

A journal of world insect systematics

INSECTA MUNDI

0932

A new species and new records for two
other exotic species of *Dirrhagofarsus* Fleutiaux, 1935
(Coleoptera: Eucnemidae: Melasinae: Dirhagini)
in the United States

Robert L. Otto

W4806 Chrissie Circle, Shawano, WI 54166, USA

Date of issue: April 29, 2022

Center for Systematic Entomology, Inc., Gainesville, FL

Otto RL. 2022. A new species and new records for two other exotic species of *Dirrhagofarsus* Fleutiaux, 1935 (Coleoptera: Eucnemidae: Melasinae: Dirrhagini) in the United States. *Insecta Mundi* 0932: 1–15.

Published on April 29, 2022 by
Center for Systematic Entomology, Inc.
P.O. Box 141874
Gainesville, FL 32614-1874 USA
<http://centerforsystematicentomology.org/>

INSECTA MUNDI is a journal primarily devoted to insect systematics, but articles can be published on any non-marine arthropod. Topics considered for publication include systematics, taxonomy, nomenclature, checklists, faunal works, and natural history. *Insecta Mundi* will not consider works in the applied sciences (i.e. medical entomology, pest control research, etc.), and no longer publishes book reviews or editorials. *Insecta Mundi* publishes original research or discoveries in an inexpensive and timely manner, distributing them free via open access on the internet on the date of publication.

Insecta Mundi is referenced or abstracted by several sources, including the Zoological Record and CAB Abstracts. *Insecta Mundi* is published irregularly throughout the year, with completed manuscripts assigned an individual number. Manuscripts must be peer reviewed prior to submission, after which they are reviewed by the editorial board to ensure quality. One author of each submitted manuscript must be a current member of the Center for Systematic Entomology.

Guidelines and requirements for the preparation of manuscripts are available on the *Insecta Mundi* website at <http://centerforsystematicentomology.org/insectamundi/>

Chief Editor: David Plotkin, insectamundi@gmail.com
Assistant Editor: Paul E. Skelley, insectamundi@gmail.com
Layout Editor: Robert G. Forsyth
Editorial Board: Davide Dal Pos, Oliver Keller, M. J. Paulsen
Founding Editors: Ross H. Arnett, Jr., J. H. Frank, Virendra Gupta, John B. Heppner, Lionel A. Stange, Michael C. Thomas, Robert E. Woodruff
Review Editors: Listed on the *Insecta Mundi* webpage

Printed copies (ISSN 0749-6737) annually deposited in libraries

Florida Department of Agriculture and Consumer Services, Gainesville, FL, USA
The Natural History Museum, London, UK
National Museum of Natural History, Smithsonian Institution, Washington, DC, USA
Zoological Institute of Russian Academy of Sciences, Saint-Petersburg, Russia

Electronic copies (Online ISSN 1942-1354) in PDF format

Archived digitally by Portico
Florida Virtual Campus: <http://purl.fcla.edu/fcla/insectamundi>
University of Nebraska-Lincoln, Digital Commons: <http://digitalcommons.unl.edu/insectamundi/>
Goethe-Universität, Frankfurt am Main: <http://nbn-resolving.de/urn/resolver.pl?urn:nbn:de:hebis:30:3-135240>

Copyright held by the author(s). This is an open access article distributed under the terms of the Creative Commons, Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited. <http://creativecommons.org/licenses/by-nc/3.0/>

A new species and new records for two
other exotic species of *Dirrhagofarsus* Fleutiaux, 1935
(Coleoptera: Eucnemidae: Melasinae: Dirhagini)
in the United States

Robert L. Otto

W4806 Chrissie Circle, Shawano, WI 54166, USA
tar1672@yahoo.co

🌐 <https://orcid.org/0000-0002-5679-4044>

Abstract. New records for a new species and other exotic *Dirrhagofarsus* Fleutiaux (Coleoptera: Eucnemidae: Melasinae: Dirhagini) species are reported from throughout much of the northeastern and southern areas of the United States. *Dirrhagofarsus brevis*, **new species**, is hereby described in this study. Two other exotic species, *Dirrhagofarsus modestus* (Fleutiaux) and *Dirrhagofarsus unicolor* (Hisamatsu), **new country records**, are redescribed and diagnosed as they were compared with other *Dirrhagofarsus* species present in the Nearctic region. All *Dirrhagofarsus* species in this study are imaged, highlighting essential character states to facilitate better diagnosis in conjunction to the new identification key provided in this study.

Key words. False click beetles, taxonomy, northeastern United States, southern United States, distribution, surveys.

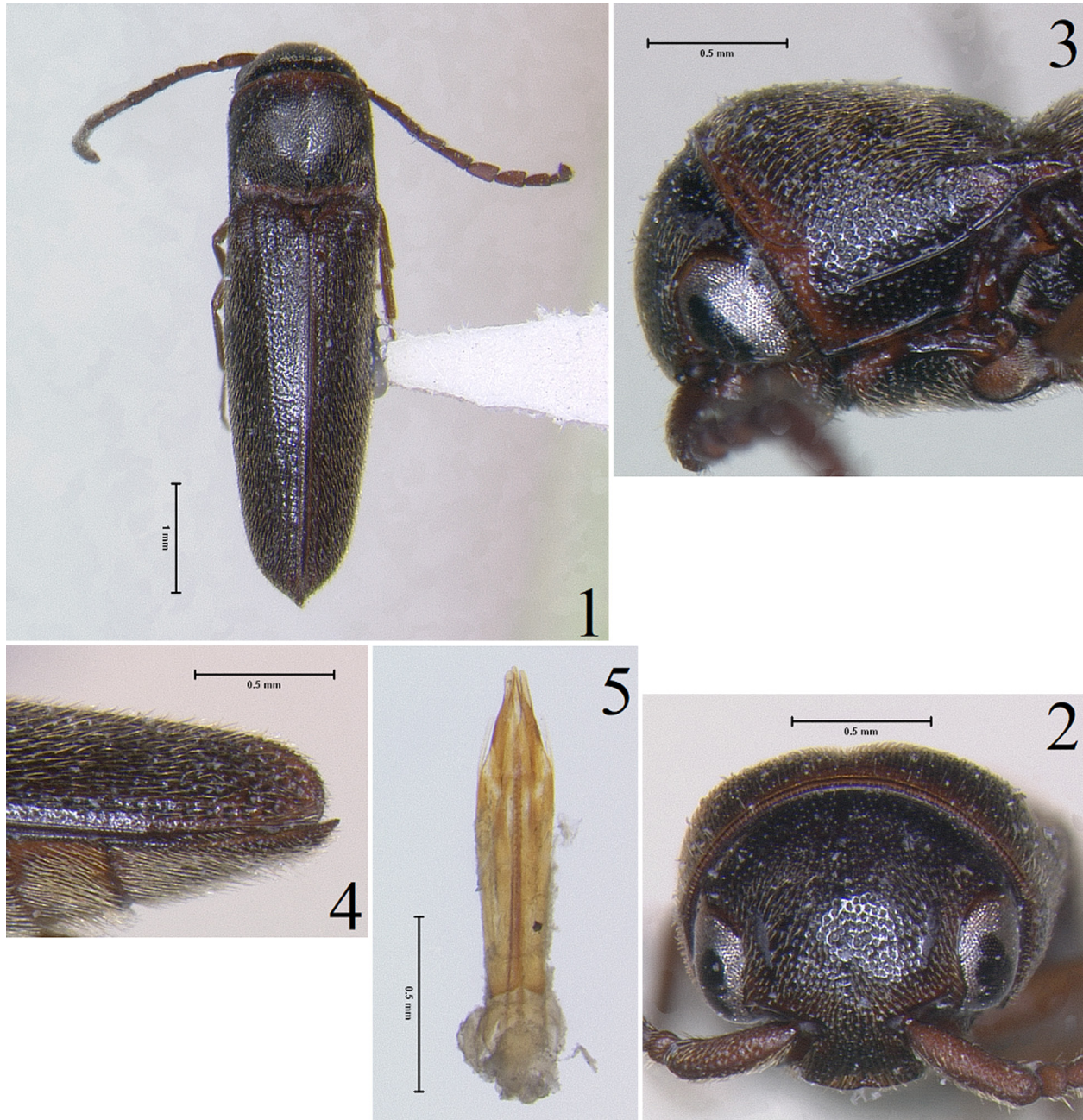
ZooBank registration. urn:lsid:zoobank.org:pub:24DCE05F-14CE-465B-AB11-A2F34012FAB6

Introduction

The onset of this study began when correspondence was received from Paul J. Johnson regarding questions on an unknown member of Eucnemidae he encountered while identifying elateroid beetles for the United States National Park Service in Virginia. The eucnemid was later identified as a member of *Dirrhagofarsus* Fleutiaux. Further investigations took place that included examining a number of *Dirrhagofarsus* specimens taken from the national bark beetle survey conducted by the United States Department of Agriculture which were loaned from the Carnegie Museum of Natural History. Additional specimens of the unknown *Dirrhagofarsus* were found intermixed within *Dirrhagofarsus ernae* Otto, Muona and McClarin, along with a series of a second unknown *Dirrhagofarsus* species. The two unknown *Dirrhagofarsus* species were later identified using Seung et al. (2018). The two unknown species matched the illustrations and were confirmed to be *Dirrhagofarsus modestus* (Fleutiaux) and *Dirrhagofarsus unicolor* (Hisamatsu), both of which are newly recorded in the United States. Virginia records for *D. modestus* were published by Johnson and Steury (2021), but are included in this study. *Dirrhagofarsus modestus* has been present in the United States at least a decade before specimens were identified.

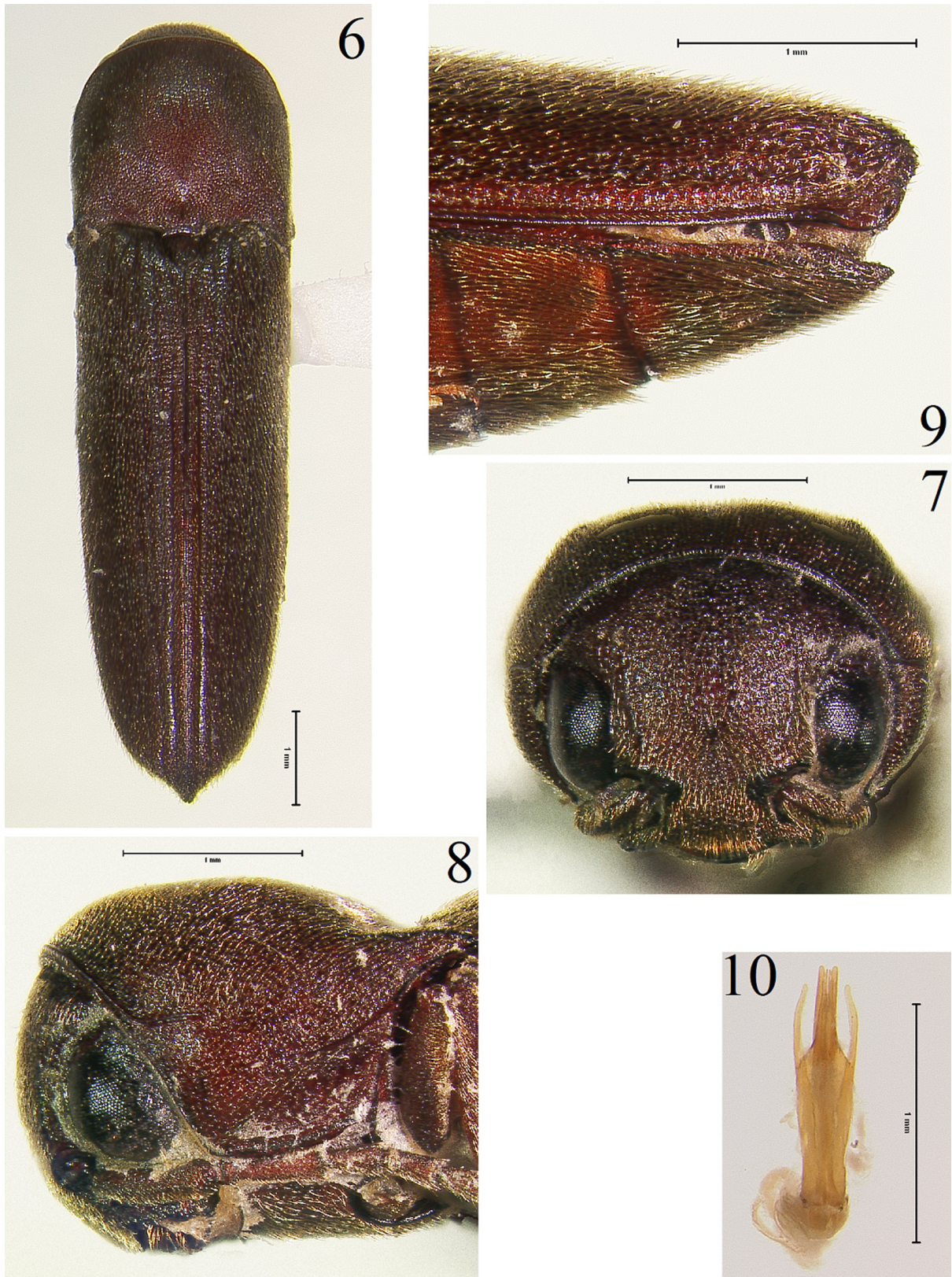
A third undetermined species was discovered after receiving some Eucnemidae from John Leavengood based on a series of eucnemids collected in Alabama and Florida. It was determined that series belongs to an undescribed species based on observed character traits which do not match with any of the other *Dirrhagofarsus* species present in the region. Additional specimens of the undescribed species include one specimen collected in Alabama and held at the Florida State Collection of Arthropods, and an additional specimen was taken from northeastern Wisconsin during a 2011 survey of the emerald ash borer beetle (Coleoptera: Buprestidae: *Agrilus planipennis* Fairmaire). This study adds three species of *Dirrhagofarsus* to the Nearctic region for a total of five species.

The genus *Dirrhagofarsus* is a small group of at least nine described species distributed largely in the Palearctic and Southeast Asian regions. *Dirrhagofarsus attenuatus* (Mäklin) is distributed throughout much of Eastern Europe. Muona in Otto et al. (2014) noted a species complex is present within *D. attenuatus*. *Dirrhagofarsus foveicollis* Otto is an endemic species in Laos. An undescribed species is also present in Laos and Vietnam (Otto, pers. obs.). *Dirrhagofarsus ernae* Otto, Muona and McClarin (Fig. 1–5) is widely distributed throughout much of eastern United States and it is believed the species was introduced from southeastern Asia into North



Figures 1–5. *Dirrhagofarsus ernae* Otto, Muona and McClarin. 1) Dorsal habitus. 2) Head, frontal view. 3) Pronotum, lateral view. 4) Elytral apices, lateral view. 5) Aedeagus, dorsal view. (Scale: 5 = 0.5 mm; 1–4 = 1.0 mm.)

America. *Dirrhagofarsus lewisi* (Fleutiaux) (Fig. 6–10) and *D. unicolor* are both present in Japan, South Korea, and the United States. *Dirrhagofarsus modestus* (Fleutiaux) is present in Japan, Russia's Far East region, South Korea, and the United States. *Dirrhagofarsus ferrugineus* (Reitter) is distributed in the Middle East, particularly Iran and Azerbaijan. Muona (per. comm.) encountered one undescribed species from Southeast Asia. Lastly, the new species has been largely taken from the Gulf Coast region in the southern United States with a single record in Wisconsin.



Figures 6–10. *Dirrhagofarsus lewisi* (Fleutiaux). **6)** Dorsal habitus. **7)** Head, frontal view. **8)** Pronotum, lateral view. **9)** Elytral apices, lateral view. **10)** Aedeagus, dorsal view. (Scale: 6–10 = 1.0 mm.)

Materials and Methods

Specimens were examined through a Wild M3C 6.4–40× zoom stereo binocular microscope with 20x oculars. Habitus images were taken with a JVC KY-F75U digital camera attached to a Leica® Z16 APO dissecting microscope with apochromatic zoom objective and motor focus drive, using a Synchroscope Auto-Montage® Pro System and software version 5.01.0005, resulting image stacks were processed using CombineZP®. All images were captured as TIFF files during the imaging process. Each image was modified through a paint program and Photoshop® Elements 10® software on a Toshiba Satellite® C55 series laptop computer and all were collated into plates through the computer's paint program. Size of each plate was modified to 300 dpi.

Adult measurements were taken using a ruler at 0.1 mm increments. Habitus length was measured from the apex of the head to the apex of the elytra. Habitus width was measured across the humeri, just below the base of the pronotum. Pronotal lengths were measured across the middle from the apex to the base above the scutellar shield. Pronotal widths were measured across the base of the pronotum above the elytral humeri.

Aedeagi were dissected following immersion of the sectioned abdomen in a KOH solution for three hours at a concentration of one KOH tablet in 40 ml of water. Aedeagi were suspended in Germ-X® hand-sanitizer for imaging. The abdomen was secured on cardstock and pinned beneath the corresponding specimen. The dissected aedeagus was stored in a microvial filled with glycerin and pinned beneath the abdomen and corresponding specimen.

Label data for all specimens are presented verbatim, with text for each individual label placed inside quotation marks and separated from an underlying label by a slash (/). Each line on an individual label is separated by a semicolon (;). Observed metadata for some labels are placed inside parenthesis and/or brackets. Each specimen deposited in the collection of the Global Eucnemid Research Project (GERP) bears a green framed white label, "Collection of the Global, Eucnemid Research Project, (Robert L. Otto)".

The study was based on the examination of 180 dry mounted and pinned specimens from a small number of collections as noted below:

BCIC Broward College Insect Collection, Fort Lauderdale, FL

CMNH Carnegie Museum of Natural History, Pittsburgh, PA

FSCA Florida State Collection of Arthropods, Gainesville, FL

GERP Global Eucnemid Research Project, UW-Madison, Dept. Entomology, Madison, WI

GWMP National Park Service, Turkey Run Park Headquarters, McLean, VA

JMC Jyrki Muona Collection, University of Helsinki, Helsinki, Finland

KESC Kyle E. Schnepf Collection, Gainesville, FL

Systematics

Subfamily Melasinae Fleming, 1821

Tribe Dirhagini Reitter, 1911

Genus *Dirrhagofarsus* Fleutiaux, 1935

(= *Attenuorhagus* Olexa, 1975)

Diagnosis. Apical margin of frontoclypeal region fairly evenly rounded and more than twice as wide as the distance between antennal sockets; vertex with transverse rows of dense setae; frons with pair of longitudinal carinae near compound eyes; hypomeron with notosternal antennal grooves; serrate antennae; male protarsomere I simple, without sex combs; metacoxal plates medially 3.0–6.0 times wider than laterally; last visible ventrite produced; simple tarsal claws; lateral surfaces of mesothoracic and metathoracic tibiae with setae only; male aedeagus dorsoventrally compressed; with secondary lateral lobes; lateral lobes simple, apices directed medially; median lobe simple, deeply and widely bifurcate apically; flagellum complex and tubular (Otto 2016; Seung et al. 2018).

Key to the species of *Dirrhagofarsus* in the Nearctic region

1. Elytra with simple apices at lateral view 2
- Elytra with convex, protruding apices at lateral view *D. lewisi* (Fleutiaux)
2. Frons with pair of strongly-developed longitudinal carinae near compound eyes; microcombs present on longitudinal carinae (Fig. 11) 3
- Frons with pair of poorly-developed longitudinal carinae near compound eyes; microcombs absent on longitudinal carinae (Fig. 12) *D. unicolor* (Hisamatsu)
3. Longitudinal carinae positioned a distance of six eye facets from the compound eyes (Fig. 13) 4
- Longitudinal carinae positioned a distance of three eye facets from the compound eyes (Fig. 14)
- *D. brevis* Otto, sp. nov.
4. Elytral striae largely absent but present only at humeri and apices; frons without medio-longitudinal carina *D. ernae* Otto, Muona and McClarin
- Elytral striae indistinctly indicated throughout; frons with variably weak medio-longitudinal carina
- *D. modestus* (Fleutiaux)

***Dirrhagofarsus brevis* Otto, new species**

Fig. 15–20

Differential diagnosis. Simple elytral apices (Fig. 15) as viewed laterally will distinguish *D. brevis* new species from *D. lewisi*. Presence of well-developed longitudinal carinae on the frons near the compound eyes will further distinguish the new eucnemid species from *D. unicolor*. The new species is very similar to *D. ernae* and *D. modestus* and can be distinguished by the longitudinal carinae positioned much closer to the compound eyes (Fig. 14). Longitudinal carinae are positioned further away from the compound eyes in both *D. ernae* and *D. modestus* (Fig. 13).

Type material. Male holotype: “FLORIDA: Suwannee Co.; Suwannee River State Park; BLT 30.389079, -83.168807; by creek trail 19–20-VI-2020; coll: J.M. Leavengood, Jr.” / “HOLOTYPE;; *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2020” (red printed label); **Female allotype:** “ALABAMA: Winston County; Bankhead National Forest, south; of jet Slick Ford Rd & Big Bear; Branch Rd, blacklight; N34°04.707" W87°16.991"; Coll:



Figures 11–14. *Dirrhagofarsus* species, frontal carina. **11)** *Dirrhagofarsus modestus* (Fleutiaux). **12)** *Dirrhagofarsus unicolor* (Hisamatsu). **13)** *Dirrhagofarsus ernae* Otto, Muona and McClarin. **14)** *Dirrhagofarsus brevis* Otto, new species.



Figures 15–20. *Dirrhagofarsus brevis* Otto new species. 15) Male holotype, elytral apices, lateral view. 16) Male holotype, dorsal habitus. 17) Male holotype, head, frontal view. 18) Male holotype, pronotum, lateral view. 19) Female allotype, dorsal habitus. 20) Male paratype, aedeagus, dorsal view. (Scale: 15–20 = 1.0 mm.)

J.M. Leavengood, Jr. & E.G. Chapman 14-VIII-2020” / “**ALLOTYPE**;; *Dirrhagofarsus; brevis* ♀; Otto; Det. R.L. Otto; 2020” (yellow printed label). Holotype and allotype are deposited in FSCA.

Paratypes. 6 ♀♀, 21 ♂♂: **UNITED STATES: ALABAMA:** 1 ♂, “USA: Alabama: Blount; Co.; Highland Lake; 15.vii – 2.viii.2011; BLT; Col. T. King” / “*Dirrhagofarsus; ernae*; Otto, Muona & McClarin; Det. R.L. Otto; 2017” (folded; “17” handwritten on label) / “**PARATYPE:** *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2020” (yellow printed label) (FSCA); 1 ♂, “**ALABAMA: Winston Co.:** Bankhead Nat’l For., Reserve Rd.; off Big

Bear Branch Rd, BLT; S 34.074288° W 87.285412°; Coll. JM Leavengood, Jr. & EG Chapman 9-14-VIII-2020" / "PARATYPE: *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2020" (yellow printed label) (FSCA); 11 ♂♂, "ALABAMA: Winston County; Bankhead Nat'l For., Reserve Rd.; off Big Bear Branch Rd, BLT; S 34.074288° W 87.285412°; Coll. JM Leavengood, Jr. & EG Chapman 9-14-VIII-2020" / "PARATYPE: *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2021" (yellow printed label) (10, BCIC; 1, JMC); 1 ♀, 1 ♂, "ALABAMA: Winston County; Bankhead National Forest, off; Big Bear Branch Rd, blacklight; N34°04.382" W87°16.255"; Coll. J.M. Leavengood, Jr. & E.G. Chapman 10-VIII-2020" / "PARATYPE: *Dirrhagofarsus; brevis* ♂ (or ♀); Otto; Det. R.L. Otto; 2020" (yellow printed label) (FSCA); 4 ♀♀, "ALABAMA: Winston County; Bankhead National Forest, south; of jet Slick Ford Rd & Big Bear; Branch Rd, blacklight; N34°04.707" W87°16.991"; Coll. J.M. Leavengood, Jr. & E.G. Chapman 11-VIII-2020" / "PARATYPE: *Dirrhagofarsus; brevis* ♀; Otto; Det. R.L. Otto; 2020" (yellow printed label) (1, FSCA; 3, GERP); 2 ♂♂, "ALABAMA: Winston County; Bankhead National Forest, off; Slick Ford Rd, blacklight; N34°04.319" W87°14.176"; Coll. J.M. Leavengood, Jr. & E.G. Chapman 13-VIII-2020" / "PARATYPE: *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2020" (yellow printed label) (FSCA); 1 ♀, "ALABAMA: Winston County; Bankhead National Forest, south; of jet Slick Ford Rd & Big Bear; Branch Rd, blacklight; N34°04.707" W87°16.991"; Coll. J.M. Leavengood, Jr. & E.G. Chapman 14-VIII-2020" / "PARATYPE: *Dirrhagofarsus; brevis* ♀; Otto; Det. R.L. Otto; 2020" (yellow printed label) (FSCA); FLORIDA: 3 ♂♂, [same as holotype] / "PARATYPE: *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2020" (yellow printed label) (1, BCIC; 2, GERP); 1 ♂, "FLORIDA: Suwannee Co.; Suwannee River State Park; BLT 30.388145, -83.16873; nr. crk. brdg. 19-20-VI-2020; coll: J.M. Leavengood, Jr." / "PARATYPE: *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2020" (yellow printed label) (GERP); WISCONSIN: 1 ♂, "WI: Outagamie Co.; along State Highway 47; N44.33004°; W-088.41487°; EABT100072B; 20 July 2011; Robert L. Otto" / "Taken from EAB; prism trap baited; with Manuka oil; & Z3-Hexa-1-ol" / "PARATYPE: *Dirrhagofarsus; brevis* ♂; Otto; Det. R.L. Otto; 2020" (GERP). Paratypes are deposited in BCIC, FSCA, GERP and JMC.

Description. Male holotype: Length, 4.5 mm. Width, 1.0 mm. Body subcylindrical, elongate; dorsum uniformly brownish-black with infuscate very dark reddish margin of the pronotum and pronotal hind angles; scape very dark reddish-brown, pedicel brownish-black, flagellomeres I-IX brownish-black; legs including tarsi reddish-brown; head, pronotum and elytra clothed with short, recumbent yellowish setae (Fig. 16). **Head** (Fig. 17): Subspherical; integument closely punctate to rugose, dullish except the vertex; vertex with undulating, narrow belt of brownish-colored microcombs; vertex without setae; frons convex, with weak medio-longitudinal carina; pair of longitudinal carinae on frons near compound eyes well-developed, with brownish-colored microcombs; apical margin of frontoclypeal region rounded, about 2 times wider than base; mandibles stout, bidentate, densely punctate. **Antenna:** weakly serriform from flagellomeres I-IX, attaining at least $\frac{2}{3}$ the length of the body; flagellomere I longer than II; flagellomeres II-IX each sub-equal, longer than wide; flagellomere IX longer than VIII. **Pronotum:** integument somewhat dullish, closely punctate; slightly longer than wide, with moderate, sharp hind angles; lateral sides parallel-sided at basal $\frac{3}{4}$, arcuate anteriorly at apical $\frac{1}{4}$; disc convex with very shallow median impression; short basal medio-longitudinal carina present; base sinuous; anterolateral pronotal ridge (Fig. 18) extremely short, less than $\frac{1}{6}$ the length of the pronotum, directed posteroventrally; posterolateral pronotal ridge elongate, extending more than $\frac{3}{4}$ the length of pronotum. **Scutellar shield:** longer than wide, sub-triangular, shallowly punctate, setose and distally rounded. **Elytra:** distinctly striate at humeri and along elytral suture, absent elsewhere; interstices flattened; integument shiny, transversely rugose at basal $\frac{1}{4}$ and very closely punctate elsewhere; specialized punctures present along lateral sides and dorsum near elytral apices. **Legs:** first tarsomere as long as the combined lengths of the remaining four on meso- and metatarsi; tibiae rounded in cross section; metatarsomeres I-III simple; metatarsomere IV excavated, emarginate; metatarsomere V elongate with simple claws. **Venter:** closely punctate, with short, recumbent yellowish setae; hypomeron with notosternal antennal grooves; metepisterna parallel-sided; metacoxal plates medially 3.0-6.0 times wider than laterally; last abdominal ventrite apically produced.

Female allotype (Fig. 19): 5.0 mm long, 1.25 mm wide; habitus dark brown; antennae weakly serriform, about $\frac{1}{2}$ of body length; flagellomere I longer than II; flagellomere II quadrate, slightly shorter than flagellomere III; flagellomeres III-VIII each slightly longer than wide, sub-equal; flagellomere IX about 1.5 times longer than VIII; lateral sides of pronotum parallel-sided, apically arcuate, longer than wide.

Aedeagus (paratype) (Fig. 20): Basal piece longer than wide, spatulate, dorsally open, apically rounded; remaining parts elongate, basally narrow, laterally arcuate, widest medially; parameres very short, apically rounded, simple; secondary lateral lobes present, very short, shorter than lateral lobes; median lobe very short and basally broad, apically pointed, as long as the parameres.

Variations. Six female and 21 male paratypes were examined. Six female paratypes measured 5.0–5.5 mm long. All female paratypes measured 1.25 mm wide. Twenty-one male paratypes measured 3.5–5.0 mm long. All male paratypes measured 1.0 mm wide. All six female paratypes are longer than and wider than the holotype. Three male paratypes are slightly longer than and just as wide as the holotype. Nine male paratypes are as long as and just as wide as the holotype. Nine male paratypes are shorter than and just as wide as the holotype. Color variability are present amongst the series. Six males and six females are uniformly dark brown, likely attributed to its slightly teneral state at the time of collection. Two males possess dark reddish-brown antennae and is uniformly dark brownish-black. One male paratype possess dark brownish-black antennae and is also uniformly dark brownish-black without the deep dark infusate reddish coloration on the apical margin of the pronotum and pronotal hind angles compared with the holotype. Twelve male paratypes have uniformly reddish-brown antennae and are shiny dark brownish-black with an infusate reddish coloration of the apical margin of the pronotum. Nineteen male and six female paratypes each have a very delicate medio-longitudinal carina present on the frons. Two males lack the medio-longitudinal carina on the frons. No other exoskeletal differences were observed between the paratypes and the holotype.

Distribution. This species has been taken from five locales in Alabama, two locales within the same area in Florida and a single locale in northeastern Wisconsin.

Biology. Five adults were taken from a blacklight trap within a state park in Florida. Twenty-three adults were taken from a blacklight trap in Alabama. One adult was taken from a purple prism trap baited with Manuka oil and Z3-Hexa-1-ol in Wisconsin. Larvae and pupae are unknown.

Etymology. The specific epithet is derived from its very short anterolateral pronotal ridge present in the new species.

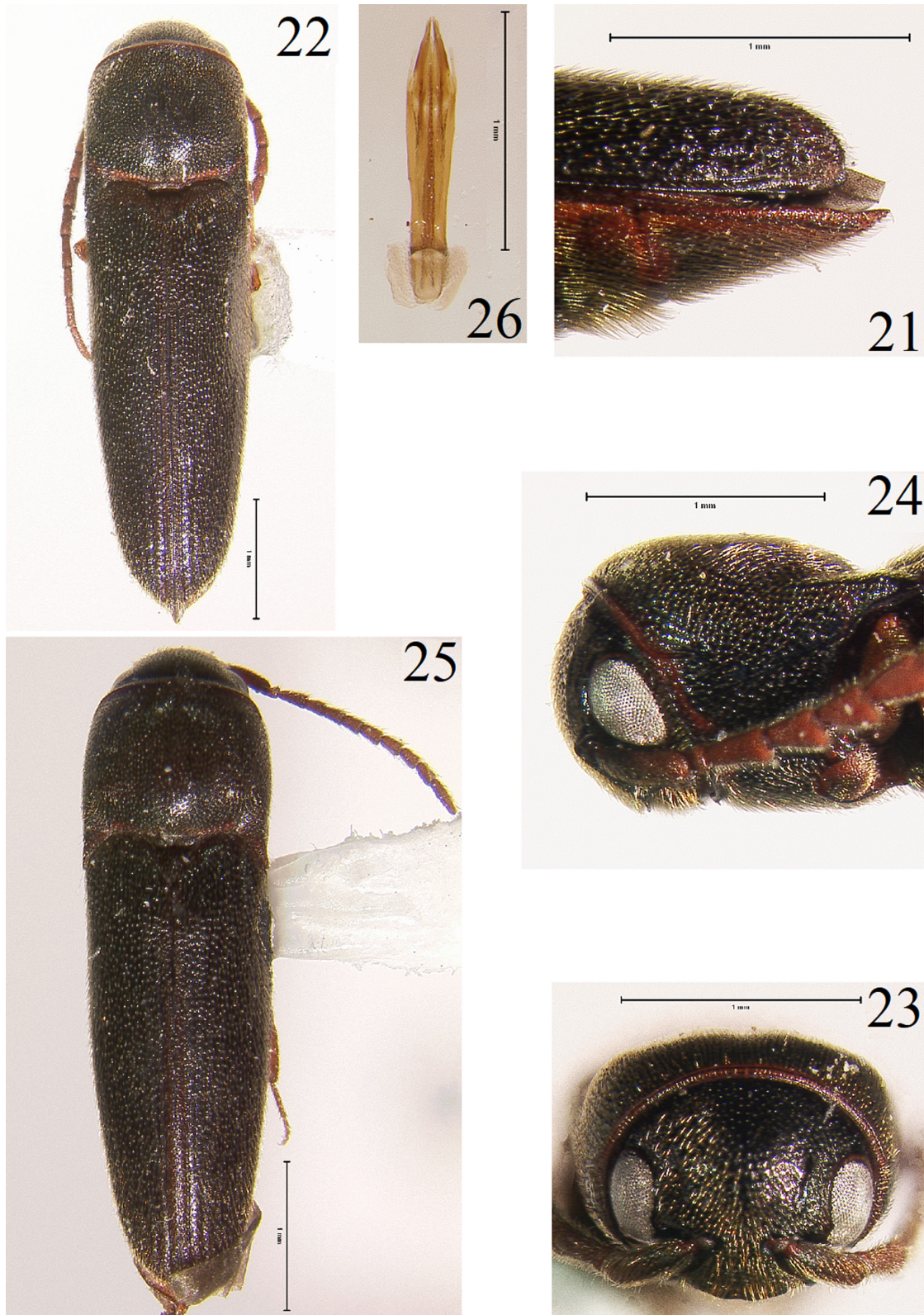
***Dirrhagofarsus modestus* (Fleutiaux, 1923)**

Fig. 21–30

Dirrhagofarsus modestus Fleutiaux 1923: 311–313

Diagnosis. Simple elytral apices (Fig. 21) as viewed laterally will distinguish *D. modestus* from *D. lewisi*. Presence of well-developed longitudinal carinae with microcombs on the frons will further distinguish the eucnemid species from *D. unicolor*. *Dirrhagofarsus modestus* is very similar to *D. brevis* **new species** and *D. ernae*. When compared with *D. brevis* **new species**, *D. modestus* has longitudinal carinae positioned further away from the compound eyes. The species can be distinguished from *D. ernae* by the presence of indistinct striae throughout the elytra and variably indicated medio-longitudinal carina on the frons.

Specimens examined. One hundred twenty-eight specimens were available for study: **CONNECTICUT:** “CONNECTICUT: New Haven; Co., 1.2 km NE Morgan; Point, 41.25376, –72.87708; 9m, 15–28 Jun 2018, LFT; K. Bjarnason, BSF# 79688” (1, CMNH); **FLORIDA:** “Florida: Suwannee Co.; 6.5 miles W White Springs; March 29, 2017 at light; Kyle E. Schnepf” (1, KESC); “Florida: Suwannee Co.; ~7 miles W White Springs; March 29–April 19, 2017; Lindgren funnel trap; Kyle E. Schnepf” (1, KESC); “Florida: Suwannee Co.; ~7 miles W White Springs; March 29–April 19, 2017; Lindgren funnel trap; Kyle E. Schnepf” / “*Dirrhagofarsus; ernae*; Otto; Muona & McClarin; Det. R.L. Otto; 2017” [folded] (1, KESC); “Florida: Suwannee Co.; ~7 miles W White Springs; May 16–June 20, 2017; Lindgren funnel trap; Kyle E. Schnepf” (1, KESC); **GEORGIA:** “Georgia: Long Co.; ~10 miles WNW Ludowici; July 22, 2116 at light; Kyle E. Schnepf” (1, KESC); “GEORGIA: Chatham Co.; 4.4km WNW Port Went-; worth, 32.16031, –81.20731; 5 m, 11–25 Apr 2018, LFT; R. Morgan, BSF# 78446” (1, CMNH); **INDIANA:** “Indiana: Montgomery Co.; Shades State Park; May 21–June 8, 2013; fermenting sugar trap; Kyle E. Schnepf” (1, KESC); **MAINE:** “MAINE: Aroostook Co.; 3.2km N Masardis, 175m; 46.53279, –68.36319; 25 Jun–10 Jul 2018, LFT; J. Bither, BSF# 81272” (1, CMNH); “MAINE: Aroostook Co.; 3.3 km N Masardis; 46.53279, –68.36319; 175m, 10–23 Jul 2018” / “black cross-vane panel; trap, J. Bither; BSF# 81309” (1, CMNH); “MAINE: Aroostook Co.; 3.2km N Masardis, 175 m; 46.53279, –68.36319; 23 Jul–7 Aug 2018, LFT; J. Bither, BSF# 81274” (1, CMNH);



Figures 21–26. *Dirrhagofarsus modestus* (Fleutiaux). 21) Elytral apices, lateral view. 22) Male, dorsal habitus. 23) Head, frontal view. 24) Pronotum, lateral view. 25) Female, dorsal habitus. 26) Aedeagus, dorsal view. (Scale: 21–26 = 1.0 mm.)

“MAINE: Somerset Co.; 7.1km SSE Solon, 181 m; 44.89562, -69.80982; 3–17 Aug 2018, K.Kimball; M.Smith, LFT, BSF#82015” (1, CMNH); “MAINE: Aroostook Co.; 3.2 km N Masardis; 46.53279, -68.36319; 174 m, 4–18 Sep 2019” / “black cross-vane; panel trap, J. Bither; BSF# 89419” (1, GERP); **MASSACHUSETTS**: “MASSACHUSETTS: Essex; Co., 0.9km WSW Salisbury; 42.839571, -70.870927; 12 m, 31 May–13 Jun 2018; J. Klein, LFT, BSF# 80400” (1, CMNH); “MASSACHUSETTS: Middle-; sex Co., 4.8km N Framingham; Center, 42.339856, -71.428893; 78 m, 6–19 Jun 2018; J. Klein, LFT, BSF#80405” (1, GERP); **NEW JERSEY**: “NEW JERSEY: Morris Co.; 2km SSE Netcong, 324m; 40.882025, -74.697199; 29 May–15 Jun 2018; K. Pinto, LFT, BSF#79375” (2, CMNH); **NEW YORK**: “NEW YORK: Franklin Co.; 8.2 km E of Hogansburg; 44.9771, -74.5593, 67 m; 29 Jul–14 Aug 2019, LFT; A. Johnson, BSF# 88001” (1, GERP); **OHIO**: “OHIO: Cuyahoga Co.; 4.2km SW Strongsville; 41.2857, -81.8681, 290m; 26 May–9 Jun 2018, LFT; N. Wright, BSF# 80119” (1, GERP); “OHIO: Seneca County; 2.4km SE Tiffin, 238m; 41.1051, -83.1516; 26 Jun–16 Jul 2018” / “cross-vane panel; trap, C. Poe; BSF# 82735” (1, CMNH); **RHODE ISLAND**: “RHODE ISLAND: Kent Co.; 3.3 km SSE of Centerville; 41.66816, -71.51265, 84m; 3–17 Jul 2018, LFT; K. DiVito, BSF# 87905” (1, CMNH); **VERMONT**: “VERMONT: Chittenden; Co., 2.1km NNE Burlington; 44.494596, -73.208362; 35 m, 13–27 Jul 2018; E. Inoue, LFT, BSF#80825” (1, CMNH); **VIRGINIA**: “VIRGINIA: Fairfax Co.; Turkey Run; 22.vi–6.vii.2006” (1, GWMP); “VIRGINIA: Fairfax Co.; Turkey Run west; 1–22.v.2008, B. Steury” (1, GWMP); “VIRGINIA: Fairfax Co.; Great Falls Swamp; 19–30.vi.2009; B. Steury” (1, GWMP); “VIRGINIA: Fairfax Co.; Little Hunting Creek; 5–19.v.2017, jar #2” (1, GWMP); “VIRGINIA: Rockbridge Co.; 1.5km NE Fairfield, 526m; 37.887858, -79.275894; 31 May–2 Jul 2018, LFT; D. Heltzel, BSF# 79609” (1, CMNH); “VIRGINIA: Fairfax Co.; Turkey Run; 18–30.vi.2018” (1, GWMP); **WEST VIRGINIA**: “WEST VIRGINIA: Raleigh; Co., 0.8km N Beckley; 37.78494, -81.19034, 697m; 7 Jun–5 Jul 2016, LFT; R. Hays, BSF# 70752” (1, CMNH); **WISCONSIN**: “WI: Outagamie Co.; along Spencer Road; N44.25813°; W-088.56426°; EABT100215B; 19 July 2011; Robert L. Otto” / “Taken from EAB; prism trap baited; with Manuka oil; & Z3-Hexa-1-ol” (2, GERP); “WI: Winnebago Co.; along State Highway 76; N44.24240°; W-088.54046°; EABT100245C; 19 July 2011; Robert L. Otto” / “Taken from EAB; prism trap baited; with Manuka oil; & Z3-Hexa-1-ol” (2, GERP); “WI: Oconto Co.; L. Gipp property; 6 mi. W. Suring; 17 March 2012; Robert L. Otto” / “Reared from larvae; in rotten *Populus*; stump on 9 May; 2012” (6, GERP); “WI: Oconto Co.; L. Gipp property; 6 mi. W. Suring; 17 March 2012; Robert L. Otto” / “Reared from larvae; in rotten *Populus*; stump on 12 May; 2012” (11, GERP); “WI: Oconto Co.; L. Gipp property; 6 mi. W. Suring; 17 March 2012; Robert L. Otto” / “Reared from larvae; in rotten *Populus*; stump on 16 May; 2012” (1, GERP); “WI: Oconto Co.; Chequamegon-; Nicolet N.F.; along S.H. 64; 20 March 2012; Robert L. Otto” / “Reared from; larvae in rotten; *Populus* stump; on 1 May 2012” (60, GERP); “WI: Oconto Co.; Chequamegon-; Nicolet N.F.; along S.H. 64; 20 March 2012; Robert L. Otto” / “Reared from; larvae in rotten; *Populus* stump; on 12 May 2012” (1, GERP); “WI: Oconto Co.; along Bonita Road; N45.108908°; W-088.451765°; 12–26 June 2012; Robert L. Otto” / “Taken from elevated; flight intercept trap; baited with manuka oil” (1, GERP); “WI: Oconto Co.; along Bonita Road; N45.108908°; W-088.451765°; 26 June–13 July 2012; Robert L. Otto” / “Taken from elevated; flight intercept trap; baited with manuka oil” (3, GERP); “WI: Oconto Co.; along C.R. NN; N44.859383°; W-087.865933°; 26 June–13 July 2012; Robert L. Otto” / “Taken from elevated; flight intercept trap; baited with manuka oil” (1, GERP); “WI: Dane Co.; Turville Point Preserve; N43° 03.143’; W-089° 22.156’; 21 October 2012; Robert L. Otto” / “Reared from larvae; in rotten oak log; on 17 February 2013” (5, GERP); “WI: Oconto Co.; along Timberline Rd.; N44° 49.310’ W-088° 9.353’; 11–25 June 2016; Robert L. Otto; Purple Suzuki-Otto FIT #5” (3, GERP); “WI: Oconto Co.; along County Rd. E; N44° 47.600’ W-088° 9.495’; 11–25 June 2016; Robert L. Otto; Purple Suzuki-Otto FIT #8” (1, GERP); “WI: Oconto Co.; along Garrity Rd.; N44° 49.011’ W-088° 8.370’; 25 June–9 July 2016; Robert L. Otto; Purple Suzuki-Otto FIT #2; baited with Manuka oil” (1, GERP); “WI: Oconto Co.; along Elmlawn Rd.; N44° 47.645’ W-088° 9.198’; 9 July 2016; Robert L. Otto; on car” (1, GERP); “WI: Oconto Co.; Chequamegon-Nicolet N.F.; along Diamond Roof Road; N45.33673°; W-88.69745°; 23 June 2021; Robert L. Otto; handpicked from rotten log” (3, GERP).

Redescription. Male. Length 3.0–4.0 mm. Width, 0.75–1.0 mm. Body subcylindrical, elongate; dorsum uniformly black with infuscate reddish margin of the pronotum; antennae reddish-brown; legs including tarsi reddish-brown; head, pronotum and elytra clothed with short, recumbent yellowish setae (Fig. 22). **Head** (Fig. 23): subspherical; integument evenly punctate, somewhat dullish, except the vertex; vertex with narrow belt of silver-colored microcombs; frons convex, with variably weak medio-longitudinal carina; pair of longitudinal carinae on frons positioned further away from the compound eyes, well-developed, with silver-colored microcombs;

apical margin of frontoclypeal region rounded, about 2 times wider than base; mandibles stout, bidentate, densely punctate. **Antenna:** weakly serriform from flagellomeres I–IX, attaining nearly $\frac{3}{4}$ the length of the body; flagellomere I longer than II; flagellomeres II–VIII each sub-equal, longer than wide; flagellomere IX longer than VIII. **Pronotum:** integument somewhat shiny, closely punctate; slightly longer than wide, with moderate, sharp hind angles; lateral sides parallel-sided at basal $\frac{3}{4}$, arcuate anteriorly at apical $\frac{1}{4}$; disc convex with very shallow median impression; short basal medio-longitudinal carina present; base sinuous; anterolateral pronotal ridge (Fig. 24) somewhat short, about $\frac{1}{6}$ the length of the pronotum, directed posteroventrally; posterolateral pronotal ridge elongate, extending $\frac{3}{4}$ the length of pronotum, slightly sinuous. **Scutellar shield:** quadrate, sub-triangular, shallowly punctate, setose and distally rounded. **Elytra:** indistinctly striate throughout; interstices flattened; integument shiny, transversely rugose at basal $\frac{1}{4}$ and closely punctate elsewhere; specialized punctures present along lateral sides near elytral apices. **Legs:** First tarsomere as long as the combined lengths of the remaining four on meso- and metatarsi; tibiae rounded in cross section; metatarsomeres I–III simple; metatarsomere IV excavated, emarginate; metatarsomere V elongate with simple claws. **Venter:** evenly punctate, with short, recumbent yellowish setae; hypomeron with notosternal antennal grooves; metepisterna parallel-sided; metacoxal plates medially 3.0–6.0 times wider than laterally; last abdominal ventrite apically produced.

Sexual dimorphism. Females (Fig. 25) are similar to males, but can be distinguished by their slightly shorter antennae, about $\frac{1}{2}$ the length of the body, and more robust body. Flagellomeres are much stouter than the males, being slightly longer than wide for flagellomeres II–VIII. Females are just as long or longer and as wide as or slightly wider than males; length 3.5–5.5 mm and width 1.0–1.25 mm.

Aedeagus (Fig. 26): Basal piece longer than wide, spatulate, dorsally open, apically rounded; remaining parts elongate, basally narrow, laterally arcuate, widest medially; parameres very short, apically rounded, simple; secondary lateral lobes present, very short, shorter than parameres; median lobe very short and basally broad, apically pointed, as long as the parameres.

Distribution. This commonly encountered eucnemid species is known from Japan (Honshu and Kyushu), Russia (Far East), South Korea (Gangwond-Do, Gyeonggi-Do, Jeju-Do (Isl.), Jeollanam-Do and Seoul-Si) and the United States (Seung et al. 2018; Otto, *pers obs.*). In the United States, *D. modestus* was taken in Connecticut, Florida, Georgia, Indiana, Maine, Massachusetts, New Jersey, New York, Ohio, Rhode Island, Vermont, Virginia, West Virginia, and Wisconsin.

Biology. In South Korea, larvae were taken from dead, standing *Alnus japonica* ((Thunberg) Steudel (Betulaceae)) trees. Many adults were reared from collected larvae as well as taken commonly from light traps (Seung et al. 2018). Three specimens were taken from cross-vane panel traps in Maine and Ohio. Two specimens were taken from lights. One specimen was taken from a fermenting sugar trap in Indiana. Seventeen specimens were taken from Lindgren funnel traps deployed in states across northeastern and southeastern United States. A large series of eucnemid specimens were reared from rotten *Populus* (Betulaceae) logs or stumps and oak logs (Fagaceae) in Wisconsin. Four specimens were taken from purple prism traps baited with Manuka oil and Z3-Hexa-1-ol in Wisconsin. Five specimens were taken from an elevated flight intercept trap baited with Manuka oil in northeastern Wisconsin. One specimen was handpicked from my car. Five specimens were taken from my home-made flight intercept traps inspired from an image provided by W. Suzuki dubbed “Suzuki-Otto FIT”. A rotten stump and nearby log were examined (Fig. 27–30) on 23-VI-2021 along Diamond Roof Road within the Chequamegon-Nicolet National Forest, Wisconsin (GPS coordinates: N45.33673°, W–88.69745°). Several adults were spotted crawling on the surfaces, especially at the edges around mid-morning. Several adult female beetles were handpicked from a nearby rotten log at this site. So far, the species have been taken largely in the northern mesic forests and southern mesic forests in Wisconsin.

Note. Both Otto et al. (2014) and Seung et al. (2018) used the presence of weak medio-longitudinal carina on the frons to diagnose *D. modestus* from other species within the group. In examining a number of specimens, I found the character state exhibits a degree of variability among these specimens, making it quite difficult for diagnosing *D. modestus* from other similarly known small, dark-colored *Dirrhagofarsus* species, especially *D. ernae*. Both *D. ernae* and *D. modestus* have been found together in a number of localities in Wisconsin which indicate *D. modestus* may have been present in the United States since the late 1990’s, as long as *D. ernae*. Unknown larvae of



Figures 27–30. *Dirrhagofarsus modestus* (Fleutiaux) habitat, Chequamegon-Nicolet National Forest, along Diamond Roof Road, Oconto County WI, U.S.A., 23-VI-2021. **27)** Rotten stump. **28)** Female beetle on stump. **29)** Female beetle on nearby fallen log. **30)** Nearby fallen log. Images taken by author with Samsung Galaxy S10e smartphone.

Dirrhagofarsus believed to belong to *D. modestus* were recovered from a rotten *Populus* stump approximately 20 miles northwest of Suring, Wisconsin, U.S.A. on 12 March 2012.

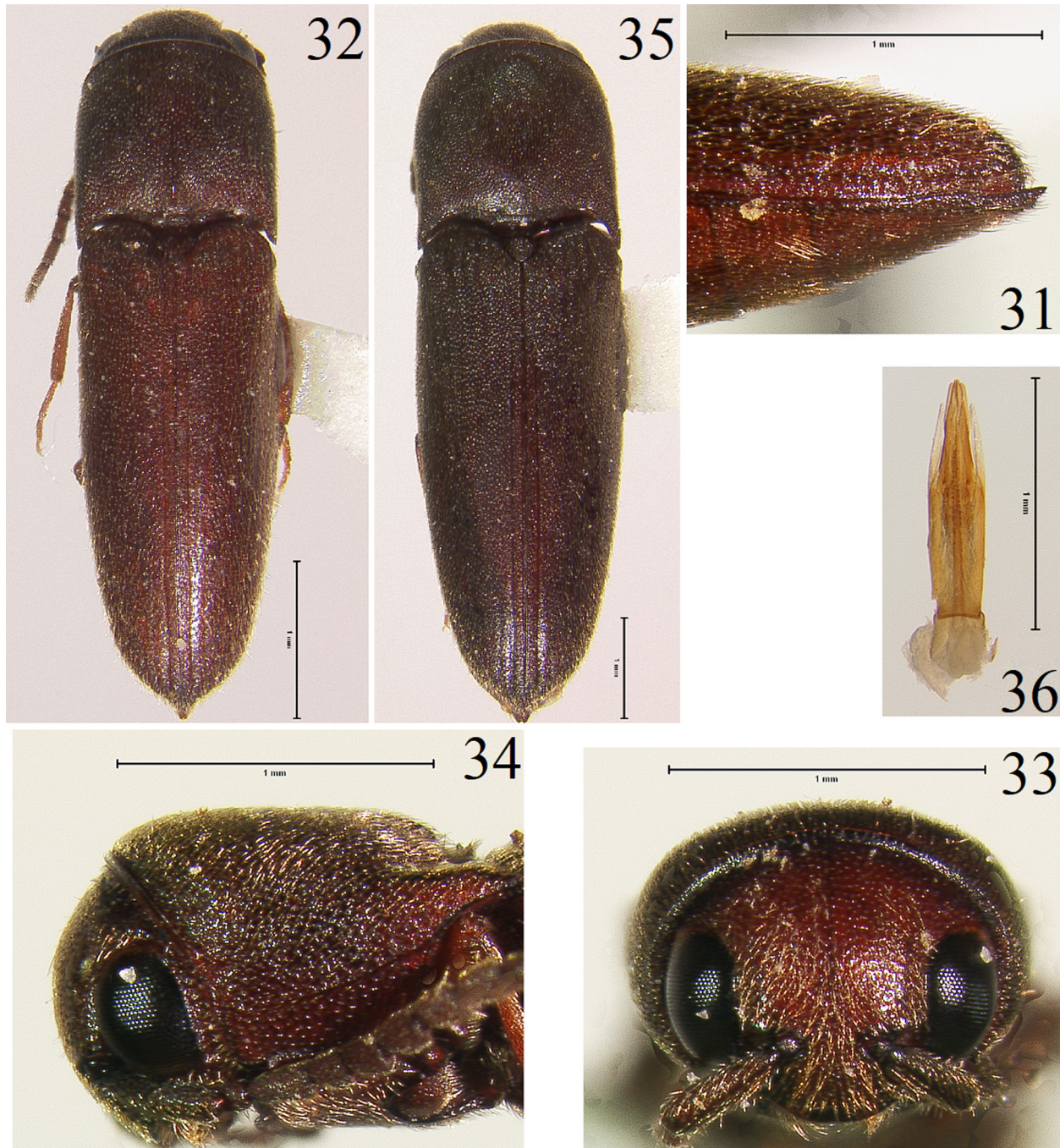
***Dirrhagofarsus unicolor* (Hisamatsu, 1960)**

Fig. 31–36

Dirrhagus modestus f. *unicolor* Hisamatsu 1960: 102 (see note below)

Diagnosis. Simple elytral apices (Fig. 31) as viewed laterally will distinguish *D. unicolor* from *D. lewisi*. Presence of poorly-developed longitudinal carinae without microcombs on the frons near the compound eyes will further distinguish the eucnemid species from *D. brevis* **new species**, *D. ernae*, and *D. modestus*.

Specimens examined. Twenty specimens were available for study: **CONNECTICUT:** “CONNECTICUT: New Haven; Co., 3.6 km ESE Woodbridge; 41.34495, -72.96683, 68 m; 28 Jun–12 Jul 2018, LFT; K. Bjarnason, BSF# 80898” (1, CMNH); “CONNECTICUT: Fairfield; Co., 0.9 km SE Port Chester; 40.9961, -73.65825, 10 m; 13–27 Jun 2019, LFT; K. Bjarnason, BSF# 86404” (1, CMNH); “CONNECTICUT: New Haven; Co., 2.1 km NNE of Devon; 41.220626, -73.094976, 35 m; 27 Jun–10 Jul 2019, LFT; K. Bjarnason, BSF# 87761” (1, CMNH); “CONNECTICUT: New Haven; Co., 2.1 km NNE of Devon; 41.220626, -73.094976, 35 m; 10–24 Jul 2019, LFT; K. Bjarnason, BSF# 88812” (1, CMNH); **MASSACHUSETTS:** “MASSACHUSETTS: Essex Co.; 1.6 km SSE West Newbury; 42.788002, -70.983402; 45 m, 8–26 Jul 2019, LFT; A. Perkins, BSF# 87348” (1, GERP); **NEW JERSEY:** “NEW JERSEY: Middlesex; Co., 5.2 km SE Edison; 40.4977, -74.3575, 3 m; 24 May–14 Jun 2018, LFT; S. Coachman, BSF#79374” (2, CMNH); “NEW JERSEY: Gloucester; Co., 4.6 km ENE Sewell; 39.78384, -75.09519, 41 m; 5–18 Jun 2018, LFT; M.Parkinson, BSF# 79390” (1, GERP); “NEW JERSEY: Somerset; Co., 1.6 km N Branchburg; 40.6014, -74.6976, 39 m; 6–22 Jun 2018, LFT; S. Coachman, BSF#79377” (1, CMNH); “NEW JERSEY: Warren Co.; 1.2 km SE Alpha, 104 m; 40.661464, -75.145893; 13–26 Jun 2018, LFT; P. Rockerman, BSF#79653” (3, CMNH); “NEW JERSEY: Gloucester; Co., 4.7 km ENE Sewell; 39.78448, -75.09516, 41 m; 18 Jun–3 Jul 2018, LFT; M.Parkinson, BSF# 79580” (1, CMNH); “NEW JERSEY: Passaic; Co., 4.2 km SE Clifton; 40.8331, -74.1264, 4 m; 21 Jun–11 Jul 2018, LFT; S.Limbachia, BSF#80501” (1, CMNH); “NEW JERSEY: Monmouth; Co., 1.2 km S Farmingdale; 40.18605, -74.16875, 30 m; 26 Jun–9 Jul 2018, LFT; D.Armstrong, BSF# 80353” (1, GERP); “NEW JERSEY: Gloucester; Co., 4.6 km NE of Sewell; 39.78511, -75.09613, 44 m; 4–17 Jun 2019, LFT; M. Parkinson, BSF#84919” (1, CMNH); “NEW JERSEY: Warren; Co., 1.1 km ESE Alpha; 40.68244, -75.1464; 116 m, 2–17 Jul 2019” / “cross-vane panel trap; N. Aponte-Rivera; BSF# 86202” (1, CMNH); **OHIO:** “OHIO: Erie County; 1.9 km SW Bogart; 41.3826, -82.6706, 204 m; 23 Aug–6 Sep 2016” / “cross-vane panel; trap, C. Poe; BSF# 70355” (1, CMNH); **RHODE ISLAND:** “RHODE ISLAND: Kent; Co., 2.5 km E of Pontiac; 41.73109, -71.44839; 25m, 3–17



Figures 31–36. *Dirrhagofarsus unicolor* (Hisamatsu). 31) Elytral apices, lateral view. 32) Male, dorsal habitus. 33) Head, frontal view. 34) Pronotum, lateral view. 35) Female, dorsal habitus. 36) Aedeagus, dorsal view. (Scale: 31–36 = 1.0 mm.)

Jul 2019, LFT; K. DiVito, BSF# 87902” (1, GERP); “RHODE ISLAND: Providence; Co., 3.8 km W of Quinnville; 41.92608, -71.47851, 113 m; 5–19 Jul 2019. LFT; K. Bjarnason. BSF#87882” (1, CMNH).

Redescription. Male. Length 4.5–5.0 mm. All examined male specimens measured 1.0 mm wide. Body subcylindrical, elongate; dorsum uniformly medium to dark reddish-brown; antennae dark reddish-brown; legs including tarsi reddish-brown; head, pronotum and elytra clothed with short, recumbent yellowish setae (Fig. 32). **Head**

(Fig. 33): subspherical; integument evenly punctate, dullish except the vertex; vertex without narrow belt of microcombs; frons convex, simple; pair of longitudinal carinae on frons near compound eyes poorly-developed, without microcombs; apical margin of frontoclypeal region rounded, about 2 times wider than base; mandibles stout, bidentate, densely punctate. **Antenna:** weakly serriform from flagellomeres I–IX, attaining nearly $\frac{2}{3}$ the length of the body; flagellomere I longer than II; flagellomere II slightly shorter than III; flagellomeres III–VIII each sub-equal, a little longer than wide; flagellomere IX longer than VIII. **Pronotum:** integument dullish, transversely rugose to closely punctate; slightly longer than wide, with moderate, sharp hind angles; lateral sides parallel-sided at basal $\frac{3}{4}$, arcuate anteriorly at apical $\frac{1}{4}$; disc convex; short basal medio-longitudinal carina present; base sinuous; anterolateral pronotal ridge (Fig. 34) somewhat short, about $\frac{1}{6}$ the length of the pronotum, directed posteroventrally; posterolateral pronotal ridge elongate, extending $\frac{3}{4}$ the length of pronotum, slightly sinuous. **Scutellar shield:** quadrate, sub-triangular, shallowly punctate, setose and distally rounded. **Elytra:** indistinctly striate at humeri and elytral apices; striae present along elytral suture; interstices flattened; integument shiny, transversely rugose at basal $\frac{1}{4}$ and closely punctate elsewhere; specialized punctures present at elytral apices. **Legs:** first tarsomere as long as the combined lengths of the remaining four on meso- and metatarsi; tibiae rounded in cross section; metatarsomeres I–III simple; metatarsomere IV excavated, emarginate; metatarsomere V elongate with simple claws. **Venter:** closely punctate, with short, recumbent yellowish setae; hypomeron with notosternal antennal grooves; metepisterna parallel-sided; metacoxal plates medially 3.0–6.0 times wider than laterally; last abdominal ventrite apically produced.

Sexual dimorphism. Females (Fig. 35) are similar to males, but can be distinguished by their slightly shorter antennae being about $\frac{1}{2}$ the length of the body, and stouter body. Flagellomeres are much stouter than the males, being quadrate to slightly longer than wide for flagellomeres II–VIII. Females are just as long or longer and as wide to slightly wider than males; length 4.5–6.5 mm and width 1.0–1.5 mm.

Aedeagus (Fig. 36): Basal piece longer than wide, spatulate, dorsally open, apically rounded; remaining parts elongate, basally narrow, laterally arcuate, widest medially; parameres very short, apically rounded, simple; secondary lateral lobes present, very short, shorter than parameres; median lobe very short and basally broad, apically pointed, as long as the parameres.

Distribution. This rare eucnemid species is known from Japan (Honshu and Kyushu), South Korea (Gyeonggi-Do and Seoul-Si) and taken for the first time here in the United States (Seung et al. 2018; Otto, *pers obs.*). In the United States, *D. unicolor* was taken in Connecticut, Massachusetts, New Jersey, Ohio, and Rhode Island.

Biology. In South Korea, larvae were taken from dead, standing *A. japonica* trees. Many adults were reared from collected larvae as well as taken from light traps and occasionally from flight intercept traps (Seung et al. 2018). Two specimens were taken from cross-vane panel traps in New Jersey and Ohio. Eighteen specimens were taken from Lindgren funnel traps deployed in many states across northeastern United States. Developmental stages remain undescribed.

Note. Seung et al. (2018) discovered specimens from Korea are identical to the Japanese form and were identified as *Dirrhagus modestus* f. *unicolor* Hisamatsu, 1960. Additionally, Seung et al. (2018) determined, based on ICZN article 10.2, species names given infrasubspecific forms proposed by 1 January 1961 are available with original authority unless the description included information which showed the author intended it an infrasubspecific grouping. They determined it was not the case with the originating author and the previously ignored species was transferred to *Dirrhagofarsus*.

Acknowledgments

I thank Paul Johnson (South Dakota State University) and Brent Steury (Turkey Run Park Headquarters; McLean, VA) for bringing to my attention the discovery of an unknown *Dirrhagofarsus* species that facilitated the study. I thank Robert Androw (CMNH) as well as Kyle Schnepf and Paul Skelley (both FSCA) for lending specimens during the course of this study. I thank Jyrki Muona (Finnish Museum of Natural History) for his thoughts on *Dirrhagofarsus*, John Leavengood (Tampa, FL) for providing me some *Dirrhagofarsus* specimens

for my research, Daniel Young (UW-Madison) for blocking off time to allow me to operate the Auto-Montage equipment in the laboratory, and Jyrki Muona (Helsinki, Finland) and Paul Johnson (Brookings, South Dakota) for reviewing and offering their input on the manuscript.

Literature Cited

- Johnson PJ, Steury BW. 2021.** The elateroid beetles of the George Washington Memorial Parkway, Virginia, USA, including new state records. *The Maryland Entomologist* 8(1): 31–51.
- Otto RL. 2016.** The false click beetles (Coleoptera: Eucnemidae) of Laos. *Entomologica Basilensia et Collectionis Frey* 35: 181–427.
- Otto RL, Muona J, McClarin J. 2014.** Description of *Dirrhagofarsus ernae* n. sp. with a key to the known *Dirrhagofarsus* species (Coleoptera: Eucnemidae). *Zootaxa* 3878: 179–184.
- Seung J, Muona J, Lee S. 2018.** Taxonomic review of the genus *Dirrhagofarsus* in Korea (Coleoptera: Eucnemidae). *ZooKeys* 781: 97–108.

Received March 3, 2022; accepted March 12, 2022.

Review editor Michael L. Ferro.

