

THE GENERA CYPERANA AND PALUDA  
(Homoptera-Cicadellidae)



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Reprinted from

"THE AMERICAN MIDLAND NATURALIST"

Vol. 18, No. 2, pp. 225-236, March, 1937

The University Press  
Notre Dame, Ind.



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# The Genera *Cyperana* and *Paluda* (Homoptera - Cicadellidae)

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In an effort to clarify the relationship of a large number of species of leafhoppers formerly included in the genus *Thamnottetix*, several new genera have been erected and the present treatment is an attempt to establish certain of these species belonging to two genera on the basis of the internal genital characters of the males. The coloration and other characters are also given in the descriptions.

## KEY TO GENERA

- 1 Yellow or orange yellow without black spots on vertex. Male plates with dorsal blunt spine on apical half. Ninth segment terminating in a pair of blade-like processes as long as basal portion of segment.....*Paluda*
- 1' Yellow, green or tawny, vertex marked with black spots or band on margin. Male plates without a dorsal spine, with segment rounded or angled normally.....*Cyperana*

## Genus *Cyperana* DeLong

The genus *Cyperana* DeLong was recently described<sup>1,2</sup> to include the common green leafhoppers of the *Thamnottetix* type which occur in fresh water marshes on *Cyperus*, other sedges and grasses. They are characterized by having a bluntly angled vertex which is produced but sometimes almost rounded at apex. The elytra are long and narrow with venation as in *Thamnottetix*. The species are usually some shade of green or yellow with a black band or a row of black spots on the margin of the vertex between the eyes.

The members of this genus occur throughout the United States but the larger number of species are found only in the eastern portion, some occurring as far west as the Rocky Mountains. Heretofore only ten species which apparently belong to this genus have been described or recorded for the North American fauna. Four additional species, all western in distribution, are described in the following pages. Since these species have been somewhat confused because of similar color markings, previous records for distribution cannot be relied upon in some cases. The records included here have been checked for the male genital characters which structures have not been previously illustrated nor used in published treatments of these species. The female characters are quite similar in type and are of value in separating species only in a few cases.

1 Ohio Jour. Sci. 35:217-219, July 1936.

2 Since submitting the manuscript (September 1936) two species, *C. smithi pollicarius* and *C. wanakena* have been described by Ball (Pan Pacific Ent. October 1936). They are not illustrated and can not be definitely placed at this time.

## KEY TO SPECIES

- 1 Tawny or pale brown, longitudinally marked with brownish or reddish stripes, spots on vertex linear in form or forming a band-----2  
 1' Yellow or green without longitudinal stripes-----3  
 2 (1) Vertex with four linear black spots on margin of vertex-----*cyperacea*  
 2' Vertex with a black band on margin of vertex-----*vittipennis*  
 3 (1') Size 6.5-7 mm. pale yellow with a pair of large black spots at apex and a pair of smaller spots next eyes-----*straminea*  
 3' Size not exceeding 6 mm. usually green or yellowish green-----4  
 4 (3') Black coloration on margin of vertex forming a band between eyes-----5  
 4' Black coloration on margin of vertex in form of spots-----6  
 5 (4) Vertex twice as wide between eyes as median length, band rather straight and even. Male plates with apical finger process on inner margin-----*smithi*  
 5' Vertex one-half wider between eyes than median length, band sinuate, uneven, male plates broadly inflated on apical half and strongly convexly rounded to form a blunt apex-----*montula*  
 6 (4') Male plates broadly bluntly rounded at apex, styles decidedly longer than plates obliquely sloping at apex and sharp pointed on outer margin-----*stylata*  
 6' Male plates more pointed at apex styles not decidedly longer than plates-----7  
 7 (6') Four black spots on margin of vertex but without markings posterior to ocelli-----8  
 7' Markings on margin of vertex and also posterior to ocelli-----9  
 8 (7) Male plates deeply concavely excavated on inner margin of apical third, styles tapered from base to apex-----*melanogaster*  
 8' Male plates sloping on inner margin, not concavely rounded, styles with a pair of finger-like processes at apex, an inner long one and an outer short one-----*ciliata*  
 9 (7') Male plates without prolonged finger-like processes at apex, oedagus bifid at apex-----10  
 9' Male plates longer with finger-like processes at apex, oedagus not bifid-----11  
 10 (9) Male oedagus short not greatly enlarged at base, size smaller 3.5-4.5 mm. Known to occur only in western U. S. and Canada-----*longiseta*  
 10' Male oedagus long, large at base, apical two-thirds very slender, larger more than 4.5 mm. Northeastern in distribution-----*decipiens*  
 11 (9') Inner finger process of style long and slender, outer finger process curved outwardly, oedagus tapered on apical half to pointed tip-----*gesa*  
 11' Inner finger process broader, outer process slender curving inwardly together forming a chela, oedagus not narrowed until near apex-----*eruca*

*Cyperana cyperacea* (Osborn)

*Thamnotettix cyperaceus* Osb. Proc. Ia. Acad. Sci. 5:245, 1898

A tawny species with orange or brownish longitudinal stripes and four black dashes on margin of vertex. Length 5.5-6 mm.

Vertex flat and bluntly angled, one half wider between eyes at base than length at middle.

Color: vertex creamy with four linear spots on margin between eyes. A median narrow stripe extending from apex of vertex to apex of scutellum and a broad one extending from margin of vertex next either eye to basal angle of scutellum, tawny or brownish. Elytra tawny to brown, nervures pale.

Genitalia: Female last ventral segment with lateral angles broadly rounded,

posterior margin slightly narrowly indented either side of a broad, median slightly produced tooth. This median tooth is about one-third the width of segment. A large round area on outer third of segment each side composed of oblique ridges and striae. Male plates rather long and broad, each convexly rounded to blunt apex which bears a rather long incurved finger-like process at its apex. Styles long, broad on basal half, then rather rapidly narrowed to slender apical processes which are produced half the length of style. Oedagus rather small, slightly enlarged at base, apical portion narrowed, produced dorsally and curved anteriorly.

This species occurs on *Cyperus* in fresh water marshes and is a common species in the northeastern states. Specimens have been examined from New York, Pennsylvania, Ohio, Illinois, Wisconsin and Iowa. It undoubtedly occurs in similar habitats in the intermediate states.

*Cyperana vittipennis* (Sanders & DeLong)

*Thamnotettix vittipennis* S. & DeL. Ann. Ent. Soc. Amer. 10:91, 1917

Resembling cyperacea in form and general appearance but with vertex more rounded and with a black marginal line between the eyes. Length 5.5-6 mm.

Vertex bluntly angled, twice as wide between eyes as length at middle.

Color: Vertex with a black marginal stripe between eyes. A broad tawny band covering disc and extending to eyes, posterior central portion pale. Pronotum tawny to testaceous. Elytra tawny, nervures white margined with brown, appearing striped.

Genitalia: Female last ventral segment with posterior margin slightly emarginate and narrowly notched either side of middle, outer third striated as in cyperacea. Male plates short and broad, convexly rounded on outer margin and strongly sloping on inner margin to form a blunt tooth-like structure at apex. Styles long, sinuately tapered from base and curving outwardly to form blunt apices, pointed on outer margin. Plates decidedly longer than styles. Oedagus slender, slightly enlarged at base, normally directed dorsally, curved slightly caudally at middle.

Known only from the four type specimens collected at Trout Lake and Ladysmith, Wisconsin in August and September 1916 by the writer. No other records have been published and no additional specimens have been available for study.

*Cyperana straminea* (Sanders & DeLong)

*Thamnotettix stramineus* S. & DeL. Ann. Ent. Soc. Amer. 10:90, 1917

A large yellow species with black dashes on margin of vertex. Length 6.5-7 mm.

Vertex broad and bluntly angled, almost twice as broad as median length.

Color yellow sometimes tinted with orange, with four transverse black

spots on margin of vertex. The spots either side the apex of vertex are large and those next the eyes are small.

Genitalia: Female last ventral segment with outer angles forming broadly rounding lobes between which the posterior margin is shallowly concavely rounded. The outer third of segment on either side black with prominent oblique ridges and striae. Male plates short, gradually narrowed on inner margin and convexly rounded on outer to form a prominent pointed projection at apex. Styles long and slender, tapering and slightly constricted just before bluntly pointed apex.

This is also a marsh species but is restricted to higher altitudes or more northern areas. The known distribution includes the type series from localities in northern Wisconsin, as well as specimens from Cranberry Lake, N. Y. (Osborn) and Gillette, Pennsylvania, August 30, 1922 (Sanders and DeLong).

*Cyperana melanogaster* (Provancher)

*Jassus melanogaster* Prov. Nat. Can. 4:387, 1872

A greenish or yellowish species with four large black spots in a row on margin of vertex. Length 5-5.5 mm.

Vertex bluntly angled, one-half wider between eyes than length at middle.

Color yellow to green but always conspicuously marked by a row of four large black spots in a row on margin of vertex between the eyes. The spots are about equidistant, one on either side of blunt apex and one next either eye. The elytra often appear darker or may be orange.

Genitalia: Female last ventral segment with posterior margin sinuate and broadly, shallowly emarginate. Male plates abruptly concavely narrowed on inner margin to produce bluntly pointed apices. Styles long and slender, narrowed near base and produced into long tapering processes with bluntly pointed apices. Oedagus long, slender and usually directed dorsally. Basal portion a little thicker and with anterior process, apical portion slender and pointed at tip.

This is the most common marsh species of this genus and occurs abundantly throughout the eastern United States from Maine to South Dakota and south to the Ohio River. It is not so abundant south of the Ohio River but has been taken in North Carolina and Tennessee. It is also common in Quebec and Ontario.

*Cyperana ciliata* (Osborn)

*Thamnotettix ciliatus* Osb. Proc. Ia. Acad. Sci. 5:244, 1898

Similar to *melanogaster* in form and coloration but with black spots on vertex smaller and with distinct genitalia. Length 5-5.5 mm.

Vertex blunt, scarcely angled almost twice as wide between eyes at base as median length.

Color green tinged with yellow. Vertex pale yellow with four small round black spots in a row on margin of vertex. Ocelli black, above and between the two spots on either side. Pronotum, scutellum and elytra usually green.



Genitalia: Female last ventral segment with lateral angles rounding to posterior margin which is broadly shallowly emarginate. Male plates short and broad, strongly convexly rounded on outer margin and strongly sloping on inner margin to a blunt apex with a slight tooth like projection. Oedagus broad at base, constricted and produced dorsally and anteriorly as a wide blade-like structure which is pointed at apex.

A species occurring on sedges in fresh water marshes. Specimens have been examined and characters checked from Maine; Madison, Wisconsin; Lincoln, Nebraska; and Sioux City, Iowa. It is also reported for Colorado but these specimens have not been available for checking. A large series of specimens in the writer's collection is from craters of the Moon Idaho and Tahoe Lake, California.

*Cyperana smithi* (Van Duzee)

*Thamnotettix smithi* V. D. Can. Ent. 24:266, 1892

Green with a broadly rounded vertex and a broad black band on margin of vertex between the eyes. Length 5 mm.

Vertex broadly rounded well produced but almost parallel margined, twice as wide between eyes at base as median length.

Color green tinged with yellow, vertex with a broad black band on the margin between the eyes. Elytra appearing darker greenish, apices usually smoky.

Genitalia: Female last ventral segment with lateral angles broadly rounded. Posterior margin slightly emarginate either side of a broad slightly produced tooth at middle which is produced almost as far as the rounded lateral angles. Male plates short, sides convexly rounded to blunt apex with a short blunt tooth like projection. Styles rather long narrowed at about one third their length and produced to form a spur-like tooth on outer margin and an elongated rather broad finger-like process on inner margin which is blunt at apex. Oedagus rather short, enlarged at base, narrowed at about half its length to form a slender apical process which is directed dorsally.

This species occurs on *Spartina michauxiana* in fresh water marshes and is found only in rather northern areas. Records are at hand and specimens have been examined from New Jersey; Connecticut; Presque Isle, Pennsylvania; northern Illinois (Princeton); Iowa and Wisconsin.

*Cyperana decipiens* (Provancher)

*Thamnotettix decipiens* Prov. Pet. Faune. Ent. Can. 3:285, 1890

Resembling melanogaster in form and color but with two outer spots above margin and posterior to ocelli. Length 4.5-5 mm.

Vertex blunt and rounded at apex, almost twice as wide between eyes at base as length at middle.

Color: Vertex yellow tinged with green, with two large round black spots on margin of vertex, one either side of blunt apex. A black spot next either

eye above margin and posterior to ocellus. Pronotum and scutellum usually green and darker. Elytra appearing darker green with veins paler.

Genitalia: Female last ventral segment with lateral angles rather well produced between which the posterior margin is sinuately concavely emarginate more than one-third the distance to base. At the apex of this emargination is a very short blunt white tooth. Male plates rather broad and short convexly rounded to blunt apices. Styles long and narrow inner margin produced into a long curved finger-like process, outer margin with a very short spur only. Oedagus large at base rapidly constricted to a very slender apical portion which is long and curves dorsally and anteriorly and is bifid at apex. A large black bifurcate spine is on the dorsal caudal portion of pygofer.

This species was described from Quebec, Canada and has since been recorded for Maine, New York, Utah and British Columbia. Records are also at hand from Wisconsin; Kane, Pennsylvania; Pingree Park, Colorado; Shoshone Basin and Stanley Basin, Idaho; Everett Lake, Washington; and Slave Lake, Alberta. These specimens have been checked for genital characters.

*Cyperana stylata* sp. nov.

Resembling an orange colored specimen of *melanogaster* but with distinct genitalia. Length 5.5-6 mm.

Vertex bluntly angled, almost twice as wide between eyes at base as length at middle.

Color orange yellow to sordid green washed with orange. The four black spots on margin of vertex variable in size and form but usually more elongate laterally. The median pair always larger than those next the eyes. Elytra often orange or sordid green at base, apex hyaline with veins orange.

Genitalia: Female last ventral segment almost truncate, posterior margin slightly indented either side of broad slightly produced median lobe. Male plates short and broad, roundedly expanded toward apex which is blunt and rounded and bears a minute black tooth at apex. Styles long, tapering from base to sharp pointed, outwardly directed apices. Oedagus rather broad at base abruptly and concavely narrowed to a rather long slender apical process which is normally directed dorsally.

Described from a series of 42 male and 34 female specimens. Holotype—male; New Port, Idaho, August 8, 1926, R. W. Haegele, collector. Allotype—female; Stanley Basin, Idaho, July 19, 1930, D. M. DeLong, collector; Paratypes—two female and one male, Mackey, Idaho, July 7, 1926, R. W. Haegele; ten females and twenty males, Fish Lake, Utah, September 2, 1930, D. M. DeLong collector; three males, Stanley Basin, Idaho, August 3, 1930; two females and two males, Galena Summit, Idaho, August 3, 1930; one female, Tamarack, Idaho, July 26, 1926; one male, Stanley, Idaho, July 10, 1926, R. W. Haegele; 14 male and 18 female specimens, Slave Lake, Alberta, Aug. 14-17, 1924, Bryant; all in collection of the author.

*Cyperana gesa* sp. nov.

In general appearance resembling *melanogaster* but differing in color markings and with distinct genitalia. Length 5.5-6 mm.

Vertex bluntly angled almost rounded, almost twice as wide between eyes at base as length at middle.

Color: Bright yellow tinted with orange and shading to dull green. Vertex with a pair of large marginal spots flattened ventrally and convexly rounded above on either side of apex of vertex. A much smaller one next either eye on marginal line. A very small spot just posterior to each ocellus and a pair of dots just back of apex at anterior end of impressed basal line. Sutures separating frons, clypeus and genae, and antennal pits, black. Pronotum, scutellum and elytra sordid green tinged with yellow.

Genitalia: Female last ventral segment with lateral angles broadly rounded to posterior margin which is broadly, shallowly emarginate. Areas at either side of segment with oblique striae. Male plates rather short and broad, abruptly narrowed at apex to short finger-like process near inner margin. Styles long and rather narrow except at base. The inner margin is produced into a long narrow finger-like process one-third the length of style. A shorter process is produced on outer margin. Oedagus long, recurved on itself. Enlarged at base with apical portion blade-like, gradually narrowed to pointed tip and normally curving anteriorly.

Described from one male and two female specimens.

Holotype—male; Redfish Lake, Idaho; August 3, 1930; collected by the writer. Allotype—female; Tahoe Lake, California; August 6, 1930; same collector. Paratype—female; same data.

Type specimens in author's collection.

*Cyperana eruca* sp. nov.

Resembling *gesa* in form and coloration but with more strongly produced vertex which is more heavily marked and with genitalia distinct. Length 5-5.5 mm.

Vertex bluntly angled, more than two thirds wider between eyes at base than length at middle.

Color: Vertex yellow, with four quadrate black spots on margin of vertex, the central pair are much larger than those next the eyes. A small round black spot just posterior to ocellus and next to eyes and a pair of small dots just above apex. Sutures of face, antennal pits and venter black. Pronotum and elytra sordid green, veins of elytra orange or pale. Scutellum yellowish.

Genitalia: Female last ventral segment with posterior margin truncate. Segment without striae. Male plates short and broad, strongly convexly rounded on inner margin to rather abruptly pointed apex. Styles long and narrow, the inner margin convexly rounded to form a long rather heavy finger-like process. This together with the one on the outer margin form a chela-like structure. Oedagus enlarged at base then narrowed into a long blade-like

structure which is curved anteriorly and rather abruptly narrowed near apex to an upturned blunt tip.

Described from a series of seven male and eight female specimens. Holotype—male; Boise, Idaho; July 11, 1930, D. M. DeLong collector. Allotype—female; Alturas Lake, Idaho; July 19, 1930. Paratype—male and female; same date; male and female; Brookings, South Dakota; Sept 9 and October 15 respectively, 1920; H. C. Severin collector; male and female; Yosemite Park, California; August 10, 1930; D. M. DeLong collector; all in author's collection. Four female and two male; Yosemite California; June 28, 1931; E. D. Ball collector and one male Weed, California; June 27, 1934; E. D. Ball collector; all in Ball collection.

*Cyperana montula* sp. nov.

Resembling *eruca* in general appearance but with distinct coloration and genitalia. Length 5-6 mm.

Vertex bluntly angled more than one-half wider between eyes than length at middle.

Color: Yellow marked with sordid green and black. Vertex yellow with the four black spots on margin fused to form a rather broad, conspicuous sinuate band between eyes which is sometimes interrupted at middle. A conspicuous black spot is posterior to each ocellus and a proximal pair of black lines is usually on disc. Pronotum sordid green. Elytra dull greenish subhyaline, veins pale heavily bordered with brown.

Genitalia: Female last ventral segment with posterior angles broadly rounded, posterior margin narrowly shallowly emarginate either side of a broad slightly produced rounded median lobe. Outer portions of segment with heavy oblique striae, male short and broad, the apical half roundedly inflated and convexly roundedly narrowed on both inner and outer margins to form a bluntly jointed apex. Styles long, gradually tapered from base to a pointed incurved apex. Oedagus erect, broad on basal half, rather abruptly narrowed to blade-like portion on apical half which is curved anteriorly and gradually narrowed to pointed apex. Basal end also tapered and pointed.

Described from a series of four male and two female specimens. Holotype—male; Estes Park, Colorado; August 25, 1920; H. C. Severin collector. Allotype—female; same locality; August 27, 1920; H. C. Severin collector. Paratypes—three males; same data; one female; Pingree Park, Colorado; August 20, 1929; J. G. Sanders collector; all specimens in author's collection.

*Cyperana longiseta* (Van Duzee)

*Thamnotettix longiseta* V. D. Can. Ent. 24:266. 1892

A species resembling *melanogaster* in coloration but with a broad blunt head and a pair of tiny spots back of ocelli as well as the four on the anterior margin of vertex. Length 3.5-4.5 mm.

Vertex bluntly angled, two-fifths wider between eyes than length at middle.

Color dull green tinged with yellow. Vertex with a row of four round black spots on margin of vertex and a very small one just posterior to each ocellus. Elytra appearing darker, veins pale.

Genitalia: Female last ventral segment sinuate and almost truncate, with posterior margin slightly concave. Male plates short and broad, strongly convexly rounded on outer and inner margins to form a bluntly pointed apex. Styles narrowed gradually from base to form a long finger-like process on inner margin which is strongly curved outwardly and a much shorter process on outer margin, about one-third the length of the inner process. Oedagus only slightly enlarged at base curved dorsally and anteriorly about as far as base, apex bifid.

This is the common western species of the genus occurring on marsh grasses and sedges throughout the states of the northwest.

Specimens are at hand from Colorado; Craters of the Moon, American Falls, Stanley Basin, Blackfoot, and Red Fish Lake, Idaho; Colfax, Lodi and Donner Lake, California; and it has been reported from Iowa, but no specimens have been examined which are of this species.

#### **Paluda** gen. nov.

Related to *Cyperana* but differing by the male plates bearing a dorsal blunt tooth on the posterior portion and the apices of the ninth segment (pygofers) terminating in blade-like structures which are produced the length of the segment and directed dorsally and caudally. The oedagus is also different in type, having a broad basal structure and a short narrow apical process. The absence of black spots on the margin of the vertex also separates this genus from *Cyperana*.

Type of genus *Thamnotettix placidus* Osborn.

Only one species which is strikingly different in structural and color characters is placed in this genus. It is a common inhabitant of fresh water marshes, but is restricted to northern areas.

#### *Paluda placida* (Osborn)

*Thamnotettix placidus* Osb. Twentieth Rept. N. Y. St. Ent., p. 536, 1905

*Thamnotettix mellus* S. & DeL. Ann. Ent. Soc. Amer. **10**:91, 1917

An orange yellow species without dark markings. Length 5 mm.

Vertex broadly rounded, almost twice as wide between eyes as length at middle.

Color: Orange yellow without definite markings. Elytra subhyaline veins orange yellow.

Genitalia: Female last ventral segment with rather prominent lateral angles, between which the posterior margin is rather broadly excavated about one-third the distance to base. The sides of the excavated portion are slightly convex, the apex is rather broad and there is a slightly produced, rounded

tooth at center. Male plates rather long, gradually, evenly narrowed to bluntly angled apices. Styles sinuately, gradually narrowed from a broad base to outwardly directed, bluntly pointed apices. Oedagus broad on basal two-thirds then rapidly narrowed to a slender apical third which is directed dorsally. Apical portion of pygofers narrowed into blade-like structures which are strongly produced caudally and dorsally the length of the pygofer proper.

This species is north eastern in its distribution and apparently is confined to the area occupied by the northern conifer forest. It has been recorded only for Maine, New York, Wisconsin and New Brunswick, Canada. Specimens in the author's collection and the Osborn collection have been examined from these localities. One specimen is also at hand which was collected by the writer at Redfish Lake, Idaho, August 3, 1930. This is the only western record I have seen and extends the range considerably over previous known records.

Although the type specimens of *Thamnotettix mellus* S. & DeL. are pale in color and appear more narrow it has been impossible to find significant differences in the genital characters of this species and placida. It therefore seems advisable to place this as a synonym of the former species.

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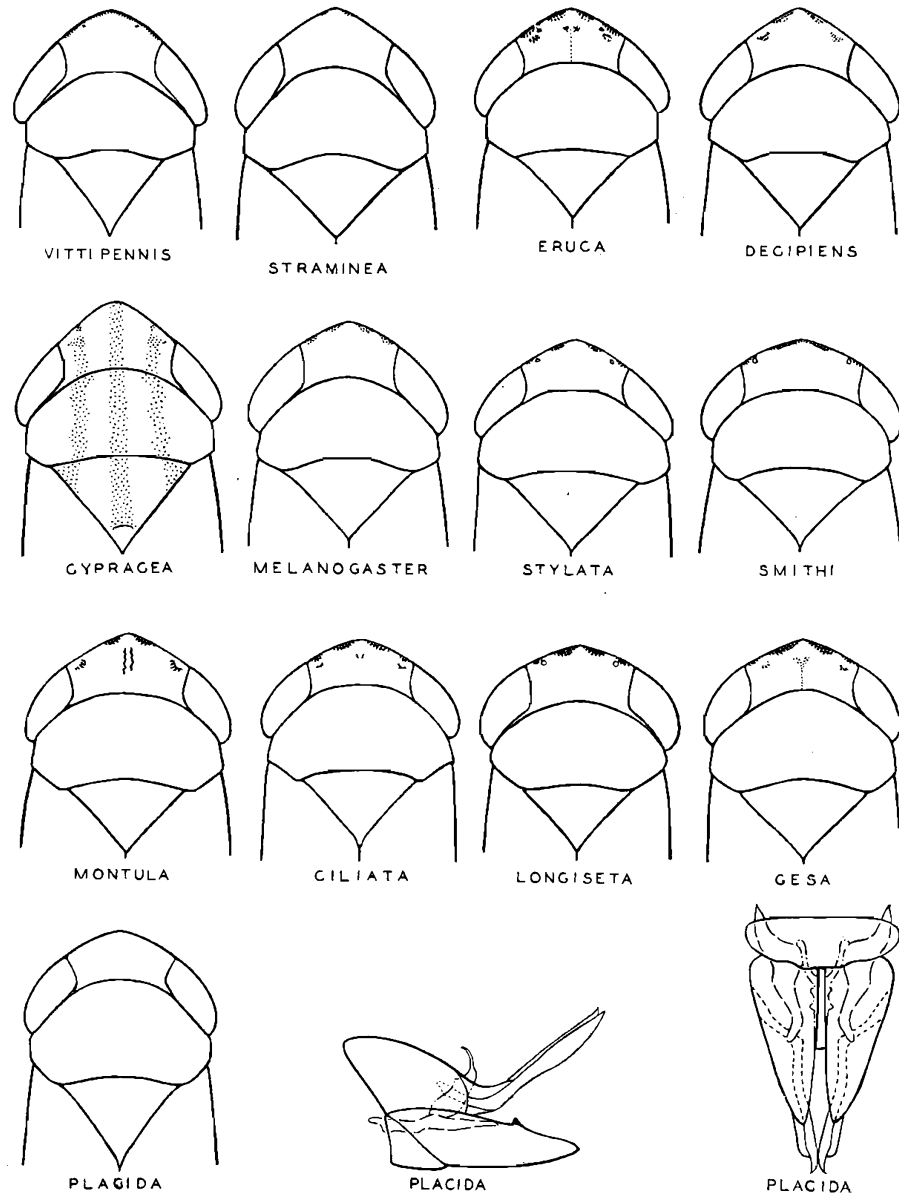


Plate 1. Upper—Illustrations of the head of the species of the Genus *Cyperana*.  
 Lower—Head, lateral and ventral views of the male genitalia of *Paluda placida*.

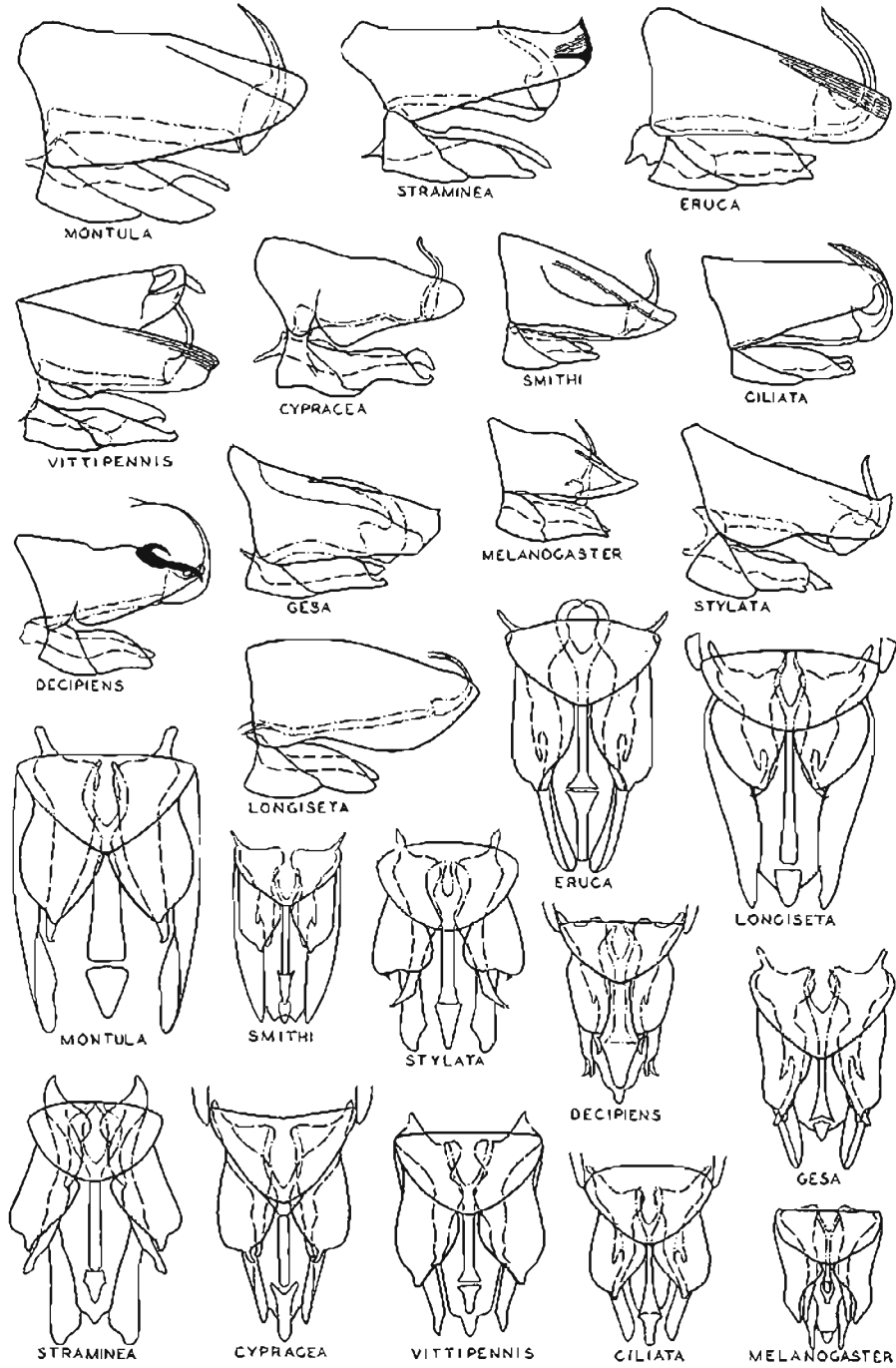


Plate II. Upper—Lateral views of male oedagi in situ.  
 Lower—Ventral views of male oedagi in situ.









