

110

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(HOMOPTERA, CICADELLIDAE)

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TWELVE NEW SPECIES OF EMPOASCA FROM THE UNITED STATES

BY

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TWELVE NEW SPECIES OF EMPOASCA FROM THE UNITED STATES

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A continuation of the study of the Genus *Empoasca* has brought to light several species which have apparently not previously been described. The present group of species contains material from various portions of the United States.

***Empoasca mucronata* n. sp.**

Resembling *pyramidata* but with more narrowed apical portion of pygofer spine. Length, 4 mm.

Vertex produced and bluntly rounded, almost twice as wide between eyes as median length, produced one half its length before anterior margin of eyes.

Color: Pale to dull green, often marked with the three pale longitudinal stripes on the vertex, the three pale spots on anterior margin of pronotum and the median broad pale stripe on the scutellum.

Genitalia: Male plates narrowed on apical half and with narrow rounded apices. Lateral processes curved concavely outward with the apices directed outwardly. Pygofer spine with a broad, short basal portion at the caudal ventral edge of which a short narrow spine arises and is directed ventrally.

Holotype male, Pickaway Co., Ohio, June 24, 1934 (J. S. Caldwell), in DeLong collection. Paratype males same locality and date and Oakwood, Illinois, Aug. 17, 1934 (DeLong and Ross), in DeLong collection and Illinois Natural History Survey collection.

***Empoasca curvatura* n. sp.**

Resembling *pyramidata* and *distracta* but with aedeagus more enlarged at apex and pygofer spine more narrowed apically. Length, 3.2 mm.

Vertex produced, bluntly angled, twice as wide as median length, produced almost one half its length before anterior margin of the eyes.

Color: Dull green with three white longitudinal areas on vertex and three anterior white spots on anterior margin of pronotum. Scutellum with broad longitudinal median white stripe and a transverse band just before apex.

Genitalia: Female last ventral segment broadly roundedly produced. Male plates rather long, apices blunt and narrowed. Lateral processes

<sup>1</sup>Previous studies of the group are summarized in Ohio Journal of Science 36: 225, July, 1936, and 32: 29, January, 1935.

curved concavely outward and overlapping near apex. Pygofer spines rather short, abruptly narrowed and produced into a ventrally directed apical spine. Anterior margin concavely, broadly notched.

Holotype male from Taylor Falls, Minnesota, August 16, 1916 (DeLong), allotype female, Urbana, Illinois (Jones) and paratype males and female from Urbana, Illinois (Jones) and Athens, Ohio (Stehr) in the DeLong collection.

***Empoasca orthodens* n. sp.**

Resembling *bifurcata* in general appearance and internal male genitalia, but with a distinct pygofer spine. Length, 3.5 mm.

Vertex rather strongly produced and bluntly angled. Two-thirds as long at middle as basal width between eyes. Produced two-thirds its length before anterior margins of the eyes.

Color: Dull yellowish-green. Vertex with a pale blotch next either eye. Pronotum with three pale spots on anterior margin.

Genitalia: Male with long plates, apices rounded and slightly diverging. Lateral processes of pygofers curved concavely outward, apices rather abruptly narrowed and narrowly produced for a short distance. Pygofer spine rather long curved caudally and dorsally forming a spine like apex. Also a short straight spine arising ventrally and extending ventrad.

Holotype male from Putnam, Illinois, collected by Ross and DeLong July 6, 1934, in the collection of the Illinois Natural History Survey.

***Empoasca bicuspidata* n. sp.**

Resembling *bifurcata* and *orthodens* but smaller in size and with shorter posterior spine of the bifurcate pair and different lateral processes. Length, 3 mm.

Vertex produced and rounded at apex, a little wider between eyes than length at middle. Almost as long at middle as basal width between eyes.

Color: Dull green, often washed with golden yellow without pale markings. Anterior margin of pronotum often with three pale spots.

Genitalia: Female last ventral segment with posterior margin roundedly produced. Male plates rather narrow, tapered and bluntly pointed. Lateral processes vermiculate as in *bifurcata*. Pygofer spines with bifurcate apex, the posterior spine of the bifurcate pair comparatively short.

Holotype male and allotype female Belle Glade, Florida, 1929 (Clifton) in the DeLong collection. Paratype male and female specimens from Spavina, Oklahoma, St. Petersburg (Osborn), Gainesville (Osborn), Coconut Grove (Breakey), Miami (Breakey), Dade Co. (Breakey), and Belle Glade (Clifton), Florida, in the DeLong, Osborn and Breakey collections.

***Empoasca latarca* n. sp.**

Resembling *bifurcata* but more robust and with lateral processes and spine of pygofer more like those of the species of *Kybos*. Length, 3.5 mm.

Vertex roundedly produced, about one-fourth wider between eyes

at base than median length, produced almost one-half its length before anterior margin of eyes.

Color green, vertex with central pale median stripe and a pair of divergent pale stripes. Pronotum with three pale spots on anterior margin. Scutellum with a pale transverse band near apex.

Genitalia: Female last ventral segment roundedly produced. Male plates broad at apex and well rounded. Lateral processes concave on inner margin at apex. In lateral view appearing narrowed and concave before apex which is sharply pointed. Pygofer spines strongly rounded, notched on anterior ventral margin forming a rather long gradually tapered apical spine with the apex sharp pointed and directed anteriorly.

Holotype male from Chicago, Illinois, 1905 (Sanders), allotype female Urbana, Illinois, 1937 (Jones) and Washington, D. C., 1906 (Sanders), in DeLong collection. Male paratypes, Apple River Canyon, 1934, and Warren, Illinois, 1934 (Frison and Douglas), in Illinois Natural History Survey collection.

***Empoasca biarca* n. sp.**

Resembling *ponderosa* in general appearance and shape of the lateral processes but with a twice curved pygofer spine and without the caudal spine on oedeagus. Length, 3.5-4 mm.

Vertex weakly produced and well rounded, a little more than half as long at middle as basal width between eyes, produced about one-third its length before anterior margin of eyes.

Color: Dull green to golden yellow without definite markings.

Genitalia: Female last ventral segment with posterior margin roundedly produced. Male plates with bluntly pointed apices. Lateral process straight as in *coccinea*. Pygofer spines long, gradually tapered, twice curved on anterior margin, apex slender, curved anteriorly.

Male holotype, San Francisco Co., California, July 25, 1912 (Ball), Allotype female, Colfax, California, June 23, 1908 (Ball) and paratypes from Colfax, California and Chilcoat, California, in Ball collection. Paratype male and female Colfax, California, in DeLong collection.

***Empoasca perlonga* n. sp.**

Resembling *coccinea* in general appearance and shape of lateral processes but with a very long, slender characteristic spine. Length, 3 mm.

Vertex weakly produced, broadly, bluntly angled. A little wider between eyes at base than median length, produced about one-third its length before anterior margin of the eyes.

Color: Dull sordid green washed with yellow and without definite markings.

Genitalia: Female last ventral segment with posterior margin roundedly produced. Male plates rather narrow with rounded apices. Lateral processes straight as in *coccinea*. Pygofer spines very long, broad at base, abruptly narrowed and produced as a long, slender, ventrally directed spine.

Holotype male and allotype female, Cantwell Cliffs, Ohio, June 24, 1922 (DeLong) and paratype male and female same place and date, in DeLong collection. Paratype males, Neotoma, Hocking Co. (Thomas) in Osborn collection

**Empoasca caverna** n. sp.

Resembling *fabae* in general appearance but with lateral processes concave on outer margin at apex and with spine broader at base and more abruptly narrowed. Length, 3.5 mm.

Vertex bluntly produced, about one-third wider between eyes than median length, produced one-half its length before anterior margin of eyes.

Color: Green washed with yellow, vertex with a median pale longitudinal stripe, a pair of pale spots at apex and a pair at base. Pronotum with three pale spots on anterior margin. Elytra with pale fuscous spot at middle.

Genitalia: Male plates broadened at middle, concavely narrowed on apical half to rather broad rounded apices. Lateral processes strongly, abruptly, concavely narrowed on outer margin forming slender pointed apices which are sometimes overlapped. Pygofer spine broad at base, abruptly narrowed to form apical slender spine which is directed ventrally and as long as basal portion.

Holotype male, Warren, Illinois, August 22, 1936 (DeLong and Ross), in the Illinois Natural History Survey collection.

**Empoasca decurvata** n. sp.

Resembling *curvata* both in general appearance and internal male genitalia but with characteristic lateral processes and longer pygofer spine. Length, 3.5 mm.

Vertex produced and angled, one-third longer on middle than width between the eyes, produced about one-half its length before the anterior margin of the eyes.

Color: Green, vertex with a central stripe, two apical oblique and two basal oblique white dashes. Pronotum with three anterior white spots. Scutellum with central third occupied by a broad white longitudinal stripe.

Genitalia: Female last ventral segment strongly, roundedly produced. Male plates rather broadly rounded at apex. Lateral processes in ventral view rather strongly curved inwardly with the apices curved abruptly outwardly and extending laterally. Spines of pygofer long, gradually narrowed, apical half produced as a narrow spine extending ventrally and curved slightly anteriorly.

Holotype male and allotype female, Clarksville, Tennessee, July 14, 1915, and paratypes from Clarksville and Colliersville, Tennessee, are in the DeLong collection. Male and female paratypes, Douglas Co., Kansas, in the Snow Collection, University of Kansas.

**Empoasca pergrada** n. sp.

Resembling *panda* both externally and internally. The lateral processes more broadened at apex and the pygofer spine more tapered to apical portion. Length, 3 mm.

Vertex strongly produced and bluntly angled, two-thirds as long as basal width, produced one-half its length before anterior margin of eyes.

Color: Pale yellowish-green, usually with the three longitudinal pale areas on the vertex, the three pale spots on anterior margin of pronotum and a transverse pale spot on scutellum.

Genitalia: Female last ventral segment roundedly produced. Male plates well rounded at apex. Lateral processes narrowed at apex, apices bent obliquely inwardly, usually overlapping. Pygofer spines broad at base, abruptly narrowed so that apical half forms a slender spine which is directed obliquely ventro-anteriorly.

Holotype male, Decatur, Georgia (Auten), allotype female, Taylor's Falls, Minnesota, August 16, 1916 (DeLong) and paratype males and females, Taylor's Falls, Minnesota, Biloxi, Mississippi (Grimes), in DeLong collection. Male paratypes, Alton and White Pine Forest Park, Illinois (Ross, Frison, DeLong), in Illinois Natural History Survey collection.

***Empoasca luda* n. sp.**

Resembling *smaragdula* in size and internal male genitalia, but with a broad, short spine. Length, 4.2 mm.

Vertex broadly rounded, more than twice as broad as median length, produced about one-third its length before anterior margin of eyes.

Color: Dull green washed with yellow and brown. Vertex, pronotum and scutellum predominantly brownish with yellowish-green paler areas. Elytra dull green, veins brown.

Genitalia: Male plates with well rounded apices. Lateral processes straight, pointed at apices. Pygofer spines broad, deeply rounded, notched on anterior apical half forming a curved spine on ventral caudal margin which is directed ventrally with the apex pointing anteriorly.

Holotype male, Wooster, Ohio (Houser) taken in galleries of *Crabro davidsoni* and paratype male Urbana, Illinois, 1917, in DeLong collection.

***Empoasca excava* n. sp.**

Resembling *digita* externally but with lateral processes roundedly, abruptly narrowed at apex, concave ventrally and on outer margin with apices turned outwardly. Length, 4 mm.

Vertex broadly rounded, slightly produced, more than twice wider than median length and produced about one-third its length before anterior margin of eyes.

Color: Dull green washed with golden yellow, pronotum often with the three pale areas on anterior margin, the median one often forming a pale stripe, and scutellum with longitudinal pale stripe.

Genitalia: Female last ventral segment roundedly produced. Male plates long, gradually tapered to bluntly pointed apices. Lateral processes narrowed near apex with tips slender and pointed outwardly, process concave ventrally and on outer margins at apex. Pygofer spine rather short, abruptly narrow at about half its length on anterior margin with apex curved anteriorly.

Holotype male from Clarksville, Tennessee, July, 1915 (DeLong), allotype female LaPrelle, Texas, November (Knull) and male and female paratypes Oklahoma (Standish-Kaiser), Texas (Knull) and Tennessee (DeLong), in the DeLong collection. Male and female paratypes, Vienna, Ursa and Havana, Illinois (Ross, Mohr, Burks, DeLong), in Illinois Natural History Survey collection.



