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First record of *Planchonia stentae* (Brain, 1920) (Hemiptera: Coccomorpha: Asterolecaniidae) on *Asclepias curassavica* Linnaeus, 1753 (Gentianales: Asclepiadaceae) in Mexico, with observations on parasitic Encyrtidae

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Abstract. In April 2018, specimens of an asterolecaniid were collected on infested wild plants of *Asclepias curassavica* Linnaeus, 1753 (Gentianales: Asclepiadaceae) in Jiquilpan, Michoacan, Mexico. The collected specimens were identified as *Planchonia stentae* (Brain, 1920) (Hemiptera: Asterolecaniidae). In this paper, we record for the first time the presence of *P. stentae* infesting *A. curassavica* in Mexico.

Key words. Parasitoid, pit scales, scarlet milkweed.

Introduction

Members of the family Asterolecaniidae (pit scales) are phytophagous insects that constitute one of the largest and more economically important scale insect taxa worldwide, with its members occurring in almost all zoogeographical regions of the world (Stumpf and Lambdin 1999, 2006). Females of many species of pit scales produce open galls, in which they suck plant sap (Stumpf and Lambdin 2006). Currently, this family consists of 25 genera and 247 species worldwide (García Morales et al. 2016).

One of the economically most important taxa of Asterolecaniidae includes the genus *Planchonia* Signoret, 1870 (Stumpf and Lambdin 2006), which contains ten species worldwide (García Morales et al. 2016). Specifically, the species *Planchonia stentae* (Brain, 1920) is significant due to its wide range of host plants, extensive distribution, and relative ability to be transported through movement of host plant material (Stumpf and Lambdin 2000, 2006).

Materials and Methods

Since 2012, a few scale insects have been observed on wild plants of *Asclepias curassavica* Linnaeus, 1753 (Asclepiadaceae) in the Cienega of Chapala region, but had not been collected. Adult female Asterolecaniidae infesting *A. curassavica* were first collected in April 2018 in Jiquilpan, Michoacan, Mexico (19°59′10.3″N, 102°42′37.6″W; 1560 meters above sea level) (Fig. 1A). Scale insect specimens were separated from the plants and preserved in 70% alcohol; subsequently, permanent slide-mounts of the adult females were prepared for species identification according to De Haro and Claps (1995). Samples of slide-mounted specimens were deposited in the Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional (CIIDIR), Unidad Michoacán, Instituto Politécnico Nacional, México, and alcohol-preserved specimens were deposited in the Entomological Collection of Louisiana State University at Alexandria, Alexandria, Louisiana, USA.

Results and Discussion

The female insect specimens were identified as *P. stentae* (Fig. 1B). We present the first official record for the presence of *P. stentae* in Mexico. This species is considered a major pest in Florida (Stumpf and Lambdin 2000), and also has the potential to interfere with Integrated Pest Management in Mexico. Although the presence of this species had already been recorded on *Echeveria* sp. (Crassulaceae) intercepted in Korea when imported from Mexico (Ji and Suh 2012; Suh et al. 2013), until identification its establishment in Mexico was not corroborated. Our findings also represent the first record of this species infesting *A. curassavica* and the family Asclepiadaceae in Mexico. So far, *P. stentae* has been recorded on a variety of host plants in South Africa (Brain 1920); Kenya, South Africa, USA (Russell 1941); Sao Tomé, South Africa, Zimbabwe (Giliomee 1966); USA (Gill 1993); Colombia (Stumpf and Lambdin 2000, 2006; Kondo 2001); Kenya, Puerto Rico, South Africa, USA (Stumpf and Lambdin 2000, 2006); Martinique (Germain and Grassart 2004; Matile-Ferrero and Étienne 2006); South Africa (Giliomee and Kozár 2008); Great Britain (Malumphy 2009); Mexico (Ji and Suh 2012; Suh et al. 2013) and Turks and Caicos Islands (Malumphy and Reid 2017). *Planchonia stentae* is the only pit scale species recorded from the host plant genus *Asclepias* (Stumpf and Lambdin 2006).

Scale insect taxonomy relies on the morphology of adult females. The genus *Planchonia* possesses fused, anvil-shaped anal plates, an arched plate, and an anal ring with six setae (Fig. 1C). Large 8-shaped pores (Fig. 1D) occur only on the dorsum and are found in marginal bands and in median swirls and bands. Rows of simple disk pores are present on dorsum and venter (Fig. 2) (Stumpf and Lambdin 2006). *Planchonia stentae* possesses three to four transverse multilocular pore bands ventrally around the vulva, with locular plates of multilocular pores having fringed edges (Fig. 1E), and ventral simple disk pores are only present in a submarginal row (Fig. 2) (Stumpf and Lambdin 2006). Morphologically, this species could be mistaken for *Planchonia arabidis* Signoret, 1877, but *P. arabidis* has at least five multilocular pore bands on the venter, the edges of locular plates are not fringed, and ventral simple disk pores are found in both submarginal and transverse rows (Stumpf and Lambdin 2006).

During the process of preparing specimens for slide-mounting, between two to four fully-developed adult parasitic wasps in the family Encyrtidae were found inside of some of the collected adult females of *P. stentae*. While *P. stentae* represents a new record of a phytophagous insect on *A. curassavica* in Mexico, the population density of this pit scale appears to be relatively low. We conclude that the polyembryonic encyrtid wasp found in this study could be an important population regulator of *P. stentae* populations in the Cienega of Chapala region. This finding is relevant, because there are no previous records of parasitoids attacking *P. stentae* (Stumpf and Lambdin 2006). The presence of parasitoids on *P. stentae* could be important for the management of agricultural pests, because *A. curassavica* hosts a large number of phytophagous insects, such as *Danaus plexippus* Linnaeus, 1758 (Lepidoptera: Nymphalidae) and *Aphis nerii* Boyer de Fonscolombe, 1841 (Hemiptera: Aphididae). Although *A. nerii* primarily feeds on the plant family Asclepiadaceae, this aphid can also colonize other plant families (Blackman and Eastop 1984) and can vector viral diseases, e.g., papaya ringspot virus (Mora-Aguilera et al. 1993). Nevertheless, the wide range of natural enemies that phytophagous insects associated with *A. curassavica* can support could help regulate pests in some agroecosystems as has been documented in citrus (Jacas and Urbaneja 2010; Godoy-Ceja and Cortez-Madrigal 2018). Therefore, the integration of *A. curassavica* as companion plant in agroecosystems has been suggested (Peña-Martínez et al. 2001; Cortez-Madrigal et al. 2016). Parasitoids controlling *P. stentae* on *A. curassavica* are valuable allies in this effort.

Future studies should be conducted in search of other host plants of *P. stentae* in Mexico, because the literature mentions about 40 host plants in Florida alone (Stumpf and Lambdin 2000), several of them present in Mexico. At the same time, parasitoid species involved in biological control of this pit scale should be identified. Our future goal is to estimate the pest potential of *P. stentae* in Mexico and to determine its biology.

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Literature Cited

Blackman, R. L., and V. F. Eastop. 1984. Aphids on the world´s crops. An identification guide. John Wiley & Sons; London, UK. 413 p.

Brain, C. K. 1920. The Coccidae of South Africa-IV. Bulletin of Entomological Research 10(2): 95–128.

Cortez-Madrigal, H., F. García-González, A. Guzmán-Larralde, J. A. Acuña-Soto, and G. Otero-Colina. 2016. Conserving phytophagous arthropods to conserve natural enemies: *Asclepias curassavica* as the model. Southwestern Entomologist 41(3): 681–693.

De Haro, M. E., and L. E. Claps. 1995. Conociendo nuestra fauna III. Familia Dactylopiidae. (Insecta: Homoptera). Morfología, biología e importancia económica. Serie monográfica y didáctica N° 19. Instituto Superior de Entomología. INSUE. Facultad de Ciencias Naturales e Instituto Miguel Lillo. Universidad Nacional de Tucumán; Tucumán, Argentina. 20 p.

García Morales, M., B. D. Denno, D. R. Miller, G. L. Miller, Y. Ben-Dov, and N. B. Hardy. 2016. ScaleNet. Available at http://scalenet.info. (Last accessed April 2, 2020.)

Germain, J. F., and L. Grassart. 2004. First occurrence into Martinique (French West Indies) one pit scale and four mealybugs (Abstract only). p. 330. *In*: L. B. Erkilic and M. B. Kaydan (eds.). Proceeding of the X International Symposium on Scale Insect Studies. 19-23 April 2004. Plant Protection Research Institute; Adana, Turkey. 408 p.

Giliomee, J. H. 1966. A list of South African scale insects (Homoptera: Coccoidea) in the collection of the British Museum (Natural History) with information on their hosts plants and distribution. Annale Universiteit Van Stellenbosch. 41. Serie A 8: 412–428.

Giliomee, J. H, and F. Kozár. 2008. Review of the family Asterolecaniidae (Hemiptera: Coccoidea) in South Africa, with the description of a new species. African Entomology 16(2): 276–286.

Gill, R. J. 1993. The scale insects of California. Part 2. The minor families (Homoptera: Coccoidea). California Department of Food and Agriculture; Sacramento, California. 241 p.

Godoy-Ceja, C. A., and H. Cortez-Madrigal. 2018. Potencial de *Asclepias curassavica* L. (Apocynaceae) en el control biológico de plagas. Revista Mexicana de Ciencias Agrícolas 9(2): 303-315.

Jacas, J. A., and A. Urbaneja. 2010. Biological control in citrus in Spain: from classical to conservation biological control. p. 61–72. *In*: A. Ciancio and K. G. Mukerji (eds.). Integrated management of arthropod pests and insect borne diseases. Springer; London. 366 p.

Ji, J., and S. J. Suh. 2012. A list of scale insects (Hemiptera: Coccoidea) intercepted in quarantine on imported succulent plants in Korea 2006-2010. Insecta Mundi 0272: 1–5.

Kondo, T. 2001. Las cochinillas de Colombia (Hemiptera: Coccoidea). Biota Colombiana 2(1): 31–48.

Malumphy, C. 2009. A brief review of pit scales (Hemiptera: Asterolecaniidae) recorded in Britain. Cecidology 24: 46–49, 64.

Malumphy, C., and S. Reid. 2017. Improving bio-security in the United Kingdom overseas territories: Identification service for invasive alien invertebrate plant pests. Food and Environment Research Agency; UK. 23 p.

Matile-Ferrero, D., and J. Étinne. 2006. Cochenilles des antilles françaises et de quelques autres îles des Caraïbes (Hemiptera, Coccoidea). Revue Française d' Entomologie (N.S.) 28(4): 161–190.

Mora-Aguilera, G., D. Nieto-Angel, D. Teliz, and C. L.Campbell. 1993. Development of a prediction model for papaya ringspot in Veracruz, Mexico. Plant Disease 77(12): 1205–1211.

Peña-Martínez, M. R., J. R. Lomelli, G. L. A. Trejo, and N. Villegas J. 2001. Monitoreo de Afidos y Afidófagos de Importancia Agrícola. Escuela Nacional de Ciencias Biológicas. Instituto Politécnico Nacional; Mexico, D. F. 89 p.

Russell, L. M. 1941. A classification of the scale insect genus *Asterolecanium*. United States Department of Agriculture. Miscellaneous Publication No. 424. Washington, D.C. 322 p.

Stumpf, C. F., and P. L. Lambdin. 1999. A comparison of the pit scale genera of North and South America (Hemiptera: Coccoidea: Asterolecaniidae). Entomologica, Bari 33: 153–156.

Stumpf, C. F., and P. L. Lambdin. 2000. Distribution and known host records for *Planchonia stentae* (Hemiptera: Coccoidea: Asterolecaniidae). Florida Entomologist 83(3): 368–369.

Stumpf, C. F., and P. L. Lambdin. 2006. Pit scales (Sternorrhyncha: Coccoidea) of North and South America. Tennessee Agricultural Experiment Station. University of Tennessee Institute of Agriculture; Knoxville, Tennessee. 231 p.

Suh, S. J., H. M. Yu, and K. J. Hong. 2013. List of intercepted scale insects at Korean ports of entry and potential invasive species of scale insects to Korea (Hemiptera: Coccoidea). Korean Journal of Applied Entomology 52(2): 141–160.

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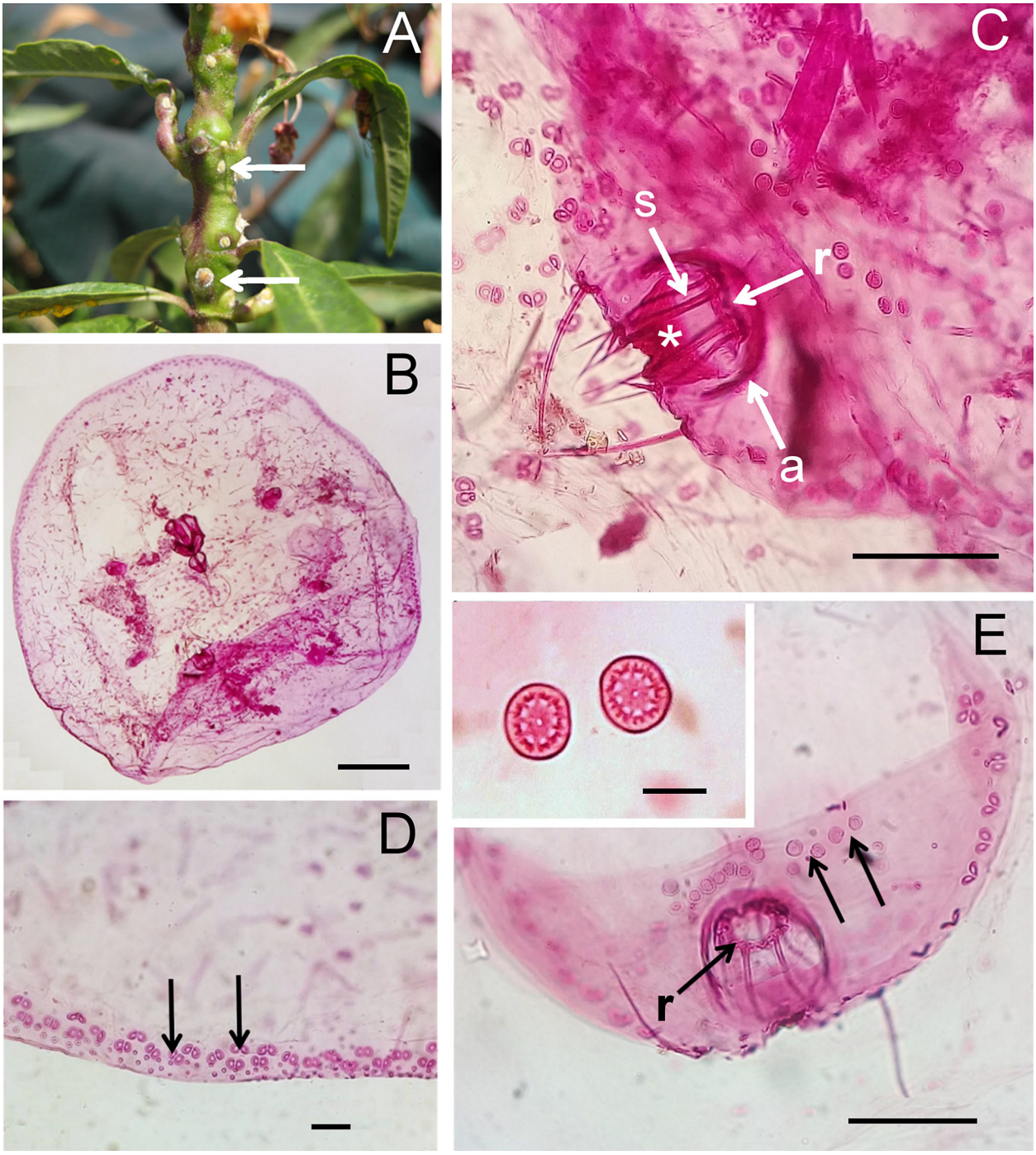

Figure 1. Adult females of *Planchonia stentae*. **A)** Adult females (arrows) on the stem of *Asclepias curassavica*. **B)** Whole body. **C)** Anal ring (r) with setae (s), arched plate (a) and anal plate (asterisk). **D)** Lateral abdominal margin with 8-shaped pores in double or triple row (arrows). **E)** Multilocular pore bands (arrows), with locular plates of multilocular pores with fringed edges (insert); anal ring (r). Scales: B = 0.2 mm. C = 50 µm. D = 20 µm. E = 50 µm. Insert = 6.0 µm.

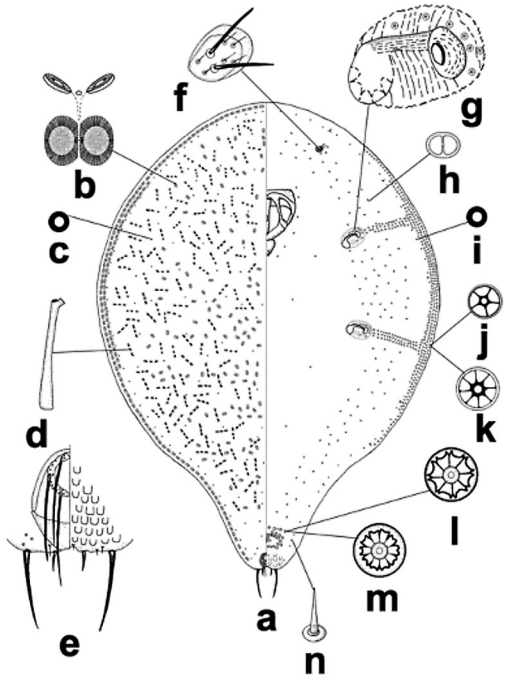

Figure 2. Illustration of mature adult female of *Planchonia stentae* with ventral characters on right side and dorsal characters on left side. Size: 1–2.5 mm. **a)** Body with mouthparts in upper third. **b)** Dorsal 8-shaped pores. **c)** Dorsal simple disk pores. **d)** Tubular ducts. **e)** Anal lobes with arched plate, anal plates, and anal ring (see Fig. 1C-1E for details of structures). **f)** Antennae. **g)** Spiracles. **h)** Ventral 8-shaped pores. **i)** Ventral simple disk pores. **j)** Quinquelocular pores. **k)** Multilocular pores. **l**–**m)** Multilocular pores with fringed edges. **n)** Setae. For more detailed taxonomic data, see Stumpf and Lambdin (2006). Illustration taken with permission from Stumpf and Lambdin (2006). © C. Stumpf.