

REVIEW OF *LASIODACTYLUS* PERTY, WITH DESCRIPTIONS OF
THREE NEW SPECIES (COLEOPTERA: NITIDULIDAE: NITIDULINAE)

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Abstract

The genus *Lasiodactylus* contains four species, the type species *L. brunneus* Perty from Peru and Brazil, and three **new species** described here; *L. centralis* Cline from southern Mexico, Belize, and Honduras, *L. falini* Cline from Suriname and French Guiana, and *L. kelleri* Cline from Argentina. *Lasiodactylus kelleri* inhabits the burrow systems of dynastine scarabs in the genus *Heterogomphus* and feeds on plant sap flows caused by their feeding. The genus is characterized by at least two unambiguous characters, a well developed triangular supraocular region and mentum with a sulcate anterior margin. Other external characters shared with the *Aethina*-complex of genera also are described to assess the position of *Lasiodactylus* within the Nitidulinae. A key to *Lasiodactylus* species is provided and new country records for *L. brunneus* are listed.

Resumen

El genero *Lasiodactylus* contiene cuatro especies, las especies *L. brunneus* Perty de Perú y Brasil, y tres nuevas especies descritas aquí; *L. centrales* del sur de México, Belice y Honduras, *L. falini* de Surinam y Guayana Francesa y *L. kelleri de Argentina*. *Lasiodactylus kelleri* habita los mismos túneles que habitan los escarabajos de la sub-familia Dynastinae del genero *Heterogomphus* y se alimenta de la savia de las plantas producida por las heridas causadas por los hábitos alimenticios de estos escarabajos de este genero. Este genero a sido caracterizado por tener dos características particulares, una región supraocular bien desarrollada y un mentón de concavidad bien definida en el margen anterior. Otras características externas del complejo *Aethina* del mismo genero también ha sido descrita para entender la posición del genero *Lasiodactylus* en los Nitidulinae. Una clave taxonómica ha sido provista y hay nuevos registros de *L. brunneus* han sido listados.

Much confusion has surrounded the generic limits of *Lasiodactylus*, which was originally represented in the Neotropics by the type species *L. brunneus* Perty (1830). *Lasiodactylus brunneus* was later described as *Lordites procerus* (Erichson 1843; type designation by Chenu and Desmarest 1851 and Lacordaire 1855) and *Nitiduligen meridionalis* (Gillogly 1965). Thirty-two Old World species also were at one time included in *Lasiodactylus*. These Old World species were subsequently allocated to other genera including: *Aethinodes* Blackburn (Jelinek 1999), *Australycra* Kirejtshuk and Lawrence (Kirejtshuk and Lawrence 1992), *Lasiodites* Jelinek (Jelinek 1999), and *Lordyra* Gemminger and Harold (Reitter 1873). Thus, only *L. brunneus* remained in the genus *Lasiodactylus*. Kirejtshuk and Kvamme (2002) recently included *Lasiodites* as a subgenus of *Phenolia*. A cladistic revision of the *Aethina* complex (*sensu* Kirejtshuk and Lawrence 1999) and the *Phenolia* complex is necessary to establish the monophyly of their constituent taxa, and to bring resolution to two major nitiduline lineages.

Members of *Lasiodactylus* are some of the largest known Nitidulidae (hence Gillogly's (1965) term "Nitiduligen" translated as large nitidulid). The large, distinct body shape of *Lasiodactylus*, with enlarged tibia and serial elytral punctation, is easily recognized among the Nitidulidae. *Lasiodactylus* are elongate, robust-bodied,

moderately compressed beetles 8–16 mm in length. Kirejtshuk and Lawrence (1999) proposed that *Lasiodactylus* was included in the *Aethina* complex of genera based on comparative morphology. We provide additional evidence for the inclusion of *Lasiodactylus* in this group. A dichotomous key of the four Neotropical *Lasiodactylus* species, three of which are described in this paper, is provided. Biological information for the genus is provided including observations of an association of one species with the burrow systems of dynastine scarabs in the genus *Heterogomphus* Burmeister.

Materials and Methods

Genitalia were extracted from each specimen with minuten pins, and placed on a glycerin slide mount. Genitalia drawings were made using an Olympus® BX50 compound microscope attached to a camera lucida. All external drawings were made through a camera lucida attached to a WILD® Heerbrugg dissecting microscope. Scale bars were calibrated using an ocular micrometer. All genitalia were cleaned manually with minuten pins, not with KOH, due to the fragility of the organs.

Depositories for specimens examined include: the National Museum of Natural History the Smithsonian Institution, Washington D.C. (USNM), the Natural History Museum, London (NMNH), the University of California—Berkeley Essig Museum, Berkeley, CA (EMEC), the American Museum of Natural History, New York, NY (AMNH), Cornell University Insect Collection, Ithaca, NY (CUIC), and the Los Angeles County Natural History Museum, Los Angeles, CA (LACM) the University of Nebraska State Museum, Lincoln, NE (UNSM), the Louisiana State Arthropod Museum, Baton Rouge, LA (LSAM), the Florida State Collection of Arthropods, Gainesville, FL (FSCA), and the Snow Entomological Collection (SEMC) at the University of Kansas, Lawrence, KS. The type of *Lordites procerus* Erichson was also studied and it is deposited in the Zoologisches Museum der Humboldt Universität zu Berlin (ZMHB), *i.e.*, the Musuem für Naturkunde.

Key to species of *Lasiodactylus*

- 1a) Male protibia narrow at base greatly produced/dilated at apical one-third with pronounced inner curvature (Fig. 16), ovipositor with large pit at gonocoxal apex from which the gonostylus originates (Figs. 39, 42) 2
- 1b) Male protibia broad at base, moderately produced/dilated at apical one-third with little inner curvature (Figs. 14–15), gonocoxites without large apical pits (Figs. 40–41) 3
- 2a) Metacoxal line diverging posteriorly toward basal margin of abdominal sternite, pronotal punctation faintly impressed and widely separated, double row of elytral punctation separated by at least 1 puncture diameter, male metatibia slender in basal one-third with pronounced inner curvature (Fig. 22), male anal sclerite with medial notch and some curved apical setae (Fig. 26), tegmen large L:W ratio ~2.4:1 and noticeably curved ventrally (Fig. 33), ovipositor paraprocts with multiple projections apically (Fig. 38), gonocoxites fused in apical one-fourth without a medial notch (Fig. 42) *Lasiodactylus kelleri* **new species** (Argentina)
- 2b) Metacoxal line not diverging posteriorly, pronotal punctation deeply coarsely impressed and densely distributed, double row of elytral punctation separated by less than 1 puncture diameter, male metatibia robust in basal one-third with little inner curvature, male anal sclerite without medial notch and no curved apical setae (Fig. 23), tegmen L:W ratio ~2.2:1 with little ventral curvature (Fig. 27), ovipositor paraprocts with inner apical projection only (Fig. 35), gonocoxites not

- fused in apical one fourth (Fig. 39)
 *L. brunneus* Perty (Peru, Bolivia, Paraguay, and Brazil)
- 3a) Prosternal process with short vertical face and flattened medially (Fig. 8), pygidium narrowly rounded at apex (Fig. 11), terminal segment of maxillary palp oblong with sensillar area not extending across entire apex (Fig. 3), tegmen with concave basal margin and many hairs scattered along the lateral margin including a longer tuft in the middle (Fig. 29), male anal sclerite with numerous setae at apex (Fig. 24), gonocoxites fused in basal two-thirds with a medial notch present (Fig. 40), paraprocts with prominent central lobes that overlap gonocoxites (Fig. 36) *L. falini* **new species** (Suriname, Fr. Guiana)
- 3b) Prosternal process without vertical face, rounded at apex (Fig. 9), pygidium nearly truncate at apex (Fig. 12), terminal segment of maxillary palp enlarged apically (Fig. 4), inner fossa of meso- and metatibia large (Figs. 18, 21), tegmen with straight perpendicular basal margin and only a few short hairs scattered along the lateral margin (Fig. 31), male anal sclerite with tuft of setae medially at apex (Fig. 25), gonocoxites not fused along entire length (Fig. 41), paraprocts lacking prominent central lobes (Fig. 37)
 *L. centralis* **new species** (Central America)

Lasiodactylus Perty

Lasiodactylus Perty 1830. Type species *L. brunneus* Perty, by monotypy

Lordites Erichson 1843: 316. Type species *L. procerus* Erichson (= *Lasiodactylus brunneus*, syn. by Murray 1867)

Nitiduligen Gillogly 1965: 3. Type species *N. meridionalis* Gillogly 1965: 3, by monotypy (= *Lasiodactylus brunneus*, syn. by Kirejtshuk 1996)

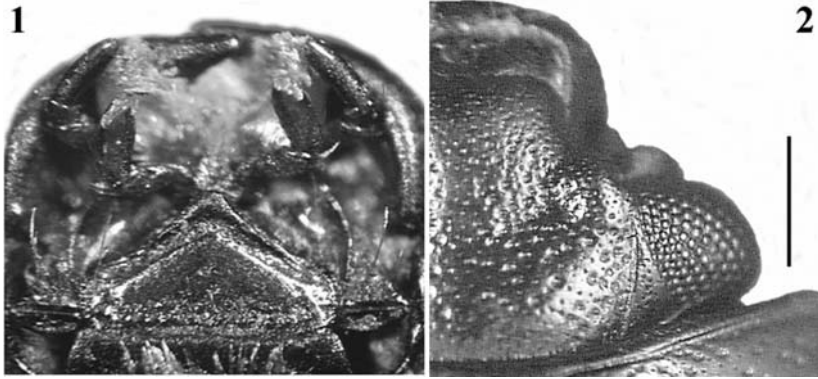
Lasiodactylus, as first described by Perty (1830), was based primarily on elytral punctuation and the bilobed condition of the labrum. Erichson (1843), in his description of *Lordites procerus* (= *L. brunneus* Perty), was somewhat more detailed, taking into account the spinose condition of the tibia, the simple mesosternum, as well as several features of the head. Gillogly's (1965) description of *Nitiduligen meridionalis* (= *L. brunneus* Perty) was thorough and illustrations of the dorsal and ventral habitus were provided.

Diagnosis. Characters defining the genus include: robust oblong body, sulcate anterior margin of mentum (Fig. 1), labrum bilobed, well-developed triangular supraocular region between vertex and orbit (Fig. 2), antennal grooves deep and convergent, elytral and pronotal margins finely ciliate, elytra serially punctate with intervening double or triple rows of punctures between raised single rows of punctures, tibiae with large apical spines, protibia crenulate along lateral margin, pro- and mesosternum somewhat depressed, caudal marginal lines curved medially from metacoxal cavities, and tarsomeres 1–3 bilobed.

Lasiodactylus falini Cline, **new species**

(Figs. 3, 5, 8, 11, 14, 17, 20, 24, 29, 30, 36, 40, 44)

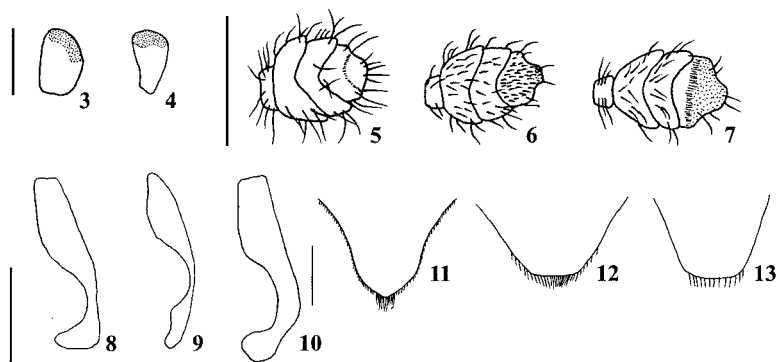
Type Series. Holotype: ♀, Data Labels: Suriname, Marowijne, Palumeu, ca 160 m, 3°20'56"N: 55°26'18"W, 5–9 July, Z.H. Falin and D. Konoe collr., SUR1F99 185, ex: flight intercept trap; Bar Code Label, SM0164807, KUNHM-ENT; HOLOTYPE, *Lasiodactylus falini*, A.R. Cline des. 2002. Deposited SEMC. Paratype: ♂, Data Labels: French Guiana; Entomotech Lodge, 30 km SE Roura on Kaw Rd., 1-12-XII-2002, J.E. Eger; 04°33.570'N, 052°12.433'W, 300 m; PARATYPE, *Lasiodactylus falini*, A.R. Cline des. 2003. Deposited in FSCA.



Figs. 1–2. Diagnostic external characters of *Lasiodactylus*. 1) *Lasiodactylus kelleri*, mentum; 2) *L. brunneus*, dorsal aspect of head. Scale bars = 0.5 mm.

Description. Length 9.0 mm, Width 4.1 mm, Depth 2.0 mm. Body uniformly dark reddish brown/black. Head with labrum deeply indented halfway to posterior border. Labrum glabrous with a few scattered minute punctures. Clypeus broadly emarginate at clypeo-labral suture. Maxillary palpi elongate with sensillar area not extending completely across apex (Fig. 3). Vertex with small shallow fovea next to each orbit. Both small and large punctures evenly dispersed across head. Axillary (supraocular) space extending forward to middle of eye. Antennal scape curved along posterior margin. Eighth antennomere flattened. Antennal club compact, antennomeres 9 and 10 chevron shaped, antennomere 11 somewhat diamond-shaped (Fig. 5). Several short, stiff setae are apparent throughout the coarsely faceted eyes. Pronotum with anterior margin shallowly emarginate, lateral margin widest just before posterior angles, posterior margin with small indentations near posterior angles. Both large and small punctures evenly dispersed across pronotum. Scutellum broadly triangular with several small punctures scattered throughout. Elytra finely, densely fimbriate along lateral margin from humeri to apex. Humeri moderately produced. Elytral margins narrowly explanate from humeri to five-sixths the length of the elytra. Punctures deeply impressed and in double rows, a row of minute punctures each bearing a minute golden seta between the double rows. Pygidium broadly triangular, narrowed at apex, with disperse setae scattered, apical margin bearing short setae laterally and longer setae medially (Fig. 11).

Mentum with minute punctures along margin. Prosternal process in lateral aspect angled from anterior origin to a flattened area over procoxae, with short vertical face posteriorly (Fig. 8). Prosternal process in ventral aspect greatly expanded behind procoxae with many short setae along apical border. Protibia shallowly curved along medial border. Apical spine short, as long as first tarsomere. Lateral margin finely, narrowly crenulate (Fig. 14). Mesotibia similar to *L. brunneus*, except for broad teeth on the apical border (Fig. 17). Metatibia with short slender spines along entire length of lateral margin, and only present in apical half of medial margin. Apical margin armed with 16–18 teeth (Fig. 20). Apical spine large, as long as first two tarsomeres combined. Male genitalia with anal sclerite (= tergite VIII) broadly convex with shallow fossa for reception of tegmen, apicolateral corners convex (Fig. 24). Numerous setae present on apical border, becoming longer medially. Tegmen small and compact, basal margin with shallow concavity (Fig. 29). Scattered, short setae in apical one-half not extending to dorsal side of tegmen, with longer tuft of setae basally. Median lobe large, robust, greater than $3/4$ length of tegmen, with simple apical opening (Fig. 30). Ovipositor with gonocoxites fused from base to apical one-third of structure (Fig. 40). Group of small basal sensilla, and larger sensilla scattered along apical two-thirds of gonocoxites. Terminal appendage originating from small pit on lateral margin near apex. Terminal appendage bearing seven setae from apex. Two setae overlapping at the extreme tip of the gonocoxites. Paraprocts with lateral and medial margins heavily sclerotized (Fig. 36). Apical margin tapered into broad point at apex. Basal medial margin prolonged into a terminal ridge that extends over the base of the gonocoxites. Ovipositor long and slender.



Figs. 3–13. External characters of *Lasiodactylus*. 3–4) Maxillary palpi; 3) *L. falini*; 4) *L. centralis*. 5–7) Antennomeres 8–11; 5) *L. falini*; 6) *L. centralis*; 7) *L. kelleri*. 8–10) Prosternal process, lateral aspect; 8) *L. falini*; 9) *L. centralis*; 10) *L. kelleri*. 11–13) Pygidium; 11) *L. falini*; 12) *L. centralis*; 13) *L. kelleri*. Scale bar = 0.25 mm for Figures 3–4, 0.5 mm for Figures 5–13.

Etymology. The specific epithet honors the collector of the Holotype, Zack Falin.

Diagnosis. Non-genitalic characters delimiting this species include: distinct large and small puncture pattern on the head, large size of the axillary space behind the eyes, maxillary palpi elongate with a sensillar region not extending across the apical margin, and lateral aspect of the prosternal process somewhat produced, with a short vertical face. The following genitalic features distinguish *L. falini* from the other known species: tegmen relatively small in comparison to the large median lobe, shorter setae on tegmen not extending around apex to dorsal surface, anal sclerite with concave apicolateral corners, gonocoxites of ovipositor distinctly fused in apical half, basal aggregation of sensilla on gonocoxites, seven setae originating from terminal gonocoxite accessory appendage, and sclerotized basal ridge on paraproct that partially covers the gonocoxite base.

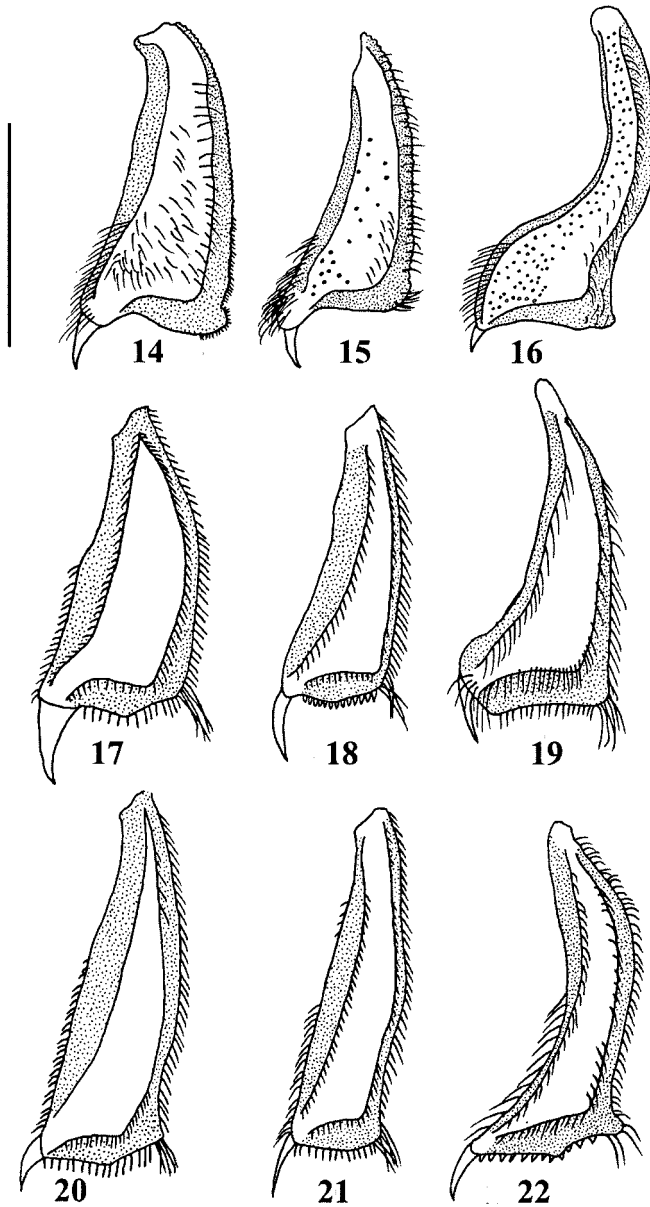
Distribution. The holotype was collected at a locality near Palumea on the Tapanahony River in Marowijne province, southern Suriname. The paratype was collected in Guyanan Shield forest in neighboring French Guiana (Fig. 44).

Biology. The village at the type locality is surrounded by a semi-circle of actively farmed fields, partially cut secondary forest, older secondary forest, disturbed primary forest, and undisturbed forest several kilometers away from the village. The flight intercept trap was in the disturbed primary forest. The forest there is classic Guyanan Shield forest, found throughout the interior of Suriname and the Guyanas. The forest where this particular trap was placed was disturbed only in that the larger, economically valuable/useful trees had been removed, otherwise it was virtually indistinguishable from the surrounding pristine forest (Z. Falin pers. comm.).

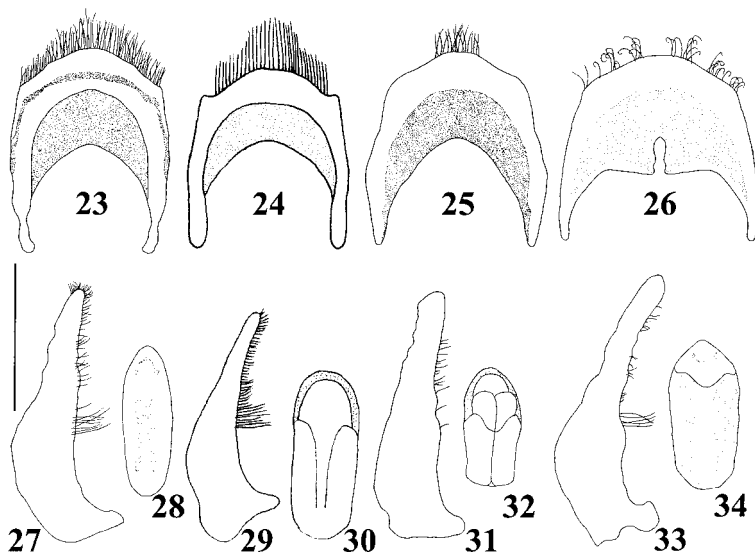
Lasiodactylus centralis Cline, **new species**

(Figs. 4, 6, 9, 12, 15, 18, 21, 25, 31, 32, 37, 41, 45)

Type Series. Holotype: ♂, Data Labels: Mexico, Ver., Estac. Biol. Los Tuxtlas, VII-1/9-1988, J.A. Lites & J.A. Chemsak collr.; HOLOTYPE, *Lasiodactylus centralis*, A.R. Cline des. 2002. Deposited in USNM. Paratypes: ♀ (4), ♂ (2): Two ♀ with same locality label as holotype; PARATYPE, *Lasiodactylus centralis*, A.R. Cline des. 2002.



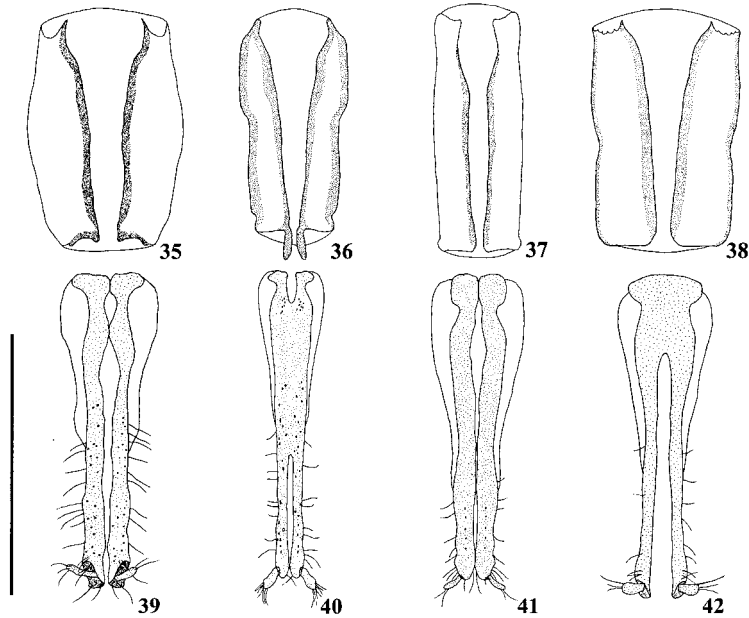
Figs. 14–22. Tibiae of *Lasiodactylus* spp. 14–16) Protibia; 14) *L. falini*; 15) *L. centralis*; 16) *L. kelleri*. 17–19) Mesotibia; 17) *L. falini*; 18) *L. centralis*; 19) *L. kelleri*. 20–22) Metatibia; 20) *L. falini*; 21) *L. centralis*; 22) *L. kelleri*. Scale bar = 1.00 mm.



Figs. 23–34. Male genitalia of *Lasiodactylus* spp. 23–26) Anal sclerite; 23) *L. brunneus*; 24) *L. falini*; 25) *L. centralis*; 26) *L. kelleri*. 27–34) Tegmen and median lobe; 27–28) *L. brunneus*; 29–30) *L. falini*; 31–32) *L. centralis*; 33–34) *L. kelleri*. Scale bar = 0.8 mm.

Deposited in EMEC. Two ♀ specimens with following label data: Belize, Toledo dist., Blue Creek Village, June 28 1981, W. E. Steiner collr., EARTHWATCH Belize Expedition 1981, D. H. Messersmith, W. E. Steiner, *et al.*; PARATYPE, *Lasiodactylus centralis*, A.R. Cline des. 2002. Deposited in the USNM. One ♂ specimen with same locality data as holotype; *Lasiodactylus centralis*, A.R. Cline des. 2002. Deposited in EMEC. One ♂ specimen with the following data label: Mexico, Veracruz, Coatzacoalcos, 10 mi. S., VII-10-1963, J. Doyen collr. Deposited in EMEC. One ♂ specimen with the following data label: Honduras, Atlantida Parque Nac. Pico Bonito Estacion CURLA, 185 m, 15°42'07"N 86°50'48"W, 18 Julio 2001, R. Cordero collector, 64.081 EAPZ; *Lasiodactylus centralis*, A.R. Cline des. 2002. Deposited in USNM.

Description. Length: 8.75 mm, Width: 4.2 mm, Depth: 1.9 mm. Body uniformly dark brownish black, almost entirely black. Head with labrum with narrowly emarginate, medial labral apices converging over indentation, one setae on each side of the emargination, converging, but not overlapping. Clypeo-labral suture truncate. Labrum with small densely distributed punctures. Maxillary palpi enlarged apically, with sensillar area completely covering apex (Fig. 4). Vertex with U-shaped fossa extending across head between eyes, both large and small punctures present but not intermingled, small punctures aggregated anteriorly and laterally, larger punctures in posterior and posterolateral areas. Medial area of vertex lacking punctures. Axillary (supraocular) space almost reaching anterior margin of eye. Antennal club compact, antennomere 8 trapezoid shaped, antennomeres 9 and 10 chevron shaped, and antennomere 11 somewhat diamond shaped (Fig. 6). Pronotum with anterior margin moderately emarginate, lateral margin widest at middle, posterior margin with indentations near posterior angles, large and small punctures evenly distributed across pronotal surface, lateral margin fimbriate with minute golden setae. Scutellum triangular, almost as long as wide (L:W = 1:1.2), evenly covered with small fine punctures. Elytra with humeri slightly produced, lateral margin moderately explanate to five-sixths length of elytra, lateral margins densely finely fimbriate. Punctuation of elytra comprising eight rows of ciliate striae,



Figs. 35–42. Female genitalia of *Lasiodactylus* spp. 35–38) Paraprocts; 35) *L. brunneus*; 36) *L. falini*; 37) *L. centralis*; 38) *L. kelleri*. 39–42) Gonocoxites; 39) *L. brunneus*; 40) *L. falini*; 41) *L. centralis*; 42) *L. kelleri*. Scale bar = 0.8 mm.

with the two lateral rows bearing longer setae than the others, this is also different from *L. brunneus*, which has setae of all the same length. Pygidium broadly triangular with only a few (7–10) scattered setae (Fig. 12), apical border with dense pubescence near apex.

Prosternal process in lateral aspect angled both anteriorly and posteriorly, with only a small flat area over the procoxae (Fig. 9), in ventral aspect moderately expanded behind procoxae, apical border of prosternal process with a few setae protruding, mostly medially. Protibia with faint internal ridges (Fig. 15), apical spine as long as first tarsomere, weakly curved along median border, lateral margin faintly crenulate, entire tibia scarcely pubescent. Internal ridges on both the meso- and metatibia approximate with tibial margins with little intervening space (Figs. 18 and 21). Male genitalia with anal sclerite broadly convex with deep fossa for reception of the tegmen (Fig. 25), setal tuft, of ~20 setae, present at apex. Tegmen compact, basal margin vertical and blunt (Fig. 31), scattered short setae in apical one-half. Median lobe with three prominent distal lobes (Fig. 32). Ovipositor with gonocoxites separate though approximate at base and apex (Fig. 41). Lateral flanges extending from base to apical third of gonocoxites, five scattered sensilla in apical one-third, each terminal appendage originating from small terminal pit, the terminal appendages each bearing three setae. Terminal gonocoxite setae non-overlapping. Paraprocts cylindrical with only medial margin sclerotized (Fig. 37).

Etymology. The specific epithet refers to Central America, and the “centralized” tuft of setae on the apex of the male anal sclerite.

Diagnosis. Non-genitalic characters distinguishing this species include: punctation pattern on head and pronotum, U-shaped fossa on vertex of head, somewhat elongate scutellum, sensillar area of maxillary palpi extending across entire width of apex, and acute nature of the ligula. The following genitalic characters distinguish *L. centralis* from other *Lasiodactylus*: cylindrical shape of paraprocts, serial sensilla on distal

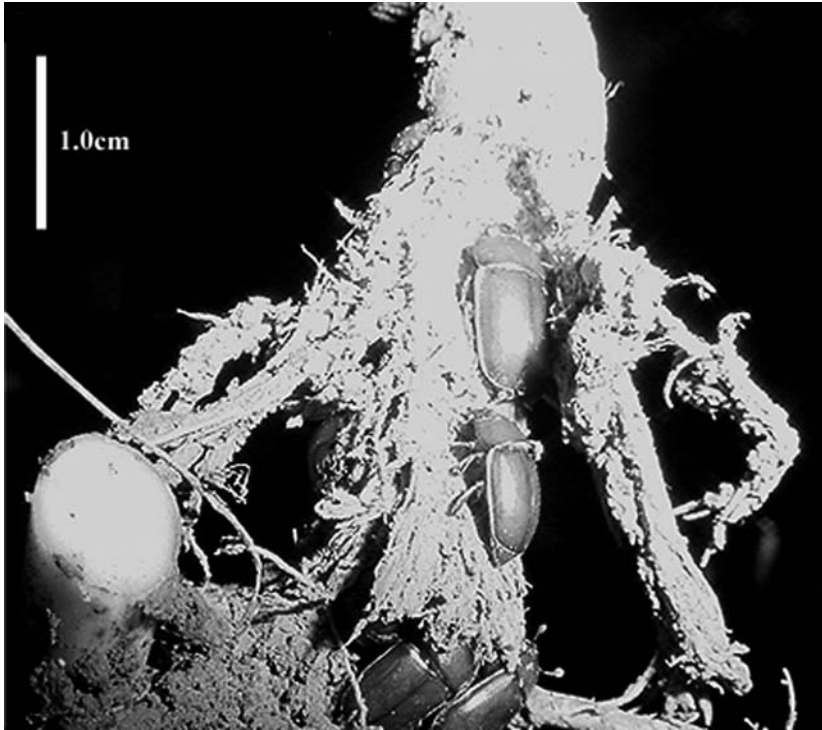


Fig. 43. Specimens of *L. kelleri* feeding at a stem sap flow of *Chusquea ramosissima* Lindm. (Poaceae) caused by the feeding damage of *Heterogomphus* sp. Photograph by Hector Keller.

region of gonocoxites, two elongate setae on terminal gonocoxal accessory appendage, sparse setal arrangement on tegmen, central grooves on median lobe, large deep fossa on anal sclerite, and central tuft of setae at apex of male anal sclerite.

Distribution. Five specimens were collected from southern Mexico near Veracruz, one specimen from the Toledo district in Belize, and another from Atlantida province of Honduras (Fig. 44). The authors have examined thousands of nitidulids from Costa Rica and Panama and have not seen specimens of *L. centralis* from those countries.

Variation. The specimen from Belize is a light tan color, lighter than the other specimens. Gilgoly (1965) noted this type of color variation for specimens of *N. meridionalis* (= *L. brunneus*) as well.

Lasiodactylus kelleri Cline, **new species**

(Figs. 7, 10, 13, 16, 19, 22, 26, 33, 34, 38, 42, 44)

Type Series. Holotype: ♂, Data Labels: Misiones, San Pedro, Argentina: x-16-2001, coll. H. Keller, in burrows in soil; HOLOTYPE, *Lasiodactylus kelleri*, A.R. Cline des. 2002. Deposited in UNSM. Paratypes: ♀ (6) ♂ (2), Data Labels: 3 ♀ with same locality label as Holotype; PARATYPE, *Lasiodactylus kelleri*, A.R. Cline des. 2002.; one deposited in USNM, one in UNSM, and one LSAM. 3 ♀ and 3 ♂ specimens with the following locality and data labels: Argentina, Misiones, Departamento Guaraní,



Fig. 44. Distribution of *L. falini* (squares); *L. centralis* (circles); *L. kelleri* (X); and *L. brunneus* (triangles).

Reserva de Uso Múltiple Guaríní, 26°54'S–54°12'–18'W, interior de selva primaria con sotobosque de bambúseas, interior de madrigueras de *Heterogomphus aidoneus* Perty, 14-11-2002, PARATYPE, *Lasiodactylus kelleri*, A.R. Cline des. 2002; three deposited in LSAM and three in UNSM.

Description. Length: 9.6 mm, Width: 4.7 mm, Depth: 2.6 mm. Body uniformly dark reddish brown/black. Dorsum lacking pubescence except for a fringe along the margins of the pronotum and elytra. Head large with prominent mandibles. Labral notch broad and triangular with two convergent setae overlapping within the emargination clypeo-labral suture slightly undulate at anterior margin. Vertex with two large impressed fossae, one on each side of midline. Head densely punctate anteriorly becoming diffusely moderately punctate near posterior margin. Antennal club compact, antennomeres 9 and 10 chevron shaped, and antennomere 11 acutely hexagonal with setal band around middle (Fig. 7). Axillary (supraocular) space reaching anterior margin of eye. Pronotum confusedly, shallowly, minutely punctate, anterior margin shallowly emarginated,

lateral margin broadly tapering to posterior margin, widest near posterior angles, posterior margin slightly emarginate near posterior angles. Scutellum broadly hemispherical with light, small punctures unevenly scattered across surface. Elytral humeri moderately produced, lateral margin narrowly explanate from humeral angle to seven-eighths the length of the elytra, apices broadly rounded, margin finely densely ciliate from humeri to apices, medial suture dark piceous along its entire length. Punctures faint, in serial rows of 2–3 punctures, these rows separated by small raised ridges that bear a series of smaller punctures. Pygidium broadly rounded, almost truncate at apex (Fig. 13), covered with short golden pubescence throughout and along apical margin.

Prosternal process in lateral aspect moderately produced posteriorly over coxae (Fig. 10), in ventral aspect greatly expanded behind procoxae, posterior margin bearing short stiff setae along entire margin. Protibia with sharp lateral curve on inner angle (Fig. 16), apical region expanded, lateral border smooth, medial margin with dense area of small slender spines, central ridge distinct from lateral border with area one-fourth width of tibia between ridge and margin, central ridge bearing row of short setae, also short setae present in area between ridge and lateral margin, apical spine short only as long as first tarsomere. Meso- and metatibia more elongate than either of the other two new species (Figs. 19 and 22) (see Gillogly 1965). Anal sclerite of male genitalia with broad fossa for reception of tegmen (Fig. 26), median notch present along basal margin, dispersed curved setae on apex of sclerite. Tegmen in lateral aspect notched on basal margin (Fig. 33), four long setae originating near base of median lobe fossa on tegmen, sparse short setae on remainder of apex. Median lobe with two large lateral impressions (Fig. 34). Ovipositor with gonocoxites long and slender, fused at basal one-fifth of the coxites (Fig. 42), a few sparse setae present along lateral border of each coxite, terminal gonocoxite appendages borne from large latero-apical pit, each terminal appendage bearing three long setae. Paraprocts sub-cylindrical with medial and lateral borders heavily sclerotized (Fig. 38), apical margin bearing a series of sharp points.

Etymology. The specific epithet honors the collector of the specimens, Hector Keller, who also provided the accounts of the biology of the species.

Diagnosis. The deep inward curvature of the male metatibia, and greatly produced shape of the protibia are all unique characters of this species. Several genitalic features also distinguish this species from any other *Lasiodactylus*, including: fusion of gonocoxites only along basal one-fifth of the structure, three terminal setae on gonocoxal accessory appendage, sharp projections on apical margin of paraprocts, medial notch of male anal sclerite and recurved setae on apex of this sclerite, deep notch at base of tegmen, and overall structure of median lobe.

Distribution. Known only from the type locality in Misiones, Argentina near San Pedro (Fig. 44).

Biology. The accounts of the biology of *L. kelleri* are from conversations with Hector Keller, an ethnobotanist from Argentina, who is currently pursuing research on the interactions of dynastine scarabs, food plants, and the native people of the area (Keller 2003). During his work on scarab-plant interactions, he observed the presence of *Lasiodactylus kelleri* specimens within burrows constructed by dynastines near damaged plants. Dynastines of the genus *Heterogomphus* construct burrows near potential food plants, then forage nocturnally at the base of the stalks and on foliage of the plants, in particular the bamboo plant *Chusquea ramosissima* Lindm. (Poaceae) for *H. aidoneus* Perty. The scarabs return to their burrows during the day, where they defecate. Keller has found up to 20 specimens of *L. kelleri* within the confines of these burrows. Thus far, *L. kelleri* has been found associated with two species of *Heterogomphus*, namely, *H. eteocles* Burmeister and *H. aidoneus*. Species of *Heterogomphus* are found throughout the range of *Lasiodactylus*, extending from southern Mexico to Argentina. Direct observation by Keller demonstrated that *L. kelleri* feeds from the sap flows of the plant stems damaged by the dynastines (see Fig. 43). The burrow microhabitat provided by these large herbivorous scarabs represents an ideal refuge for the nitidulids due to its proximity to a food source and protection against predation. This microhabitat and other types of burrow habitats should be more fully

explored to discover species that share this interesting association. Keller did not find specimens of *L. kelleri* in every burrow he examined, suggesting that there may be a successional component to the relationship.

***Lasiodactylus brunneus* Perty**
(Figs. 23, 27, 28, 35, 39, 44)

Lordites procerus Erichson, 1843: syn. by Murray 1867

Nitiduligen meridionalis Gillogly, 1965: syn. by Kirejtshuk 1996

Material Examined. Holotype (*Lordites procerus* Er.), BRAZIL, deposited in ZMHB; BRAZIL, Espirito Santo, Mun. Conceicao da Barra, 12 km E Pedro Canario Fazenda Klabin, Dec 1972, J.P. Abravaya collr.; deposited in LACM. BRASIL, Rondonia, 62 km S. Ariqemes Faz. Rancho Grande, 10°32'S 62°48'W, XI-11-22-1991, B.C. Ratcliffe collr.; two deposited in UNSM. BRAZIL: Rondonia, 62 km SW Ariqemes, nr. Fzda. Rancho Grande, 4-16-XI-1997, J.E. Eger collr., black light trap; two deposited in FSCA. BOLIVIA, Santa Cruz, 5 km ESE Warnes, Hotel Rio Selva, 20-X-2000, coll. M.C. Thomas, blacklight trap; deposited in FSCA. BOLIVIA, Santa Cruz, 3.7 km SSE Buena Vista, Hotel Flora and Fauna, 430 m, 14-19-X-2000, coll. M.C. Thomas, tropical transition forest; three deposited in FSCA. BOLIVIA, Santa Cruz, 3.7 km SSE Buena Vista, Hotel Flora and Fauna, 405 m, 5-15-XI-2001, 17°29.949'S 63°33.152'W, coll. M.C. Thomas & B.K. Dozier, tropical transition forest; deposited in FSCA. BRAZIL, Rondonia, 62 km SW Ariqemes, nr. Fzda. Rancho Grande, 8-20-XI-1994, J.E. Eger and C. O'Brien, blacklight; deposited in FSCA. BRAZIL, Rondonia, 62 km SW Ariqemes, nr. Fzda. Rancho Grande, 10-XI-1994, C. O'Brien, blacklight trap; deposited in FSCA. BRAZIL, Rondonia, 62 km SW Ariqemes, nr. Fzda. Rancho Grande, 8-20-XI-1994, JE Eger, blacklight trap, two deposited in FSCA. BRAZIL, Rondonia, 62 km SW Ariqemes, nr. Fzda. Rancho Grande, 25-XI-1993, U. Schmitz, BLT; deposited in FSCA. PARAGUAY; deposited in AMNH. PARAGUAY; deposited in Ron Cave collection. PARAGUAY; deposited in CUIC. PERU: Madre de Dios, Rio Tambopata Res., 19 January 1987, Q.D. Wheeler, ex. UV light; deposited in CUIC.

Description. The external anatomy of this species was thoroughly described by Gillogly (1965) as *N. meridionalis*. Male genitalia with anal sclerite possessing a shallow fossa for reception of tegmen (Fig. 23), bearing a longitudinal sclerotized ridge across apical region of sclerite near apical margin, and numerous moderate to long straight setae originating from apex. Basal margin of the tegmen angled slightly anteriorly (Fig. 27), nine long setae originating near base of median lobe fossa, with numerous short dense setae present from ventral to dorsal surface at apex. Median lobe with two slender median grooves (Fig. 28). Ovipositor with gonocoxites long and slender, distinctly separate but approximate at base (Fig. 39), bearing numerous scattered sensillae present on apical two-thirds, several long setae along lateral margin, and terminal appendages borne from large latero-apical pit, each terminal appendage bearing 3 long setae. Paraprocts subcylindrical with medial areas somewhat swollen (Fig. 35), medial and basal borders moderately sclerotized.

New Distributional Records. Previously, *L. brunneus* was known from near Caviuna in Parana and Santa Catarina, Brazil, the Middle Rio Ucayali in Peru, and also near Sani Beni around Lima, Peru. Thus, the species was known from two areas, around the southwestern coast of Peru and southeastern Brazil. New records extend to the Esperito Santo province of Brazil, westward into Rondonia near the Bolivian and Peruvian border, into Paraguay, and also the Santa Cruz district of Bolivia. Therefore, *L. brunneus* occurs across South America from the Atlantic to Pacific coasts (Fig. 44).

Discussion

The biological accounts of *L. kelleri* provide insights not only into feeding behavior of members of this genus, but also yield valuable microhabitat information for beetle collectors searching for other species of *Lasiodactylus* and potentially other Nitidulidae throughout the Neotropics (e.g., in the burrows of *Heterogomphus*). According to Endrödi (1985), *Heterogomphus* is a Neotropical dynastine genus holding 44 species. Burrows of other *Heterogomphus* species may be shared with *Lasiodactylus* species, as well as other beetle taxa. As the burrow system becomes filled with excrement from scarabs and nitidulids, fungi and microbes would begin to proliferate, providing a food source for fungivorous and saprophagous beetles. Several nitidulid taxa other than *Lasiodactylus* are known sap feeders, in particular members of the subfamily Cryptarchinae, and they may also exploit the resources created by these large scarabs (i.e., damaged plants with active wounds).

The nomenclatural history of *Lasiodactylus* illustrates the difficulty in distinguishing members of the *Aethina* and *Phenolia* generic complexes. The revisions of Kirejtshuk and Kvamme (2002), Kirejtshuk and Lawrence (1999), Kirejtshuk (1996) and Jelínek (1999) have made contributions towards understanding the taxonomy and morphology of the group, however, cladistic analysis of the constituents of these groups is needed. The research here provides examples of three new species of *Lasiodactylus*, which subsequently establish a good data set (four species instead of the previous single species) for determining potential synapomorphies of the genus. Two such potential synapomorphies exhibited by *Lasiodactylus* species are 1) presence of a well-developed triangular axillary (supraocular) space between the orbits and vertex of the head and 2) an anterior submarginal sulcus on the mentum. The following species were studied to assess the apomorphic nature of these two characters in the *Aethina*-complex: 1) *Aethina (Circopes) brunnescens* Reitter, 2) *Aethina (Circopes)* spp. from China, Taiwan, and India, 3) *Aethina quadrata* Sharp, 4) *Aethina tumida* Murray, 5) *Aethina villosa* Reitter, 6) *Aethina vegans* Lea, 7) *Aethina (Idaethina) concolor* (Murray), 8) *Anister raffrayi* Grouvelle, 9) *Brounithina* sp. from New Zealand, and 10) *Lordyra nitiduloides* (Grouvelle). None of the species listed above exhibit either of the two characters. Research currently underway of other genera in the *Aethina*-complex will aid in determining the exact placement of *Lasiodactylus* within the complex, as well as establish relationships between the taxa allied to *Aethina* and *Lasiodactylus*.

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