

A NEW SPECIES OF *Toumeyella* (HEMIPTERA: COCCOIDEA: COCCIDAE) ON *Erythrina* IN MEXICO

Takumasa Kondo¹ and Michael L. Williams²

¹Department of Entomology, University of California. One Shields Avenue, Davis, CA 95616-8584, USA.

²Department of Entomology and Plant Pathology, Auburn University, 301 Funchess Hall, Auburn, AL 36849-5413, Alabama, USA. E-mail: ¹kondota@ucdavis.edu, ²mlwillia@acesag.auburn.edu

ABSTRACT

The adult female and first-instar nymph of the erythrina scale, *Toumeyella erythrinae*, a new pest species of soft scale insect collected on *Erythrina coralloides*, locally known as "árbol de colorín" in Mexico, are described and illustrated. Closely related species, also occurring on *Erythrina* spp., are discussed.

Key Words: *Erythrina coralloides*, new species, soft scale insect.

RESUMEN

Se describe e ilustra la hembra adulta y la ninfa del primer estadio de la escama del colorín, *Toumeyella erythrinae*. Esta es una nueva especie de escama blanda colectada sobre *Erythrina coralloides*, localmente conocido como "árbol de colorín" en México. También se mencionan otras especies cercanamente relacionadas que se han encontrado sobre *Erythrina* spp.

Palabras Clave: *Erythrina coralloides*, nueva especie, escama blanda.

INTRODUCTION

Recently, an undescribed species of soft scale insect in the genus *Toumeyella* was recognized as a serious pest of erythrina trees and shrubs in Mexico. In some localities this soft scale causes serious damage to *Erythrina coralloides* D.C. (Fabaceae), reaching an infestation rate of 91%, and a mortality rate of 56%¹. This soft scale was first observed on the twigs and branches of its host in 1991, and by 1992 it was already considered a damaging pest (Muñoz perso. comm.). First reports on its detection, damage and control were presented by Reyes and Muñoz^{2,3}.

The erythrina scale is ovoviviparous and has one generation per year^{4,5}. It is a bisexual species, with males developing alongside the leaf veins on the underside of leaves of its host^{4,6,7}. Damage caused by this insect includes localized chlorosis on leaves, defoliation, branch dieback, and often death of the host plant^{2,4}. Symptoms are often associated with sooty molds that grow on the honeydew excreted by the scale insects^{2,4,6,7}. Chemical control has been discussed by Cibrián *et al.*^{6,7}, however, an integrated pest management program which incorporates pruning, natural enemies, selective and low toxic

pesticides, mineral oils, and brushing off insects has also been recommended^{3,4}.

This coccid species is herein described and named as *T. erythrinae*, new species. The genus *Toumeyella* is part of the *Toumeyella*-group, which is composed of 50 species and includes the genera *Akermes*, *Cyclolecanium*, *Megasaissetia*, *Neolecanium*, *Pseudophilippia* and *Toumeyella*⁸. The genus is well represented in North America north of Mexico with 11 described species. Two species are known from Brazil, and one from Cuba⁸. Adult females of *Toumeyella* are characterized by the presence of tubular ducts around the perivulvar area, preopercular pores on the dorsum, spiracular and perivulvar pores predominantly 5-locular, by the body usually being highly convex, by reduced legs and antennae, and the absence of submarginal tubercles and eyes.

Toumeyella erythrinae was previously reported as *Kermes grandis* Cockerell⁶, but no species under this name has been described, thus, *K. grandis* is considered a *nomen nudum*.

MATERIALS AND METHODS

Specimens were slide mounted according to the method given by Kosztarab⁹, and were studied under a Zeiss RA phase

Nota: Artículo recibido el 18 de noviembre del 2002 y aceptado el 13 de mayo del 2003.

contrast compound microscope. Illustrations of the insects follow the typical style adopted for the Coccoidea, with the dorsal side drawn on the left and the ventral side drawn on the right. Enlargements of important characters are placed around the drawing, however these enlargements are not in direct proportion to each other.

***Toumeyella erythrinae* Kondo & Williams, new species.**

DESCRIPTION. ADULT FEMALE (fig. 1 & 2)
Living appearance

Young specimens oval, greenish-ocher in color, smooth, covered with a thin waxy layer. Mature specimens subcircular, becoming highly convex, gall-like (Fig. 1), whitish, cream to yellow ocher in color, mottled with black and/or brown, occasionally with an orange tinge, shiny, with a coriaceous texture.

Slide mounted specimens

Insects sub-circular or elongate oval in outline (Fig. 2), 3.3-21.0 mm long, 2.8-20.0 mm wide; anal cleft extending about 1/5 of body length from posterior margin.

Dorsum

Dorsal derm membranous, becoming only slightly sclerotized. Body setae (Fig. 2E) sharply spinose, straight or slightly bent, scattered over dorsum, 10-24 μm long, shorter around body margin. Simple disc pores (Fig. 2C) 2.7-4.4 μm wide, scattered evenly over dorsum. Preopercular pores (Fig. 2G) 6.2-8.0 μm wide, about same size or slightly larger than bilocular microducts, highly convex, present anterior to anal plates, extending onto mid-dorsum. Dorsal bilocular microducts (Fig. 2D) thick rimmed, about 4.4-6.2 μm wide, with a long ductule, numerous, scattered throughout dorsum (magnification of dorsal derm is shown in Fig. 2A). Anal plates (Fig. 2H) each triangular in shape, 216-291 μm long, 216-280 μm wide, anterolateral margin 164-194 μm long, posterolateral margin 216-280 μm long. Each plate with 4 dorsal apical setae, often broken off and represented by setal sockets, 6-9 ventral subapical setae, anal fold with 10 fringe setae. Anal ring (Fig. 2J) with 12-14 setae and a variable number of translucent wax pores arranged in about 2 rows.

Margin

Marginal setae (Fig. 2F) sharply spinose, straight, slightly or strongly bent, 24-42 μm long, arranged in an irregular single row around margin, with

about 10-15 setae between anterior and posterior spiracular setae. Spiracular setae (Fig. 2B) numbering 3, bluntly or sharply spinose, slightly or strongly curved, tips rarely bifurcating, median seta usually longest, 26-96 μm long, lateral setae 21-68 μm long. Eyespots not detected.



Figure 1. Large specimens of *Toumeyella erythrinae* Kondo & Williams.

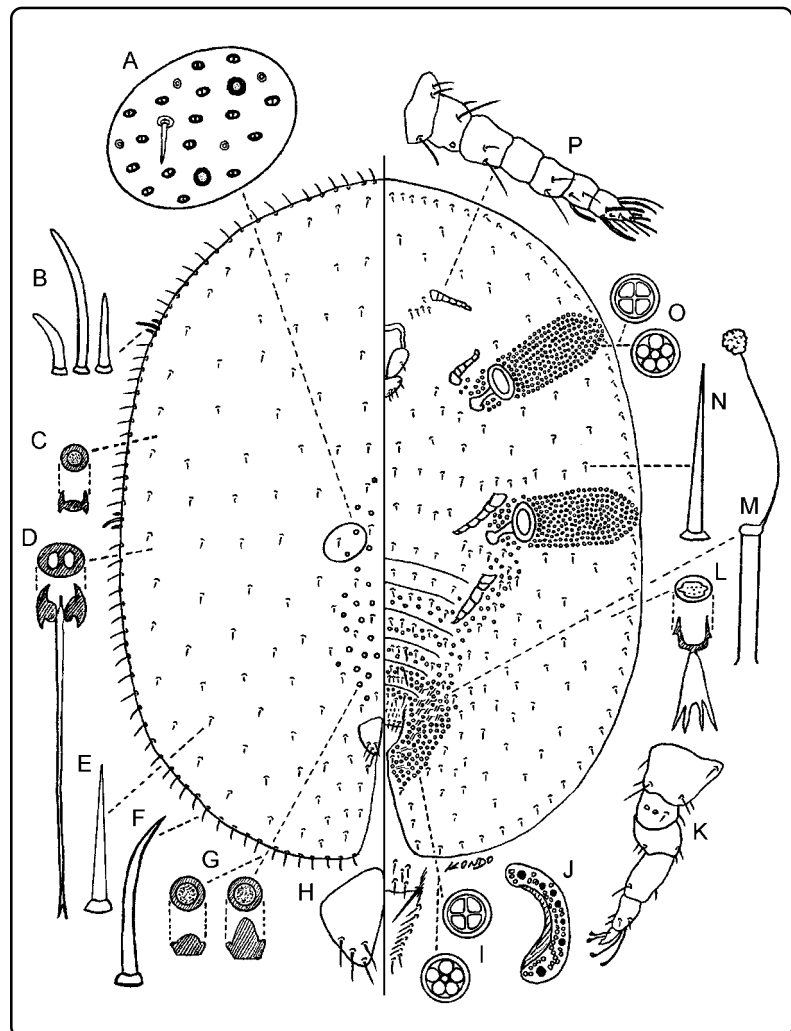


Figure 2. *Toumeyella erythrinae* Kondo & Williams, adult female.

Venter

Derm membranous. Ventral body setae (Fig. 2N) sharply spinose, 11-27 μm long, 3 pairs of longer prevulvar setae, 33-91 μm long. One row of submarginal setae, similar to ventral body setae. Interantennal setae in a cluster of 5 near base of each antennal scape. Antennae (Fig. 2P) short, 5-7-segmented, 243-350 μm long. Clypeolabral shield 280-312 μm wide, labial setae numbering 8. Legs (Fig. 2K) reduced; prothoracic legs shortest, total length 253-383 μm ; each mesothoracic and metathoracic leg 296-474 μm long. Tarsus and claw each with a pair of slender, knobbed digitules; claw simple. Spiracles large, anterior peritreme usually smaller, 216-302 μm wide, posterior peritreme 286-350 μm wide. Spiracular pores (Fig. 2O) numerous, 3-7 locular, mostly 5-locular, fairly large, 5.3-8.0 μm wide; spiracular pore band about 10 pores wide, narrowing near spiracular spines. Tubular ducts (Fig. 2M) each with a slender filament, present around vulvar opening only. Perivulvar pores (Fig. 2I) numerous, with 3-5 loculi, mostly 5-locular, present around vulvar area and on anterior abdominal segments, forming a narrow band connecting to each posterior spiracle. Microducts (Fig. 2L) numerous, elongate oval, 4.4-5.3 μm wide, scattered evenly throughout venter.

DESCRIPTION. FIRST INSTAR NYMPH (fig. 3)

Slide mounted material elongate oval (Fig. 3), just hatched or early settled nymphs 528-641 μm long, 253-323 μm wide, fully grown nymphs 1180-1304 μm long and 641-690 μm wide.

Dorsum

Dorsal derm membranous, with segmentation delineated by membranous folds. One pair of dorsal setae (Fig. 3B) on head region, short, 4-8 μm long. A trilocular pore (Fig. 3A) present on each side of head region near margin. Bilocular microducts (Fig. 3F) 3.6-4.4 μm wide, present in one submarginal and one submedian longitudinal row running full length of body, with an extra row of about 3 bilocular microducts between submarginal and submedian rows on anterior thorax. Most bilocular microducts associated with simple disc pores (Fig. 3E); each simple disc pore about 1.8 μm wide, very hard to detect. Anal plates (Fig. 3G) with shingled surface texture, each triangular, 66-72 μm long, 23-30 μm wide, anterolateral margin 34-44 μm long, posterolateral margin 38-45 μm long, with 4 dorsal apical setae, 1 ventral hypopygial seta and 1 fringe seta. Anal ring (Fig. 3G) with 6 setae and 9 translucent wax pores.

Margin

Outline smooth. Marginal setae (Fig. 3C), sharply spinose, straight or with a bent apex, total number

32, numbering 8 anteriorly between eyes, 2 between each eye and anterior spiracular setae, 2 between each group of anterior and posterior spiracular setae, and 8 between posterior spiracular setae and body apex. Spiracular setae (Fig. 3D) numbering 3, sharply or bluntly spinose, with median seta longest, 22-29 μm long, lateral setae 2.0-5.3 μm long.

Venter

Ventral derm membranous, with microtrichia present on abdominal segments anterior to vulvar area. Prevulvar setae 3 pairs. Submarginal setae in 7 pairs on abdomen, one seta between each anterior and posterior spiracle, and one pair near apex of head (Fig. 3K). Ventral microducts (Fig. 3H) present between inner and outer submarginal setae on abdomen except near apex, 1 between anterior and posterior spiracle, and 1 near base of each antennal scape. Spiracular pores (Fig. 3J) with 3-4 loculi, about 6.4 μm wide, 3 lateral to anterior spiracle and 4 lateral to posterior

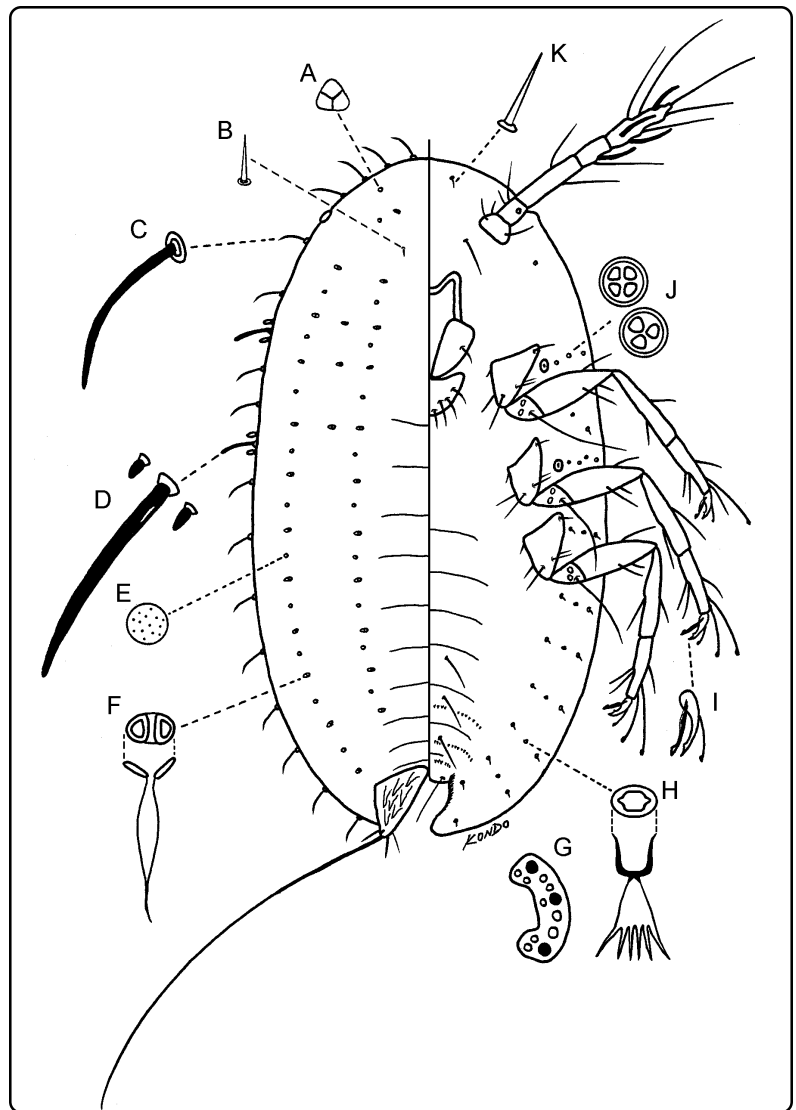


Figure 3. *Toumeyella erythrinae* Kondo & Williams, first-instar nymph.

spiracle. Clypeolabral shield 77-80 μm wide, with 8 labial setae. Legs well developed; trochanter with a long seta, about same length as femora, trochanter + femur 98-104 μm long, tibia + tarsus 132-145 μm long, microctenidia present on tibial apex. Prothoracic tarsal digitules dissimilar, one knobbed and one spiniform, mesothoracic and metathoracic tarsal digitules similar, knobbed. Claw (Fig. 3I) with a denticle; claw digitules knobbed, one slightly broader than other. Antennae 5-segmented, third antennal segment longest, with one pair of interantennal setae.

Etymology

The species epithet of the erythrina scale is named after the genus of the host plant: *Erythrina coralloides*.

MATERIAL STUDIED

Toumeyella erythrinae, sp.n. **HOLOTYPE:** adult ♀. MEXICO: Mexico City, on *Erythrina* sp., 23-VII-2000, Coll. Víctor, Arriola-P., AL-158-2000, deposited in U.S. National Museum of Natural History, Beltsville, Maryland (USNM). **PARATYPES:** 2 adults ♀♀ on 2 slides, same data as holotype, Laboratorio de Control de Plagas, Unidad de Morfología y Función, Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México (UNAM); 4 adults ♀♀ on 4 slides, same data as holotype, deposited in USNM; 4 adults ♀♀ on 4 slides, same data as holotype, deposited in the Natural History Museum, London, UK (BMNH); 1 slide, AL-156-2000, same data as holotype, deposited at the Muséum National d'Histoire Naturelle, Paris, France (MNHN); MEXICO: Mexico City, AL-(155, 157, 160 and 162)-2000, collected on 6-VIII-2000, 17-IX-2000, 27-VIII-2000, and 6-VIII-2000 respectively, Coll. Víctor, Arriola-P., 32 slides, deposited among the Auburn University Coccoidea Collection (AUCC), Auburn, Alabama, USA, the Department of Entomology, University of California Davis (UCD), California, USA, MNHN, USNM and the Vienna Museum of Natural History, Vienna, Austria (VMNH); Mexico, Cuernavaca, 20-XI-1902, coll. Koebele, A., ex. *Erythrina* sp., 2 slides, California Department of Food and Agriculture, USA (CDFA); Mexico, via Los Angeles Co., CA, CDFA#1122863, 9/20/95, ex. *Erythrina* sp., coll. J. Tovar, 4 slides (CDFA); Mexico, Vallejo, D.F., 10-X-1992, coll. A.L., Muñoz, ex. *Erythrina* sp., 10 slides, AL-003-95, AUCC; First instar nymphs, AL-(159, 167 and 186)-2000, collected on 13-V-2000, 4-VI-2000 and 13-VI-2000 respectively, same data, 10 slides deposited among the above institutions.

OTHER MATERIAL STUDIED

The following species and specimens were examined to make taxonomic comparisons with the new species: *Toumeyella* spp., Guatemala, V-1905, coll. D.F., Cook, ex. *Erythrinum* sp., 6 slides, USNM; Guatemala, V-1905, coll. D.F., Cook, ex. *Erythrinum* sp., 7 slides, AL-561-75, AUCC; Guatemala, Amatitlan, Guatemala City, 9-XI-1917, coll. W., Poponoe, labeled as *Neolecanium sallei*, ex. *Erythrina corallodendron*, 3 slides with numerous

first instar nymphs, USNM; Guatemala, Los Cedros, San Antonio, 2-VI-1990, coll. M.L., Williams, ex. "Árbol de Pito" (*Erythrina berteroana*), 5 slides, AL-001-93, AUCC; *Lecanium sallei*, (currently *Neolecanium sallei*), det. Signoret, Mexico, slide mounted by T. Kondo, August 2002, 1 specimen, slide mounted on 6 slides labeled: Holotype, VMNH-001-2002A-F, Vienna Museum of Natural History (VMNH).

DISCUSSION

Toumeyella erythrinae is unusual in having antennae with up to 7 segments and an anal ring with 12-14 setae. The erythrina scale can be differentiated from other species included in *Toumeyella* by comparing the ratio of the spiracular peritremes to the anal plates. In *T. erythrinae* the posterior peritremes are about the same size or wider than the length of the anal plates. It should be noted that although many species of *Toumeyella* are tended by ants, no ant attendance has been reported for *T. erythrinae*.

A closely related species collected on *Erythrina* from Guatemala was also studied. This species is similar to *T. erythrinae* but differs in that the bilocular microducts are much smaller and the preopercular pores are more abundant. Species of *Toumeyella* have also been recorded from *Erythrina* sp. in Colombia^{10,11}, however, these species are not conspecific with *T. erythrinae*. First-instar nymphs deposited in the United States National Museum (USNM) collected on *Erythrina corallodendron* from Guatemala and labeled *Neolecanium sallei* are very similar to *T. erythrinae* and may be conspecific. *Neolecanium sallei* was described from Mexico on an undetermined host¹². We have examined the type material of *N. sallei* (from the VMNH) and it is not conspecific with any of the specimens labeled as *N. sallei* deposited in the USNM.

Fifty species of scale insects (Hemiptera: Coccoidea) have been recorded from *Erythrina* spp. worldwide¹³. With the addition of *T. erythrinae*, the list increases to 51 species.

ACKNOWLEDGEMENTS

We are thankful to Ana Lilia Muñoz Viveros from the Universidad Nacional Autónoma de México for providing much of the literature and valuable information, to Víctor Arriola-P. for providing the material studied, to Dr. Douglass Miller of the United States National Museum for the loan of slides, to Dr. Danièle Matile-Ferrero of the Muséum National d'Histoire Naturelle, France for donating specimens, and to Dr. Penny Gullan of the University of California at Davis, USA, for kindly reviewing the manuscript.

REFERENCES

1. Muñoz Viveros, A.L. & Reyes López, R.A. Evaluación comparativa de la infestación y daños por la escama *Toumeyella* sp. (Homoptera: Coccidae) en el arbolado de "colorín", *Erythrina coralloides* D.C. en un sitio del D.F. (1994, 1997). Memorias

- XXXII Congreso Nacional de Entomología, Sociedad Mexicana de Entomología 69-70 (1997).
2. Reyes López, R.A. & Muñoz Viveros, A.L. Infestación y daños por la escama *Toumeyella* sp. en el arbolado de colorín (*Erythrina* sp.) en dos sitios del D.F. (Homoptera: Coccidae). XIV Coloquio de Investigación, Programa general y resúmenes. Universidad Nacional Autónoma de México Campus Iztacala 164 (1994).
 3. Reyes López, R.A. & Muñoz Viveros, A.L. Detección, Infestación y daños por *Toumeyella* sp. (Homoptera: Coccidae), en el arbolado urbano de "colorín" (*Erythrina coralloides*) en dos sitios del D.F. Sociedad Mexicana de Entomología, Memoria XXX Congreso Nacional de Entomología, Parasitología Agrícola Universidad Autónoma de Chapingo, Chapingo, Estado de México 242-244 (1995).
 4. Reyes López, R.A. Contribución al conocimiento bioecológico de la escama *Toumeyella* sp. en el arbolado del colorín (*Erythrina coralloides* D.C.), una nueva plaga en el D.F. (Homoptera: Coccidae). (Universidad Autónoma de México, Tesis, 1996).
 5. Reyes López, R.A. & Muñoz Viveros, A.L. Aportaciones al conocimiento bioecológico de la escama *Toumeyella* sp., en el arbolado del "colorín" (*Erythrina coralloides* D.C.) una plaga reciente en las áreas verdes del D.F. (Homoptera: Coccidae). Memorias XXXII Congreso Nacional de Entomología, Sociedad Mexicana de Entomología 44-45 (1997).
 6. Cibrián-Tovar, D., Méndez, J.T., Campos, R., Yates, H. & Flores, J. Insectos forestales de México (Universidad Autónoma de Chapingo, México, 1995).
 7. Cibrián-Tovar, D., Méndez, J.T., Campos, R., Yates, H. & Flores, J. Insectos forestales de México (Universidad Autónoma de Chapingo, México, 2000).
 8. Kondo, T. & Williams, M.L. The Myzolecaniinae (Hemiptera: Coccidae): Old World vs. New World. *Bolletino di Zoologia agraria e di Bachicoltura* Ser. II, **33(3)**, 125-128 (2001).
 9. Kosztarab, M. Scale insects of Northeastern North America. Identification, Biology and Distribution. Special Publication Number 3. Virginia Museum of Natural History, Martinsville, Virginia, USA (1996).
 10. Figueroa-Potes, A. Catálogos de los artrópodos de las clases Arachnida e Insecta encontrados en el hombre, los animales y las plantas de la República de Colombia-II. *Acta Agronómica Colombia* **2**, 199-223 (1952).
 11. Kondo, T. Las cochinillas de Colombia (Hemiptera: Coccoidea) [Spanish/English]. *Biota Colombiana* **2(1)**, 31-48 (2001).
 12. Signoret, V. Essai sur les cochenilles ou gallinsectes (Homoptères-Coccides), 1^{le} partie. *Annales de la Société Entomologique de France* Ser. **5(3)**, 410 (1874).
 13. Ben-Dov, Y., Miller, D.R. & Gibson, G.A.P. Scalenet. <http://www.sel.barc.usda.gov/scalenet/scalenet.htm> (2003).