

STUDIES OF THE GENUS EMPOASCA
(HOMOPTERA, CICADELLIDAE)

PART VI

TWENTY-TWO NEW SPECIES OF EMPOASCA
FROM NORTH AMERICA

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***Empoasca necyla* n. sp.**

Resembling *birdii* in appearance and coloration but with lateral processes as in *radiata* and a dorsal spine as in *spira*. Length 4 mm.

External characters: Vertex produced and bluntly angled. Color yellowish with a median pale longitudinal line, and a basal oblique pale spot on either side. Pronotum with three pale spots on anterior margin. Scutellum with a median longitudinal stripe, and apical third pale. Claval area and sometimes a transverse spot across disc of elytron dark brown in color. Female segment roundedly produced.

Internal male genitalia: Lateral processes long, and slender, apex pointed and curved sharply outwardly, but when crossed before apices these curved tips are directed toward each other. Dorsal spine appearing transverse, directed caudally on basal portion, abruptly bent ventrally and gradually, evenly, narrowed to a curved, medially directed, long slender apex.

Holotype male, allotype female, and male and female paratypes from Warren, Illinois, Aug. 28, 1934 (Frison and DeLong), in collection of the Illinois State Natural History Survey. A male and female paratype in collection of authors.

***Empoasca curvexa* n. sp.**

Resembling *recurvata* in shape of lateral processes but with distinctly characteristic spines. Length 3 mm.

External characters: Vertex bluntly produced and rounded. Color dull green, tinged with golden yellow. Apices of elytra subhyaline.

Internal male genitalia: Lateral processes abruptly curved dorsally at three-fourths their length resembling the lateral processes of *recurvata*. Dorsal spines long, curved ventrally, broad to near apex where they are rather rapidly narrowed to pointed apices. This species can be distinguished from *recurvata* by the spine character.

Holotype male from Edgewater, Florida, April 6, 1938 (DeLong) deposited in the authors' collection.

Empoasca dorothyi n. sp.

Resembling *elongata* in general appearance with lateral processes somewhat like *galluxa* and a characteristic dorsal spine. Length 3.5 mm.

External characters: Vertex rather strongly, bluntly produced, color dull yellow, with a pale spot at apex of vertex, a median pale line and a pale spot next either eye on anterior margin. Pronotum with three pale spots on anterior margin. Apical third of scutellum pale. Elytra golden yellow, subhyaline.

Internal male genitalia; Lateral processes rather short, slightly enlarged on median third, slender at apex, curved caudally and dorsally. Dorsal spines broad at base with a rounded lobe posteriorly, then abruptly curved and narrowed on posterior margin to form a ventrally directed narrow spine at apex.

Holotype male, and paratype male from Oak Creek Canyon, Arizona, Aug. 1, 1938 (Knull) and a male paratype from Flagstaff, Arizona, July 30, 1938 (Knull). Types in the Ohio State University collection and the authors' collection.

The authors take pleasure in naming this species in honor of Dorothy Johnson Knull who has collected and described many interesting Cicadellidae.

Empoasca knulli n. sp.

Resembling *similis* in form and general appearance, with lateral process as in *similis* and a spine as in *bicuspidata*. Length 3 mm.

External characters: Vertex broadly rounded, only slightly produced before anterior margins of eyes. Color yellowish green, a median pale line on vertex and an oblique dash at base on each side. Three spots on anterior margin of pronotum, and a broad, pale, longitudinal band on scutellum. Elytra smoky green, veins pale.

Internal male genitalia: Lateral processes broadened on median third then tapered to acutely pointed, slender tips. Dorsal spines broad at base, extending caudally, curved ventrally and narrowed to a bifurcate apex. The anterior spine slightly longer than the posterior and the two are separated by a V-shaped notch. Aedeagus broad, curved slightly caudad and then dorsad.

Holotype male from Huachuca Mts., Arizona, Sept. 9, 1938. (Knull), deposited in the authors' collection.

This species is named in honor of Prof. J. N. Knull who has collected so many interesting undescribed species in the Cicadellidae and many other groups.

Empoasca manda n. sp.

Resembling *plebeia* somewhat in general form and appearance but with distinct genital characters. Length 3 mm.

External characters: Vertex broadly rounded, bluntly produced. Color pale green tinged with yellow.

Internal male genitalia: Lateral processes long, widened on outer margins just before apex to form rounded lobe-like structures, then narrowed abruptly to form finger-like processes on inner margins, the apices of which are slender and waved. Dorsal spines directed ventrally,

rather broad, abruptly and strongly rounded at apex forming structure as in *tamiama*.

Holotype male from Dade County, Florida, collected in March, 1938, (Fisk) and deposited in the authors' collection.

***Empoasca pinella* n. sp.**

Resembling *ponderosa* in form and general appearance, with processes on aedeagus and dorsal spine somewhat as in *coccinea*. Length 3.7 mm.

External characters: Vertex strongly produced, but apex blunt. Vertex, pronotum, and scutellum sordid green tinged with golden yellow. Elytra smoky, often appearing almost black. Face sordid green. Female segment roundedly produced.

Internal male genitalia: Aedeagus with the two proximal long slender processes arising at base as in *coccinea*, but not as heavy nor as deeply notched. Body of aedeagus erect, apical end forming a broad sickle-shaped blade. Dorsal spine broad at base, constricted abruptly to narrow pointed process which is directed downwardly.

Holotype male, allotype female, and male and female paratypes from San Franc. Mts., Arizona, Aug. 12, 1929 (Ball); male and female paratypes from Chiricahua Mts., Arizona (Ball), July 5, 1930, and Tucson, Arizona, Sept. 1, 1929 (Ball). Types in the Ball collection except for male and female paratypes in the collection of the authors.

***Empoasca nema* n. sp.**

Resembling *erigeron* in form and general appearance but with distinctly different lateral processes. Length 3-3.5 mm.

External characters: Vertex broadly bluntly angled. Color, dull green to golden yellow. Vertex usually unmarked, pronotum with three white spots on anterior margin. Scutellum with central portion and apical third pale. Elytra tinged with golden yellow. Female segment roundedly produced.

Internal male genitalia: Lateral processes similar to *erigeron* in shape, narrowed on inner margin to form slender, finger like processes on outer margins. Dorsal spine broad on basal portion, bent abruptly and curved ventrally at caudal margin and narrowed to a long slender apex which is directed anteriorly. Aedeagus erect with a rather long and widened process arising caudally near apex and directed dorsally and caudally.

Holotype male, allotype female, and male and female paratypes from Oak Lawn, Illinois, July 1, 1935 (DeLong and Ross). Male and female paratypes from Alsip, Illinois, Aug. 23, 1934, (DeLong and Ross) and from Des Plaines, Illinois, Sept. 18, 1935, (DeLong and Ross). All types in collection of Illinois State Natural History Survey except for a male and female paratype in the DeLong Collection and the Ohio State University collection.

***Empoasca sagitta* n. sp.**

Resembling *dentata* in form and general appearance but with characteristic dorsal spine. Length 3.7 mm.

External characters: Vertex strongly produced, conical, apex blunt, color dull yellow without definite markings. Elytra subhyaline.

Internal male genitalia: Lateral processes long, slender, touching just before apical portions which are strongly bent outward and pointed at tips. Dorsal spines broad at base tapered to curved slender apical hooks which are curved caudally dorsally and inwardly. Aedeagus slender, a rather long, broad caudal portion arising near middle and extending dorsally and caudally.

Holotype male from White Pine Forest Park, Illinois, July 12, 1934 (DeLong and Ross) and deposited in the collection of the Illinois Natural History Survey.

***Empoasca strangula* n. sp.**

Resembling *obtusa* in form and general appearance but with distinct lateral processes. Length 4 mm.

External characters: Vertex broadly rounded, parallel margined, scarcely produced. Color reddish brown, elytra subhyaline.

Internal male genitalia: Lateral processes appearing slightly concavely notched on ventral side at apex forming a very short blunt process on dorsal margin. Dorsal spines rather large at base with a ventral pointed spur beneath basal portion, the remainder sickle-shaped with the blade strongly curved and tapered to a very slender apex, which is ventrally curved and anteriorly pointed.

Holotype male from Redfish Lake, Idaho, Aug. 3, 1930 (DeLong) and a male paratype from Galena, Illinois, June 28, 1935 (DeLong and Ross). Holotype in the DeLong collection; paratype in the Illinois Natural History Survey Collection.

***Empoasca thela* n. sp.**

Resembling *dilitara* in form, general appearance, and shape of lateral processes. Length 3 mm.

External characters: Vertex broad, bluntly produced. Color sordid green tinted with golden yellow. Elytra dull green subhyaline. Female segment concavely rounded either side of a central lobe.

Internal male genitalia: Lateral processes enlarged on apical two-thirds to apex which is abruptly narrowed on ventral margin forming a curved, slender finger-like process. Dorsal spines, short and broad, directed ventrally, almost straight on anterior margin, strongly convex on posterior margin to form a bluntly pointed apex. Aedeagus erect, a long sickle-shaped process very broad at base, arising on caudal margin at apex, and a long slender process on each side just below base of the larger process. These structures are curved caudally and then dorsally from point of attachment.

Holotype male (Nov. 22, 1910), allotype female (Dec. 6, 1910) and female paratype (Dec. 6, 1910) from Brownsville, Texas. One female paratype from Katherine, Texas, Dec. 3, 1911, and a series of male and female paratypes from Brownsville, Texas, Aug. 8, 1937 (Knull), all deposited in the collections of the authors and the Ohio State University.

Empoasca ocala n. sp.

In general appearance resembling pale specimens of *fabae* but male genital characters more like *ancistra*. In the latter species the lateral processes of male are slender before the inwardly curved portion and the dorsal spine is not gradually tapered to slender apex. Length 2.5 mm.

External characters: Vertex produced and bluntly angled, color yellowish or pale green. Two greenish spots on disc of vertex. Female last ventral segment roundedly produced.

Internal male genitalia: Lateral processes long, in lateral view appearing rather broad, definitely widened just before apical third which is strongly curved inwardly and abruptly narrowed, the two processes contiguous and curved outwardly to form rather long slender apices which are divergent and directed laterally. Dorsal spine sickle-shaped, rather broad at base, curved, gradually narrowed to slender apical third which is directed anteriorly.

Holotype male, allotype female, and a large series of male and female paratypes from Ocala Forest, Silver Springs, Florida, collected March 20, 1938 (DeLong). Types in the collections of the authors and the Ohio State University.

Empoasca mesolinea n. sp.

Resembling *osborni* in general form. Smoky, marked with a median pale line across vertex, pronotum, and scutellum. Length 3.5 mm.

External characters: Vertex broadly rounded, parallel margined. Face with a dark brown band on either side between which is a pale median line that continues across vertex, pronotum and scutellum. A pale spot on pronotum behind each eye. Elytra dark greenish, a smoky line along commissural line with claval suture brownish. Apices of elytra smoky. Female segment roundedly produced.

Internal male genitalia: Lateral processes long, enlarged near apex and in ventral view with a finger process on inner margin of enlargement. In lateral view clavate, appearing to have a terminal curved finger process arising from apex of the rounded, enlarged apical portion. Dorsal spines rather heavy at base directed caudad then ventrad, tapering from base to form long slender spines. Aedeagus directed dorsad, terminal third erect, ovate, with a short anterior spine at base.

Holotype male and allotype female from Huachuca Mts., Arizona, July 20, 1937 (Knull) in authors' collection.

Empoasca amara n. sp.

Resembling *radiata* in coloration but paler and with vertex more bluntly angled. Length 3.5 mm.

External characters: Vertex bluntly angled only slighter longer at middle than next the eyes. General coloration, green marked with orange. Vertex and pronotum dull green mottled with orange; basal angles of scutellum orange. Elytra pale, with three light orange longitudinal stripes, one each on clavus, costal area and corium, while in some specimens these areas are entirely orange. Apices smoky, veins pale. Female last ventral segment roundedly produced.

Internal male genitalia: Lateral process long, slender, apices very narrow, curved outwardly, divergent. Dorsal spine short, basal half broad, transverse apical half directed ventrad, tapered rapidly to a slender pointed apex. Aedeagus enlarged on apical third with a pair of short spines at base of enlargement. These spines are directed posteriorly and the tips are slightly curved upwardly.

Holotype male, allotype female, and a large series of male and female paratypes from Davis Mts., Texas, June 2, 1937, and Sept. 20, 1938, (Knull) in the authors' collection and the Ohio State University collection.

Empoasca kaibaba n. sp.

Resembling *medora* in general appearance but with lateral processes as in *recta* and dorsal spine somewhat like *pelecana*. Length 3–3.5 mm.

External characters: Vertex broad, blunt, slightly produced. Color yellowish tinged with orange. Elytra dull golden iridescent, the veins pale, causing them to appear striped. Female last ventral segment roundedly produced.

Internal male genitalia: Lateral processes simple, a little longer than styles, apices pointed. Dorsal spines short, broad, anterior margin slightly concave; posterior margin more strongly rounded to form pointed ventral apex. Aedeagus erect, apical portion branched, an arm extending from both sides to dorsal spines, and a rather long slender caudal portion produced caudad and dorsad.

Holotype male, allotype female and female paratype from Kaibab, Utah, June 21, 1937. Also male and female paratypes from Flagstaff, Arizona, June 23, 1937, and June 28, 1937, all collected by D. J. and J. N. Knull. Types in the authors' collection and the Ohio State University Collection.

Empoasca uvalda n. sp.

A small species, resembling *bifurcata* and *bicuspidata* in general appearance, but with characteristic lateral processes somewhat like those of *spira*. Length 3 mm.

External characters: Vertex produced and bluntly angled; colored dull green, with a median, pale, longitudinal stripe and a pale spot on disc of either side. Three pale spots on margin of pronotum. Elytra rather uniformly golden green, apices slightly smoky. Female last ventral segment roundedly produced.

Internal male genitalia: Lateral processes slender bent abruptly ventrally near apices which are pointed. Dorsal spines broad at base, apical half sickle-shaped, directed ventrad and rapidly narrowed to slender pointed apex. Aedeagus erect, apex with bifurcate arms and a caudal projection near apex.

Holotype male, allotype female and male paratype, from Brownsville, Texas, Aug. 8, 1937, (Knull) and male and female paratypes from Uvalde, Texas, Aug. 4, 1937, (Knull). Types in the authors' collection and the Ohio State University Collection.

Empoasca ancistra n. sp.

Resembling *recurvata* in general appearance but with vertex more produced and lateral processes somewhat as in *radiata*. Length 2.5 mm.

External characters: Vertex distinctly produced but bluntly angled. Color apple green marked with darker green to brownish. Elytra dusky, venation paler, marked with longitudinal streaks of brownish pigment of variable intensity between the veins. Apices of elytra dusky. Last ventral segment of female roundedly produced.

Internal male genitalia: Lateral processes tapered to slender apical portions which are strongly bent outwardly near apices. Dorsal spines short, basal half widened and directed caudad, apical half directed ventrad and tapered to a very slender tip.

Holotype male and allotype female from Oak Creek Canyon, Arizona, Aug. 15, 1938 (Knull). Male paratypes from Huachuca Mts., Arizona, July 20, 1937 (Knull). Types in the authors' collection and the Ohio State University Collection.

***Empoasca hecta* n. sp.**

Resembling *cerea* in form and general appearance but with distinct lateral processes and a dorsal spine which resembles that of *decora*. Length 2.75 mm.

External characters: Vertex bluntly produced, of sordid green color with a faint median line and a pale spot next each eye at base. Pronotum with a row of pale spots along anterior margin. Elytra with apices smoky, veins pale.

Internal male genitalia: Lateral processes short, tapered to slender, straight apices. Dorsal spines rather broad at base extending caudad, apical third more slender, curved ventrad, blunt at apex and rounded. Aedeagus erect, three caudal processes arising about middle. The central process is longer and is directed more dorsad than the lateral shorter pair.

Holotype male from Davis Mts., Texas, Sept. 20, 1938 (Knull) and a male paratype from the same locality collected Aug. 2, 1937. Types in authors' collection and the Ohio State University Collection.

***Empoasca madra* n. sp.**

Resembling *diverta* in general coloration, but larger in size and with more produced head. Lateral processes resembling those of *amara*. Length 3 mm.

External characters: Vertex strongly produced and bluntly angled. Color of vertex brownish green with a median pale longitudinal line, a pale spot around each ocellus and a larger one at the base next either eye. Pronotum with a pale spot behind each eye and a pale spot at middle. Apical half of scutellum pale. Elytra smoky tinged with green; basal portion, spots on clavus, and apical third brown. Veins of apical portion paler in color.

Internal male genitalia: Lateral processes long, slender, apical fourth slender and strongly curved laterad, then gently curved dorsad. Dorsal spine broad on basal half which is directed caudad at the apex of which it curved to slender apical, ventrally directed half.

Holotype male from Huachuca Mts., Arizona, collected July 20, 1937, (Knull). Type in authors' collection.

Empoasca galluxa n. sp.

Resembling *ancistra* in general form and appearance, but with distinct lateral processes and a dorsal spine somewhat like that of *ratio*. Length 3 mm.

External characters: Vertex strongly produced and bluntly pointed. Color pale yellowish, mottled with paler yellow, a darker stripe extending from base to apex of elytron just anterior to claval suture. Last ventral segment of female roundedly produced.

Internal male genitalia: Lateral processes short, slender, only a little longer than styles, gently curved dorsad. The tips of these processes are gently, concavely notched on inner margin. Dorsal spines broad at base deeply roundedly notched on anterior margin forming a ventrally directed rounded lobe from the anterior apical portion of which arises a narrow finger-like spine directed anteriorly and curved ventrad.

Holotype male and allotype female from Santa Rita Mts., Arizona, July 13, 1937, (Knull) and male and female paratypes from Huachuca Mts., Arizona, July 20, 1937, (Knull). Types in authors' collection and the Ohio State University Collection.

Empoasca utrica n. sp.

Resembling *birdii* in general appearance and coloration but with dorsal spines roundedly inflated at base and with distinct lateral processes. Length 4 mm.

External characters: Vertex bluntly angled, produced before margins of the eyes. General coloration, pale yellow. Vertex with a pale marking at apex connected with a median pale line and with two oblique dashes at base. Pronotum with three pale spots on anterior margin. Scutellum with a broad median pale band. Elytra with claval area sometimes brownish.

Internal male genitalia: Lateral processes long, rather broad at base, concavely narrowed on outer margin to slender processes which are enlarged at three fourths their length by slightly convexly rounded outer margins, then tapered to pointed apices. Dorsal spine roundedly inflated dorsally at base, curved to apical half which is slender and directed ventrally and slightly anteriorly.

Holotype male from Poudre R. Canyon, Colorado, Aug. 22, 1931, (Beamer), and a male paratype from Republic, Washington, Aug. 6, 1931, (Beamer). Holotype in the collection of Dr. R. H. Beamer and paratype in authors' collection.

Empoasca tamiama n. sp.

Resembling *bifurcata* in coloration and general appearance but with blunter vertex and a short, bluntly rounded, lobe-like spine. Length 3.5 mm.

External characters: Vertex strongly produced and bluntly angled. Color green tinged with golden yellow, a pair of round green spots on disc of vertex. Female segment broadly angularly produced.

Internal male genitalia: Lateral processes resembling those of *ziona*, being long, straight, with apices slightly concave on upper margins. Aedeagus in lateral view broad, erect, apex truncate, with a rounded

notch on anterior margin near apex. A long heavy spine arises on posterior margin near base which is erect and curved caudad at the middle and extends to the apex of the pygofer. Dorsal spines short, rather broad, directed ventrad and rounded at apex somewhat as in *solana*.

Holotype male, allotype female, and a large series of male and female paratypes from Tamiami Trail, Florida, March 31, 1938, (DeLong). Types in the authors' collection and the Ohio State University Collection.

***Empoasca gampsoa* n. sp.**

Resembling *elongata* in general form but with characteristic shape of lateral processes and dorsal spine. Length 4 mm.

External characters: Vertex distinctly produced and bluntly rounded, with a T-shaped mark, the top of which is at the apex and a pale spot on each side near the base next to each eye. Yellowish to greenish in color, apical third of scutellum paler. Elytra subhyaline tinged with golden yellow. Female segment roundedly produced.

Internal male genitalia: Lateral processes rather long narrowed on apical fourth which is bent laterad. These are usually crossed one third this distance from apex so that the apices are proximal and convergent. The tips of these processes are flattened and enlarged, appearing pad-like. Dorsal spines broadened from base, the caudal ventral angle strongly rounded. The anterior ventral angle strongly curved mesad and ventrad and slightly twisted to form a rather short apical spine. Aedeagus erect with the caudal process bifurcate at apex.

Holotype male, allotype female, and male paratype from Graham Mts., Arizona, Aug. 28, 1933 (F. H. Parker). One male paratype from Pinal Mts., Arizona (Parker), three female paratypes from Huachuca Mts., Arizona, July 20, 1937, (Knull), and three male paratypes from Oak Creek Canyon, Arizona, Aug. 1, 1938, (Knull). Types in the authors' collection and the Ohio State University Collection.
