**Known distribution and pest status of fluted scale insects (Hemiptera: Monophlebidae: Iceryini) in South America**

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**Abstract**

Current information on the known distribution of 18 species (12 species of *Crypticerya* Cockerell and 6 species of *Icerya* Signoret) of fluted scale insects (Hemiptera: Monophlebidae: Iceryini) found in South America is provided. A list of known host plants and natural enemies of these species is given and their pest status in South America is discussed.

**Introduction**

The tribe Iceryini (Hemiptera: Monophlebidae) is composed by 84 species distributed in five genera, i.e., *Crypticerya* Cockerell, *Icerya* Signoret, *Echinicerya* Morrison, *Gigantococcus* Pesson & Bielenin, and *Gueriniella* Targioni Tozzetti (Unruh & Gullan, 2008a, b; Garcia *et al*., 2016). Of these, only *Crypticerya* and *Icerya* are known from South America. Twelve of 27 described species of *Crypticerya* and six of 35 species of *Icerya* have been recorded from one or more South American countries (Garcia *et al*., 2016). For the purpose of this paper, we treat South America as including [Argentina](https://en.wikipedia.org/wiki/Argentina), [Bolivia](https://en.wikipedia.org/wiki/Bolivia), [Brazil](https://en.wikipedia.org/wiki/Brazil), [Chile](https://en.wikipedia.org/wiki/Chile), [Colombia](https://en.wikipedia.org/wiki/Colombia), [Ecuador](https://en.wikipedia.org/wiki/Ecuador), [French Guiana](https://en.wikipedia.org/wiki/French_Guiana), [Guyana](https://en.wikipedia.org/wiki/Guyana), [Paraguay](https://en.wikipedia.org/wiki/Paraguay), [Peru](https://en.wikipedia.org/wiki/Peru), [Suriname](https://en.wikipedia.org/wiki/Suriname), [Uruguay](https://en.wikipedia.org/wiki/Uruguay), and [Venezuela](https://en.wikipedia.org/wiki/Venezuela), but exclude the [ABC islands](https://en.wikipedia.org/wiki/ABC_islands_%28Lesser_Antilles%29), [Trinidad and Tobago](https://en.wikipedia.org/wiki/Trinidad_and_Tobago), and [Panama](https://en.wikipedia.org/wiki/Panama), which are sometimes considered as part of South America. In South America, the pest iceryine species are commonly called fluted scales because the female (often hermaphroditic) produces a white waxy ovisac marked with longitudinal grooves or flutes. The species of greatest economic importance in South America are *Crypticerya brasiliensis* (Hempel), *C. multicicatrices* Kondo & Unruh, *C. genistae* (Hempel), *C. montserratensis* (Riley & Howard), *C. palmeri* (Riley & Howard), *C. zeteki* (Cockerell), *Icerya purchasi* Maskell and *I. seychellarum* (Westwood). All of the above species are polyphagous and attack plant species of economic importance. For example, *C. multicicatrices* is known to feed on almost 150 plant species and, when outbreaks occurred on San Andres Island, Colombia, the most common hosts included essentially all palm species (Arecaceae), breadfruit (*Artocarpus altilis* (Parkinson) Fosberg), *Citrus* spp., guava (*Psidium* spp.), all leguminous trees and weeds (Fabaceae), *Ficus* spp., *Mammea americana*, *Melicocca bijuga* and *Spondias* spp. (Kondo *et al*., 2012a). Another species, *C. genistae*, has been reported on 80 species of plants, and was reported recently in Colombia, where it is considered a pest of chili peppers (Kondo *et al*., 2016). We provide information on the distribution and host plants of the iceryine species found in South America and discuss their economic importance.

***Crypticerya abrahami* (Newstead)**

*Llaveia abrahami* Newstead, 1917: 1.

**Distribution in South America: Colombia** (Kondo & Unruh, 2009), **Guyana** (Foldi, 2009; Newstead, 1917; Unruh & Gullan, 2008b), **Venezuela** (Foldi, 2009).

**Pest status:** Not considered a pest.

**Natural enemies:** Unknown.

**Host plants:** **Euphorbiaceae:** *Sapium jenmanii* Hemsl. (Unruh & Gullan, 2008b). **Fabaceae:** *Pithecellobium dulce* (Roxb.) Benth. (Newstead, 1917). \***Myrtaceae:** *Psidium guajava* L. (T.K., personal observation). The asterisk (\*) indicates that this is the first record on this host.

**Remarks:** The insects live underneath the bark of their host plant; adult females are covered by a thin layer of white wax and lack the typical ornamental waxy secretions seen in many species of *Crypticerya*. Instead of an ovisac, the females keep their eggs underneath their body in a marsupium, which may be an adaptation for living in crowded spaces. According to the original description by Newstead (1917), the type specimens were found “inhabiting indentations in the bark of a rubber-producing tree (*Sapium jenmani*); attended by ants which construct coverings over the Coccids”. Similarly, in Colombia they are often found on *Pithecellobium dulce* and *Psidium guajava*, underneath the bark, on bark crevices and inside ant cartons and tended by *Azteca* and *Crematogaster* ants (T. Kondo, personal observations). Two other species, *C. pimentae* from Jamaica and *C. rosae* known from Guadeloupe, Haiti, Mexico, Puerto Rico and the U.S.A., are morphologically identical to *C. abrahami*, but are not genetically identical (Unruh & Gullan, 2008b).

***Crypticerya brasiliensis* (Hempel)**

*Icerya brasiliensis* Hempel, 1900: 370.

**Distribution in South America: Argentina** (Lizer y Trelles, 1938), **Colombia** (Kondo *et al*., 2016), **Brazil** (Hempel, 1900, 1912; Lizer y Trelles, 1938; Unruh & Gullan, 2008b), **Guyana** (Unruh & Gullan, 2008a).

**Pest status:** This species is often found congregating in large numbers on the underneath of branches and twigs of its host, and has been reported as causing the dieback of numerous shade trees in São Paulo, Brazil (Hempel, 1900). Recently, in the Department of Boyacá in Colombia, *C. brasiliensis* was reported as causing great damage to many types of shrubs and guava trees (Kondo *et al*., 2016).

**Natural enemies:** **Hymenoptera: Encyrtidae:** *Brethesiella abnormicornis* (Girault), *Brethesiella longipes* Blanchard (Noyes, 2004; Trjapitzin & Trjapitsyn, 2006).

**Host plants:** **Arecaceae:** *Caryota* sp. **Euphorbiaceae:** *Codiaeum* sp. **Lauraceae:** *Cinnamomum camphora* (L.) J. Presl). **Magnoliaceae:** *Liriodendron tulipifera* L. **Moraceae:** *Ficus* sp. **Myrtaceae:** *Psidium guajava* L. **Rosaceae:** *Rosa* sp. (Hempel, 1900, 1912; Kondo *et al*., 2016; Lizer y Trelles, 1938).

**Remarks:** Outside South America, *C. brasiliensis* has been also recorded from Panama (Canal Zone) by (Cockerell, 1914). In life, the arrangement of waxy secretions in *C. brasiliensis*, *C. multicicatrices* and *C. zeteki* is superficially similar, with all having a long caudal tuft and a shorter cephalic tuft (Kondo *et al*., 2016). In *C. brasiliensis*, the waxy tufts laterad to the long caudal tuft are usually three or more times longer than other marginal tufts. However, in *C. zeteki*, the waxy tufts laterad to the long caudal tuft are about three times longer than the shorter marginal tufts, thus overlapping with *C. brasiliensis* (Kondo *et al*., 2016). At this time, the only reliable way to differentiate them is by looking at slide-mounted specimens.

***Crypticerya flava* (Hempel)**

*Icerya flava* Hempel, 1920: 334.

**Distribution in South America: Brazil** (Hempel, 1920).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants:** Hempel (1920) lists *C. flava* (as *I. flava*) as occurring on the bark of indigenous trees locally known as 'cambara preta' and 'sucara'. Unruh & Gullan (2008b) identified 'cambara preta' as “black *Gochnatia*”, a plant in the family Asteraceae. The other plant, 'sucara' appears to be a plant in the genus *Xylosma*, in the family Salicaceae.

**Remarks:** This species is known only from Brazil and very little information is available for it in the scientific literature.

***Crypticerya flocculosa* (Hempel)**

*Icerya flocculosa* Hempel, 1932: 312.

**Distribution in South America: Brazil** (Hempel, 1932).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants:** **Fagaceae:** *Castanea* sp. **Rutaceae:** *Citrus* sp. (Hempel, 1932).

**Remarks:** Only known from Brazil. Unruh & Gullan (2008b) were unable to examine specimens of *C. flocculosa* for their identification guide to species of Iceryini and suggested that this species may be a synonym of another species.

***Crypticerya genistae* (Hempel)**

*Icerya genistae* Hempel, 1912: 55.

**Distribution in South America: Brazil** (Culik *et al*., 2007; Hempel, 1912), **Colombia** (Kondo *et al*., 2016).

**Pest status:** *Crypticerya genistae* has been reported as a pest of eggplants, peanuts, peppers and tomatoes in Barbados (Hodges *et al*., 2008). In Puerto Rico it has been reported as a devastating pest of soybeans and other legumes (Jenkins *et al*., 2014). In Florida, hosts currently are restricted to common roadside plants, with no infestations observed in agricultural crops or on ornamental plants (Hodges *et al*., 2008). In Colombia, it has been reported as a pest of chili peppers, *Capsicum* sp. cv. ‘Topito’ (Solanaceae) (Kondo *et al*., 2016). Plants in the families Asteraceae, Euphorbiaceae and Fabaceae are favored by *C. genistae* (Etienne & Matile-Ferrero 2008; Hodges *et al*., 2008; Stocks, 2013), but, plants of the families Malvaceae and Solanaceae also appear to be common hosts of *C. genistae*.

**Natural enemies:** **Coleoptera: Coccinellidae:** *Anovia circumclusa* (Gorham) (Ciomperlik 2010), *A. punica* Gordon (T.K., personal observation), *Rodolia cardinalis* (Mulsant) (Etienne & Matile-Ferrero, 2008). **Diptera: Cecidomyiidae:** *Pectinodiplosis erratica* (Felt) (Gagné & Etienne, 2009). **Phoridae:** *Syneura cocciphila* (Coquillet) (Ciomperlik, 2010).

**Host plants:** **Arecaceae:** *Dypsis lutescens* (H. Wendl.) Beentje & J. Dransf.**Asteraceae:** *Ambrosia artemisiifolia* L., *Baccharis halimifolia* L., *Bidens pilosa* L., *Centratherum punctatum* Cass., *Conyza canadensis* (L.) Cronquist, *Eclipta prostrata* (L.) L., *Eleutheranthera ruderalis* (Sw.) Sch. Bip., *Emilia fosbergii* Nicolson, *Erigeron canadensis* L., *Eupatorium capillifolium* (Lam.) Small ex Porter & Britton, *Helianthus debilis* Nutt., *Heterotheca subaxillaris* (Lam.) Britton & Rusby, *Mikania micrantha* Kunth, *Parthenium hysterophorus* L., *Pluchea carolinensis* (Jacq.) G. Don, *Pluchea odorata* (L.) Cass., *Solidago leavenworthii* Torr. & A. Gray, *Sonchus oleraceus* L., *Sphagneticola trilobata* (L.) Pruski, *Tridax procumbens* L. **Cannabaceae:** *Trema micrantha* (L.) Blume.**Casuarinaceae:** *Casuarina equisetifolia* L.**Convolvulaceae:** *Ipomoea batatas* (L.) Lam., *I. pes-caprae* (L.) R. Br., *Merremia aegyptia* (L.) Urb.**Cucurbitaceae:***Momordica charantia* L. **Cyperaceae:** *Carex* sp., *Rhynchospora* sp. **Euphorbiaceae:** *Euphorbia cyathophora* Murray, *E. heterophylla* L., *E. hirta* L., *E. hypericifolia* L., *E. mesembryanthemifolia* Jacq., *Ricinus communis* L. **Fabaceae:** *Acacia cornigera* (L.) Willd., *A. macracantha* Humb. & Bonpl. ex Willd., *Aeschynomene americana* L., *Arachis pintoi* Krapov. & W.C. Greg., *Caesalpinia bonduc* (L.) Roxb., *Cajanus cajan* (L.) Huth, *Calopogonium mucunoides* Desv., *Canavalia rosea* (Sw.) DC., *Centrosema pubescens* Benth., *C. virginianum* (L.) Benth., *Crotalaria incana* L., *C. retusa* L., *Desmanthus virgatus* (L.) Willd., *Desmodium incanum* (Sw.) DC., *D. tortuosum* (Sw.) DC., *Desmodium* sp., *Genista scoparia* Lam., *Haematoxylum campechianum* L., *Indigofera suffruticosa* Mill., *I. tinctoria* L., *Kummerowia striata* (Thunb.) Schindl., *Macroptilium lathyroides* (L.) Urb., *Mimosa pigra* L., *M. pudica* L., *Pueraria phaseoloides* (Roxb.) Benth., *Rhynchosia baukea* Du Puy & Labat*, Senna obtusifolia* (L.) H.S. Irwin & Barneby, *S. polyphylla* (Jacq.) H.S. Irwin & Barneby, *Sesbania* sp., *Stylosanthes biflora* (L.) Britton, Sterns & Poggenb., *Teramnus labialis* (L. f.) Spreng., *Vicia acutifolia* Elliott, *Vigna luteola* Jacq.) Benth., *Vigna* sp.**Malvaceae:** *Malvastrum* sp., *Waltheria indica* L.**Onagraceae:** *Ludwigia peruviana* (L.) H. Hara.**Passifloraceae:** *Turnera subulata* Sm. **Phyllanthaceae:** *Phyllanthus debilis* Klein ex Willd.**Poaceae:** *Bothriochloa pertusa* (L.) A. Camus.**Primulaceae:** *Samolus valerandi* L.**Rosaceae:** *Fragaria* sp.**Rubiaceae:** *Richardia grandiflora* (Cham. & Schltdl.) Steud., *Spermacoce verticillata* L.**Sapindaceae:** *Filicium decipiens* (Wight & Arn.) Thwaites.**Solanaceae:** *Capsicum* sp. cv. ‘Topito’, *Solanum torvum* Sw.**Vitaceae:** *Ampelopsis arborea* (L.) Koehne, *Vitis rotundifoliaMichx.* (Esquivel-Ríos, 2015; Etienne & Matile-Ferrero, 2008; Hempel, 1912; Hodges *et al*., 2008; Kondo *et al*., 2016).

**Remarks:** Outside South America, *C. genistae* has been reported from Antigua and Barbuda (Miller *et al*., 2014), Bahamas (Hodges, 2006), Barbados (Ciomperlik 2010; Hodges, 2006), Colombia (Kondo *et al*., 2016), Curacao (van Buurt & Debrot, 2011), Dominica (Miller *et al*., 2014), Grenada (Evans & Dooley, 2013; Miller *et al*., 2014), Guadeloupe (Etienne & Matile-Ferrero, 2008), Haiti (PestNet, 2016), Jamaica (Miller *et al*., 2014), Mexico (Miller *et al*., 2014), Panama (Esquivel-Ríos, 2015), Puerto Rico (Ciomperlik, 2010; Evans & Dooley, 2013; Miller *et al*., 2014), St. Kitts and Nevis (Miller *et al*., 2014), Saint Lucia (Malumphy, 2014), Trinidad and Tobago (Evans & Dooley, 2013; Miller *et al*., 2014), USA (Hodges *et al*., 2008), U.S. Virgin Is. (Evans & Dooley, 2013; Miller *et al*., 2014), and West Africa (Evans & Dooley, 2013).

***Crypticerya luederwaldti* (Hempel)**

*Icerya luederwaldti* Hempel, 1918: 197.

**Distribution in South America: Brazil** (Hempel, 1918).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants.** Hempel (1918) lists the host as a salt-loving plant, with the insects living on the underside of the leaves near the central nerves (main veins).

**Remarks:** Only known from Brazil. Unruh & Gullan (2008b) could not examine specimens of *C. flocculosa* for their identification guide to species of Iceryini.

***Crypticerya minima* (Morrison)**

*Icerya minima* Morrison, 1919: 64.

**Distribution in South America: Argentina** (Lizer y Trelles, 1938; Morrison, 1919).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants.** **Amaranthaceae:** *Suaeda divaricata* Moq. (Lizer y Trelles, 1938; Morrison, 1919).

**Remarks:** Only known from Argentina.

***Crypticerya montserratensis* (Riley & Howard)**

*Icerya montserratensis* Riley & Howard, 1890: 99.

**Distribution in South America: Colombia** (Figueroa-Potes, 1946), **Ecuador** (Bartlett, 1978), **Venezuela** (Gordon, 1972).

**Pest status:** Known as a major pest of citrus in Ecuador and a minor pest in Puerto Rico (Bartlett, 1978).

**Natural enemies: Coleoptera: Coccinellidae:** *Anovia punica* Gordon (Gordon, 1972), *Rodolia cardinalis* (Mulsant) (Bartlett, 1978). **Diptera: Cryptochaetidae:** *Cryptochaetum iceryae* (Williston) (Bartlett, 1978); **Phoridae:** *Syneura cocciphila* (Coquillett) (Bartlett, 1978). **Hymenoptera: Encyrtidae:** *Brethesiella* sp., *Cheiloneurus pulvinariae* Dozier, *Homosemion bennetti* Annecke, *Iceromyia flavifrons* Noyes (Noyes, 2004).

**Host plants.** **Arecaceae:** *Cocos nucifera* L. **Calophyllaceae:** *Calophyllum calaba* L., *Mammea americana* L. **Casuarinaceae:** *Casuarina equisetifolia* L. **Fabaceae:** *Albizia saman* (Jacq.) F. Muell., *Inga fagifolia* G. Don, *I. vera* Willd., *Prosopis* sp. **Lauraceae:** *Persea americana* Mill. **Lythraceae:** *Lawsonia inermis* L. **Malpighiaceae:** *Byrsonima crassifolia* (L.) Kunth. **Moraceae:** *Ficus microcarpa* L. f. **Musaceae:** *Musa* sp. **Myrtaceae:** *Psidium guajava* L., *Psidium* sp. **Rutaceae:** *Citrus aurantium* L., *C. maxima* (Burm.) Merr., *Citrus* sp. **Sapotaceae:** *Chrysophyllum* sp. (Figueroa-Potes, 1946; Foldi, 1995; Martorell, 1976; Riley & Howard, 1980a, b; Townsend & Cockerell, 1898).

**Remarks:** Outside of South America, *C. montserratensis* is known from Grenada (Vayssière, 1926), Haiti (Perez-Gelabert, 2008), Mexico (Foldi, 1995, Cockerell, 1899), Montserrat (Riley & Howard, 1890), Panama (Cockerell, 1899), and Puerto Rico (Martorell, 1976).

***Crypticerya multicicatrices* Kondo & Unruh**

*Crypticerya multicicatrices* Kondo & Unruh, 2009: 95.

**Distribution in South America:** **Colombia** (Kondo & Unruh, 2009).

**Pest status:** *Crypticerya multicicatrices* is present throughout the year, with infestations being more severe in times of drought (Kondo *et al*., 2012a). It has been reported associated with stunted growth on soursop (Kondo, 2008) and defoliation and death of the host in severe attacks (Kondo *et al*., 2012a). The species produces honeydew which promotes the growth of fungi that cause sooty mold, resulting in cosmetic damage to the commercial parts of the plant and reducing the quality of the product. Outbreaks of *C. multicicatrices* occurred on San Andres Island (Colombia) between 2010 and 2013, until the coccinellid beetle, *Anovia* sp. successfully controlled this insect pest (Kondo *et al*., 2014). The insect predator was later identified as *Anovia punica* Gordon (González & Kondo, 2014). In mainland Colombia, outbreaks of *C. multicicatrices* commonly occur in the city of Cali, affecting urban trees such as *Caesalpinia pluviosa* var. *peltophoroides*, *Pithecellobium dulce* and *P. saman* (Fabaceae) and mango *Mangifera indica* (Anacardiaceae) (Pinchao *et al*., 2015).

**Natural enemies:** **Fungi: Eurotiales: Trichocomaceae:** *Isaria* sp. (Kondo *et al*., 2012a, Silva-Gómez *et al*., 2013). **Coleoptera: Coccinellidae:** *Anovia punica* Gordon (González & Kondo, 2014), *Delphastus quinculus* Gordon, *Diomus seminulus* (Mulsant) (González *et al*., 2012), *Rodolia cardinalis* (Mulsant) (Pinchao *et al*., 2015). **Diptera: Phoridae:** *Syneura cocciphila* (Coquillet) (Gaimari *et al*., 2012). **Hymenoptera: Encyrtidae:** *Brethesiella* cf. *abnormicornis* (Girault) (Montealegre *et al*., 2016), *Cheiloneurus* sp. (a hyperparasitoid). **Neuroptera: Chrysopidae:** *Chrysoperla* sp., *Ceraeochrysa* sp. (Kondo *et al*., 2014).

**Host plants:** **Acanthaceae:** *Avicennia germinans* (L.) L., *Dicliptera assurgens* (L.) Juss., *Graptophyllum pictum* (L.) Griff., *Pseuderanthemum reticulatum* (Hort. ex Hook. fil.) Radlk. **Amaranthaceae:** *Achyranthes* sp., *Spinacia oleracea* L. **Amaryllidaceae:** *Allium cepa* L., *A. fistulosum* L., *Hymenocallis caribaea* (L.) Herb. **Anacardiaceae:** *Mangifera indica* L., *Spondias mombin* L., *S. purpurea* L. **Annonaceae:** *Annona cherimola* Mill., *A. muricata* L., *Annona squamosa* L. **Apocynaceae**: *Catharanthus roseus* (L.) G. Don., *Nerium oleander* L., *Plumeria* sp. **Araceae:** *Adonidia merrillii* (Becc.) Becc., *Alocasia macrorrhizos* (L.) G. Don, *Anthurium cubense* Engl., *Epipremnum aureum* (Linden & André) G.S. Bunting. **Araliaceae:** *Polyscias* sp., Schefflera sp. **Arecaceae:** *Attalea butyracea* (Mutis ex L. f.) Wess. Boer, *Caryota* sp., *Cocos nucifera* L., *C. nucifera* L. “Malayan dwarf”, *Dypsis lutescens* (H. Wendl.) Beentje & J. Dransf., *Phoenix roebelenii* O’Brien, *Pritchardia pacifica* Seem. & H. Wendl., *Veitchia* sp. **Asparagaceae:** *Cordyline terminalis* (L.) Kunth., *Cordyline* sp., *Dracaena* sp., *Sansevieria fasciata* Cornu ex Gérôme & Labroy. **Asteraceae:** *Emilia sonchifolia* (L.) DC. **Berberidaceae:** *Nandina domestica* Thunb. **Bignoniaceae:** *Crescentia cujete* L., *Spathodea campanulata* P. Beauv., *Tecoma stans* (L.) Juss. ex Kunth. **Bixaceae:** *Bixa orellana* L. **Boraginaceae:** *Cordia sebestena* L. **Calophyllaceae:** *Mammea americana* L. **Capparaceae:** *Quadrella odoratissima* (Jacq.) Hutch. **Caricaceae:** *Carica papaya* L. **Casuarinaceae:** *Casuarina equisetifolia* L. **Chrysobalanaceae:** *Licania tomentosa* (Benth.) Fritsch. **Clusiaceae:** *Rheedia madruno* (Kunth) Planch. & Triana. **Combretaceae:** *Conocarpus erectus* L., *Laguncularia racemose* (L.) C.F. Gaertn. **Convolvulaceae:** Ipomoea batatas (L.) Lam. **Crassulaceae:** *Kalanchoe pinnata* (Lam.) Pers. **Cucurbitaceae:** *Cucumis sativus* L., *Luffa cylindrica* (L.) M. Roem. **Cyperaceae:** *Cyperus ligularis* L. **Euphorbiaceae:** *Acalypha wilkesiana* Müll. Arg., *Codiaeum variegatum* (L.) Rumph. ex A. Juss., *Euphorbia aphylla* Brouss. ex Willd., *Euphorbia hirta* L., *E. pulcherrima* Willd. ex Klotzsch, *Jatropha gossypiifolia* L., *J. integerrima* Jacq., *Manihot esculenta* Crantz. **Fabaceae:** *Albizia lebbeck* (L.) Benth., *Arachis pintoi* Krapov. & W.C. Greg., *Bauhinia monandra* Kurz, *Caesalpinia peltophoroides* Benth., *Cajanus cajan* (L.) Huth, *Calliandra pittieri* Standl., *Calliandra* sp., *Cassia fistula* L., *C. grandis* L. f., *Delonix regia* (Bojer ex Hook.) Raf., *Erythrina variegata* L., *Erythrina* sp., *Flemingia strobilifera* (L.) R. Br., *Leucaena leucocephala* (Lam.) de Wit, *Gliricidia sepium* (Jacq.) Kunth ex Walp., *Phaseolus vulgaris* L., *Phaseolus* sp., *Pithecellobium dulce* (Roxb.) Benth., *Tamarindus indica* L. **Lamiaceae:** *Ocimum sanctum* L., *Plectranthus unguentarius* Codd, *Salvia* sp., *Tectona grandis* L. f. **Lauraceae:** *Persea americana* L. **Musaceae:** *Musa* × *paradisiaca* L., *Musa* x *sapientum* L. **Lythraceae:** *Lagerstroemia indica* L., *Punica granatum* L. **Malvaceae:** *Abelmoschus esculentus* (L.) Moench, *Ceiba pentandra* (L.) Gaertn., *Gossypium barbadense* L., *Guazuma ulmifolia* Lam., *Hibiscus rosa-sinensis* L., *Hibiscus sabdariffa* L., *Hibiscus* sp., *Malvaviscus arboreus*, *Thespesia populnea* (L.) Sol. ex Corrêa. **Moraceae:** *Artocarpus altilis* (Parkinson) Fosberg, *Artocarpus heterophyllus* Lam., *Ficus benjamina* L., *F. elastica* Roxb. ex Hornem., *F. lyrata* Warb., *F. microcarpa* L. f., *Ficus* sp. **Myrtaceae:** *Pimenta dioica* (L.) Merr., *Psidium guajava* L., *Psidium* sp., *Syzygium jambos* (L.) Alston, *Syzygium samarangense* (Blume) Merr. & L. M. Perry. **Nyctaginaceae:** *Bougainvillea* sp. **Orchidaceae:** *Brassavola nodosa* (L.) Lindl. **Oxalidaceae:** *Averrhoa carambola* L. **Passifloraceae:** *Passiflora edulis* fo. *flavicarpa* O. Deg. **Phyllanthaceae:** *Phyllanthus acidus* (L.) Skeels. **Poaceae:** *Poa* sp., *Zea mays* L. **Polygonaceae:** *Coccoloba uvifera* (L.). **Rubiaceae:** *Alibertia edulis* (Rich.) A. Rich. ex DC., *Ixora coccinea* L., *Morinda citrifolia* L. **Rutaceae:** *Citrus* × *aurantiifolia* (Christm.) Swingle, *C. aurantium* L., *C. grandis* (L.) Osbeck, *C. latifolia* Tanaka, *C.* × *limon* (L.) Osbeck, *C. reticulata* Blanco, *C. sinensis* (L.) Osbeck, *Swinglea glutinosa* (Blanco) Merr. **Sapindaceae:** *Melicoccus bijugatus* Jacq. **Sapotaceae:** *Chrysophyllum cainito* L., *Manilkara zapota* (L.) P. Royen. **Smilacaceae:** *Smilax spinosa* Mill. **Solanaceae:** *Capsicum chinense* Jacq. (Habanero pepper), *Capsicum* sp., *Cestrum nocturnum* L., *Solanum lycopersicum* Lam., *S. melongena* L. **Strelitziaceae:** *Ravenala madagascariensis* Sonn. **Urticaceae:** *Cecropia peltata* L., *C. schreberiana* Miq. **Zingiberaceae:** *Alpinia purpurata* (Vieill.) K. Schum. (Kondo *et al*., 2012a; Silva *et al*., 2013).

**Remarks:** Only known from Colombia. In life, the species resembles *C. brasiliensis* and *C. zeteki*, which are also known to occur in Colombia (see Remarks section under *C. brasiliensis*).

***Crypticerya palmeri* (Riley & Howard)**

*Icerya palmeri* Riley & Howard, 1890: 103.

**Distribution in South America:** **Argentina** (Lizer y Trelles, 1938), **Chile** (Bartlett, 1978; Lizer y Trelles, 1938, Vayssière, 1926).

**Pest status:** *Crypticerya palmeri* has been reported as a serious pest of alfalfa, grapevines and ornamental plants in Chile (Bartlett, 1978).

**Natural enemies:** **Coleoptera: Coccinellidae:** *Rodolia cardinalis* (Mulsant) (Bartlett, 1978). **Hymenoptera: Encyrtidae:** *Brethesiella flava* Timberlake (Timberlake, 1926).

**Host plants:** **Fabaceae:** *Coursetia* sp. (Foldi, 1995; Townsend & Cockerell, 1898), *Medicago* sp. (Bartlett, 1978). **Poaceae:** undetermined species (Lizer y Trelles, 1938). **Rosaceae:** *Acaena argentea* Ruiz & Pav. (Lizer y Trelles, 1938). **Vitaceae:** *Vitis vinifera* L. (Bartlett, 1978; Riley & Howard, 1890).

**Remarks:** The species was originally described from specimens collected in Mexico, on grapevines (Riley & Howard, 1890). Later, the species was reported from Argentina and Chile (see distribution above), but whether the South American specimens are conspecific with the Mexican species needs to be verified. In their identification guide to species of Iceryini, Unruh & Gullan (2008b) examined only specimens from Mexico (the type locality), thus, currently we do not know whether the South American species are conspecific, and these may be an undescribed species or a different named species.

***Crypticerya subandina* (Leonardi)**

*Icerya subandina* Leonardi, 1911: 238.

**Distribution in South America:** **Argentina** (Leonardi, 1911; Lizer y Trelles, 1917, 1938).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants:** **Fabaceae:** *Anadenanthera colubrine* (Vell.) Brenan (Lizer y Trelles, 1938). **Zygophyllaceae:** *Bulnesia retama* (Gillies ex Hook. & Arn.) Griseb. (Leonardi, 1911; Lizer y Trelles, 1938).

**Remarks:** Only known from Argentina.

***Crypticerya zeteki* (Cockerell)**

*Icerya zeteki* Cockerell, 1914: 148.

**Distribution in South America:** **Colombia** (Kondo *et al*., 2016).

**Pest status:** In Colombia, it is listed as a pest of coconut, oil palm and roses by Posada (1989).

**Natural enemies:** Not reported.

**Host plants:** **Arecaceae:** *Dypsis lutescens* (H. Wendl.) Beentje & J. Dransf., *Cocos nucifera* L., *Elaeis guineensis* Jacq. **Fabaceae:** *Trifolium repens* L., *Arachis pintoi* Krapov. & W.C. Greg. **Rosaceae:** *Rosa* sp. (Kondo *et al*., 2016; Posada, 1989).

**Remarks:** The species was originally recorded from Panama (Canal Zone) on an undetermined plant (Cockerell, 1914). The arrangement of waxy secretions in live specimens of *C. brasiliensis*, *C. multicicatrices* and *C. zeteki* is superficially similar, all sharing a long caudal waxy tuft and a shorter cephalic tuft (for more details see Kondo *et al*., 2016). A discussion of the similarities of *C. brasiliensis*, *C. montserratensis*, *C. multicicatrices* (latter referred to as an undescribed Colombian species) and *C. zeteki* can be found in Unruh and Gullan (2008b).

***Icerya chilensis* Hempel**

*Icerya chilensis*, Hempel, 1920, 333.

**Distribution in South America: Chile** (Hempel, 1920).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants:** Collected on the leaves of an undetermined wild tree (Hempel, 1920).

**Remarks:** Only known from Chile. Unruh & Gullan (2008b) regarded this species as *incertae sedis*. The occurrence of an *Icerya* species in South America is doubtful. The genus *Icerya* is native to Indomalaya and Australasia, NOT South America. In the original description, Hempel (1920) wrote that once the male of this species was discovered, that the species may be put into a different genus.

***Icerya insulans* Hempel**

*Icerya insulans* Hempel, 1923: 510.

**Distribution in South America: Brazil** **(**Hempel, 1923).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants: Asteraceae:** undetermined species. **Melastomataceae:** *Tibouchina clavata* (Pers.) Wurdack (Hempel, 1923).

**Remarks:** Only known from Brazil. Unruh & Gullan (2008b) regarded this species as *incertae sedis*. The occurrence of an *Icerya* species in South America is doubtful as the genus *Icerya* is native to Indomalaya and Australasia, NOT South America. In the original description, Hempel (1923) writes that this species belongs to the same group as *Icerya taunayi* Hempel, which is now *Laurencella taunayi* (Hempel), and thus it is likely that *I. insulans* may also be a species of *Laurencella*.

***Icerya paulista* Hempel**

*Icerya paulista* Hempel, 1920: 336.

**Distribution in South America: Brazil** (Hempel, 1920).

**Pest status:** Unknown.

**Natural enemies:** Not reported.

**Host plants: Poaceae:** On the thorns of a plant locally known as "taquarucu", *Guadua* sp. (Hempel, 1920).

**Remarks:** Only known from Brazil. Unruh & Gullan (2008b) regarded this species as *incertae sedis*. The occurrence of an *Icerya* species in South America is doubtful as the genus *Icerya* is native to Indomalaya and Australasia, NOT South America.

***Icerya purchasi* Maskell**

*Icerya purchasi* Maskell, 1879: 221.

**Distribution in South America: Argentina** (CABI, 1971; Lizer y Trelles, 1938; Granara de Willink & Claps, 2003), **Bolivia** (CABI, 1971), **Brazil** (CABI, 1971; Culik *et al*., 2007; Hempel, 1918, 1920), **Chile** (CABI, 1971; González, 1989; Ripa *et al*., 2008), **Colombia** (CABI, 1971; Figueroa-Potes, 1946; Kondo, 2001; Kondo *et al*., 2012b), **Ecuador** (CABI, 1971; Galapagos island: Causton *et al*., 2004; Lincango *et al*., 2010), **French Guiana** (Remillet, 1988), **Paraguay** (CABI, 1971), **Peru** (Bederski, 1969; CABI, 1971; Lindinger, 1942), **Uruguay** (CABI, 1971, Lizer y Trelles, 1938), **Venezuela** (CABI, 1971).

**Pest status:** *Icerya purchasi* is a well-known pest of citrus and many other plants (Caltagirone, 1981; Watson & Malumphy, 2004). In recent years it was reported as a serious pest in the Galapagos Island, where it was successfully controlled by the vedalia beetle, *Rodolia cardinalis* (Mulsant) (Causton *et al*., 2004). In Colombia, *I. purchasi* is not considered a pest of citrus (Kondo *et al*., 2012b).

**Natural enemies:** **Hemiptera: Heteroptera: Anthocoridae:** *Cardiastethus nazarenus* Reuter (Awadallah *et al*., 1976). **Coleoptera: Coccinellidae:** *Anovia punica* Gordon (Gordon, 1972), *Chilocorus bipustulatus* (L.) (Argyriou *et al*., 1976), *Cryptolaemus montrouzieri* Mulsant (Jashenko, 1999; Puttarudriah & Channabasavanna, 1957), *Hippodamia* sp. (Jashenko, 1999), *Rodolia cardinalis* (Mulsant) (Brain & Kelly, 1917; Gullan & Cranston, 2014; Zimmerman, 1948), *Rodolia pumila* Weise (Chiu *et al*., 1985), *Scymnus* sp. (Fullaway, 1913). **Diptera: Cryptochaetidae:** *Cryptochaetum iceryae* (Williston)(Gullan & Cranston, 2014; Mendel & Blumberg, 1991; Quezada & DeBach, 1973; Denmark, 1964), **Phoridae:** *Syneura cocciphila* (Coquillet)(Autuori, 1928). **Hymenoptera: Aphelinidae:** *Ablerus molestus* Blanchard, *Coccophagus lycimnia* Walker, *Coccophagus scutellaris* Dalman (Noyes, 2004, 2016). **Encyrtidae:** *Brethesiella abnormicornis* Girault, *B. latifrons* Timberlake, *Cheiloneurus pulvinariae* Dozier, *Homalotylus eytelweinii* Ratzeburg, *H. flaminius* Dalman, *Homosemion bennetti* Annecke, *Isodromus iceryae* Howard, *Lamennaisia ambigua* Nees, *Tetracnemoidea brevicornis* Girault (Noyes, 2004, 2016). **Eriaporidae:** *Euryischia* sp., *Euryischia lestophoni* Riley (Noyes, 2016). **Eulophidae:** *Entedon coquillettii* Riley (Noyes, 2004, 2016). **Mymaridae:** *Alaptus iceryae* Riley (Noyes, 2004, 2016). **Pteromalidae:** *Austroterobia* sp., *Ophelosia crawfordi* Riley, *O. hypatia* Girault, *Oricoruna arcotensis* Mani & Kurian, *Parasaphodes townsendi* Ashmead, *Parasaphodes* sp. (Noyes, 2004, 2016). **Lepidoptera: Pyralidae:** *Laetilia coccidivora* (Comstock) (Jashenko, 1999). **Thysanoptera: Phlaeothripidae:** *Megalothrips* sp. (Jashenko, 1999). **Neuroptera: Chrysopidae:** *Chrysopa pallens* Rambur (Jashenko, 1999), *C. sapporensis* Okamoto (Jashenko, 1999), *Pseudomallada ventralis* (Curtis) (Jashenko, 1999), *Semachrysa matsumurae* (Okamoto) (Jashenko, 1999; Kuwana, 1922).

**Host plants:** This species is highly polyphagous. It has been recorded on more than 230 species of plants distributed in 162 genera in 66 plant families (Garcia *et al*., 2016).

**Remarks.** Of Australian origin, *I. purchasi* has now spread worldwide with infested plant material. In Colombia, the cottony cushion scale *Icerya* sp. (possibly *I. purchasi* Maskell) is considered as one of the first urban pests (Kondo, 2015). According to Valenzuela (1993), on the occasion of the celebration of the IX Pan American Conference held in Bogota in 1948, a number of acacia trees were introduced to the country in order to beautify the streets of the capital city; however, the imported plants came infested with an insect pest, *Icerya* sp., for which populations increased to such an extent that it did not take long before the citizens started calling it the "white plague". Fortunately, a successful classical biological control program was implemented through the importation of the lady beetle *R. cardinalis* (Mulsant) (Valenzuela, 1993). Several subspecies of *I. purchasi* can be found in the literature (i.e., *Icerya purchasi citriperda* Hempel, *I. purchasi crawii* Cockerell and *I. purchasi maskelli* Cockerell), however, there is no evidence to recognize subspecies of *I. purchasi* and thus the name *I. purchasi* *citriperda* Hempel and other trinomens should NOT be used (Gullan & Kondo, 2011).

***Icerya schrottkyi* Hempel**

*Icerya schrottkyi* Hempel, 1900: 373.

**Distribution in South America: Argentina** (Lizer y Trelles, 1936, 1938), **Brazil** (Foldi & Soria, 1989; Hempel, 1900).

**Pest status:** Considered a pest of gravevines in Brazil (Foldi & Soria, 1989).

**Natural enemies:** Not reported.

**Host plants:** **Euphorbiaceae:** *Sebastiania commersoniana* (Baill.) L.B. Sm. & Downs (Lizer y Trelles, 1938). **Vitaceae:** *Vitis vinifera* L. (Foldi & Soria, 1989).

**Remarks:** Unruh & Gullan (2008b) included this species in the “*Icerya aegyptiaca* group” which includes two species, i.e., *I. aegyptiaca* and *I. schrottkyi*. Both species have pores on the derm that resemble the vulvar pores, but *I. schrottkyi* possesses unique hexalocular pores on the ventral surface that are absent from all other iceryine species. The two species can be separated easily by the number of cicatrices (one in *I. aegyptiaca*, three in *I. schrottkyi*) (Unruh & Gullan, 2008b).

***Icerya seychellarum* (Westwood)**

*Dorthesia seychellarum* Westwood, 1855: 836.

**Distribution in South America: Colombia** (Figueroa-Potes, 1946), **French Guiana** (Williams & Watson, 1990).

**Pest status:** This species has been reported from Fiji as a pest of guava and citrus (Lever, 1946) and *Rosa* sp. (Hinckley, 1965). It has also been reported killing citrus trees in Vanautu (Williams & Butcher, 1987). *Icerya seychellarum* may produce copious amounts of honeydew which serve as a medium for sooty molds that grow on the leaves, reducing plant respiration and photosynthesis (Cohic, 1955).

**Natural enemies:** **Coleoptera: Coccinellidae:** *Rodolia cardinalis* (Mulsant) (Bartlett, 1978), *R. limbata* (Blackburn) (Bartlett, 1978); *R. pumila* Weise(Beardsley, 1955). **Diptera: Cryptochaetidae:** *Cryptochaetum iceryae* (Williston) (Bartlett, 1978); **Hymenoptera: Encyrtidae:** *Zaplatycerus tachikawai* Subba Rao (Noyes, 2004, 2016). **Eriaporidae:** *Euryischia indica* Mani & Kurian (Noyes, 2004, 2016). **Eulophidae:** *Aprostocetus pauliani* Risbec (Noyes, 2004, 2016). **Pteromalidae:** *Ophelosia crawfordi* Riley, *Parasaphodes townsendi* Ashmead (Noyes, 2004, 2016).

**Host plants:** *Icerya seychellarum* is a highly polyphagous species, recorded from 166 plants distributed in 126 genera in 57 families (Garcia *et al*., 2016).

**Remarks:** In South America, it has been reported only from Colombia. This is a widespread species in the Pacific region especially in the tropical South Pacific area, throughout Africa and southern Asia on many plant species (Williams & Watson, 1990). The species was redescribed and illustrated by Unruh & Gullan (2008a).

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