SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

# A New Species of *Crypticerya* Cockerell (Hemiptera: Monophlebidae) from Colombia, with a Key to Species of the Tribe Iceryini Found in South America

TAKUMASA KONDO, CORINNE M UNRUH

*Corporación Colombiana de Investigación Agropecuaria (CORPOICA), Centro de Investigación Palmira, Calle 23, Carrera 37 Continuo al Penal, Palmira, Valle, Colombia; takumasa.kondo@gmail.com*
*Authors equally contributed to the authorship of this manuscript.*

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Una Nueva Especie de *Crypticerya* Cockerell (Hemiptera: Monophlebidae) de Colombia, con una Clave para Especies de la Tribu Iceryini Encontradas en Sur America

RESUMEN - La hembra adulta y la ninfa del primer estadio de una nueva especie de cochinilla acanalada de la tribu Iceryini, *Crypticerya multicicatrices* Kondo & Unruh sp. n., se describe e ilustra. La escama es polífaga y se colectó en 13 especies de plantas distribuidas en siete familias botánicas, incluyendo frutales de importancia económica como la guanábana y el mango. Se incluye una clave taxonómica para las especies actualmente incluidas en la tribu Iceryini en Sur América. Previos registros de *C. brasiliensis* (Hempel) en Colombia fueron confirmados como una identificación errónea de la nueva especie.

PALABRAS-CLAVE: Ninfa del primer estadio, *Icerya,* planta hospedera

ABSTRACT - The adult female and first-instar nymph of a new species of iceryine scale insect, Crypticerya multicicatrices Kondo & Unruh sp. n., are described and illustrated. The new scale insect is polyphagous and was collected on 13 plant species distributed in seven botanical families, including fruit trees of economic importance such as mango and soursop. A taxonomic key to the species of the tribe Iceryini known from South America is provided. Previous records of *C. brasiliensis* (Hempel) from Colombia are confirmed to be misidentifications of this new species.

KEY WORDS: First-instar nymph, *Icerya,* host plant

The tribe Iceryini was revised recently and is comprised of five genera made of 75 described species found worldwide (Unruh 2008, Unruh & Gullan 2008a, b). Species from three iceryine genera are found in Central and South America. Two of these, *Crypticerya* Cockerell and *Echinicerya* Morrison, are native to the New World, and the third, *Icerya* Signoret, is introduced from the Australasian region (Unruh & Gullan 2008a). *Crypticerya* is comprised of 22 species native to the New World (Unruh 2008, Unruh & Gullan 2008a). Ten of these species are found in the southwestern United States and Northern Mexico, including a recently described species, *Crypticerya bursera* Unruh, from Baja California (Unruh 2008). The remaining 12 species are distributed throughout Central America south of Mexico (including the Caribbean) and South America (Ben-Dov *et al* 2006) (here considered the Neotropical region).

Neotropical *Crypticerya* species tend to lay their eggs in one of two ways: i) eggs are deposited in a waxy ovisac that acts as a brood chamber and is attached to and extends from the posterior end of the body, or ii) eggs are deposited in an unattached waxy mass directly on the substrate beneath the adult female, causing the body of the female to become concave with age. First-instars emerge from slits in the ovisac or crawl from underneath the body of the adult female and disperse.

Unruh & Gullan (2008b) placed *Crypticerya* species into informal groups based on morphological similarity and phylogenetic relationships. Neotropical *Crypticerya* species were placed into three different groups: the *montserratensis* group, the *rosae* group, and the *littoralis* group. Although many South American *Crypticerya* species resemble one another in life, especially species in the *montserratensis* group (Fig 1), see images of *C. montserratensis* (Riley & Howard), *C. brasiliensis* (Hempel), *C. zeteki* (Cockerell) and *C. multicicatrices* Kondo & Unruh sp. n., they are genetically distinct (Unruh & Gullan 2008a). Several *Crypticerya* species


Fig 1 Photographs and illustrations of various Neotropical iceryine species. A, *Crypticerya multicicatrices* **sp. n.** on *Caesalpinia peltophoroides*. B, *C. multicicatrices* **sp. n.** on *Annona muricata*. C, *C. multicicatrices* **sp. n.** on *Mangifera indica*. D, *Crypticerya abrahami* on *Pithecellobium dulce* (Colombia). E, *Crypticerya brasiliensis* (Guyana). F, *Crypticerya genistae* on *Caesalpinia cariaria* (Aruba). G, *Crypticerya montserratensis* (reproduced from illustration by Riley and Howard (1890); H, *Icerya purchasi* on *Phoradendron flavescens* (USA); I, *Icerya seychellarum*, notice slender glassy filaments (Thailand); J, *Crypticerya similis* (photo taken from Type dry material); K, *Crypticerya zeteki* (Panama); L, *Echinicerya* sp. (Photos A-D, H-J by T Kondo; E, by J H Martin; F, by P J Gullan; K, by C Darling; L, by C M Unruh).

are well-documented pests in the Neotropics. For example, *C. montserratensis* was reported as a pest of citrus in Ecuador (Bartlett 1978), *C. brasiliensis* was reported as a pest of *Codiaeum* sp., *Rosa* sp., *Ficus* sp. and other unidentified plants in Brazil (Hempel 1900) and *C. palmeri* (Riley & Howard) was reported as a pest of alfalfa (*Medicago sativa*), grapevine (*Vitis vinifera*) and unidentified ornamentals in Chile (Bartlett 1978).

In life, wax deposit on the dorsal surface of *Crypticerya* adult female ranges from dense waxy tufts and/or tendrils, *i.e*., *C. flocculosa* (Hempel), *C. genistae* (Hempel) and *C. montserratensis*, to almost completely absent, *i.e., C. abrahami* (Newstead), *C. pimentae* (Newstead) and *C. rosae* (Riley & Howard). The lack of wax in the latter three species is probably an adaptation to their habitat under the bark of their hosts.

Hughes-Schrader and colleagues studied the cytology of many iceryine species, including four Neotropical species, *C. rosae*, *C. montserratensis*, *C. similis* (Morrison) and *C. zeteki*, and the introduced pest, *Icerya purchasi* Maskell (Hughes-Schrader 1925, 1930a, b, Hughes-Schrader & Monahan 1966, Hughes-Schrader & Tremblay 1966). From these species, three hermaphrodites were identified (*C. zeteki*, *I. purchasi* and an undescribed Costa Rican iceryine species), and the remaining species were determined to be arrhenotokous haplodiploid, *i.e*., males develop from unfertilized eggs (Normark 2003).

In this paper, we describe and illustrate the adult female and first-instar nymph of a new species from Colombia, *Crypticerya multicicatrices* sp. n. We provide a key to the adult females of 15 iceryine species found in South America, *i.e*., 12 *Crypticerya* species, one related species, *Echinicerya anomala* Morrison, and two non-native pest species, *I. purchasi* and *I. seychellarum* (Westwood). *Crypticerya flocculosa* and *C. leuderwaldti* (Hempel) are not included in the key because we were unable to examine material of these species.

## Material and Methods

Specimens were slide-mounted using a method adapted from Gullan (1984). The descriptions follow the format and terminology of Bhatti (1990), Bhatti & Gullan (1990) and Unruh & Gullan (2008a, b). All measurements are expressed as a range. All diameters are maximum dimensions. Length of thoracic spiracle includes peritreme. Illustrations follow the traditional format for scale insects, with the dorsum shown on the left side, and the venter on the right side. Special features are enlarged to the side of each illustration but are not drawn to the same scale between each other. The collecting data of the material studied are followed by the number of slides, with the total number of specimens, and the growth stage in parentheses. For example, one slide with three specimens, of which two are adult females and one second-instar male is represented as follows: 1(3: 2 adult females + 1 second-instar male). This is followed by the depositories in parentheses. Growth stages are not given when all specimens on the slide(s) are adult females.

The following abbreviations are for institutions or collections where material were deposited: BME, The Bohart Museum of Entomology, University of California, Davis, California, USA; UVCO, Museo de Entomologia, Universidad del Valle, Cali, Colombia; USNM, United States National Entomological Collection, U.S. National Museum of Natural History, Washington D.C., USA.

The voucher number (*i.e*. CMU031 or CMU032) refers to material used as part of a molecular analysis [refer to Unruh & Gullan (2008a)] and stored at BME.

## Key to the Adult Females of South American Iceryine Species

1 In life, very slender, long and glassy filaments present on dorsal surface. Derm of slide-mounted specimens with open-center pores (multilocular pores with a large central opening and thick rim formed by a variable number of smaller loculi); pores on derm variable, with bilocular or trilocular center and 6-12 outer loculi .....…… 2

- In life, very slender, long and glassy filaments absent from dorsal surface. Derm of slide-mounted specimens without open-center pores (multilocular pores with a large circular or subcircular center without loculi); pores on derm variable, with a bilocular, trilocular, quadrilocular, reniform, cruciform or star-shaped center and 0-12 outer loculi..... 3

2 Open-center pores restricted to marginal clusters. Abdominal spiracles in two pairs (Fig 1H)..... .....*Icerya purchasi* Maskell

- Open-center pores in marginal clusters and transverse rows across dorsum. Abdominal spiracles in three pairs (Fig 1I)……..... *Icerya seychellarum* (Westwood)

3 In life, long and waxy ovisac absent from posterior abdomen. Slide-mounted specimens without an ovisac band of pores on ventral abdomen .....……..…….….. 4

- In life, long and waxy ovisac present at posterior abdomen. Slide-mounted specimens with an ovisac band of pores on ventral abdomen …….....……... 5

4 Dorsal surface and margins densely covered in spiniform setae. Cicatrices numbering >30, forming one or two semicircles on ventral abdomen .....… *Echinicerya anomala* Morrison (refer to Fig 1L, *Echinicerya* sp.).

- Dorsal surface and margins without spiniform setae. Cicatrices numbering 3, forming a transverse row on ventral abdomen …… *Crypticerya abrahami* (Newstead) (Fig 1D), *C. pimentae* (Newstead) and *C. rosae* (these three species are apparently morphologically identical in the adult stage, but differ genetically and are found in different regions, *i.e., C. abrahami* in Colombia and Guyana, *C. pimentae* in Jamaica and *C. rosae* in Mexico and USA (Florida).

5 Clusters of simple multilocular pores with a quadrilocular (appearing cruciform) or quinquelocular (appearing star-shaped) centre and 4-8 outer loculi absent submarginally and marginally on head and thorax. Ovisac band without a dense mass of flagellate setae.....….. 6

- Clusters of simple multilocular pores with a quadrilocular (appearing cruciform) or quinquelocular (appearing star-

shaped) centre and 4-8 outer loculi present marginally and submarginally on head and thorax. Ovisac band with dense mass of flagellate setae …..... 12
6 With three cicatrices ……..... 7
- With five or more cicatrices ….....…….. 10
7 Long hair-like setae sparsely scattered at posterior abdomen, not forming marginal clusters. Short hair-like setae very sparsely scattered across all body segments. Simple multilocular pores sparsely scattered on all surfaces …..... .....……..... *C. subandina* (Leonardi)
- Long hair-like setae forming marginal clusters. Short hair-like setae scattered on derm. Simple multilocular pores densely covering dorsum and venter …….....……..... 8
8 Simple multilocular pores forming inner ovisac band 6-8 pores wide …..... *C. flava* (Hempel)
- Simple multilocular pores forming inner ovisac band >8 pores wide …….....9
9 Long hair-like setae in clusters of 3-5 around margin (Fig 1 E)…..... *C. brasiliensis* (Hempel)
- Long hair-like setae in clusters of 1-3 around margin (Fig 1G)…..... *C. montserratensis* (Riley & Howard)
10 With five cicatrices (Fig 1J) ……. *C. similis* (Morrison)
- With seven or more cicatrices ……..…..... 11
11 With seven cicatrices (Fig 1K)..… *C. zeteki* (Cockerell)
- With 11-13 cicatrices (Fig 1A-C)..... ..... *C. multicicatrices* sp. n.
12 Body very small (length <2.5 mm). Setae and pores on dorsal surface very sparse, not forming a dorsal medial longitudinal row …….....….... *C. minima* (Morrison)
- Body not especially small (length >3.0 mm). Setae and pores covering dorsal surface, dense across all surfaces and densest in medial and submarginal longitudinal rows (Fig 1F) …..... *C. genistae* (Hempel)

## *Crypticerya* Cockerell

Refer to Unruh (2008) for the most recent description of the genus. The definition of the genus does not change as a result of describing this new species.

### *Crypticerya multicicatrices* Kondo and Unruh, sp. n.

(Figs 2, 3)

**Material studied**

**Holotype.** adult ♀, **COLOMBIA**: Tolima, Gualanday, ex *Mangifera indica*, 28.i.1995, T. Kondo, 1(1) (USNM).

**Paratypes. COLOMBIA**: same data as holotype, 19(73: 14 adult females, 59 first-instar nymphs) (USNM; one adult female, DNA voucher CMU032, at BME); Valle del Cauca, Cali, ex *Pithecellobium dulce*, tended by *Azteca* ants, 11.iii.2002, T. Kondo, 14(16: one adult female, two third-instar nymphs, two second-instar nymphs, 11 first-instar nymphs) (USNM); ex Arecaceae sp. 1, leaves, 09.iii.2002, T. Kondo, 2(3: 3 third-instar nymphs) (USNM); ex *Pithecellobium dulce*, 28.xii.2001, T. Kondo, 18(22: 14 adult females, seven third-instar nymphs, one second-instar nymph) (USNM); Valle del Cauca, Cali, 27.iv.1939, collector and host not given, 1(1) (USNM); Valle de Cauca, Cali, 5.i.2008, T. Kondo, ex twigs of *Nandina domestica* (Berberidaceae), 1(1) (DNA voucher CMU031, BME); Valle del Cauca, Cali, 9.i.2008, T. Kondo, ex twigs of *Delonix regia* (Fabaceae), 3(3) (UVCO); Valle del Cauca, Cali, 27.i.2008, T. Kondo, ex leaf of Arecaceae sp. 2, 2(2) (UVCO); Valle del Cauca, Cali, Plaza Caicedo, 4.i.2008, T. Kondo, ex twig of *Caesalpinia peltophoroides* (Fabaceae), 4(4) (UVCO); Valle del Cauca, Cali, Zoológico, 27.i.2008, T. Kondo, ex twig of *Cassia fistula* (Fabaceae), 1(1) (UVCO); Valle del Cauca, Palmira, Corpoica, 03°30′41.7″N, 76°18′59.0″W, 1007 m, 31.i.2008, T. Kondo, ex leaves and twigs of *Ficus* sp. (Moraceae), 2(2) (UVCO); Valle del Cauca, Palmira, Corpoica, 03°30′52.5″N, 76°18′53.7″W, 1013 m, 12.ii.2008, T. Kondo, ex leaves and twigs of *Rheedia madruno* (Clusiaceae), 2(2) (UVCO); Valle del Cauca, Ginebra, Finca San Francisco, 03°42′28.1″N, 76°13′40.8″W, 1179 m, 8.iv.2008, C. Reyes, ex leaves and twigs of *Annona muricata* (Annonaceae), 4(4) (UVCO); Antioquia, Medellin, Jardín Botánico de Medellín, 26.iv.2008, T. Kondo, ex twigs of *Calliandra* sp. (Fabaceae), 3(3) (UVCO).

**Diagnosis.** Slide-mounted adult females of *C. multicicatrices* **sp. n.** can be easily separated from other iceryine species occurring in the New World by the following combination of features: (i) presence of 11-13 cicatrices forming a U-shape on the ventral abdomen; (ii) presence of an ovisac band; (iii) absence of dense flagellate setae in the ovisac band; (iv) absence of spiniform setae on the dorsal surface; (v) absence of open-center pores; and (vi) presence of three pairs of abdominal spiracles. This species is included in the *Crypticerya montserratensis* group (Unruh & Gullan 2008b) because of the shape and distribution of the derm pores.

**Description of adult female** (Figs 1A-C, 2).

*Unmounted material*. (Figs 1A-C). Adult female elliptical; antennae, legs and eyes brownish-black; body orange-red, covered dorsally by white wax, with one long caudal tuft (up to 20.5 mm long, usually less than 15 mm long, but always longer than cephalic tuft), one shorter cephalic tuft protruding anteriorly, a marginal row of nine waxy tufts on each side, mealy wax abundant around dorsal submargin just above row of lateral waxy processes and forming a thick elevated submarginal ridge, with a median longitudinal waxy ridge composed of about five short tufts; waxy processes on each side of the caudal and cephalic tufts longer than other marginal processes. Ovisac elongate, white, distal end narrow, often curved upwards, appearing fluted, with 14 or 15 longitudinal furrows. Caudal and cephalic tufts with about four longitudinal furrows. Ovisac with about 120 eggs, each egg elliptical, about 0.8 mm long; ovisac slit on dorsomedial line, where crawlers escape.

*Slide-mounted material*. Body elongate to oval, 4.7-5.6 mm long, 2.8-3.5 mm wide. Antennae 11-segmented, rarely 10 segmented, each 850-1000 μm long, segment I widest, segment V shortest, rarely fused with segment IV, segments VI-X subequal in length, segment XI equal or slightly longer than segments IX and X, apical segment 140-180 μm long, 40-50 μm wide; segments I-X each with about six setae, segment XI with 15 or 16 setae. Eyes dark, circular,

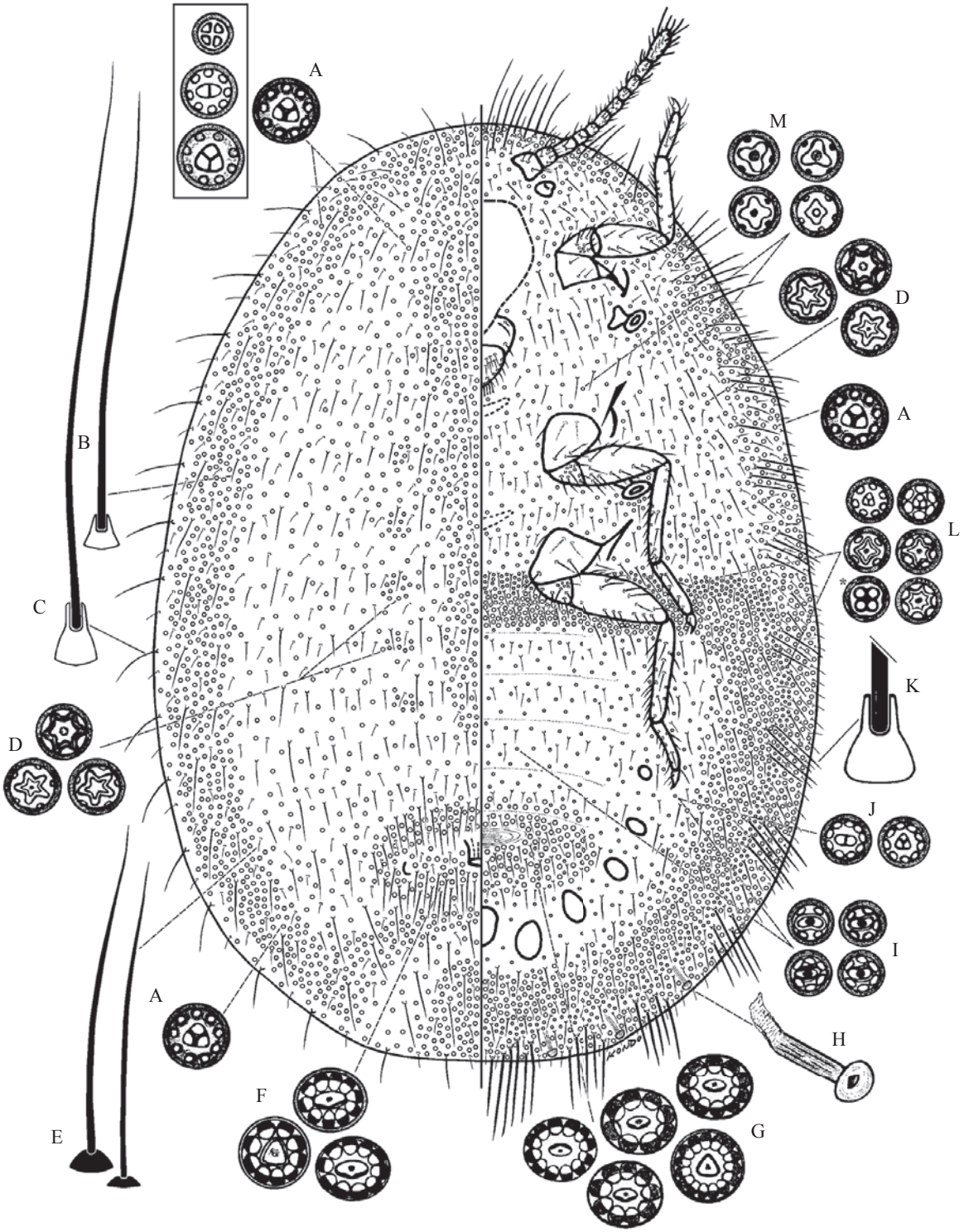


Fig 2 *Crypticerya multicicatrices* **sp. n.**, adult female. A, Simple multilocular pores, each with bilocular or trilocular center and 6-8 (very rarely 0) outer loculi. B, Short hair-like seta. C, Long hair-like seta. D, Various types of simple multilocular pores, each with star-shaped center and 4-6 outer loculi. E, Flagellate seta. F, Simple multilocular pores surrounding anal opening, each with bilocular or trilocular centre and 8-10 elongate outer loculi, appearing slightly bluish under stain. G, Simple multilocular pores surrounding vulva, each with bilocular or trilocular centre and each with 8-14 elongate outer loculi, appearing slightly bluish under stain. H, Abdominal spiracle. I, Simple multilocular pores present on ventromedial abdomen, each pore with reniform center and 4-6 outer loculi. J, Simple multilocular pores, each with bilocular or trilocular center and 8-10 outer loculi. K, Enlargement of setal base. L, Various types of simple multilocular pores, each with triangular, cruciform or star-shaped center and 4-6 (very rarely 0) outer loculi. M, Various types of simple multilocular pores present on ventral abdomen, each with triangular or cruciform center and 3-6 outer loculi.

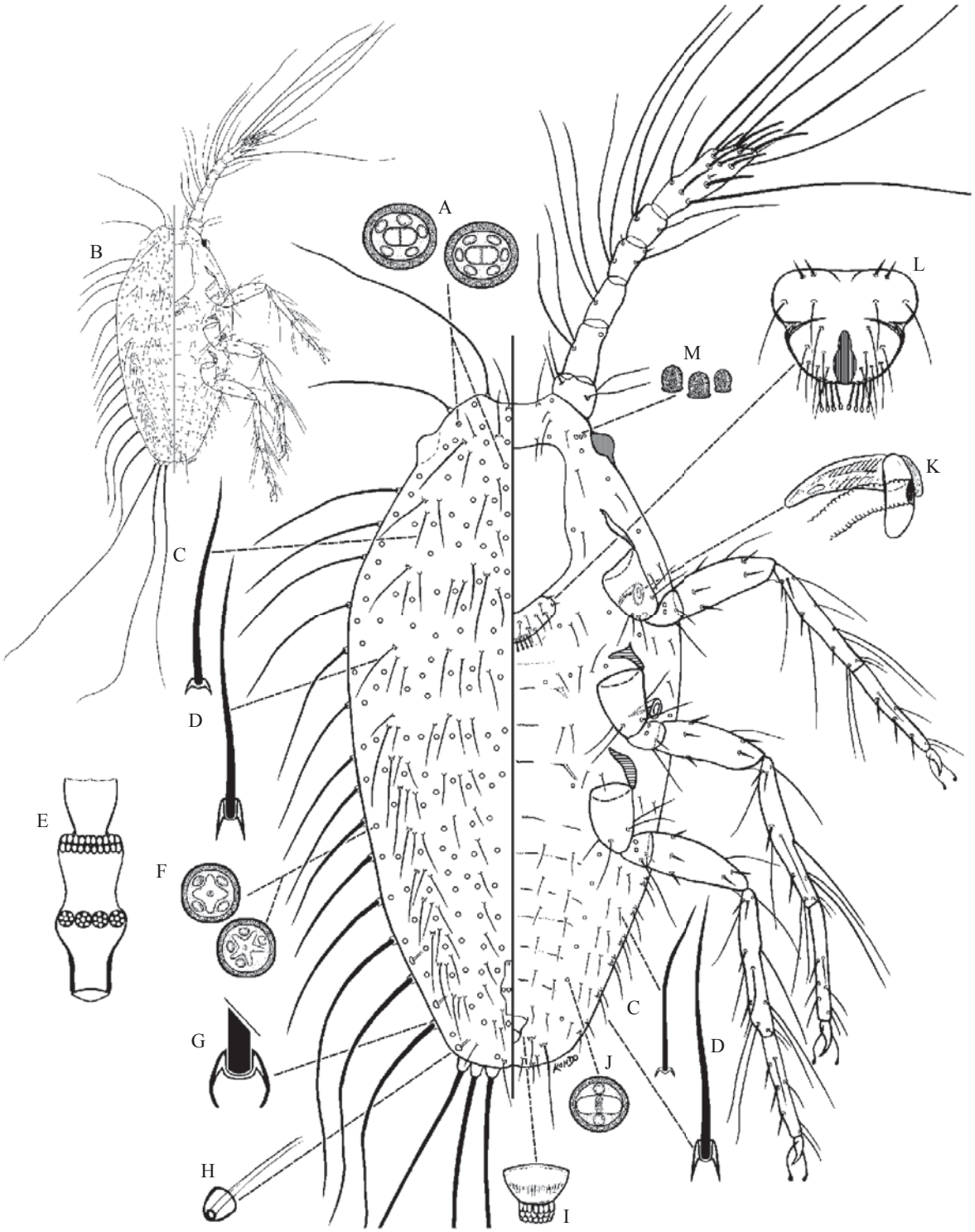


Fig 3 *Crypticerya multicicatrices* **sp. n.**, first-instar nymph. A, Simple multilocular pores, each with bilocular center and five or six outer loculi. B, Full-body view of first-instar nymph. C, Flagellate seta. D, Hair-like seta. E, Anal tube. F, Simple multilocular pores with cruciform or star-shaped center and four outer loculi. G, Enlargement of setal base. H, Abdominal spiracle. I, Cicatrix. J, Simple multilocular pore with reniform center and two outer loculi. K, Thoracic spiracle. L, Mouthparts. M, Sensory pores.

70-100 µm in diameter, at base of antennae. Labium three segmented with spatulate setae on apex, hair-like setae anteriorly; clypeolabral shield 250-325 µm long, 110-155 µm wide; labium 175-290 µm long, 150-310 µm wide. Sternal apodemes present between mid- and hindlegs. Legs well developed; forelegs shorter than mid- and hindlegs; each trochanter with a long distal trochanteral seta on apical margin; tibia with robust setae towards apex; tarsus curved ventrally, with an inner longitudinal band of robust setae; tarsal setae increasing in length towards apex; claw with one pair of digitules, acute and shorter than claw apex. Forelegs: coxa 125-275 µm long, 200-275 µm wide; trochanter 65-150 µm long, 85-110 µm wide; femur 37-450 µm long, 145-175 µm wide; tibia 400-515 µm long, 50-70 µm wide; tarsus 210-250 µm long, 45-65 µm wide; claw 50-65 µm long, 25-35 µm basal width. Midlegs: coxa 190-225 µm long, 190-240 µm wide; trochanter 110-175 µm long, 90-135 µm wide; femur 375-435 µm long, 160-195 µm wide; tibia 500-540 µm long, 60-80 µm wide; tarsus 165-300 µm long, 50-60 µm wide; claw 65-70 µm long, 30-40 µm basal width. Hindlegs: coxa 210-290 µm long, 210-340 µm wide; trochanter 135-175 µm long, 95-110 µm long; femur 400-450 µm long, 150-180 µm wide; tibia 525-550 µm long, 65-80 µm wide; tarsus 225-290 µm long, 50-55 µm wide; claw 65-80 µm long, 30-40 µm basal width; each trochanter with four sensory pores on each face. Mesothoracic spiracle, 80-125 µm long, opening of atrium 50-100 µm wide. Metathoracic spiracle, 80-175 µm long, opening of atrium 60-120 µm wide. Abdominal spiracles in three pairs; atrium of abdominal spiracles 25-30 µm wide. Ovisac band well developed, 4-6 pores wide at anterior edge, widening to 6-8 pores wide at submarginal edge, formed by multilocular pores of two types: (i) larger pores, 10-12 µm in diameter, with trilocular center (sometimes bilocular) and 10-12 outer loculi, forming inner edge of ovisac band, 3 or 4 pores wide, and (ii) smaller pores, 8-10 µm in diameter, with cruciform or star-shaped center forming outer edge of ovisac band, two or three pores wide. Vulvar opening on ventromedial abdomen, surrounded by setae and multilocular pores, each 12-13 µm in diameter, with bilocular or trilocular centre and with 10-12 elongate outer loculi, appearing slightly bluish under stain. Ventral cicatrices numbering 11-13 (holotype has 11 cicatrices), arranged in a U-shape distribution in ovisac cavity. Anal ring simple, sclerotized, 110-155 µm in diameter; anal opening with sclerotized apodemes and surrounded by robust hair-like setae 170-245 µm long and vulvar multilocular pores, each 15-16 µm in diameter, with bilocular or trilocular center and 12-16 elongate outer loculi.

*Dorsum*. Hair-like setae, 140-250 µm long, scattered in transverse rows on all body segments; hair-like setae, 80-125 µm long, flagellate setae, 25-75 µm long, scattered amongst multilocular pores on all segments. Simple multilocular pores, each 10-13 µm in diameter with bilocular or trilocular center and 9-12 outer loculi, densely scattered across all body segments, forming dense medial clusters on head and thorax. Smaller multilocular pores, each 8-10 µm in diameter, with cruciform or star-shaped center and 4-7 outer loculi (rarely 0-2), forming clusters of 6-8 on submedial head, thorax and anterior abdomen. Small, sclerotized patches forming longitudinal rows on medial, submedial, intermediate and submarginal thorax and abdomen.

*Venter*. Hair-like setae, 75-120 µm long scattered on head and thorax and outside of ovisac band on abdomen, scattered, scant in ovisac cavity; longest (up to 510 µm long) between antennae and marginally, becoming longest and densest towards abdominal apex. Flagellate setae, 25-75 µm long, scattered, scant, across all body segments. Multilocular pores, each 10-12 µm in diameter, with bilocular or trilocular center and 10-12 outer loculi, scattered on submarginal to marginal areas of all body parts, becoming densest towards margin. Multilocular pores, each 8-10 µm in diameter, with cruciform or star-shaped center and 4-7 outer loculi (rarely 0-2) forming clusters of 10-12 anterolateral to coxal articulations of all legs. Multilocular pores, each 10-11 µm in diameter, with reniform center and four outer loculi, scattered across medial to ventromedial abdomen. Slightly sclerotized patches forming patchy segmental lines across ventromedial abdomen.

**Description of first-instar nymph** (Fig 3)

*Slide-mounted material*. Body elongate to oval, 750 µm long, 400 µm wide. Antennae six segmented, each 400-420 µm long, segment I shortest and widest, segments becoming gradually shorter from segment II towards segment V, segment VI longest, 140-155 µm long, 40 µm wide. Segment I with four hair-like setae; segment II with two longer hair-like setae and a sensory pore near base of segment III; segment III with three hair-like setae; segment IV with three hair-like setae and two short setae; segment V with three hair-like setae; segment VI with about nine fleshy setae, seven hair-like setae and 1 trichoid sensillum. Cluster of three sensory pores, 5-7 µm in diameter, at base of each antenna. Eyes dark, conical, 35-45 µm in diameter, located near antennal bases. Labium with four pairs of spatulate setae at apex, hair-like setae anteriorly, clypeolabral shield 113-190 µm long, 120-162 µm wide; labium 75-80 µm long, 105-110 µm wide. Legs well developed; each trochanter with a long distal trochanteral seta on apical margin; each claw with a pair of knobbed digitules extending beyond claw apex. Forelegs: coxa 45-50 µm long, 50-53 µm wide; trochanter 30-40 µm long, 30-40 µm wide; femur 110-125 µm long, 35-40 µm wide; tibia 150-160 µm long, 20-25 µm wide; tarsus 125-175 µm long, 20-23 µm wide; claw 30-35 µm long, 10 µm basal width. Midlegs: coxa 45-65 µm long, 50-65 µm wide; trochanter 25-45 µm long, 25-35 µm wide; femur 125-145 µm long, 35-45 µm wide; tibia 190-205 µm long, 15-20 µm wide; tarsus 125-138 µm long, 18-20 µm wide; claw 28-40 µm long, 10-15 µm basal width. Hindlegs: coxa 50-55 µm long, 45-60 µm wide; trochanter 30-40 µm long, 25-33 µm long; femur 113-145 µm long, 38-45 µm wide; tibia 188-200 µm long, 25-28 µm wide; tarsus 120-133 µm long, 20-25 µm wide; claw 23-35 µm long, 10-15 µm basal width; each trochanter with two sensory pores on each face; claw digitules knobbed, 40-48 µm long. Mesothoracic spiracles 25-45 µm long, 12.5 µm wide. Metathoracic spiracles 38-50 µm long, 13-15 µm wide. Abdominal spiracles in three pairs, atrium of abdominal spiracles 5-7 µm wide. Anal tube 100-110 µm long; inner sclerotized ring of polygonal pores, opening with six multilocular pores, each 6 µm in diameter. Cicatrix round, 25-30 µm in diameter.

*Dorsum*. Hair-like setae, 63-140 μm long, flagellate setae, 42-50 μm long, scattered on head and thorax. Hair-like setae, 175-400 μm long, marginal around body, length increasing towards abdominal apex. Abdomen with medial longitudinal row of long, hair-like setae, 63-140 μm long; submedial longitudinal row of a cluster of three setae: one long hair-like seta, one short hair-like seta, 25-38 μm long and one flagellate seta, length increasing towards anal opening; submarginal longitudinal row of a pair of setae: one long hair-like seta, one short hair-like seta. Three pairs of long hair-like setae, 1000-1100 μm long, and one pair of short hair-like setae 88-100 μm long at abdominal apex. Multilocular pores, 8-10 μm in diameter, with elongate center and five or six outer loculi, scattered on head and thorax; similar pores, 7-8 μm in diameter, arranged in transverse rows on abdominal segments. Multilocular pores, 7-8 μm in diameter, with cruciform or star-shaped central opening and four outer loculi found in clustered between antennae, in marginal clusters on thorax, absent from abdomen.
*Venter*. Hair-like setae, 25-75 μm long, in marginal, submarginal and submedial longitudinal rows on abdomen. Multilocular pores, 6.0-7.5 μm in diameter, with slightly reniform central loculus and two outer loculi, scant on head and thorax, in submedial longitudinal row on abdomen.

**Etymology.** The species epithet is formed by the Latin word "*multi*" meaning "many", and cicatrices, referring to its numerous (11-13) cicatrices. The name was originally a manuscript name written on specimens discovered in the USNM collection. The handwriting on the slides was that of the late coccidologist, Dr. Harold Morrison who worked on various scale insect groups including the Margarodidae *sensu lato* which contained the tribe Iceryini.

**Distribution.** Neotropical: Colombia: Valle del Cauca (Cali and Palmira), Antioquia (Medellin)

**Host plants.** Anacardiaceae: *Mangifera indica*; Annonaceae: *Annona muricata*; Arecaceae: palms; Berberidaceae: *Nandina domestica*; Clusiaceae: *Rheedia madruno*; Fabaceae: *Caesalpinia peltophoroides*, *Calliandra* sp., *Cassia fistula*, *Delonix regia*, *Pithecellobium dulce*; Moraceae: *Ficus* sp.

## Discussion

Kondo (2001) misidentified *C. multicicatrices* as *C. brasiliensis* in a survey of scale insects found in Colombia. The misidentification of these two species resulted from the use of Hempel's (1900) original description, which is largely based on external morphology. *Crypticerya brasiliensis*, *C. multicicatrices* and *C. zeteki* are very similar in life (see Fig 1) and observation of cuticular microscopic features is needed to separate them with accuracy. Besides Kondo's (2001) erroneous record of *C. brasiliensis*, currently there is no other published report that indicates that this species occur in Colombia.

A heavy infestation of *C. multicicatrices* was found on a mango tree at Gualanday, Tolima, Colombia, during a field survey conducted by T K in January, 1995. The owner of the mango orchard called the scale insect by the local name 'palomilla' and reported the insect as a 'pest'. In April 8, 2008, the scale insect was collected infesting all twigs and some leaves of a small soursop tree which showed clear symptoms of stunt growth when compared to other trees in the orchard that were planted at the same time (Kondo 2008). The scale is found commonly on palms and many species of woody shrubs and trees in urban areas of the city of Cali, Colombia. No sooty mould has been observed associated with *C. multicicatrices* (T K per. obs.).

*Crypticerya multicicatrices* was included in a molecular phylogenetic study of the tribe Iceryini (as Iceryine sp. 5) and was found to be closely related to *C. zeteki*, *C. brasiliensis* and *C. montserratensis* (Unruh & Gullan 2008a). As a result, it was included in the informal *Crypticerya montserratensis* group described in Unruh & Gullan (2008b) as it shares several key features to other species in the group that are not seen in any other iceryine species. Specifically, these *Crypticerya* species have dorsal submedial and ventral submarginal clusters of small (9-11 μm in diameter) multilocular pores with a cruciform or star-shaped center and 4-6 outer loculi.

In Colombia, five icerine species have been recorded; these are *C. rosae* on *Elaeis guineensis* and *Prosopis* sp. (Ochoa-Lázaro 1989); *C. brasiliensis* [a misidentification of *C. multicicatrices*] on Arecaceae and mango (Kondo 2001); *C. montserratensis* on *Prosopis* sp. (Figueroa-Potes 1946); *C. zeteki* on *E. guineensis* (Ochoa-Lázaro 1989); and *Icerya purchasi* on *Citrus* spp. (Figueroa-Potes 1946, 1952, Ochoa-Lázaro 1989). There is no information concerning the depositories of the specimens studied by Figueroa-Potes (1946, 1952) and Ochoa-Lázaro (1989), so the records by these authors cannot be confirmed.

Three species of *Crypticerya*, *i.e*., *C. abrahami*, *C. pimentae* and *C. rosae*, comprise the *Crypticerya rosae* group, whose species differ from all other species because: the adult females form neither an ovisac nor a marsupium, the adult females typically do not have elaborate waxy secretions on the dorsal surface, and the derm is often very dark in color and becomes very convex and sclerotized with age (Unruh, & Gullan 2008a, b). *Crypticerya abrahami*, *C. pimentae* and *C. rosae* are morphologically identical in the adult stage, but differ genetically (Unruh & Gullan 2008a, b) and are found in different regions, *i.e*., *C. abrahami* in Colombia and Guyana, *C. pimentae* in Jamaica and *C. rosae* in Mexico and USA (Florida). Thus the record of *C. rosae* in Colombia is probably a misidentification of *C. abrahami*.

The *Crypticerya montserratensis* group, composed of *C. brasiliensis*, *C. montserratensis*, *C. multicicatrices* and *C. zeteki* are similar on their external morphology, thus records of *C. montserratensis* and *C. zeteki* in Colombia may all be misidentifications of the polyphagous *C. multicicatrices*. On the other hand, there is no doubt about the record of *Icerya purchasi* in Colombia, as this species is commonly found in insect collections in Universities and Research Institutions in Colombia (T K per. obs.). In conclusion, currently, only

the records of the iceryines, *C. abrahami*, *C. multicicatrices* and *I. purchasi* in Colombia can be confirm.

With the addition of *C. multicicatrices*, the number of species included in the genus *Crypticerya* is increased to twenty-three.

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