

AGALLIA PEREGRINANS Stal.

Bythoscopus peregrinans Stal. Freg. Eugen. Resa. Ins., p. 291, 1859.
Berg Hemipt. Argent., p. 276, 1879.

Agellia peregrinans Berg. Addend. et Emend. ad. Hemip. Arg., p. 176,
1884.

While this species seems quite certainly to be an *Agallia*, especially from the description of Berg, lack of access to the original description of Stal leaves some doubt as to the specific determination. A species represented in our material by a number of examples from Southern California and Palo Alto, Cal., should probably be referred here and they would fall under the third division of the synopsis next to *sanguinolenta*, from which they may be separated by the larger size, longer elytra, and female segment and the tubular plates in the male.

 DESCRIPTIONS OF EARLY STAGES AND NEW SPECIES
OF BYTHOSCOPIDÆ.

 MACROPSIS APICALIS n. sp. (Plate II., Fig. 1.)

Form of *robustus* nearly, somewhat larger, elytra longer; green, the elytra sub-hyaline with green pubescence, infusate at the apex. Length, ♀, 5 mm.; ♂, 4.5 mm.; width, ♀, 1.8 mm.; ♂, 1.3 mm.

Vertex over three times wider than long, as long as the eye, margins parallel, slightly curved, anterior margin rounding to the face, face half wider than long, front tumid, clypeus and genæ flat. Pronotum large, two and one-half times the length of the vertex, twice wider than long, side margins very long, carinate, surface with fine but distinct transverse striations, scutellum large, transversely striate, elytra full three times longer than wide, margins nearly parallel, less convex than in *robustus*, clavus with the apex obliquely truncate, inner apical cell wanting, confluent with the broad appendix, the marginal nerve becoming obsolete not far from the base, fourth apical cell narrow at the apex, next two short, broad behind, three antepical cells, the outer one smallest, whole surface of elytra except the broad appendix clothed with short, remote hairs.

Color: Bright-green, pronotum shiny, elytra appearing lighter from the reflection of the light-green hairs, the apex of clavus, tip of

second sector, the line separating the appendix from corium, and a spot on the margin of each apical cell, black; legs and below, deep-green, tarsi blackish at the tip.

Genitalia; ♀, ultimate segment twice wider than long, rounding, or slightly produced with a slight notch; ♂, valve long, parallel margined, rounding behind, angularly elevated along the median line.

Described from numerous examples collected from the honey locust at Ames and Sioux City, Iowa, and one from West Point, Neb.

Larvæ: Similar in form to the adult, very noticeable for their large pronotum and the entire dorsal surface being covered with stout hairs, bright-green, those on more exposed situations, brownish.

This is a common species on the honey locust wherever it has been examined, but has never been found elsewhere. There are two broods in a year, the adults appearing in June and again in September. It is intermediate in size between *robustus* and *clacta*, but differing from both in venation and in the clytral hair being light-green.

BYTHOSCOPIUS DISTINCTUS V. D. (Plate II., Fig. 2.)

General form similar to the preceding, about one-third smaller, head green, reduced to a curved line bordering the rounding pronotum, narrower than the dark-brown eyes. Pronotum greenish, coarsely pitted with black, darker behind the eyes, scutellum triangular, green, with the corners black, wings with a broad band at base, the tip and a narrow band before it black; in light specimens the whole wing is of a grayish slate except for a black spot in place of the middle band.

Larvæ: Stout green forms with thicker, blunter heads than the adults, nearly straight-margined, with a few long hairs projecting forward, body large, plump, abdomen ridged above, the sides with a flap-like margin which fits around the sides of the leaf-stem, or twig upon which the insect rests.

This species occurs in abundance on black walnut and butternut and adults have been found on hickory and hackberry, but only where they were adjacent to the first-named trees. Full-grown larvæ and freshly-issued adults were found the second week in June; a few days later the larvæ had all issued, the adults remaining abundant until into July. The second brood of larvæ appeared before the middle of August, the adults again in the latter part of September, to hibernate and deposit eggs in the spring.

PEDIOPSIS TRISTIS V. D. (Plate II., fig. 3.)

This is a large, narrow, grayish-brown species from one-fifth to one-fourth of an inch long. The head from above appears only as a light line from the eyes around the angular point of the pronotum. The pronotum has a narrow light margin behind and is covered with fine light hairs, the wings are slightly transparent, setting off the dark-margined raised veins. Easily recognized by the face below being light-greenish with a large black spot in the middle below the eyes and a band on the margin above.

The larvæ are very similar in form to those of *B. distinctus*, but the abdomen is not as strongly ridged and the head is broader. They are reddish-brown above, marked with whitish on some of the sutures, and with four dark-margined light spots in the form of a square on the body. The whole surface is covered with fine white hairs, giving a light reflection. The face is light with a large black spot as in the adult.

The species seems to be strictly confined to plum trees, to which it is admirably adapted in color. They were found to occur most abundantly on the native plums but have been taken from cultivated varieties.

The larvæ appear in May and have all issued as adults by the end of June. The first adults appear about the third week in June and are found abundantly throughout July, disappearing before the middle of August.

PEDIOPSIS FERRUGINOIDES V. D. (Plate II., Fig. 4.)

This is a very pretty rusty-red species a little larger than *viridis*, being nearly one-fourth of an inch long (5 mm.); the females vary from reddish-orange all over except for a large transparent spot before the end of the wings to dark reddish-brown; in this case the light spot extends clear across the wings, dividing the dark up into two parts.

The larvæ are yellow and brown in general imitation of the adult, the head and pronotum yellow, the rest of the body brown with a transverse band across the back of the wing pads and another across the abdomen.

They occur on the narrow-leaved willows, very commonly. The larvæ were found early in June, from which the males began to issue late in the month and the females by the first of July. The males soon after disappeared, the females remaining through the month.

PEDIOPSIS SUTURALIS n. sp.

Form of *ferruginoides* nearly, bright-green with the the entire claval areas black, approaching *basalis* in size and ornamentation, but with a much more produced vertex. Length of ♀, 6 mm.; width, 1.75 mm. ♂ smaller.

Vertex little more than half the length of the eye, forming nearly a right angle in front, the center of the eye behind the middle of the vertex; front very flat, acutely angled above; pronotum finely wrinkled, nearly twice longer on middle than across the humeral angle to the eye, posterior margin shallowly emarginate, elytra long, roundly angled behind.

Color: Bright green on face, pronotum and scutellum, a black stripe arising just back of either eye, widening backwards to the humeral angle, usually leaving a small green spot on the outer angle of the pronotum next the eye, the entire claval area of the elytra deep black, sharply and definitely bounded by the claval suture until just before the apex of clavus, when it crosses the suture and extends as a gradually narrowing stripe around to the tip of the wing, corium greenish on basal portion, hyaline beyond. Eyes reddish, propleura unmarked.

Described from one male and seven females from Ames, Iowa, and one female from the Van Duzee Collection (Colden, N. Y.)

Larvæ similar in form to those of *ferruginoides*, head very broad, transverse or slightly rounding; eyes prominent, thorax stout, convex; abdomen short, broad, dorsally carinate.

Color, green, a black stripe arising behind either eye as in the adult, but running back across the wing pads and along the abdomen just within the margin, widest near the end of the wing pads, where it curves out and becomes narrower on the abdomen.

The larvæ appear on willows about the first of June and even then show the unmistakable black line; adults from the first of July on into August.

Readily distinguished from other described species by its black dorsal shield. It might be mistaken for *basalis*, with the basal mark elongated, but for its sharp vertex.

PEDIOPSIS GLEDITSCHIAE n. sp.

Form and color of *viridis* nearly, about one-third smaller, with a slightly shorter, rounder vertex, approaching *reversalis* in size but much

darker green, propleura unmarked in either sex. Length, ♀ 4.5-5 mm.; width, 1.25 mm.; ♂ slightly smaller, darker.

Head compact, eyes small, a line across their centers cutting off less than one-third of the pronotum, vertex slightly, roundingly, obtusely angled, distinctly shorter than in *viridis*. Pronotum very finely granulated, posterior margin angularly excavated, disc strongly convex, depressed within and behind either eye, elytra moderately long, broadly and evenly rounded behind.

Color: Females, bright-green, the elytra hyaline at the tip; males, the head and pronotum green, the elytra clouded with brownish or dark fuscous, the costal margin green, scutellum yellowish or clouded with fuscous in the darker examples. Below, green in both sexes, the propleura without a black spot in either sex.

Described from numerous examples.

Larvæ very similar to *viridis*, short and stout, with transverse heads, thorax convex, shiny, abdomen broad, crested, each segment of the crest elevated into a flat curved tooth projecting backward and tipped with a hair; color, bright green.

Found exclusively on the honey locust along with *Macropsis*, the larvæ appearing in May and maturing before the middle of June, the adults throughout June and the first half of July. They are found at the base along the sides of the leaf stalks. This species might easily be confused with *viridis*, but the female is only as large as the *viridis* male while the males are still smaller and lack the spot on the propleura. Deeply-colored males have the elytra almost black instead of brown, as in *viridis*. These characters, along with the very distinct and constant difference in food plant and life history, leave no question as to specific identity.

PEDIOPSIS CROCEA n. sp. (var. *gleditschiæ*?)

Form of *basalis* nearly, smaller, with short, stout elytra which are scarcely longer than the abdomen and are inclined to be flaring behind as in *tristis*; bright saffron yellow, the elytra clouded with brown. Length, ♀ 5 mm.; width, 1.5 mm.; males smaller.

Head short, depressed, the pronotum very much elevated behind, the anterior margin depressed, obtusely angled before, the rugæ coarse and distinct, a median raised line. Scutellum very coarsely rugose, a triangular spot in each basal angle shagreened. Elytra strong, nervures distinct, lighter.

Color: Face and pronotum bright saffron-yellow, scutellum light-yellow, sometimes with the basal angles clouded. Elytra clouded with brown, deepest on the claval areas and fading out to light-yellow before reaching the costal margin, sutural and humeral margins with a narrow saffron-yellow line. Below, light-yellow, claws brown, propleura unmarked. In two examples the elytra are scarcely clouded, being light-hyaline yellowish throughout.

Described from eight females and five males collected on honey locust at Lexington, Ky., by H. Garman.

Its occurrence on this food plant suggests identity with the preceding species, but aside from the striking and apparently constant difference in color (which might possibly be referred to fading or variability) there seems to be some differences in form of head and other details which, if in any degree constant, would be of specific value.

PEDIOPSIS REVERSALIS n. sp.

Allied to *punctifrons* but larger, in size intermediate between that species and *gleditschiæ*. Light-green, the male with two broad, black stripes across the face, tips of the legs, and a spot on the propleura black. Length, ♀ 4.50 mm.; ♂ 4 mm.; width, about 1.25 mm.

Head short, stout, more obtusely angled than in *gleditschiæ*, a line across the eyes scarcely cutting off a third of the vertex, vertex with much finer striations than in *punctifrons*, less excavated behind, the disc equally convex, but not as strongly pitted in front. Elytra moderately strong, venation regular, not strongly marked.

Color: Light-green, pronotum and face washed with yellow in the female, male with a broad black band along the upper margin of the face extending down to the middle of the front in a triangular point; below this, between the lower margins of the eyes, is a still broader black band, propleura with a round black spot, tips of the anterior pairs of tibiæ and tarsi annulate with black. In some of the males the band on the face is reduced to three black spots, one on the apex above and one just within and below each ocellus. The females are entirely unmarked except that in some cases the propleura has a faint spot.

Described from twenty-four males and twenty-four females collected from willows at Ames, Iowa, from the middle of June until into August, and three males from the Van Duzee collection from Colden, N. Y.

This is the second American species of the spotted-face group so common in Europe, and represents the section in which the nerves are concolorous with the elytra, while *punctifrons* represents the colored nerved section. The spots on the male face are very variable, sometimes covering half the surface and again nearly wanting. The three males from New York are of this type, the spot on the propleura also wanting, as it is in a few of those from Iowa. A damaged female from Denver, Colo., is also apparently of this species.

IDIOCERUS ALTERNATUS Fitch. (Plate II., Fig. 1.)

This common species is slightly over one fifth of an inch long with a broad head curving around the pronotum. The middle bears a large reddish-brown blotch, just outside of which, on top, there are two small black spots on a yellow band that extends to the eyes. The pronotum is reddish-brown and usually there is a white stripe down the middle. The wings are partly transparent, the veins being dark in some places and light in others, alternating, a light spot near the center of the median line.

The eggs are about one mm. long by about one fifth of a mm. wide, cylindrical, slightly curved, tapering gradually to a point at one side of the smaller end and cut off obliquely to an obtuse point on the opposite side at the large end. They are deposited in the young wood, near the tip of a branch, usually close to a bud, sometimes singly, more often three or four near each other. In either case the twig would enlarge at the spot and finally burst open and show the end of the egg in the seam. If many eggs were deposited in a twig, as was the case in the cage experiments, it usually died, while if only a few were deposited in a place, as was the case in the field, it sometimes continued to grow, though weak and distorted. The final result on the trees under observation was that over one third of the branches had their tips killed back or distorted, usually the main stem and larger branches being worst affected, probably owing to their more rapid growth in the spring, offering a more favorable place for deposition than the slow-growing side branches.

The larvæ are brownish with light rings or greenish with dark ones according to the amount of exposure of their position, in either case closely imitating the bark upon which they rest. The dark rings are made up of about twelve hair-bearing spots on the hind margin of each segment.

Life History: The adults pass the winter under the leaves and rubbish in the woods, becoming active quite early in the spring. Some eggs were deposited before the middle of May and from then on nearly through the month. The first larvæ were found the last week in May, when a number hatched in the cases and a few were found in the field, the majority not appearing until in June, the egg stage lasting nearly three weeks in the breeding cage where the temperature was fairly constant, probably a little longer under the changeable spring weather out-of-doors. The larvæ burst through the projecting top of the egg and are quite active from the start. When first hatched they are nearly white except for their red eyes; the head is nearly twice the breadth of the body. Within a few days they become greenish in color and their body is much larger proportionately. The larvæ are abundant throughout June and well into July, the adults beginning to issue the first week, and from then on through the month, remaining abundant through August. The second brood was not as closely watched. The larvæ appeared early in September and the adults soon after, remaining abundant until cold weather sent them under cover.

IDIOCERUS MONILIFERÆ n. sp. (Plate III., Fig. 2.)

Form of *brunneus* nearly, more slender behind, resembling *alternatus* in appearance but lacking the fulvous shade and the dorsal white mark. Length, 5.50 mm.; width across eyes, 2 mm.

Vertex broad, shorter than the eyes; face convex; front less produced than in *brunneus*; narrow below; clypeus small at the base, much broadened on the truncate or slightly concave apex; genæ narrow, the margins concave, slightly reflexed below. Pronotum broad, disc nearly flat, humeral margin short, nearly straight, anterior margin broadly rounded. Elytra rather long, venation as in *alternatus*, outer antepical cell long, parallel-margined, appendix broad, closely folded posteriorly when at rest.

Color: Vertex yellow, brownish fuscous between the usual black spots which are rather small, a median light line broadest at the base; face yellow, black above, omitting a yellow spot just outside the ocelli, and another above the antennæ; front yellow with a brownish circle above connected with an oval below; pronotum nearly irrorate with brownish fuscous on the disc, margins and a broad median stripe light; scutellum yellow, a spot within the basal angle black, a narrow median line forking at the suture, and two spots on the disc reddish-

brown; elytra subhyaline, the nervures alternately black and white, white at base, an oblique black band across the center of the claval nervures and extending to the center of the costa, another from the apex of the clavus behind the nervures transversely to the center of the costa, apical nervures reddish-brown, the cross nervures between the first and second nervures broadly white.

Genitalia: ♀ ultimate ventral segment very short on lateral margins, roundly produced and shallowly notched, pygofers short and inflated: ♂ valve broad, with a median acute tooth and sharp lateral angles.

Described from four females and one male. Larvæ and adults taken from cottonwood in July.

This species is very distinct and at once readily separated from other described species by the position of the white markings on the elytral nerves.

IDIOCERUS BRUNNEUS n. sp. (Plate III., Fig. 3.)

Form of *lachrymalis* nearly, but smaller, resembling the European *I. scurra* in form and color, but smaller and wanting the outer antepical cell to the elytra. Cinnamon-brown with two black spots on the vertex. Length, 5.5 mm.; width across the eyes, 2 mm.

Vertex very broad and stout, eyes much more prominent than in *alternatus*, nearly half their width beyond the margin of the pronotum. Face very broad and short, front broad and very convex in both diameters, the outer margin of the genae concave, clypeus one-third longer than broad. Pronotum rather short, elytra broad, the appendix narrow, only slightly overlapping behind. Venation distinct, the nerves strong, thickly set with minute tubercles, outer antepical cell wanting, the outer branch of the outer fork of the first sector curving away to the costa immediately, or at most forming a small triangular cell in the fork.

Color: Dull cinnamon-brown. Vertex and face tawny-yellow, a pair of black spots on the vertex and an olive brown area between them and extending nearly down to the dark ocelli, pronotum olive-brown, testaceous on the depressed spots behind the eyes, scutellum cinnamon-brown in the female, yellowish with three triangles on the base and two spots on the disc black in the male. Elytra brownish sub-hyaline, nervures brown, dark at apex.

Described from numerous examples.

Larvæ very distinct, yellowish and reddish-brown, forms with stout bodies and broad roundly transverse heads, the whole upper surface clothed with long coarse hairs. The abdomen is rather broad for this genus and there are about twelve hair-bearing tubercles in a row near the posterior margin of each segment.

Color: Head yellow, brownish in front; pronotum yellow, behind which there is a brown cloud and the margins of the abdomen are brown, broadest in the middle, the disc yellow.

Genitalia: ♀, ultimate segment about half longer than the penultimate, posterior margin broadly roundly produced on the middle half, with an obtuse median notch, pygofer short, less than half longer than their width at base. ♂, valve long, posterior margin produced in an acute median tooth, plates short, stout, curved upward.

The cinnamon color and the simpler elytral venation render this a very distinct species in our fauna. It occurs abundantly on willows at Ames, and has been received from Nebraska. There are two broods in a season, one in July and the other in September, the latter hibernating and depositing eggs in the spring, which hatch out by the first of June.

IDIOCERUS MACULIPENNIS Fitch. (Plate II., Fig. 4.)

This is a very bright chestnut-brown species with light markings; the head is very short and the eyes curve around the pronotum and do not stand out as in the willow species. The face is light-yellow with a red stripe down the middle and two large black spots on the side above. There is a light spot on the pronotum, a v-shaped mark on the scutellum and another of the same color on the wings; the outer margins of the wings are very dark except for a white patch before the tip.

The larvæ are dark reddish-brown, sometimes blackish in color with broad, blunt heads and prominent eyes. They are very active and though readily seen, are very difficult to capture, dodging around a limb whenever approached.

They occur very commonly on hawthorn and crab apple trees, the larvæ appearing in May. The earlier ones mature by the middle of June and the last early in July; the adults common the latter half of June and nearly through July. The adults were again common the last of August and early in September.

transverse impression and a pair of approximate spots on the disc in line with the two other pairs on the anterior margins of pronotum and vertex. Elytra sub-hyaline soiled yellowish-brown. Tergum and venter black, margins yellow.

♂, face and all below very dark, a few light arcs on the upper part of the front, vertex very dark, an irregular spot on the tip, a ring around the ocelli and the "X" light, pronotum and scutellum heavily marked with fuscous brown, elytra dark, the nervures lighter.

Genitalia: ♀, ultimate ventral segment broad on basal third, beyond this the lateral margins are sharply constricted and the whole surface depressed, lateral angles produced, forming acute teeth, nearly half as long as the width of segment at base, posterior margin deeply emarginate between these teeth, forming two smaller rounding or obtusely angular teeth separated by a median notch. Pygofers inflated, slightly exceeded by the stout ovipositor: ♂, valve very large, triangular, the apex slightly produced, plates much enlarged, broad at base, where they are convex, extending beyond the valve about half its length, without narrowing, their truncate tips standing nearly perpendicular to the plane of the valve, and together with the short pygofers forming an enclosed cavity, spines on pygofers stout, rather long, extending down outside the plates.

Described from eight females and one male from Colorado, one from Van Duzee collection, three from Prof. Pammel, and four females and one male from Prof. Gillette.

EUETTIX SCABER n. sp.

Form of *lurida*, dark, fulvous-brown above, with a large angular area on the outer base of the elytra. Length, ♀ 6.5 mm; ♂ 6 mm. Width, 1.75 mm.

Vertex parallel-margined, over three times wider than long, transversely depressed back of the rounding margin, front broad, wedge-shaped, longer than in *lurida*, the clypeus hardly widened at the tip, genæ with the outer margin rounding. Pronotum broad, convex, highest behind, the humeral margin straight, parallel with the margin of the scutellum. Elytra broad, only slightly overlapping behind, nervures indistinct.

Color: The vertex reddish-brown anteriorly with five white spots confluent with the margin, posteriorly with two white spots just before the margin slightly nearer each other than the eyes, face light-yellow, a black spot against the outer margin of the loræ, pronotum and

scutellum chestnut, finely irrorate, two white spots on the scutellum against the ends of the transverse depression and another at tip; clytra heavily irrorate, almost clouded with dark chestnut, except for the outer margin of the basal part of the clavus the entire basal half of the corium, and an indistinct transverse band just before tip strongest on the costal margin. The basal part of corium is hyaline yellowish, oblique behind, bordered above by a narrow white line on the margin of the clavus and extending forward across the lateral margin of the pronotum to the corner of the eye; below yellowish.

Genitalia: ♀, ultimate ventral segment moderately long, lateral angles rounding, posterior margin slightly produced and feebly notched in the middle, pygofer much longer than in *lurida*, obscure yellowish with brown spots: ♂, valve rounding, plates triangular, twice the length of the valve, their margins clothed with long hairs.

Described from three females and one male, collected at Ames, Iowa; two of them swept from white oak.

EUTETTIX CINCTA n. sp.

Eutettix jucundus,* VanDuzee. Psyche, VI., p. 307, 1890; Osborn, Proc. Iowa Acad. Sci. I. pt. 2, p. 120, 1892.

Size of *scaber* nearly, elytra narrow and vertex pointed. Dull reddish-brown with an oblique obscure saffron band before the middle of the elytra. Length, ♀, 6 mm.; ♂, 5.25 mm.; width, 1.60 mm.

Vertex strongly rounding, one-third longer on middle than next to eye, disc flat with transverse depressions just behind the rounding margins; face long, more acutely angled than is usual in this genus; front narrow, nearly twice longer than broad, margins straight; genæ parallel-margined below the eyes, distinctly angled. Pronotum short, one-half its length included between the eyes, transversely striated except for the depressed anterior margin. Elytra rather narrow, compressed behind. Venation; veins on clavus approximate before the middle; antepical cell usually divided, anterior portion small, nearly circular, the posterior portion narrowing behind; apical veins curved, usually another small round cell behind the central antepical, about five transverse veinlets on the apical half of the costa.

Color: Vertex and superior third of front, soiled-yellowish, ocelli margined with red, remainder of the front rusty-brown, the rest of face

* The *Jassus jucundus* of Uhler listed by VanDuzee as *Eutettix jucundus* is, as later suggested by VanDuzee, a *Paranesus* near *twiningi*, and the species of *Eutettix* upon which the reference was made has been hitherto undescribed.