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A new species of the Bug Genus *Empicoris* Wolff from Dominican Copal, with the Redescription of *E. nudus* McAtee & Malloch (Heteroptera: Reduviidae: Emesinae)

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With 10 figures.

Summary

A new species representing the peculiar carnivorous bug subfamily Emesinae (Reduviidae) in the Caribbean is described: *Empicoris copal* n. sp. from (sub)recent copal of the Dominican Republic (Amber Collection of the Staatliches Museum für Naturkunde in Stuttgart). The new species seems particularly closely related to *E. armatus* (Champion) and *E. nudus* McAtee & Malloch); the latter is redescribed upon the holotype from Florida. A synopsis of the stability and variability of a number of external characters and coloration in the three species in question is given.

Zusammenfassung

Eine neue Art der räuberischen Wanzen-Subfamilie Emesinae (Reduviidae) wird aus dem (sub)rezenten Kopal der Dominikanischen Republik beschrieben: *Empicoris copal* n. sp. (Bernsteinsammlung Stuttgart). Diese neue Art ist wahrscheinlich nahe verwandt mit *E. armatus* (Champion) und *E. nudus* McAtee & Malloch; letztere wird nach dem Holotypus aus Florida neu beschrieben. Ein Überblick über die Stabilität bzw. Variabilität einiger Struktur- und Farbmerkmale dieser drei Arten wird gegeben.

1. Introduction

The bug genus *Empicoris* Wolff 1811 is known to comprise about 50 species chiefly restricted to the tropics and subtropics of Asia, Australia, America and Africa. The almost two dozen American *Empicoris* species are mainly encountered in the Neotropical realm, of which the Central American and Caribbean fauna comprises no less than a dozen described forms.

The present paper is part of a series devoted to the Neotropical Emesinae (Reduviidae) from the famous Dominican Amber Collection of the Staatliches Museum für Naturkunde in Stuttgart (SMNS). This short article deals, however, not with a

Dominican amber inclusion, but with a (sub)recent copal specimen which, on base of a closer examination, has turned out to represent a still undescribed species of *Empicoris*. Moreover, among all the variety of known congeners the new Dominican species has happened to share the peculiar elevation at the hind margin of the pronotum only with *E. armatus* (CHAMPION 1898), widespread in Panama, Guatemala, Mexico, southern USA and the Greater Antilles, and *E. nudus* McATEE & MALLOCH 1925, from Florida and Mexico (s. MALDONADO CAPRILES & BRAILOVSKY 1983).

Unfortunately the original description of *E. nudus* is too poor to be of any value for comparison (s. McATEE & MALLOCH 1925), nor any illustrations were given. As regards *E. armatus*, its description and redescription are also highly incomplete (s. CHAMPION 1898, McATEE & MALLOCH 1925), and the sketches too formal and lacking details. Therefore, to be able to describe adequately the above Dominican copal *Empicoris*, I have restudied the holotype of *E. nudus* housed at the United States National Museum, Smithsonian Institution, Washington D.C. (USNM), and consulted Dr. W. R. DOLLING, of the British Museum (Natural History), London (BMNH), who kindly compared my own sketches with the type of *E. armatus* kept at the BMNH. These efforts have resulted in the confirmation that the Dominican copal specimen actually belongs to a different, new species.

Acknowledgements

I wish to express my deep gratitude to Dr. D. SCHLEE for the help and facilities provided for my research during my short stay at the SMNS. For the opportunity to restudy the type of *E. nudus*, I am deeply indebted to Dr. T. J. HENRY and Dr. A. S. MENKE, both USNM. Dr. W. R. DOLLING's kind assistance in comparing my drawings with the type of *E. armatus* at the BMNH are also highly appreciated. And finally I wish to acknowledge Dr. S. I. GOLOVATCH's help, who kindly checked the English of the manuscript.

2. Analysis of the characters

As base for the analysis I have chosen the characters of both external morphology and coloration in the new Dominican species, *E. copal* n. sp., and *E. nudus*, sometimes also of *E. armatus*, with the aim to elucidate the stability vs. variability from species to species.

Coloration. – I have already emphasized elsewhere (s. POPOV 1987) that in the Emesinae coloration varies considerably, though it still displays certain species characters. Thus, the coloration of antennomere 1 in both *E. copal* n. sp. and *E. nudus* is quite similar: 11 and 7 rings, respectively. However, in the latter species the rings are wider and arranged differently. In both of the species in question the base of antennomere 1 is pale, whereas in *armatus* it is darkened. The coloration of the rostrum seems particularly stable: a dark base and a midlength ring on rostral joint 1. However, a row of reduction can be traced as follows: in *armatus* almost the entire basal half is darkened, in *nudus* the basal ring is relatively wide, and in *copal* n. sp. the very base only is dark. The apex of rostral joint 3 is dark in *copal* n. sp., and this entire joint in *nudus* is pale.

The coloration of both head and thorax seems another good species character: in *nudus* and *armatus* there are narrow and wider pale stripes, respectively, on the head and pronotum, while in *copal* n. sp. the head and pronotum are entirely dark; the

meso- and metapleurae are uniformly dark brown in both *copal* n. sp. and *armatus*, but with pale longitudinal stripes in *nudus*.

The coloration of the extremities seems to be species-characteristic, though certain rings, i.e. their size and number, may turn to be variable even within one and the same species. In general, in *nudus* these rings seem to be wider than in *copal* n. sp., thus making the background darker (Fig. 1). The coloration of the fore legs may be a good character as well: in *nudus*, coxae 1 are pale due to the greatly reduced and poorly coloured subapical ring, whereas in *copal* n. sp. there are a wide subapical and a narrow submedial ring, both being better developed. Also the femora and tibiae are differently coloured in the fore legs of the two species in question (see f_1 and t_1 in Fig. 1). In all the leg-pairs, the tarsi are coloured species-characteristically, too.

The scutellar spine and the spine of abdominal segment 1 are dark in *nudus*, but in *copal* n. sp. all spines are pale but for the base of the scutellar spine, while in *armatus* the latter is dark brown but for the pale tip, whereas the metathoracic spine is light and that of abdominal segment 1 is dark brown.

The hemelytra are coloured species-characteristically as well. The pterostigma has a medial spot in *nudus* and *armatus*, but it is almost entirely dark in *copal* n. sp.; the base of the hemelytra is spotty in *copal* n. sp. and *armatus*, but pale in *nudus*; the cells lying between the discoidal cell and costal margin are almost completely dark in *nudus* and spotty in *copal* n. sp.; the shape and distribution of the dark patches behind the pterostigma along the anterior margin is also different in all the three compared species (s. Figs. 5 and 9).

Body morphology. – An analysis of external morphological characters has revealed the significance of some of them in the systematics of the species involved. Thus, the anterior and posterior lobes of the head are equally long in *copal* n. sp., whereas the anterior lobe is significantly longer (1.33:1) than the posterior one in *nudus*. Besides, the length ratio of eye and postocular head is 1.15:1 in both *nudus* and *copal* n. sp., but it is 1.62:1 in *armatus*, while the height ratio of head and eye is 1.3:1 in *nudus* and 1.2:1 in *copal* n. sp. Furthermore, rostral joint 1 is relatively short and rostral joint 2 relatively long in *nudus* as compared to *copal* n. sp.; joint 3 is subequal in lenght to 2nd in *nudus*, but longer than 2nd in *copal* n. sp. Antennae seem to be relatively shorter in *nudus* than in *copal* n. sp. (antennomere 1 shorter almost by 1 mm).

The pronotum displays perhaps the best diagnostic differences: The posterior lobe is twice as long as the anterior one in *copal* n. sp., but only 1.7 in *nudus*. Besides, *copal* n. sp. differs strikingly from either *armatus* or *nudus* by the flap-like projections on the humeri. (A similar projection on the humerus is met with only in the American *incredibilis* Wygodzinsky 1966). The shape of the hind marginal elevation of pronotum is also a good character distinguishing all the three species compared.

The spines of the scutellum, metathorax, and abdominal segment 1 are long in all of the tree species in question, though a little different in shape and inclination from species to species.

When comparing the legs of *copal* n. sp. and *nudus*, those of the latter happen to be somewhat shorter, particularly the anterior pair. Thus, in *nudus* and *copal* n. sp. the length ratio of head and coxa 1 is 1.18:1 and 1.3:1, respectively, the length/width ratio of coxa 1 is 4.3:1 and 8.6:1, respectively, the length ratio of coxa 1 and femur 1 is 1:2.1 and 1:1.9, respectively, the length ratio of femur 1 and tibia 1 is 1:1.3 and 1:1.2, respectively, the length/width ratio of femur 1 is 8.5:1 and 12.8:1, respectively.

The hemelytra are also well different; in *nudus* they are wider (3.4:1), pointed at apex, while less wide (4.0:1) and widely rounded at apex in *copal* n. sp. In the latter the discal cell is long (3.7:1), but in *nudus* it is shorter (2.2:1).

3. Descriptions

Empicoris copal n. sp.

Figs. 1–6

Holotype: ♂ from Dominican copal of Hispaniola. Deposited in SMNS, Inv.-Nr. DoC-3050-E.

Derivatio nominis: Named after copal, the (sub)recent resin harbouring the holotype.

Description: Length from apices of hemelytra 4.6 mm; maximum length of hemelytra 3.6 mm, width 0.8 mm; length of head 0.46 mm (0.23 + 0.23), length of pronotum 0.72 mm (0.26 + 0.53).

General coloration dark, in vivo perhaps rubro-argillaceous, paler parts perhaps whitish or straw yellow. Light vittae, stripes and other pattern elements present (Figs. 1–5). Head and pronotum with microscopical, delicate, scattered hairs; antennomere 1 with short adpressed hairs. Head, thorax and abdomen with background colour devoid of white stripes; posterior lobe of pronotum paler than background. Base and medial ring of rostral joint 1, as well as general colour of joint 2, and apex of joint 3 dark. Antennomere 1 with 8 dark and 3 feebly coloured rings (Fig. 1a). Lateral carinae, flap-like projection of humerus, and hind margin of pronotum white. Spines of scutellum (except base), metanotum and abdominal segment 1 pale. Fore legs light; coxa 1 with 2 rings (thin submedial and wider subapical), femur with 4 rings (subbasal and subapical very wide), tibia with 3 rings (subbasal somewhat thinner), tarsus with light joint 1, base and apex of joint 2 also pale. Middle and hind legs light, with dark coxae and rings; femur 2 with 7 rings (wide subapical), tibia 2 with 15 rings (wide apical); femur 3 with 13 rings (mostly thin), tibia 3 with 16 rings (mostly thin, apical one wide) (Fig. 1a). Tarsi 2 and 3 entirely dark. Hemelytra light, with numerous darker spots, patterns as in Fig. 5; basal part striped, pterostigma mostly dark, cell between discal cell and costal margin spotted. Hind wings without any spots.

Abdomen with light spiracles; anterior half of connexival segments light both dorsally and ventrally.

Shape of head as in Fig. 2; anteocular portion equal to postocular one. Eyes rather large, semicircular; head height/eye height = 1.2:1 (in lateral view). Eye length/postocular length of head 1.15:1. Rostrum as in Fig. 2; joint 1 equal to joints 2 and 3 combined; joint 2 conspicuously shorter than joint 3, their ratio in mm 0.37:0.16:0.21. Antennae clothed with very short and dense, adpressed hairs; length of joint 1 is 2.85 mm.

Pronotum as in Fig. 2; surface very smooth, beset with suberect hairs scattered throughout the surface; posterior lobe twice as long as anterior one; humeral angles of posterior lobe well-developed; humeri with 1+1 laterally projecting, flap-like, vertical protuberances; lateral carinae complete; elevation at hind margin of pronotum large and pointed at apex. Spines of scutellum, of metanotum and of abdo-

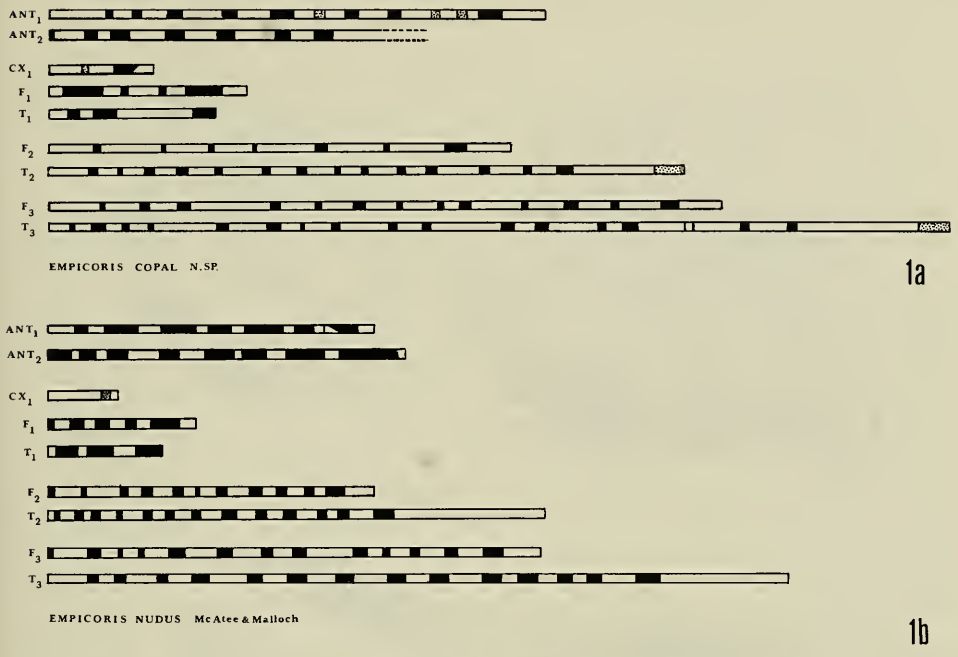


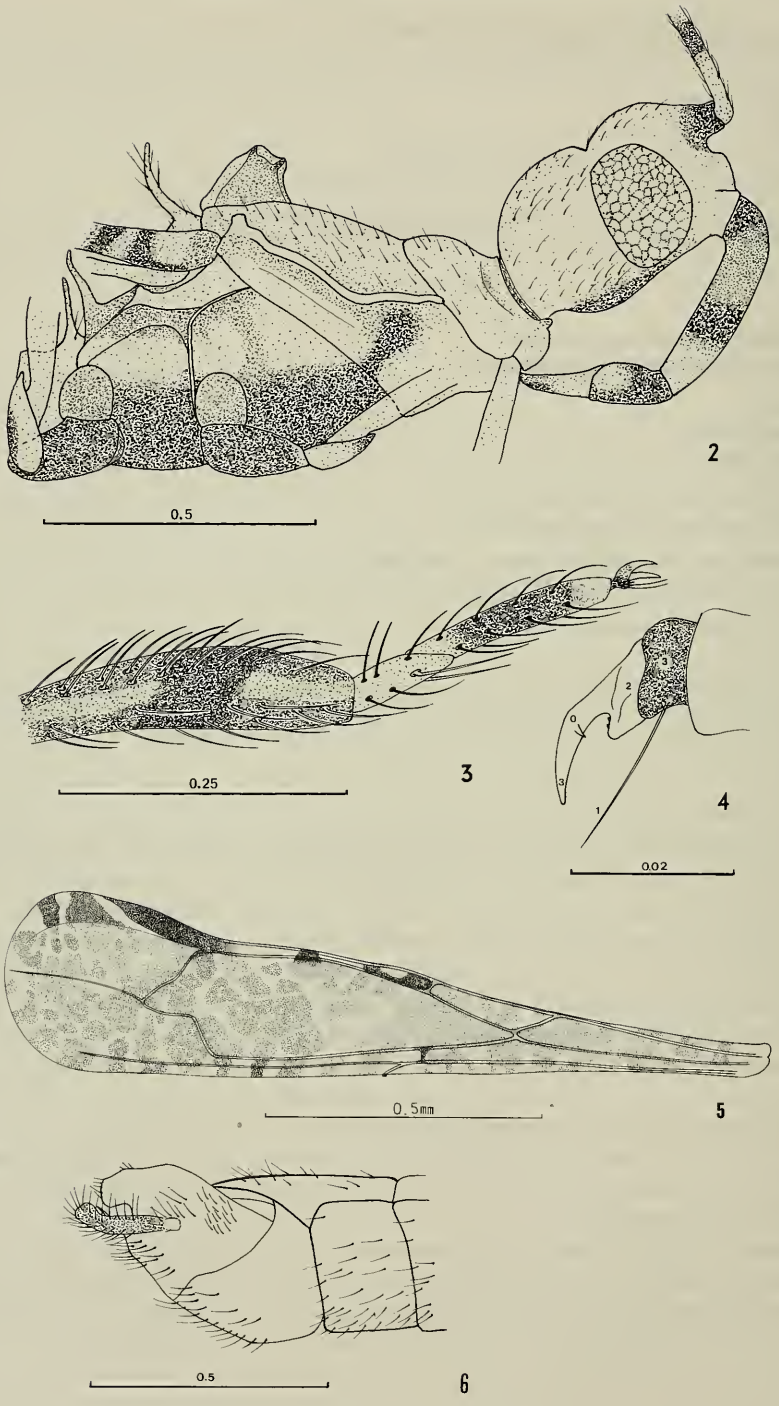
Fig. 1. Distribution of colour patterns on antennae (ant_1), coxa 1 (cx_1), femur 1 (f_1), tibia 1 (t_1), femur 2 (f_2), tibia 2 (t_2), femur 3 (f_3) and tibia 3 (t_3) (drawn not to scale): a: *Empicoris copal* n.sp., ♂ holotype; b: *Empicoris nudus*, ♀ holotype.

minal segment 1 long and slender, pointed at apex, vertical; those of scutellum and metanotum slightly curved, that of abdominal segment 1 straight and shorter (Fig. 2).

Fore legs slender, clothed with short hairs, shorter than diameter of coxa and femur. Coxa 1, femur 1 and tibia 1 in mm as 0.6:1.12:0.95. Coxa 1 slender, rather long, 1.3 times as long as head and 8.6 times as long as wide; femur 1 ca. 1.2 times longer than tibia 1 and ca. 13 times as long as wide; femur 1 ventrally with two rows of short, numerous, spiniform processes which do not exceed femoral diameter, about 40 processes in either row. Middle femur and tibia in mm as 2.65 and 2.9, hind femur and tibia in mm as 3.87 and 5.12. Tarsal joint 2 of leg 1 twice as long as joint 1. Claws straight, distal part pale, on ventral side with two minute teeth, basally with two long chaetae distinctly projecting beyond claw proper (Fig. 4).

Hemelytra quite narrow, apically widely rounded, slightly surpassing apex of abdomen by ca. 0.5 mm; their pattern and venation as in Fig. 5; discal cell quite long, 3.7 times as long as wide.

Abdomen gradually broadening toward apex; genital segment as in Fig. 6; last tergite tapering toward pointed apex and projects above basal part of pygophore; latter with a quite long, needle-shaped apophysis covered by apically curved parameres (Fig. 6); surface of pygophore clothed partly with short and delicate hairs.



Figs. 2–6. *Empicoris copal* n. sp., ♂ holotype.
2: Head, thorax and abdominal segment 1 (lateral view).
3: Distal part of tibia 1 and entire tarsus 1.
4: Claws 1.
5: Hemelytron.
6: Hypopygium (lateral view).

Empicoris nudus McAtee & Malloch 1925
Figs. 7–10

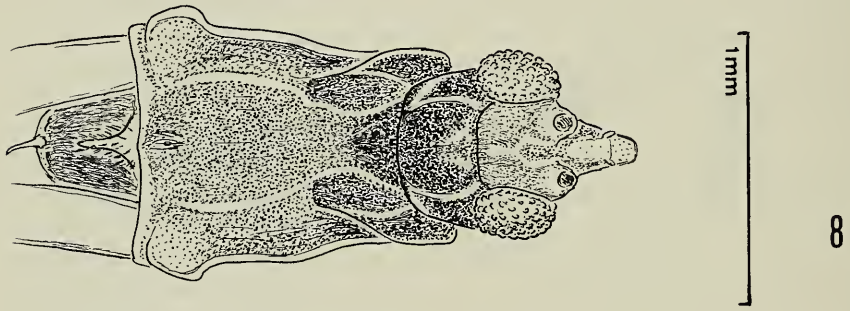
1925 *Empicoris nudus* McAtee & Malloch, Proc. U.S. Natn. Mus. **67**, 2573: 22.
1966 *Empicoris nudus* Wygodzinsky, Bull. Amer. Mus. Nat. Hist. **133**: 381.

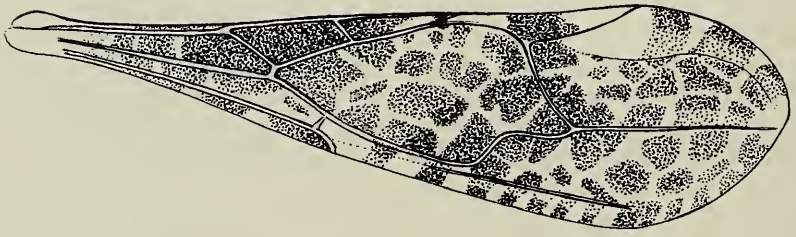
Holotype: ♀ (USNM), USA, Florida, Paradise Key, 6 March 1919, leg. E. A. Schwarz & H. S. Barber (Inv.-Nr. 26706, USNM).

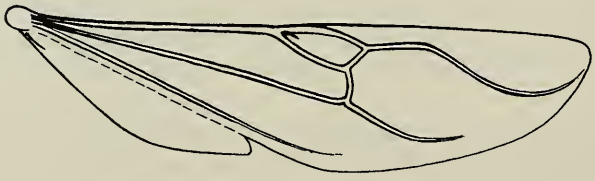
Redescription: Length from apices of hemelytra 3.9 mm; length of hemelytra 2.95 mm, width 0.87 mm; length of head 0.49 mm (0.28 + 0.21), width 0.4 mm; length of pronotum 0.64 mm (0.26 + 0.44), width 0.55 mm.

General coloration rubro-argillaceous to argillaceous, with white or whitish stripes and other pattern elements (Figs. 7 and 8). Antennae with very short, adpressed hairs, denser on joints 3 and 4, sparser on joint 2. Head, pronotum, meso- and metapleurae with adpressed, silvery white, wool-like pubescence forming very conspicuous stripes dorsally and laterally (Figs. 7 and 8). Head of background colour; anterior lobe dorsally with an Y-shaped median marking; posterior lobe dorsally with two regularly arched, longitudinal stripes, white stripes at anterior border form an incomplete triangle, lateral sides with two white longitudinal stripes, ventral side with four short stripes (Fig. 8). Rostrum: basal part and medial ring of joint 1, as well as basal part of joint 2 brown, joint 3 entirely whitish. Antennomeres 1 and 2 with rather wide argillaceous rings (7 and 8, respectively) (Fig. 1b). Pronotum rubro-argillaceous, posterior lobe paler, with two short, white, arched lines on anterior lobe and two long, arched lines ending near hind margin of pronotum; lateral carinae, humeral angles and hind margin whitish (Fig. 8). Scutellum, meso- and metanotum, abdomen argillaceous. Spines of scutellum and of abdominal segment 1 argillaceous, spine of metathorax whitish. Meta- and mesopleurae with three white longitudinal stripes. Fore legs whitish; coxa 1 with one narrow, fine, subapical ring; trochanter with argillaceous apical part; femur with five argillaceous rings (subapical ring very wide); tibia with 3 wide rings; tarsus 1 with white joint 1; except pale apex, joint 2 entirely argillaceous. Middle and hind legs whitish, with argillaceous coxae and rings; femur 2 with 11 rings and tibia 2 with 13 narrow rings (last submedial ring wide, but distal part pale); femur 3 with 13 rings (mostly wide) and tibia 3 with 14 rings (mostly wide, distal part pale) (Fig. 1b). Tarsi 2 and 3 entirely pale argillaceous. Hemelytra rubro-argillaceous, with numerous spots; their pattern as in Fig. 9; base white, middle and distal parts slightly lighter, pterostigma with one large medial spot; cells between discal cell and costal margin in basal part of wing almost entirely dark, patches behind pterostigma and apex of hemelytron transparent, between the patches along fore margin of wing three dark patches. Hind wing without any spots. Pubescence of prothoracic ventral surface forming two conspicuous arcuate stripes, that of ventral surface of meso- and metathorax dense, very short, almost everywhere adpressed; pubescence of ventral surface of abdomen sparser, very short, delicate, adpressed everywhere.

Shape of head as in Figs. 7 and 8; anteocular part 1.33 times as long as postocular one. Eyes rather large, semicircular; in lateral view the head height is 1.3 times as long as eye height; length ratio of eye and postocular part of head is 1:1.15 in lateral aspect; in dorsal view the interocular isthmus is 1.5 times as wide as the eye. Rostrum: joint 1 almost equal to joints 2 and 3 combined, joint 2 slightly shorter than 3rd, their ratio being in mm as 0.32:0.18:0.2. Antennae clothed with very short, dense, adpressed hairs, denser on joints 3 and 4; there are some long and sparse, erect







Figs. 7–10. *Empicoris nudus*, ♀ holotype.
7: Head, thorax and abdominal segment 1 (lateral view).
8: Head, thorax and scutellum (dorsal view).
9: Hemelytron.
10: Hind wing.

hairs each exceeding the diameter of the joints; ratio of antennomeres 1–4 in mm as 1.87:2.05:0.57:0.32, respectively. Pronotum as in Fig. 8; surface rather smooth, hairless; posterior margin distinctly straight. Anterior lobe 1.4 times as wide as long, its centre rather deeply impressed. Posterior lobe 1.29 times as wide as long; humeral angles well-developed, elevation at hind border slightly compressed from sides, pointed at apex (Fig. 7); lateral carinae complete. Spines of scutellum, of metanotum and of abdominal segment 1 long and slender, subvertical, straight, directed backward, subequal in length; spine of abdominal segment 1 with a rounded apex. Fore legs stout, with short hairs shorter than diameter of joints (Fig. 7). Length of coxa 1, femur 1 and tibia 1 in mm as 0.4:0.85:0.65. Coxa 1 stout, rather short, slightly shorter than head's length and 4.3 times as long as wide; femur 1 ca. 1.3 times as long as tibia 1 and ca. 8.6 times longer than wide; femur 1 ventrally with two rows of numerous spiniform processes, with three of these spines particularly well-developed and situated on basal part of the joint (Fig. 7). Femur 2 and tibia 2 in mm as 1.87 and 2.85. Femur 3 and tibia 3 in mm as 2.82 and 4.25.

Hemelytra relatively wide, apically slightly pointed, surpassing apex of abdomen by 0.8 mm; their pattern and venation as in Fig. 9; discal cell quite short, ca. 2.2 times longer than wide. Hind wing as in Fig. 10; A_2 greatly reduced.

Abdomen widest at segments 4–5; first four segments paler argillaceous than subsequent ones.

Distribution: Besides the locus typicus (Florida), this species has been recorded from Mexico City, Mexico (MALDONADO CAPRILES & BRAILOVSKY 1983).

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