

The Neotropical genera *Oxycrepis* Reiche and *Stolonis* Motschulsky: a taxonomic review, key to the described species and description of new *Stolonis* species from Ecuador (Coleoptera: Carabidae: Loxandrinini)

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Abstract

Five species of *Stolonis* (Carabidae: Loxandrinini) are newly described: *S. yasuni* Will, **sp. n.**, *S. spinosus* Will, **sp. n.**, *S. catenarius* Will, **sp. n.**, *S. tapiai* Will, **sp. n.** from Yasuni Scientific Station, Orellana Province (previously part of Napo Province), Ecuador and *S. scortensis* Will, **sp. n.** with its type locality Reserva Faunistica Cuyabeno, Sucumbios Province, Ecuador. A key to adults of *Stolonis* and *Oxycrepis* species is provided. Generic concepts for these taxa are briefly reviewed.

Key words: Neotropical ground beetles, species key, female reproductive tract

Introduction

Among Neotropical wetland-inhabiting carabid beetles, members of Loxandrinini are prominent. The numerous species in the group, many of which are not easily recognized, offer a substantial taxonomic challenge. One assemblage of species distinctive from other loxandrinines is that of *Oxycrepis* Reiche and its putative relatives.

Stolonis Motschulsky, including *Prostolonis* Mateu, is currently treated by most authors as a genus of Loxandrinini and synonymous with *Oxycrepis* Reiche (Straneo 1979, Lorenz 1998). Many authors apparently have followed the idea of van Emden (1949:880) that these genera form a group separate from other loxandrinines based on “the formation of the pronotum . . . which becomes Anchomenini-like, and the real hind angles . . . lie well in front of the base.” *Oxycrepis* and *Stolonis* were ranked as subgenera by van Emden (1949) and Allen and Ball (1980). Additionally, Allen and Ball (1980) discuss the variation in elytral setation and pronotal form and conclude that *Oxycrepis* is not well

defined but that *Oxycrepis* and *Stolonis* can be recognized as subgenera. I have studied the type specimens of *O. brasiliensis* Tschitschérine, *O. cordata* Tschitschérine and confidently identified specimens of *O. leucocera* Reiche, and all have the posterior seta at the base of the pronotum. I have not examined *O. schadei* van Emden. In all the specimens of *Oxycrepis* (*sensu stricto*) the dorsal surface of the pronotum and elytra are rather densely hirsute in contrast to *Stolonis* species, which at most have a few setigerous punctures on one or all elytral intervals. Putative specimens of *S. dimidiaticornis* Bates examined by G.E. Ball (Allen & Ball 1980:529), which I have not seen, are said to have “two rows of setigerous punctures on each elytral interval”. This probably represent an undescribed species as I found the presumed holotype for the species to exhibit setigerous punctures on elytral intervals 3,5 and 7 only. Nevertheless, neither condition is similar to the complete pubescence found in *Oxycrepis* species. Allen and Ball (1980:529) also note a specimen “with the pronotal form of *Oxycrepis* (*sensu stricto*), but dorsal surface glabrous” and addition marginal setae. However, other characteristics of the specimen are not discussed, e.g. the setation of the elytra. It is quite possible that this species would belong to Straneo’s (1991) “group 17” species of *Loxandrus*. Mateu (1976, 1984) provided a thorough discussion of the taxonomic history of *Stolonis* and *Oxycrepis* along with a description and discussion of his new genus *Prostolonis*. I concur with Mateu that *Stolonis* and *Oxycrepis* should be treated as separate generic-level taxa, but not with his recognition of *Prostolonis*. The pattern of variation in pronotal form and number of elytral setae—characteristics used by Mateu to define *Prostolonis* based on *S. martinezi* Mateu—that is found in individuals of *Loxandrus*, *Stolonis* and *Oxycrepis* indicates that these are homoplasious character states and do not provide synapomorphies supporting *Prostolonis* as a separate genus. The relationship of *Stolonis* and *Oxycrepis* taxa to *Loxandrus* is still problematic.

Under this concept for these genera, the four species that include individuals that are large, hirsute and have elongate-oval shaped pronota remain in *Oxycrepis* and the generally glabrous species with basally constricted pronota are included in *Stolonis*. *Stolonis* then is a genus that presently includes 18 species with a distribution from Paraguay to the southern United States. Most of the species are known from Brazil but many new forms await description from throughout the range of the genus. Especially numerous are the undescribed taxa with individuals that have maculate elytra. These unnamed maculate forms are not treated herein, but will be included in a future taxonomic revision and phylogenetic analyses of the tribe. Individuals of the species described here have already been used in investigations of pygidial defensive compounds (Will *et al.* 2000) and are important exemplars in an ongoing phylogenetic analysis of generic-level taxa in the tribe (Will unpublished). Therefore it is necessary to describe these species prior to the completion of the revision as a whole so that all of their morphological characters, DNA sequence data and life history information can be clearly tied to the specific taxonomic hypotheses represented by named individuals.

In addition to describing these new species, this work provides a key for adults of all the presently named species in these two genera as a background for further work, to allow for provisional sorting of museum materials and as a summary of what is known currently about species level diversity.

Materials and Methods

Methods. All methods and terms follow procedures outlined by Will (2002). Below, verbatim type specimen label data are enclosed in quotation marks and labels are separated by a forward slash. All specimen data have been entered into the Essig Museum of Entomology (EMEC), Berkeley, California, data base and individual records can be accessed online using the database numbers that are included on each specimen as listed below, e.g., EMEC1003610.

Motschulsky (1865) devised the genus-group name *Stolonis* without explanation of its etymology or gender. *Stolonis* could be based on any one of several Greek or Latin roots. However, no plausible root words can be formed in which *Stolonis* is a noun in the nominative singular case, though the genus must be treated as such (Article 11.8 (ICZN 1999)). *Stolonis* was originally combined with a noun in apposition (*notula*), rather than an adjective. Therefore Article 30.2.3, where the gender of the genus is indicated by its combination with an adjectival species-group name, does not apply. No gender was specified or indicated, so the name must to be treated as masculine (Article 30.2.4). Bates (1871) and Chaudoir (1873) treated *Stolonis* as feminine, as indicated by their use of the epithets *leucotela*, *apicata* and *intercepta*, the only three names in the genus that are formed with adjectival species-group names. However, this subsequent use is without explanation and cannot be used to determine Motschulsky's actual intent. The newly describe species and, as appropriate, previously described species names are formed or reformed to reflect the treatment of *Stolonis* as masculine.

Materials. I have studied, including dissection and/or detailed examination, exemplars representing all genera of Loxandriini. Specimens of *Stolonis* studied included the types deposited in institutional collections noted in the species descriptions below and types and/or confidently identified material in the Muséum National d'Histoire Naturelle, Paris (MNHN); Museo de Civico di Storia Naturale, Milano (including S.L. Straneo collection) (MCHN); and Carnegie Museum of Natural History, Pittsburgh, Pennsylvania (CMNH). I studied the type specimens or confidently identified material for all *Oxycrepis* and *Stolonis* species except *O. schadei*, *S. martinezi* and *S. willinki* (Mateu). I examined a single specimen that follows very closely the description of *S. willinki* but may be an unnamed form.

Key to adults of *Oxycrepis* Reiche and *Stolonis* Motschulsky

1. Pronotum and elytra densely pubescent. Pronotum elongate-oval, lateral margins without or with a short straight section near the slightly obtuse hind angles. Protibial spur smooth edged (*Oxycrepis* Reiche) 2
- 1'. Pronotum and elytra glabrous except for one to nine elongate setae on interval 3 or on 3, 5 and 7. Pronotum distinctly narrowed basally. Base produced beyond the baso-lateral setae in most species. Protibial spur serrulate along edge (*Stolonis* Motschulsky) 5
- 2(1). Antennomere 7 black or white at the apex only, 8–9 entirely white, 10 entirely white or black at the apex only 3
- 2'. Antennomeres 7–9 entirely white, 10 entirely black
..... *Oxycrepis schadei* van Emden [Paraguay]
- 3(2). Pronotum with arcuate lateral margins straight anterad short and obtuse, but obvious, hind angles 4
- 3'. Pronotal form oval, lateral margins continuous unto base, without hind angles
..... *Oxycrepis leucocera* Reiche [Brazil]
- 4(3). Hind angles of the pronotum very obtusely rounded, rounded lateral margin nearly extended to base..... *Oxycrepis brasiliensis* Tschitschérine [Brazil]
- 4'. Hind angles of pronotum obtuse, but nearly right angled, straight section of lateral margin distinct *Oxycrepis cordata* Tschitschérine [Brazil, Venezuela]
- 5(1'). Elytron with series of 6–9 setigerous punctures on interval 3 6
- 5'. Elytron with single dorsal setigerous puncture on interval 3 8
- 6(5). Elytron with series of setigerous punctures on interval 3 only (*Prostolonis* sensu Mateu, 1976)..... 7
- 6'. Elytron with series of setigerous punctures on intervals 3, 5 and 7
..... *Stolonis dimidiaticornis* (Dejean) [Brazil]
- 7(6). Nine setae on elytral interval 3. Pronotal lateral margins angulate
..... *Stolonis martinezi* (Mateu) [Venezuela]
- 7'. Six setae on elytral interval 3. Pronotal lateral margins rounded
..... *Stolonis willinki* (Mateu) [Paraguay]
- 8(5'). Distinct, nearly round, rufous colored spot present on intervals 1–3 and sometimes 4 or pale region restricted to interval 1 in apical third of elytra 9
- 8'. Without a rufous colored spot. At most only a light region at the apex and along the apico-lateral margins..... 12
- 9(8). Distinct, nearly round, rufous spot present on intervals 1–3 and partly on interval 4 in apical third of elytra..... 10
- 9'. Elytra lacking a distinct apical spot. Pale region restricted to interval 1 in apical third of elytron...
..... *Stolonis interceptus* (Chaudoir) [Mexico]
- 10(9). Antennomeres 7–9 white, 10 somewhat infuscated and 11 black..... 11

- 10'. Antennomeres 7–11 white *Stolonis leucotelus* Bates [Brazil]
- 11(10). Body length about 9mm..... *Stolonis fulvostigma* Bates [Brazil]
- 11'. Body length about 6.8mm..... *Stolonis notula* Motschulsky [Venezuela]
- 12(8'). Antennomeres 10–11 infuscated to blackish 13
- 12'. Antennomere 10 white, 11 white, lightly infuscated or black 14
- 13(12). Base of pronotum distinctly punctate and not depressed.....
..... *Stolonis leistoides* Bates [Brazil]
- 13'. Base of pronotum very shallowly punctate and depressed.....
..... *Stolonis laevicollis* Bates [Brazil]
- 14(12'). Pronotal hind setae at or near base (Figs. 2B–E), at most anterad base 1/3 or less distance from the hind seta to anterior setae..... 15
- 14'. Pronotal hind setae set far anterad base, about 3/4 distance from the hind seta to anterior setae..... 16
- 15(14). Pronotal hind setae slightly forward of base, margin with low rounded prominence at hind seta. Antennomeres 7–10 white, 11 slightly infuscated.....
..... *Stolonis parvulus* (Straneo) [Colombia]
- 15'. Pronotal hind setae at base (Fig. 2A), set in acutely pointed prominent hind angles. Antennomeres 7–10 white, 11 black..... *Stolonis tapiai* n. sp. [Ecuador]
- 16(14'). Pronotum wider than long; w/l = 1.28–1.3. Antennomeres 7–10 white, 11 black ...
..... 17
- 16'. Pronotum nearly as long as wide; w/l = 1.1. Antennomeres 7–11 white
..... *Stolonis ovaticollis* Bates [Brazil]
- 17(16). Angular process of margin at hind pronotal setae not evident 18
- 17'. Pronotal margins (Fig. 2B) with clearly evident, but very low rounded angular process at the hind setae *Stolonis scortensis* n. sp. [Ecuador]
- 18(17). Pronotal base (Fig. 2C) with shallow punctulae at least laterally..... 19
- 18'. Pronotal base impunctate..... *Stolonis spinosus* n. sp. [Ecuador]
- 19(18). Pronotal lateral margins clearly wider basad anterior setae, front angles prominent and lateral margin ending distant from base of head. Body length usually 6.0mm or longer..... 20
- 19'. Pronotal lateral margins only slightly wider basad anterior setae, front angles not prominent and lateral margin ending close to base of head. Small species, body length 5.8mm *Stolonis gracilis* Bates [Brazil]
- 20(19). Elytral striae densely and deeply punctate, intervals slightly or not crenulate or more notably so on the lateral intervals..... 21
20. Elytral striae broadly and shallowly punctate, intervals clearly crenulate anterad discal setae of interval 3 and laterally, striae with very few shallow punctulae posteriad discal setae or punctulae lacking *Stolonis yasuni* n. sp. [Ecuador]
- 21(20). Elytral striae uniformly deeply and densely punctate on disc and laterally, striae and punctures shallower to almost absent in apical third

- *Stolonis catenarius* n. sp [Ecuador]
 21'. Elytral stria more deeply punctate and intervals more crenulate laterally, striae and
 punctures similarly impressed along entire length
 *Stolonis apicatus* Bates [Brazil]

Species treatments

Stolonis tapiai Will, new species

(Figs. 1, 2A, 3A–D, 4A)

Type Material. HOLOTYPE: ♂ (EMEC). Labeled: "00°40'36"S 76°24'02"W, ECUADOR, Napo Prov., Yasuni Scientific Station, 22:IV:1998, Col.K.Will"/"U.C. Berkeley EMEC1003610" / [red label] "Holotype, *Stolonis tapiai*, K.Will". ALLOTYPE: ♀ (EMEC). Labeled: "00°40'36"S 76°24'02"W, ECUADOR, Napo Prov., Yasuni Scientific Station vic[inity]., 19:IV:1998, 210m Col.K.Will, Headlamp"/"U.C. Berkeley EMEC1003607"/ [red label] "Allotype, *Stolonis tapiai*, K.Will". PARATYPES: **Ecuador: Orellana Prov.:** Yasuni Scientific Station: 3♂♂ (EMEC), 22.iv.1998, headlamp, EMEC1003612, EMEC1003613, EMEC1003619; 1♀ (EMEC), 00°37 '03"S 76°28'00"W, 20.iv.1998, EMEC1003617. 00°40'36"S 76°24'02: 2♂♂ (EMEC), 22.iv.1998, EMEC1003620, EMEC1003621; 2♂♂ (EMEC), 22.iv.1998, treading in palm swamp, EMEC1003608, EMEC1003609; 1♂ (EMEC), 19.iv.1998. 210m, headlamp, EMEC1003614; 1♂ (EMEC), 20.iv.1998, 210m, headlamp/treading, EMEC1003606; 210m, headlamp, 6♂♂ and 7 ♀♀ 19.iv.1998. EMEC1003633, EMEC1003602 (QCAZ), EMEC1003632 (USNM), EMEC1003615, EMEC1003630 (CUIC), EMEC1003616, EMEC1003625, EMEC1003626 EMEC1003627, EMEC1003636, EMEC1003624, EMEC1003628, EMEC1003629, EMEC1003634 (EMEC). 7♂♂ and 3♀♀ 22.iv.1998. EMEC1003600 (USNM), EMEC1003603, EMEC1003604, EMEC1003605, EMEC1003611, EMEC1003618, EMEC1003622, EMEC1003623, EMEC1003637 (EMEC); 2 disarticulated ♂♂ 19.iv.1998. Headlamp, fallen *Ficus* fruits nr water, EMEC1004674 (DNA sequence data voucher, EMEC) and EMEC1004675 (EMEC).

Etymology: Noun in the genitive case, in honor of Italo Tapia, who assisted me during my field-work in Ecuador including my time collecting the type series of this beetle.

Diagnosis. Differs from all other species of *Stolonis* by the location of the hind setae of the pronotum at base of the pronotum, set in the acutely pointed, prominent hind angles (Fig. 2A).

Description. Length 8.5mm (8.0–9.1mm). Dorsal surface deep black, shiny, lightly iridescent; antennomeres 1–2 brunneous, 3 brunneous at base and black at apex, 4–6 and 11 black, 7–10 white; mouth parts brunneous and legs flavotestaceous with coxae, trochanters and ventral region of femora brunneous to black.



FIGURE 1. Dorsal habitus image of *Stolonis tapiai*, male paratype, EMEC1003614.

Form of head average build; eyes moderately prominent; frontal impressions well marked, rectangular or crescent form, short, nearly punctiform, length less than half distance from base of clypeus to anterior supraorbital setae; frons between eyes shiny, lightly iridescent near base, microlines scarcely evident even at magnification $>35\times$.

Pronotum (Fig. 2A) clearly broader than long; narrowly constricted at base; anterior submarginal sulcus deep and complete; basal impressions elongate, $>1/3$ length of pronotum; lateral margins broadly rounded and widely explanate, narrowly constricted onto base; hind angles very prominent, acute and at base of narrowly constricted region of pronotum; smooth or shallowly punctate over base, in basal impressions and basal $1/3$ – $1/2$ of lateral margin. Elytra, elongate oval, length 5.2mm, overall width 3.5mm; slightly convex, rounded and notably sinuate near apex; humeri sloped and rounded; striae densely, shallowly punctate, less evident apically; intervals, broad, slightly convex, shallowly crenulate, more broadly crenulate near base and laterally. Legs, moderately slender; meso- and metatarsi with prominent external sulcus; fifth tarsomeres ventrally glabrous. Ventral surface shiny, clearly iridescent; mesosternum with 8–10 deep, broad punctures; metasternum laterally with 6–8 deep broad punctures.

Base of abdominal sternum II with row of dense, deeply impressed punctures; metepisternum with medial sulcus very deeply impressed, slightly longer than wide ($l/w=1.4$); base of sterna IV–VII with dull band of coarse irregular microsculpture; sterna IV–VI with one pair paramedial setae; in male one pair paramedial setae on VII, female with two pairs. Aedeagus (Figs. 3A–D) with spines of endophallus in repose a cluster to left side near apex and a single spine to the left side near midpoint of blade. Female reproductive tract (Fig. 4A) with large right-side dorsolateral bursal pouch with a region of 1–12 irregular sclerotized plates (bs) ventro-apically on inner surface, smaller expanded region closely subtending a more narrowed region on which the broadly connected, stout spermatheca (sp) and common oviduct (co) connect; gland (sg) connected by short duct to base of spermatheca; laterotergites IX (lt) with scattered setae; gonocoxite-1 (gx1) with 6–7 apical setae; gonocoxite 2 (gx2) with 3 lateral ensiform setae, 2 apical nematiform setae. Pygidial gland reservoir form simple with no additional lobes, chemical compounds produced: formic and acetic acids, 2-pentadecanone and C10:0, C11:0 hydrocarbons (published as species number EC1998010 in Will *et al.* 2000).

Natural history and collecting information. Individuals active at night in very wet areas of primary tropical forest. Taken treading vegetation in muddy areas and near fallen *Ficus* and palm. Active and abundant on days with very heavy rains. Three larval instars and pupae were reared for this species in the laboratory. Eggs are relatively large and placed apparently randomly in the soil. Larvae were highly active. Six pigmented stemmata are present in the larvae.

Additional Material. Specimens examined but not included in type series: 2♂♂ and 2♀♀. EMEC1003601, EMEC1003635, EMEC1003638, EMEC1003631. The two males were reared in the lab in Ithaca, NY from the adults collected Ecuador: Orellana Prov.,

Yasuni Scientific Station 19.iv.1998. These specimens are not included in the type series as the males were lab-reared and not naturally occurring and the two females used for egg production were in extremely poor condition.

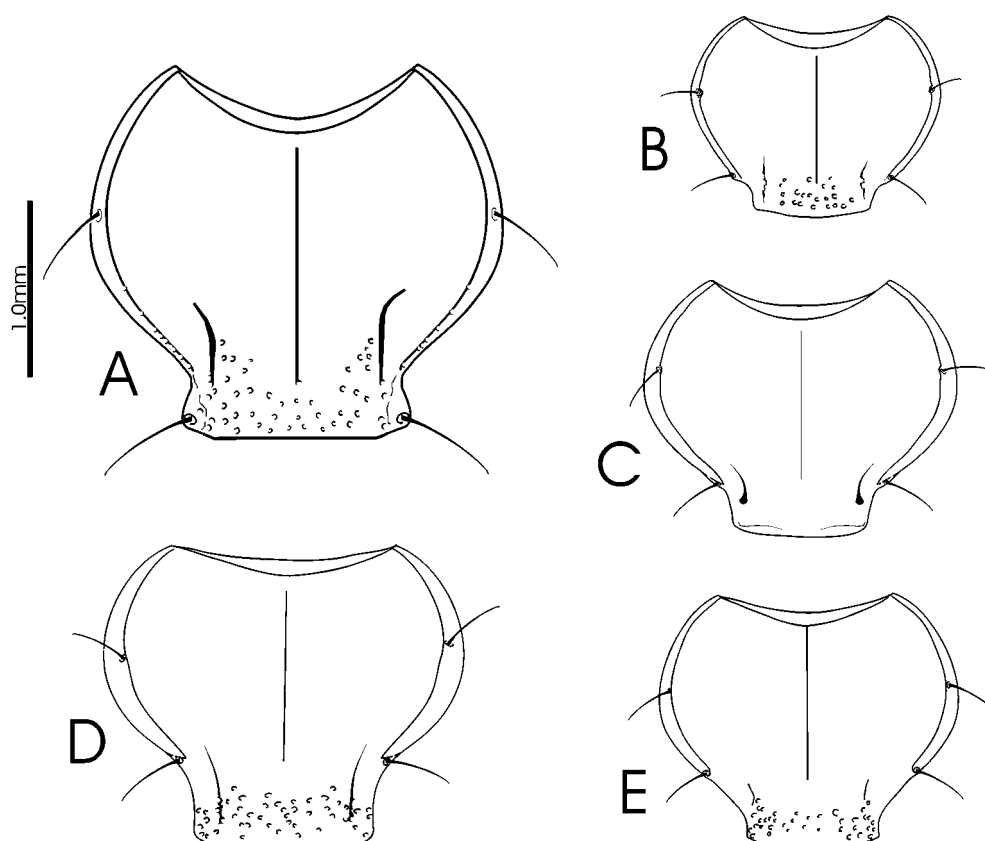


FIGURE 2. Pronota of: A—*Stolonis tapiai*, B—*Stolonis scortensis*, C—*Stolonis spinosus*, D—*Stolonis yasuni*, E—*Stolonis catenarius*.

***Stolonis scortensis* Will, new species**

(Figs. 2B, 3E–H)

Type Material. HOLOTYPE: ♂ (EMEC), dissected genitalia in vial, portions of the abdomen and a single hind leg stored in ethanol separate from point mounted body and genitalia. Labelled: "ECUADOR: SUCUMBIOS: Reserva Faunistica Cuyabeno, Nuevo Mundo cabins along Rio Cuyabeno at jcn with Lago Agrio–Tipishca HWY 19–29.iv.1994 W. Maddison #WPM 94-021"/ "EMEC1004673". Ethanol stored portion additionally labeled "kww38".

Etymology. Specific epithet formed by the junction of two Latin words, *scorteus*, -a, -um, "leather" and *ensis*, -is, m "sword" and refers to the leathery rugosities of the male median lobe.

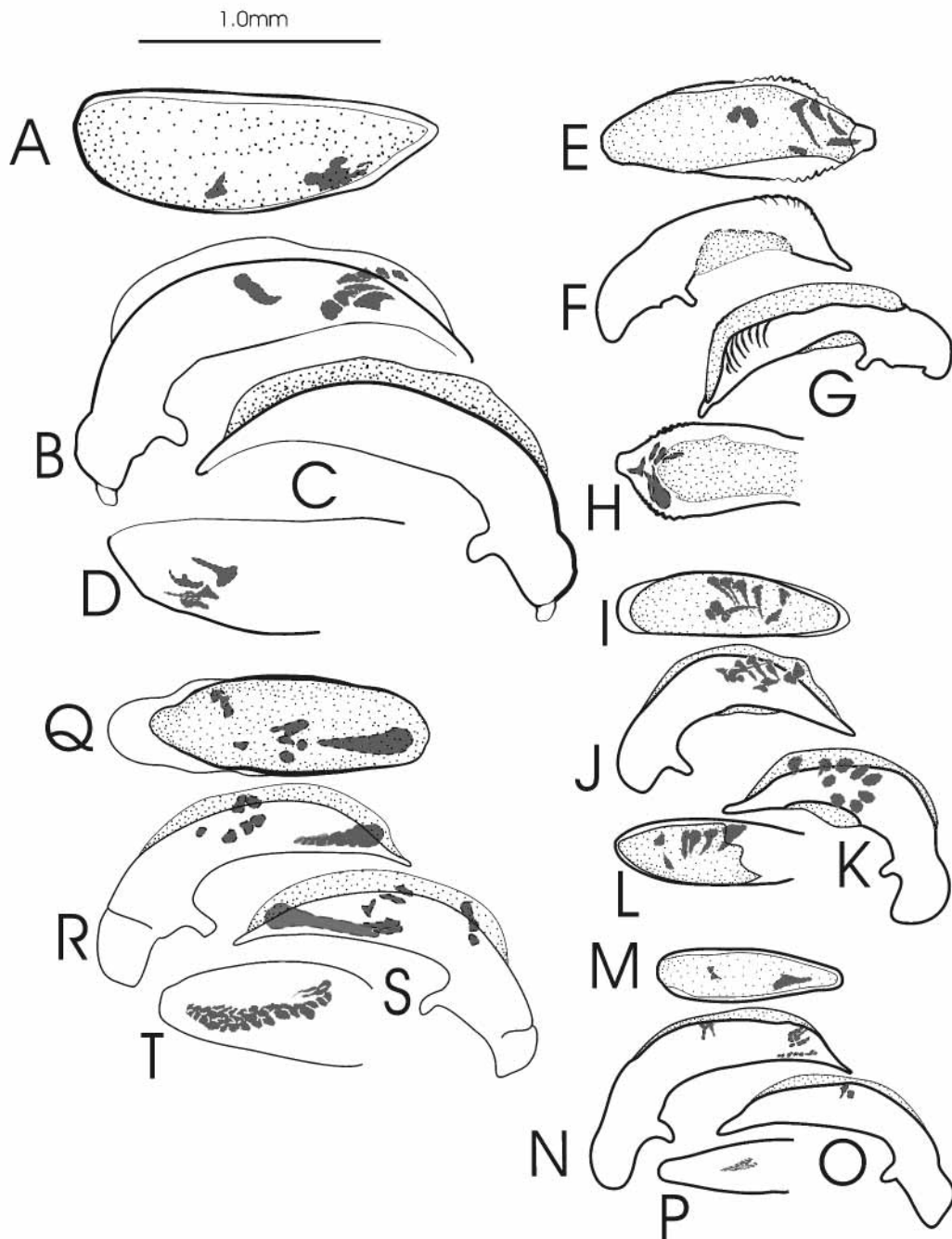


FIGURE 3. Aedeagus dorsal, left lateral, right lateral and ventral views of: A–D—*Stolonis tapiai*, E–H—*Stolonis scortensis*, I–L—*Stolonis spinosus*, M–P—*Stolonis yasuni*, Q–T—*Stolonis catenarius*.

Diagnosis. Differs from other *Stolonis* species by the combination of broad pronotum with narrowly expanded lateral margins, low rounded, but produced, angular process at the hind setae (Fig. 2B) and immaculate elytra. The laterally wrinkled median lobe of the aedeagus is diagnostic for males (Figs. 3E–H).

Description. Length 5.9mm. Dorsal surface black, shiny, lightly iridescent; antennomeres 1–3 brunneous, 4–6, base of 7 and 11 black, apex of 7 and 8–10 white; mouth parts brunneous and legs flavotestaceous with coxae darker, concolorous with ventral surface.

Form of head average build; eyes moderately prominent; frontal impressions not well marked, very short, punctiform, frons between eyes shiny, scarcely iridescent near base, microlines not evident.

Pronotum (Fig. 2B); clearly broader than long; narrowly constricted at base; anterior submarginal sulcus deep and complete; basal impressions short broad and not clearly defined apically; lateral margins broadly rounded and moderately explanate, of almost equal width throughout; low rounded, but produced, angular process at hind setae; base punctate between and in basal impressions. Elytra elongate oval, length 3.5mm, overall width 2.3mm, slightly convex, rounded and notably sinuate near apex; humeri sloped and rounded; striae densely, shallowly punctate; intervals broad, slightly convex, shallowly crenulate. Legs, moderately slender; meso- and metatarsi with evident, but shallow, external sulcus; fifth tarsomeres ventrally glabrous. Ventral surface shiny, clearly iridescent; mesosternum with 7 small, shallow punctures; metasternum laterally with 7 shallow, very small punctures.

Base of abdominal sternum II with row of shallowly impressed punctures; metepisternum longer than wide ($l/w = 1.5$); base of sterna IV–VII with band of dull, coarse irregular microsculpture; sterna IV–VI with one pair paramedial setae; in male one pair paramedial setae on VII. Aedeagus (Figs. 3E–H) with median lobe stout, small narrowed and blunt tip, slightly reflexed ventrally, ostium dorsal and very large; ventral surface broadly membranous medially; median lobe laterally irregularly strigate; endophallus in repose with 4 spines near apex, 2 subapical spines, and two spines located medially, arranged as in figures 3E–H. Females unknown so reproductive tract unstudied. Pygidial gland reservoir form simple with no additional lobes, chemical compounds produced unknown.

***Stolonis spinosus* Will, new species**

(Figs. 2C, 3I–L)

Type Material. HOLOTYPE: ♂ (EMEC), genitalia dissected. Labeled: "00°40'36"S 76°24'02"W, ECUADOR, Napo Prov., Yasuni Scientific Station, 22:IV:1998, 210m. Col.K.Will, Headlamp"/ "U.C. Berkeley EMEC1003666"/[red label] "Holotype, *Stolonis spinosus*, K.Will", ALLOTYPE: ♀, (EMEC), genitalia dissected. Labeled same as

holotype/"EMEC1003665"/[red label] "Allotype, *Stolonis spinosus*, K.Will".
PARATYPES: **Ecuador: Orellana Prov.:** Yasuni Scientific Station: 1♀ (EMEC), 00°40'36"S 76°24'02"W, 22:iv:1998, Col.K.Will, Treading in palm swamp, EMEC1003667; 3♂♂ (EMEC), headlamp, 210m, EMEC1003658, EMEC1003659, EMEC1003660; 4♂ EMEC1003661 (EMEC), EMEC1003663 (USNM), EMEC1003664 (CUIC), EMEC1003662 (QCAZ).

Etymology. Specific epithet is the Latin *spinosus*, *a, um* "of thorns" and refers to the many spines in the male endophallus.

Diagnosis. Differs from other *Stolonis* species by the combination of broad pronotum with broadly expanded lateral margins, impunctate base of the pronotum (Fig. 2C) and immaculate elytra. The numerous spines and their pattern in the endophallus (Figs. 3I–L) are diagnostic for males.

Description. Length 5.1mm (5.0–5.5mm). Dorsal surface black, vaguely paler at apex, shiny, lightly iridescent; antennomeres 1–3 brunneous or palpi infuscated and/or apex of antennomere 3 infuscated; antennomeres 4–6 and 11 black, 7–10 white; mouth parts brunneous and legs flavotestaceous with coxae concolorous or slightly lighter than ventral surface.

Form of head average build; eyes slightly prominent; no or very slight constriction behind eyes; frontal impressions marked but not clearly delimited dorsally and medially, shallow, short, length much less than half distance from base of clypeus to anterior supraorbital setae; frons between eyes shiny, scarcely iridescent near base, microlines not evident.

Pronotum (Fig. 2C); clearly broader than long; narrowly constricted at base; anterior submarginal sulcus deep and complete; basal impressions short, nearly punctiform, not evident apically or only as very shallow, broad depressions, slightly divergent when evident; lateral margins broadly rounded and widely explanate, constricted just apical hind setae; not evident basal hind setae; no angular process at the hind setae; base and basal impressions impunctate. Elytra, elongate oval, length 3.0mm, overall width 2.5mm; slightly convex, somewhat depressed in basal 1/3, form rounded and slightly sinuate near apex; humeri sloped and rounded; striae with moderately deep, small, dense punctures, somewhat less evident apically; intervals broad, nearly flat, only very slightly crenulate. Legs, slender; meso- and metatarsi with prominent external sulcus; fifth tarsomeres ventrally glabrous. Ventral surface shiny, iridescent mesosternum with 8–10 deep, punctures; metasternum laterally with 4–6 broad, deep punctures; metepisternum with medial sulcus moderately deeply impressed, slightly longer than wide ($l/w = 1.3$).

Base of abdominal sternum II with very narrow row of dense, moderately deeply impressed punctures; base of sterna IV–VII without evident coarse irregular microsculpture; sterna IV–VI with one pair paramedial setae; in male one pair paramedial setae and female with two pairs on VII. Aedeagus (Figs. 3I–L) with median lobe bluntly rounded and slightly asymmetrical tip, ostium dorsal and large; ventral surface distinctly

sclerotized; in repose endophallus with eight spines in form of ring in middle of median lobe in right lateral view, single spine closer to apex and small scale field left of midline from near apex to almost 1/4 length of median lobe, best visible in ventral view. Female reproductive tract with large, right dorsolateral bursal pouch, smaller expanded region closely subtending a more narrowed region on which the broadly connected, moderately stout and spermatheca and common oviduct connect; gland connected by a duct to base of spermatheca; laterotergites IX with scattered setae; gonocoxite-1 with 6 apical setae; gonocoxite 2 with 1–2 lateral ensiform setae, 1 apical nematiform seta. Pygidial gland reservoir form simple without additional lobes, chemical compounds produced unknown.

Natural history and collecting information. Night active in very wet areas of primary forest. Taken treading vegetation in muddy areas and near fallen *Ficus* and palm plants. Collected with *S. yasuni* and *S. catenarius*.

***Stolonis yasuni* Will, new species**

(Figs. 2D, 3M–P, 4B)

Type Material: HOLOTYPE: ♂ (EMEC) genitalia dissected. Labeled: "00°40'36S"/76°24'02"W, ECUADOR, Napo Prov., Yasuni Scientific Station, 19:IV:1998, 210m. Col.K.Will" / [red label] "*Stolonis yasuni*, K.Will" / "U.C.Berkeley EMEC1003668". ALLOTYPE: ♀ (EMEC), same data and deposition as holotype except database number, "EMEC1003669". PARATYPES: **Ecuador: Orellana Prov.:** Yasuni Scientific Station: 1 ♀ same data as holotype except database number EMEC1003680; 1 ♂ and 1 ♀ (QCAZ), same data as holotype except database numbers, EMEC1003670, EMEC1003671.

Etymology. Name is a noun in apposition of the name of the type locality, Yasuni Scientific Station, Orellana Province, Ecuador.

Diagnosis. Differs from other *Stolonis* species by the combination of broad pronotum (Fig. 2D) with broadly expanded lateral margins, immaculate elytra and basally crenulate and apically nearly smooth elytral intervals.

Description. Length 7.4mm (7.0–7.5mm). Dorsal surface deep black, shiny, lightly iridescent; antennomeres 1–3 brunneous; 4–6 and 11 black, 7–10 white; mouth parts brunneous and legs flavotestaceous with coxae and ventral region of femora infuscated.

Form of head average build; eyes moderately prominent; slightly constricted behind eyes; frontal impressions distinct, shallow, rectangular, short, length less than half distance from base of clypeus to anterior supraorbital setae; frons between eyes shiny, scarcely iridescent near base, microlines not evident.

Pronotum (Fig. 2D); clearly broader than long; narrowly constricted at base; anterior submarginal sulcus deep and complete; basal impressions of moderate length, 1/3 length of pronotum or less, very shallow apically, divergent apically when evident; lateral margins broadly rounded and widely explanate, constricted just apicad hind setae; not evident basad hind setae; no angular process at hind setae; shallowly punctate over base

and in basal impressions. Elytra, elongate oval, length 4.3mm, overall width 2.8mm; slightly convex, rounded and notably sinuate near apex; humeri sloped and rounded; striae shallowly and broadly punctate, punctures less evident to impunctate apically; intervals, broad, slightly convex, clearly crenulate in basal half and laterally, not or very superficially crenulate apical of discal setae on interval 3. Legs, slender; meso- and metatarsi with prominent external sulcus; fifth tarsomeres ventrally glabrous or with few very small setae. Ventral surface shiny, clearly iridescent; mesosternum with 8–10 deep, broad punctures; metasternum laterally with 6–8 deep broad punctures; metepisternum with medial sulcus very deeply impressed, slightly punctate, slightly longer than wide ($l/w = 1.3$).

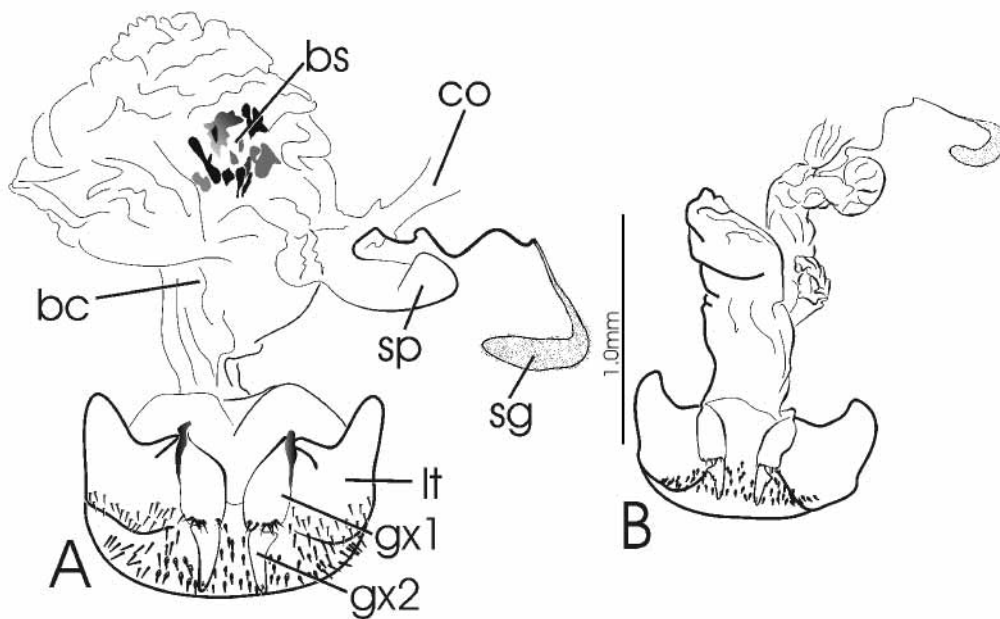


FIGURE 4. Female reproductive tract, ventral views of: A—*Stolonis tapiai*, B—*Stolonis yasuni*. bc, bursa copulatrix. bs, bursal sclerites. co, common oviduct. gx1, gonocoxite-1. gx2, gonocoxite-2. lt, laterotergite IX. sg, spermathecal gland. sp, spermatheca.

Base of abdominal sternum II with row of dense, moderately deeply impressed punctures; base of sterna IV–VII with dull band of coarse irregular microsculpture, more extensive on VII; sterna IV–VI with one pair paramedial setae; in male one pair paramedial setae on VII, female with two pairs. Aedeagus (Figs. 3M–P) with median lobe simply rounded at tip, ostium dorsal and large; ventral surface well sclerotized; in repose endophallus with clearly defined scale field near apex, left of midline and two spines located at $1/2$ length of median lobe. Female reproductive tract (Fig. 4B) with elongate, right dorsolateral bursal pouch, smaller expanded region subtending the broadly connected spermatheca and common oviduct; gland connected by a short duct to the subspermathecal

pouch; laterotergites IX with scattered setae; gonocoxite-1 with 5–7 apical setae; gonocoxite 2 with 2 lateral ensiform setae, 1 apical nematiform setae.

Pygidial gland form simple, no extra lobes, chemical compounds produced: formic and acetic acids, 2-pentadecanone and C10:0, C11:0 hydrocarbons (as species number EC199802O in Will *et al.* 2000).

Natural history and collecting information. Night active in very wet areas of primary forest. Taken treading vegetation in muddy areas and near fallen *Ficus* and palm plants. Collected with *S. catenarius* and *S. spinosus*. The first two larval instars were reared for this species in the laboratory. Six pigmented stemmata are present in the active larva.

***Stolonis catenarius* Will, new species**

(Figs. 2E, 3Q–T)

Type Material. HOLOTYPE: ♂ (EMEC), genitalia dissected. Labeled: "ECUADOR, Napo Prov., Yasuni Scientific Station, 22:IV:1998, 210m, Col.K.Will, Headlamp"/"U.C. Berkeley EMEC1003678"/[red label] "Holotype, *Stolonis catenarius*, K.Will". ALLOTYPE: ♀ (EMEC), Labeled same as holotype/"U.C. Berkeley EMEC1003678"/[red label] "Allotype, *Stolonis catenarius*, K.Will".

PARATYPES: **Ecuador: Orellana Prov.:** Yasuni Scientific Station, 00°40'36"S 76°24'02": 1♂ (QCAZ), "210m, Col.K.Will, Headlamp" EMEC1003674; 2 m EMEC1003679 (EMEC), EMEC1003681 (USNM); 1♀, (QZAC), 21:iv:1998, EMEC1003673; 1♀, (EMEC), 25:iv:1998, 210m, Col.K.Will, heading in palm swamp, EMEC1003675; 1♀ (EMEC); 25:iv:1998, 210m, Col.K.Will, headlamp, EMEC1003676.

Etymology. Specific epithet is based on the Latin word *catenarius*, *a, um*, "chains" and refers to the series of closely set punctures of the elytral striae.

Diagnosis. Differs from other *Stolonis* species by the combination of broad pronotum (Fig. 2E) with broadly expanded lateral margins, immaculate elytra and evenly and densely punctate elytral striae.

Description. Length 6.1mm (6.1–6.0mm). Dorsal surface black, vaguely paler at apex, shiny, lightly iridescent; antennomeres 1–3 brunneous or palpi paler; antennomeres 4–6 and 11 black, 7–10 white; mouth parts brunneous and legs flavotestaceous with coxae and trochanters concolorous with ventral surface or slightly more infuscated.

Form of head slightly broader than average build; eyes only slightly prominent; not or very slightly constricted behind eyes; frontal impressions well marked but not clearly delimited medially, shallow, nearly punctiform, short, length much less than half distance from base of clypeus to anterior supraorbital setae; frons between eyes shiny, scarcely iridescent near base, microlines not evident.

Pronotum (Fig. 2E); clearly broader than long; narrowly constricted at base; anterior submarginal sulcus deep and complete; basal impressions short, 1/3 length of pronotum or

less, very shallow apically and basally, apically divergent when evident; lateral margins broadly rounded and widely explanate, constricted just apical hind setae; not evident basal hind setae; without angular process at the hind setae; shallowly punctate over base and in basal impressions. Elytra, elongate oval, length 3.8mm, overall width 2.3mm; slightly convex, rounded and slightly sinuate near apex; humeri sloped and rounded; striae with moderately deep small, dense, punctures, somewhat less evident apically; intervals, broad, slightly convex, only slightly crenulate. Legs, slender; meso- and metatarsi with prominent external sulcus; fifth tarsomeres ventrally with two pair of very small setae or glabrous. Ventral surface shiny, clearly iridescent; mesosternum with 6–10 deep, broad punctures; metasternum laterally with 4–8 broad, more or less deep punctures; metepisternum with medial sulcus deeply impressed, slightly punctate, slightly longer than wide ($l/w = 1.2$).

Base of abdominal sternum II with row of dense, moderately deeply impressed punctures; base of sterna IV–VII with very narrow, dull band of coarse irregular microsculpture, restricted to lateral region in some specimens; sterna IV–VI with one pair paramedial setae; in male one pair paramedial setae on VII, female with two pairs. Aedeagus (Figs. 3Q–T) with median lobe bluntly rounded, slightly asymmetrical tip, ostium dorsal and large; ventral surface well sclerotized; in repose endophallus with clearly defined scale field left of midline from near apex to almost 1/2 length of median lobe, best visible in ventral view. Seven other spines arranged as in figure 3R. Female reproductive tract with large right dorsolateral bursal pouch, spermatheca broadly connected and stout; appended gland duct 3.5× length of spermatheca attached to spermatheca base; laterotergites IX with scattered setae; gonocoxite-1 with 5–6 apical setae; gonocoxite 2 with 2–3 lateral ensiform setae, 2 apical nematiform setae. Pygidial gland form simple, without any additional lobes, chemical compounds produced unknown.

Natural history and collecting information. Night active in very wet areas of primary forest. Taken treading vegetation in muddy areas and near fallen *Ficus* and palm plants. Collected with *S. yasuni* and *S. spinosus*.

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