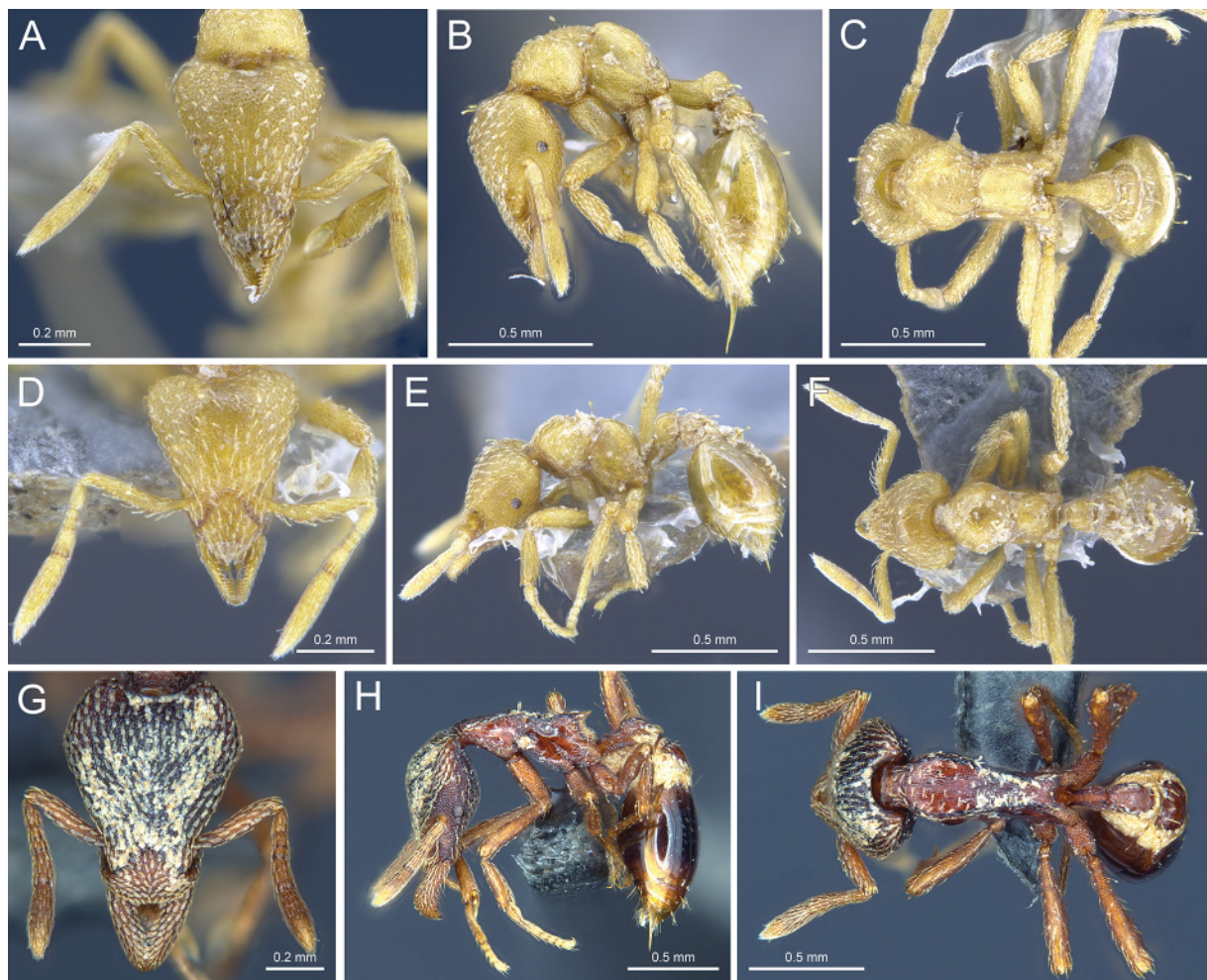


Fig. 32. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. **A–C.** Worker of *S. mutica* (Brown, 1949) from Hainan, mainland China (HNA-00747). **D–F.** Worker of *S. mutica* from Vietnam (NN-S45-sp02). **G–I.** Worker of *S. nathistorisoc* Tang *et al.*, 2019 from Hainan, mainland China (HNA-01523).

Comments

This species has been collected in Japan, South Korea, Taiwan and multiple provinces in southern China. Its record in Hainan (Fig. 32A–C) could indicate that the current disjunction in geographical range along the coastal region of mainland China is another example of undersampling. Given the new record in Vietnam (Fig. 32D–F), its presence in Cambodia, Laos and Thailand is also likely.

Strumigenys nanzanensis Lin & Wu, 1996

Fig. 33

Strumigenys nanzanensis Lin & Wu, 1996: 148, figs 13, 30–34 (w.q.) TAIWAN. Indomalaya.

Material examined

MAINLAND CHINA – **Yunnan Province** • 1 worker; Jinghong; 7–12 Aug. 2006; S. Onoda leg.; KUM.

HONG KONG • 1 worker; Central & Western District, Lung Fu Shan; 22.2794° N, 114.1349° E; 240 m a.s.l.; 28 Jun. 2019; K. Chan leg.; IBBL • 1 worker; same collection data as for preceding; IBBL • 4 workers; Lantau Island, Sha Lo Wan; 22.2898° N, 113.9069° E; 20 m a.s.l.; 6 May 2016; B.M. Worthington leg.; Winkler, 4 corners; IBBL • 14 workers; Lantau Island, Sha Lo Wan; 22.2881° N, 113.9013° E; 20 m a.s.l.; 19 Oct. 2015; B.M. Worthington leg.; Winkler, 4 corners; IBBL • 1 queen; Tai Po District, Ping Shan Chai; 22.486° N, 114.167° E; 2–16 May 2016; leg.; IBBL • 1 queen; Tai Po District, Ping Shan Chai; 22.486° N, 114.167° E; 9 Apr.–8 May 2016; leg.; IBBL • 1 worker; Wan Chai District, Victoria Park; 27 Jun. 1999; Sk. Yamane leg.; KUM ANTWEB1010909.

Geographic range

Bhutan, mainland China (Hong Kong, Jiangxi, Yunnan), India, Indonesia (Borneo, Lesser Sunda Islands), Malaysia, Singapore, Taiwan, Thailand.

Ecology

Collected at elevation 20–240 m.

Comments

Specimens from Hong Kong are observed to have an areolate process (spongiform tissues) on the dorsal surface of the petiole in profile view, from the petiolar peduncle just in front of the petiolar node to the

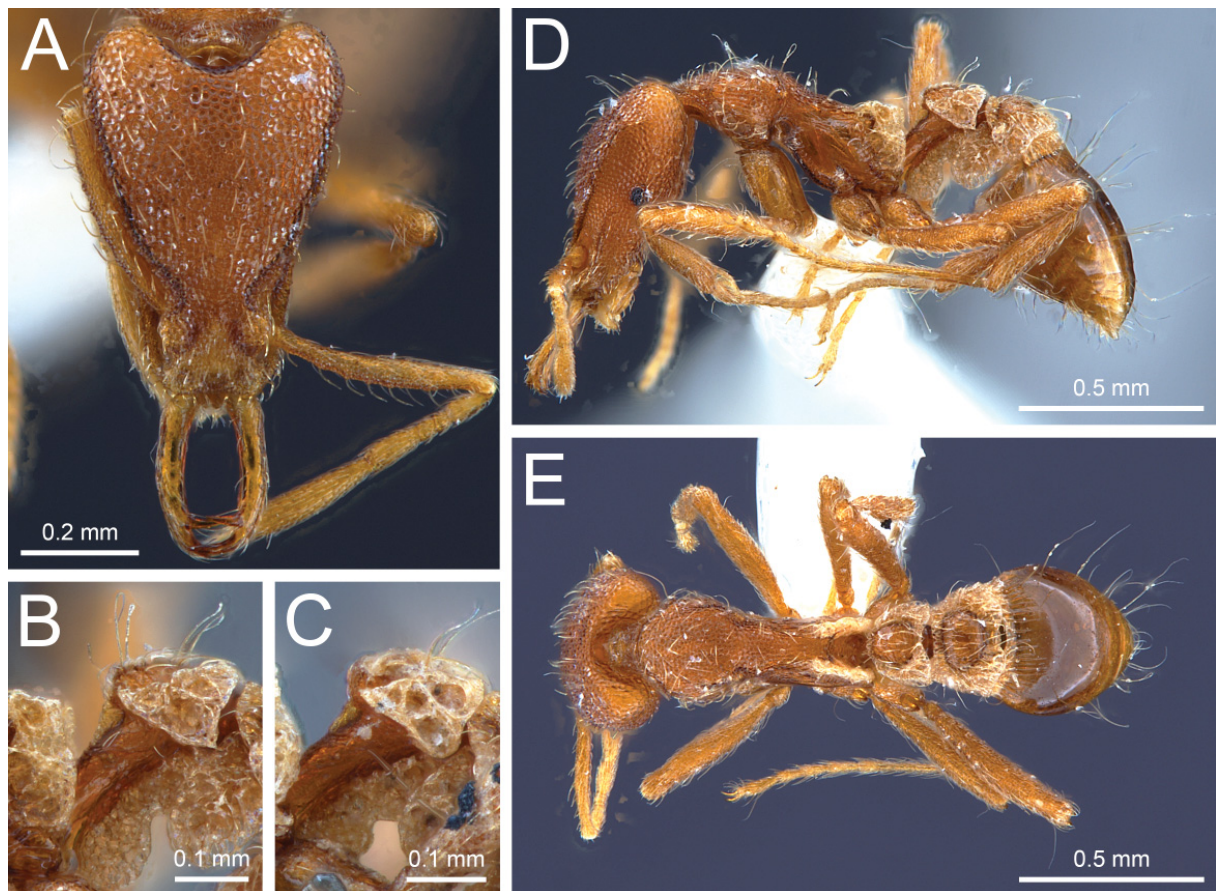


Fig. 33. Workers of *Strumigenys nanzanensis* Lin & Wu, 1996 from Hong Kong. **A–B, D–E.** ANTWEB1010909. **C.** K-D-084. **A.** Full-face view. **B–C.** Petiole close-up in profile view. **D.** Profile view. **E.** Dorsal view.

entire anterior face of the node; the petiolar node also has a conspicuous concave notch near the bottom of the anterior face (Fig. 33B). In a few other specimens from Hong Kong, as well as specimens from outside Hong Kong (e.g., Yunnan Province), the process is less developed and the notch is also less conspicuous (Fig. 33C). There is no other major morphological difference between specimens from Hong Kong and elsewhere, hence we consider this as a geographical variation within the species.

The areolate process on the anterodorsal surface of the petiolar node seems not to be uncommon in species of the same species group, i.e., *S. godeffroyi*-group (e.g., *S. hispida*, *S. minutula*, *S. solifontis*), though often merely present as a narrow strip and inconspicuous. This character is not well documented in previous publications and may be overlooked, but could be useful for diagnosis within the group.

A common species in the Oriental and Sino-Japanese realms. Presence in other provinces of southern China, as well as Laos, Myanmar and Vietnam seem likely.

Strumigenys nathistorisoc Tang *et al.*, 2019

Fig. 32G–I; Table 2

Strumigenys nathistorisoc Tang *et al.*, 2019: 31, figs 12a–d (w.) CHINA (Hong Kong). Indomalaya.

Material examined

MAINLAND CHINA – **Guangxi Province** • 1 worker; Huaping, Hongtan; 17 Aug. 1998; J. Fellowes leg.; HKBM ANTWEB1011906 • 2 workers; Nonggang, Longhu; 23 May 1998; J. Fellowes leg.; HKBM ANTWEB1011904 to ANTWEB1011905 • 1 worker; Qingshitian, Jiuwu; 26 Aug. 1998; J. Fellowes leg.; HKBM ANTWEB1011901. – **Hainan Province** • 1 worker; Bawangling, BWLP12; 19.09324° N, 109.20006° E; 4 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLS5; 19.10036° N, 109.17835° E; 7 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL.

Measurements

Workers

TL 3.1–3.4, HL 0.72–0.82, HW 0.58–0.63, MandL 0.23–0.26, SL 0.33–0.41, EL 0.061–0.084, PW 0.25–0.30, ML 0.80–0.87, PL 0.33–0.38, PH 0.13–0.17, DPW 0.13–0.16, PPL 0.19–0.24, GL 0.79–0.91, CI 76–80, MI 31–34, SI 56–65, OI 10–14, LPI 40–44, DPI 37–41 (n=5).

Worker redescription

PILOSITY. In full-face view, cephalic dorsum with appressed spatulate setae, slightly inclined towards midline; clypeal dorsum covered with small oblanceolate setae; mandibular dorsum covered with spatulate to obovate setae, masticatory margins each with row of similar, medially-directed setae. Head without any laterally-projecting seta; decumbent setae present along dorsolateral margin of head and leading edge of scape. Surface of scape covered with appressed spatulate to subspatulate setae; funiculus (except for apical antennomere) covered with appressed plank-like setae; progressively finer setae covering apical antennomere. In dorsal view, promesonotal dorsum sparsely with appressed subspatulate setae, directed toward midline; posteriorly-directed decumbent setae present along lateral margins; posteriorly-directed appressed setae present along lateral margins of petiolar node and disc of postpetiole. Pronotal humeral seta absent. In profile view, cephalic dorsum without any erect seta; suberect to decumbent stout setae present on propodeal dorsum, petiolar node and disc of postpetiole; gastral tergites sparsely with very short, apically-acute, suberect to decumbent setae; second and third gastral tergites with around two pairs of erect stout setae; ventral surface of head with appressed setae; gastral sternites sparsely with suberect to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of femora, tibiae and basitarsi with long decumbent to appressed setae.

Geographic range

Mainland China (Guangxi, Hainan, Hong Kong).

New record for Guangxi and Hainan.

Ecology

Collected in primary and secondary forest.

Comments

These are the first two records of a recently-described species outside Hong Kong, which indicates, as suggested in Tang *et al.* (2019), that the species is not endemic to Hong Kong but is likely more widespread within south China, with future records expected from the Guangdong Province.

The pilosity description of the species is revised using newly-defined terminologies. We have determined that *S. nathistorisoc* belongs to its own species group due to its unique dentition. See *S. nathistorisoc*-group's diagnosis for a detailed discussion.

***Strumigenys natynion* Bolton, 2000**
Fig. 34A–C; Table 2

Strumigenys natynion Bolton, 2000: 762 (w.) BORNEO. Indomalaya.

Material examined

THAILAND – **Sakon Nakhon Province** • 2 workers; Site 104; 17.1326° N, 103.99685° E; 501 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011940 to ANTWEB1011941 • 1 queen; Site 107; 17.12902° N, 104.00193° E; 484 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011942. • 1 worker; 17.1326° N, 103.99685° E; 501 m a.s.l.; 21 Jun. 2018; IBBL members legs. ANTWEB1011941; Winkler, 4 corners; IBBL.

VIETNAM – **Đông Nai Province** • 1 worker; Cat Tien National Park; 11.44912° N, 107.35963° E; 140 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Cat Tien National Park; 11.48512° N, 107.38658° E; 168 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011952.

Measurements

Workers

TL 2.5–2.7, HL 0.62–0.71, HW 0.45–0.52, MandL 0.22–0.27, SL 0.31–0.36, EL 0.056–0.060, PW 0.28–0.30, ML 0.63–0.66, PL 0.28–0.30, PH 0.13–0.15, DPW 0.13–0.15, PPL 0.17, GL 0.57–0.61, CI 72–74, MI 35–38, SI 67–74, OI 12–13, LPI 45–51, DPI 46–52 (n=3).

Queen

TL 2.7, HL 0.63, HW 0.48, MandL 0.25, SL 0.34, EL 0.104, PW 0.31, ML 0.73, PL 0.27, PH 0.15, DPW 0.13, PPL 0.16, GL 0.65, CI 75, MI 40, SI 71, OI 22, LPI 54, DPI 48 (n=1).

Geographic range

Malaysia (East Malaysia), Thailand (Sakon Nakhon), Vietnam (Đông Nai).

New record for Thailand and Vietnam.

Ecology

Collected in secondary forest, with elevation from 140 to 501 m.

Comments

Specimens from Thailand and Vietnam all show a smaller preapical tooth, a slightly broader propodeal spine, a larger lateral lobe of the petiole (in both profile and dorsal views), relatively denser erect filiform to flagellate setae on the gaster than specimens from Borneo. They are also smaller (TL 2.5–2.7, HL 0.62–0.71, ML 0.63–0.66) than specimens from Borneo (TL 3.2–3.5, 0.88–0.94, ML 0.98) but retain similar body ratios (CI 72–74, Si 67–74 vs CI 68–74, SI 71–77). Bolton (2000) mentioned that the species appears plastic, with variations in pilosity and propodeal teeth. Hence, it is uncertain if the aforementioned morphological differences between specimens from Thailand and Vietnam on the one hand and those from Borneo on the other hand are geographical differences or an indication of a separate species. Based on the current species diagnosis, we consider material from Thailand and Vietnam as *S. natynion*.

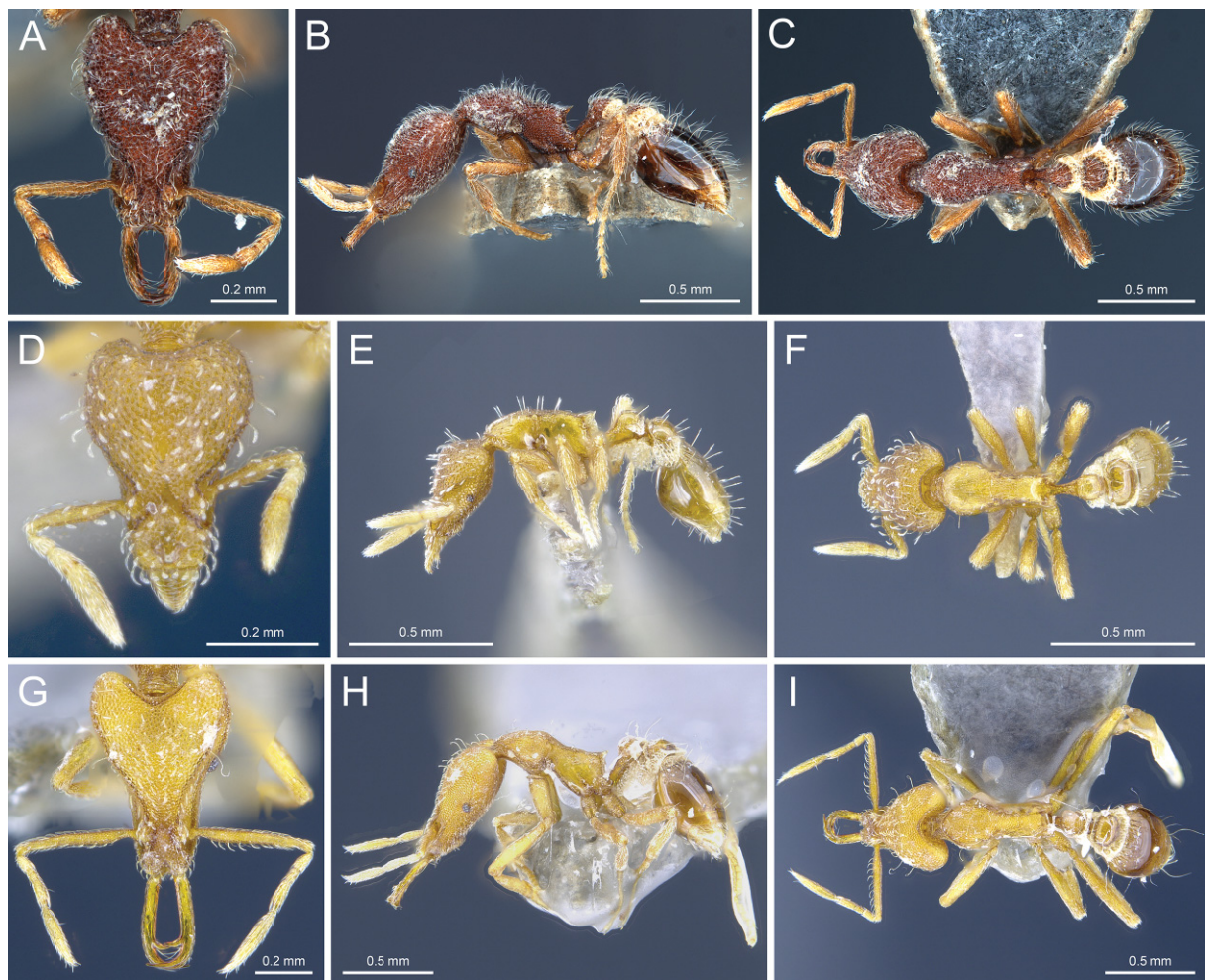


Fig. 34. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. **A–C.** Worker of *S. natynion* Bolton, 2000 from Thailand (ANTWEB1011940). **D–F.** Worker of *S. nepalensis* De Andrade, 1994 from Hainan, mainland China (HNA-00614). **G–I.** Worker of *S. rallarhina* Bolton, 2000 from Hainan, mainland China (HNA-01469W).

The records in northern Thailand and southern Vietnam imply that the species is not endemic to Borneo, but instead may be more widespread in the Indochinese Peninsula. Its presence is likely in the other parts of the region, e.g., Peninsular Malaysia, Cambodia, Laos and Myanmar.

Strumigenys nepalensis De Andrade, 1994
Fig. 34D–F; Table 2

Strumigenys nepalensis De Andrade, 1994: 57, figs 33–34 (w.q.) NEPAL. Indomalaya.

Smithistruma nepalensis – Bolton 1995: 385.

Pyramica nepalensis – Bolton 1999: 1673.

Strumigenys nepalensis – Baroni Urbani & De Andrade 2007: 124.

Material examined

MAINLAND CHINA – **Hainan Province** • 3 workers; BM5; 19.925° N, 110.263° E; 12 Aug. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; Bawangling, BWLR2; 19.16283° N, 109.03451° E; 12 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; IBBL • 7 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLR3; 19.17547° N, 109.02785° E; 12 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLR5; 19.12684° N, 109.06656° E; 13 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLR7; 19.19498° N, 109.0201° E; 15 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLR8; 19.19349° N, 109.02° E; 15 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL. – **Yunnan Province** • 4 workers; Jinghong; 7–12 Aug. 2006; S. Onoda leg.; KUM.

THAILAND – **Buang Kan Province** • 1 worker; Site 88; 17.84684° N, 103.93899° E; 179 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers, 2 queens; Site 91; 17.84873° N, 103.93433° E; 164 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 5 workers; Site 92; 17.84931° N, 103.93221° E; 173 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 5 workers; Site 93; 17.8497° N, 103.93024° E; 172 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker, 1 queen; Site 97; 17.85925° N, 103.92703° E; 172 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Site 98; 17.85993° N, 103.92825° E; 164 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL. – **Sakon Nakhon Province** • 2 workers; Site 102; 17.13524° N, 103.9944° E; 530 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 queen; same collection data as for preceding; IBBL • 1 worker; Site 104; 17.1326° N, 103.99685° E; 501 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 6 workers; same collection data as for preceding; IBBL • 1 worker; Site 105; 17.13092° N, 104.00115° E; 469 m a.s.l.; 21 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 7 workers; Site 83; 17.11857° N, 104.00355° E; 405 m a.s.l.; 18 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 16 workers; Site 84; 17.12228° N, 104.00245° E; 388 m a.s.l.; 18 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

VIETNAM – **Đắk Nông Province** • 1 queen; Nam Nung Reserve; 12.1731° N, 107.76395° E; 902 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL. – **Đông Nai Province** • 9 workers, 2 queens; Cat Tien National Park; 11.44912° N, 107.35963° E; 140 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 5 workers; Cat Tien National Park; 11.44995° N, 107.36279° E; 162 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 4 workers; Cat Tien National Park; 11.45098° N, 107.36353° E; 160 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Cat Tien National Park; 11.45298° N, 107.36467° E; 174 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 4 workers; Cat Tien National Park; 11.45688° N, 107.36958° E; 175 m a.s.l.; 4 Jun.

2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.45683° N, 107.36852° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 6 workers; same collection data as for preceding; IBBL • 4 workers; Cat Tien National Park; 11.48488° N, 107.3858° E; 157 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.48423° N, 107.38517° E; 156 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.4843° N, 107.38571° E; 164 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.36605° N, 107.49292° E; 170 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Geographic range

Native: mainland China (Yunnan), India (north), Malaysia (Peninsular), Nepal, Singapore, Thailand, Vietnam.

Introduced: mainland China (Hainan, Hong Kong, Macau), Mascarene Islands, India (Kerala).

New record for Hainan.

Ecology

Collected in rubber plantations and urban parks in Hainan, and rubber plantations, secondary forest and mature forest for Thailand and Vietnam. Elevation from 140 to 902 m.

Comments

The tramp status of the species was suggested in Tang *et al.* (2019) given its association with relatively disturbed habitats in Hong Kong and a recent record from Mauritius. New records from Hainan Province also originated only from habitats such as rubber plantations and urban parks. Its presence in Guangdong and Guangxi provinces (possibly as a tramp species), as well as in Myanmar, Laos and Cambodia (as a native species) is also likely. We thus recommend further sampling, in particular within anthropogenic habitats (e.g., urban parks) to detect the potential presence of this species within China and nearby countries.

Strumigenys nytaxis Bolton, 2000 Table 2

Strumigenys nytaxis Bolton, 2000: 797 (w.) THAILAND. Indomalaya.

Material examined

THAILAND – **Bueng Kan Province** • 1 worker; Site 94; 17.84915° N, 103.92847° E; 176 m a.s.l.; 20 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Geographic range

Thailand (Bueng Kan, Chanthaburi, Phetchaburi).

Ecology

Collected in rubber plantation at an elevation of 176 m.

Comments

In addition to the previous records in central to south provinces of Thailand, we now report its presence in the north-eastern province of Bueng Kan, extending the known range of this species by 500 km NE.

Strumigenys rallarhina Bolton, 2000

Fig. 34G–I; Table 2

Strumigenys rallarhina Bolton 2000: 891 (w.) CHINA. Palearctic.

Material examined

MAINLAND CHINA – **Guangdong Province** • 3 workers; Dinghushan; 6 May 1998; J. Fellowes leg.; HKBM • 2 workers; Dinghushan; 100 m a.s.l.; 7 May 1998; J. Fellowes leg.; HKBM ANTWEB1011910. – **Guangxi Province** • 1 worker; Dapingshan; 25 Sep. 1998; J. Fellowes leg.; HKBM • 1 worker; Dawangling, Leidashan; 880 m a.s.l.; 5 Aug. 1999; J. Fellowes leg.; HKBM • 3 workers, 1 queen; Dawangling, Longuo; 1190 m a.s.l.; 6 Aug. 1999; J. Fellowes leg.; HKBM • 1 worker; Dayaoshan, Longan Cun; 18 Sep. 1998; J. Fellowes leg.; HKBM • 1 worker; same collection data as for preceding; HKBM • 1 worker; same collection data as for preceding; HKBM • 1 worker; Dayaoshan, Luoxiang Cun; 23 Sep. 1998; J. Fellowes leg.; HKBM • 17 workers; Diding; 1110 m a.s.l.; 9 Jul. 1999; J. Fellowes leg.; HKBM • 6 workers, 1 queen; Longhushan; 16 Oct. 1998; J. Fellowes leg.; HKBM • 1 worker; Nonggang, Longshan (Longrui); 27 May 1998; J. Fellowes leg.; HKBM • 1 worker; Nongxin; 1050 m a.s.l.; 12 Jul. 1999; J. Fellowes leg.; HKBM. – **Hainan Province** • 1 worker; Yinggeling; 1020 m a.s.l.; 26 Aug. 2005; J. Fellowes leg.; HKBM • 6 workers; Cong1; L. Wang leg.; Winkler, 4 corners; IBBL • 69 workers; Jianfengling, JFLFW4; 18.706° N, 108.871° E; 4 Jan. 2016; L. Wang leg.; Winkler, 4 corners; IBBL.

HONG KONG • 6 workers; Lantau Island, Sunset Peak South; 22.25733° N, 113.96257° E; 670 m a.s.l.; 8 Oct. 1996; J. Fellowes leg.; HKBM • 1 worker, 2 queens; Sai Kung District, Pak Kong; 22.37933° N, 114.25811° E; 50 m a.s.l.; 2 Nov. 1996; J. Fellowes leg.; HKBM • 8 workers; Sha Tin District, Ma On Shan; 15 Oct. 1996; J. Fellowes leg.; HKBM • 25 workers; Tai Po District, Kadoorie Farm and Botanic Garden; 11 Jul. 1995; J. Fellowes leg.; HKBM • 1 worker; Tai Po District, Kadoorie Farm and Botanic Garden; J. Fellowes leg.; HKBM ANTWEB1015017 • 4 workers; Tai Po District, Ng Tung Chai Bottom Falls; 22.43149° N, 114.13086° E; 180 m a.s.l.; 12 Nov. 1996; J. Fellowes leg.; HKBM • 1 worker, 1 queen; Tai Po District, Wong Chuk Yeung Feng Shui Wood; 29 Oct. 1996; J. Fellowes leg.; HKBM • 16 workers; Tsuen Wan District, Shing Mun; 17 Aug. 1995; J. Fellowes leg.; HKBM.

Geographic range

Mainland China (Guangdong, Guangxi, Hainan, Hong Kong, Tibet, Yunnan), Vietnam.

New record for Guangdong and Hainan.

Ecology

Collected in primary and secondary forest, at elevations from 50 to 1190 m.

Comments

This species has been recorded from west to east: Tibet and Yunnan Province of mainland China, northern region in Vietnam, Guangxi Province and Hong Kong. The new records in Guangdong and Hainan presented here fill in the previous gap between Hong Kong and its remaining native range. Its presence in Laos seems also likely.

Strumigenys rogeri Emery, 1890

Fig. 35A–C; Table 2

Strumigenys rogeri Emery, 1890: 68, pl. 7 fig. 6 (w.) ANTILLES. Neotropic.

Strumigenys incisa Godfrey, 1907: 102 (synonymized by Donisthorpe 1915: 341).

Strumigenys sulfurea Santschi, 1915: 261 (synonymized by Brown 1954b: 20).

Material examined

THAILAND – **Trang Province** • 5 workers; Khao Chong; 7.25423° N, 99.71394° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011943 • 2 workers; Khao Chong; 7.25533° N, 99.71729° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.25784° N, 99.7113° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.2591° N, 99.70889° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

VIETNAM – **Đông Nai Province** • 3 workers; Cat Tien National Park; 11.42753° N, 107.42713° E; 144 m a.s.l.; 6 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 23 workers, 1 queen; Cat Tien National Park; 11.39719° N, 107.48502° E; 142 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 8 workers; Cat Tien National Park; 11.39712° N, 107.48432° E; 271 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 104 workers, 2 queens; Cat Tien National Park; 11.3972° N, 107.48502° E; 143 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 32 workers; Cat Tien National Park; 11.39854° N, 107.48625° E; 140 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Cat Tien National Park; 11.37033° N,

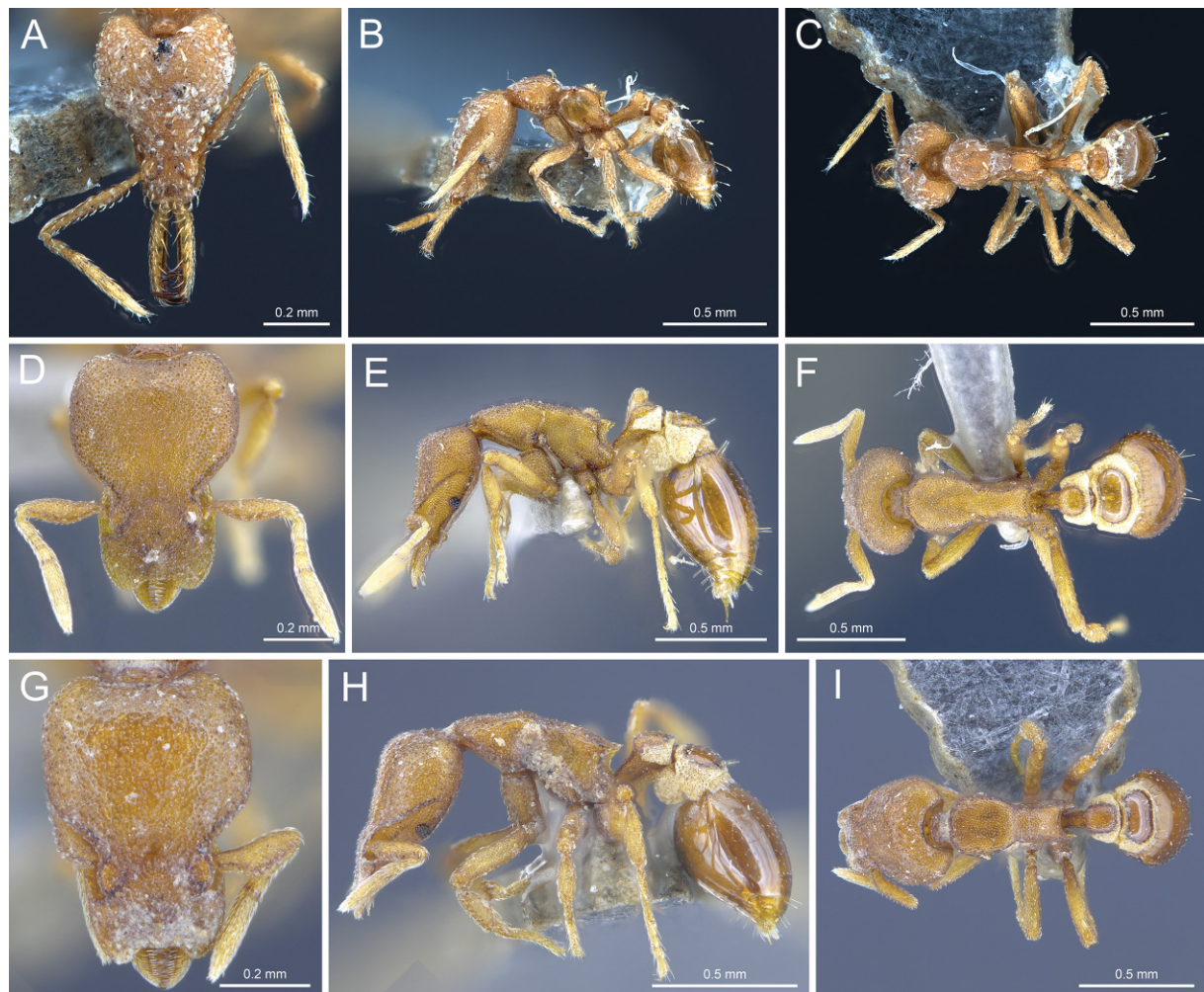


Fig. 35. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. **A–C.** Worker of *S. rogeri* Emery, 1890 from Thailand (ANTWEB1011943). **D–F.** Worker of *S. sauteri* (Forel, 1912) from Hainan, mainland China (HNA-00767). **G–I.** Worker of *S. sauteri* from Vietnam (NN-S67-sp14).

107.51338° E; 172 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 40 workers, 2 queens; Cat Tien National Park; 11.37623° N, 107.50349° E; 175 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 9 workers, 1 queen; Cat Tien National Park; 11.37042° N, 107.50924° E; 175 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.36651° N, 107.49233° E; 169 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 5 workers; Cat Tien National Park; 11.36605° N, 107.49292° E; 170 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Geographic range

Native: central Africa

Introduced: Oriental realm (India: Kerala; Indonesia: Borneo, Java, Sumatra; Malaysia; Philippines; Singapore; Taiwan; Thailand: Trang; Vietnam), Sino-Japanese realm (mainland China: Hong Kong). For a full global account refer to antmaps.org (Janicki *et al.* 2016; Guénard *et al.* 2017).

New record for Thailand.

Ecology

Collected in mature forest and rubber plantations, at elevations from 140 to 271 m.

Comments

An Afrotropical tramp species with an extensive introduced range across Malagasy, Nearctic, Oceanian, Oriental, Panamanian and Sino-Japanese realms, as well as indoor introduction in the Australian and Palearctic realms. Given its records in nearby Vietnam and Peninsular Malaysia, this new record in southern Thailand was expected. Its presence in Laos and Cambodia is also likely.

Strumigenys rongi sp. nov.

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Fig. 36; Tables 2, 6

Diagnosis

Strumigenys rongi sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum with appressed spatulate setae only; clypeal and mandibular dorsum with small spatulate to obovate setae; without any laterally-projecting seta in full-face view; pronotum marginated dorsolaterally; pronotal humeral seta absent; side of mesosoma mostly smooth and shining; in profile view, propodeal spines subtended by narrow lamellae; lateral lobe of petiole small and not reaching midpoint of node in profile; femora, tibiae and basitarsi with decumbent to appressed setae only.

Etymology

The species is named after mythological Vietnamese dragons (rồng) owing to its Vietnamese origin. The name was created by adding a suffix -i to the Vietnamese noun 'rong' for ease of pronunciation.

Type material

Holotype worker (Fig. 36)

VIETNAM • Lào Cai Province, Sa Pa, Cổng trời (B); 2000 m a.s.l.; 26 Apr. 2002; K. Eguchi leg.; mature forest; LKCNHM ANTWEB1010903 (collection code KUM Eg02-VN-098).

Paratype worker

VIETNAM • 1 worker; Lào Cai Province, Sa Pa, Cồng trời (E); 2100–2200 m a.s.l.; 2 May 2002; K. Eguchi leg.; mature forest; KUM ANTWEB1010904 (collection code KUM Eg02-VN-243).

Measurements

Holotype worker

TL 3.1, HL 0.78, HW 0.51, MandL 0.13, SL 0.42, EL 0.109, PW 0.28, ML 0.88, PL 0.35, PH 0.19, DPW 0.15, PPL 0.16, GL 0.84, CI 65, MI 16, SI 82, OI 22, LPI 53, DPI 44.

Paratype worker

TL 3.1, HL 0.78, HW 0.50, MandL 0.13, SL 0.41, EL 0.095, PW 0.27, ML 0.85, PL 0.33, PH 0.17, DPW 0.15, PPL 0.21, GL 0.80, CI 65, MI 16, SI 81, OI 19, LPI 51, DPI 46 (n=1).

Worker description

HEAD. In full-face view, occipital margin broadly concave; occipital corners well developed and bluntly angular; occipital carina narrow. Clypeus slightly broader than long, around 1.1–1.3 times as long, roughly resembling inverted diamond; anterior clypeal margin bluntly angular around midline. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles. In profile view, eye with five ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum broadly convex, propodeum more or less flat transversely; pronotum marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by narrow lamella with concave posterior margin that broadens slightly basally into small rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle not grading evenly into node, but anterior face of petiolar node short and inconspicuous; petiolar node with broadly convex posterior face; petiolar peduncle about

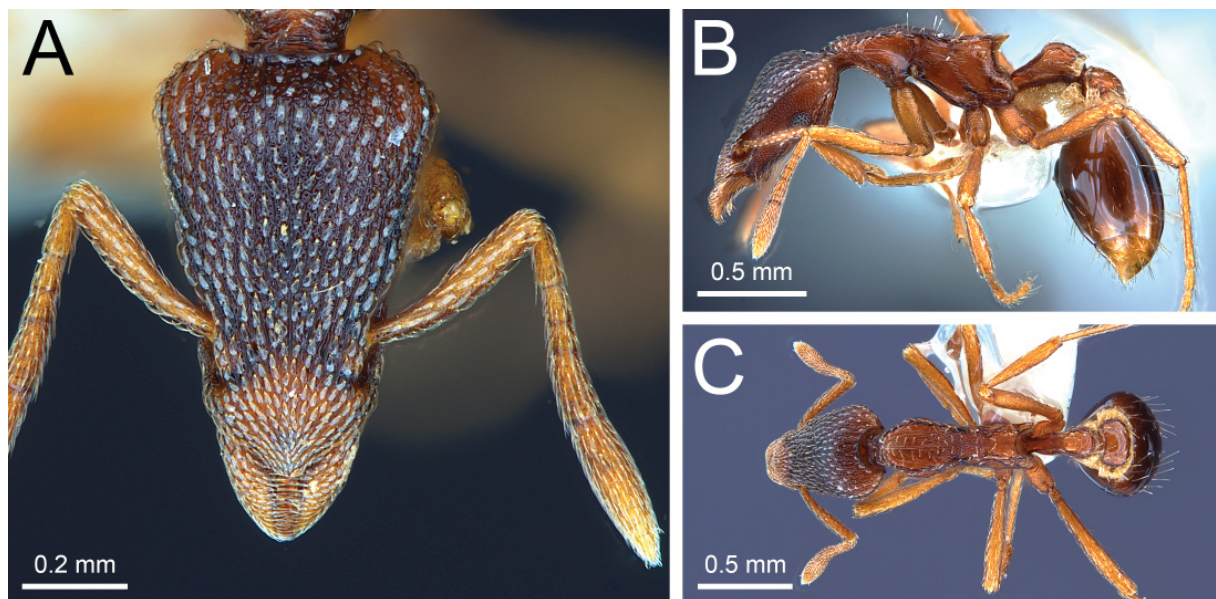


Fig. 36. Holotype worker (ANTWEB1010903) of *Strumigenys rongi* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

as long as node. In dorsal view, petiolar node slightly longer than broad, around 1.2–1.3 times as long; disc of postpetiole broader than long, around 1.5–1.7 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely small flap at posterolateral angle of node in profile and not reaching midpoint of node; in dorsal view, processes present along posterior margin of petiolar node, and surrounding disc of postpetiole, thicker along lateral margins than on anterior or posterior margin.

PILOSITY. Surface of scape with appressed subspatulate to spatulate setae; funiculus covered with appressed acicular to fine setae; cephalic dorsum covered with small spatulate setae; clypeal and mandibular dorsum covered with small spatulate to obovate setae; masticatory margins each with row of medially-directed fine setae. Leading edge of the scapes with decumbent setae. In full-face view, dorsolateral margin of head without any laterally-projecting seta. Pronotal humeral seta absent. In dorsal view, promesonotal dorsum sparsely with appressed subspatulate setae; lateral margins with posteriorly-directed decumbent setae. In profile view, cephalic dorsum without any erect seta; suberect to erect stout setae restricted to a few pairs on the mesonotal dorsum, petiolar node and disc of postpetiole, and all over gastral tergites; similar but suberect setae also present on gastral sternites; ventral surface of head with appressed to decumbent setae. Hairwheel present at mesopleural excavation, slightly elongated. Surfaces of femora, tibiae and basitarsi with decumbent to appressed stout setae, without any laterally-projecting erect seta.

SCULPTURE. Cephalic dorsum densely areolate-rugulose; surface of antennal scrobe, antenna and legs densely areolate. Pronotal dorsum predominantly, relatively weakly areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; dorsum of mesonotum, propodeum and petiolar node densely areolate-rugulose; side of mesosoma mostly smooth and shining with vestiges of sculpture around margins. Disc of postpetiole smooth and shining. Basigastral costulae absent to inconspicuous; rest of gaster smooth and shining.

Comments

Strumigenys rongi sp. nov. is a member of the *S. leptothrix*-group and shares all its characters (Bolton 2000), and very likely belongs to the *leptothrix*-complex. The type specimens all have fully-closed mandibles and the view is obscured by setae along the inner margin of the mandible, making an accurate assessment of the dentition difficult. Placing the specimen against backlight suggests the presence of a principal dental row of around 7 teeth, followed by around 2 small teeth and 4 denticles, terminating in a small apical tooth.

Aside from *Strumigenys rongi* sp. nov., there are three other SEA species from the same species group (*S. japonica*, *S. megaera* and *S. scolopax*) that share the following characters: cephalic dorsum covered with appressed spatuliform (plank-like, linear, elliptic, subspatulate, spatulate, oblanceolate, obovate or ovate) setae only, head without laterally-projecting seta in full-face view, propodeal spines present and subtended by narrow lamellae or carinae (Table 6). Unlike all of the above three species, for *S. rongi* the side of the mesosoma is mostly smooth and shining (instead of fully sculptured as in *S. megaera* and *S. scolopax*, or mostly sculptured with a partially-smooth mesopleuron as in *S. japonica*).

The type specimens of this new species have previously been reported as *S. japonica* due to their similarity (Bui & Eguchi 2003). With the recognition of this new species, it is recommended that any other specimen collected from Vietnam that has previously been identified as *S. japonica* should be re-examined.

Geographic range

Vietnam (Lào Cai).

Ecology

Collected in mature forests at elevations from 2000 to 2200 m.

Strumigenys sauteri (Forel, 1912)

Fig. 35D–I; Table 2

Pentastruma sauteri Forel 1912: 51 (w.) TAIWAN. Indomalaya.

Pyramica sauteri – Bolton 1999: 1673.

Strumigenys sauteri – Baroni Urbani & De Andrade 2007: 127.

Material examined

MAINLAND CHINA – **Guangdong Province** • 1 worker; Gutian; 3 Apr. 1997; J. Fellowes leg.; HKBM ANTWEB1011972. – **Guangxi Province** • 1 worker; Damingshan; 12 May 1997; J. Fellowes leg.; HKBM • 1 worker; Dawangling, Leidashan; 870 m a.s.l.; 5 Aug. 1999; J. Fellowes leg.; HKBM • 1 worker; Dayaoshan, Yinchan; 16 Sep. 1998; J. Fellowes leg.; HKBM • 1 worker; Diding; 9 Jul. 1999; J. Fellowes leg.; HKBM • 1 worker; Huaping, Hongtan; 17 Aug. 1998; J. Fellowes leg.; HKBM • 2 workers; same collection data as for preceding; HKBM • 2 workers; Maoershan, Bajiaotian; 22 Aug. 1998; J. Fellowes leg.; HKBM • 1 worker; Qingshitan, Jiuwu; 26 Aug. 1998; J. Fellowes leg.; HKBM • 1 worker; Xidamingshan, Xiaomingshan; 16 Oct. 1998; J. Fellowes leg.; HKBM. – **Hainan Province** • 1 worker; Jiaxi; 480 m a.s.l.; 14 Jun. 1999; J. Fellowes leg.; HKBM • 1 worker; Limushan; 1360 m a.s.l.; 16 Jun. 1999; J. Fellowes leg.; HKBM • 1 queen; Wangxia; 5 Apr. 1998; J. Fellowes leg.; HKBM • 1 worker; Wuzhishan; 1280 m a.s.l.; 9 Jun. 1999; J. Fellowes leg.; HKBM • 13 workers; BM4; 19.931° N, 110.212° E; 3 Aug. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; BM7; 19.194° N, 109.739° E; 23 Aug. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 5 workers; Bawangling, BWLP1; 19.11618° N, 109.15523° E; 21 Jun. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 9 workers; Bawangling, BWLP11; 19.09188° N, 109.20321° E; 4 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLP12; 19.09324° N, 109.20006° E; 4 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 6 workers; Bawangling, BWLP2; 19.0895° N, 109.19792° E; 29 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 1 worker; Bawangling, BWLP3; 19.08824° N, 109.19681° E; 30 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 6 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 2 workers; Bawangling, BWLP4; 19.09217° N, 109.2017° E; 1 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 5 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLP6; 19.09148° N, 109.20041° E; 1 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 3 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 2 workers; Bawangling, BWLP8; 19.09125° N, 109.20155° E; 3 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 8 workers; same collection data as for preceding; IBBL • 12 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 2 workers; Bawangling, BWLP9; 19.0903° N, 109.20101° E; 3 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLS12; 19.11796° N, 109.13055° E; 10 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 5 workers; Bawangling, BWLS13; 19.11699° N, 109.12711° E; 10 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 10 workers; Bawangling, BWLS8; 19.08559° N, 109.19128° E; 9 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 23 workers; same collection data as for preceding; IBBL • 6 workers; same collection data as for preceding; IBBL • 5 workers; same collection data as for preceding; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLS9; 19.08973° N, 109.19127° E; 9 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 6 workers; Huoshankou, HSK3; 5 Jul. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; Huoshankou, HSK4; 3 Aug. 2015; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; Yinggeling, YGLK13; 19.08432° N, 109.26697° E; 3 Aug. 2016; L. Wang leg.; Winkler, 12 random; IBBL.

HONG KONG • 2 workers; Central and Western District, The Peak; 26 Aug. 1993; J. Fellowes leg.; HKBM • 1 worker; Sai Kung District, Tit Kim Hang East; 22.40541° N, 114.30226° E; 90 m a.s.l.; 1 Aug. 1996; J. Fellowes leg.; HKBM.

VIETNAM – **Đắk Nông Province** • 1 worker; Nam Nung Reserve; 12.20579° N, 107.75476° E; 882 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 2 workers; Nam Nung Reserve; 12.1958° N, 107.75674° E; 892 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 2 workers; Nam Nung Reserve; 12.1945° N, 107.75802° E; 881 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 5 workers; Nam Nung Reserve; 12.19245° N, 107.75954° E; 892 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 5 workers, 1 queen; Nam Nung Reserve; 12.19073° N, 107.75925° E; 883 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.18893° N, 107.76046° E; 890 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; same collection data as for preceding; IBBL • 1 queen; Nam Nung Reserve; 12.18737° N, 107.76132° E; 888 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.18455° N, 107.76223° E; 878 m a.s.l.; 9 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.23025° N, 107.83087° E; 886 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.23113° N, 107.83153° E; 907 m a.s.l.; 12 Jun. 2018; IBBL members leg.; Winkler; IBBL. – **Đồng Nai Province** • 17 workers; Cat Tien National Park; 11.36605° N, 107.49292° E; 164 m a.s.l.; 7 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL ANTWEB1011957.

Geographic range

Mainland China (Fujian, Guangdong, Guangxi, Hainan, Hong Kong, Hunan, Macau, Yunnan), Japan (Ryukyu Islands), Taiwan, Thailand (Nakhon Ratchasima), Vietnam (Đắk Nông, Đồng Nai).

New record for Guangdong, Hainan and Vietnam.

Ecology

A very common species which has been collected in primary forest, secondary forest, mature forest, urban forest, urban parks, fruit, rubber and agro-rubber plantations. Elevation from 90 to 1360 m.

Comments

A common species present in multiple provinces in southern China and Thailand. The new records from Guangdong and Hainan provinces (Fig. 35D–F), and from southern Vietnam (Fig. 35G–I) complete the distribution range of this species within Southeast Asia, with future records from Cambodia and Laos likely.

Strumigenys scutica sp. nov.

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Fig. 37; Tables 2, 10

Diagnosis

Strumigenys scutica sp. nov. can be distinguished from other species in the *S. godeffroyi*-group by a combination of the following characters: apicoscrobial seta short and stout; pronotal humeral seta simple; pronotum and dorsum of petiolar node fully sculptured, side of pronotum sometimes with small smooth patch; pleurae, side of propodeum and disc of postpetiole mostly smooth and shining; propodeal spines subtended by broad lamellae; petiolar node with differentiated anterior face, not claviform; gastral tergites with flagellant setae, erect or looped; dorsal surface of femur without any erect seta; hind tibiae and basitarsi without any projecting flagellate seta; MI 44–49, SI 80–88.

Etymology

The species is named after the presence of flagellate setae on its gaster. The epithet ‘*scutica*’ is the nominative singular of the Latin noun ‘*scutica*’ (meaning ‘lash’).

Type material

Holotype worker (Fig. 37)

MAINLAND CHINA • Hainan Province, Bawangling, BWLP12; 19.09324° N, 109.20006° E; 4 Jul. 2016; L. Wang leg.; Winkler, 12 random; primary forest; LKCNHM ANTWEB1011923 (collection code IBBL HNA-00953).

Paratype workers

CHINA • 13 workers; same collection data as for holotype; HKBMANTWEB1011881, ANTWEB1011918 to ANTWEB1011922, ANTWEB1011924 to ANTWEB1011930 (collection code IBBL HNA-00953).

Additional material examined

MAINLAND CHINA – **Hainan Province** • 1 worker; Bawangling, BWLP11; 19.09188° N, 109.20321° E; 4 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL ANTWEB1011884 • 2 workers; Bawangling, BWLP5; 19.09396° N, 109.20101° E; 1 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL ANTWEB1011882, ANTWEB1011917 • 1 worker; Bawangling, BWLP8; 19.09125° N, 109.20155° E; 3 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL ANTWEB1011883.

Measurements

Holotype worker

TL 2.8, HL 0.69, HW 0.48, MandL 0.32, SL 0.41, EL 0.071, PW 0.26, ML 0.72, PL 0.29, PH 0.13, DPW 0.12, PPL 0.18, GL 0.62, CI 70, MI 46, SI 84, OI 15, LPI 44, DPI 40.

Paratype workers

TL 2.7–2.9, HL 0.67–0.76, HW 0.46–0.53, MandL 0.31–0.35, SL 0.38–0.44, EL 0.060–0.071, PW 0.23–0.27, ML 0.69–0.74, PL 0.25–0.32, PH 0.12–0.15, DPW 0.11–0.13, PPL 0.16–0.19, GL 0.55–0.64, CI 68–72, MI 44–49, SI 80–88, OI 12–15, LPI 42–53, DPI 39–45 (n=13).

Worker description

HEAD. In full-face view, occipital margin evenly, deeply concave; occipital corners well developed; preocular lamina wide; anterior clypeal margin very broadly, shallowly concave. Scapes subcylindrical, margined but not converging anteriorly to form thin lamella at leading edge; apical antennomere

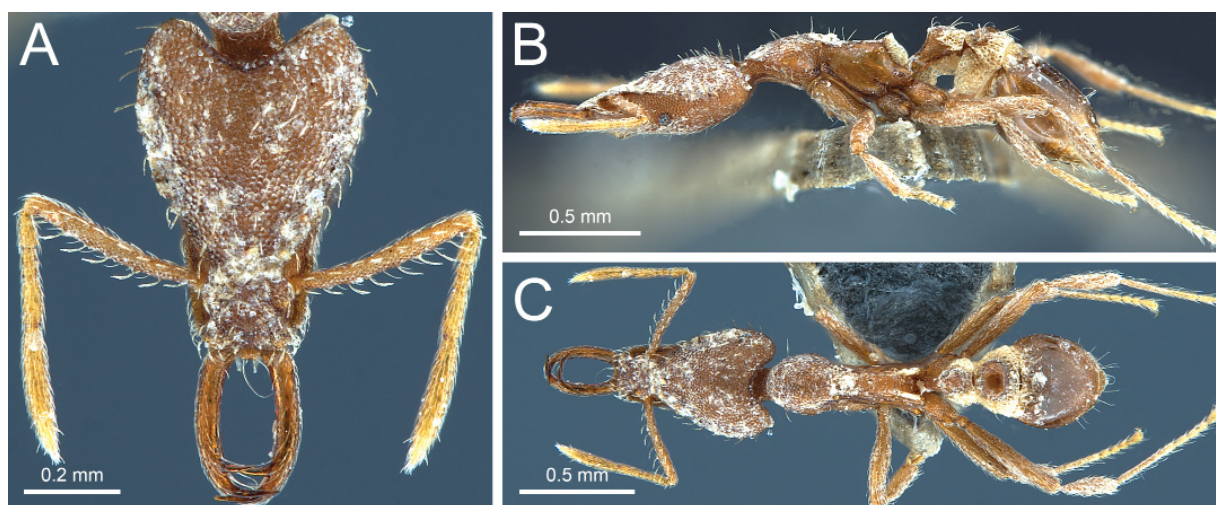


Fig. 37. Holotype worker (ANTWEB1011923) of *Strumigenys scutica* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

unconstricted basally. Mandible curvilinear and long, with spiniform preapical tooth located close to apicodorsal tooth; width of mandible fairly constant from basal portion to where preapical tooth first arose; preapical tooth distinctly longer than width of mandible at point where tooth arises; apicodorsal tooth markedly longer than apicoventral tooth. In profile view, eye with three ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum broadly convex, propodeum more or less flat transversely; pronotum not marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal teeth present but inconspicuous, subtended on each side by broad lamella with broadly convex posterior margin narrowing basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiole not claviform; petiolar node with anterior face differentiated from peduncle, petiolar peduncle about as long as node. In dorsal view, petiolar node about as broad as long; disc of postpetiole broader than long, around 1.2–1.4 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile view; anterior face of the node with inconspicuous strip; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum sparsely with appressed seta; apicoscrobial seta short and stout, sometimes truncated; around 3–4 shorter setae present posterior to it on lateral margin of occipital lobe. Antennae and mandibles covered with short appressed simple setae; upper scrobe margin, lateral clypeal margin and leading trailing edge of scape with decumbent stout to shoehorn-shaped setae; those on edges of scape apically-directed; anterior clypeal margin with medially-directed acicular setae. Pronotal humeral seta simple, sometimes slightly curved. In profile view, cephalic dorsum, mesosomal dorsum, dorsum of petiolar node and disc of postpetiole with simple erect simple setae; those on cephalic dorsum denser than on rest of body; petiolar node and disc of postpetiole also with posteriorly-directed decumbent simple setae; gastral tergites sparsely with long flagellant setae, erect or looped (fragile, sometimes partially abraded and appear as hooked or apically-curved simple setae); ventral surface of head with short decumbent setae; gastral sternites with short suberect simple setae. Hairwheel present at mesopleural excavation. Dorsal and ventral surfaces of femur without any erect seta against ground pilosity of appressed setae; surfaces of middle and hind tibiae and basitarsi without any projecting flagellate seta.

SCULPTURE. Surface of head (including antennal scrobe), antennae, side of pronotum, mesosomal dorsum, petiolar node and legs densely areolate; mandibles with sparse weak punctate sculpture and weakly areolate basally, but otherwise mostly smooth. Pleurae, side of propodeum and disc of postpetiole mostly smooth and shining (anepisternum sometimes also sculptured), with vestiges of sculpture around margins. Basigastral costulae short, around one fourth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys scutica sp. nov. is a member of Subgroup B in the *S. godeffroyi*-group and shares all its characters (Bolton 2000), but cannot be further assigned to any existing species complex within the group. It can be confidently stated that *S. scutica* does not belong to the *rofocala*-complex, for its pronotal humeral seta is simple (instead of long and flagellate). *Strumigenys scutica* has flagellate setae on the gastral tergites, which conflicts with the current diagnosis of the *signeae*-complex.

Aside from *Strumigenys scutica* sp. nov., there are ten other species from the *signeae*-complex (*S. ahares* Bolton, 2000, *S. forficata* Brown, 1959, *S. izepara* Bolton, 2000, *S. mailei* Wilson & Taylor, 1967,

Table 10. Diagnostic characters of *Strumigenys scutica* sp. nov. in comparison with Oriental and Sino-Japanese species from the *signeae*-complex of the *S. godeffroyi*-group. Values indicate the presence (1) or absence (0) of a character.

Species	Characters								
	Apicoscrobal hair present and not remiform	Mandible narrow	Cuticular lamella absents on inner mandible margin	Pronotal dorsum sculptured	Pronotal humeral hair presents	Side of propodeum unsculptured	Propodeal declivity with broad lamella	Petiole lateral lobe not extensive in profile	Flagellate hairs present on gastral tergites
<i>S. scutica</i> sp. nov.	1	1	1	1	1	1	1	1	1
<i>S. ahares</i> Bolton, 2000	1	0	1	1	1	1	1	1	0
<i>S. degonya</i> Bolton, 2000	0	1	1	1	0	0	0	1	0
<i>S. esrossi</i> Brown, 1957	0	1	1	1	0	0	1	1	0
<i>S. forficata</i> Brown, 1959	0	0	0	0	0	1	1	0	0
<i>S. gabarys</i> Bolton, 2000	1	1	1	1	1	0	0	1	0
<i>S. gamegyn</i> Bolton, 2000	0	1	1	1	1	0	1	1	0
<i>S. halpas</i> Bolton, 2000	1	1	1	1	1	0	1	1	0
<i>S. izepara</i> Bolton, 2000	1	1	1	0	1	1	0	1	0
<i>S. mailei</i> Wilson & Taylor, 1967	1	1	1	1	1	1	0	1	0
<i>S. mocsaryi</i> Emery, 1897	1	1	1	1	1	0	0	1	0
<i>S. ortholex</i> Bolton, 2000	0	1	1	1	0	0	0	1	0
<i>S. praefecta</i> Bolton, 2000	1	1	1	1	0	1	0	1	0
<i>S. signeae</i> Forel, 1905	1	1	0	1	1	1	1	1	0
<i>S. sublaminate</i> Brown, 1959	1	1	1	1	1	1	1	1	0
<i>S. sulcate</i> Bolton, 2000	0	1	1	1	0	0	0	1	0
<i>S. sytaria</i> Bolton, 2000	1	1	1	1	1	0	0	1	0
<i>S. tumida</i> Bolton, 2000	0	1	1	1	1	0	0	1	0
<i>S. uichancoi</i> Brown, 1957	0	1	1	0	1	1	1	1	0
<i>S. valefor</i> Bolton, 2000	1	1	1	1	1	1	1	1	0
<i>S. virgila</i> Bolton, 2000	1	1	1	1	1	1	1	0	0

S. praefecta Bolton, 2000, *S. signae* Forel, 1905, *S. sublaminata* Brown, 1959, *S. uichancoi* Brown, 1957, *S. valefor* Bolton, 2000 and *S. virgila* Bolton, 2000) that also have their side of the propodeum at least partially smooth and shining (Table 10). For *S. scutica*, its mandible is curvilinear, narrow and without carina on the inner margin (unlike *S. ahares*, *S. forficata* or *S. signae*, for the first two species have non-curvilinear mandibles, while the latter two species have carina on the inner margin of the mandible); a pronotal humeral seta is present (unlike in *S. forficata* or *S. praefecta*); the pronotum is sculptured (unlike in *S. forficata*, *S. izepara* or *S. uichancoi*); the propodeal lamella is broad (instead of narrow lamella as in *S. izepara*, or just a narrow carina as in *S. mailei* or *S. praefecta*); the lateral lobe of the petiole is small in profile view (instead of large and extensive as in *S. virgila*). *Strumigenys scutica* lacks the characteristic spatuliform pilosity on the cephalic dorsum of *S. sublaminata*, or remiform setae on the mesonotum of *S. valefor*. *Strumigenys scutica* also has a relatively longer mandible (MI 44–49) than *S. forficata* (MI 35) or *S. virgila* (MI 36–38), and longer scape (SI 80–88) than *S. izepara* (SI 67) or *S. sublaminata* (SI 62–69).

Geographic range

Mainland China (Hainan).

Ecology

Collected in primary forest.

Strumigenys signae Forel, 1905

Table 2

Strumigenys signae Forel, 1905: 10 (w.) INDONESIA (Java). Indomalaya.

Material examined

THAILAND – **Trang Province** • 21 workers, 1 queen; Khao Chong; 7.54401° N, 99.80087° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 9 workers; same collection data as for preceding; IBBL • 2 workers; Khao Chong; 7.54496° N, 99.80184° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Geographic range

Borneo, Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand (Phang-nga, Trang), Vietnam.

Ecology

Collected in primary forest.

Comments

In addition to the previous records in Phang-nga Province of Thailand, we now report its presence in Trang Province as well.

Strumigenys solifontis Brown, 1949

Table 2

Strumigenys (Strumigenys) solifontis Brown, 1949b: 18 (w.q.) JAPAN. Palearctic.

Material examined

TAIWAN • 3 workers; Chiayi, Alishan, Shuisheliao; 1200 m a.s.l.; 4 Jul. 2017; Sk. Yamane leg.; hand collection; KUM TW17-SKY-28 • 3 workers, 1 alate queen; Taipei, Yangmingshan, Old Trail; 450 m a.s.l.; 8 Jul. 2017; Sk. Yamane leg.; hand collection; KUM TW17-SKY-82.

Geographic range

Japan, South Korea, Taiwan.

Ecology

Collected in forests at elevations of 450–1200 m.

Strumigenys strumneri sp. nov.

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Fig. 38; Tables 2, 6

Diagnosis

Strumigenys strumneri sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: clypeal dorsum with small appressed acicular setae; mandibular dorsum with small appressed narrowly elliptic setae; in profile view, long suberect to erect setae densely present on cephalic dorsum and gaster; erect setae present on mesonotal dorsum as three pairs; in dorsal view, pronotum with laterally-projecting setae behind humeral setae; pronotum marginated dorsolaterally; propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long erect setae.

Etymology

The species is named in honor of the late musician Joe Strummer, lead singer and co-founder of the punk band The Clash. The name was created by adding the singular Latin genitive case suffix *-i* to the last name of a male person.

Type material

Holotype worker (Fig. 38)

VIETNAM – **Đông Nai Province** • Cat Tien National Park, Site 11; 11.45098° N, 107.36353° E; 160 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; LKCNHM ANTWEB1010914 (collection code IBBL CT-S11-4m2-sp14).

Paratype workers

VIETNAM – **Đông Nai Province** • 8 workers; same collection data as for holotype; HKBM ANTWEB1010912, ANTWEB1010913, ANTWEB1010915 to ANTWEB1010920 (collection code IBBL CT-S11-4m2-sp14).

Additional material examined

VIETNAM – **Đông Nai Province** • 1 worker; Cat Tien National Park, Site 13; 11.45298° N, 107.36467° E; 174 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL CT-S13-4m2-sp01.

Measurements

Holotype worker

TL 2.7, HL 0.64, HW 0.55, MandL 0.13, SL 0.32, EL 0.071, PW 0.30, ML 0.67, PL 0.36, PH 0.16, DPW 0.12, PPL 0.21, GL 0.71, CI 85, MI 21, SI 59, OI 13, LPI 43, DPI 34.

Paratype workers

TL 2.5–2.8, HL 0.61–0.65, HW 0.49–0.55, MandL 0.12–0.14, SL 0.30–0.33, EL 0.066–0.077, PW 0.26–0.31, ML 0.62–0.69, PL 0.32–0.37, PH 0.15–0.16, DPW 0.11–0.14, PPL 0.19–0.24, GL 0.65–0.73, CI 81–85, MI 19–21, SI 58–62, OI 12–14, LPI 43–48, DPI 34–39 (n=8).

Worker description

HEAD. In full-face view, occipital margin deeply concave; occipital corners well developed and bluntly angular; occipital carina broad. Clypeus broader than long, around 1.5–1.7 times as long, roughly resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles; basal lamellae low and broadly triangular, not fully visible at full closure. In profile view, eye with four ommatidia in diameter.

DENTITION (Fig. 38B). (Only partially visible with all type specimens having their mandibles fully closed and obscured by setae along the inner mandible margins.) Principal dental row with an elongated-triangular tooth, followed by six alternating elongated-triangular teeth and rounded teeth; second, fourth and sixth tooth elongated-triangular, longer than first tooth and neighboring rounded teeth, second tooth longest among all teeth, fourth and sixth tooth subequal in size; third, fifth and seventh tooth broad and rounded, subequal in length with first tooth; apex of mandible at down curvature, in anterior view, with small tooth, followed by crowded series of around six minute denticles, terminating in small conical apical tooth. Total dental count of around 15.

MESOSOMA. In profile view, mesosomal dorsum broadly, weakly convex; pronotum marginated dorsolaterally. In dorsal view, lateral margins of the pronotum broadly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with deeply concave

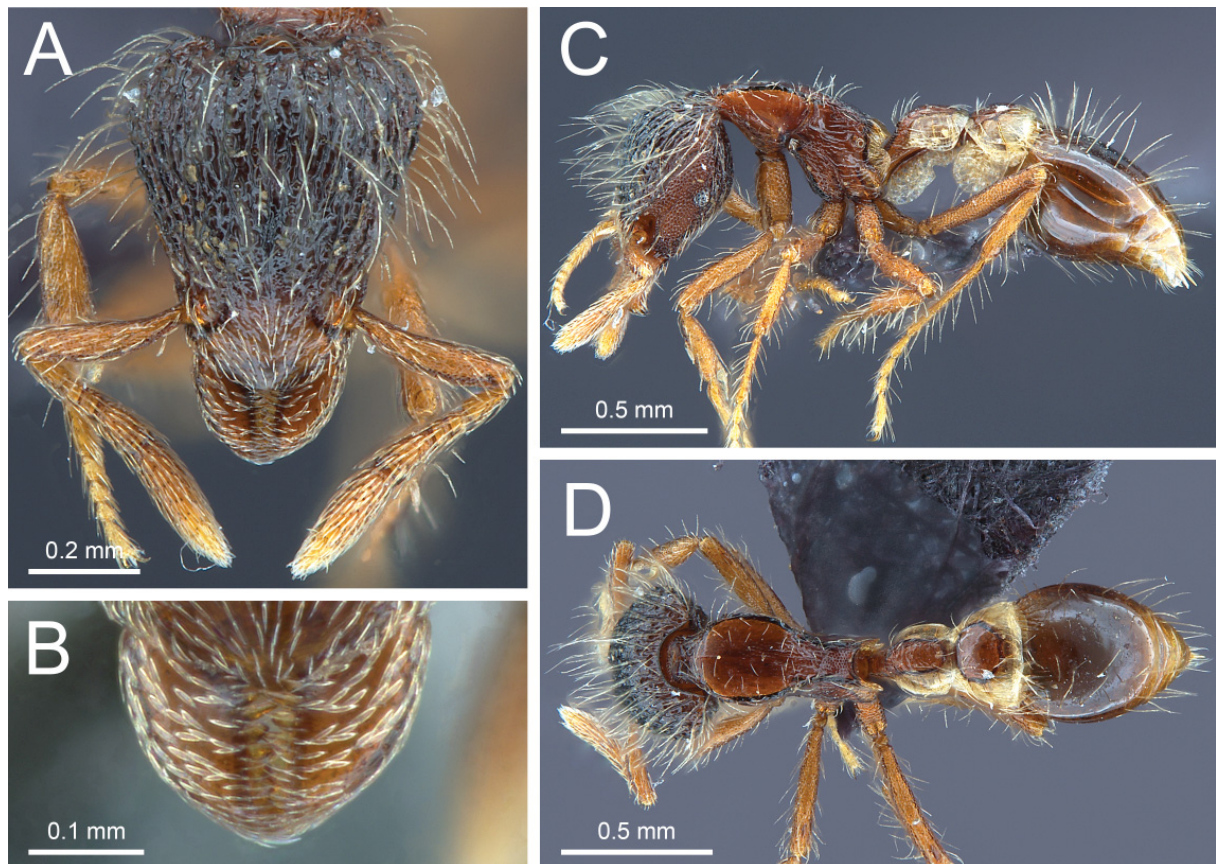


Fig. 38. Type specimens of *Strumigenys strummeri* sp. nov. **A, C–D.** Holotype worker (ANTWEB 1010914). **B.** Paratype worker (ANTWEB1010912). **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle grade evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around 1.7–1.9 times as long; disc of postpetiole broader than long, around 1.2–1.4 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming extensive flap at posterolateral angle of node, almost reaching level of spiracle on peduncle in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, clypeal dorsum covered with appressed acicular setae; mandibular dorsum covered with appressed narrowly elliptic setae; masticatory margins each with row of medially-directed fine setae. Surface of scape covered with appressed acicular setae; surface of funiculus covered with progressively finer setae. Lateral margin of occipital lobe and posterior-half of upper scrobe margin with numerous long, overlapping, laterally-projecting setae; anterior-half of upper scrobe margin and leading edge of scape with decumbent setae. In dorsal view, promesonotal dorsum sparsely with appressed setae; posteriorly-directed decumbent setae present along lateral margins; appressed setae present along margins of petiolar node and disc of postpetiole. Pronotal humeral seta long, slightly-curved and stout, followed by 1–2 similar but shorter laterally-projecting setae. In profile view, long suberect to erect setae present densely throughout cephalic dorsum; suberect to erect setae also present on mesonotal dorsum in three pairs, on petiole in two pairs, on disc of postpetiole as one pair and all over gastral tergites; erect setae on cephalic dorsum and gastral tergites distinctly longer than other setae; ventral surface of head with decumbent setae; gastral sternites with suberect to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of middle and hind femora, tibiae and basitarsi with long stout erect setae.

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose; mandibular dorsum mostly smooth and shining; surface of antennal scrobe, antenna and legs densely areolate. Promesonotal dorsum predominantly, relatively weakly areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; propodeal dorsum densely areolate-rugulose; dorsum of petiolar node transversely rugulose. Side of pronotum mostly smooth and shining, with weak rugulae around margins; pleurae and side of propodeum densely areolate-rugulose. Disc of postpetiole smooth and shining. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys strummeri sp. nov. is a member of the *zanderi*-complex in the *S. leptothrix*-group and shares all its characters (Bolton 2000).

Aside from *Strumigenys strummeri* sp. nov., there are five other SEA species from the same species group (*S. jacobsoni*, *S. leptothrix*, *S. medusa*, *S. stheno* and *S. yamanei* sp. nov.) that share the following character: cephalic dorsum with suberect to erect setae only and without any appressed seta (Table 6). For *S. strummeri*, its pronotum strongly marginate dorsolaterally (instead of not marginated as in *S. yamanei*, or only very weakly marginated as in *S. leptothrix*); propodeal spines present and subtended by broad lamellae (instead of subtended by narrow carinae as in *S. medusa* or *S. stheno*). In comparison with *S. jacobsoni*, in profile view, the erect setae on the cephalic dorsum are much longer and denser in *S. strummeri*; erect setae on the mesosomal dorsum are also only restricted to the mesonotal dorsum as three pairs (instead of across the mesosomal dorsum). See comments under *S. intermedia* sp. nov. for a detailed comparison between the newly described species and the existing species from *S. leptothrix*-group.

Geographic range

Vietnam (Đồng Nai).

Ecology

Collected in secondary forests at an elevation of 160 m.

Strumigenys strygax Bolton, 2000

Table 2

Strumigenys strygax Bolton, 2000: 853 (w.) THAILAND. Indomalaya.

Material examined

THAILAND – **Chiang Mai Province** • 1 worker; Doi Suthep; 500–700 m a.s.l.; 22 Dec. 1997; Sk. Yamane leg.; KUM.

Geographic range

Mainland China (Yunnan), Indonesia (Borneo), Malaysia (East Malaysia), Thailand.

Ecology

Collected in forest. No other information available.

Strumigenys sydorata Bolton, 2000

Fig. 39A–C; Table 2

Strumigenys sydorata Bolton 2000: 876 (w. q.) JAVA. Indomalaya.

Material examined

MAINLAND CHINA – **Hainan Province** • 1 worker; Lumuwan; 250 m a.s.l.; 17 Jun. 1999; J. Fellowes leg.; HKBM ANTWEB1011912 • 7 workers; Bawangling, BWLP10; 19.094° N, 109.20246° E; 4 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; Bawangling, BWLP11; 19.09188° N, 109.20321° E; 4 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 2 workers; Bawangling, BWLP3; 19.08824° N, 109.19681° E; 30 Jun. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 2 workers; Bawangling, BWLP4; 19.09217° N, 109.2017° E; 1 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 6 workers; same collection data as for preceding; Winkler, 4 corners; IBBL • 1 worker; Bawangling, BWLP7; 19.09134° N, 109.19848° E; 3 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 5 workers; Bawangling, BWLP9; 19.0903° N, 109.20101° E; 3 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL • 7 workers; Bawangling, BWLS3; 19.09437° N, 109.17985° E; 6 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 18 workers; Bawangling, BWLS4; 19.09674° N, 109.17778° E; 30 Jun. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 8 workers; Bawangling, BWLS7; 19.10643° N, 109.17604° E; 7 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; Winkler, 12 random; IBBL • 3 workers; Bawangling, BWLS8; 19.08559° N, 109.19128° E; 9 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL • 4 workers; Bawangling, BWLS9; 19.08973° N, 109.19127° E; 9 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL.

THAILAND – **Chanthaburi Province** • 1 worker; Khao Soi Dao; 3 Jun. 2001; K. Eguchi leg.; KUM Eg01-TH-014. – **Trang Province** • 1 worker; Khao Chong; 7.54309° N, 99.80029° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.54251° N, 99.79813° E;

25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 14 workers, 1 queen; Khao Chong; 7.54246° N, 99.79651° E; 25 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.54525° N, 99.79203° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54676° N, 99.79009° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54765° N, 99.78864° E; 26 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54227° N, 99.81011° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54395° N, 99.80502° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.54496° N, 99.80184° E; 27 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 14 workers; Khao Chong; 7.27201° N, 99.65614° E; 28 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 11 worker, 1 queen; Khao Chong; 7.25423° N, 99.71394° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; IBBL • 1 worker; Khao Chong; 7.25675° N, 99.70862° E; 29 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers; Khao Chong; 7.54692° N, 99.79557° E; 30 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers;

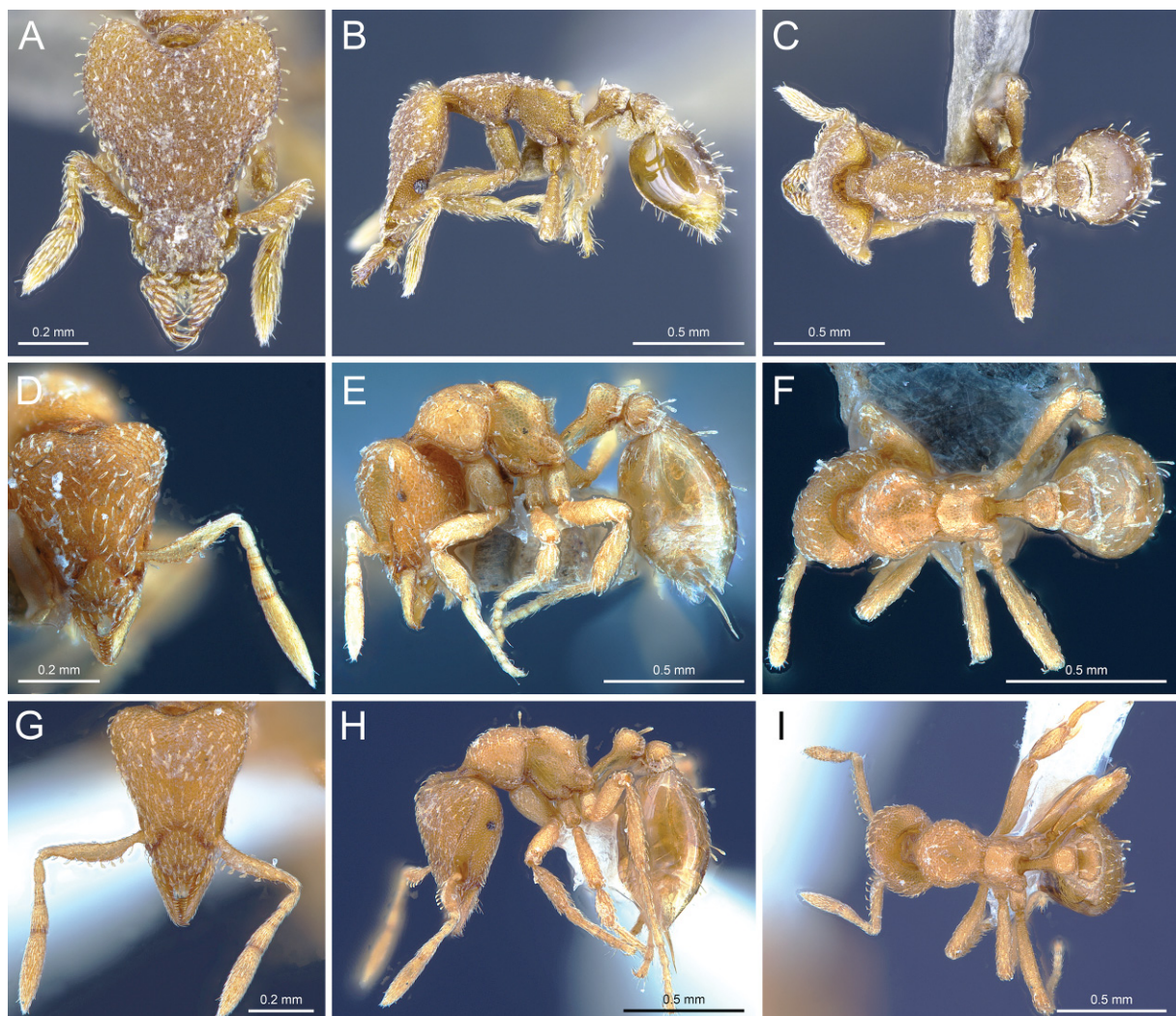


Fig. 39. New species records of *Strumigenys* Smith, 1860 in full-face, profile and dorsal views. **A–C.** Worker of *S. sydorata* Bolton, 2000 from Hainan, mainland China (HNA-00781). **D–F.** Worker of *S. takasago* (Terayama *et al.*, 1995) from Guangxi, mainland China (ANTWEB1011895). **G–I.** Worker of *S. takasago* from Taiwan (ANTWEB1010910(1)).

Khao Chong; 7.54381° N, 99.79488° E; 30 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Khao Chong; 7.54197° N, 99.79446° E; 30 Dec. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 5 workers, 2 queens; Khao Chong; 7.55602° N, 99.78968° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL • 23 workers; Khao Chong; 7.55487° N, 99.7865° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Khao Chong; 7.55606° N, 99.78436° E; 1 Jan. 2019; IBBL members leg.; Winkler, 4 corners; IBBL.

VIETNAM – **Đắk Nông Province** • 1 queen; Nam Nung Reserve; 12.17563° N, 107.779° E; 894 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 2 workers; Nam Nung Reserve; 12.17645° N, 107.77879° E; 896 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.17097° N, 107.7708° E; 912 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.1757° N, 107.76062° E; 907 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 8 workers, 3 queens; same collection data as for preceding; IBBL • 6 workers, 2 queens; Nam Nung Reserve; 12.1666° N, 107.76752° E; 893 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL • 1 worker; Nam Nung Reserve; 12.16745° N, 107.76682° E; 890 m a.s.l.; 10 Jun. 2018; IBBL members leg.; Winkler; IBBL. – **Đồng Nai Province** • 1 queen; Cat Tien National Park; 11.43021° N, 107.42669° E; 146 m a.s.l.; 3 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker, 1 queen; Cat Tien National Park; 11.43728° N, 107.42385° E; 141 m a.s.l.; 3 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Cat Tien National Park; 11.43273° N, 107.42529° E; 141 m a.s.l.; 3 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; IBBL • 2 workers; Cat Tien National Park; 11.4327° N, 107.42593° E; 137 m a.s.l.; 3 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.44912° N, 107.35963° E; 140 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers, 1 queen; Cat Tien National Park; 11.45098° N, 107.36353° E; 160 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 3 workers; Cat Tien National Park; 11.45298° N, 107.36467° E; 174 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 2 workers; Cat Tien National Park; 11.45385° N, 107.367° E; 184 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.4587° N, 107.37202° E; 170 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.45688° N, 107.36958° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; same collection data as for preceding; IBBL • 3 workers, 1 queen; Cat Tien National Park; 11.45683° N, 107.36852° E; 175 m a.s.l.; 4 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.48512° N, 107.38658° E; 168 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 queen; Cat Tien National Park; 11.48379° N, 107.38651° E; 171 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL • 1 worker; Cat Tien National Park; 11.48525° N, 107.38425° E; 157 m a.s.l.; 5 Jun. 2018; IBBL members leg.; Winkler, 4 corners; IBBL.

Geographic range

Mainland China (Hainan, Hong Kong, Yunnan), Indonesia (Java, Sumatra), Singapore, Thailand, Vietnam.

New record for Hainan.

Ecology

A common species which has been collected in primary and secondary forest in Hainan. It has been collected in similar habits, as well as mature forest and rubber plantations in Thailand and Vietnam.

Comments

This species has been recorded from Yunnan, Thailand, Vietnam and Hong Kong, another species with geographical disjunction between Hong Kong and its remaining native range. Future records from Guangdong and Guangxi provinces of mainland China, as well as Cambodia and Laos appear likely.

Strumigenys takasago (Terayama *et al.*, 1995)
Fig. 39D–I; Table 2

Kyidris takasago Terayama *et al.*, 1995: 87, figs 7–9 (w.q.) TAIWAN. Indomalaya.

Pyramica takasago – Bolton 1999: 1672.

Strumigenys takasago – Baroni Urbani & De Andrade 2007: 128.

Material examined

MAINLAND CHINA – **Guangxi Province** • 2 workers; Maoershan, Bajiaotian; 22 Aug. 1998; J. Fellowes leg.; HKBM ANTWEB1011895 to ANTWEB1011896.

TAIWAN • 2 workers; Nantou, Sun Moon Lake; 9 Feb. 2017; P.C. Hsu leg.; reared colony, specimens collected on 6 Jul. 2017; KUM ANTWEB1010910 • 1 worker; same collection data as for preceding; KUM ANTWEB1010911.

Measurements

Workers

TL 2.0, HL 0.46–0.47, HW 0.39, MandL 0.13, SL 0.28, EL 0.036, PW 0.29, ML 0.49–0.50, PL 0.25–0.26, PH 0.13–0.16, DPW 0.13, PPL 0.10–0.12, GL 0.54–0.55, CI 83–85, MI 28, SI 71–72, OI 9, LPI 52–60, DPI 49–53 (n=2).

Geographic range

Mainland China (Guangxi), Taiwan.

New record for Guangxi.

Comments

Specimens from Guangxi Province of mainland China (Fig. 39D–F) have propodeal spines that are slightly broader and less developed than those of the specimens from Taiwan (Fig. 39G–I), and not armed at a distinct upward angle; the specimens from Guangxi (TL 2.0, ML 0.49–0.50) are also slightly smaller than those from Taiwan (TL 2.2–2.3, ML 0.55–0.60). No other major morphological difference is observed; hence, we consider specimens from Guangxi as *S. takasago*. This is the first record of the species within continental Asia, indicating it is not endemic to Taiwan.

Strumigenys xenopilus sp. nov.

urn:lsid:zoobank.org:act:1B52AABA-33A9-499F-BEB4-D73EB66AA332

Fig. 40; Table 2

Diagnosis

Strumigenys xenopilus sp. nov. can be distinguished from all other species of *Strumigenys* in Southeast Asia by a combination of the following characters: surface of head, scape, promesonotum, petiole, postpetiole, anterior and posterior portions of gaster with appressed obovate setae; mandibles short and triangular, without diastema or gap between mandibles; scape dorsoventrally flattened with anteriorly-projected small subbasal lobe; eyes reduced; side of mesosoma mostly smooth and shining; propodeal lamellae broad.

Etymology

The species is named after its peculiar pilosity on the gaster. The name was created by combining the prefix ‘*xeno*’ (meaning ‘foreign’) with ‘*pilus*’, the nominative singular of Latin noun ‘*pilus*’ (meaning ‘hair’).

Type material

Holotype worker (Fig. 40)

MAINLAND CHINA • Hainan Province, Yinggeling, YGLK12; 19.08446° N, 109.50425° E; 2 Aug. 2016; L. Wang leg.; Winkler, 4 corners; secondary forest; LKCNHM ANTWEB1011877 (collection code IBBL HNA-00363).

Measurements

Holotype worker

TL 2.0, HL 0.48, HW 0.39, MandL 0.12, SL 0.23, EL 0.027, PW 0.22, ML 0.52, PL 0.22, PH 0.13, DPW 0.11, PPL 0.14, GL 0.48, CI 82, MI 25, SI 59, OI 7, LPI 56, DPI 50.

Worker description

HEAD. In full-face view, occipital margin broadly concave; occipital corners well developed and bluntly angular; occipital carina narrow; dorsolateral margin of head broadly convex, lateral margin of occipital lobe and upper scrobe margin not forming blunt angle. Anterior clypeal margin broadly convex, with rounded anterolateral angles. Scape dorsoventrally flattened, basally narrow followed by anteriorly-projected small subbasal lobe; trailing edge transverse to very shallowly concave. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles. In profile view, eye greatly reduced, located just above ventral margin of antennal scrobe.

MESOSOMA. In profile view, promesonotal dorsum broadly convex, propodeum more or less flat transversely. Pronotum very weakly marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal teeth present but inconspicuous, subtended on each side by broad

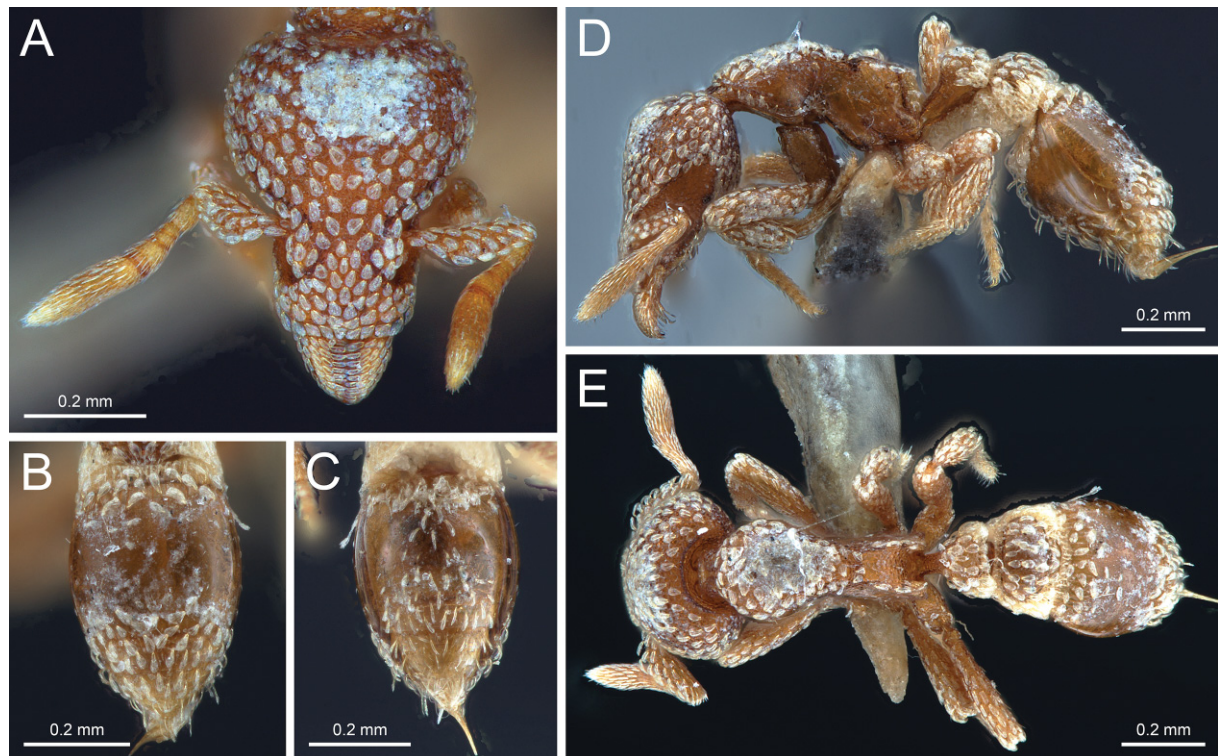


Fig. 40. Holotype worker (ANTWEB1011877) of *Strumigenys xenopilus* sp. nov. **A.** Full-face view. **B.** Gaster close-up in dorsal view. **C.** Gaster close-up in ventral view. **D.** Profile view. **E.** Dorsal view.

lamella with mostly straight posterior margin, transit gently into propodeal lobe with equally straight posterior margin. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar node high; petiolar peduncle not grading evenly into node, longer than node, around 1.2 times as long; petiolar node with differentiated anterior face. In dorsal view, node broader than long, around 1.2 times as long; disc of postpetiole broader than long, around 1.7 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker around posterolateral angles than on rest of margins.

PILOSITY. Surfaces of head (including ventral surface and clypeal dorsum, but excluding antennal scrobe) and scape covered with appressed obovate setae; mandibular dorsum with small appressed obovate to oblanceolate setae. In full-face view, laterally-projecting seta absent; appressed setae on the clypeal and mandibular dorsum much denser than on remaining surface of head; dorsolateral margin of head with continuous row of anteriorly-directed spoon-shaped setae; similar setae present on lateral and anterior clypeal margin, and on leading edge of scape directed apically; funiculus (except for apical antennomere) covered with short appressed fine setae, apical antennomere covered with short appressed narrowly elliptic to fine setae. Pronotal humeral seta absent. In profile view, erect seta absent on dorsal surface of head or mesosoma. Promesonotal dorsum, dorsum of petiolar node and postpetiole, near anterior and posterior margin of first gastral tergite covered with appressed obovate setae; remaining gastral tergites with appressed obovate to spatulate setae, and transit to suberect remiform setae towards pygidium; suberect to decumbent, subspatulate to narrowly elliptic setae covering gastral sternites; very short appressed fine setae also present sporadically across the surface of gaster but inconspicuous (Fig. 40B–C). Hairwheel present at mesopleural excavation. Surfaces of legs without any laterally-projecting setae; femora covered with appressed oblong to subspatulate setae; tibiae covered with appressed subspatulate setae.

SCULPTURE. Cephalic dorsum (including antennal scrobe), surface of antenna and legs, mesosomal dorsum and dorsum of petiolar node densely areolate. Side of mesosoma mostly smooth and shining, with vestiges of sculpture around margins. Disc of postpetiole smooth and shining. Basigastral costulae short, around one fourth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys xenopilus sp. nov. is well distinguished from other species of *Strumigenys* by its peculiar pilosity in combination with its mandibles and broad flattened scape. It does not belong to any existing *Strumigenys* species group, and is most likely a member of its own species group.

Strumigenys xenopilus sp. nov. shares similar short triangular mandibles with the *S. leptothrix*-group, and appressed spatulate setae with a few species from the group, but it also has a broad flattened scape, which is absent in all species of the *S. leptothrix*-group. Appressed spatulate setae are present on the surface of the gastral tergites of *S. xenopilus*, in contrast, species of the *S. leptothrix*-group have stout standing setae instead.

On the other hand, a broad flattened scape is a common feature among species of the *S. circothrix*-group and *S. argiola*-group. However, their pilosity is predominantly orbicular setae instead of obovate or spatulate setae. The former group has narrow and apically-tapered mandibles while the latter has curvilinear mandibles, both of which have a prominent gap between the mandibles. *Strumigenys xenopilus* sp. nov. has short triangular mandibles with masticatory margins that engage across entire length instead.

Strumigenys xenopilus sp. nov. does not belong to the *S. rostrata*-group either. It lacks the basally-directed seta on the leading edge of scape or any pronotal humeral seta, both of which are typical in species of the *S. rostrata*-group. Its scape is also strongly dorsoventrally flattened with an anteriorly-projected small subbasal lobe, in contrast with the weakly to moderately dorsoventrally flattened scape with a thin flange at the leading edge of the *S. rostrata*-group.

Geographic range

Mainland China (Hainan).

Ecology

Collected in secondary forest.

Strumigenys yamanei sp. nov.

urn:lsid:zoobank.org:act:041DBC07-AF41-4A33-A8E3-6ABAA882DE0F

Fig. 41; Tables 2, 6

Diagnosis

Strumigenys yamanei sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: clypeal and mandibular dorsum with small appressed obovate setae; cephalic dorsum relatively weakly reticulate-rugulose, fainter around vertex; in profile view, long erect setae present on cephalic dorsum, promesonotal dorsum, petiolar node, disc of postpetiole and gaster; mesosoma, front coxa and femur mostly smooth and shining; in profile view, propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long erect setae.

Etymology

The species is named after Dr Seiki Yamane in recognition of his remarkable work on ants and other Hymenoptera in Asia, and his kindness in sending us specimens that led to the recognition of this new species. The name was created by adding the singular Latin genitive case suffix *-i* to the last name of a male person.

Type material

Holotype worker (Fig. 41)

TAIWAN • Chiayi, Alishan, Shuisheliao; 1200 m a.s.l.; 4 Jul. 2017; Sk. Yamane leg.; hand collection; NMNS ANTWEB1010901 (collection code KUM TW17-SKY-21).

Paratype workers

TAIWAN • 2 workers; same collection data as for holotype; KUMANTWEB1010900, ANTWEB1010902 (collection code KUM TW17-SKY-21).

Measurements

Holotype worker

TL 2.9, HL 0.67, HW 0.45, MandL 0.08, SL 0.33, EL 0.086, PW 0.27, ML 0.74, PL 0.33, PH 0.16, DPW 0.16, PPL 0.17, GL 0.90, CI 67, MI 12, SI 74, OI 19, LPI 48, DPI 48.

Paratype workers

TL 2.9–3.0, HL 0.71, HW 0.47, MandL 0.09–0.10, SL 0.36–0.37, EL 0.090–0.101, PW 0.27–0.29, ML 0.75–0.76, PL 0.34–0.36, PH 0.15–0.16, DPW 0.16, PPL 0.19–0.21, GL 0.83–0.86, CI 67, MI 12–14, SI 76–78, OI 19–21, LPI 44–45, DPI 45–48 (n=2).

Worker description

HEAD. In full-face view, occipital margin broadly, shallowly concave; occipital corners well developed; occipital carina present; dorsolateral margin of head broadly convex, lateral margin of occipital lobe and upper scrobe margin not forming blunt angle. Clypeus slightly broader than long, around 1.1–1.2 times as long, roughly resembling inverted diamond; anterolateral angles of clypeus roughly semi-circular. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles. In profile view, eye with four ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum broadly convex; propodeum more or less flat transversely, anterior part of propodeum with small bump; pronotum not marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with concave posterior margin that broadens slightly basally into small rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle not grading evenly into node; petiolar node with differentiated anterior face, but short and inconspicuous; petiolar node with broadly convex posterior face; petiolar peduncle about as long as (or slightly longer than) node. In dorsal view, petiolar node slightly longer than broad, around 1.1 times as long; disc of postpetiole broader than long, around 1.5–1.6 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole merely a flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral margins than on anterior or posterior margins.

PILOSITY. Surface of antennae (except for apical antennomere) with appressed stout to acicular setae; progressively finer setae densely covering apical antennomere; clypeal and mandibular dorsum densely covered with small obovate setae; masticatory margins each with row of medially-directed fine setae;

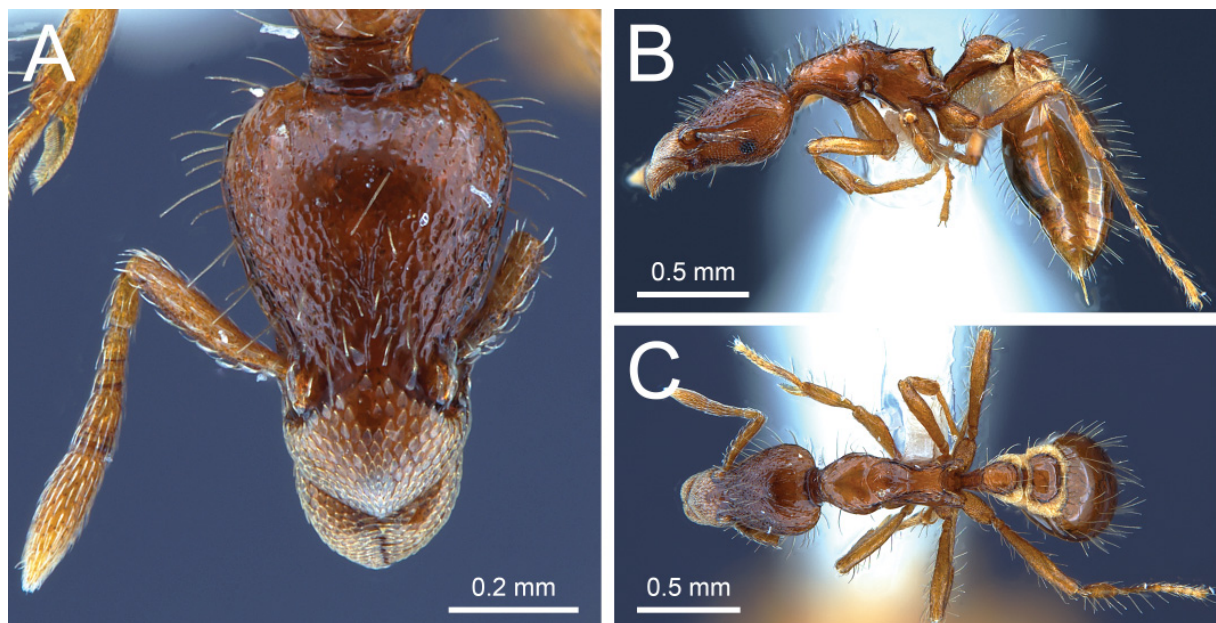


Fig. 41. Holotype worker (ANTWEB1010901) of *Strumigenys yamanei* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

except for a few subspatulate setae close to posterior clypeal margin, appressed seta absent on rest of cephalic dorsum. Leading edge of scapes with decumbent setae. In full-face view, dorsolateral margin of head with numerous laterally-projecting setae. Pronotal humeral seta long and stout. In profile view, long erect setae present on cephalic dorsum, promesonotal dorsum, petiolar node, disc of postpetiole and dorsal surface of gaster; shorter suberect setae present on gastral sternites; ventral surface of head with appressed to decumbent setae. Hairwheel present at mesopleural excavation. Surfaces of middle and hind femora, tibiae and basitarsi with long stout erect setae.

SCULPTURE. Clypeal and mandibular dorsum smooth and shining; cephalic dorsum mostly smooth and shining, relatively weakly vertically reticulate-rugulose on the cephalic dorsum, fainter around vertex and stronger along periphery, especially towards posterior clypeal margin; surface of antennal scrobe, antenna and legs (except front coxa and femur) densely areolate. Front coxa and femur mostly smooth and shining, with relatively weak areolate close to trochanter. Mesosoma and disc of postpetiole mostly smooth and shining, with very weak longitudinal rugulae on the dorsum of mesonotum and propodeum. Dorsum of petiolar node transversely reticulate-rugulose. Basigastral costulae short, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys yamanei sp. nov. is a member of the *S. leptothrix*-group and shares all its characters (Bolton 2000), and very likely belongs to the *leptothrix*-complex. The type specimens all have fully-closed mandibles and the view is obscured by setae along the inner margin of the mandible, making an accurate assessment of the dentition difficult. Placing the specimen against backlight suggests the presence of a principal dental row of around 7 teeth, followed by a series of small teeth and denticles, terminating in a small apical tooth.

Strumigenys yamanei sp. nov. can be distinguished from all other SEA species of the same species group by its unique combination of clypeus and mandibles covered with appressed obovate setae, a cephalic dorsum with numerous long erect setae, a pronotum that is not marginated, propodeal spines present and subtended by broad lamellae (Table 6). In contrast, other species that have long suberect to erect setae only on the cephalic dorsum (*S. jacobsoni*, *S. leptothrix*, *S. medusa*, *S. scylla*, *S. stheno* and *S. strummeri* sp. nov.) lack appressed obovate setae on the clypeus, or do not have a smooth, unsculptured pronotal dorsum.

Geographic range

Taiwan.

Ecology

Collected in forest at elevation of 1200 m.

Strumigenys zanderi sp. nov.

urn:lsid:zoobank.org:act:4BE92DF4-C0B7-4588-AAAA-A6E8E51FC158

Figs 42–43; Tables 2, 6

Diagnosis

Strumigenys zanderi sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum, surface of scape, promesonotal dorsum with short appressed setae; without any laterally-projecting seta in full-face view; mandibles with appressed obovate setae; pronotum marginated dorsolaterally; pronotal humeral seta absent; side of mesosoma mostly smooth and shining; propodeal spines subtended by broad lamellae; petiolar node with conspicuous anterior face.

Etymology

The species is named after a young boy named Zander who loves all things in nature and insects in particular. The name was created by adding the singular Latin genitive case suffix -i to the given name of a male person.

Type material

Holotype worker (Fig. 42)

MAINLAND CHINA • Hainan Province, Bawangling, BWLS6; 19.10423° N, 109.17608° E; 7 Jul. 2016; L. Wang leg.; Winkler, 4 corners; secondary forest; LKCNHM ANTWEB1011885 (collection code IBBL HNA-00851).

Paratype workers

MAINLAND CHINA • 8 workers; same collection data as for holotype; HKBM ANTWEB1011931 to ANTWEB1011938 (collection code IBBL HNA-00851).

Paratype queen (Fig. 43)

MAINLAND CHINA • 1 dealate queen; Hainan Province, Jianfengling, JFLFW1; 19.117° N, 109.152° E; 24 Dec. 2015; L. Wang leg.; Winkler, 12 random; primary forest; LKCNHM ANTWEB1011891 (collection code IBBL HNA-01611).

Additional material examined

MAINLAND CHINA – **Hainan Province** • 2 workers; Jiaxi; 940 m a.s.l.; 14 Jun. 1999; J. Fellowes leg.; HKBM ANTWEB1011902 to ANTWEB1011903 • 1 queen; Wuzhishan; 850 m a.s.l.; 9 Jun. 1999; J. Fellowes leg.; HKBM ANTWEB1011907 • 1 worker; Bawangling, BWLP10; 19.094° N, 109.20246° E; 4 Jul. 2016; L. Wang leg.; Winkler, 4 corners; IBBL ANTWEB1011886 • 12 workers; same collection data as for preceding; Winkler, 12 random; IBBL ANTWEB1011887, ANTWEB1011961 to ANTWEB1011971 • 1 worker; Bawangling, BWLP7; 19.09134° N, 109.19848° E; 3 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL ANTWEB1011889 • 1 worker; Bawangling, BWLS6; 19.10423° N, 109.17608° E; 7 Jul. 2016; L. Wang leg.; Winkler, 12 random; IBBL ANTWEB1011890 • 1 worker;

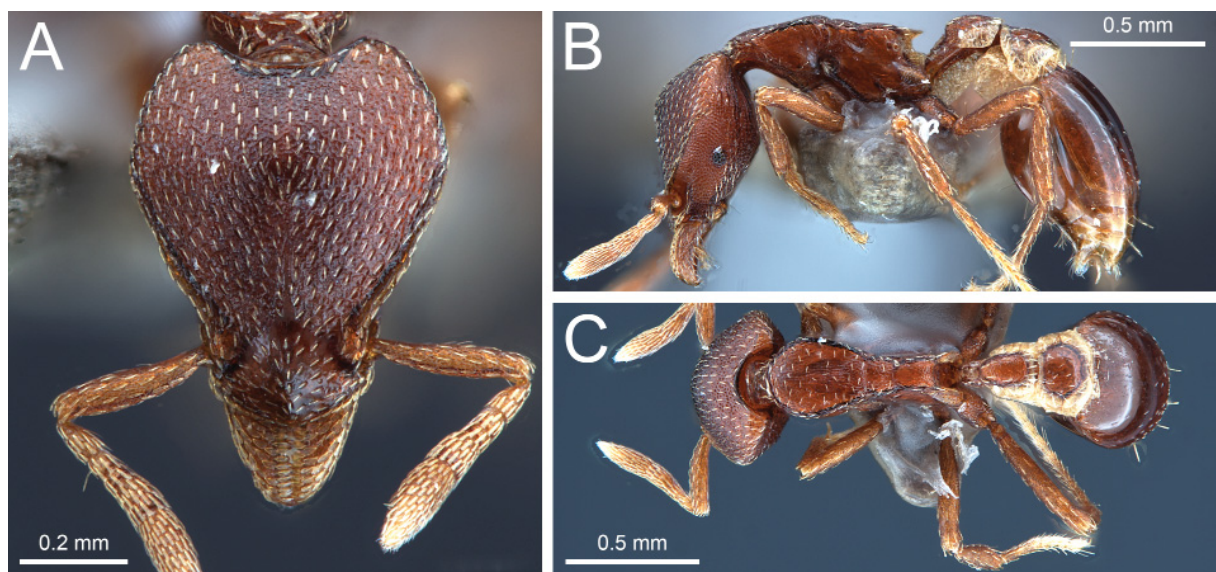


Fig. 42. Holotype worker (ANTWEB1011885) of *Strumigenys zanderi* sp. nov. **A.** Full-face view. **B.** Profile view. **C.** Dorsal view.

Jianfengling, JFLFW2; 19.115° N, 109.159° E; 26 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL ANTWEB1011888 • 1 worker; Jianfengling, JFLFW3; 19.121° N, 109.118° E; 26 Dec. 2015; L. Wang leg.; Winkler, 4 corners; IBBL ANTWEB1011892.

Measurements

Holotype worker

TL 3.0, HL 0.71, HW 0.58, MandL 0.15, SL 0.31, EL 0.074, PW 0.29, ML 0.77, PL 0.34, PH 0.15, DPW 0.13, PPL 0.21, GL 0.80, CI 82, MI 21, SI 52, OI 13, LPI 43, DPI 37.

Paratype workers

TL 2.6–3.0, HL 0.66–0.80, HW 0.55–0.68, MandL 0.14–0.16, SL 0.29–0.34, EL 0.066–0.080, PW 0.27–0.30, ML 0.67–0.77, PL 0.25–0.33, PH 0.12–0.15, DPW 0.11–0.13, PPL 0.17–0.21, GL 0.70–0.80, CI 81–85, MI 20–23, SI 49–55, OI 10–14, LPI 42–49, DPI 38–45 (n=8).

Paratype queen

TL 3.5, HL 0.77, HW 0.62, MandL 0.16, SL 0.31, EL 0.151, PW 0.40, ML 0.94, PL 0.40, PH 0.17, DPW 0.19, PPL 0.23, GL 0.98, CI 81, MI 21, SI 50, OI 24, LPI 41, DPI 47 (n=1).

Worker description

HEAD. In full-face view, occipital margin deeply concave; occipital corners well developed and bluntly angular; occipital carina present; dorsolateral margin of head broadly convex, lateral margin of the

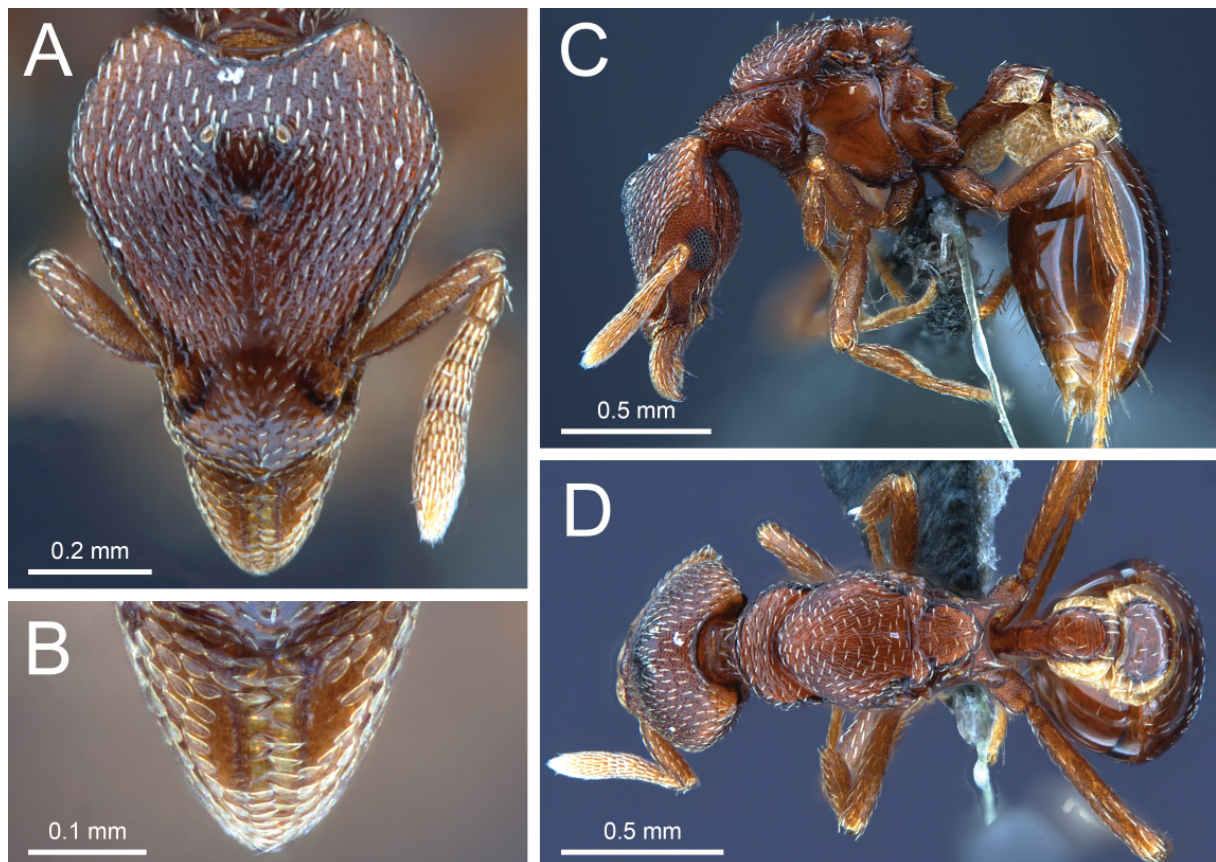


Fig. 43. Paratype queen (ANTWEB1011891) of *Strumigenys zanderi* sp. nov. **A.** Full-face view. **B.** Mandible close-up. **C.** Profile view. **D.** Dorsal view.

occipital lobe and upper scrobe margin not forming blunt angle. Clypeus broader than long, around 1.3–1.4 times as long, roughly resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles; basal lamellae low and broadly triangular, not fully visible at full closure. In profile view, eye with 3–4 ommatidia in diameter.

DENTITION (Fig. 43B). Principal dental row with elongated-triangular tooth at oblique orientation towards proximal end of mandibles, followed by six alternating elongated-triangular teeth and rounded teeth; second, fourth and sixth tooth elongated-triangular, longer than first tooth and neighboring rounded teeth; third, fifth and seventh tooth broad and rounded; apex of mandible at down curvature, in anterior view, with elongated-triangular small tooth, followed by crowded series of six minute denticles, terminating in small conical apical tooth. Total dental count of 15.

MESOSOMA. In profile view, dorsum of mesosoma more or less flat transversely, except for small raise between pronotum and mesonotum, as well as two slight depressions immediately anterior and posterior to mesonotum; pronotum marginated dorsolaterally. In dorsal view, lateral margins of pronotum evenly convex. Propodeal spines elongated-triangular, subtended on each side by broad lamella with concave posterior margin that broadens basally into rounded convex propodeal lobe. Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle not grading evenly into node, and about as long as (or slightly shorter than) node; petiolar node low, with short, conspicuous anterior face and much longer, broadly convex posterior face. In dorsal view, petiolar node longer than broad, around 1.4–1.6 times as long; disc of postpetiole slightly broader than long, around 1.1–1.2 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node, almost reaching level of anterior margin of node in profile and in dorsal view; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on anterior margin.

PILOSITY. In full-face view, cephalic dorsum covered with short appressed plank-like to subspatulate setae, clypeal dorsum with appressed oblong to narrowly elliptic setae, all partially embedded within surface sculpture; mandibular dorsum with appressed obovate setae; masticatory margins each with row of medially-directed elliptic setae. Surface of scape with appressed acicular setae; funiculus covered with plank-like setae. Head without any laterally-projecting seta; dorsolateral margin of head with row of decumbent setae; lateral and anterior clypeal margins with small spoon-shaped setae. In dorsal view, surface of pronotal neck, promesonotal dorsum, margins of petiolar node, disc of postpetiole and gastral tergites sparsely with appressed subspatulate setae; posteriorly-directed decumbent setae present along lateral margins of mesosoma. Pronotal humeral seta absent. In profile view, erect absent on dorsal surface of head, mesosoma, petiole or postpetiole; second and third gastral tergites with erect stout setae; gastral sternites with erect to suberect setae; ventral surface of head, anterior to level of the eye, with decumbent setae. Hairwheel present at mesopleural excavation. Appressed to decumbent elliptic to plank-like setae cover femora, tibiae and basitarsi. Surfaces of legs without any laterally-projecting setae; femora and tibiae with appressed to decumbent subspatulate setae.

SCULPTURE. Cephalic dorsum densely areolate-rugulose; clypeal dorsum, except for sculpture encompassing appressed setae, mostly smooth and shining, with sparse vestiges of sculpture; surface of antennal scrobe, antenna and legs densely areolate; ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae densely areolate-rugulose. Promesonotal dorsum areolate, with

weak longitudinal striation; propodeal dorsum areolate-rugulose; petiolar node transversely areolate-rugulose; side of mesosoma mostly smooth and shining, with vestiges of sculpture around margins. Disc of postpetiole smooth and shining. Basigastral costulae short, sometimes inconspicuous, around one fifth in length of first gastral tergite; rest of gaster smooth and shining.

Queen description

Similar in all points to worker caste except for reproductive caste morphological characters (presence of 3 ocelli, enlarged eyes and thorax), and following: pronotal dorsum predominantly transversely rugulose; mesosomal dorsum with strong directional rugulae towards midline.

Comments

Strumigenys zanderi sp. nov. is a member of the *zanderi*-complex in the *S. leptothrix*-group and shares all its characters (Bolton 2000).

Aside from *Strumigenys zanderi* sp. nov., there are three other SEA species from the same species group (*S. assamensis*, *S. decumbens* sp. nov. and *S. doydeei* sp. nov.) that share the following characters: appressed setae only on the cephalic dorsum, pronotum marginated dorsolaterally, propodeal declivity with broad lamellae (Table 6). Unlike *S. assamensis*, its propodeal spines are well developed (instead of absent); the lateral lobe of the petiole is moderate in size (instead of extensive and blister-like). Unlike *S. decumbens* or *S. doydeei*, an erect seta is absent from the mesosomal dorsum (instead of present as a few pairs on the mesonotum); the side of the mesosoma is mostly smooth and shining (instead of having mostly sculptured pleurae and side of propodeum). Unlike all of the above three species, the petiolar node has an anterior face differentiated from the petiolar peduncle (instead of the petiolar peduncle grading evenly into the node). See comments under *S. intermedia* sp. nov. for detailed comparison between the newly described species and the existing species *S. leptothrix*-group.

Geographic range

Mainland China (Hainan).

Ecology

Collected in primary and secondary forest, and relatively rarely in rubber plantations, at elevations from 850 to 940 m.

Strumigenys zhenghuii sp. nov.

urn:lsid:zoobank.org:act:5B0E49AF-B3AC-44A0-A66E-6C3C85E276E7

Fig. 44; Tables 2, 6

Diagnosis

Strumigenys zhenghuii sp. nov. can be distinguished from other species in the *S. leptothrix*-group by a combination of the following characters: cephalic dorsum with appressed subspatulate to linear setae; in profile view, erect setae present sporadically across cephalic dorsum, not restricted to area between highest point of vertex and th occipital margin; pronotum marginated dorsolaterally; side of mesosoma completely smooth and shining; in profile view, propodeal spines subtended by broad lamellae; femora, tibiae and basitarsi with long erect setae.

Etymology

The species is named after Dr Zhenghui Xu in recognition of his remarkable work on ants in China. The name was created by adding the singular Latin genitive case suffix *-i* to the given name of a male person.

Type material

Holotype worker (Fig. 44)

MAINLAND CHINA • Yunnan Province, Jinghong; 7–12 Aug. 2006; S. Onoda leg.; SWFC ANTWEB1010905.

Paratype worker

MAINLAND CHINA • 1 worker; same collection data as for holotype; KUM ANTWEB1010906.

Measurements

Holotype worker

TL 3.1, HL 0.78, HW 0.59, MandL 0.12, SL 0.35, EL 0.089, PW 0.31, ML 0.78, PL 0.34, PH 0.16, DPW 0.13, PPL 0.21, GL 0.82, CI 76, MI 16, SI 58, OI 15, LPI 47, DPI 38.

Paratype worker

TL 3.2, HL 0.78, HW 0.62, MandL 0.13, SL 0.37, EL 0.082, PW 0.32, ML 0.82, PL 0.38, PH 0.16, DPW 0.14, PPL 0.21, GL 0.83, CI 79, MI 17, SI 59, OI 13, LPI 42, DPI 36 (n=1).

Worker description

HEAD. In full-face view, occipital margin deeply, broadly concave; occipital corners well developed and bluntly angular; occipital carina present. Clypeus broader than long, around 1.3–1.4 times as long,

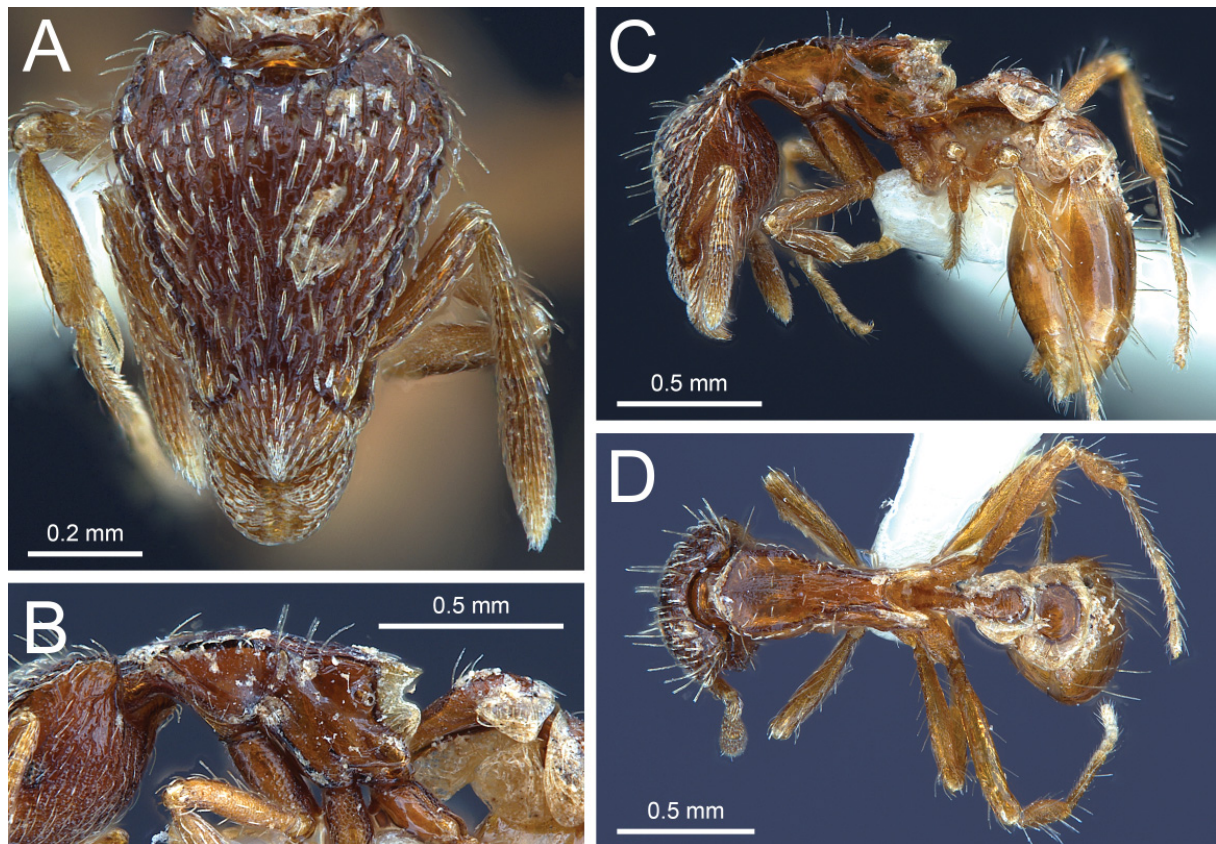


Fig. 44. Type specimens of *Strumigenys zhenghuii* sp. nov. **A, C–D.** Holotype worker (ANTWEB 1010905). **B.** Paratype worker (ANTWEB1010906). **A.** Full-face view. **B.** Mesosoma close-up in profile view. **C.** Profile view. **D.** Dorsal view.

roughly resembling inverted diamond. Scapes subcylindrical, marginated but not converging anteriorly to form thin lamella at leading edge. Mandibles in full-face view triangular; masticatory margins engaged across entire length, without diastema or gap between mandibles. In profile view, eye with four ommatidia in diameter.

MESOSOMA. In profile view, promesonotal dorsum weakly convex, propodeum more or less flat transversely; pronotum marginated dorsolaterally. In dorsal view, anterior margin and lateral margins of pronotum converged into blunt angle; lateral margins mostly straight and subparallel in anterior portion, converge posteriorly to meet lateral margins of mesonotum. In profile view, propodeal spines elongated-triangular, subtended on each side by broad lamella with concave posterior margin broadening basally into rounded convex propodeal lobe (Fig. 44B). Metapleural gland bulla well developed.

METASOMA. In profile view, petiolar peduncle grading evenly into node, and about as long as (or slightly shorter than) node. In dorsal view, petiolar node longer than broad, around 1.5–1.6 times as long; disc of postpetiole broader than long, around 1.2–1.4 times as long. Areolate processes (spongiform tissues) present on both petiole and postpetiole; ventral lobes of petiole and postpetiole extensive; lateral lobe of petiole forming moderately extensive flap at posterolateral angle of node in profile; in dorsal view, processes present along lateral and posterior margins of petiolar node, and surrounding disc of postpetiole, thicker along lateral and posterior margins than on the anterior margin.

PILOSITY. In full-face view, cephalic dorsum with appressed setae, ranging from subspatulate setae near occipital margin to linear setae near posterior clypeal margin; clypeal dorsum covered with linear to narrowly elliptic setae; mandibular dorsum covered with small oblanceolate setae; masticatory margins each with row of medially-directed fine setae. Surface of scape and funiculus (except for apical antennomere) covered with appressed acicular setae; progressively finer setae densely covering apical antennomere. Lateral margin of occipital lobe with around five laterally-projecting setae; dorsolateral margin of head and leading edge of scape with decumbent setae. In dorsal view, promesonotal dorsum sparsely with appressed subspatulate setae; posteriorly-directed decumbent setae present along lateral margins. Pronotal humeral seta long, straight and stout. In profile view, erect setae present sporadically across cephalic dorsum, not restricted to area between highest point of vertex and occipital margin; suberect to erect setae also present on mesonotal dorsum in three pairs, on petiole in two pairs, on disc of postpetiole in one pair and all over gastral tergites; similar but suberect setae also present on gastral sternites; ventral surface of head with decumbent setae. Hairwheel present at mesopleural excavation and well developed. Surfaces of middle and hind femora, tibiae and basitarsi with long stout erect setae.

SCULPTURE. Cephalic dorsum, clypeal dorsum and ventral surface of head sparsely reticulate-rugulose, with spaces between rugulae weakly areolate-rugulose; surface of antennal scrobe, antenna and legs (except first coxa) densely areolate; first coxa mostly densely areolate with smooth patch of surface. Mesosomal dorsum predominantly, relatively weakly areolate, with weak longitudinal rugulae and long, weak, longitudinal median striation; dorsum of petiolar node transversely areolate-rugulose; side of mesosoma smooth and shining. Disc of postpetiole mostly smooth and shining. Basigastral costulae short, around one third in length of first gastral tergite; rest of gaster smooth and shining.

Comments

Strumigenys zhenghuii sp. nov. is a member of the *S. leptothrix*-group and shares all its characters (Bolton 2000), and very likely belongs to the *elegantula*-complex. The type specimens all have closed mandibles and the view is obscured by setae along the inner margin of mandible, making an accurate assessment of the dentition difficult. Placing the specimen against backlight suggests the presence of a principal dental row of around 8 teeth, alternating between short and long teeth, followed by around 4 smaller teeth and 4 denticles, terminating in a small apical tooth.

Aside from *Strumigenys zhenghuii* sp. nov., there are six other SEA species from the same species group (*S. ailaoshana*, *S. delicata* sp. nov., *S. densissima* sp. nov., *S. elegantula*, *S. intermedia* sp. nov. and *S. nankunshana*) that share the following characters: both appressed and erect setae present on the cephalic dorsum, pronotum marginate dorsolaterally, propodeal spines present and subtended by broad lamellae (Table 6). For *S. zhenghuii*, its pronotum dorsum is areolate-rugulose (instead of predominantly longitudinally-striated as in *S. ailaoshana*, or predominantly transversely-striated as in *S. nankunshana*); erect setae are present sporadically across the cephalic dorsum (instead of only restricted to the area between the highest point of the vertex and the occipital margin as in *S. ailaoshana*, *S. densissima*, *S. elegantula* or *S. nankunshana*); the appressed setae on the cephalic dorsum are subspatulate to linear (instead of fine setae as in *S. delicata*). Unlike all of the above six species, the side of the mesosoma is completely smooth and shining (instead of partially to fully sculptured). *Strumigenys zhenghuii* (CI 76–79) also has a proportionally wider head than the abovementioned species (CI 68–74). See comments under *S. intermedia* for a detailed comparison between the newly described species and the existing species from *S. leptothrix*-group.

Geographic range

Mainland China (Yunnan).

Ecology

Collected in forest. No other information available.

Key to Strumigenys Smith, 1860 of East Asia (as Pyramica Roger, 1862) [partial, updated]

The following key is a partial overhaul of the original key to *Strumigenys* of East Asia (as *Pyramica*) by Bolton (2000), replacing couplets 37–56. New species described since the publication of the original key, which would be keyed out around the above couplets, are included. This includes all known East Asian species from the *S. acubecca*-, *S. bubisnoda*-, *S. leptothrix*-, *S. nathistorisoc*-, *S. semicompta*- and *S. wilsoniana*-groups. Some of the couplets are only slightly modified from the original. As more than two dozen of species are added, the original couplet numberings are not retained.

1. (Couplet 37 of the original key) Mandibles elongate and narrow in full-face view; masticatory margins engage only in apical half or less of their length at full closure, proximally with large gap between mandibles; labral lobes visible through gap; $MI > 25$ 2
– Mandibles triangular to elongated-triangular in full-face view; masticatory margins engage throughout their length at full closure, proximally without large gap between mandibles; labral lobes not visible; $MI < 25$ 4
2. When fully-closed, mandibles entirely dentate from base to apex in full-face view; teeth range from triangular, spiniform to broad and rounded (Mainland China) *Strumigenys nathistorisoc* Tang *et al.*, 2019
– When fully-closed, mandibles edentate from base to about the mid-length in full-face view; teeth triangular and spiniform, without broad and rounded tooth 3
3. Flagellate setae present on dorsolateral margins of head, pronotal humeri, petiole, postpetiole, first gastral tergite and dorsal (outer) surfaces of tibiae and basitarsi. Aligned rows of appressed spatulate setae entirely absent. Anterior clypeal margin with small median tooth. Eye minute, with only 3–4 ommatidia in total. Scape long and slender, $SI > 100$. (Malaysia (Peninsular)) *Strumigenys acubecca* (Brown, 1972)
– Flagellate setae entirely absent. Aligned rows of appressed spatulate setae conspicuous on cephalic dorsum, scapes and mandibles. Anterior clypeal margin evenly convex. Eye

- relatively large, with 5 ommatidia in longest row. Scape short and stout, $SI < 70$. (Mainland China) *Strumigenys wilsoniana* Baroni Urbani, 2007
4. Masticatory margin of mandible with total dental count of 5; all stoutly conical and slightly recurved teeth, without denticles. Anterior clypeal margin transverse or nearly so. Apices of labral lobes truncated 5
- Masticatory margin of mandible with total dental count of 12–18; with basal series of 6–9 teeth that may be elongated-triangular, broad and rounded, conical or spiniform; distal to this series number of smaller teeth and denticles. Anterior clypeal margin convex. Apices of labral lobes may be triangular, conical or digitate, but never truncated 7
5. Dorsal (outer) surfaces of middle and hind tibiae and basitarsi with numerous erect long simple setae. Dorsal surfaces of middle and hind femora with suberect to erect elongate simple setae. Leading edge of scape with row of short suberect clavate setae. Basigastral costulae extend for some distance onto sclerite proper, not restricted to limbus. (Indonesia (Maluku Islands), Papua New Guinea, also present in Australia) *Strumigenys semicompta* (Brown, 1959)
- Dorsal (outer) surfaces of middle and hind tibiae and basitarsi with short decumbent to appressed setae. Dorsal surfaces of middle and hind femora without elongate simple setae. Leading edge of scape with row of closely appressed minute setae. Basigastral costulae extremely short, traversing limbus but barely extending onto sclerite proper 6
6. Cephalic dorsum behind clypeus entirely sculptured, with longitudinal rugulae present. Dorsolateral margin of occipital lobe with 3 short stiff projecting setae; dorsum of head with a few erect short setae near occipital margin. Pronotal humeral seta present, stiff and projecting laterally. Dorsal mesosoma with short erect setae present along dorsolateral margins. (Papua New Guinea) *Strumigenys carnassa* (Bolton, 2000)
- Cephalic dorsum behind clypeus mostly smooth, without longitudinal rugulae. Dorsolateral margin of occipital lobe without projecting setae; dorsum of head without erect setae. Pronotal humeral seta absent. Dorsal mesosoma without erect setae anywhere. (Indonesia (New Guinea)) *Strumigenys pydrax* (Bolton, 2000)
7. Postpetiole enormously inflated, PPL 0.42. Larger species, HL 1.22. Head in profile extremely dorsoventrally flattened, its depth at level of eye only slightly greater than maximum diameter of eye. Propodeal spiracle located at apex of V-shaped depression inside sclerite. (Malaysia (East Malaysia)) *Strumigenys bubisnoda* (Bolton, 2000)
- Postpetiole small, PPL < 0.3. Smaller species, HL < 0.90. Head in profile not dorsoventrally flattened, its depth at level of eye much greater than maximum diameter of eye. Propodeal spiracle not located at apex of a V-shaped depression inside sclerite 8
8. In profile view, propodeal declivity with simple carina, or at most narrow lamella with posterior margin close to and parallel with edge of declivity 9
- In profile view, propodeal declivity with broad lamella, posterior margin not close to nor parallel with edge of declivity 17
9. Dorsal (outer) surface of hind tibia without suberect to erect projecting setae; any setae present are decumbent to appressed 10
- Dorsal (outer) surface of hind tibia with suberect to erect projecting setae 14
10. Propodeal lobes (at base of declivity) elongate, narrowly acutely triangular. Declivity above propodeal lobe margined only by vestigial carina extending upward to propodeal spine 11
- Propodeal lobes (at base of declivity) short, low and rounded. Declivity above propodeal lobe margined by narrow lamella distinctly engaging base of propodeal tooth or spine 13

11. With head in profile view, dorsal outline of clypeus forming shallow even convexity with highest point at about mid-length; clypeal outline sloping evenly and gently upward from basal margin of mandible to highest point and posterior to this sloping evenly and gently downward to posterior clypeal apex 12
- With head in profile view, dorsal outline of clypeus not forming even shallow convexity with highest point at about mid-length; clypeal outline rising almost vertically from basal margin of mandible and passing through bluntly bulging angle (vertical portion accounts for about one-third of length of outline), posterior to this outline almost flat to posterior clypeal apex. (East Malaysia) *Strumigenys megaera* (Bolton, 2000)
12. With head in profile view, dorsum with single transverse row of 4–6 short standing setae posteriorly, immediately in front of occipital margin. In full-face view dorsolateral margin of occipital lobe without freely projecting stiff setae. Head narrower and scape longer, CI 56–60, SI 81–86. (Thailand) *Strumigenys scolopax* (Bolton, 2000)
- With head in profile view, dorsum with numerous standing setae posteriorly, obviously more than single row immediately in front of occipital margin. In full-face view dorsolateral margin of occipital lobe with 4–5 freely projecting stiff setae. Head broader and scape shorter, CI 65–70, SI 71–77. (Malaysia (Peninsular), Indonesia (Java)) *Strumigenys rudinodis* Stärcke, 1941
13. Side of pronotum, mesopleuron, metapleuron and side of propodeum entirely smooth and shining; pronotum strongly marginated dorsolaterally (Vietnam) *Strumigenys rongi* sp. nov.
- Side of pronotum and propodeum entirely sculptured, mesopleuron and metapleuron only partly smooth and shining; pronotum at most weakly marginated dorsolaterally (Mainland China, Korea, Japan, Taiwan) *Strumigenys japonica* Ito, 1914
14. With head in full-face view, upper scrobe margin with continuous row of short anteriorly directed decumbent to appressed setae only, without elongate setae freely projecting beyond margins; one or two freely projecting setae may occur on lateral occipital lobes well behind level of eyes. (Malaysia (East Malaysia), Philippines) *Strumigenys euryale* (Bolton, 2000)
- With head in full-face view, upper scrobe margins with straight or curved elongate setae freely projecting laterally or dorsolaterally beyond margins; similar or even longer setae project from occipital lobes 15
15. Leading edge of antennal scape with series of straight anteriorly projecting setae; dorsum of petiolar node unsculptured (Indonesia (Sulawesi)) *Strumigenys stheno* (Bolton, 2000)
- Leading edge of antennal scape without series of straight anteriorly projecting setae; dorsum of petiolar node fully sculptured 16
16. Propodeal lobes elongate and narrowly triangular, more than half length of propodeal spines. Elongate setae on dorsum of head erect in profile view, weakly curved or sinuate along their length but not strongly arched forward. Pronotal dorsum with spaces between longitudinal costulae vestigially punctulate to smooth. (Malaysia (East Malaysia)) *Strumigenys medusa* (Bolton, 2000)
- Propodeal lobes short and broadly triangular, much less than half length of propodeal spines. Elongate setae on dorsum of head strongly arching forward in profile view, their apices directed anteriorly. Pronotal dorsum with spaces between the longitudinal costulae densely reticulate-punctate. (Papua New Guinea, Philippines) *Strumigenys scylla* (Bolton, 2000)
17. Dorsal (outer) surface of hind tibia without suberect to erect projecting setae; any setae present are decumbent to appressed 18
- Dorsal (outer) surface of hind tibia with suberect to erect projecting setae 23

18. Dorsal mesosoma entirely lacking standing setae	19
– Dorsal mesosoma with standing setae present at least on the mesonotum	20
19. With petiole in profile view, lateral spongiform lobe very broad and extending forward to level of spiracle on peduncle. Propodeal spines or teeth absent. (Mainland China, India, Vietnam)	<i>Strumigenys assamensis</i> De Andrade, 1994
– With petiole in profile view, lateral spongiform lobe not extending forward to level of spiracle on peduncle. Propodeum with pair of spines or acute teeth. (Mainland China)	<i>Strumigenys zanderi</i> sp. nov.
20. With head in full-face view, dorsolateral margin of head strongly marginated; lateral margin of occipital lobe and upper scrobe margin forming blunt angle. Pronotum marginated dorsolaterally. (Thailand)	<i>Strumigenys decumbens</i> sp. nov.
– With head in full-face view, dorsolateral margin of head at most weakly marginated; lateral margin of occipital lobe and upper scrobe margin meeting as continuous curve and not forming blunt angle. Pronotum not marginated dorsolaterally	21
21. With head in full-face view, lateral margin of occipital lobe with numerous long setae freely projecting beyond margins	22
– With head in full-face view, lateral margin of occipital lobe without any setae freely projecting beyond margins. (Korea)	<i>Strumigenys calvus</i> Dong & Kim, 2020
22. Pronotal dorsum with numerous long erect simple setae. (Taiwan)	<i>Strumigenys formosimonticola</i> (Terayama <i>et al.</i> , 1996)
– Pronotal dorsum without long erect simple setae. (Japan, Taiwan)	<i>Strumigenys benten</i> (Terayama <i>et al.</i> , 1996)
23. In profile view, mesosoma with numerous erect long setae	24
– In profile view, erect setae on mesosoma either short and stubbly, or limited to a few pairs on the mesonotum only.	26
24. With head in full-face view, clypeus entirely covered with scale-like obovate setae. Pronotal dorsum entirely smooth and shining. (Taiwan)	<i>Strumigenys yamanei</i> sp. nov.
– With head in full-face view, clypeus with stout and truncated or narrowly elliptic setae only, not scale-like obovate. Pronotal dorsum fully sculptured	25
25. Leading edge of antennal scape with series of straight anteriorly projecting simple setae. Side of mesosoma entirely smooth and shining. Petiole with differentiated short anterior face. (Mainland China, Japan, Taiwan)	<i>Strumigenys leptothrix</i> Wheeler, 1929
– Leading edge of antennal scape without series of straight anteriorly projecting simple setae. Side of mesosoma mostly sculptured. Petiolar peduncle grading evenly into node, petiole without differentiated short anterior face. (Indonesia (Borneo, Sumatra), Malaysia, Philippines, Vietnam)	<i>Strumigenys jacobsoni</i> Menozzi, 1939
26. Dorsum of head with suberect to erect setae only; appressed setae, if any, limited to clypeal dorsum only. (Vietnam)	<i>Strumigenys strummeri</i> sp. nov.
– Dorsum of head has both appressed and erect setae, appressed setae not limited to clypeal dorsum.	27
27. Side of mesosoma entirely smooth and shining	28
– Side of mesosoma mostly or entirely sculptured	29

28. In profile view, erect setae on mesosoma long and stout; propodeal lamellae relatively broad, broadest part slightly broader than maximum width of middle femur. Pronotum strongly marginated dorsolaterally. (Mainland China) *Strumigenys zhenghuii* sp. nov.
– In profile view, erect setae on mesosoma short and stubbly; propodeal lamellae relatively narrow, widest part much narrower than maximum width of middle femur. Pronotum at most weakly marginated dorsolaterally. (Japan, Korea) *Strumigenys alecto* (Bolton, 2000)
29. With head in profile view, dorsum without any erect seta. In full-face view, cephalic dorsum with appressed, distinctly spatulate setae; laterally-projecting setae limited to at most 1–2 around the occipital corner. (Mainland China, Thailand, Vietnam) *Strumigenys doydeei* sp. nov.
– With head in profile view, the dorsum with erect setae. In full-face view, cephalic dorsum with appressed fine, stout, plank-like or subspatulate setae, not distinctly spatulate; at least 4–5 laterally-projecting setae on lateral margin of occipital lobe 30
30. With head in profile view, erect setae on the dorsum restricted to area between highest point of the vertex and the occipital margin 31
– With head in profile view, erect setae present sporadically across dorsum, not restricted to area between highest point of vertex and occipital margin 34
31. Pronotal dorsum predominantly, strongly longitudinally or transversely striated 32
– Pronotal dorsum areolate-rugulose (reticulate-punctate), sometimes with weak longitudinal striation, not predominantly longitudinally or transversely striated 33
32. Pronotal dorsum predominantly, strongly longitudinally striated. (Mainland China)
..... *Strumigenys ailaoshana* (Xu & Zhou, 2004)
– Pronotal dorsum predominantly, strongly transversely striated. (Mainland China)
..... *Strumigenys nankunshana* (Zhou, 2011)
33. With head in full-face view, appressed setae different in shape between dorsum and clypeus, plank-like to subspatulate setae on dorsum, and narrowly elliptic on clypeus. (Mainland China, Taiwan, Thailand) *Strumigenys elegantula* (Terayama & Kubota, 1989)
– With head in full-face view, appressed setae similar in shape in both dorsum and clypeus, consistently stout and truncated. (Mainland China) *Strumigenys densissima* sp. nov.
34. With head in full-face view, appressed setae on dorsum fine and apically-acute; lateral margin of occipital lobe with more than 7 laterally-projecting setae. (Thailand)
..... *Strumigenys delicata* sp. nov.
– With head in full-face view, appressed setae on dorsum stout and truncated; lateral margin of occipital lobe with at most 5–6 laterally-projecting setae. (Mainland China)
..... *Strumigenys intermedia* sp. nov.

Discussion

Strumigenys represents an interesting model for studying the biogeography of ants in tropical and subtropical Asian regions due to their high diversity, easiness to be sampled especially through leaf litter samples and relatively good taxonomy (Bolton 2000), even if important progress can still be achieved as illustrated by this and previous studies (Tang *et al.* 2019; Liu *et al.* 2020). Here, we note several species (e.g., *S. canina*) that present a more or less continuous distribution along the SE coast of mainland China including Guangdong, Guangxi, Hainan and Hong Kong, and occasionally Taiwan or Vietnam. It should be noted, however, that the distribution of several of these species is likely to be more widespread within mainland China, but the lack of sampling in several provinces such as Fujian

(5 species), Guizhou (2 species), Hunan (9 species), Jiangxi (4 species) and Sichuan (2 species) prevents a complete picture of the northern distribution for those. Similarly, in Southeast Asia, several countries such as Cambodia, Laos and Myanmar are almost void of any records of *Strumigenys* with 1, 0 and 4 species recorded, respectively (Jaitrong *et al.* 2016; Janicki *et al.* 2016; Guénard *et al.* 2017). This is in sharp contrast with the diversity observed in neighboring regions of Thailand and Yunnan where at least 41 and 28 species have been recorded, respectively, while more records are highly possible in those regions as recently illustrated (Liu *et al.* 2020). Our results from Hainan Island also sharply illustrate how the lack of sampling in some regions prevents a clear view of the regional or global pattern. Before this study, no species of *Strumigenys* had been identified from this subtropical province, and while our sampling remains limited, it demonstrates the knowledge gap exists, with no less than 23 species ultimately recorded for the first time, including several firstly described here.

We also highlight several cases of species which may appear to be widespread but actually include more than one species due to limited taxonomic efforts in the region, for instance, *S. intermedia* sp. nov., *S. decumbens* sp. nov. and *S. doydeei* sp. nov., which were all previously identified as *S. elegantula*. Similarly, *S. mitis*, as proposed by Bolton (2000), also appears to fall into the same category, but would require further work beyond the scope of this study. *Strumigenys exilirhina* and *S. feae*, with the morphological comparison discussed in detail in the Results section, represent another complicated case, for which, under the current diagnosis of both species, specimens from Thailand and Vietnam would fall into a grey zone between the two species, indicating a further need for sampling across Asia.

Species groups and complexes

The landmark taxonomic work by Bolton (2000) has revised the genus and introduced numerous species groups, sub-groups and complexes based upon shared morphological characters. For many of those morphological groups, in particular those with numerous members and with variable characters (e.g., *S. caniophanes*-group and *S. godeffroyi*-group), Bolton stated the groupings are “crude and for convenience”, and thus do not necessarily infer a taxonomic relationship. Hence, these morphological groups should be considered mainly as a tool to aid identification for this highly diverse genus. In particular, many species groups of common Southeast Asian species include species from the Malagasy realm (e.g., *S. godeffroyi*-group and *S. leptothrix*-group), but without species found in other biogeographical realms, further highlighting that some of the current species groups are unlikely to be monophyletic. For the *S. leptothrix*-group, this has been confirmed by the phylogenetic works by Booher *et al.* (2021).

Unless members of a morphological group share very distinctive characters, e.g., an unusual dentition, mandible morphology or a highly-derived head shape, often less distinctive characters would be employed for diagnosis. It might include pilosity, sculpture and general morphology of different body parts. Each of these less distinctive characters is, most likely, not unique to any particular group. To adequately define a group, a unique combination of characters is used instead. As such, the choice of characters considered as diagnostic for the groupings from a list of shared characters is highly influenced by the pool of species already described. Newly described species could become the counterexample of certain characters that were once assumed to be stable within a group. These characters were included in the original diagnosis, but, with the introduction of new species, are then revealed to be varied within the group.

In this study, *S. scutica* sp. nov. shares all the typical characters of the *S. godeffroyi*-group. It further belongs to the Subgroup B for its dorsal surface of hind basitarsus lacks erect flagellate setae. However, currently, it fits the definition of neither the *rofocala*-complex nor the *signeae*-complex of Subgroup B. Its pronotal humeral seta are simple and stout, contradicting the current diagnosis of the *rofocala*-complex (with long and flagellate pronotal humeral setae). The *signeae*-complex is defined as “flagellate setae always absent from dorsal surfaces of head, alitrunk and gaster”, but *S. scutica* has long flagellate setae

on the gaster. It is to be expected that the number of similar isolated species will increase as more new species are described. Given that these species groups and complexes serve to group morphologically similar species and help identification, leaving multiple isolated species in a species group may not be ideal. One possible solution might be to redefine some of the existing complexes to accommodate the new species, though it could be complicated for some of the larger species groups with a high character variability. It may not be obvious which species complex's diagnosis should be changed to accommodate the new species. Another temporary solution would be to create more species complexes for convenience, similar to the *smythiesii*-complex in Subgroup A of the *S. godeffroyi*-group, which groups species together which do not belong to other relatively better-defined complexes within the same species subgroup. However, this is very unsatisfactory from a taxonomic perspective.

Ultimately, a thorough overhaul of these below-genus species groupings to better understand their phylogenetic relationships and recover robust taxonomic definitions is necessary, which has been done in other diverse ant genera (e.g., Feldhaar *et al.* 2003; Jansen *et al.* 2010). The phylogenetic reconstruction of *Strumigenys* by Booher *et al.* (2021) in their work on the evolution of trap-jaw mechanism could serve as a starting point. Their reconstruction with 360 described and 110 undescribed species covered 90% of Bolton's morphological species groups. Nevertheless, as only a few species from each group are included in the study, extensive works are still required to recover phylogenetically-supported species groups. This study and Booher's other works (Booher & Hoenle 2021) have also highlighted the potential of internal morphological features, such as mandible articular processes, in future studies which might help resolve complicated taxonomic relationships between certain species. However, the technology used (μ CT scans) is yet to be made easily accessible.

Introduced species

As shown in several recent publications, the introduction of exotic species of *Strumigenys* in Asia (Tang *et al.* 2019; Brassard *et al.* 2020) or other parts of the world (Hamer *et al.* 2021) is a common and growing phenomenon, at least in their detection. Our results highlight the spread of five species with the first records of *S. hexamera* and *S. nepalensis* in Hainan, *S. emmae* and *S. rogeri* in Thailand, and *S. membranifera* in Vietnam. It also confirms the trampy behavior of these species being mainly collected within urban parks or highly disturbed habitats (e.g., rubber plantations), but also, although rather rarely, within secondary forests, including some more mature ones. As a result, as the anthropogenization of the landscape and accessibility to particular once remote regions increases, the spread of these species is likely to expand as illustrated by the records of *S. emmae* in the Bueng Kan Province, located at several hundreds of kilometers from any coastline or associated port where first establishment by exotic species is most likely (Dawson *et al.* 2017). It should be noted, however, that the ecological impact of introduced species of *Strumigenys* is unknown, nor that very high population abundance or biomass have been reported in areas where those species are present, contrary to some other well-known invasive species (e.g., Guénard & Dunn 2010). As such, it seems unlikely for introduced *Strumigenys* to be a driver of biodiversity extinction, but instead, these species may increase the local or regional pool of species present, while other factors such as habitat change may contribute more significantly to the change in species composition and richness in this genus.

The improved taxonomy of *Strumigenys*, if combined with relevant ecological knowledge, could contribute to test how this hyperdiverse genus could be used as an efficient ecological indicator of environmental changes in many regions of the world, starting in Asia where the genus is extremely diverse (Table 1) and with future sampling still promising numerous discoveries.

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