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A taxonomic review of the ancora species group of *Graphipterus*
Latreille (Coleoptera: Carabidae)

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A taxonomic review of the ancora species group of *Graphipterus*
Latreille (Coleoptera: Carabidae)

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Abstract. The taxonomy of the ancora species group of *Graphipterus* Latreille (Coleoptera: Carabidae) is reviewed and seven species are recognized, all from southern Africa: *Graphipterus ancora* Dejean, *Graphipterus cordiger* Dejean, *Graphipterus distinctus* Péringuey (**new status**), *Graphipterus fasciatus* Chaudoir, *Graphipterus fritschi* Chaudoir, *Graphipterus wahlbergi* Boheman (**new status**), and *Graphipterus westwoodi* Brême (**new status**). Diagnostic features are provided for each species and adult specimens of each species are illustrated.

Key Words. Carabidae, velvet ground beetle, taxonomy, key, South Africa

Introduction

Graphipterus Latreille is one of the most diverse genera of Carabidae in continental Africa, with 116 species and 123 subspecies recognized by Basilewsky (1977) in the most recent revision of the genus. Commonly known as “velvet ground beetles” because of the velvety pubescence on the elytra (Picker et al. 2004), species of *Graphipterus* can be found in all parts of the continent except for the central portion of the Sahara Desert and the tropical forests of west and central Africa (Basilewsky 1977, see particularly Carte 1 and Carte 2). Many species in this genus are widely distributed, while other species and subspecies exhibit varying degrees of endemism (Basilewsky 1977).

Adults of *Graphipterus* species lack functional flying wings and are typically found running on the ground in open areas with bare clay or sandy soil (Picker et al. 2004), usually in close proximity to the openings of subterranean ant nests where the larvae of *Graphipterus* species live and feed (Paarmann 1985; Dinter et al. 2002). Emergence of adults appears to be triggered by the onset of seasonal rains (Basilewsky 1977), and individual species of the genus may be locally abundant in the rainy season.

Graphipterus has recently emerged as a taxon of conservation interest in southern Africa, with particular focus on those species of the genus that are rare, highly endemic, or restricted to particular vegetation types or ecological communities. Kotze (2000) discussed the distribution of species across vegetation communities in KwaZulu/Natal, while Magagula (2003) discussed the use of *Graphipterus* and other carabids as possible biological indicators in agricultural systems of Swaziland. Several species of the genus have recently been considered for potential listing as Threatened or Protected Species under the South African Biodiversity Act of 2004 (R. Müller, J. duG. Harrison, pers. comm.).

The conservation of individual insect species requires a robust taxonomic understanding of the group to which those species belong. With regards to *Graphipterus* species, the taxonomy of the genus is solidly grounded in revisionary studies by Basilewsky (1977) and Burgeon (1929) which were in turn based on a wealth of specimens from African, European, and North American museum collections. However, the taxonomic methods used in these revisions are now somewhat outdated, relying on the “New Systematics” paradigm of Huxley (1940) and Mayr (1942). This is demonstrated most clearly by the application of a polytypic species concept throughout both of the revisions of *Graphipterus*. In this approach, similar forms which differ in minor characters (e.g. vestiture or pigmentation) are placed as subspecies under the umbrella of a single, polytypic species. This approach has come under criticism (Cracraft 1992; Wheeler 1995) because it often leads to the “lumping” of clearly diagnosable taxa (which would otherwise be recognized as full species) as subspecies under a single polytypic umbrella.

This type of “lumping” appears to have occurred in at least three occasions in the ancora species group. This group of seven species forms one of the more distinctive and possibly monophyletic lineages within the larger genus *Graphipterus*. Adults of species in this group (Figures 1–18) can be immediately recognized by their large, transverse or rounded bands or patches of contrasting dark and light pubescence on the elytral disc, a characteristic which readily separates them from the other species in the genus whose elytral pubescence is either uniform in color or arranged in longitudinal (lengthwise) bands (Basilewsky 1977).

The present study had its origins in my field research on Carabidae (incl. Cicindelinae) in the Kruger National Park, Mpumalanga Province, Republic of South Africa (RSA), between 2007 and 2011. While studying the material of *Graphipterus* species from this geographic area, it became apparent that there was no zone of intergradation between the two alleged “subspecies” *G. fasciatus distinctus* Péringuey and *G. fasciatus fasciatus* Chaudoir (as recognized by Basilewsky 1977) and that these two forms each possessed a consistent set of diagnostic features which suggested that they merited recognition as separate species. Continued study of museum specimens led to the conclusion that at least two valid species had likewise been “lumped” under each of the species names *G. ancora* Dejean and *G. cordiger* Dejean by Basilewsky (1977). In the sections that follow, I present a re-classification of the species in this species group, providing illustrations and a list of key diagnostic features for each of the valid, diagnosable species in the group.

Materials and Methods

This study is based on collections of adults of *Graphipterus* Latreille and allied genera in the following institutional collections: Field Museum of Natural History, Chicago, Illinois (FMNH); Kruger National Park Museum (Scientific Services), Skukuza, South Africa (KNPC); South African National Collection of Insects, Pretoria, South Africa (SANC); National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH); Transvaal Museum, Pretoria, South Africa (TMSA). The great majority of the specimens that I examined in the course of my studies have been authoritatively identified by the late P. Basilewsky, who studied this genus for many years and published a comprehensive monograph which includes detailed information about the specimens in the collections that I examined (Basilewsky 1977).

It is worth noting that the male genitalia, which are an important source of diagnostic features in many lineages of Carabidae, do not provide diagnostic characters at the species level in the genus *Graphipterus* (Basilewsky 1977). Diagnoses of species in this genus are therefore based on combinations of surface sculpture, the proportions of the various body parts, the structure of the appendages including tibial spurs, and the dorsal vestiture. Groups of specimens which are substantially similar in these external characters and which were collected in more or less contiguous geographic areas are assumed to represent a single species (Basilewsky 1977).

Genus *Graphipterus* Latreille (1802: 83)

Type species *Anthia variegata* Fabricius (= *Graphipterus serator* Forskal), designated by Latreille (1810: 426).

Ancora species group

“Groupe ancora” Basilewsky (1977: 26–27, 67–97)

Diagnosis. Mid-sized to large-bodied (11–18 mm) members of the genus *Graphipterus* with contrasting areas of black pubescence and yellow, yellowish-grey, or orange pubescence on the head, pronotum, and elytra. The elytral pubescence is arranged in a series of transverse bands or patches, rather than the uniform pubescence or longitudinal bands which are present in other species of the genus. Most species in this group occur in southern Africa (Botswana, Lesotho, Mozambique, Namibia, Republic of South Africa, Swaziland, and Zimbabwe) although one species is found as far north as Malawi and Zambia. Seven species are currently recognized.

Key to species of the ancora species group

1. Elytra with a line of yellow pubescence along the entire length of the suture (Figure 4).....***G. fritschi* Chaudoir**
 – Elytra with dark pubescence along most of the suture **2**
- 2(1). Elytra with a dark line of black pubescence along suture, broadening out on the disc into a single large rounded, ovate, or rectangular patch of black pubescence (Figures 10–18); metatibiae with two simple arcuate spurs **3**
 – Elytral vestiture not as above; metatibiae with one arcuate and one spatulate spur at apex.. **4**
- 3(2). Dark patch of pubescence on elytra lobed or broadly rounded; basal band of yellow or orange pubescence on the elytra always with a triangular projection onto disc; linear band of dark pubescence on pronotal disc very wide, broader than half of the basal width of the pronotum ***G. cordiger* Dejean**
 – Dark patch of pubescence on elytra transverse, rectangular or nearly so; basal band of yellow or orange pubescence on the elytra always lacking a triangular projection onto disc; linear band of dark pubescence on pronotal disc narrow, usually less than half of the basal width of the pronotum except in specimens from KwaZulu/Natal Province, RSA, where this band is very wide (Figures 15–18) ***G. wahlbergi* Boheman**
- 4(2). Elytral vestiture on basal half composed of a dark oval or triangular patch of pubescence completely surrounded by lighter yellowish-grey, yellow, or orange pubescence (Figures 1–2) **5**
 – Elytral vestiture on basal half composed mostly of dark pubescence, with a band of pale pubescence along the lateral and basal margins and with a transverse or oblique band of pale pubescence at mid-elytron that extends from the lateral margin but does not attain suture (Figures 3, 5–9) **6**
- 5(4). Dark patch of pubescence on basal half of elytra elongate and more oval in shape (Figure 1); body size larger (13–18 mm); dorsal vestiture coarser ***G. ancora* Dejean**
 – Dark patch of pubescence on basal half of elytra broader, more triangular in shape (Figure 2); body size smaller (11–13 mm); dorsal vestiture fine ***G. distinctus* Péringuey**
- 6(4). Band of pale pubescence at mid-elytron oblique (Figures 5–9); body size larger (13–18 mm)..... ***G. westwoodi* Brême**
 – Band of pale pubescence at mid-elytron transverse (Figure 3); body size smaller (11–13 mm).. ***G. fasciatus* Chaudoir**

***Graphipterus ancora* Dejean**

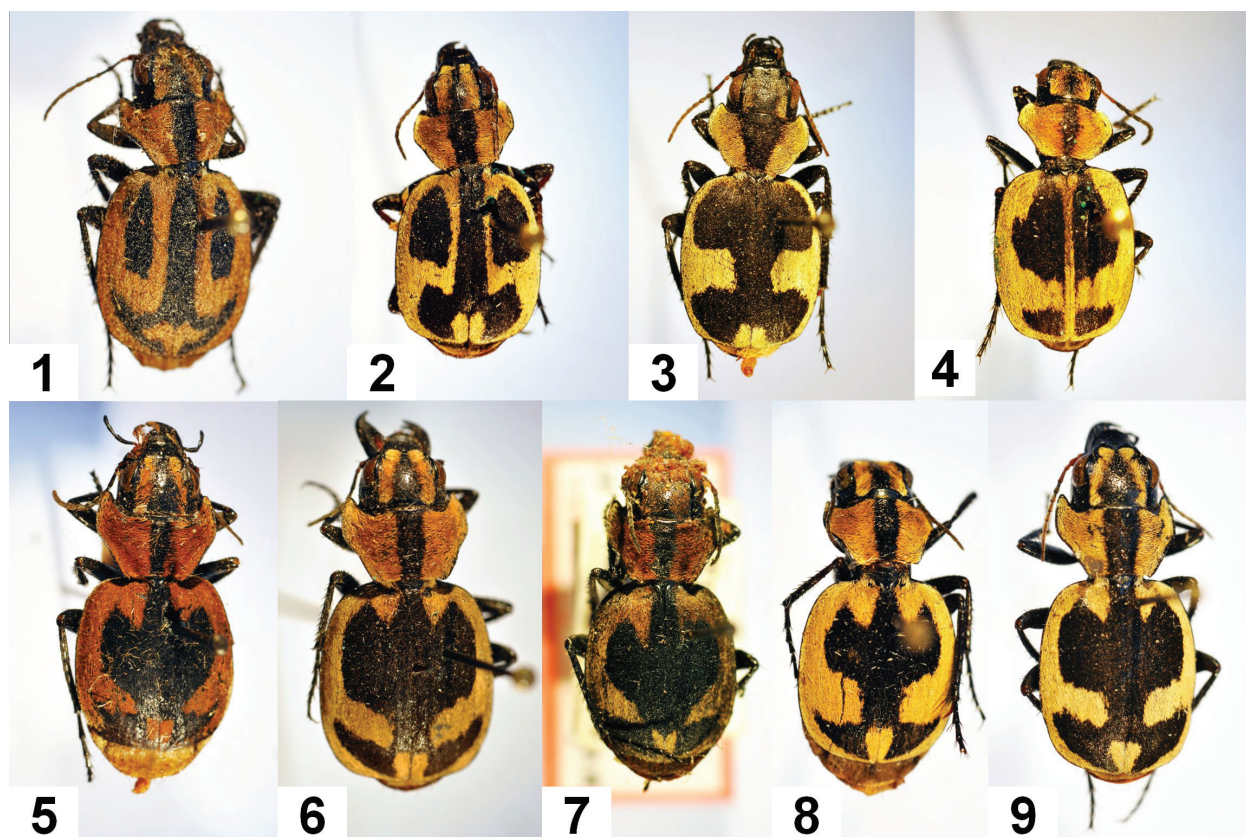
Figure 1

Graphipterus ancora Dejean (1831: 460) (Holotype, Cap de Bonne-Espérance, Muséum National d'Histoire Naturelle, Paris).

Graphipterus giganteus Chaudoir (1870: 323) (Holotype, Bords du lac N'Gami, Muséum National d'Histoire Naturelle, Paris).

Graphipterus ancora subgiganteus Basilewsky (1977: 67, 71) (Holotype, Cape Province, Vryburg, Musée Royale de l'Afrique Centrale)

Diagnosis. Large adults, length 13–18 mm. Pattern of elytral vestiture distinctive, with a narrow dark band of pubescence along the suture and extensive areas of yellowish-grey to orange pubescence which surround an oval patch of dark pubescence on the basal half of the elytra (Figure 1). The triangular patch of lighter pubescence along the suture at the very apex of the elytra is also diagnostic of many specimens from RSA (specimens from Botswana and Namibia often lack the patches of dark pubes-



Figures 1–9. Adult habitus images of specimens of species in the ancora species group, from the TMSA collection. Specimen identifications by P. Basilewsky are given in brackets after the current valid name for the specimen figured. **1)** *G. ancora* Dejean [*G. ancora ancora* Dejean], Hanover, Northern Cape Province, RSA. **2)** *G. distinctus* Péringuey [*G. fasciatus distinctus* Péringuey], Shilouvane, Limpopo Province, RSA. **3)** *G. fasciatus* Chaudoir [*G. fasciatus fasciatus* Chaudoir], Umfolozi, KwaZulu/Natal Province, RSA. **4)** *G. fritschi* Chaudoir, Pietersburg, Limpopo Province, RSA. **5)** *G. westwoodi* Brême [*G. ancora aurantiacus* Basilewsky], Bulawayo, Zimbabwe. **6)** *G. westwoodi* [*G. ancora egressus* Péringuey], Ohrigstad, Mpumalanga Province, RSA. **7)** *G. westwoodi* [*G. ancora subegregius* Basilewsky, paratype], Tuli District, Botswana. **8)** *G. westwoodi* [*G. ancora transitans* Péringuey], Metsimaklaba, Botswana. **9)** *G. westwoodi* [*G. ancora westwoodi* Brême], Swartruggens Marico, North West Province, RSA.

cence on the apical half of the elytra). Adults can be separated from *G. westwoodi* by the differences in elytral pubescence patterns (compare Figure 1 with Figures 5–9) and by the somewhat coarser elytral vestiture. Adults can also be separated from *G. distinctus* (Figure 2) by the much larger body size and by the coarser elytral vestiture.

Distribution. Botswana, Lesotho, Namibia, Republic of South Africa (Eastern Cape, Free State, Northern Cape, North West Provinces). For a list of collecting localities see Basilewsky (1977: 71–72).

Taxonomic Notes. I tentatively include *G. giganteus* and *G. ancora subgiganteus* with this species, based on the overall similarity in elytral vestiture among the three forms, especially the similar large oval patch of dark pubescence on the base of the elytra (see Basilewsky 1977: 70). The few specimens known of *G. giganteus* and *G. ancora subgiganteus* have much more extensive areas of pale pubescence on the apical half of the elytra than the nominate form. It is possible that these forms will ultimately be found to represent one or more separate species. Further material is needed to resolve the status of these two forms, which are known collectively from a total of nine specimens (Basilewsky 1977: 71).

***Graphipterus cordiger* Dejean**

Figures 10–14

Graphipterus cordiger (Dejean 1831: 461) (Holotype, Cap de Bonne-Espérance, Muséum National d'Histoire Naturelle, Paris).

Graphipterus hamatus Boheman (1848: 81) (Holotype, in Caffraria interiore, Naturhistoriska Riksmuseet, Stockholm).

Graphipterus zambezius Péringuey (1892: 99) (Holotype, Near Zambezi River, South African Museum).

Graphipterus cordiger subcordiger Basilewsky (1977: 76, 81-82) (Holotype, South West Africa, Farm Neitsas, bez. Grootfontein, Musée Royal de l'Afrique Centrale).

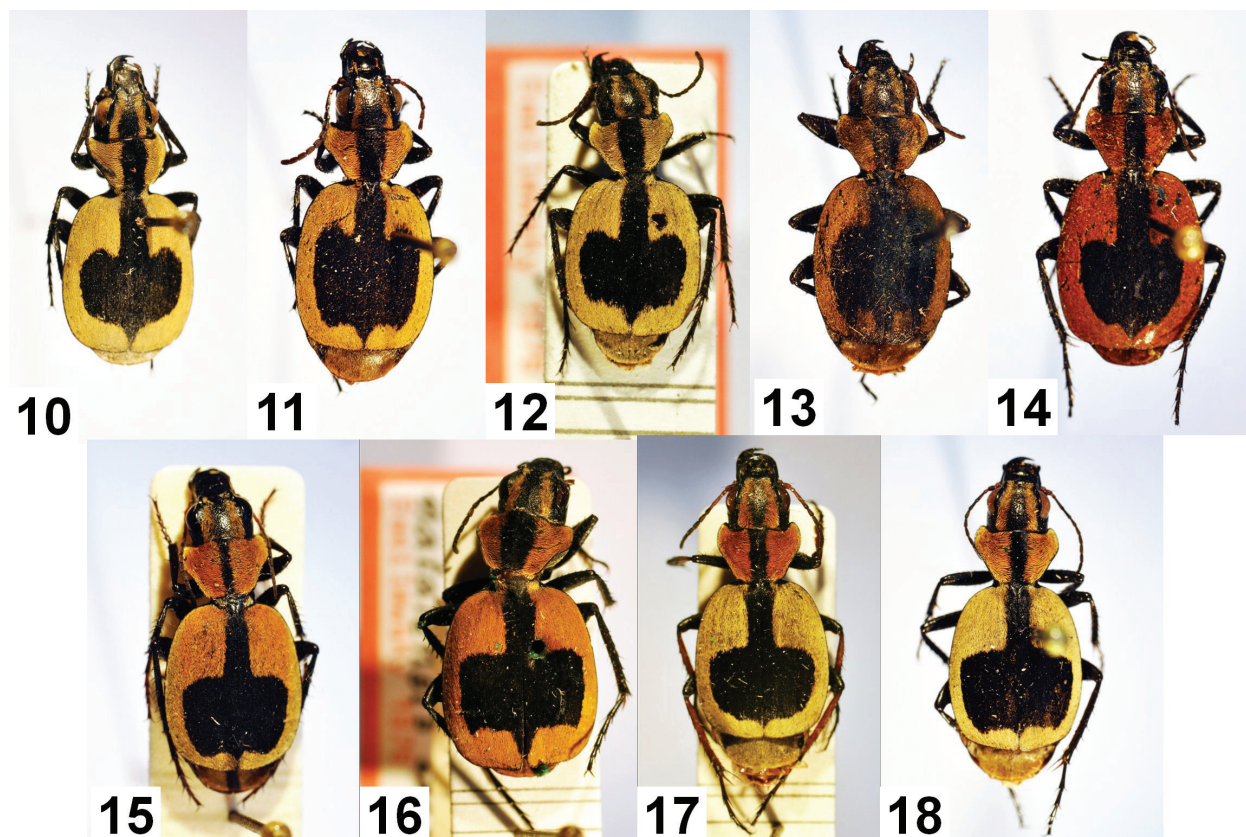
Graphipterus cordiger subhamatus Basilewsky (1977: 76-77, 84) (Holotype, Natal, Port Natal, Zoologisches Museum der Humboldt-Universität, Berlin).

Diagnosis. Smaller adults, length 11–15 mm. Pattern of elytral vestiture distinctive (Figures 10–14), with contrasting patches of yellowish-grey and black pubescence, the latter forming a narrow band along suture and a single broad, rounded lobe-like patch extending onto the disc but not attaining the lateral margin. The basal band of lighter pubescence has a distinct triangular projection onto the disc. The color of the lighter pubescence ranges from yellowish-grey to orange. This is also one of the few species of *Graphipterus* in which the second metatibial spur is arcuate and not spatulate (Basilewsky 1977). The shape of the patches of dark setae and the coloration of the lighter setae varies between populations and was used by Burgeon (1929) and Basilewsky (1977) as the basis for recognizing subspecific taxa.

Distribution. Botswana, Lesotho, Malawi, Mozambique, Namibia, Republic of South Africa (Eastern Cape, Free State, Gauteng, KwaZulu/Natal, Northern Cape, North West, and Western Cape Provinces), Zambia, Zimbabwe. For a list of collecting localities see Basilewsky (1977: 80-87).

Taxonomic Notes. The names listed above in synonymy (as well as many of the taxa listed under *G. wahlbergi* below) were generally considered valid species before Burgeon (1929) placed them as subspecies under *G. cordiger*. Basilewsky (1977) treated all of the names that I have included here under the species *G. cordiger* and *G. wahlbergi* as subspecies of a single polytypic species, which he called *G. cordiger* by priority. This approach is problematic, as there are clear areas of overlap between many of the alleged subspecific forms (e.g. between *G. c. betshuana* and *G. c. subhamatus*, between *G. c. betshuana* and *G. c. zambezius*, and between *G. c. hamatus* and *G. c. transfugus*), and these overlapping populations generally lack intergrade forms (Basilewsky 1977). Furthermore, several pairs of putative subspecies (*G. c. cordiger* and *G. c. subcordiger*, *G. c. hamatus* and *G. c. subhamatus*, *G. c. betshuana* and *G. c. wahlbergi*) have identical patterns of elytral pubescence and can be separated only by collecting locality (Basilewsky 1977). Having examined extensive collections of this species in the museum collections listed above, I came to the conclusion that at least two separate species are present. One species has a large rounded patch of dark pubescence on the elytra, and a triangular projection on disc associated with the basal band of light pubescence. The other species has a more transverse, often rectangular band of dark pubescence on the elytra, and consistently lacks the triangular projection from the basal band of light pubescence. By priority, these two species are named *G. cordiger* and *G. wahlbergi*, respectively. Recognition of two separate species resolves the problems associated with overlapping subspecies, since the observed areas of overlap are always between forms with a rounded patch of dark pubescence and forms with a transverse band of dark pubescence. The subspecific taxa with identical markings can be interpreted as disjunct populations of either *G. cordiger* (in the case of *G. c. cordiger* and *G. c. subcordiger* and in the case of *G. c. hamatus* and *G. c. subhamatus*) or *G. wahlbergi* (in the case of *G. c. betshuana* and *G. c. wahlbergi*).

Graphipterus cordiger as restricted here is generally distributed throughout the southern and central provinces of the Republic of South Africa, with populations also in central Namibia, central Zimbabwe, southern Zambia, northern Mozambique, and Malawi. For a full synonymy for this species, see Basilewsky (1977: 76–77).



Figures 10–18. Adult habitus images of specimens of species in the ancora species group, from the TMSA collection. Specimen identifications by P. Basilewsky are given in brackets after the current valid name for the specimen figured. **10)** *G. cordiger* [*G. cordiger cordiger* Dejean], Gideon's Kraal Farm, 30.38 S, 25.34 E, Northern Cape Province, RSA. **11)** *G. cordiger* [*G. cordiger hamatus* Boheman], nr. Hartbeespoort Dam, North West Province, RSA. **12)** *G. cordiger* [*G. cordiger subcordiger* Basilewsky, paratype], Swakopmund, Namibia. **13)** *G. cordiger* [*G. cordiger subhamatus* Basilewsky, paratype], Thornybush, Limpopo Province, RSA. **14)** *G. cordiger* [*G. cordiger zambeziensis* Péringuey], Salisbury, Mashonaland (modern-day Harare, Zimbabwe). **15)** *G. wahlbergi* [*G. cordiger betshuana* Burgeon], Grootdraai, Mpumalanga Province, RSA. **16)** *G. wahlbergi* [*G. cordiger natalicus* Basilewsky, paratype], "Natal," KwaZulu/Natal Province, RSA. **17)** *G. wahlbergi* [*G. cordiger transfugus* Péringuey], Nylsvley, Limpopo Province, RSA. **18)** *G. wahlbergi* [*G. cordiger wahlbergi* Boheman], Ohrigstad, Mpumalanga Province, RSA.

Graphipterus distinctus Péringuey, new status

Figure 2

Graphipterus distinctus Péringuey (1898: 340) (Holotype, Transvaal, Lydenburg District, South African Museum).

Diagnosis. Smaller adults, length 11–13 mm. Pattern of elytral vestiture distinctive (Figure 2), with the elytra covered in contrasting black and yellowish-grey pubescence. Basal half of elytron with a black linear band of pubescence along suture and a triangular patch of black pubescence completely surrounded by yellowish-grey pubescence; apical half of elytron predominantly covered in black pubescence but with a small ovate patch of yellowish-grey pubescence along the suture at apex, an angled median band of yellowish-grey pubescence which is contiguous with the patches of yellowish-grey pubescence on the basal half, and a narrow lateral band of yellowish-grey pubescence which connects the apical and median patches of yellowish-grey pubescence. The pronotal vestiture is likewise distinctive in that the median longitudinal band of black pubescence is more or less equal in width from base to apex. The shape of the patches of pubescence will readily separate individuals of this species from those of

G. fasciatus, which has much more extensive areas of black pubescence on the elytra, and in which the median longitudinal band of dark pubescence on the pronotum becomes distinctly wider from base to apex (Figure 2). Small adults of *G. ancora* are also similar but that species is generally larger in body size (length 13–18 mm) and the elytral vestiture is coarser and more irregular (Figure 1).

Distribution. Mozambique, Republic of South Africa (Limpopo and Mpumalanga Provinces), Swaziland. For a list of collecting localities see Basilewsky (1977: 93).

Taxonomic Notes. This species was considered a subspecies of *G. fasciatus* by Burgeon (1929) and Basilewsky (1977) but the lack of any intergrade specimens between these two rather distinctive forms suggests that two separate species are indicated.

Graphipterus fasciatus Chaudoir

Figure 3

Graphipterus fasciatus Chaudoir (1870: 323) (Holotype, Caffrerie, Muséum National d'Histoire Naturelle, Paris).

Diagnosis. Smaller adults, length 11–13 mm. Pattern of elytral vestiture distinctive (Figure 3), with the elytra covered mostly in black pubescence except for a median transverse band of yellow-grey pubescence (which does not attain the suture), an oval apical spot of yellow-grey pubescence along the suture on the apical fifth of the elytra, and a lateral border of yellow-grey pubescence which connects the median and apical spots and extends along the lateral margin to the base of the elytra. The pattern of pronotal pubescence is also diagnostic, with the median longitudinal band of dark pubescence becoming distinctly wider from the base to the apex of the pronotum (Figure 3). The shape of the patches of pubescence will readily separate individuals of this species from those of *G. distinctus*, in which there is an additional longitudinal band of yellowish grey setae paralleling the suture, and in which the median longitudinal band of dark pubescence on the pronotum is more or less uniform in width from base to apex (Figure 2). Small adults of *G. westwoodi* are also similar, but in that species the median yellowish-grey band of pubescence is more oblique and less transverse and the basal band of yellowish-grey setae has a distinct triangular projection extending onto the elytral disc (Figures 5–9).

Distribution. Republic of South Africa (KwaZulu/Natal and Mpumalanga Provinces), Swaziland. For a list of collecting localities see Basilewsky (1977: 90).

Taxonomic Notes. As discussed above under *G. distinctus*, this species and *G. distinctus* were treated as subspecies of the polytypic species *G. fasciatus* by Burgeon (1929) and Basilewsky (1977). I have examined the material of this species in NMNH, SANC, and TMSA, as well as recently collected material from the Kruger National Park, and have failed to find specimens with pronotal and elytral setal patterns that could be considered intermediate between *G. distinctus* (Figure 2) and *G. fasciatus* (Figure 3). This lack of intermediate forms suggests that two distinct species are involved.

Graphipterus fritschi Chaudoir

Figure 4

Graphipterus fritschi Chaudoir (1883: 25) (Holotype, Bechuanaland, Bawankitsi, Muséum National d'Histoire Naturelle, Paris).

Diagnosis. Smaller adults, length 11–13 mm. Pattern of elytral vestiture distinctive (Figure 4), as this is the only species in the ancora group which has an unbroken line of yellowish-grey pubescence along the entire length of the elytral suture. The species also has a much narrower dark median line on the pronotum than most of the other species in this group, except for certain forms of *G. cordiger*.

Distribution. Botswana, Republic of South Africa (Free State, Limpopo, Northern Cape, and North West Provinces), Zimbabwe. For a list of collecting localities see Basilewsky (1977: 94-97).

***Graphipterus wahlbergi* Boheman, new status**

Figures 15–18

Graphipterus wahlbergi Boheman (1848: 60) (Holotype, in Caffraria interiore, Naturhistoriska Riksmuseet, Stockholm).

Graphipterus transfugus Péringuey (1896: 297, 324) (Holotype, Transvaal, Makapan, South African Museum).

Graphipterus cordiger betshuana Burgeon (1929: 294) (Holotype, Serue, Zoologisches Museum der Humboldt-Universität, Berlin).

Graphipterus cordiger natalicus Basilewsky (1977: 77, 87–88) (Holotype, Natal, Mfongosi, South African Museum).

Diagnosis. Smaller adults, length 11–15 mm. Pattern of elytral vestiture distinctive (Figures 15–18), with contrasting patches of yellowish-grey and black pubescence, the latter forming a narrow band along suture and a single broad transverse, nearly rectangular patch extending onto the disc but not attaining the lateral margin. The color of the lighter pubescence ranges from yellowish-grey to orange. This species has long been confused with *G. cordiger* and in fact was placed in synonymy with that species by Burgeon (1929) and Basilewsky (1977). In *G. cordiger*, however, the median elytral patch of dark pubescence is broadly rounded or lobed on the disc, and the anterior band of pale pubescence has a distinct triangular projection onto the disc (Figures 10–14). Along with *G. cordiger*, this is one of the few species of *Graphipterus* in which the second metatibial spur is arcuate and not spatulate (Basilewsky 1977). The shape of the patches of dark setae and the coloration of the lighter setae varies between populations and was used by Burgeon (1929) and Basilewsky (1977) as the basis for recognizing subspecific taxa.

Distribution. Botswana, Republic of South Africa (Gauteng, KwaZulu/Natal, Limpopo, Mpumalanga, Northern Cape, and North West Provinces), Swaziland, Zimbabwe. For a list of collecting localities see Basilewsky (1977: 82–88).

Taxonomic Notes. Burgeon (1929) and Basilewsky (1977) placed this species in synonymy with *G. cordiger* and Basilewsky (1977) recognized a total of nine subspecific taxa under that single polytypic species. Application of the polytypic species concept to this group of taxa is not straightforward, as shown by the fact that Basilewsky could only offer a partial key to subspecies (Basilewsky 1977: 78, 80) and a map (Basilewsky 1977: Carte 9) which shows clear areas of overlap between many of the alleged subspecific forms (e.g. between *G. c. betshuana* and *G. c. subhamatus*, between *G. c. betshuana* and *G. c. zambezius*, and between *G. c. hamatus* and *G. c. transfugus*). Furthermore, several pairs of putative subspecies have identical patterns of elytral pubescence and can be separated only by collecting locality (e.g. *G. c. cordiger* and *G. c. subcordiger*, *G. c. hamatus* and *G. c. subhamatus*, *G. c. betshuana* and *G. c. wahlbergi*; Basilewsky 1977). As discussed above under *G. cordiger*, many of these difficulties can be resolved by dividing this single polytypic taxon into two distinct species, one with a rounded, lobe-shaped median patch of pubescence on the elytra, the other with a transverse, rectangular median patch of pubescence on the elytra. The observed areas of overlap between the subspecies always involve a form with a lobe-shaped pubescence patch on the elytra (*G. c. subhamatus*, *G. c. zambezius*, *G. c. hamatus*) and a form with a transverse pubescence patch on the elytra (*G. c. betshuana*, *G. c. transfugus*). The forms with identical patterns of pubescence can be interpreted as disjunct forms of either *G. cordiger* (in the case of *G. c. cordiger* and *G. c. subcordiger* and in the case of *G. c. hamatus* and *G. c. subhamatus*) or *G. wahlbergi* (in the case of *G. c. betshuana* and *G. c. wahlbergi*). It is possible that even more taxa will be split from *G. cordiger* and *G. wahlbergi* when additional material is available for study and the boundaries between the different geographic forms are studied in more detail.

Graphipterus wahlbergi is generally distributed throughout the central and northern portions of the Republic of South Africa, where it can be locally abundant (Basilewsky 1977: 82). Populations of this species extend into adjacent portions of Botswana and Zimbabwe (Basilewsky 1977: Carte 9). For a full synonymy for this species, see Basilewsky (1977: 76–77).

***Graphipterus westwoodi* Brême, new status**

Figures 5–9

Graphipterus westwoodi Brême (1844: 291, pl. 7 f. 10) (Holotype, Cap de Bonne-Espérance, Muséum-National d'Histoire Naturelle, Paris).

Graphipterus ancora var. *transitans* Péringuey (1896: 297, 320) (Holotype, Bechuanaland, South African National Collection).

Graphipterus egressus Péringuey (1896: 297, 322) (Holotype, Transvaal, Lydenburg District, South-African National Collection).

Graphipterus ancora herero Kuntzen (1919: 126, f. 6) (Holotype, Hereroland, Zoologisches Museum der Humboldt-Universität, Berlin).

Graphipterus ancora aurantiacus Basilewsky (1948: 108) (Holotype, Matabele, Naturhistoriska Riksmuseet, Stockholm).

Graphipterus ancora subegregius Basilewsky (1977: 69, 75) (Holotype, Betschuanaland, Zoologisches-Museum der Humboldt-Universität, Berlin).

Diagnosis. Large-bodied adults, length 13–18 mm. Pattern of elytral vestiture distinctive (Figures 5–9), composed of yellowish-grey to orange lighter setae and brownish-black darker setae in well-defined patterns, dark elytral setal fields extensive and contiguous, forming two lobes on the disc and lining the suture until apical fourth or fifth where there is a small oval or rectangular patch of lighter setae, the latter joined along the lateral margin to a large, transverse or slightly oblique median band of lighter setae and a small triangular patch of setae near the scutellum on disc. Easily separated from *G. ancora* (Figure 1) by the finer, less coarse elytral vestiture and by the lack of a band of lighter-colored setae on the basal half of the elytra which surrounds an oval patch of black setae (Figure 1).

Distribution. Botswana, Mozambique, Namibia, Republic of South Africa (Eastern Cape, Free State, Gauteng, KwaZulu/Natal, Limpopo, Mpumalanga, Northern Cape, and North West Provinces), and Zimbabwe. For a list of collecting localities see Basilewsky (1977: 72–76).

Taxonomic Notes. *Graphipterus westwoodi* and the taxa listed in synonymy above were considered subspecies of *G. ancora* by Basilewsky (1977). However, several characters consistently separate adults of *G. westwoodi* and its synonyms from adults of *G. ancora* and suggest that at least two species are involved. First, the specimens of *G. westwoodi* and synonyms tend to have finer setae in their elytral vestiture than do specimens of *G. ancora*. Second, *G. westwoodi* lacks the band of light setae paralleling the suture on the basal half of the elytra which is present in *G. ancora*. The basal half of the elytra in *G. westwoodi* always has a large lobe of dark pubescence (Figures 5–9) rather than an oval of dark pubescence surrounded by lighter pubescence as in *G. ancora* (Figure 1). Third, most *G. westwoodi* specimens have a small ovate or rectangular patch of lighter setae along the suture at the apex of the elytra (Figures 5–9) whereas in *G. ancora* this patch is typically larger and more distinctly triangular (Figure 1). Finally, the distributions of these two forms overlap to a minor degree in the Free State and North West Provinces (Basilewsky 1977, see Carte 8), and the lack of putative intergrade specimens suggests again that two separate species are involved.

The various taxa listed in synonymy above were all considered valid subspecies of *G. ancora* by Basilewsky (1977) but should be placed under *G. westwoodi* according to the classification adopted here. Specimens in NMNH and TMSA which were identified by Basilewsky as these subspecific taxa (e.g. Figures 5–9) are much more similar in appearance than would be judged from the illustrations and diagnoses in Basilewsky (1977). The only noticeable differences are found in the elytral vestiture, including minor differences in the shape of the dark patches and variation in the coloration of the

light setae which range from orange to yellow to yellowish-grey (see Figures 5–9). Based on this strong overall similarity, I infer that only a single species is involved. For a full synonymy for this species, see Basilewsky (1977: 67–69).

Discussion

The results of the study presented here suggest that it may be time for a broader re-evaluation of the genus *Graphipterus*, starting in particular with a review of the taxa recognized as subspecies by Burgeon (1929) and Basilewsky (1977). It is possible that many of these taxa will prove to be separate species, as is the case with *G. distinctus* and *G. fasciatus* discussed above, or synonyms of a single species, as is the case with the taxa that have been placed in synonymy with *G. westwoodi* above. Further field collections are still needed in certain cases, for example to collect additional individuals from the Botswana and Namibia populations of *G. ancora* in order to clarify the status of *G. giganteus* and *G. ancora subgiganteus*. Better sampling of existing populations and a more robust geographical analysis of variation, using Geographic Information Systems software and spatial statistical analysis, is needed to analyze the patterns of inter-population variation in taxa such as *G. cordiger* and *G. wahlbergi*. It is hoped that this modest contribution will inspire further research into the taxonomy, biology, and phylogenetic relationships of this fascinating group of beetles.

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