

A new species of *Proctolaelaps* Berlese (Acari: Mesostigmata: Melicharidae) from the Dominican Republic

Cristina Antonia Gómez-Moya ^{a,b}, João Pedro Inez Martin ^c, Andrea O. Feliz Lebrón ^b, Gilberto J. de Moraes ^c

^a Universidad Tecnológica del Cibao Oriental (UTECO). Ave. Universitaria 10, Cotui, Provincia Sánchez Ramírez, Dominican Republic.

^b Instituto Dominicano de Investigaciones Agropecuarias y Forestales (IDIAF), C. Rafael Augusto Sánchez 89, Santo Domingo, Dominican Republic.

^c Depto. Entomologia e Acarologia, Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo (ESALQ-USP), Piracicaba-SP, Brazil.

Original research

ABSTRACT

A new species, *Proctolaelaps elcotoy* Gómez-Moya & Martin, n. sp., is described from the Dominican Republic (in the Hispaniola Island), based on adult females and males collected from adults of *Conotelus* sp. (Coleoptera: Nitidulidae) found in flowers of passionfruit (*Passiflora edulis* Sims, Passifloraceae). *Conotelus* species have been reported in Brazil to cause significant damage to passionfruit.

Keywords *Conotelus*; passionfruit; predatory mite; Hispaniola Island

Zoobank <http://zoobank.org/2A6E53FE-3187-4F02-AFA4-9D41B3E56F3E>

Introduction

After the important citrus disease known as greening or Huanglongbing reached the Dominican Republic (Matos *et al.* 2009), country located on Hispaniola Island in the Caribbean region, the interest for the cultivation of passionfruit (*Passiflora edulis* Sims) increased considerably, to replace citrus cultivation. As a consequence, the interest to determine the organisms associated with passionfruit has also increased. Little is known about the phytosanitary problems affecting this crop in the Dominican Republic (Valdez *et al.* 2016), but recent investigations have shown the common presence of adult beetles (Coleoptera) of the family Nitidulidae in the flowers. Studies conducted in different parts of Brazil have shown the presence of the following nitidulid species in passionfruit flowers: *Brachypeplus* sp. (Azevedo *et al.* 2005), *Conotelus* sp. (Potin *et al.* 2016) and *Conotelus luteicornis* Erichson (Souza Santos *et al.* 2021; Souza Santos 2022). An unidentified species of *Conotelus* has been mentioned to cause about 80% yield losses in passionfruit in western Brazil, where the insect is found throughout the year (Potin *et al.* 2016).

Examination of the beetles collected in the Dominican Republic showed the presence of numerous pale-yellow mites, moving quickly over the whole beetle. The objective of this publication is to present the description of a new species found in this study.

Material and methods

Samples of leaves, flowers and fruits of *P. edulis* were collected from plants of commercial cultivations and transported in plastic bags to the laboratory for examination. The samples were examined under dissecting microscopes, collecting all mites found in association with adults of an unidentified species of the beetle *Conotelus* (Coleoptera: Nitidulidae) and mounting them in

Received 24 April 2023

Accepted 21 June 2023

Published 05 July 2023

Corresponding author

Academic editor
Faraji, Farid

<https://doi.org/10.24349/np6y-3o4v>

ISSN 0044-586X (print)

ISSN 2107-7207 (electronic)



Gómez-Moya C. A. *et al.*

Licensed under

Creative Commons CC-BY 4.0



How to cite this article Gómez-Moya C. A. *et al.* (2023), A new species of *Proctolaelaps* Berlese (Acari: Mesostigmata: Melicharidae) from the Dominican Republic. *Acarologia* 63(3): 856-866. <https://doi.org/10.24349/np6y-3o4v>

Hoyer's medium on microscope slides. They were later examined under phase (Leica, DMLB) and interference contrast (Nikon, Eclipse 80i) microscopes. The morphological characterization included the measurements of each structure in micrometers, with a graded eyepiece, that are here presented as averages followed (in parentheses) by the respective ranges. It also included the illustration of taxonomically relevant structures, based on photographs taken with a digital camera attached to the interference contrast microscope, processing the images with a digital tablet, using the Adobe Illustrator® program.

Notation of the idiosomal setae is based on Lindquist and Evans (1965) and Lindquist (1994), of pores and lyrifissures, on Kazemi *et al.* (2014); leg chaetotaxy, on Evans (1963a); and palp chaetotaxy, on Evans (1963b).

Results

An initial examination of the mites showed them to belong to an undescribed species of *Proctolaelaps* Berlese, 1923 of Melicharidae Hirschmann, 1962. This species is subsequently described.

***Proctolaelaps elcotoy* Gómez-Moya & Martín n. sp.**

Zoobank: [88EB0309-2860-4943-88A2-904C2F414656](https://zoobank.org/88EB0309-2860-4943-88A2-904C2F414656)

Diagnosis

Female with dorsal shield not sufficiently large to cover dorsum of idiosoma, exposing a relatively broad band of unsclerotized dorsomarginal cuticle; dorsal shield with 34 pairs of aciculate to slightly spiny setae, *j1* the longest (19–23 µm) and *J5* the shortest (8–12 µm). Sternal shield with posterior margin concave; epigynal shield with posterior margin slightly convex; anal shield ovoid and with distinct anteromedial lobe; opisthogaster with setae *Jv1*–*Jv5*, *Zv1*–*Zv5* and *Sv*. Spermatheca discernible as a long duct whose proximal fourth narrows down from about 3 to about 1 µm in diameter, retained for the remaining extension; epistome short, acuminate and with few and distinct denticles; fixed and movable cheliceral digits respectively with 9–11 and three teeth; tibia III with nine setae (one more *pl* seta than usual for the genus); no leg macrosetae. Male with separate ventral and anal shields, the first about hexagonal and the second ellipsoidal; spermatodactyl sinuous, directed initially down- and forward and then up- and forward, narrowing down from base to apex and with tip truncate and with barely noticeable enlargement.

Adult female

(Figs. 1A–1G, 2A–2D) (seven specimens measured)

Dorsum of idiosoma — (Fig. 1A): dorsal shield 438 (425–438) long and 275 (263–228) wide (at level of *z6*, widest level), not sufficiently large to cover dorsum of idiosoma, exposing a relatively broad band of unsclerotized dorsomarginal cuticle; reticulate, except for section posteriad *Z4* and a central longitudinal band between *j3* and *j5*–*j6*, smooth; probably because of being dome-shaped, mounted females show a fold between *j6* and *J1*, which should not be confused with a division of the dorsal shield. Podonotal region with 23 pairs of setae (*j1*–*j6*, *z1*–*z6*, *s1*–*s6*, *r2*–*r6*) five pairs of distinguishable lyrifissures and four pairs of distinguishable pores. Opisthonotal region with 21 pairs of setae, 11 pairs of lyrifissures and three pairs of pores; although usually ventral in Gamasina, *Jv5* and *Zv5* are visible on dorsal view in all type specimens of this species. All setae aciculate to slightly spiny and smooth. Setal lengths: *j1* 22 (19–23), *j2* 15 (14–17), *j3* 15 (12–15), *j4* 15 (15–16), *j5* 16 (16–17), *j6* 17 (16–18), *z1* 13 (10–14), *z2* 15 (15–16), *z3* 16 (15–16), *z4* 16 (15–17), *z5* 16 (15–17), *z6* 16 (15–17), *s1* 13 (13–15), *s2* 15 (15–16), *s3* 16 (15–17), *s4* 17 (15–20), *s5* 18 (16–19), *s6* 16 (15–20), *r2* 16 (15–17), *r3* 17 (16–18), *r4* 15 (15–16), *r5* 16 (15–18), *r6* 15 (16–16), *J1* 18 (17–18), *J2* 18

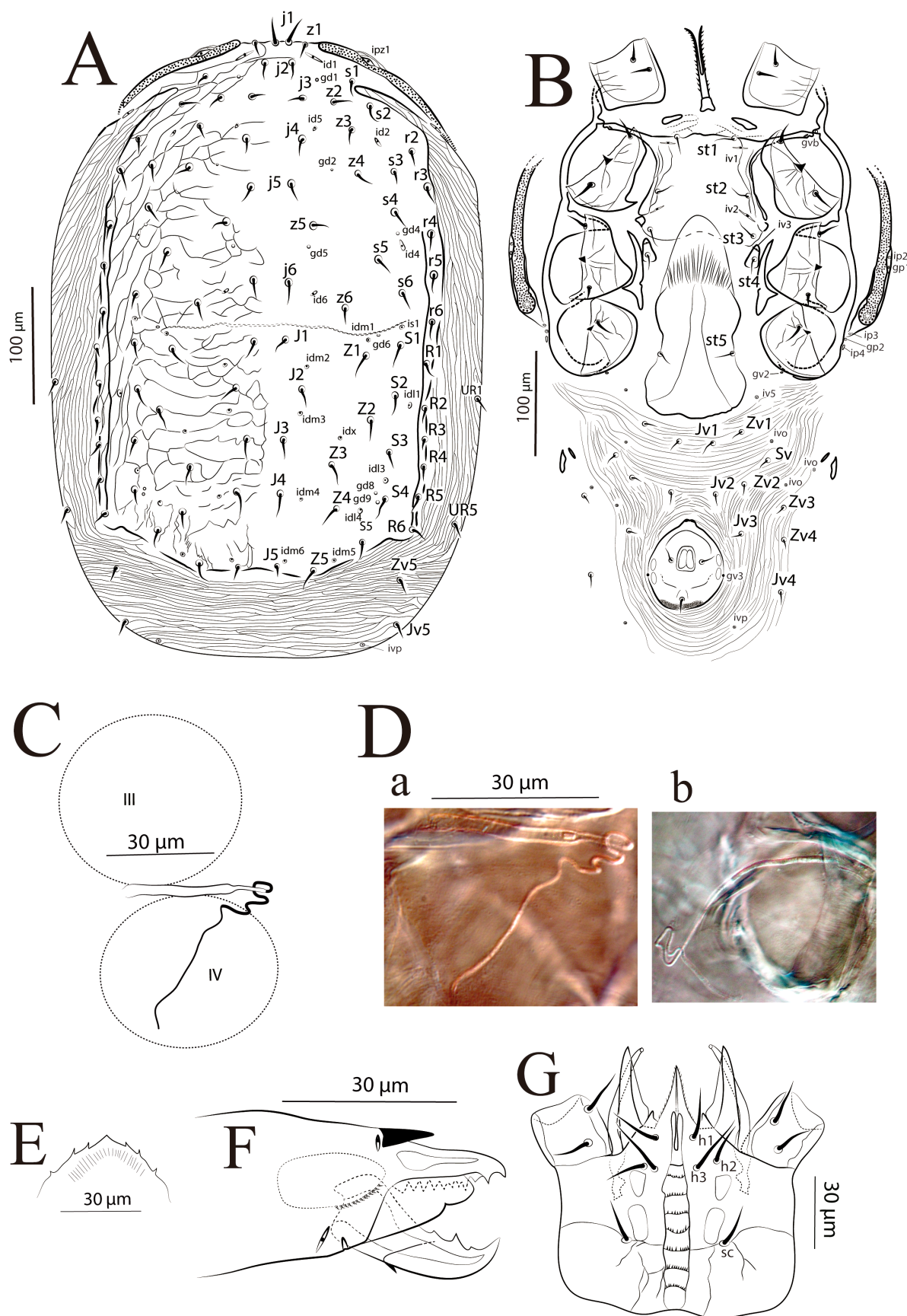


Figure 1 *Proctolaelaps elcotoy* Gómez-Moya & Martín, n. sp., Holotype female: A – dorsum of idiosoma; B – venter of idiosoma; C – drawing of the spermathecal structure; Da – illustration of the spermathecal structure; Db – photos of the spermathecal structure; E – epistome; F – chelicera; G – venter of gnathosoma.

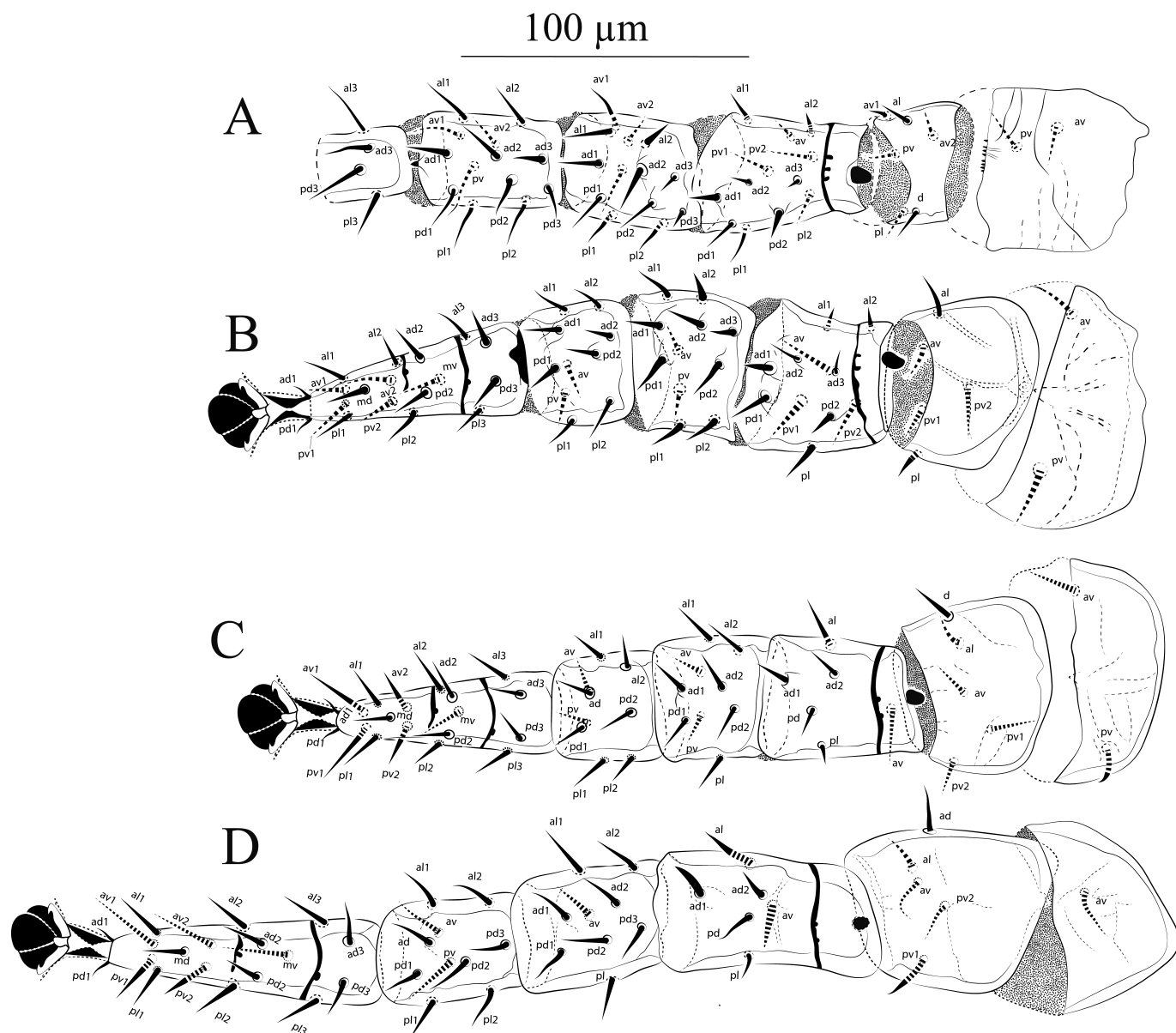


Figure 2 *Proctolaelaps elcotoy* Gómez-Moya & Martín, n. sp., Holotype female legs: A – leg I; B – leg II; C – leg III; D – leg IV.

(16–20), J3 18 (17–20), J4 16 (15–17), J5 10 (8–12), Z1 17 (16–20), Z2 18 (16–20), Z3 17 (16–18), Z4 16 (14–16), Z5 16 (15–18), S1 16 (15–17), S2 17 (15–18), S3 17 (15–17), S4 15 (15–15), S5 16 (15–18), R1 14 (13–15), R2 13 (13–15), R3 14 (13–15), R4 14 (13–15), R5 14 (13–15), R6 13 (13–14), UR1 13 (12–13), UR5 13 (12–14).

Venter of idiosoma — (Fig. 1B): all setae aciculate to slightly spiny and smooth. Base of tritosternum 10 (10–13) long and 13 (12–14) wide proximally; laciniae 68 (62–70) long, divided for about 60% of their total length. Presternal region sparsely reticulate, with a pair of transversely elongate cells surrounded by the less sclerotized background. Sternal shield 90 (84–100) long medially and 80 (73–85) wide at level of *st*₂; fused with anterior portion of endopodal plate, usually with slightly undulate line of connection to the presternal region and with posterior margin medially concave; mostly smooth, with few laterolongitudinal striae; with three pairs of setae (*st*₁–*st*₃), one pair of pores (*gvb*) at distal end of extension between

coxae I–II and two pairs of lyrifissures (*iv1*, *iv2*). Metasternal plate irregular, bearing *st4* and *iv3*. Sclerotized section of epigynal shield with rather irregular margin, smooth, with a pair of median lines diverging posteriorly; 175 (174–183) long, including hyaline flap, whose anterior margin narrows down to a broad tip, reaching level between *st2*–*st3*; 86 (84–88) wide at widest level posteriorly and bearing *st5*; distance *st5*–*st5* 65 (60–66); with lateral margins posteriorly diverging; posterior margin slightly convex; lyrifissures *iv5* on unsclerotised cuticle, posterolaterad *st5*. Anal shield 80 (75–85) long and 65 (65–70) wide at widest level, ovoid, with distinct anteromedial lobe (in some specimens constituted by a pair of closely associated tubercles darker than surroundings) and scant striae; bearing the circumanal setae and one pair of marginal pores (*gv3*) posterolaterad para-anal setae; anal opening not enlarged, 33 (31–34) long including frame; one of the types with two post-anal setae fused proximally; other types, with the usual single post-anal seta. Posterior portion of endopodal plate represented by a dagger-shaped to tri-radiate fragment between coxae III–IV. Exopodal plate distinct from posterior margin of coxa IV to level of coxa I, bearing *gv2* right at the margin. With two pairs of metapodal plates, the inner smaller and less clearly discernible. Unsclerotised cuticle around anal shield with 11 pairs of setae (*Jv1*–*Jv5*, *Zv1*–*Zv5* and *Sv*; *Jv5* and *Zv5* observed in dorsal view) and four pairs of lyrifissures. Setal lengths: *st1* 20 (17–21), *st2* 20 (17–23), *st3* 20 (15–20), *st4* 18 (13–20), *st5* 18 (16–18), *Jv1* 16 (15–17), *Jv2* 16 (13–16), *Jv3* 12 (12–14), *Jv4* 12 (12–14), *Jv5* 15 (14–17), *Zv1* 13 (12–15), *Zv2* 14 (13–15), *Zv3* 12 (12–13), *Zv4* 12 (10–13), *Zv5* 14 (12–15), *Sv* 12 (11–12), para-anal 15 (15–18), and post-anal 15 (12–15).

Peritrematic plate and peritreme — (Figs. 1A, 1B): peritrematic plate fused with dorsal shield anteriad *s1* and fused with exopodal plate beside coxa IV by a narrow and curved bridge; with a lyrifissure (*ipz1*) next to the outer margin of the peritrematic plate, fitting a constricted section of the peritreme about in level with *s1*; with a lyrifissure (*ip2*) and a pore (*gp1*) in the section between coxae II–III; with a lyrifissure immediately posteriad stigma (*ip3*) followed by *gp2* at the distal end of the peritrematic bridge connecting to the exopodal plate; lyrifissure *ip4* at the margin of the exopodal plate, just behind the connection with the peritrematic bridge; peritreme extending forward almost to level of *z1*.

Spermathecal structure — (Figs. 1C, 1D): distinguishable as a long duct (tubulus) 147 (135–180) long, seemingly opening (vestibulus) at anterior margin of coxa IV, narrowing down slightly in the proximal fourth (from about 3 to about 1 μ m) and then maintaining uniform diameter up to the distal end, which in some specimens seems bifurcate.

Gnathosoma — (Figs. 1E–1G): anteromedian region of epistome short, acuminate and with few and distinct denticles. Fixed cheliceral digit 38 (37–38) long, with 9–13 teeth and an expansive hyaline lobe lightly constrict medially; movable digit 35 (35–36) long, with three teeth and with ventral projection distinct in some specimens, connected with an anti-axial curved line extending forward to the masticatory surface. Dorsal and antiaxial lyrifissures as well as dorsal seta distinct, the latter as a stout spine; fringed hyaline rim along the paraxial face of the cheliceral shaft above base of movable digit with 15–20 denticles; dorsodistal pointed process of fixed digit undiscernible. Deutosternum relatively wide, demarcated by lateral lines and smooth anterior and posterior margins and with seven transverse denticulate lines, the first three with 5–10 and others with 10–20 denticles. Corniculus 23 (20–25) long and 7 (6–8) wide at widest level, in some specimens parallel to each other, in others strongly convergent, crossing each other distally; with a short thorn-like extension of the anterior margin of the hypostome at the inner base of each corniculus, so that in each side, the tip between the internal malae and the palp trochanter seemingly incised. Internal malae subtriangular, with discreet fimbriae. Palp femur *al* broadly spatulate; palp genu *a1* and *a2* spine-shaped, the first erect and the second curved; palp tarsal claw 2-tined. Setal lengths: *h1* 20 (16–20), *h2* 25 (24–25), *h3* 16 (15–19), *sc* 17 (16–20); inner palp trochanter seta (*av*) 17 (17–18), outer palp trochanter seta (*pv*) 14 (14–15).

Legs — (Figs. 2A–2D): leg pretarsi I–IV each with a pair of claws and pulvillus with three rounded lobules. Leg lengths (from base of coxa to tip of tarsus, not including pre-tarsus): I – 350 (325–350), II – 288 (275–300), III – 295 (268–300) and IV – 370 (363–375). Chaetotaxy:

leg I – coxa 0–0/1, 0/1–0, trochanter 1–0/1, 1/2–1, femur 2–3/1, 2/2–2, genu 2, 3/2, 3/1, 2, tibia 2, 3/2, 3/1, 2; leg II – coxa 0–0/1, 0/1–0, trochanter 1–0/1, 0/2–1, femur 2–3/1, 2/2–1, genu 2, 3/1, 2/1, 2, tibia 2, 2/1, 2/1, 2; leg III – coxa 0–0/1, 0/1–0, trochanter 1–1/1, 0/2–0, femur 1–2/1, 1/0–1, genu 2, 2/1, 2/1, 1, tibia 2, 1/1, 2/1, 2 (one more *pl* seta than usual for the genus); leg IV – coxa 0–0/, 0/1–0, trochanter 1–1/1, 0/2–0, femur 1–2/1, 1/0–1, genu 2, 2/1, 3/0, 1, tibia 2, 1/1, 3/1, 2; tarsi: I: setae not counted; II–IV: 18 setae each. Leg setae aciculate and smooth; no macrosetae.

Adult male

(Figs. 3A–3D) (three specimens measured)

Dorsum of idiosoma — (Fig. 3A): dorsal shield 410 (400–425) long and 250 (245–275) wide (at level of *z*6, widest level), sufficiently large to cover most of the dorsum of the idiosoma, except for a narrow lateral and posterior band; ornamentation, as in adult female; mounted males with a fold between *j*6 and *J*1, which should not be confused with a division of the dorsal shield. Podonotal and opisthonotal regions as in adult female in relation to chaetotaxy, shape of the setae and distinguishable lyrifissures and pores, except for the absence of *R*6 and *UR*5; setae *j*2–*j*5, *z*2–*z*4 longer than in female and other setae slightly shorter. Setal lengths: *j*1 25 (24–25), *j*2 34 (31–36), *j*3 28 (28–29), *j*4 20 (20–21), *j*5 19 (18–21), *j*6 14 (13–15), *z*1 13 (12–14), *z*2 28 (25–30), *z*3 26, *z*4 22 (22–23), *z*5 14 (14–15), *z*6 13 (12–15), *s*1 14 (13–15), *s*2 16 (16–17), *s*3 16 (15–17), *s*4 15 (14–17), *s*5 19 (19–20), *s*6 15 (14–17), *r*2 16 (16–17), *r*3 17 (17–18), *r*4 16 (15–18), *r*5 15 (14–16), *r*6 13 (13–14), *J*1 16 (15–17), *J*2 14 (13–16), *J*3 12 (12–13), *J*4 11 (10–12), *J*5 9 (8–9), *Z*1 18 (16–20), *Z*2 16 (16–17), *Z*3 13 (12–15), *Z*4 11 (10–12), *Z*5 13 (13–14), *S*1 14 (13–17), *S*2 15, *S*3 11, *S*4 10 (10–11), *S*5 12 (11–13), *R*1 12, *R*2 12 (11–13), *R*3 11 (11–12), *R*4 11 (10–12), *R*5 12 (11–13), *UR* 10 (10–11).

Venter of idiosoma — (Fig. 3B): all setae aciculate and smooth. Tritosternum similar to adult female, base 5 long and 8 wide proximally; laciniae 45 long, divided for about 60% of their total length. Presternal region without distinguishable plates or ornamentation. Composition of ventral setae and distinguishable lyrifissures and pores as in adult female, except for the absence of *Sv*. Sternogenital shield fused with whole endopodal plate, posteriorly truncate to slightly convex, with a pair of small lateral incisions; 180–182 long and 73–77 wide at level of *st*2; smooth, except for scant lateral striae posteriad *st*4; bearing five pairs of setae (*st*1–*st*5), one pair of pores (*gvb*) on distal end of extension between coxae I–II and two pairs of lyrifissures (*iv*1, *iv*2). Ventral and anal shields separate; the former about hexagonal, 53–56 long at midline and 102–105 of maximal width, reticulate, with irregular margin; bearing four pairs of setae (*Jv*1, *Jv*2, *Zv*1, *Zv*2) and one pair of lyrifissure (*iv*5). Anal shield 75–80 long at midline and 65–74 of maximal width, ellipsoidal, with a short pair of anteromedial lobes (darker than surroundings), with scant striae; bearing circumanal setae and a pair of marginal pores (*gv*3) posterolaterad para-anal setae; anal opening not enlarged, 25 long, including frame. Exopodal and metapodal plates as in adult female. Unsclerotised cuticle around anal shield with six pairs of setae (*Jv*3–*Jv*5, *Zv*3–*Zv*5) and four pairs of lyrifissures. Setal lengths: *st*1 16 (15–18), *st*2 18 (15–20), *st*3 16 (15–16), *st*4 15 (13–17), *st*5 15 (15–16), *Jv*1 16 (15–17), *Jv*2 16 (15–17), *Jv*3 12 (10–13), *Jv*4 11 (10–12), *Jv*5 15 (15–16), *Zv*1 12 (12–13), *Zv*2 12, *Zv*3 10, *Zv*4 11 (11–12), *Zv*5 11 (10–12), para-anal 13 (12–13), and post-anal 13 (12–13).

Peritrematic plate and peritreme — (Figs. 3A, 3B): peritrematic plate fused with dorsal shield at level of *r*3; lyrifysure *ipz*1 seemingly present in one of the adult males, but not distinguishable in others; with one lyrifissure (*ip*2) and one pore (*gp*1) in region between coxae II–III; with a lyrifissure immediately posteriad stigma(*ip*3) followed by *gp*2 at the posterior end of the narrow, irregular bridge connecting the exopodal plate; lyrifissure *ip*4 at the margin of the exopodal plate; peritreme extending forward almost to level of *z*1.

Gnathosoma — (Figs. 3C, 3D): anteromedian region of epistome apparently truncate and smooth. Fixed cheliceral digit almost strait, 32–40 long, with 7–9 teeth in addition to the apical tooth; movable digit sigmoid, 32–35 long, with one tooth; spermatodactyl 50–60 long, sinuous, directed initially down- and forward and then up- and forward, narrowing down from



base to apex, with truncate tip and with barely noticeable enlargement; dorsal and antiaxial lyrifissures distinct; dorsal seta short, thorn-shaped. Deutosternum demarcated by lateral lines, with smooth anterior and posterior margins containing three basal denticulate transverse lines, each with 6–15 denticles followed by four smooth transverse lines. Setal lengths: *h1* 15 (13–16), *h2* 14 (13–15), *h3* 20 (20–22), *sc* 14 (13–16); palp trochanter *av* 14 (14–15), *pv* 10 (9–10). Corniculus 32 (30–35) long and 7 (6–8) wide at widest level, parallel to each other. Internal malae subtriangular, thoroughly fimbriate.

Legs — Leg lengths: I, 290 (270–310); II, 260 (250–275); III, 265 (263–270) and IV 340

(330–363). Leg chaetotaxy and shape as in adult female; also, no macrosetae, but *pv1* and *pv2* of femora I–II and *pv* of genua and tibiae of same legs distinctly stouter and longer than *av* setae of same segments.

Type specimens

Holotype female, three paratype females, and one paratype male, on *Conotelus* spp. (Insecta: Nitidulidae), from flowers of *Passiflora edulis* Sims (Passifloraceae), collected by C.A. Gómez-Moya on 9-V-2019 at Duey (DD lat, long: 19.0005754, -70.0485666), Cotui, Sánchez Ramírez province, Dominican Republic, deposited in the mite collection of Departamento de Entomología e Acarologia, Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo, Piracicaba, Estado de São Paulo, Brazil. Four paratype females and one paratype male, same data, deposited in the Entomological Collection of Instituto de Investigaciones Botánicas y Zoológicas, Universidad Autónoma de Santo Domingo, Santo Domingo, Dominican Republic; and five paratype females and one paratype male, on the same insect carrier and the same plant, collected by A.O. Feliz Lebrón at Juana Vicenta (DD lat, long: 19.226665, -69.4213367), Samaná province, Dominican Republic, deposited in the Entomological Collection of Museo Nacional de Historia Natural “Prof. Eugenio de Jesús Marciano”, Santo Domingo, Dominican Republic (MNHNSD).

Etymology

The epithet “*elcotoy*» is a name in apposition referring to the place of origin of the type specimens of the new species (El Cotoy), the ancient name of Cotui.

Remarks

This new species closely resembles *Proctolaelaps micropilis* De Leon, 1963 in different ways, as by having very short dorsal idiosomal setae, a line parallel to the margin of dorsal shield demarcating a lateral band in which most *r-R* setae are inserted, *r3* on dorsal shield and anal shield with distinct median anteromarginal lobe; however, *P. micropilis* differs from the new species by having dorsal shield mostly smooth, reticulated only anterolaterally, genital shield medially reticulate, spermathecal structure narrow next to solenostome and wider and seemingly punctate for most of its extension and males with ventrianal shield (instead of with separate ventral and anal shields in *P. elcotoy* n. sp.). It is also similar to *Proctolaelaps lobatus* De Leon, 1963 in different ways, including by the short dorsal idiosomal setae, the presence of *ipz1* and the similar shape of the spermathecal apparatus; however, *P. lobatus* differs from the new species by lacking a line parallel to the margin of the dorsal shield, by having *r3* off the shield, *j1* much shorter than *Z5*, anal shield without distinct median anteromarginal lobe, an extensive central area of the podonotal region smooth, the presence of only one *pl* seta on tibia III (according to Halliday *et al.* 1998, but see subsequent note) and males with ventrianal shield [as reported by Abo-Shnaf *et al.* (2016), and differently from what was mentioned by Halliday *et al.* (1998), specimens identified as *P. lobatus* from the Dominican Republic have two *pl* setae on tibia III; Brazilian specimens that we identified as *P. lobatus* also have two *pl* setae on tibia III]. *Proctolaelaps micropiloides* Karg, 1994 is also similar in relation to the lengths of the dorsal idiosomal setae and the presence of marginal band bearing the *R* setae, differing by having one of the marginal setae (apparently *r6*) off the dorsal shield, chelicera with discreet dorsal seta, different ornamentation of sternal shield, and anal shield without distinct median anteromarginal lobe. *Proctolaelaps pistilli* Ma & Yin, 1999 also looks similar to the new species, differing from it by having *Z5* longer than other dorsal shield setae and *J5* very short; sternal shield with posterior margin about straight, and anal shield subquadrate. Nothing has been mentioned in the literature about the number of *pl* setae on tibia III of *P. macropilis*, *P. macropiloides* and *P. pistilli*.

Discussion

The presence of metapodal plates in males of *Proctolaelaps* species is not common. For most *Proctolaelaps* species whose adult males have been described, discrete metapodal platelets have not been shown. Apparently, this is due to their fusion with the large subtriangular ventrianal shield. Few species of *Proctolaelaps* have the anterior section of the ventrianal shield narrowed, namely *P. glaucis* Fain, Hyland & Aitken, 1977, *P. hunteri* Fain, Hyland & Aitken, 1977, *P. jurgatus* OConnor, Colwell & Naeem, 1991, *P. kirmsei* Fain, Hyland & Aitken, 1977 and *P. mermillion* OConnor, Colwell & Naeem, 1991; all of these have a pair of large metapodal plates; these mites have either been found in association with hummingbirds or in flowers. Yet three other species (*P. belemensis* Fain, Hyland & Aitken, 1977, *P. naskreckii* Dusbabek & Havlicek, in Dusbabek *et al.* 2007 and *P. threnetes* Dusbabek & Literak, in Dusbabek *et al.* 2007), also described from hummingbirds, have wider ventrianal shields and do not have discrete metapodal platelets.

Males of most *Proctolaelaps* species have separate sternogenital and ventrianal shields. However, in males of *P. holovertris* Moraes, Britto, Mineiro & Halliday, 2016 the ventral idiosomal shields are fused, as suggested by its name. *Proctolaelaps elcotoy* Gómez-Moya & Martin sp. nov. seems to be the first species of the genus to have well separate ventral and anal shields, despite the delusive impression in males of *P. belemensis*, with a constriction between the anal and the ventral section of the shield. Likewise, the presence of *ipz1* (in both sexes of the species here described) is also uncommon. Putatively the same lyrifissure, was reported by Lindquist and Moraza (2008) in deutonymphs but in no other stages of *Spadiseius calypitrogynae* Lindquist & Moraza (Melicharidae), and not in any developmental stages of another species of the same genus described in that publication. Lyrifissure *ipz1* should not be confused with that designated *ip1* by Lindquist and Moraza (2008), also on the peritrematic plate, next to *s2* and to the inner margin of the peritrematic plate.

The family Melicharidae (Acari: Mesostigmata) is little known in the Dominican Republic. According to Perez-Gelabert (2020) and Santos *et al.* (2023), only one previous publication (Abo-Shnaf *et al.* 2016) refers to species of this family in that country, reporting the following species: *Proctolaelaps bickleyi* (Bram, 1956), *Proctolaelaps aff. fiseri* Samšínák, 1960 and *P. lobatus*. This is an extremely small number, given that over 150 species are presently included in this genus of worldwide distribution (Santos *et al.* 2023).

Some species of genus *Proctolaelaps* have been mentioned to have potential as biological control agents (Moraes *et al.* 2015). Hence the interest on the study of this particular new species found in association with *Conotelus*, considering the potential of these beetles to cause economic damage to passionfruit, as observed in Brazil.

Proctolaelaps species have shown diverse feeding habits in different habitats, including association with insects, plant foliage, tree bark, laboratory cultures, beetle galleries, nests of birds and ants, moss, rotten fruits and litter (Lindquist and Hunter 1965; Moraes *et al.* 2015; Santos *et al.* 2023). About 25 species of *Proctolaelaps* have been reported as phoretic on beetles (Lindquist and Hunter 1965, Trach and Khaustov 2017, Duarte *et al.* 2018, Silva *et al.* 2020, Santos *et al.* 2023). At least two of these have been reported in association with nitidulid species; however, this seems to be the first report of association between a *Proctolaelaps* and a *Conotelus* species.

Acknowledgements

To Fondo Nacional de Innovación y Desarrollo Científico y Tecnológico (FONDOCYT), for subsidizing the projects 2016-2017-179 and 2016-2017-127. To Eddy Antigua and Pedro Agramonte, Ministry of Agriculture office of the Sánchez Ramírez province; to Elsa Tineo, laboratory assistant at the Mata Larga Experimental Station, IDIAF, San Francisco de Macorís, Duarte province and to the students Mariely Jerez, Santo Jiménez and Eliazar Brito (UTECO School of Agronomy), for the collaboration provided.

ORCID

Cristina Antonia Gómez-Moya  <https://orcid.org/0000-0002-6456-6500>

João Pedro Inez Martin  <https://orcid.org/0000-0001-8841-1370>

Andrea O. Feliz Lebrón  <https://orcid.org/0009-0000-1864-7978>

Gilberto J. de Moraes  <https://orcid.org/0000-0002-5587-1781>

References

- Abo-Shnaf R., Sánchez L., Moraes G.J. de. 2016. Plant inhabiting Gamasina mites (Acari: Mesostigmata) from the Dominican Republic, with descriptions of four new species of *Lasioseius* (Blattisociidae) and complementary descriptions of other species. *Sys. & App. Acarol.*, 21(5): 607-646. <https://doi.org/10.11158/saa.21.5.5>
- Azevedo F.R., Guimarães J.A., Mesquita A.L.M., Braga Sobrinho R. 2005. Ocorrência e danos do besouro-da-flor-do-maracujazeiro-amarelo. Fortaleza, Embrapa Agroindústria Tropical. 3pp. (Comunicado Técnico, 105).
- Berlese A. 1923. Centuria sesta di Acari nuovi. *Redia*, 15: 237-262.
- Bram R.A. 1956. A new predatory mite from insect culture. *Proceedings of the Entomol. Soc. Wash.*, 58: 292-294.
- De Leon D. 1963. New genus and twelve new species of mites from Mexico and southeast United States (Acarina: Blattisociidae). *The Fl. Entomol.*, 46: 197-207. <https://doi.org/10.2307/3493632>
- Duarte A.daF., Cunha U.S.da, Moraes G.J. de. 2018. Suitability of edaphic arthropods as prey for *Proctolaelaps bickleyi* and *Cosmolaelaps brevistilis* (Acari: Mesostigmata: Melicharidae, Laelapidae) under laboratory conditions. *Exp. & App. Acarol.*, 74: 275-282. <https://doi.org/10.1007/s10493-018-0229-z>
- Dusbabek F., Literak I., Capek M., Havlicek M. 2007. Ascid mites (Acari: Mesostigmata: Ascidae) from Costa Rican hummingbirds (Aves: Trochilidae), with description of three new species and a key to the *Proctolaelaps belemensis* species group. *Zootaxa*, 1484: 51-67. <https://doi.org/10.11646/zootaxa.1484.1.3>
- Evans G.O. 1963a. Observations on the chaetotaxy of the legs in the free-living Gamasina (Acari: Mesostigmata). *Bull. Br. Mus. (Nat. Hist.), Zool.*, 10: 277-303. <https://doi.org/10.5962/bhl.part.20528>
- Evans G.O. 1963b. Some observations on the chaetotaxy of the pedipalps in the Mesostigmata (Acari). *Ann. Mag. Nat. Hist., Series 13*(6): 513-527. <https://doi.org/10.1080/00222936308651393>
- Fain A., Hyland K.E., Aitken T.H.G. 1977. Nouveaux acariens Ascidae (Mesostigmata) phoretique dans les fosses nasales de colibris (note préliminaire). *Bull. Ann. Soc. Roy. Bel. d'Entomol.*, 113: 184-186.
- Halliday R.B., Walter D.E., Lindquist E.E. 1998. Revision of the Australian Ascidae (Acarina: Mesostigmata). *Invert. Taxon.*, 12: 1-54. <https://doi.org/10.1071/IT96029>
- Hirschmann W. 1962. Gangsystematik der Parasitiformes. Teil 5. Gamasiden Rückenhaarbestimmungstabellen von 260 *Typhlodromus*-Arten der Erde. Gänge, Chaetotaxie Porotaxie, Mundwerkzeuge von *Typhlodromus* und verwandten Gattungen von *Proctolaelaps*, *Melichares*, *Lasioseius*, *Iphidozercon*, *Sejus*, *Rhodacarellus*, *Rhodacarus*, *Gamasellus*, *Veigaia*, *Macrocheles ivanovi*. Erstversuch der Aufstellung eines Gangsystems der Gamasiden aufgrund der Gnathosomaunterseite. *Acarologie. Schriftenreihe für Vergleichende Milbenkunde*, 5: 1-5.
- Karg W. 1994. Raulmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. *Mitt. Zool. Mus. Berl.*, 70: 179-216. <https://doi.org/10.1002/mmzn.19940700202>
- Kazemi S., Rajaei A., Beaulieu F. 2014. Two new species of *Gaeolaelaps* (Acari: Mesostigmata: Laelapidae) from Iran, with a revised generic concept and notes on significant morphological characters in the genus. *Zootaxa*, 3861: 501-530. <https://doi.org/10.11646/zootaxa.3861.6.1>
- Lindquist E.E. 1994. Some observations on the chaetotaxy of the caudal body region of gamasine mites (Acari: Mesostigmata), with a modified notation for some ventrolateral body setae. *Acarologia*, 35: 323-326.
- Lindquist E.E., Evans G.O. 1965. Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina: Mesostigmata). *Mem. Entomol. Soc. Can.*, 47: 1-64. <https://doi.org/10.4039/entm9747fv>
- Lindquist E.E., Hunter P.E. 1965. Some mites of the genus *Proctolaelaps* Berlese (Acarina: Blattisociidae) associated with forest insect pests. *Can. Entomol.*, 97: 15-32. <https://doi.org/10.4039/Ent9715-1>
- Lindquist E.E., Moraza M.L. 2008. A new genus of flower-dwelling melicharid mites (Acari: Mesostigmata: Ascoidea) phoretic on bats and insects in Costa Rica and Brazil. *Zootaxa*, 1685: 1-37. <https://doi.org/10.11646/zootaxa.1685.1.1>
- Ma L.-M., Yin X. 1999. Four new species and two new record genera of the family Aceosejidae from China (Acari, Gamasina). *Acta Arachnologica Sinica*, 8: 1-7. [in Chinese]
- Matos L., Hilf M.E., Camejo J. 2009. First Report of '*Candidatus Liberibacter asiaticus*' Associated with Citrus Huanglongbing in the Dominican Republic. *Plant Dis.*, 93(6): 668-668. <https://doi.org/10.1094/PDIS-93-6-0668B>
- Moraes G.J. de, Britto E.P.J., Mineiro J.L.deC., Halliday R.B. 2016. Catalogue of the mite families Ascidae Voigts and Oudemans, Blattisociidae Garman and Melicharidae Hirschmann (Acari: Mesostigmata). *Zootaxa*, 4112: 1-299. <https://doi.org/10.11646/zootaxa.4112.1.1>
- Moraes G.J. de, Venancio R., Santos VLVdos, Paschoal A.D. 2015. Potential of Ascidae, Blattisociidae and Melicharidae (Acari: Mesostigmata) as biological control agents of pest organisms. In: Carrillo D., Moraes G.J. de, Peña J.E. (Eds). *Prospects for biological control of plant feeding mites and other*

- harmful organisms. *Progress in Biological Control*, 19, Springer Int. Pub. Switzerland, p. 33–75. https://doi.org/10.1007/978-3-319-15042-0_2
- OConnor B.M., Colwell R.K., Naeem S. 1991. Flower mites of Trinidad II. The genus *Proctolaelaps* (Acari: Ascidae). *Great Basin Naturalist*, 51: 348–376. https://doi.org/10.1007/978-3-319-15042-0_2
- Perez-Gelabert D.E. 2020. Checklist, bibliography and quantitative data of the arthropods of Hispaniola. *Zootaxa*, 4749: 1–668. <https://doi.org/10.11646/zootaxa.4749.1.1>
- Potin D.M., Andrade G.S., Pereira R.Z., Kassab S.O. 2016. *Conotelus* sp. (Coleoptera: Nitidulidae), a new insect pest of Passionfruit in the Amazon Biome. *Fl. Entomol.*, 99: 580–582. <https://doi.org/10.1653/024.099.0345>
- Samšínák K. 1960. Über einige forstwirtschaftlich wichtige Milben der Gattung *Proctolaelaps* Berlese 1923. *Československá Parasilogie*, 7: 297–307.
- Santos J.C., Demite P.R., Moraes G.J. de. 2023. Melicharidae Database. Available from <https://www.lea.esalq.usp.br/acari/melicharidae> (accessed 17/02/2023).
- Silva C.A.D., Castilho R.C., Galvão Filho A.L.A., Zanuncio J.C. 2020. *Proctolaelaps bickleyi* (Acari: Mesostigmata: Melicharidae): First record of its association with cotton boll weevil. *Neotrop. Entomol.*, 49: 311–313. <https://doi.org/10.1007/s13744-019-00752-y>
- Souza Santos R. 2022. Identificação e registro de *Conotelus luteicornis* Erichson (Coleoptera: Nitidulidae), nova praga do maracujazeiro-Azedo no estado do Acre. *Comunicado Técnico* 204. <https://doi.org/10.13140/RG.2.2.24600.06404>
- Souza Santos R., Jelinek J., Andrade Carvalho Neto R. de. 2021. Record of *Conotelus luteicornis* Erichson (Coleoptera: Nitidulidae) in passion fruit vine in Acre state, Brazil. *Rev. Cer.*, 68(4): 368–370. <https://doi.org/10.1590/0034-737X202168040015>
- Trach V.A., Khaustov A.A. 2017. Mites of the genus *Proctolaelaps* Berlese, 1923 (Acari: Mesostigmata: Melicharidae) associated with bark beetles in Asian Russia. *Acarina*, 25: 151–163. <https://doi.org/10.1590/0034-737X202168040015>
- Valdez F., Matos L., Porfirio A. 2016. Índice de Plagas y Enfermedades de Importancia Económica en la República Dominicana. Ministerio de Agricultura. Oficina de Ejecución de Proyectos. 244 pp.