Revision of Newsteadia (Homoptera: Coccoidea) of the Nearctic and Neotropic Regions, with Descriptions of New Species

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Six new species of Newsteadia are described from the Nearctic and Neotropic Regions. A key is presented for the identification of 10 species currently included in the genus from these regions. The number of species in the genus worldwide is 37. A modified concept of the genus is presented and some new characters are given as diagnostic of the genus. The zoogeography of the genus is discussed.

Keywords: Homoptera, Coccoidea, Ortheziidae, Newsteadia, Nearctic and Neotropic Regions, new species.

The genus Newsteadia was studied in detail by Morrison (1925, 1952). Since 1952 one new species (N. trisegmentalis) was described from the Nearctic Region (USA, Ga) by Howell (1975). Only one species, N. tristani (Morrison, 1952) was recorded from the Neotropic Region (Costa Rica, and Mexico). New distribution records in the Eastern USA, of the two known species (N. americana, and N. minima) are given in the work of Kosztarab (1996). There are no records of this genus in the western part of USA (Morrison, 1952; Gill, 1993; Miller et al., 1999).

The purpose of the present work is to provide a revision of the genus Newsteadia in the Nearctic and Neotropic Regions, including descriptions of some new species.

Materials and Methods

The insects described in this study were collected mostly using a Berlese funnel and are from the Hungarian collecting expeditions of soil arthropods (more than 1000 samples), from 12 countries (Chile, Cuba, Santa Lucia, Brazil, Mexico, Falkland Islands, Ecuador, Paraguay, Costa Rica, Bolivia, Peru, Venezuela) (Dr. János Balogh, Collection of Arachnida, University of Loránd Eötvös (ELTE), Dr. Sándor Mahunka, Collection of Arachnida, Hungarian Natural History Museum, Budapest, Hungary) (HNHM). The collection numbers in the text are from the collection of Dr. J. Balogh and Dr. S. Mahunka. In these samples 168 contained specimens of Ortheziidae, among them 39 samples contained Newsteadia species, 121 specimens of Mixorthezia, 8 specimens of Orthezia, and none of Nipponorthezia. The specimens of previously described species are in the collection of the US National Collection of Insects, Beltsville, Maryland, USA (USNM), and University of Napoli (Portici).
The insects studied were mounted on microscope slides, or partly preserved in alcohol. The holotypes of new species are deposited in the Hungarian Natural History Museum, Budapest (HNHM). Paratypes are deposited in the Plant Protection Institute, Hungarian Academy of Science (PPI), and in the collection of USNM (Beltsville, USA).

Terminology follows that of Morrison (1925, 1952), and of Miller and Kozár (1999, in preparation) except for some new characters found in the present work.

Results

*Newsteadia americana* Morrison, 1925

![Fig. 1. *N. americana* Morrison, 1925, female]
Material Examined

Holotype: female, USA, Maryland, 08. 08, 1917, Leg: H. S. Barber, on the same slide one paratype. Two paratype females on one slide, USA, Virginia shore, opp. Plummers Is, Md, June 15, 1922, Leg: H. Morrison. One paratype female, Canada, Ontario, Grimsby, Leg: Horn.

The species is different from all species known in the Region by densely covered body with wax plates including the venter of the thorax. A new drawing is presented (Fig. 1), because the original drawing does not contain several important characters, like the number of quadrilocular pores on the venter of abdomen and other parts of the body.

This species was not found in our samples.

Newsteadia borhidii sp. n.

Material Examined


Description of Adult Female

Mounted specimen (Fig. 2): Holotype adult female 1.2 mm long, 0.8 mm wide. Antennae 3-segmented, 1st segment 186 µm long, 2nd segment 102 µm long, apical segment 390 µm long, all segments with clavate setae, the longest is 47 µm long, with 9 setae on apical segment, apical seta 114 µm long, without subapical seta, medial sensory seta 34 µm long situated near end of segment.

Venter

Labium 166 µm long, partly with clavate setae. Stylet loop as long as labium. Legs: 1st coxa 90 µm long, trochanter-femur 320, tibia-tarsus 432 µm long, claw 42, claw digitules destroyed, 2nd coxa 94 µm long, trochanter-femur 390, tibia-tarsus 457, claw 41, claw digitules destroyed, 3rd coxa 98 µm long, trochanter-femur 415, tibia-tarsus 498 µm long, claw 43, claw digitules 7 µm long, with clavate setae from coxae to middle of tibia-tarsus and with spinedike setae on posterior part of tibia-tarsus; without flagellate sensory setae near tibial sensorium on all legs; trochanter with 4 sensory pores on each surface. Ovisac band short, not interrupted in middle, with a special depression covered by quadrilocular pores in front of middle part of ovisac, ovisac wax plate groups on last segments of abdomen absent; wax plates almost absent on the thorax and head. Coxal depressions not developed. Anterior thoracic spiracles without quadrilocular pores, anterior thoracic spiracles 26 µm in diameter. Hairlike setae scattered in medial areas of thorax. Quadrilocular and simple pores 4–7 µm in diameter; tubular quadrilocular pores long, protruding from derm, associated with wax plates; quadriloculars and simple pores present in wide bands within ovisac band and in groups between wax plates elsewhere. Abdominal spiracles five pairs.

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DORSUM

Wax plates cover only part of the surface. Spines at the margin of wax plates are elongate, 18 µm long. Hairlike setae present in marginal clusters near posterior edges of marginal wax plates, and near anterolateral and anteromedial edges of each dorsomedial wax plate, 37 µm long. Quadrilocular and discoidal pores scattered between wax plates, 8 µm long. Tubular ducts present. Anal ring with rows of pores; longest anal ring seta 42 µm long, anal ring 48 µm wide and 65 µm long.

The species is named after the collector Dr. Attila Borhidi, Hungarian botanist, who worked for many years in Cuba and collected several interesting scale insect species in different parts of the world.

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**Fig. 2.** *N. borhidii* sp. n., female
COMMENTS

*N. borhidii* is similar to *N. tristani*, but differs by having clavate setae on all segments of the antennae, and by the presence of long tubular ducts.

*Newsteadia brasiliensis* sp. n.

**Fig. 3. N. brasiliensis** sp. n., female

**MATERIAL EXAMINED**

DESCRIPTION OF ADULT FEMALE

Mounted specimen (Fig. 3): Holotype adult female 1.0 mm long, 0.8 mm wide. Antennae 6-segmented, 1st segment 186 \( \mu \)m long, 2nd segment 122 \( \mu \)m long, apical segment 141 \( \mu \)m long, with 24 \( \mu \)m long, strong hairlike setae, with 7 setae on apical segment, apical seta 94 \( \mu \)m long, with one, 34 \( \mu \)m long subapical seta, medial sensory seta 42 \( \mu \)m. 

VENTER

Labium 110 \( \mu \)m long. Stylet loop as long as labium. Legs: 1st coxa 77 \( \mu \)m long, trochanter-femur 320, tibia-tarsus 440 \( \mu \)m long, claw 36, claw digitules 7 \( \mu \)m long, 2nd coxa 84 \( \mu \)m long, trochanter-femur 326, tibia-tarsus 465, claw 37, claw digitules 7 \( \mu \)m long, 3rd coxa 96 \( \mu \)m long, trochanter-femur 352, tibia-tarsus 498 \( \mu \)m long, claw 40, claw digitules 7 \( \mu \)m long, partly with strong hairlike, and spinelike setae; flagellate sensory setae near tibial sensorium absent on all legs; trochanter with 4 sensory pores on each surface. Ovisac band interrupted in middle, short, ovisac wax plate groups on last segments of abdomen absent; wax plates nearly absent on thorax and head. Coxal depressions not developed. Anterior thoracic spiracles with some associated quadrilocular and simple pores, 3–5 \( \mu \)m in diameter, anterior thoracic spiracles 20 \( \mu \)m in diameter. Hairlike setae, scattered in medial areas of thorax. Quadrilocular and simple pores 3-6 \( \mu \)m in diameter; quadriloculars and simple pores present in wide, long bands within ovisac band and scattered between wax plates elsewhere. Abdominal spiracles five pairs.

DORSUM

Wax plates scattered in single rows. Spines at margin of wax plate elongate 13 \( \mu \)m long. Hairlike setae present in marginal clusters near posterior edges of marginal wax plates, and near anterolateral and anteromedial edge of each dorsomedial wax plate, 19 \( \mu \)m long. Short tubular quadrilocular pores scattered between wax plates, long tubular ducts absent. Anal ring with two rows of pores; longest anal ring seta 36 \( \mu \)m long, anal ring round, 46 \( \mu \)m in diameter.

The species is named after the country of collection of the samples.

COMMENTS

*Newsteadia brasiliensis* is different from other *Newsteadia* species, by having 6-segmented antennae with long, strong, setose hairlike setae on the antennae.

*Newsteadia costaricaensis* sp. n.

MATERIAL EXAMINED

DESCRIPTION OF ADULT FEMALE

Mounted specimen (Fig. 4): Holotype adult female 1.2 mm long, 1.0 mm wide. Antennae 3-segmented, 1st segment 176 µm long, 2nd segment 128 µm long, apical segment 336 µm long, basal segments of antennae with strong hairlike setae, apical segment with 15 setose hairlike setae, apical seta 84 µm long, with 34 µm long subapical seta, with a microseta at base, medial sensory seta 35 µm.

VENTER

Labium 208 µm long. Stylet loop as long as labium. Legs: 1st coxa 121 µm long, trochanter-femur 332, tibia-tarsus 457 µm long, claw 38, claw digitules 9 µm long, 2nd

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coxa 128 µm long, trochanter-femur 357, tibia-tarsus 473, claw 38, claw digitules 9 µm long,
3rd coxa 144 µm long, trochanter-femur 398, tibia-tarsus 540 µm long, claw 43, claw
digitules 10 µm long, with spined setae; without flagellate sensory setae near tibial
sensorium on all legs; trochanter with 4 sensory pores on each surface. Ovisac band
complete; wax plates partly cover thorax and head. Coxal depressions not developed. Base
of coxa with hairlike setae, quadrilocular pores and some thick-walled 7 µm long quadri-
locular pores. Anterior thoracic spiracles with some quadrilocular and discoidal pores, 3–5
µm in diameter, anterior thoracic spiracles 20 µm in diameter. Quadrilocular and simple
pores 4–6 µm in diameter on abdomen; tubular quadrilocular pores short, protruding from
derm, associated with wax plates; quadriloculars and simple pores present in wide bands
within ovisac band and scattered between wax plates elsewhere. Raw of grouped quadri-
locular pores present posterior of vulva, 4 µm in diameter. Abdominal spiracles five pairs.

DORSUM
Wax plates cover most surface. Spines at margin of wax plate elongate 17 µm
long. Hairlike setae present in small numbers near posterior edges of marginal wax plates,
and near anterolateral and anteromedial edge of each dorsomedial wax plate, 26 µm long.
Tubular-like quadrilocular and discoidal pores scattered between wax plates. In wax plates
short tubular ducts 4 µm long present, long tubular ducts absent. Anal ring with rows of
pores; longest anal ring seta 41 µm long, anal ring 48 µm wide and 49 µm long.

The species is named after the country of collection.

COMMENTS
N. costaricaensis is similar to N. trisegmentalis, but differs by having clusters of
quadrilocular pores on the venter of the abdomen, by the presence of a subapical seta, and
by the absence of long tubular ducts.

Newsteadia floridensis sp. n.
MATERIAL EXAMINED
Holotype: female, USA, Florida, Ocala Nat. For. 26.11.72, Marion Co., Leg: R.
D. Kaplan. Paratype: one female from the same collection as the holotype. Types are
deposited in the collection of USNM.

DESCRIPTION OF ADULT FEMALE
Mounted specimen (Fig. 5): Holotype adult female 1.0 mm long, 0.8 mm wide.
Antennae 7-segmented, 1st segment 144 µm long, 2nd segment 102 µm long, apical segment
147 µm long, with clavate setae on the first two segments, with spined setae on other
segments, apical seta 70 µm long, subapical seta 22 µm long, medial sensory seta 24 µm.

VENTER
Labium 157 µm long. Stylet loop as long as labium. Legs: 1st coxa 96 µm long,
trochanter-femur 262, tibia-tarsus 398 µm long, claw 35, claw digitules 8 µm long, 2nd
coxa 103 µm long, trochanter-femur 294, tibia-tarsus 415, claw 36, claw digitules 9 µm long, 3rd coxa 110 µm long, trochanter-femur 336, tibia-tarsus 465 µm long, claw 36, claw digitules 9 µm long, partly with clavate, and with spinelike setae; without flagellate sensory setae near tibial sensorium on all legs; trochanter with 4 sensory pores on each surface. Ovisac band not interrupted in the middle, ovisac wax plate groups on last segments of abdomen present; wax plates in small groups on thorax and head. Coxal depressions with groups of quadrilocular pores, hairlike setae and tubular ducts. Anterior thoracic spiracles with some quadrilocular pores, 6 µm in diameter, anterior thoracic spiracles 23 µm in diameter. Hairlike setae scattered in medial areas of thorax. Quadrilocular and simple pores 3–5 µm in diameter; tubular quadrilocular pores long,
protruding from derm, associated with wax plates club-shaped pores are present, quadriloculars and simple pores present in rows within ovisac band and scattered between wax plates elsewhere. Abdominal spiracles five pairs.

DORSUM

Wax plates interrupted in middle of bands, cover the surface. Spines at margin of wax plate elongate 17 µm long. Hairlike setae present in marginal clusters near posterior edges of marginal wax plates, and near anterolateral and anteromedial edge of each dorsomedial wax plate, 23 µm long. Microtubular ducts scattered, abundant between wax plates, long tubular ducts 14 µm long. Anal ring with two rows of pores; longest anal ring seta 24 µm long, anal ring 48 µm in diameter.

The species is named after the state in the USA where it was collected.

COMMENTS

This specimens were identified as *N. minima* by Morrison, 1952, however *N. floridensis* differs from *N. minima*, by having clavate setae on the first segment of the antenna, and by the presence of groups of quadrilocular pores on the dorsum between the wax plates.

*Newsteadia minima* Morrison, 1952

**MATERIAL EXAMINED**

Holotype: female, USA, Durham, N.C. 08. 09. 1944, Leg: A. S. Pearse, and 3 paratype females from the same collection as the holotype, on three slides.

This species is different from all known species from the Region by widely separated wax plates especially on the abdominal dorsum, and the small number of wax plate seta on the venter of the thorax.

This species was not found in our samples.

COMMENTS

Both species (*N. americana* and *N. minima*) are similar to *N. floccosa* De Geer, 1778, and *N. kanayana* Kawai et Takagi, 1971, from the Palaearctic Region (Kozár, 1998; Kozár and Konczné Benedicty, 1999b). However *N. floccosa* differs from both species by having large group of quadrilocular pores near to coxal bases. *N. kanayana* differs from *N. floccosa, N. americana* and *N. minima* by having wax plates on the dorsum that are, and by having a small number of wax plate setae on the venter of the thorax.

*Newsteadia morrisoni* sp. n.

**MATERIAL EXAMINED**

DESCRIPTION OF ADULT FEMALE

Mounted specimen (Fig. 6): Holotype: adult female 1.3 mm long, 0.9 mm wide. Antennae 3-segmented, 1st segment 186 µm long, 2nd segment 128 µm long, apical segment 314 µm long, with long hairlike setae on all segments, with 19 setae on apical segment, apical seta 99 µm long, subapical seta 49 µm long, with one short subapical seta, medial sensory seta 51 µm.

VENTER

Labium 182 µm long. Stylet loop as long as labium. Legs: 1st coxa 128 µm long, trochanter-femur 332, tibia-tarsus 440 µm long, claw 38, claw digitules 8 µm long, 2nd...
coxa 131 µm long, trochanter-femur 349, tibia-tarsus 473, claw 41, claw digitules 8 µm long, 3rd coxa 134 µm long, trochanter-femur 382, tibia-tarsus 538 µm long, claw 38, claw digitules 10 µm long, with hairlike setae on coxae, trochanter-femur, and part of tibia-tarsus, and spinelike setae on other parts, of tibia-tarsus and claw; without flagellate sensory setae near tibial sensorium on all legs; trochanter with 4 sensory pores on each surface. Ovisac band complete; wax plates in groups or bands on thorax and head. Coxal depressions not developed. Anterior thoracic spiracles with some quadrilocular pores, 5 µm in diameter, anterior thoracic spiracles 22 µm in diameter. Hairlike setae, scattered in medial areas of thorax. Quadrilocular pores 6 µm in diameter; tubular quadrilocular pores protruding from derm, associated with wax plates; quadriloculars and simple pores present in wide bands within ovisac band and scattered between wax plates elsewhere. Abdominal spiracles five pairs.

**DORSUM**

Wax plates cover only part of surface in wide bands. Spines at margin of wax plate elongate 12 µm long. Hairlike setae present in marginal clusters near posterior edges of marginal wax plates, and near anterolateral and anteromedial edge of each dorsomedial wax plate, 22 µm long. Short tubular quadrilocular pores present, and long tubular ducts absent. On the dorsum only simple, and some quadrilocular pores are present. Anal ring with rows of pores; longest anal ring seta 43 µm, anal ring 48 µm wide and 50 µm long.

The species is named after Harold Morrison, the author of the first World monograph of this family.

**COMMENTS**

*N. morrisoni* differs from all other species known from the region by the large number of long hairlike setae on all segments of the antennae.

*Newsteadia trisegmentalis* Howell, 1975

**MATERIAL EXAMINED**

Holotype: female, USA, Echols Co., Georgia, 07. 03. 1973, on Panicum sp., Leg: S. J. Beshaer, and 2 paratype females from the same collection.

Additional material: There is a female from Florida, Weeki Wachee, Hernando Co. 04. 27. 1975, on *Quercus*, Leg: R. F. Denno, Det. J. A. Davidson and D. R. Miller, No. 2798, and also one female from Mexico, Brownsville, 08. 06. 1987, on orchids and bromeliad debris, Leg: D. Riley, No. 88-06320, all are in USNM collection.

This species (female and larvae) was found in our samples from Venezuela, between Maracay and Caracas, 1973, Leg: J. Balogh, No. Ve 36. There are four larvae in our samples from Antilles, Santa Lucia, 1980, Leg: S. Mahunka, which probably belongs to this species.

**COMMENTS**

This species is similar to *N. tristani*, the morphological differences will be discussed under the latter species.

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Newsteadia tristani (Silvestri, 1924)

Material Examined

Holotype (on the original slide written “Typus”, but according to handwriting it is not sure that it was written by Silvestri) (the original slide contains two specimens, the lectotype designated here, circled by red colour, on the upper left side of the slide) (Fig 7) (preadult female): (including one syntype, also a preadult female on the same slide) Costa Rica, San Jose, 01. 1917, remounted by Zs. Konczné Benedicty, 1 preadult female from alcohol, from the same collection (mounted by Zs. Konczné Benedicty), from the collection of Napoli University, Portici, Italy. The species was described on the base of these preadult females (Morrison, 1925). Later Morrison (1952) found an adult female in

Fig. 7. N. tristani (Silvestri, 1924), preadult female

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his collection from Mexico Tuxtla Gutierrez, 16. 08. 1948, on orchid, Leg: A. Chapman, No. Laredo 47062, which he “accepted as an example of this species”.

Here we present a new, detailed drawing, and description of the type material (preadult female) (Fig. 7), drawing, and description (Fig. 8) of the female “example of this species” mentioned by Morrison (1952).

Additional material: The species was found from some other places in our samples. One female, from Mexico, Leg: S. Mahunka, 1996, No. 351. Two females (on two slides) and one female with a larva (on one slide), and 4 larvae (on two slides), from Peru, Iquitos, Lacuna, Quistococha, 01. 12. 1971, Leg: J. Balogh, Nos. B5, B6, B7, B17.

Fig. 8. N. tristani (Silvestri, 1924), female

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DESCRIPTION OF PREADULT FEMALE

Mounted specimen (Fig. 7): Holotype preadult female 1.3 mm long, 0.9 mm wide. Antennae 3-segmented, 1st segment 96 µm long, 2nd segment 66 µm long, and apical segment 214 µm long, with clavate setae on 1st and 2nd segments of the antennae, 30 µm long on 1st and 2nd segments, apical seta 82 µm long with spinelike setae, without subapical, and medial sensory setae.

VENTER

Labium 109 µm long. Legs: 1st coxa 68 µm long, trochanter-femur 208, tibia-tarsus 275 µm long, claw 30, claw digitules 6 µm long, 2nd coxa 72 µm long, trochanter-femur 218, tibia-tarsus 282 µm long, claw 30, claw digitules 6 µm long, 3rd coxa 78 µm long, trochanter-femur 243, other parts broken, with clavate setae on coxa, trochanter-femur and part of tibia-tarsus, and with spinelike setae on other part of tibia-tarsus and claw; without flagellate sensory setae near tibial sensorium; trochanter with 2 sensory pores on each surface. Ovisac band absent; wax plates absent, only some wax plate setae present in groups, and rows. Coxal depressions not developed. Anterior thoracic spiracles with associated cluster of quadrilocular and simple pores, 3–6 µm wide, diameter of anterior thoracic spiracles 22 µm. Hairlike setae few, scattered in medial areas of thorax. Quadrilocular pores 6 µm in diameter; present in groups on thorax, and scattered on abdomen. Five pairs of abdominal spiracles.

DORSUM

Wax plates in wide bands on surface, not divided on midline. Spines at margin of wax plate elongate, with apically rounded apex, 12 µm long. Hairlike setae present near posterior edges of marginal wax plates, and near anterolateral and anteromedical edge of each dorsomedical wax plate. Quadrilocular and simple pores scattered between wax plates, 3–5 µm long, short tubular ducts, 4 µm long, present in wax plates. Anal ring partly destroyed; longest anal ring seta 22 µm long, shorter than length of anal ring; ring 31 µm wide, and 34 µm long.

COMMENTS

The preadult female of N. tristani is similar to preadult females of N. trisegmentalis (not from type series). The most important difference is the presence of a sensory seta on the apical segment of the N. trisegmentalis (which is present in all larval and adult stages). This sensory seta is absent in preadult and adult specimens of N. tristani. The setae on the first two segments of the antennae, and coxae of N. tristani are long and clavate, but short and not clavate in all stages of N. trisegmentalis, as was mentioned by Howell (1975), the latter species also has long tubular ducts.

DESCRIPTION OF ADULT FEMALE

Mounted specimen (Fig. 8): Female (Morrison’s “example of this species”) 1.3 mm long, 0.9 mm wide. Antennae 3-segmented, 1st segment 128 µm long, 2nd segment...
102 µm long, and apical segment 352 µm long, with 3 clavate setae on 1st and 2nd segments, 18–23 µm long, with 7 spinelike setae 12 µm long on apical segment, apical seta 82 µm long, without subapical, and medial sensory seta.

**Venter**

Labium 154 µm long. Stylet loop as long as labium. Legs: 1st coxa 102 µm long, trochanter-femur 340, tibia-tarsus 423 µm long, claw 43, claw digitules 8 µm long, 2nd coxa 122 µm long, trochanter-femur 365, tibia-tarsus 457 µm long, claw 46, claw digitules 8 µm long, 3rd coxa 134 µm long, trochanter-femur 415, tibia-tarsus 539 µm long, claw 48, claw digitules 13 µm long, legs with clavate setae on coxae, trochanter-femur and partly on tibia-tarsus, on other part of tibia-tarsus with spinelike setae; without flagellate sensory setae near tibial sensorium; trochanter with 4 sensory pores on each surface. Ovisac band not interrupted, but short, ovisac wax plate groups on last segments of abdomen absent; wax plates very few on the thorax and head. Coxal depressions weakly developed, mesad of each coxa, with a cluster of hairlike setae, wax spines, and many quadrilocular pores. Anterior thoracic spiracles without quadrilocular and simple pores, diameter of anterior thoracic spiracles 35 µm. Hairlike setae few, scattered in medial areas of thorax. Quadrilocular and discoidal pores 4–6 µm in diameter; quadrilocular and discoidal pores present in wide bands within ovisac band and scattered between wax plates. With five pairs of abdominal spiracles.

**Dorsum**

Wax plates in wide bands, partly divided in midline. Spines at margin of wax plate elongate, with apically rounded apex, 16 µm long. Hairlike setae present in marginal clusters near posterior edges of marginal wax plates, and near anterolateral and anteromedial edge of each dorsomedial wax plate, 24 µm long. Quadrilocular and simple pores scattered between wax plates, 3–5 µm in diameter, tubular ducts short, 4 µm long, present in wax plates. Anal ring with rows of pores; longest anal ring seta 38 µm long, shorter than length of anal ring; ring 54 µm wide, and 60 µm long.

**Comments**

*N. tristani* (although described only on the basis of preadult females), is a distinct species, distributed in different parts of Central and South America. The new larvae found are nonspecific with the larvae from type series, and the females found altogether with larvae makes possibly to identify this species and accept as valid.

*Newsteadia tropicalis* sp. n.

**Material Examined**

Holotype: female (marked with red circle, on right side of the slide) (including one paratype female on the same slide, Brazil, Leg: J. Balogh, 1995, No. B 76. Paratypes: two females from the same collection as the holotype, on two slides, Nos. B 2, B 76.)
DESCRIPTION OF ADULT FEMALE

Mounted specimen (Fig. 9): Holotype adult female 1.1 mm long, 0.9 mm wide. Antennae 6-segmented, 1st segment 176 µm long, 2nd segment 118 µm long, apical segment 182 µm long, with clavate setae on first two segments, with 7 spinelike setae on next segments, apical seta 96 µm long, subapical seta 38 µm long, medial sensory seta 33 µm.

VENTER

Labium 160 µm long. Stylet loop as long as labium. Legs: 1st coxa 102 µm long, trochanter-femur 349, tibia-tarsus 432 µm long, claw 38, claw digitules 6 µm long, 2nd coxa 115 µm long, trochanter-femur 374, tibia-tarsus 467, claw 38, claw digitules 6 µm long, 3rd coxa 122 µm long, trochanter-femur 398, tibia-tarsus 481 µm long, claw 41, claw
digitules 7 µm long, partly with clavate, and partly with spinnelike setae; without flagellate sensory setae near tibial sensorium on all legs; trochanter with 4 sensory pores on each surface. Ovisac band interrupted in middle, short, ovisac wax plate groups on last segments of abdomen absent; wax plates in small groups on thorax and head. Coxal depressions not developed. Anterior thoracic spiracles with some associated quadrilocular pores, 4 µm in diameter, anterior thoracic spiracles 22 µm in diameter. Hairlike setae scattered in medial areas of thorax. Quadrilocular and simple pores 3–5 µm in diameter; tubular quadrilocular pores long, protruding from derm, associated with wax plates; quadriloculars and simple pores present in wide, bands within ovisac band and scattered between wax plates elsewhere. Abdominal spiracles five pairs.

DORSUM
Wax plates forming bands on surface. Spines at margin of wax plate elongate, 16 µm long. Hairlike setae present in marginal clusters near posterior edges of marginal wax plates, and near anterolateral and anteromedial edge of each dorsomedial wax plate, 24 µm long. Tubular quadrilocular pores scattered between wax plates, long tubular ducts 16 µm long. Anal ring with two rows of pores; longest anal ring seta 36 µm long, anal ring round 48 µm in diameter.

The species is named after the tropical region where it was collected.

COMMENTS
N. tropicalis is similar to N. brasiliensis, but differs by having clavate setae on the first segments of the antennae, and by presence of long tubular ducts.

Key to adult females of Newsteadia found in these regions

1. Antennae three segmented
   – Antennae more than three segments 2
2. Antennal setae clavate
   – All antennal setae apically acute
      3
   – Antennal seta clavate only on the first and second segment
      borhidii sp. n.
3. All antennal setae long, clavate
   – Antennal seta clavate only on the first and second segment
      tristani (Silvestri, 1924)
4. All antennal setae long, hairlike
   – Some antennal seta spinnelike
      morrisoni sp. n.
5. With long tubular ducts, without clusters of quadrilocular pores,
   subapical seta absent
   – With short tubular ducts, with clusters of quadrilocular pores,
      subapical seta present
      trisegmentalis Howell, 1975
      costaricaensis sp. n.
6. Ovisac band interrupted
   – Ovisac band not interrupted
5
7. Tubular ducts short
   – Tubular ducts long
   floridensis sp. n.
8. Wax plates densely cover of the venter the thorax, wax plate bands on dorsum not interrupted *americana* Morrison, 1925
   - Wax plates not cover of the venter the thorax, wax plate bands on dorsum interrupted *minima* Morrison, 1952
9 Part of setae on antennae clavate, with long tubular ducts *tropicalis* sp. n.
   - Setae on the antenna strong, setose hairlike, with short tubular ducts *brasiliensis* sp. n.

**Zoogeographic Considerations**

With the data presented here, and considering earlier reports, the species number of *Newsteadia* in the Nearctic and Neotropic Regions has increased to 10. Two species (*N. americana*, *N. floridensis*, and *N. minima*) are distributed only in the Nearctic Region,
six others (*N. costaricaensis, N. morrisoni, N. borhidii, N. brasiliensis, N. tristani* and *N. tropicalis*) are only in the Neotropic Region and one species is (*N. trisegmentalis*) in both regions.

In the Nearctic and Neotropic Regions most of the species (6) were found in Central America and the northern parts of South America (*Fig. 10*). *N. trisegmentalis* has the widest distribution, and presents a link between North, Central and South America on eastern side of the continent through the Caribbean Islands. *N. tristani* presents a link between North, Central and South America on the western side of the continent. *N. americana* is distributed widely in the north-eastern part of North America.

With the new species added to the World list, the total number of the extant species has increased to 37, with two fossil species making the number 39. A worldwide zoogeographical analysis will be undertaken in the future, when treatments of *Newsteadia* from Australian and Pacific, Oriental and Palaearctic Regions (Kozár and Konczné Benedicty, 1999a, b), and Ethiopian Region (Miller and Kozár, 1999, in preparation) are published.

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**Literature**


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