

Descriptions and Illustrations of the First Instars of *Parthenolecanium corni* (Bouché) and *Parthenolecanium quercifex* (Fitch) (Hemiptera: Coccidae)¹

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Abstract Adult female specimens of *Parthenolecanium corni* (Bouche) and *Parthenolecanium quercifex* (Fitch) are often times confused for one another and misidentified. Members of the *Parthenolecanium* do show host-induced morphological dimorphisms, and the adult female is heavily sclerotized which can make key morphological characters obscure. Utilization of morphological characters of the first instar can help in the accuracy of the identification process. Key characters in distinguishing *P. corni* from *P. quercifex* are the absence of large (>5 µm) in the dorsal pore pattern.

Key Words *Parthenolecanium corni*, *Parthenolecanium quercifex*, bilocular pores

The genus *Parthenolecanium* consists of 14 species worldwide with five of those occurring within North America (Ben Dov 1993). Many members of this genus are considered economically important and can readily become pests by attaining high populations in fruit trees, shrubs, forests, and ornamental plantings in the urban landscape (Kosztarab 1996). The European fruit lecanium [*P. corni* (Bouche)] devastated between 12 to 15 million fruit trees in Europe between 1920 and 1930 and continued to be a cyclic pest for many more years (Kawecki 1958).

Once a pest outbreak occurs, proper identification must be made in order to enact the proper control measures. One problem associated with the identification of many of the members of the Coccidae (Hemiptera) is that the majority of the keys rely solely on morphological characters of the adult female. Often, the adult female life stage is heavily sclerotized whereby morphological structures remain obscured or there is host-induced dimorphism. Within the genus *Parthenolecanium*, many of the adult females superficially resemble one another morphologically. In particular, adult females of *P. corni* (European fruit lecanium) and *P. quercifex* (oak lecanium) cannot be distinguished from one another on a consistent basis. Use of morphological characteristics of the immature stages may help in distinguishing some of the species. The first-instar nymph, in particular, has yet to settle and form a protective wax coating and can be used in easily separating the species.

Descriptions and illustrations for *P. corni* and *P. quercifex* are given in this paper.

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The measurements and illustrations in the following descriptions were made using a Nikon Optiphot phase contrast microscope. Measurements were made on 10 slides for each species. All measurements are given in microns. For each species treatment under "Specimens studied", the first number indicates the number of slides and the second number (in parentheses) the number of specimens.

***Parthenolecanium corni* (Bouche)
First instar Nymph (Fig. 1)**

Material studied. *Juniperus virginiana*, 5 (20), Huntsville, AL, 15 May 1974, Ray; *Liquidambar* spp., 6 (33), Sacramento, CA, 24 May 1993, Gill; *Quercus* spp., 4 (20) Auburn, AL., 10 June 1993, Hodges; *Quercus nigra*, Athens, GA, 12 June 1998, Hodges.

General appearance. Body (Fig. 1-A) oval, 366 (347-390) long, 205 (186-229) wide. Antennae and legs well developed.

Dorsum. Derm smooth. Segmentation not clearly evident. Marginal setae (Fig. 1-B) 9 (7-11) long, pointed, slender, tapering posteriorly, distribution: 8 anteriorly between eyes, 2 between eye and anterior spiracular setae, 2 between anterior and posterior spiracular setae, 7 on each side of body posteriorly. Body setae 3 (2-4) long, 4 distributed submedially. Three spiracular setae (Fig. 1-C) with blunt apices in each spiracular furrow, median seta 7 (4-9) long, lateral setae 5 (4-6) long. Small bilocular pores (Fig. 1-E) 2 (1-3) long, occurring in a submarginal and submedial row. A pair of trilocular pores (Fig. 1-F) occurring at apex of head. Eyes present on margin just above level of antennal scape. Anal plate (Fig. 1-G) present, 36 (31-39) long, 17 (15-20) wide, cephalolateral margin 23 (19-25) long, caudolateral margin 23 (19-26) long. Anal ring (Fig. 1-H) hexagonal with 6 setae and 10 pores.

Venter. Antenna (Fig. 1-I) 90 (80-102) long. Sensory pore present on second antennal segment. Legs (Fig. 1-J) 145 (142-147) long. Tarsal digitules 27 (23-31) long, prothoracic set with 1 digitule setiform and 1 digitule capitate, mesothoracic and metathoracic sets with both digitules capitate. Claws with denticle. Spiracular furrows with 3-4 quinquelocular pores (Fig. 1-K). Ventral body setae (Fig. 1-L) hair-like, distribution: 1 pair at apex of head, 1 between anterior and posterior spiracular furrows, row of 6 pairs on each side of abdomen. Two large interantennal setae present. Three pairs of submedian setae present. Ventral microducts (Fig. 1-M) present submarginally, distribution: 1 on each side of head, 1 between each spiracular furrow, 1 between each of the ventral body setal pairs on abdominal segments 1-5. Ventral microspines on posterior abdominal segments.

***Parthenolecanium quercifex* (Fitch)
First instar nymph (Fig. 2)**

Material studied. *Quercus nigra*, 2 (7), Auburn, AL, 15 April 1994, Hodges; *Quercus undulata*, 1 (2), AZ, 4 January 1898, Collector unknown; *Quercus* spp., 1 (3), Los Angeles, CA, May 1908, Wogham; *Quercus* spp., 1 (1), GA, Cooley coll #437; ornamental tree, 1 (2), Lawrence, MA, 25 June 1908; King; Host unknown, 1 (2), Soledad canyon, NM, 12 August 1897, Cockerell; Host unknown, 2 (5) Manitou, CO, 26 November 1894, Gillette; *Quercus rubra*, 3 (10), Athens, GA, 23 June 1999, Hodges.

General appearance. Body (Fig. 2-A) oval, derm membranous, 395 (340-525) long, 222 (183-309) wide. Antennae and legs well developed.

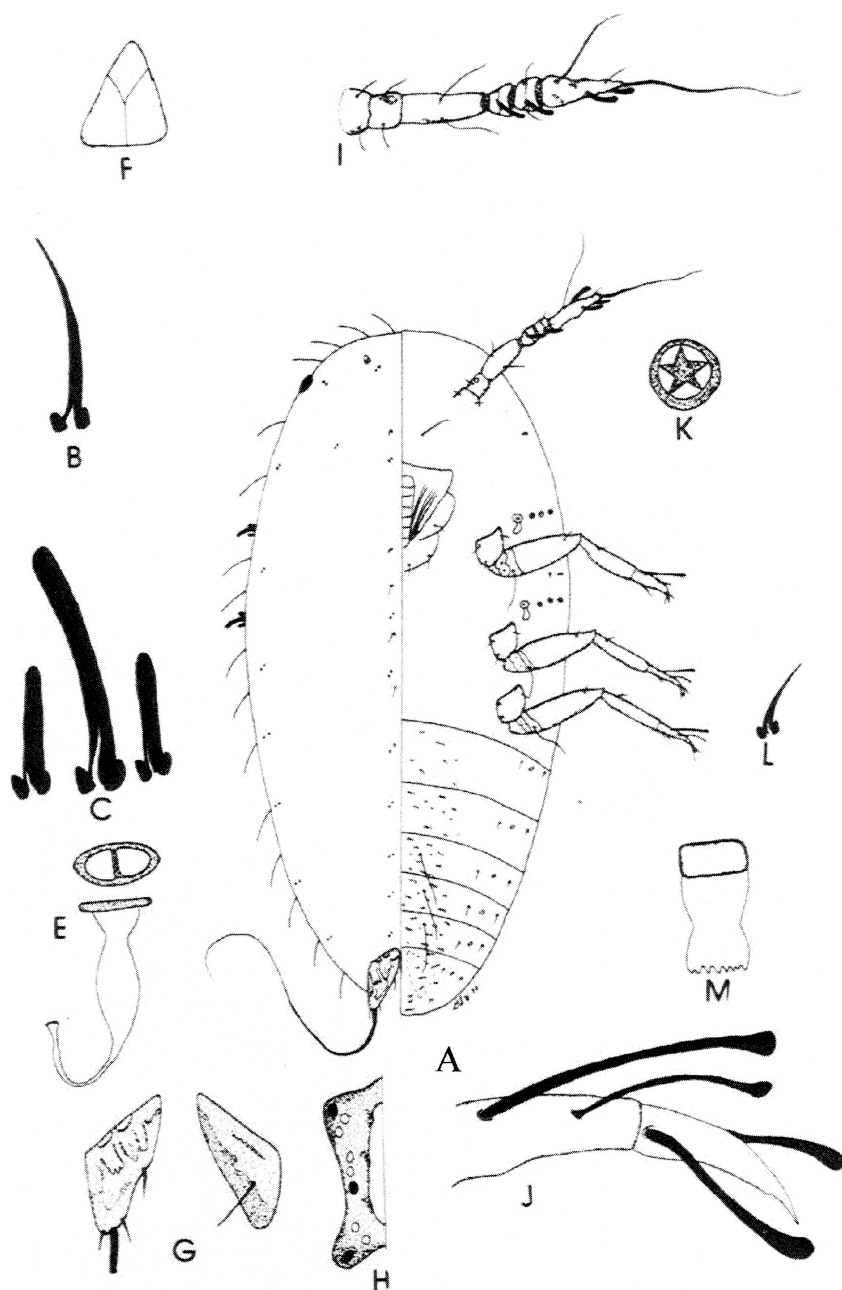


Fig. 1. *Parthenolecanium corni* (Bouche). First Instar.

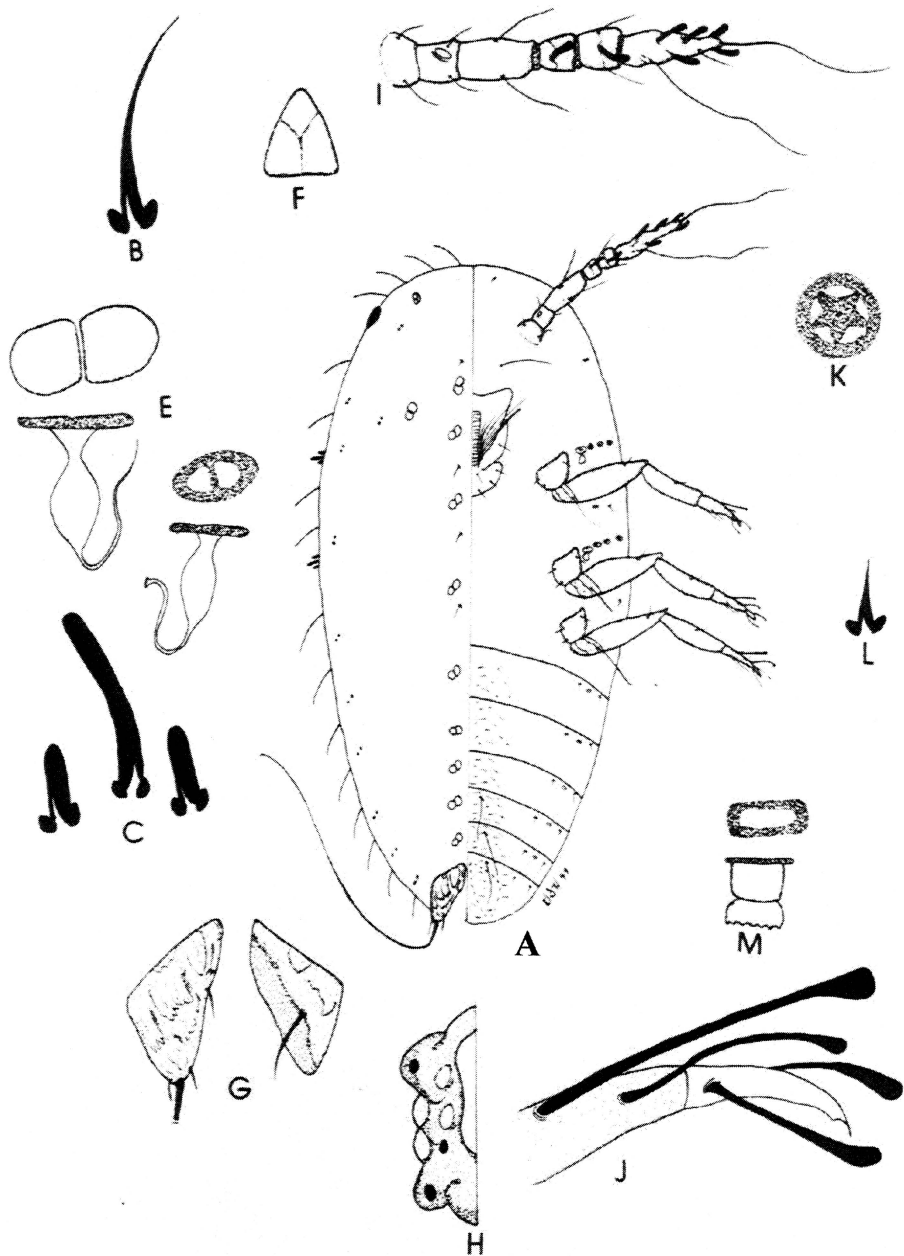


Fig. 2. *Parthenolecanium quercifex* (Fitch). First Instar.

Dorsum. Derm smooth. Segmentation not clearly evident. Marginal setae (Fig. 2-B) 10 (9-13) long, pointed, slender, tapering posteriorly, distribution: 8 anteriorly between eyes, 2 on each side of body between eye and anterior spiracular furrow, 2 on each side of body between anterior and posterior spiracular furrows, 7 on each side of body posteriorly. Body setae 3 (2-4) long, distribution: 4 located submedially. Three spiracular setae (Fig. 2-C) with blunt apices in spiracular furrow; median seta 8 (7-11) long, lateral setae 6 (5-7) long. Small bilocular pores (Fig. 2-E) 2 (1-3) long, occurring in submarginal row. Large bilocular pores (Fig. 2-E) 6 (5-8) long, occurring in submedial row. A pair of trilocular pores (Fig. 2-F) occurring at apex of head. Eyes present on margin of head just above level of antennal scape. Anal plates (Fig. 2-G) 38 (31-48) long, 21 (14-26) wide, cephalolateral margin 26 (19-31) long, caudolateral margin (24 (22-31) long. Anal ring (Fig. 2-H) hexagonal with 6 setae and 8 pores.

Venter. Antenna six segmented (Fig. 2-I) 98 (94-108) long. Sensory pore present on second antennal segment. Legs (Fig. 2-J) 160 (137-183) long. Tarsal digitules 30 (26-45) long, prothoracic set with 1 digitule setiform and 1 digitule capitate, mesothoracic and metathoracic sets with both digitules capitate. Claws with denticle. Spiracular furrows with 3-4 quinquelocular pores present (Fig. 2-K). Ventral body setae (Fig. 2-L) hair-like, distribution: 1 pair at apex of head, 1 on each side of head, 1 on each side of body between anterior and posterior spiracular furrows, row of 6 pairs on each side of body posteriorly. Two large interantennal setae present. Three pairs of long, hair-like, submedian setae present. Ventral microducts (Fig. 2-M) present submarginally, distribution: 1 on each side of head, 1 on each side of body between anterior and posterior spiracular furrows, 1 between each pair of ventral body setae on abdominal segments 1-5. Ventral microspines present on posterior abdominal segments.

Discussion

Parthenolecanium corni (European fruit lecanium) and *P. quercifex* (oak lecanium) are often morphologically and taxonomically confused. Differences between the two species are easy to discern by looking at the dorsal pore pattern and reticulations on the dorsum of the anal plates. *Parthenolecanium corni* has two pore types on the dorsum: trilocular pores near the apex of the head, small bilocular pores occurring in submarginal and submedial rows. *Parthenolecanium quercifex* has three pore types: trilocular pores near the apex of the head, small bilocular pores occurring in a submarginal row and large bilocular pores occurring in a submedial row. The anal plates of *P. corni* have reticulating shingles which are not toothed, *P. quercifex* has reticulating shingles which are toothed. Use of these two characters should assist taxonomists and practitioners to make easier and more accurate identifications of each of these species.

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