

***Phrictopyga holmgreni* (Muir): New Record for Argentina and
Description of a New Parasitoid, *Gonatopus concinnus*
(Hemiptera: Delphacidae and Hymenoptera: Dryinidae)**

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ABSTRACT: The genus *Phrictopyga* Caldwell (Hemiptera: Delphacidae) was discovered for the first time in Argentina. *Phrictopyga holmgreni* (Muir) was collected in Corrientes and Misiones Provinces on Gramineae. The male holotype of *P. holmgreni* was reviewed and redescribed; the female was described and illustrated for the first time. A new parasitoid species, *Gonatopus concinnus* new species (Hymenoptera: Dryinidae) was reared from *P. holmgreni* in the above provinces. The new species is the first dryinid found to parasitize *Phrictopyga*.

KEY WORDS: *Phrictopyga holmgreni*, *Gonatopus concinnus*, Argentina, taxonomy

RESUMEN: Se cita por primera vez en la Argentina al género *Phrictopyga* Caldwell (Hemiptera: Delphacidae). *P. holmgreni* (Muir, 1931), descrita desde material capturado en Bolivia, fue recientemente colectada sobre gramíneas en las provincias argentinas de Corrientes y Misiones. Sobre la base del examen del holotipo de *P. holmgreni* y de los materiales recolectados, se describen e ilustran otros caracteres anatómicos de valor diagnóstico y se da a conocer por primera vez a la hembra de esta especie. Una nueva especie de parasitoide, *Gonatopus concinnus* nueva especie (Hymenoptera: Dryinidae), criado desde *P. holmgreni* en las provincias mencionadas, se describe e ilustra, representando el primer registro de Dryinidae parasitoidizando a *Phrictopyga*.

PALABRAS CLAVE: *Phrictopyga holmgreni*, *Gonatopus concinnus*, Argentina, taxonomía

The Neotropical genus *Phrictopyga* Caldwell, 1951 (Hemiptera: Delphacidae: Delphacini), was erected especially for six species described in 1926 by Muir and previously included in the genus *Kelisia* Fieber, 1866, though “not quite typical of the genus” (Muir, 1926, 1930).

Presently, *Phrictopyga* includes the following ten species: *P. contorta* (Muir, 1926)(= *Sogata parvula* Osborn, 1926), from Brazil, Jamaica and Puerto Rico; *holmgreni* (Muir, 1930), from Bolivia; *nugax* Fennah, 1959, from Trinidad; *occidentalis* (Muir, 1926)(= *Sogata aurantii* Osborn, 1938), from Mexico, Puerto Rico, Jamaica, Ecuador and Brazil; *semele* Fennah, 1959, from Trinidad; and, *curvistilus* (Muir, 1926), *escadensis* (Muir, 1926), *fuscovittata* (Muir, 1926), *graminicola* (Muir, 1926) and *urbana* (Muir, 1926), known only from Brazil (Bartlett, pers. comm.; Caldwell & Martorell, 1951; Fennah, 1959).

According to Caldwell & Martorell (1951), *Phrictopyga* is distinguished mainly by a slightly flattened elongate body that is generally ochraceous to light orange, and having the apical veins infusate. According to their key, they separate this genus by the presence of a well developed medioventral process of the male pygofer and the shape of the anal segment.

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No species of *Phrictopyga* had previously reported as far south as Argentina; however, in 2006 male and female specimens of *Phrictopyga holmgreni* (Muir) were collected in Corrientes and Misiones Provinces. Some individuals were parasitized by a new species of Dryinidae (Hymenoptera Chrysidoidea) described below.

The capture of *P. holmgreni* well outside of its previously reported range provides an opportunity to redescribe it, since the original description was incomplete and based only on males.

In addition, we describe the new species of dryinid parasite that we observed associated with this planthopper species. It belongs to *Gonatopus* Ljungh, 1810 (Dryinidae: Gonatopodinae), a genus present in Argentina with 37 species (Virla and Olmi, 2007, 2008a, 2008b) and characteristic for the big difference between female and male, so that the association of the opposite sexes is impossible without rearing.

The *Gonatopus* of Argentina are insufficiently known from the point of view of the association of opposite sexes and the knowledge of hosts (Virla and Olmi, 2008a).

Material and Methods

The description of *Phrictopyga holmgreni* follows mainly the terminology of Asche (1985), Remes Lenicov (1996) and, for the drumming organ, Ossiannilsson (1949). Measurements are given in millimeters, with the average (based on 4 specimens and holotype) followed by the range in parentheses and the following abbreviations are used: T.L.: total length (with tegmina included); B.L.: body length (head to abdominal tip); h.w.: maximum head width (including eyes); t.l.: tegmina length; t.w.: tegmina width; other measurements are relative.

The description of the new species of Dryinidae follows the terminology used by Olmi (1984, 1994, 1999) and Virla & Olmi (2007). Measurements are relative, except for the total length (head to abdominal tip, without the antennae), which is expressed in millimetres. In the descriptions POL is the distance between the inner edges of the lateral ocelli; OL is the distance between the inner edges of a lateral ocellus and the median ocellus; OOL is the distance from the outer edge of a lateral ocellus to the compound eye; OPL is the distance from the posterior edge of a lateral ocellus to the occipital carina; TL is the distance from the posterior edge of an eye to the occipital carina. Rearing data are abbreviated as follows: C = collection date of parasitized host; Cc = emergence date of mature dryinid larva.

The specimens of Dryinidae studied in this paper are deposited in the following collections: MOLC: Massimo Olmi's collection, c/o Department of Plant Protection, University of Tuscia, Viterbo, Italy; IMLA: Instituto de Zoología y Fundación Miguel Lillo, Universidad Nacional de Tucumán, S. Miguel de Tucumán, Argentina.

The holotype of *P. holmgreni* is deposited in the Swedish Museum of Natural History (SMNH); the specimens of *P. holmgreni* collected in Argentina are preserved in the collection of Facultad de Ciencias Naturales y Museo, La Plata, Argentina (MLP).

Results

Hemiptera: Delphacidae

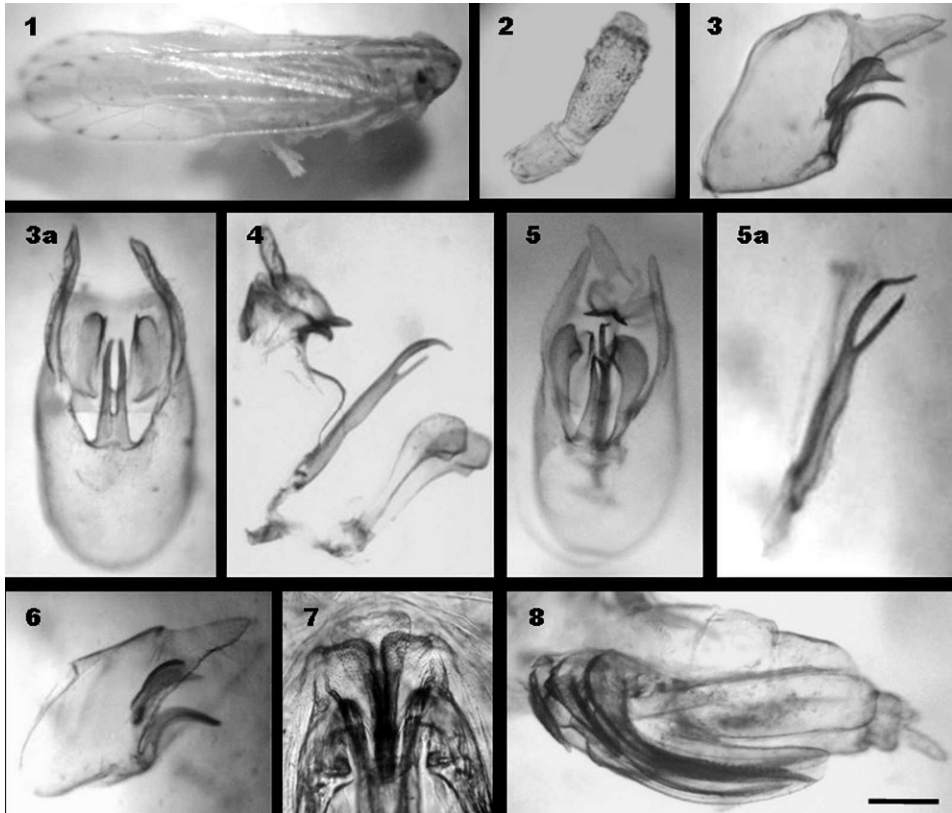
Phrictopyga holmgreni Muir

Kelisia holmgreni Muir, 1930: 213.

DIAGNOSIS: Distinguished from its congeners by the following combination of characters of male genitalia: anal angles of pygofer produced in a long, acute, dorsocaudally directed process laterally surpassing the anal segment. Medioventral process depressed within pygofer, strongly curved and bifurcated in two long, slender flat subparallel processes or spines four times as long as length of basal plate. Diaphragm strongly concave medially from caudal view; laterally forming two large lobes caudally projecting on inner sides in a sharp heavily thickened avicephaliform process. Parameres long, apically convergent, with apical half strongly dilated and produced into an angular process of the inner margin. Aedeagus subtubular, slightly curved ventrally, with a short, straight ventro-lateral process in distal third, apex ending in a slender process bent laterally. Anal segment with a pair of stout, outwardly curved spines. Externally this species resembles *P. curvistilus* (Muir), but the male can be distinguished by the shape and subparallel disposition of the medioventral pygofer process, parameres apically strongly dilated, aedeagus subtubular extending apically in a spine-like curved projection, with a ventrolateral subapical process (Figs. 3–6). Other male structures such as the outwardly curved spines on anal segment and the diaphragm show similar features. The interspecific relationships among females are not diagnostic because the female genitalic features have not been used in *Phrictopyga* systematics yet.

MALE (redescription based on four specimens from Argentina, in addition to holotype) (Figs. 1–6): T.L.: 3.79 mm (3.60–3.92 mm); B.L.: 2.81 mm (2.72–2.88 mm); h.w.: 0.72 mm; t.l.: 3.20 mm (3.04–3.28 mm); t.w.: 0.82 mm (0.80–0.88 mm). Stramineous to light yellow with three broad longitudinal white stripes, median stripe extending from middle of vertex to caudal apex of mesonotum, lateral stripes extending along the lateral carinae of pronotum and mesonotum. Legs with distal extremities of spines black. Tegmina hyaline, slightly yellowish, with veins lighter than membrane, a series of seven to eight fuscous marks on apical margin, one at distal apex of each apical vein (Fig. 1). Wings hyaline, slightly opalescent, with veins pale. Head with eyes distinctly narrower than pronotum. Vertex slightly longer than width at base (1.6:1); with distal apex rounded, slightly produced medially; lateral margins shallowly concave; basal margin as broad as greatest breadth of eye; basal compartments more than half as long as vertex, with surface shallowly concave, almost flat; inverted V and Y carinae distinct; apical cell triangular branching just at apex. Frons flat below the inflection line, ca. 1.5 times as long as its greatest breadth, with sides slightly curved at base, parallel towards the apex; frontal areas between the carinae shallowly concave; median carina simple, not prominent; with apical margin slightly concave. Postclypeus at base as wide as front; post- and anteclypeus together shorter than frons (0.9:1); lateral margins of postclypeus and median carinae prominent. Rostrum short, reaching the anterior margin of postcoxae, with subapical and apical segment subequal. Genae with a sharp oblique carina. Antennae hardly reaching base of clypeus; antennal segments subcylindrical, with I about as long as broad at distal apex; II about 2.5 as long as first, densely hairy, with few sensory fields (15–16/7) (Fig. 2).

Pronotum slightly broader than head (1.1:1), medially shorter than vertex (1:1.2), with posterior margin concave between carinae; carinae distinctly produced; lateral carinae slightly curved, diverging caudally, not reaching hind margin. Mesonotum flat, medially longer than pronotum (2.1:1), with slight carinae; lateral carinae straight, slightly diverging, vanishing near hind margin; median carina slightly



Figs. 1–8. *Phrictopyga holmgreni*: male holotype: 1, habitus lateral view (scale: 0.5 mm); 2, antennae (scale: 0.08 mm); 3, pygofer in lateral view (left side) (aedeagal complex and anal segment removed) (scale: 0.1 mm); 3a, pygofer in caudal view (aedeagal complex and anal segment removed) (scale: 0.2 mm); 4, aedeagal complex (aedeagus, parameres, suspensorium) and anal segment in lateral view (left side) (scale: 0.2 mm). Male: 5, terminalia in caudal view (scale: 0.2 mm); 5a, aedeagus and suspensorium in caudal view (scale: 0.1 mm); 6, pygofer in lateral view (left side) (aedeagal complex and anal segment removed) (scale: 0.2 mm). Female: 7, sternite VII and base of gonapophysis VIII in ventral view (scale: 0.06 mm); 8, female terminalia in left lateral view (scale: 0.2 mm).

shorter than lateral carinae, absent on scutellum. Posterior tibial spur, narrow, about as long as basitarsus (0.9:1), with inner margin provided of 16 sharp and black-tipped teeth. Posterior basitarsus more than twice as long as tarsal segments II + III (2.1:1). Tegmina hyaline, long, slender, with rounded distal apex, about four times as long as broad, slightly broader distally to the nodal line.

Drumming organ with apodemes of 2nd abdominal sternite short, sub-triangular, as long as wide, slightly erected dorsocaudally. Second abdominal tergum medially slightly convex, laterally flat and narrowing, with a pair of posteriorly convergent furrows connected by a straight transverse furrow and semi lunar apodemes projected behind them.

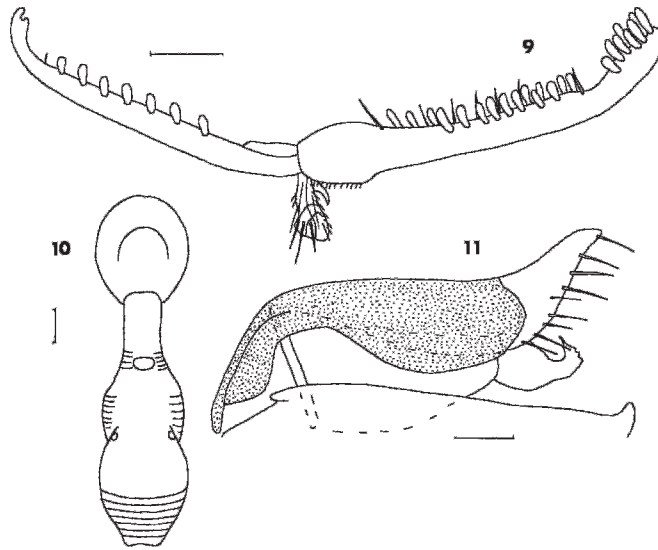
Male genitalia (Figs. 3–6): Anal emargination of pygofer deep large and straight; bearing a small rounded projection on each laterodorsal angle; in lateral view with anal angles produced in a long, acute, angular, dorsocaudally directed process surpassing anal segment laterally. Venter of genital segment 2.5 times as long as

dorsal side; ventral margin medially produced in a long curved process depressed within pygofer, turned upward and then curved ventro-caudally, with a small subquadrate base bifurcate in two long, slender, flat subparallel spine-like processes, which are 4 times as long as base. Diaphragm fairly long, filling almost the entire lower caudal half of pygofer; dorsal margin deeply U-shaped, medially notched, with two large thickened lobes projected caudally in a sharp avicephaliform process along the inner sides of both lobes (between which the aedeagus resides at rest); lower opening, small, dorsally convex (Figs. 3, 3a, 6). Parameres with distinctive short wide base, abruptly narrowed to a long stem strongly dilated in apical half; distal margin convex-truncate, inner angle acute - feebly produced and turned outward - and outer angle obtusely rounded; inner margin very slightly concave; outer margin straight on basal half, convex on distal half, apically convergent from posterior view, concave and curved ventrally on apical third in lateral view (Figs. 4, 5). Aedeagus long, subtubular, slightly compressed laterally, dorso-caudally directed; in lateral view slightly sinuate, gradually narrowed and ventrally curved distally, with a slender straight caudally directed ventro-lateral process arising from the apical fifth. Phallosome dorsoapical on right side. Connective short, Y-shaped at base, broadly fused with a membranous chamber at the base of the aedeagus. Suspensorium long, strap-like, slightly concave dorsally, with short dorsal arms (Figs. 4, 5a). Anal segment short, collar-like, with a pair of short, stout, outwardly curved spines on medio-ventral margin. Anal style slender and elongate, approximately four times as long as broad, twice as long as anal segment (Figs. 4, 5).

FEMALE (description based on 2 specimens from Argentina) (Figs. 7 and 8). T.L.: 4.00 mm; B.L.: 2.95 mm (2.90–3.00 mm); h.w.: 0.66 mm (0.64–0.69 mm); t.l.: 3.12 mm; t.w.: 0.80 mm. Pattern coloration and morphology resemble those of male. Genitalia: Sternite VII differentiated in a large triangular, slightly sclerotized scale ending in a narrow round projection, covering $\frac{1}{4}$ of gonapophyses VIII basally (= first valvulae) (Fig. 7). Ovipositor short, not exceeding abdominal apex (Fig. 8). Gonocoxa VIII covering ca. $\frac{1}{3}$ of tergite 9 antero-laterally, separated in repose, relatively broad, band-like, with anterior margin narrow, medial margin nearly straight with the greatest point of inflection well-defined near the distal apex. Gonapophyses of segment 8 strong, each meeting along medial margin, with inner basal angle subquadrate, minutely sculptured on ventral surface (Fig. 8). Gonoplac (= third valvulae) regularly broad, rounded distally, meeting along medial margin; gonapophyses IX slender, broader at base, strongly curved in basal half, with ca. 20–22 strong sharp teeth on dorsal margin in distal half; distal apex narrow, strongly angled.

MATERIAL EXAMINED: HOLOTYPE: Male, **BOLIVIA:** Tuiche, N. Holmgren (SMNH). Additional specimens: **ARGENTINA:** Misiones Province: 35 Km N El Soberbio, along Rd. 13, 30.XI.2006, on unidentified Graminaceae, M. Olmi coll. (6 males; 2 females); Corrientes Province: 7 Km.W Misiones border, along Rd. 12, 26.xi.2006, on unidentified Graminaceae, M. Olmi coll. (2 males) (MLP)

REMARKS: *Phrictopyga holmgreni* was previously known only from the type locality in Bolivia (Muir, 1930). Specimens reported here show small differences in the following structures of the male genitalia: aedeagus with more sinuose shaft and the ventro-lateral process distinctly longer (although this process of the holotype is apparently broken); distal margin of parameres with inner angle more feebly produced and the ventrocaudal process of pygofer quite curved (Figs. 5, 5a, 6). So



Figs. 9–11. *Gonatopus concinnus*: female holotype: 9, chela (scale: 0.10 mm); 10, mesosoma in dorsal view (scale: 0.15 mm); male paratype: 11, genitalia (right half removed; scale: 0.05 mm).

far we have considered that these differences could lie within the range of intraspecific variation, although more material - especially from geographically intermediate localities - is needed to consider the existence of geographical races.

Hymenoptera: Dryinidae

***Gonatopus concinnus* Olmi and Virla, new species**

DIAGNOSIS: *G. concinnus* belongs to *flavoides* group because the pronotum is crossed by a strong transverse furrow and the enlarged claw is provided with a strong subapical tooth and row of lamellae. The female of *G. concinnus* is similar to that of *G. variistriatus* (Fenton, 1927), by the testaceous color of the antennae and gaster, but the sides of metanotum are laterally protruding (Fig. 9) (not protruding in *G. variistriatus* (Fig. 866 in Olmi, 1984)). The male of *G. concinnus* is different from all other males of Neotropical *Gonatopus*, because of the shape of the dorsal process of parameres. It is in fact strap-shaped and lying along the inner margin of parameres (Fig. 11).

FEMALE: Apterous. Body length 3.12–3.62 mm (holotype 3.31 mm). Completely testaceous, except antennal segments 3–10 brown. Antennae clavate; antennal segments of the holotype in the following proportions: 7.5:5:14:7:6:6:5:5:5:7.5. Head excavated, dull, granulated; frontal line complete; occipital carina absent; POL = 3; OL = 3; OOL = 6. Greatest diameter of posterior ocelli: 1. Pronotum crossed by a strong transverse impression, dull, granulated. Scutum dull, granulated, laterally with no pointed apophyses. Metanotum flat, strongly transversely striate, not hollow behind scutellum. Sides of metanotum laterally protruding; protrusions rounded (Fig. 10). Metathorax + propodeum dull, granulated, with numerous transverse striae on posterior surface of propodeum, metapleura and mesopleura. Meso-metapleural suture obsolete. Fore tarsal segments in the following proportions: 15:2:5:15:22. Enlarged claw (Fig. 9) with large subapical tooth and row of 6–7

lamellae (7 in the holotype). Segment 5 of front tarsus (Fig. 9) with two rows of 15–21 lamellae (15 in the holotype); distal apex with a group of approximately 20 lamellae. Palpal formula 4/2. Tibial spurs 1, 0, 1.

MALE: Fully winged. Body length 2.31 mm. Head black, with mandibles testaceous. Antennae brown. Mesosoma black. Gaster brown. Legs testaceous, except coxae, femora and tibiae partly darkened. Antennae filiform; antennal segments in the following proportions: 4:4:8:6.5:6:6.5:6:6:6:7; antennal segment 3 more than three times as long as broad: 8:2. Head shiny, hairy, granulated, partly without sculpture; frontal line absent; occipital carina absent; POL = 6; OL = 2.5; OOL = 3. Greatest diameter of posterior ocelli: 2.5. Vertex without two oval smooth and shiny areas situated on the sides of the posterior ocelli and occupying the areas between the posterior ocelli and the eyes. Temples distinct. Occiput concave. Scutum finely punctate, without sculpture among the punctures, partly granulated. Notauli complete, posteriorly separated; minimum distance between the notauli shorter than greatest diameter of posterior ocelli: 1:2.5. Scutellum and metanotum shiny, finely punctate, without sculpture among the punctures. Propodeum dull, completely granulated. Forewing hyaline, without dark transverse bands; marginal cell open; stigmal vein curved, with distal part much longer than proximal part (16:7). Dorsal process of parameres (Fig. 11) reduced, band-shaped lying along the parameres. Palpal formula 4/2. Tibial spurs 1, 1, 2.

ETYMOLOGY: from the latin adjective *concinus* = fine (male gender).

MATERIAL EXAMINED: **HOLOTYPE:** Female, **ARGENTINA:** Misiones Province: 35 Km N El Soberbio, along Rd 13, C. 30.xi.2006, Cc. 3.xii.2006, M. Olmi coll., reared from adult of *Phrictopyga holmgreni* (Muir)(IMLA). **PARATYPES:** same locality label as holotype (1 female) (MOLC); same locality label as holotype, C. 30.xi.2006, Cc. 2.xii.2006 (1 male)(MOLC); Corrientes Province, 7 Km W of Misiones border, along Rd 12, C. 26.xi.2006, Cc. 27.xi.2006, M. Olmi reared from an adult of *Phrictopyga holmgreni* (Muir)(1 female)(MOLC). Additional specimen: **MEXICO:** Jalisco: Guadalajara, Zapopan, xi–xii.2004, G. Moya Raygoza reared from *Sogatella kolophon* (Kirkaldy)(Delphacidae)(1 female)(MOLC).

REMARKS: *G. concinns* new species is the first dryinid found to parasitize *Phrictopyga* (Guglielmino and Olmi, 1997, 2006, 2007).

Following the description of *G. concinns*, the key to the females of the Neotropical *Gonatopus* belonging to *flavoides* group (Olmi, 1991), can be modified by replacing couplet 10 as follows:

- 10 Antennae brown, with segment 10 whitish. *flavoides* Olmi
 - Antennae completely yellow-testaceous, or brown, with segments 1–2
 testaceous. 11
 11 Gaster black. *maidicolus* (Olmi)
 - Gaster testaceous 12
 12 Sides of metanotum rounded, not protruding laterally (Fig. 866 in Olmi,
 1984) *variistriatus* (Fenton)
 - Sides of metanotum laterally protruding; protrusions rounded
 (Fig. 10). *concinns*, new species

In addition, the key to the males of the Neotropical *Gonatopus* (Virla & Olmi, 2007) can be modified by replacing couplet 24 as follows:

- 24 Notauli complete 24'

- Notauli incomplete 34
- 24' Dorsal process of the parameres strap-shaped, lying along the inner margin of the parameres (Fig. 11) *concinus*, new species
- Dorsal process of the parameres not strap-shaped, distinctly separated from the parameres (Figs. 7, 19, 20, 25, 28, 30, 33, 34 in Virla & Olmi, 2007) . . . 25
- 25 Dorsal process of the parameres much shorter than parameres and with distal apex slender (Figs. 20, 33 in Virla & Olmi, 2007) 26
- Dorsal process of the parameres with distal apex broadened (Figs. 7, 19, 25, 28, 30 in Virla & Olmi, 2007); occasionally with distal apex slender, but in this case dorsal process approximately as long as parameres (Fig. 34 in Virla & Olmi, 2007). 27
- 26 Scutum dull, granulated; maxillary palpi with 3 segments . . . *costaricanus* Olmi
- Scutum shiny, finely punctate, without sculpture among the punctures, partly very slightly granulated; maxillary palpi with 4 segments. . *fidalgoi* Virla

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