

INSECTA MUNDI

A Journal of World Insect Systematics

0616

A new combination and an update of
Neotoumeyella Kondo and Williams, 2009
(Hemiptera: Coccoomorpha: Coccidae)

Takumasa Kondo
Corporación Colombiana de Investigación Agropecuaria (CORPOICA)
Centro de Investigación Palmira
Calle 23, Carrera 37, Continuo al Penal
Palmira, Valle, Colombia

Date of issue: March 30, 2018

A new combination and an update of *Neotoumeyella* Kondo and Williams, 2009
(Hemiptera: Coccoomorpha: Coccidae)

Takumasa Kondo

Insecta Mundi 0616: 1–5

ZooBank Registered: urn:lsid:zoobank.org:pub:5BACECB5-506F-4EFD-9FF9-C63A1B69E5EA

Published in 2018 by

Center for Systematic Entomology, Inc.

P.O. Box 141874

Gainesville, FL 32614-1874 USA

<http://centerforsystematicentomology.org/>

Insecta Mundi is a journal primarily devoted to insect systematics, but articles can be published on any non-marine arthropod. Topics considered for publication include systematics, taxonomy, nomenclature, checklists, faunal works, and natural history. *Insecta Mundi* will not consider works in the applied sciences (i.e. medical entomology, pest control research, etc.), and no longer publishes book reviews or editorials. *Insecta Mundi* publishes original research or discoveries in an inexpensive and timely manner, distributing them free via open access on the internet on the date of publication.

Insecta Mundi is referenced or abstracted by several sources, including the Zoological Record and CAB Abstracts. *Insecta Mundi* is published irregularly throughout the year, with completed manuscripts assigned an individual number. Manuscripts must be peer reviewed prior to submission, after which they are reviewed by the editorial board to ensure quality. One author of each submitted manuscript must be a current member of the Center for Systematic Entomology.

Guidelines and requirements for the preparation of manuscripts are available on the *Insecta Mundi* website at <http://centerforsystematicentomology.org/insectamundi/>

Chief Editor: David Plotkin, insectamundi@gmail.com

Assistant Editor: Paul E. Skelley, insectamundi@gmail.com

Head Layout Editor: Robert G. Forsyth

Editorial Board: J. H. Frank, M. J. Paulsen, Michael C. Thomas

Review Editors: Listed on the *Insecta Mundi* webpage

Printed copies (ISSN 0749-6737) annually deposited in libraries

CSIRO, Canberra, ACT, Australia

Museu de Zoologia, São Paulo, Brazil

Agriculture and Agrifood Canada, Ottawa, ON, Canada

The Natural History Museum, London, UK

Muzeum i Instytut Zoologii PAN, Warsaw, Poland

National Taiwan University, Taipei, Taiwan

California Academy of Sciences, San Francisco, CA, USA

Florida Department of Agriculture and Consumer Services, Gainesville, FL, USA

Field Museum of Natural History, Chicago, IL, USA

National Museum of Natural History, Smithsonian Institution, Washington, DC, USA

Zoological Institute of Russian Academy of Sciences, Saint-Petersburg, Russia

Electronic copies (Online ISSN 1942-1354, CDROM ISSN 1942-1362) in PDF format

Printed CD or DVD mailed to all members at end of year. Archived digitally by Portico.

Florida Virtual Campus: <http://purl.fcla.edu/fcla/insectamundi>

University of Nebraska-Lincoln, Digital Commons: <http://digitalcommons.unl.edu/insectamundi/>

Goethe-Universität, Frankfurt am Main: <http://nbn-resolving.de/urn/resolver.pl?urn:nbn:de:hebis:30:3-135240>

Copyright held by the author(s). This is an open access article distributed under the terms of the Creative Commons, Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited. <http://creativecommons.org/licenses/by-nc/3.0/>

Layout Editor for this article: Robert G. Forsyth

A new combination and an update of *Neotoumeyella* Kondo and Williams, 2009 (Hemiptera: Coccomorpha: Coccidae)

Takumasa Kondo

Corporación Colombiana de Investigación Agropecuaria (CORPOICA)
Centro de Investigación Palmira
Calle 23, Carrera 37, Continuo al Penal
Palmira, Valle, Colombia
Takumasa.kondo@gmail.com

Abstract. Based on morphological features of the adult female, the Brazilian soft scale, *Mesolecanium ferum* Hempel, 1920 (= *Toumeyella ferum*) (Hemiptera: Coccomorpha: Coccidae) is transferred to the genus *Neotoumeyella* Kondo and Williams, 2009, as *Neotoumeyella ferum* (Hempel), **comb. nov.** The genus *Neotoumeyella* is rediagnosed in order to accommodate the unique features of *M. ferum* and an updated key to the six species of the genus is provided. An English translation of the Spanish redescription of *M. ferum* (as *T. ferum*) by Granara de Willink (2012) is also provided, with the author's comments and interpretations.

Key words. Coccoidea, morphology, soft scale, taxonomic key.

Resumen. En base a las características morfológicas de la hembra adulta, una especie de escama blanda del Brasil, *Mesolecanium ferum* Hempel, 1920 (= *Toumeyella ferum*) (Hemiptera: Coccomorpha: Coccidae) se transfiere al género *Neotoumeyella* Kondo y Williams, 2009, como *Neotoumeyella ferum* (Hempel), **comb. nov.** El género *Neotoumeyella* se rediagnóstica para incluir las características únicas de *M. ferum* y se proporciona una clave actualizada para las seis especies del género. También se proporciona una traducción al inglés de la redescipción de *M. ferum* (como *T. ferum*) escrita en español por Granara de Willink (2012), con comentarios e interpretaciones del autor.

Palabras clave. Clave taxonómica, Coccoidea, escama blanda, morfología.

Introduction

The soft scale genus *Neotoumeyella* Kondo and Williams was erected in Kondo and Williams (2009). It contains five species that were formerly included in *Neolecanium* Parrott, 1901 and *Toumeyella* Cockerell, 1895 that shared common features, especially the presence of ventral tubular ducts distributed from the area around the vulva and submedially and/or submarginally up to at least the area of the posterior spiracular pore bands (with some species extending up the area around the anterior spiracular pore bands), often frequent on mid areas of abdominal segments and thorax. Otherwise, these species have rather similar structure to *Toumeyella*. For further differences between the two genera, see the diagnosis section of *Neotoumeyella* below).

Recently, while preparing a description of an undescribed species of the genus *Toumeyella*, the author noticed that *Mesolecanium ferum* Hempel, 1920, which was redescribed and transferred to *Toumeyella* as *T. ferum* (Hempel) by Granara de Willink (2012), has more affinities with the genus *Neotoumeyella* than to *Toumeyella*. Thus, *M. ferum* is herein transferred to *Neotoumeyella* as *Neotoumeyella ferum* (Hempel), **comb. nov.** The purpose of this study is to transfer *M. ferum* to *Neotoumeyella* and to provide an updated diagnosis of the genus and a key to all six species in the genus. A translation of the Spanish redescription of *M. ferum* (as *T. ferum*) by Granara de Willink (2012) is also provided, with the author's comments and interpretations.

Materials and Methods

The redescription of *Mesolecanium ferum* Hempel (as *Toumeyella ferum*) provided by Granara de Willink (2012) in Spanish was translated into English. Interpretation of some of the morphological features of *T. ferum* described by Granara de Willink (2012) were added in square brackets based on published

literature. *Neotoumeyella* was rediagnosed in order to accommodate the autapomorphic features of *M. ferum*. Terminology of morphological features followed Kondo and Williams (2009). This study was based solely on an analysis of published literature (no slide-mounted specimens were studied). An updated key to all six species of *Neotoumeyella* is provided.

Depository acronym

MZSP: Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil.

Results and Discussion

In this paper, *Mesolecanium ferum* Hempel, 1920, is transferred to the genus *Neotoumeyella* Kondo and Williams, 2009, as *Neotoumeyella ferum* (Hempel), comb. nov. based on the morphology of the adult female of *M. ferum* as redescribed by Granara de Willink (2012), increasing the number of species in the genus to six. The diagnosis of *Neotoumeyella* was slightly modified from the original diagnosis provided by Kondo and Williams (2009) in order to include the autapomorphic features of *M. ferum* (especially the large sclerotic pores on the dorsum) and other diagnostic features, based on the published literature. The key for *Neotoumeyella* species provided by Kondo and Williams (2009) was updated to include *N. ferum* comb. nov.

Neotoumeyella Kondo and Williams, 2009

Type species

Neolecanium leucaenae Cockerell, 1903

Generic diagnosis based on adult female (adapted from Kondo and Williams 2009). Body convex to globular, often irregular in outline, with thin glassy test, or covered with dull white waxy secretion. Ovisac reported as present for one species (i.e., *N. cerifera*), but generally absent. **Dorsum.** Dorsal derm generally becoming heavily sclerotized at maturity. Dorsal tubercles, dorsal tubular ducts and pocket-like sclerotizations absent. Dorsal setae slender, stout, spine-like or lanceolate, with a round or pointed apex. All species with convex discoidal pores (preopercular pores) present around anal plates only or found widespread over dorsum. Dorsal microducts present, of 1 or 2 types, generally of 1 type, i) a microduct with well-developed septa, and a long terminal filament, distributed evenly throughout dorsum; ii) a type of microduct found so far in *N. ferum*; known as a sclerotic pore, is a microduct surrounded by a large circular sclerotized plate (in *N. ferum* these are scattered on dorsum and form groups of 3–6 sclerotic pores in a rosette pattern around body margins). Anal plates with four apical setae, with variable numbers of subapical, fringe and hypopygial setae. Anal ring variable, with 6, 8, 10 or 12 setae. **Margin.** Marginal setae slender or stout and pointed or blunt. Stigmatic setae generally totaling three per stigmatic area (1–2 reported for *T. ferum*), present on margin or slightly dorsal of margin. Eyes not detected. **Venter.** Ventral body setae sharply spinose, slender, straight or slightly bent; with a row of submarginal setae; interantennal setae totaling four or six; with three pairs of long prevulvar setae (reported as not differentiated in *T. ferum*). Antennae and legs greatly reduced, with main segments present, occasionally indistinct or fused; without tibio-tarsal sclerotization. Antennae 3–6 segmented. Mouthparts normal, with eight labial setae. Spiracles usually large, about same size as legs. Spiracular pores with 3–8 loculi, mostly with five loculi (normally with 7 and 8 in *T. ferum*). Ventral tubular ducts of 1–3 sizes, generally with a terminal filament, but without a terminal filament in *T. ferum*, present around vulvar area and anterior abdominal segments, always present in a submarginal band on abdomen and reaching area around posterior spiracular pore band, often found submarginally as far as anterior spiracular pore band, mouthparts and antennae. Multilocular pores (other than spiracular pores) variable, with 5–12 loculi, but pores with 5–10 loculi most common. Ventral microducts present, with a short terminal filament.

Remarks. *Neotoumeyella ferum* fits well the diagnosis of the genus.

***Neotomeyella ferum* (Hempel, 1920), comb. nov.**

Mesolecanium ferum; Hempel 1920.

Tomeyella ferum; Granara de Willink 2012.

Type material. Brazil: São Paulo, Campinas, ex. *Croton floribundus* (Euphorbiaceae). 1 slide with 2 adult female specimens (one damaged); not indicated as type material but possibly belonging to the same syntype series mentioned by Ben-Dov (1993) (MZSP) (Granara de Willink 2012).

Diagnostic characters (translated from Granara de Willink 2012). Stigmatic clefts broad, with spiracular pores with 5–8 loculi. Dorsal surface with microducts and ducts with a conspicuous outer aperture, circular in shape, large, concave, highly sclerotized, with a cribriform center, convex; dorsal setae thorn-like, short. Marginal setae similar to dorsal setae, arranged around margin in one to two rows. One or two short and robust stigmatic setae slightly displaced onto dorsal surface. Preulvar setae not differentiated from other setae on [ventral] surface. Multilocular disc-pores with 6–10 loculi, with a central loculus, present on abdomen and thorax. Tubular ducts very small, lacking a terminal filament, present on area near vulva and on the border of the stigmatic furrows (Granara de Willink 2012).

Remarks. See comments below in square brackets concerning the different types of microducts in the redescription section of *N. ferum*.

Redescription (translated from the Spanish redescription of *M. ferum* provided by Granara de Willink 2012). Body round, possibly convex, anal cleft about 1/3 of body length. Legs greatly reduced with four segments, tarsal digitules and claw digitules slender, claw without a denticle. Antennae with three segments and seven setae on last segment. Anal plates (together) subquadrate; each plate 195.0 µm in length, antero-lateral margin 168.0 and posterolateral margin with a convex border, 117.0 µm in length, with four dorsal apical setae; inner surface of plates with a broad sclerotized bar with four subapical setae [on each plate]; a long and strong fringe seta [on each plate] and approximately 16 hypopygial setae. Anal ring with pores and eight setae. **Dorsal surface.** Ducts of different types: a) [a pore type] with a circular opening, some small, numerous and scattered on surface; b) [a pore type] with a large circular opening, 43 µm in diameter, concave, with a highly sclerotized surface, with thin borders, becoming thicker towards the center, which is convex and granulated (when seen longitudinally, the duct can be seen; these structures can be seen dispersed throughout the entire surface, around margin they form groups of 3–6 pores “like in a rosette” [based on Figure 6, provided by Granara de Willink (2012), probably it is not the pore opening which is 43 µm wide, but the diameter of the sclerotic plate which surrounds the microduct]; the term “sclerotic pore” was coined by Kondo (2010) to refer to these type of microducts which are commonly found in various species of *Cryptostigma* Ferris]; and c) small circular pores with a long and slender duct [probably a simple pore; in figure 6 provided by Granara de Willink (2012), these small pores are drawn resembling a microduct, however, what appears to be a long slender duct may be an optical illusion, result of the sclerotization process]. Setae on dorsal surface small, short, spur-like, 12.0 µm long, with a circular base. Preopercular pores absent. **Body margin.** [Marginal] setae spur-like, slightly longer than dorsal setae and with a sturdier base, tuberculated [although not written, in Granara de Willink’s figure 6, there are two setae drawn, one of which has a rounded tip (tuberculate) and the other with a broadened lanceolate tip], extending around margin but absent from the [margins of the] anal cleft. Stigmatic cleft broad, with most of the marginal area located towards the dorsal surface, highly sclerotized, [each cleft] with one or two robust [stigmatic] setae, short, about 24 µm long. **Ventral surface.** Pregenital disc-pores with 10 loculi (although pores with eight and nine loculi appearing more numerous), each 12.0 µm in diameter, with highly sclerotized rims, extending from vulvar area through the median and sublateral areas of the abdomen up to median area of the mesothorax. Spiracles enlarged, [each] 156.0 µm long; spiracular pores with a central loculus and five loculi (scarce), normally with seven and eight loculi, each 7.0 µm in diameter, with highly sclerotized rims, forming a broad band, 4–5 pores wide. Microduct openings oval and circular, dispersed throughout surface. Tubular ducts lacking a terminal gland, [each] about as long as a genital disc-pore, found laterally to the spiracular pore bands, in the area laterad to abdominal segments and in the area near the vulva. Setae flagellate, longer and thinner than the dorsal setae. Differentiated preulvar setae not observed. Two pairs of short interantennal setae present.

Remarks. In *N. ferum*, ventral tubular ducts are found in the perivulvar region and on submedian areas of the abdomen and on area around both anterior and posterior spiracular pore bands, a characteristic feature of *Neotoumeyella*. *Neotoumeyella ferum* corresponds to Figure 6 (page 25) in the paper by Granara de Willink (2012), which was mislabeled as *Mesolecanium baccharidis* (Cockerell).

Key to adult females of *Neotoumeyella* species (adapted from Kondo and Williams 2009)

1. Dorsal microducts of two types: i) very large sclerotic pores (up to 43 µm in diameter) with a central microduct scattered throughout, in groups of 3–6 pores “like in a rosette” around body margin; plus, ii) smaller microducts, of the normal type (not associated with a sclerotized plate) present. Ventral tubular ducts without a terminal filament ***N. ferum* (Hempel), comb. nov.**
- Dorsal microducts of one type: i) small, normal type of microduct (not associated with a large sclerotized plate) present. Ventral tubular ducts with a terminal filament **2**
- 2(1). Ventral tubular ducts scarce, of one type **3**
- Ventral tubular ducts abundant, of more than one type **5**
- 3(2). Ventral tubular ducts present around mouthparts and often near antennae. Spiracular pore band abruptly broadening just before stigmatic areas (up to 30 pores wide). Anal ring with six setae ***N. sonorensis* (Cockerell and Parrott)**
- Ventral tubular ducts absent from around mouthparts and antennae. Spiracular pore band narrow throughout (2–6 pores wide). Anal ring with 8–10 setae **4**
- 4(3). Multilocular pores abundant in mid-ventral region of mesothorax. Stigmatic setae subequal in length ***N. cephalanthi* Kondo and Williams**
- Multilocular pores absent from mid-ventral region of mesothorax. Stigmatic setae not subequal in length, median setae much longer than lateral setae . ***N. caliensis* Kondo and Williams**
- 5(2). Discoidal pores widespread over entire dorsum, except for a narrow submarginal band. Ventral tubular ducts present only up to area around posterior spiracular pore band . ***N. cerifera* (Ferris)**
- Discoidal pores present around anal plates and extending only to mid-dorsum. Ventral tubular ducts present submarginally up to areas of anterior spiracular pore band ***N. leucaenae* (Cockerell)**

Conclusions

Mesolecanium ferum Hempel, 1903, was transferred to the genus *Neotoumeyella* as *N. ferum* (Hempel), **comb. nov.** *Neotoumeyella* was rediagnosed to include the autapomorphic features of *N. ferum*. As a result, the total number of species included in *Neotoumeyella* is elevated to six species, and those included in *Toumeyella* is lowered to 17 species.

Acknowledgments

Many thanks to Dr. Ana Peronti (UNESP/FCAV - Campus de Jaboticabal, Sao Paulo, Brazil), Dr. M. Bora Kaydan (Çukurova University, Adana, Turkey) and to Dr. Aline Barcellos (Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, RS, Brazil) whose comments and reviews helped to improve the manuscript.

Literature Cited

- Ben-Dov, Y. 1993.** A systematic catalogue of the soft scale insects of the world (Homoptera: Coccoidea: Coccidae). Sandhill Crane Press; Gainesville, FL. 536 p.
- Cockerell, T. D. A. 1903.** Five new Coccidae from Mexico. *The Entomologist* 36: 45–48.

- Granara de Willink, M. C. 2012.** Revisión sistemática de *Mesolecanium* Cockerell de la región Neotropical (Hemiptera: Coccidae), con sinonimia y combinaciones nuevas. *Insecta Mundi* 0262: 1–33.
- Hempel, A. 1920.** Descrições de coccidas novas e pouco conhecidas. [Descriptions of new and little-known coccids.] *Revista do Museu Paulista* 12: 329–377.
- Kondo, T. 2010.** Taxonomic revision of the myrmecophilous, meliponiphilous and rhizophilous soft scale genus *Cryptostigma* Ferris (Hemiptera: Coccoidea: Coccidae). *Zootaxa* 2709: 1–72.
- Kondo, T., and M. L. Williams. 2009.** Redescriptions of *Neolecanium leucaenae* Ckll., *Toumeyella cerifera* Ferris and *T. sonorensis* Ckll. & Parrott and their transfer to *Neotoumeyella* gen. nov. (Hemiptera: Coccidae), with descriptions of two new species from the southeastern U.S.A. and Colombia, South America. *International Journal of Insect Science* 2: 11–27.

Received January 18, 2018; accepted March 8, 2018.
Review editor Aline Barcellos.

