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V

Monograph of the North American Species of  
*Orthotylus* (Hemiptera)

BY  
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MONOGRAPH OF THE NORTH AMERICAN SPECIES  
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BY

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Genus *Orthotylus* Fieb.

In common with other genera of its tribe, the genus *Orthotylus* has the apical margin of the pronotum without a collar; the prosternal xyphus (the triangular plate between the anterior coxæ) with a more or less distinctly carinate margin, its base being flat or convex, and the arolia (the pulvillæ between the tarsal claws) free and converging toward their apex. The following are the more essential characters of this genus:

Head almost vertical; when viewed from above, short, transverse, with the eyes distinctly wider than the anterior margin of the pronotum; when viewed from before, five-angled, but little longer than wide across the eyes. Vertex with a basal carina and before it a depressed line or area. Front convex; clypeus prominent, its base usually on a line with the base of the antennæ. Facial angle (angle between the line of the clypeus and that of the bucculæ) a right angle. Eyes prominent, viewed from the side ovate, placed a little oblique or

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nearly vertical; when viewed from above nearly round or more or less flattened within. Antennæ pubescent, inserted near or somewhat below the lower angle of the eyes; linear; basal joint thickest, the apical becoming setaceous; the basal joint with two or three longer stiff bristles or setæ within toward its apex. Pronotum trapezoidal, rather flat, usually transverse, but sometimes nearly or quite as long as broad, its converging sides nearly rectilinear and its base feebly arcuated or straight across the scutellum; callosities prominent, usually distant but often connected by an elevated area anteriorly that does not reach their hind margin. Scutellum nearly flat or moderately elevated, its basal lobe often more or less exposed. Elytra normally rather long, considerably surpassing the abdomen. Membrane biareolate. Legs rather long, the hind femora moderately incrassate; tibiæ armed with a few weak spines. Rostrum normally attaining the apex of the intermediate coxæ, becoming black at apex. Oviduct of female short, beginning behind the middle of the venter. Upper surface usually clothed with a fine pubescence or with longer and stiffer hairs, or with both.

Our species of this large and difficult genus may conveniently be grouped in three series:

Group I (*flavosparsus* group). Small, moderately elongated green species with the base of the vertex sharply carinate, the pronotum short, transverse, and the legs comparatively short. Some of the species are clothed with coarse, often flattened, deciduous black hairs. Here belong: *insignis*, n. sp.; *tibialis*, n. sp.; *ferox*, n. sp.; *viridicatus* Uhl.; *coagulatus* Uhl.; *flavosparsus* Sahlbg.; *chlorionis* Say; *fraternus*, n. sp.; *uniformis*, n. sp.; *translucens* Tuck.; *viridis*, n. sp.; *senectus*, n. sp.; *nigrinasi*, n. sp.

Group II (*ovatus* group). Medium sized, oval, pale colored species having much the form of a *Lygus* with the aspect of an *Oncotylus*. These have the base of the vertex obtusely carinate, the pronotum transverse and the legs comparatively short. Here belong *ovatus*, n. sp., and *catulus*, n. sp.

Group III (*dorsalis* group). More elongated or slender species having the base of the vertex sharply carinate preceded by a distinct bidentate transverse depression; the pronotum nearly or quite as long as broad and the legs long and slender. The species of this group are usually pale, marked more or less with fuscous or black, the elytra typically having the clavus and an area on the disk of the corium fuscous or black. Here belong: *formosus*, n. sp.; *modestus*, n. sp.; *dorsalis* Prov.; *marginatus* Uhl.; *molliticulus*, n. sp.; *affinis*, n. sp.; *angulatus* Uhl.; *brunneus*, n. subsp.; *cuneatus*, n. sp.; *pullatus*, n. sp.; *languidus*, n. sp.; *lateralis*, n. sp.; *cruciatus*, n. sp.; *submarginatus* Say; *necopinus*, n. sp.; *fumidus*, n. sp.; *ornatus*, n. sp.; *canidatus*, n. sp.

I have been unable to locate *inconspicuus* Uhl. Reuter's description of his *biguttatus* answers almost perfectly to *coagulatus* Uhl. of which it probably is a synonym. Tucker records *diaphanus* Kirschb. from Kansas, but the determination is very doubtful. The present paper includes all other species recorded from America north of Mexico. The following key will locate our species:

- Ground color green, sometimes almost white, dark markings if present not clouding the elytra .....1.
- Ground color pale testaceous to black, sometimes greenish when immature; the elytra in that case marked with fuscous or black areas....14
- 1, Antennæ, tibiæ and tarsi black; ground color a bluish-green; small species (3mm. to tip of abdomen),.....2. *tibialis*, n. sp.
- , Antennæ pale or mostly so,.....2.
- 2, Basal joint of the antennæ marked with black,.....3.
- , Basal joint of the antennæ uniformly pale,.....4.
- 3, Antennæ slightly infuscated, the basal joint green or greenish with its immediate base deep black, .....1. *insignis*, n. sp.
- , Antennæ pale; basal joint biannulate with black; base and apex of second joint fuscous; apex of the head deep black. 13. *nigrinasi*, n. sp.
- 4, Form broader or ovate, somewhat like a small *Lygus*,.....5.
- , Form more slender and parallel,.....6.
- 5, Color a yellowish-green, with the membrane infuscated; the surface clothed with deciduous matted fuscous hairs.....14. *ovatus*, n. sp.
- , Color nearly white; above sparsely dotted with bluish-green in mature examples, .....11. *senectus*, n. sp.
- 6, Membrane black or blackish with the nervures calloused and white at apex; surface clothed with coarse deciduous black hairs,.....
- .....4. *viridicatus* Uhl.
- , Membrane sometimes infuscated, the nervures then pale or concolorous, .....7.

- 7, Membrane infuscated at apex, marked with a distinct white spot at tip of the cuneus followed by a blackish cloud and beyond that a pale vitta, sometimes obsolete,.....5. *coagulatus* Uhl.
- , Membrane without alternating black and white markings at tip of the cuneus, .....8.
- 8, Upper surface with minute pale pubescence; apical antennal joints infuscated, .....9.
- , Upper surface with dark fuscous or black pubescence,.....11.
- 9, Smaller (4-4½mm.); first antennal joint thicker, obviously shorter than the head viewed from above; sinistral hook of the male genitalia short, scarcely longer than the dextral,.....10. *translucens* Tuck.
- , Larger (5-5½mm.); first antennal joint obviously as long as the head, .....10.
- 10, Basal joint of the antennæ fulvo-testaceous like the second joint; dextral hook of the male genitalia small, ligulate; sinistral long, curved and acuminate; western, .....9. *uniformis*, n. sp.
- , Basal joint of the antennæ brown, the second fulvo-testaceous; dextral hook of the male genitalia large and broad-triangular; sinistral linear and straight, rather long; eastern,.....12. *viridis*, n. sp.
- 11, Elytra surpassing the abdomen by nearly one-half its length; abdomen in the male reaching to just beyond the base of the cuneus; antennæ and membrane slightly infuscated,.....8. *fraternus*, n. sp.
- , Elytra shorter, the abdomen of the male reaching well toward the apex of the cuneus, .....12.
- 12, Upper surface clothed with deciduous black hairs which are in part flattened and conspicuous; color pale bluish-green; vertex broadly depressed, .....3. *ferox*, n. sp.
- , Upper surface clothed with a less conspicuous vestiture, the hairs not large and flattened; color a yellowish-green; transverse basal depression of the vertex narrow, .....13.
- 13, Areoles of the membrane pale green; elytra with clusters of white hairs intermixed with dark ones,.....6. *flavosparsus* Sahlbg.
- , Areoles of the membrane concolorous; elytra without pale hairs intermixed with the dark ones,.....7. *chlorionis* Say.
- 14, Form ovate as in *Lygus campestris* nearly; color a uniform whitish of fusco-testaceous, head and callosities tinged with yellowish,.....15. *catulus*, n. sp.
- , More elongated species; elytra with fuscous areas more or less marked, or at times entirely black,.....15.
- 15, Color whitish-testaceous, fuscous markings of the elytra very faint or nearly obsolete in the female,.....16.
- , Ground color sometimes pale greenish or yellowish, the dark elytral markings always distinct, or the whole insect may become almost black, .....17.
- 16, Without black markings, the disk of the head and the pronotum behind the callosities sometimes with a faint fuscous cloud in the male; membrane with a faint ray beyond the areole; antennæ pale,.....16. *languidus*, n. sp.
- , Median line of the front, vertex and scutellum, lateral margins of the pronotum and the sides of the body beneath black; membrane slightly infuscated with the nervure brown; antennæ blackish,.....32. *candidatus*, n. p.
- 17, Body uniformly fuscous, the sides of the venter darker; length 6mm., .....34. *fumidus*, n. sp.
- , Body never uniformly fuscous, the elytra with at least the costal nervure or a vitta interior to it pale,.....18.
- 18, Elytra with the costal and commissural nervures and base of the cuneus slenderly pale, otherwise fuscous-brown above; length 7mm.,.....33. *necopinus*, n. sp.

- , Elytra with more than the costal and commissural nervures pale; length under 6mm., ..... 19.
- 19, Costal nervure black with a pale vitta between it and the dark dorsal vitta, or it may be dark on the dark areas without a pale vitta interior to it, ..... 31.
- , Costal nervure pale and forming part of a pale costal vitta, ..... 20.
- 20, Disk of the pronotum pale with the lateral margins covered by a linear black vitta, the pale disk narrowing anteriorly, ..... 29.
- , Disk of the pronotum sometimes with a broad pale median vitta, but then with the humeral angles and usually the sides pale, ..... 21.
- 21, Pronotum with the anterior lobe infuscated, the posterior lobe more or less distinctly pale, usually divided by a dark median vitta, ..... 30.
- , Pronotum with the anterior lobe usually pale, never infuscated with the disk of the posterior lobe pale, ..... 22.
- 22, Membrane vittate, more or less hyaline with a darker ray beyond the areole, ..... 23.
- , Membrane uniformly infuscated, without a darker ray beyond the areole, ..... 24.
- 23, Areole of the membrane hyaline, the vitta beyond the areole evident; color of body clear pale green with a line on the hind margin of the pronotum and a spot behind the callosities black; a vitta on the clavus and spot near the inner angle of the corium fuscous, ..... 17. *formosus*, n. sp.
- , Areole of the membrane more deeply infuscated than the adjoining surface, body more or less infuscated, the base of the corium, the cuneus and usually the median line of the pronotum pale, ..... 30. *ornatus*, n. sp.
- 24, Nearly the whole surface including the legs black or blackish, the costal margin, ventral vitta, coxæ and trochanters only pale, ..... 26. *pullatus*, n. sp.
- , The legs, at least, pale or but little infuscated, ..... 25.
- 25, Callosities pale or they are the last portion of the pronotum to become invaded with black; vertex often black, when pale without a transverse black mark on either side, ..... 26.
- , Callosities black or they are the first part of the pronotum to become invaded with black; vertex pale with a transverse black mark on either side, ..... 28.
- 26, Antennæ black in both sexes; genital hooks of the male pale; the male generally with a pale dorsal vitta on the pronotum, 20. *marginatus* Uhl.
- , Antennæ pale in the female, fuscous or black in the male; genital hooks of the male black, ..... 27.
- 27, Pronotal markings transverse; when the pronotum is all black the second antennal joint of the male is rufo-testaceous, 18. *modestus*, n. sp.
- , Pronotal markings longitudinal; when the pronotum is all black the second antennal joint of the male is black, ..... 19. *dorsalis* Prov.
- 28, Smaller (5mm.); body beneath mostly black; front black or mostly so, ..... 21. *molliculus*, n. sp.
- , Larger (6mm.); body beneath mostly pale; front pale with a black arc either side, ..... 22. *affinis*, n. sp.
- 29, Smaller (4mm.); second antennal joint short, not longer than the third and fourth together, ..... 28. *lateralis*, n. sp.
- , Larger (5mm.); second antennal joint long, distinctly longer than the third and fourth together, ..... 27. *cruciatum*, n. sp.
- 30, Sutural margin of the corium with a wedge-shaped pale mark, ..... 23. *angulatus* Uhl.
- , Sutural margin of the corium with a linear pale mark, ..... 24. *angulatus brunneus*, n. subsp.

- 31, Costal nervure concolorous, dark against the dark areas; elytra blackish, the base of the cuneus and a wedge-shaped mark along the claval suture pale, .....25. *cuneatus*, n. sp.  
 —, Costal nervure black with a pale vitta between it and the black dorsal vitta, .....32.  
 32, Ground color above fulvous or salmon, elytra black, the fulvous border of the corium not attaining the costa, the extreme edge being black,.....31. *submarginatus* Say.  
 —, Elytra black with a subcostal whitish vitta covering most of the cuneus; posterior disk of the pronotum and the legs fulvous,.....  
 .....29. *knighti*, n. sp.

### GROUP I (Subgenus *Orthotylus* Fieb.)

#### 1. *Orthotylus insignis*, new species.

Larger and more slender than any allied species; elongated or elliptical; bright grass-green becoming yellowish about the head and base of the femora; first joint of the antennæ yellowish with its immediate base conspicuously black, length 5-6mm., width  $1\frac{1}{2}$ mm.

Vertex much depressed posteriorly, leaving the basal carina strongly elevated; front but moderately convex. Eyes prominent, viewed from the side shorter than in the allied forms. Antennæ unusually long, about reaching to the apex of the membrane; basal joint longer than the head in the female, much longer in the male; second joint two and a half times the length of the first; third about two-thirds the length of the second; fourth shorter than the first. Rostrum short, not attaining the apex of the intermediate coxæ. Pronotum short, flat, showing a median carina and lateral carinate margins; deeply impressed around the prominent callosities, thus making the anterior margin appear thickened; sides strongly oblique, the anterior angles broadly rounded. Elytra long, elliptical in the female, the tip of the cuneus scarcely surpassing the tip of the abdomen; in the male nearly parallel, the costal margin very gently arcuated, the corium a little surpassing the tip of the abdomen. Legs unusually long and slender, the tibiæ with a few weak bristles.

Dextral hook of the male genitalia very large, recurved from near its base, where there is an acute projection from the inner angle, the upper member greatly produced in a long curved brown spine-like process almost attaining the opposite



wall of the pygofers; sinistral hook long, white and terete, curved around horizontally concentric with the sinistral wall of the genital segment.

Color a clear bluish-green, becoming yellowish on the head, pronotum and beneath; clothed above with short, black, deciduous hairs; antennæ pale, the base of the first joint narrowly deep black, the apical joints infuscated. Elytra immaculate, the membrane with pale nervures. Tibiæ pale clothed with minute black hairs, the tarsi black.

Described from one male and two female examples taken by me at the upper end of Fallen Leaf Lake, Calif., July 24, 1915. This pretty species is unusually large and slender and in some points is not typical of this genus.

Type, male, in the collection of the University of California. Allotype (No. 301) in the Museum of the California Academy of Sciences. Paratype in collection of the University of California.

## 2. *Orthotylus tibialis*, new species.

Form of *Labopidea nigripes* nearly, but much smaller; bluish-green, conspicuously clothed with black deciduous hairs; antennæ, tibiæ, and tergum black. Length 4-4½mm. to tip of membrane.

Head large, vertical; eyes small, bead-like; viewed from the side, short, scarcely surpassing the insertion of the antennæ, narrowed below, little longer than broad. Vertex with a large triangular impressed area; basal carina prominent. Front strongly convex; clypeus small, prominent. Pronotum short, transverse, its length distinctly less than one-half its basal breadth; callosities prominent, elongated. Basal joint of the antennæ longer than the head, much thickened almost to the base; second about three times the length of the first. Elytra of the male long, the costa moderately arcuated, the apex of the abdomen reaching to the tip of the corium. Elytra of the female hardly attaining the apex of the abdomen, the costa well arcuated, giving the insect an ovate form, broadest beyond the tip of the clavus, the membrane but little surpassing the tip of the cuneus.

Dextral hook of the male genitalia broad at base, upcurved and attenuated at apex; sinistral hook short and strap-shaped, lying along the edge of the pygofer.

Color dull bluish-green, conspicuously clothed with coarse black deciduous hairs. Head and lower surface paler. Antennæ, apex of the rostrum and the tibiæ and tarsi deep black; tergum black, becoming green toward the margin.

Described from numerous examples taken about the lower end of Fallen Leaf Lake, near Lake Tahoe, Calif., July, 1915. The conspicuously black tibiæ and antennæ will readily locate this distinct species.

Type, male, and allotype in collection of the University of California. Paratypes in collections of the Museum of California Academy of Sciences (nos. 302-304), University of California and in author's collection.

### 3. *Orthotylus ferox*, new species.

Form and size of *flavosparsus*, nearly; color a pale faded green, clothed with stout black hairs when fresh. Length  $3\frac{1}{2}$  mm. to tip of membrane.

Head short, vertical. Eyes small; viewed from the side, vertical, but little longer than wide, narrowed to an angle below, not reaching much beyond the middle of the side of the head. Vertex broad, basal impression broad and shallow, the basal carina prominent, obtuse, sinuated. Front prominent, convex, its sutures deep; facial angle rounded. Antennæ short; first joint shorter than the dorsal aspect of the head. Pronotum short, transverse, its length about one-half its basal width; sides straight, the angles well rounded; anterior margin concavely sinuated; callosities prominent. Scutellum small, the basal lobe covered. Elytra moderately broad, the costa feebly arcuated. Abdomen passing the middle of the cuneus in the male, nearly attaining the apex in the female. Tibiæ with the longer bristles black. Whole upper surface clothed with coarse appressed black hairs, which are easily rubbed off.

Male genital characters much like those of *tibialis*, but the pieces are less curved and less interlocked; the dextral hook narrower and more acute; the sinistral lying close to the edge of the segment.

Color pale bluish-green with a whitish aspect when denuded. Scutellum, head, lower surface and legs, and sometimes the callosities, yellowish. Membrane faintly fuliginous, the nervures paler. Antennæ infuscated nearly to the base of the second joint, the basal pale. Tibial bristles and apex of the tarsi black.

Described from numerous specimens taken in San Diego County, Calif., as follows: Alpine, March to April; Balboa Park, San Diego, April; El Cajon Valley, May first. This insect has much the aspect of *tibialis* and quite similar genital characters, but the females are less oval and the antennæ are pale instead of black. This and the three following species have the vertex broader with much smaller and less prominent eyes.

Type, male, and allotype in author's collection. Paratypes in Museum of California Academy of Sciences (305, 306), collection of the University of California and in author's collection.

#### 4. *Orthotylus viridicatus* Uhler.

Form of *coagulatus*; clothed above with coarse black deciduous hairs; membrane blackish with the nervures at the apex of the areoles conspicuously white. Length  $4\frac{1}{2}$ mm.

Head smaller than in the allied species with the eyes large and prominent, especially in the males. Vertex flat, distinctly, angularly impressed before the prominent basal carina; front but slightly convex. Clypeus very prominent, its base distinctly below the line of the antennæ. Eyes, viewed from the side, much longer than broad, angled below, reaching over half-way to the gula. Antennæ short, the second joint scarcely longer than the basal width of the pronotum. Pronotum short, transverse; sides scarcely arcuated, the anterior angles well rounded; callosities prominent, convex. Elytra rather short, the abdomen reaching to about the middle of the cuneus in the male, to beyond its tip in the female.

Dextral hook of the male genitalia long protruding, terete, its end rounded and not at all narrowed; sinistral hook broad, curved, parallel with the lower margin of the pygofer, its acute apex curved inward.

Color, a bluish-green in mature examples, becoming yellowish on the callosities and head, and paler beneath; above clothed with deciduous pale hairs intermixed with thick black ones. Vertex and pronotum with a pale median line more or less apparent. Basal joint of the antennæ green, second darker, the third and fourth infuscated. Tibiæ a little darker, the apical half of the tarsi black. Membrane deeply infuscated, the nervures thickened and white below the base of the smaller areole.

The types of this species were from Colorado and New Mexico. I have seen specimens from Idaho and took it in abundance in San Diego County, Calif., during March, April and May, and it was not uncommon about Fallen Leaf Lake, Calif., at lower levels (between 6,000 and 7,000 feet). So far as I can now tell, my material was all taken on the sage brush, *Artemesia*, spp. The blackish membrane marked with conspicuous white nervures will distinguish this pretty species from its nearest relatives.

### 5. *Orthotylus coagulatus* Uhler.

Size and aspect of *flavosparsus* nearly, but with the head narrower and the eyes larger and more prominent; pale green, clothed with minute whitish pubescence and longer black hairs; membrane with a fuscous spot beyond the areoles. Length  $4\frac{1}{2}$ mm. to tip of the membrane.

Head rather small, viewed from above, acutely angled at apex. Vertex in the female about three times as wide as the eyes; flattened toward the base, leaving the basal carina sharp and prominent across its whole width; in the male narrower, hardly twice as wide as the large eyes, with the base scarcely impressed and the carina less prominent. Clypeus large and very prominent. Antennæ long and slender, the basal joint scarcely as long as the head, surpassing the tylus by one-half its length; third but little shorter than the second. Pronotum short; sides straight or feebly concave in the male; callosities prominent. Elytra moderately long, the tip of the abdomen reaching to the middle of the cuneus in the male, sometimes surpassing its apex in the female.

Dextral hook of the male genital segment short, knob-like; the sinistral large, convex, filling the excavation at the apex of the genital segment; its apex broadly rounded.

Color pale green, becoming yellowish, especially on the head and beneath; the color on the elytra apparently coagulated so as to leave irregular pale spots and marks. Vertex and pronotum sometimes with a continuous pale median line. Antennæ and legs soiled yellowish; the tibial bristles, tips of the tibiæ and apical one-half of the tarsi black. Membrane slightly enfumed at apex; apical inner edge of the larger areole broadly green or fuscous; at the tip of the cuneus is a white area followed by a distinct fuscous cloud. Upper surface clothed with minute pale pubescence and longer black hairs, all of which are easily rubbed off.

The types were from Colorado. I found it quite common in that state and have taken a few in San Diego County, Calif., at Lakeside and Alpine, and Mr. H. G. Barber has kindly sent me a specimen from the Huachuca Mountains, Arizona, taken July 20. The mottled aspect of the elytra and the variegated membrane will distinguish this species.

#### 6. *Orthotylus flavosparsus* Sahlberg.

Small, oblong-ovate; clear green, becoming yellowish on the callosities, head and lower surface; membrane slightly enfumed, with the surface of the areoles pale green. Length 4mm. to tip of membrane.

Head about as in *viridicatus*, small with the eyes prominent in the male, less so in the female. Vertex flat with a median areolate depression before the prominent basal carina, less conspicuous in the female. Front but moderately convex, the clypeus small with its base rather above the line of the antennæ. Antennæ short, the basal joint unusually short. Pronotum as in the allied species, short and flat with prominent callosities. Elytra short, the apex of the abdomen in the male reaching to the middle of the cuneus, nearly to the apex of the membrane in the female.

Dextral hook of the male genital segment minute, rounded; sinistral rather large, broad at base, much extended outwardly

and acute at apex, the apical margin of the hook truncated across its whole width.

Color, clear green, becoming yellowish on the callosities, head, and lower surface, and the legs and antennæ pale, the latter somewhat infuscated beyond the basal joint; tip of the tibiæ and the tarsi brown or black. Upper surface clothed with black hairs, interspersed with pale buff ones, the latter segregated into roundish spots, giving the insect a mottled aspect when fresh. Membrane slightly evenly infuscated, the nervures and surface of the areoles clear green.

This European species seems to be widely distributed in the east. I have examples from Montreal, Ottawa, Lake Temagami, P. Q., and Ridgeway, Ont., also from New York, New Jersey, District of Columbia, Virginia, Ohio, and Kansas. It may at once be distinguished from its allies by the green surface of its areoles and the peculiar yellowish mottled aspect of the fresh examples.

### 7. *Orthotylus chlorionis* Say.

Closely allied to the preceding; clear green, clothed above with minute fuscous hairs, but without an intermixture of pale ones, at least in any of the numerous specimens I have seen; membranal areoles concolorous. Length  $3\frac{1}{2}$ -4mm. to tip of the membrane.

Head as in the preceding, but with the vertex and front somewhat fuller; the basal depression of the vertex narrow, ill-defined before, the basal carina prominent. Antennæ short, the first joint shorter than the head. Pronotum short, the sides straight, with the anterior angles well rounded. Callosities bounded by a sharp depressed line behind, not as prominent as in the allied species. Elytra rather short, the abdomen reaching to about the tip of the cuneus in both sexes. Tibial bristles short and weak, not longer than the thickness of the joint.

Male genital pieces very small, the dextral hook hardly more than twice longer than broad, ligulate; sinistral curved, narrow, parallel, lying along the ventral edge of the genital segment.

Color a uniform clear green, becoming yellowish on the callosities, head and beneath. Antennæ and legs dull testaceous, the apex of the antennæ somewhat infuscated. Membrane moderately infuscated, iridescent, the nervures green, vestiture of the upper surface minute and sparse, fuscous.

Say's material was from Indiana. I possess examples from Quebec, District of Columbia and California. This pale green little species may be distinguished from *flavosparsus* by the concolorous areoles and the want of intermixed pale hairs; from *fraternus* and *uniformis*, by the shorter elytra, and from *translucens*, by the dark vestiture and the genital characters of the male.

### 8. *Orthotylus fraternus*, new species.

Very close to *translucens*, but with longer elytra clothed with fuscous instead of pale hairs. Length 4mm. to tip of the elytra.

Head substantially as in *translucens*, but with a transverse linear impression before the basal carina. Antennæ obviously more slender. Pronotum shorter than in the allied species, the sides feebly concavely arcuated with the angles more rounded. Elytra longer, the apex of the abdomen not surpassing the tip of the corium, the cuneus noticeably longer. The male genital characters are very close to those of *translucens*, but there are some differences. The dextral hook is more clavate at apex, the sinistral more curved and less inflated and the ventral aspect of the genital segment is shorter and less acutely produced.

The color of the present species is distinctly darker and more olive green, becoming yellowish toward the costa; the antennæ are darker throughout, the hairs on the upper surface are distinctly fuscous instead of pale, and the longer bristles of the tibiæ are blackish.

Described from five male examples taken at La Jolla, Calif., April 29, 1914; Alpine, San Diego County, Calif., June 5, 1913, and Pasadena, Calif., in May. This species I place next to *chlorionis* on account of its fuscous vestiture, but it is very close to *translucens*, although I believe it quite distinct. The genital characters are of little value here, but the darker color, longer elytra, fuscous vestiture, slender cuneus, more slender

and dusky antennæ and the linear impression on the base of the vertex will certainly distinguish it. I have one female taken at San Diego in April, 1913, that I believe belongs here. It has the elytra shorter, with the cuneus proportionately shortened and the sides of the pronotum almost rectilinear, but it has the same rounded pronotal angles, linear impression on the base of the vertex, dusky antennæ and fuscous vestiture.

Type, male, from Alpine, in author's collection. Paratypes in Museum of California Academy of Sciences (No. 307) and in author's collection.

### / 9. *Orthotylus uniformis*, new species.

Aspect of the preceding, the head and beneath becoming more or less yellowish. Length  $5\frac{1}{2}$ -6mm. to the tip of the membrane.

Head more oblique than in the allied forms, leaving the apex more pointed when viewed from above. Eyes prominent, rounded, viewed from the side elongated and somewhat oblique. Vertex slightly flattened, the basal carina but feebly distinguished. Front but slightly convex; clypeus prominent; facial angle rather less than a right angle. Pronotum strongly narrowed before, rather flat, the callosities but little prominent, sides unusually oblique, slightly concavely arcuated; humeri prominent. Elytra long, the apex of the abdomen scarcely surpassing the base of the cuneus in the male, almost reaching to its tip in the female. Rostrum long, reaching on to the hind coxæ.

Dextral hook of the male genitalia short, straight, ligulate, its extreme apex incurved and subacute; sinistral hook long, curved in almost a semicircle, the apex slender and acuminate. Both hooks white in the dried specimens.

Color a uniform pale yellowish-green, becoming paler on the callosities, head, legs and lower surface; tip of the tarsi and of the rostrum black. Apical two joints of the antennæ infuscated. Upper surface sparingly clothed with short pale hairs. Membrane very faintly enfumed and highly iridescent, the nervures green.

Described from 15 examples representing both sexes, taken about Fallen Leaf Lake near Lake Tahoe, Calif., at an alti-



tude of 6,000 to 7,000 feet, during July, 1915. This is a tender pale green insect that must depend upon the characters of the male genitalia for final identification. I have also in my collection one pair from Salamanca, N. Y., and an example from Phoenix, Ariz., that have the same male genitalia and are otherwise inseparable from my Tahoe material.

Type, male, and allotype in collection of the University of California. Paratypes in Museum of California Academy of Sciences (Nos. 308, 309), collections of the University of California, and of the author.

#### 10. *Orthotylus translucens* Tucker.

Aspect of *uniformis*, but smaller with the head obviously shorter and more vertical and the first antennal joint shorter and thicker. Length 4mm. to the tip of the membrane.

Head small, short. Eyes unusually large and prominent; viewed from the side, ovate, reaching almost to the gula. Vertex flat with a large depressed area, the basal carina prominent but obtuse; front scarcely convex; clypeus small, the facial angle obtuse. Antennæ, first joint obviously shorter than the head when viewed from above; the second thick, scarcely thinner than the first and about four times longer. Pronotum short, one-half as long as its basal width, the anterior angles well rounded; callosities not prominent; basal lobe of the scutellum rather broadly exposed. Elytra long, the abdomen reaching to about the middle of the cuneus.

Male genitalia small, dextral hook short, a little widened toward its apex; sinistral also short and spatulate, but little longer than the dextral, its rounded apex fringed with short hairs. The large ventral aspect of the genital segment with a narrow subacute apex which rather surpasses the hooks.

Color clear green, becoming yellowish on the base of the scutellum, callosities, head and beneath. Apical two joints of the antennæ and tip of the second infuscated. Knees darker green in my examples; apex of the tarsi black. Elytral nervures darker green, most pronounced on the costal edge of the cuneus. Membrane very faintly infuscated, iridescent, the nervures pale green. Upper surface sparsely clothed with short pale hairs.

Redescribed from one pair taken on burdock growing on the bank on Niagara River at Buffalo, N. Y., June 28, 1908, and two males taken at Elma, N. Y., August 25, 1912.

I believe I have rightly identified Mr. Tucker's species as this, although certainty is impossible without reference to the type. I know, however, of no other species that answers so well to his description. The insects of this genus are without a pronotal collum and Mr. Tucker must have referred to the space anterior to the callosities as the collum.

### 11. *Orthotylus senectus*, new species.

Form of *coagulatus* but larger; whitish, irregularly dotted with green above. Length 4mm. to tip of membrane.

Head a little oblique, with the eyes two-thirds the width of the base of the pronotum. Vertex flat, twice as wide as the eyes; basal carina straight, prominent. Front strongly convex, almost overhanging the base of the clypeus. Clypeus very prominent, strongly arcuated before. Eyes prominent, viewed from the side reaching two-thirds the way to the gula. Antennæ rather short, the basal joint nearly as long as the head; third nearly or quite as long as the second. Rostrum almost attaining the apex of the hind coxæ, the first joint a little surpassing the base of the head. Pronotum formed as in *coagulatus*, the callosities prominent and the hind margin straight. Basal lobe of the scutellum but moderately exposed. Elytra as in the allied species, the costal margin gently bowing, widest opposite the tip of the clavus. Bristles of the hind tibiæ pale, shorter than the thickness of the joint.

Color whitish tinged with green on the pronotum and elytra and with fulvous on the head and legs; either side of the vertex with a faint fulvous cloud leaving the median line white. Posterior lobe of the pronotum and the elytra irregularly dotted with bluish green points. Membrane almost white, the nervures green. Upper surface sparsely clothed with short pale hairs.

Described from two female examples taken by me at Pueblo and Manitou, Colo., in July, 1900. This species is quite distinct by its whitish color dotted with green above. It doubtless lives on the whitish vegetation of the semi-arid districts

of Colorado. It is not impossible that the green elytral points may bear stiff dark hairs in fresh individuals.

Type, female, in collection of the author. Paratype, female, in Museum of California Academy of Sciences (No. 310).

## 12. *Orthotylus viridis*, new species.

Form of *dorsalis* but with the head and pronotum of *formosus*; pale green, with the head, anterior lobe of the pronotum and legs yellowish. Length 5mm.

Head as in *formosus*, a little oblique. Vertex slightly flattened, the basal carina straight and acute, not tumid and gently arcuated as in *formosus*. Front moderately convex. Clypeus small, prominent. Rostrum attaining the apex of the intermediate coxæ. Pronotum shaped as in *formosus*, with its sides feebly concavely arcuated and the humeri rounded; callosities large, but little prominent. Elytra nearly parallel, a little wider than in *uniformis*. Upper surface clothed with a minute pale pubescence.

Dextral hook of the male genitalia broad at base, tapering along its upper edge to an incurved subacute point, which nearly attains the opposite wall of the segment; sinistral slender, acute, surpassing the sinistral notch.

Color a nearly uniform green, usually quite strongly tinged with fulvous-yellow on the head, anterior lobe of the pronotum and scutellum, legs and venter, the costa often paler or whitish. Antennæ quite strongly infuscated, especially on the basal and apical joints. Apex of the tarsi blackish. Membrane whitish-hyaline, very slightly enfumed, the nervures pale green.

Described from two males and six females taken by Mr. H. H. Knight at Batavia, N. Y., July 5 and August 2, 1914, and one female taken by Mrs. Annie Trumbull Slosson at Lake Toxaway, N. C. This insect is most closely related to *formosus* and serves to connect that species with *dorsalis* and its allies on the one hand and *uniformis* and related forms on the other.

Type, male, and allotype in collection of H. H. Knight. Paratypes in collections of H. H. Knight, Mrs. A. T. Slosson, Museum of California Academy of Sciences (No. 311), and collection of the author.

13. *Orthotylus nigrinasi*, new species.

Size and form, about, of *viridicatus*, the head a little larger and the eyes larger and more prominent; color pale green, the green on the elytra segregated, leaving clear places; first antennal joint biannulate with black, the apex of the head conspicuously black. Length 4mm. to tip of the membrane.

Head large, two-thirds as wide as the hind margin of the pronotum. Eyes unusually prominent; viewed from the side, but little longer than broad. Vertex flattened, leaving the hind margin distinctly carinate almost to the eyes. Front prominent, strongly convex; clypeal sutures deep. Basal antennal joint about as long as the head, the second scarcely three times longer. Pronotum almost flat, the callosities scarcely prominent; anterior margin straight, sides feebly concave, the anterior angles but little rounded; humeri prominent. Elytra flat, the tip of the cuneus scarcely surpassing the apex of the abdomen.

Color above green, the pronotum before, head and all beneath, pale or yellowish, more or less tinged with green; the green of the upper surface being gathered into irregular patches, especially on the elytra, leaving pale areas more numerous toward the costa. Base of the vertex with a short brown longitudinal median line; neck with a square black spot behind each eye, which is scarcely noticed unless the head is exerted. Apex of the head deep black, polished, the bounding line passing across the apex of the front just above the base of the clypeus and obliquely down each side a little below the lower angle of the eyes. Antennæ pale (apical joints wanting); the first joint black at base with a broad black annulus just before the apex; second narrowly black at base and dusky toward the apex. Membrane but slightly enfumed, with a darker cloud beyond the tip of the areoles; nervures green. Vestiture wanting from the type, but apparently pale. Legs pale, apical half of the tarsi, extreme tip of the tibiæ and apex of the rostrum black.

Described from one female taken by Mr. F. Payne at El Paso, Texas, August 31, 1911. The annulated first antennal joint and the remarkably black "nose" will at once distinguish this very distinct species.

Type, female, in author's collection.

GROUP II (Subgenus *Orthotylus* ?)14. *Orthotylus ovatus*, new species.

Form nearly of *Lygus apicalis*. Ovate, broader than the typical forms of this genus; green, nearly uniform, clothed with sparse black deciduous hairs and minute white pubescence; membrane infuscated. Length  $4\frac{1}{2}$ mm. to tip of membrane.

Head broad, convex; vertex flattened, transversely depressed before the prominent basal carina. Front unusually convex, polished; clypeus small and but little prominent. Eyes large, about one-half the width of the vertex; viewed from the side ovate, a little oblique, reaching below the middle of the sides of the head. Antennæ normal, the first joint shorter than the head. Pronotum transverse, more convex than usual in this genus; anterior angles well rounded; callosities large, moderately elevated. Elytra short and broad, the costa regularly but not greatly arcuated, the apex of the abdomen passing the middle of the cuneus in the male, attaining its apex in the female. Rostrum long, reaching about to the base of the venter.

Dextral hook of the male genitalia long, widened to the truncated apex, long triangular, with a very sharp spur at the superior apical angle, this spur but little shorter than the width of the piece at that place; sinistral hook broad, ligulate, its rounded apex attaining the sinistral margin.

Color pale green, becoming more or less yellowish. Upper surface clothed with short black hairs and a minute white pubescence, easily denuded. Antennæ a little infuscated. Membrane quite strongly infuscated, usually pale at base, the nervures pale. Tibial bristles pale. Tip of the last tarsal joint black. In faded specimens the thickened costal nervure is the last to lose its green color.

Described from numerous individuals beaten from juniper trees along Glen Alpine Creek near Fallen Leaf Lake, Calif., during July.

This species is very close to *Oncotylus puberis* Uhler, but after a careful examination of the types I am unable to consider them the same.

Type, male, and allotype in collection of University of California. Paratypes in Museum of California Academy of Sciences (No. 312), collection of the University of California and author's collection.

### 15. *Orthotylus catulus*, new species.

Form of *ovatus*, but a little broader; aspect somewhat of *Oncotylus punctipes* Reut.; uniformly pale testaceous-gray or a little brownish. Length  $4\frac{1}{2}$  mm. to tip of membrane.

Head more triangular before and less convex than in *ovatus*. Vertex flattened, forming a large depressed area, rounded before; basal carina very obtuse; front but moderately convex. Clypeus large and prominent, its basal suture somewhat above the line of the antennæ. Antennæ rather short; basal joint obviously shorter than the head when viewed from above, exceeding the clypeus by less than one-third its length; second little thinner than the first. Pronotum less convex than in *ovatus*, but more so than in the *flavosparsus* and *dorsalis* groups; sides straight; anterior angles scarcely rounded; anterior margin distinctly concavely arcuated; callosities large, not prominent. Elytra broad, the costa rather strongly arcuated; apex of the abdomen reaching the base of the cuneus in the male, rather surpassing its apex in the female. Rostrum long, about attaining the base of the abdomen.

Male genital pieces very small; dextral hook short, ovate, scarcely longer than broad; sinistral broad, irregularly triangular, filling the sinistral notch, its broad apex oblique with the angle rounded.

Color a nearly uniform pale testaceous, having a whitish aspect in life; the elytra more or less infuscated, the membrane sometimes a little more deeply infuscated with the nervures pale. Pectoral pieces tinged with fulvous. Tips of the tarsi and rostrum black. Upper surface clothed with short fuscous hairs, which are but little darker than the surface of the insect. Antennæ scarcely darker at apex.

Described from numerous examples taken on *Gnaphalium uliginosum* at Hamburg, N. Y., June 6, 1909, and at Niagara Falls, June 13. The pale testaceous color of this insect gives it the appearance of being immature.

Type, male, and allotype in author's collection. Paratypes in Museum of California Academy of Sciences (Nos. 313-315), collection of the University of California and author's collection.

GROUP III (Subgenus *Diommatus* Uhler).

16. *Orthotylus languidus*, new species.

Larger than *dorsalis*, elongated, with somewhat the aspect of a *Plagiognathus*; a pale immature looking insect with faint fuscous markings in the male. Length  $5\frac{1}{2}$ mm. to tip of membrane.

Vertex flattened, the basal carina prominent, the impression before it forming two fovæ as in most of the *dorsalis* group. Front convex, especially in the female. Eyes large; in the male two-thirds the width of the vertex, in the female about one-half. Antennæ rather short. Pronotum long, its length two-thirds its basal width; sides very feebly concave, the anterior angles well rounded; callosities large, prominent. Elytra nearly parallel, the costa a little arcuated; almost subhyaline in texture; apex of the abdomen in the male reaching the middle of the cuneus, in the female attaining its apex.

Dextral hook of the male genitalia large, very broad and convex at base, the apex rather abruptly narrowed and incurved with its apex rounded; sinistral small, linear, lying along the lower margin of the very deep sinistral notch.

Color pale whitish-testaceous, with the elytra almost diaphanous and the typical markings much reduced. Upper surface clothed with rather long and dense pale hair. In the female the colors are almost uniform over the whole surface, with only the extreme tips of the tarsi infuscated. The male is quite distinctly clouded with brown or fuscous on the disk of the vertex and on the pronotum behind the callosities, and there is a faint cloud at the apex of the clavus and two elongated ones before the apex of the corium; the membrane also has an elongated fuscous mark beyond the apex of the areoles. Sides of the basal lobe of the scutellum black. Abdomen and sternum more or less infuscated with the connexivum paler.

Described from numerous examples taken on willows at Mussey's and at Grossmont in San Diego County, Calif., in

April and May. This species has a peculiar washed-out immature look, which, with its slightly larger size, will distinguish it from our other willow species.

Type, male, and allotype in author's collection. Paratypes in Museum of California Academy of Sciences (No. 316), collection of the University of California and in author's collection.

### 17. *Orthotylus formosus*, new species.

Elongate-ovate, pale green or yellowish, polished, the typical markings reduced; hind margin of the pronotum slenderly black and there is a black mark behind the callosities. Length 7mm. to tip of the membrane.

Head somewhat oblique, not so nearly vertical as in our other species. Vertex scarcely flattened, the basal carina prominent; front broad, convex, polished; clypeus narrow, prominent and strongly arcuated. Eyes not very prominent; viewed from the side, oval, oblique, reaching below the middle of the side of the head. Antennæ long, the basal joint longer than the head, surpassing the clypeus by at least three-fourths its length; second about three and a half times the length of the first. Pronotum long, much narrowed anteriorly, its length two-thirds its basal width. Callosities large, oval, the disk behind them rather strongly convex and polished. Scutellum large, its basal lobe well exposed. Elytra long with the costal margin gently arched; apex of the abdomen reaching to about the tip of the cuneus. Rostrum attaining the apex of the intermediate coxæ. Oviduct of the female long, beginning before the middle of the venter.

Color a clear pale greenish, becoming yellowish on the scutellum, pronotum, legs and lower surface; basal lobe of the scutellum and head fulvous. Antennæ and tarsi black, the basal joint of the former dusky green. Hind edge of the pronotum and an arc behind the callosities which may be extended in a sinuate transverse line, black. Vertex with two subbasal dashes and two minute approximate points before them brown; the base of the clypeus with a small fuscous spot. Elytra marked with a slender black line next the scutellum and a shorter one on the apical margin at base of the membrane; middle line of the clavus with a long fuscous ray and near the



inner angle of the corium is an oblong fuscous spot. Membrane more or less infuscated, with a pale median vitta, the nervures green. Abdomen more or less greenish with the stomata darker and the tip of the oviduct black. Upper surface sparsely clothed with pale hairs.

Described from two female examples taken from alder bushes on the south slope of Mt. Tallac above Glen Alpine Springs, near Lake Tahoe, Calif., July 30, 1915. I tried in vain to find this species on the alders growing along Glen Alpine Creek two or three hundred feet lower. It is probable that the species was not then fully in season.

Type, female, in collection of University of California. Paratype, female, in Museum of California Academy of Sciences (No. 317).

#### 18. *Orthotylus modestus*, new species.

A little broader than *dorsalis*; pale gray, the dark markings much reduced, those on the pronotum forming two transverse vittæ. Length 5mm. to tip of membrane.

Head about as in *dorsalis*. Vertex narrowly flattened before the basal carina. Front a little more convex and less polished than in *dorsalis*. Pronotum more convex and a little broader anteriorly, the sides nearly rectilinear; anterior angles well rounded; surface transversely rugose; callosities scarcely prominent, ill-defined. Basal lobe of the scutellum a little exposed. Elytra rather short, the abdomen surpassing the tip of the cuneus; costal margin regularly slightly arcuated, rather more so than in *dorsalis*. Tibial spines longer and stouter than in the allied species, distinctly longer than the thickness of the segment.

Color, female, pale greenish shading to yellowish in places, deeper green along the claval suture. Upper surface distinctly gray-pubescent. Head pale tinged with fulvous, with a brown dot on the base of the clypeus. Antennæ pale, a little infuscated. Pronotum pale with a fuscous arc behind each callosity. These arcs may unite and form a transverse vitta, not attaining the margin. Hind margin with a broader fuscous vitta, which omits the humeral angles. Basal area of the scutellum more or less fulvous. Elytra pale or somewhat greenish; the

clavus, except at base and apex, fuscous; corium with a large fuscous cloud on the inner angle, which, at the middle, has an extension toward the costa; cuneus pale. Membrane well infuscated, the nervures pale except at their base. Beneath and legs pale, more or less tinged with green, the apex of the tarsi black.

Male much darker; head above, basal joint of the antennæ, pronotum, clavus, membrane and most of the lower surface black; the black color on the corium more extended and occupying fully one-half the surface; first antennal joint black; second, brown, yellowish at base; third and fourth, fuscous.

Dextral hook of the male genitalia black, broad and strap-like, transverse, a little widened at base, its blunt apex incurved, almost reaching the sinistral wall; sinistral hook straight, apparently terete, not thicker than the second antennal joint, surpassing the apex of the ventral surface of the genital segment.

Described from five males and eight females. Of these I took two females at Salamanca, N. Y., July 20, 1911, and one at Buffalo, N. Y., August 4, 1901. Mrs. Annie Trumbull Slosson has sent me three females taken at Delaware Water Gap, Pa., and from Mr. H. H. Knight I have received three males and two females taken at Honeoye Falls, N. Y., July 1, 1915, and two males taken at Batavia, N. Y., July 10, 1914.

Type, female, in collection of author. Allotype, male, in collection of H. H. Knight. Paratypes in collections of H. H. Knight, Mrs. A. T. Slosson, Museum of California Academy of Sciences (No. 318) and in author's collection.

### 19. *Orthotylus dorsalis* Provancher.

Elongated with the elytra nearly parallel; black; head, at least the occiput, sides and median vitta, usually, of the pronotum, broad costal margin, lower surface excepting a broad lateral vitta, legs and the antennæ of the female, pale or greenish. Length 5-5½mm. to tip of membrane.

Head almost vertical. Eyes prominent, especially in the male; viewed from the side oval, little longer than broad; reaching below the middle of the head. Vertex narrowly flattened and a little excavated before the basal carina; in the male but little broader than the eye, about twice as broad in the fe-

male. Front moderately convex, polished; clypeus small, but little prominent. Antennæ rather short, the basal joint as long as the head; second about three and one-half times as long as the first. Pronotum rather long and much narrowed before, its length two-thirds its basal width, the sides distinctly concavely arcuated with the anterior angles well rounded; surface rather flat, obscurely transversely rugose; callosities large, oval, moderately prominent, distinctly separated by a depressed area. Basal lobe of the scutellum well exposed. Elytra nearly parallel, the costa feebly arcuated; tip of the abdomen nearly attaining the apex of the cuneus in the male, quite so in the female.

Male genital hooks black; the dextral large, slender at base and expanded to an oblique triangular apex which passes the middle of the anal opening; sinistral hook finger-like, considerably surpassing the apex of the segment, clothed with minute hairs.

Color above black; beneath pale with a blackish vitta along each side, which in the male may be so extended as to cover nearly the entire lower surface. Pronotum pale with two approximate black dorsal vittæ which in the male are so extended as to cover nearly or quite the entire surface. Head in the male black, polished, with the occipital margins, antennal sockets, lower cheeks and tip of the clypeus pale; in the female pale with a large brown annulus on the front and sometimes with two small points above it and a large black spot between the antennæ covering the disk of the clypeus, apex of the front and inner cheeks. Antennæ black in the male, pale and somewhat infuscated in the female. Scutellum black, with a pale median vitta in the female and sometimes in the male. Pale costal border of the elytra encroaching upon the black disk along the claval suture and principal nervure, especially in the female; cuneus pale with the apex a little infuscated at times. Membrane infuscated, the nervures pale and with a pale spot at their apex in the female. Legs pale, the weak tibial bristles also pale, the apex of the tarsi black. Upper surface sparsely clothed with minute pale hairs.

Redescribed from a good series taken at Quinze Lake, P. Q., and about Buffalo, N. Y. It occurs on willows. I would not be surprised to learn that the females of this species are

dimorphic, some of them being like the males in color. I have carefully studied the types of both Provancher's and Uhler's species (*congrex*) and they seem to be absolutely identical.

## 20. *Orthotylus marginatus* Uhler.

Closely allied to *dorsalis*, but with the females colored dark like the males and with different male genital characters. Length 5½mm. to tip of membrane.

Vertex but little flattened, with a slight depression before the feeble basal carina; front but slightly convex, polished; clypeus small and less prominent than in most of our species. Eyes unusually large; viewed from the side broadly ovate, reaching nearly to the gula, very little smaller in the female than in the male. Pronotum almost smooth, the sides distinctly concave, the anterior angles well rounded; callosities prominent, usually connected anteriorly by a slight ridge. Basal lobe of the scutellum well exposed. Elytra long, nearly parallel, the costal margin but feebly arcuated; apex of the abdomen reaching the middle of the cuneus in the male and nearly to its tip in the female. Upper surface rather sparsely clothed with pale appressed hairs. Rostrum long, reaching well on to the hind coxæ.

Dextral hook of the male genitalia large, pale, reaching nearly across the anal opening, its apex obliquely rounded and armed with a few comb-teeth, near the base produced dorsally and backward in a sinuated acute projection which is about one-half as long as the lower member; sinistral hook long, flattened and expanded at the rounded apex, produced for one-half its length beyond the ventral apex of the genital segment.

Color as in the male of *dorsalis*, black; occiput, lower cheeks, gula, base of the vertex, median vitta of the pronotum, at times continued over the scutellum, and the sternum, pale or tinged with fulvous; costal margin of the elytra, middle of the venter and the legs pale greenish-yellow. Pale color of the costa sometimes encroaching upon the base of the clavus along its suture and on the principal nervure of the corium in the female, rarely in the male; inner angle of the cuneus usually infuscated. Membrane blackish with the nervures pale at apex.

Redescribed from a good series taken, with *dorsalis*, on willows and thorn bushes, there probably accidental. The males of this species and of *dorsalis* are nearly indistinguishable except in their genital characters, but in *dorsalis* they more often have the pronotum and scutellum entirely black.

### 21. *Orthotylus molliculus*, new species.

Allied to *dorsalis* with the dark markings much reduced, the face with a black X-shaped mark. Length 5mm. to tip of membrane.

Head broader than in the allied species. Vertex flattened, with a distinctly foveate impression before the prominent basal carina. Front but slightly convex; clypeus small. Eyes large, nearly two-thirds the width of the vertex; viewed from the side short, ovate, reaching nearly to the gula. Antennæ short; third and fourth joints together not three-fourths the length of the second, the fourth about equal to the first and two-thirds the length of the third, a little dilated and flattened at apex. Pronotum shorter than in *dorsalis*, more convex, the sides feebly concave, the anterior angles rounded; callosities large, closely approximated, moderately elevated. Basal lobe of the scutellum but little exposed. Elytra rather short, about as in female *dorsalis*, the apex of the abdomen hardly reaching to the middle of the cuneus.

Male genitalia whitish; dextral hook rather large, a little curved inward and upward, the apex truncate and drawn out dorsally into about four sharp teeth, near the base with an oblong plate projecting dorsally, the inner angle of which is produced in an acute tooth; sinistral hook long and spatulate, much exceeding the ventral aspect of the segment.

Color whitish-testaceous, perhaps tinged with green in life, with a slight tint of yellow on the head and scutellum; the basal lobe of the scutellum marked with black and fulvous. Face marked with a large black X from the antennæ to the basal fovæ, the pale angle above the clypeus sometimes filled in with black; clypeus and outer cheeks in part black. Antennæ black. Callosities black, connecting with a large fuscous spot on either side of the disk of the pronotum. Sides and suture of the scutellum black. Elytra pale with a fuscous cloud

covering the disk of the clavus, another on the corium within, exterior to which is a short fuscous ray; cuneus entirely pale. Membrane blackish-fuscous, the nervures pale at apex. Extreme base of the elytra touched with fuscous. Pleural pieces mostly black. Abdomen black with the disk and margins pale. Legs very pale green, the tarsi infuscated and black at apex. Upper surface clothed with short pale pubescence.

Described from two male examples taken on willows at Mussey's and near Grossmont, San Diego County, Calif., in April and May, 1913.

Type, male, in author's collection. Paratype, male, in Museum of California Academy of Sciences (No. 319).

## 22. *Orthotylus affinis*, new species.

Very near *molliculus*, a little larger and darker with the basal joint of the antennæ pale, the pronotum narrower before, the pale costal border broader and not marked with a fuscous ray, the sides of the body beneath scarcely marked with black, and a different male genitalia. Length 6mm. to tip of membrane.

Head as in *molliculus*, the vertex strongly impressed before the prominent basal carina, the clypeus but moderately prominent. Eyes oval, viewed from the side proportionately narrower than in the allied species. Pronotum apparently longer, the pale space before the callosities broader and the anterior angles much rounded, making the anterior margin look shorter. Legs longer, the hind femora distinctly surpassing the tip of the abdomen.

Male genitalia larger, pale; the dextral hook produced into a long sickle-shaped piece, acute at apex and serrated for a space along the external edge, the base angled but without a square projection, the curve forming a little more than a half circle; sinistral hook longer, a little curved and distinctly expanded toward the apex.

Color a very pale testaceous or greenish. Vertex with a pair of subtriangular black marks in the foveate basal impressions. Front with a blackish arc on either side, united above where they nearly or quite connect with the basal marks; on the base of the clypeus is a black polished spot which encroaches

upon the outer cheeks. Antennæ dark greenish-piceous, the basal joint more green. Sides of the pectus and abdomen with a narrow blackish vitta which is wanting in the female. Pronotum marked with a broad black vitta on either side, usually connected with the black callosities. Scutellum black, the anterior lobe sometimes marked with fuscous, the posterior with a linear median pale vitta. Elytra blackish-fuscous, the broad costa and a slender line along the commissure and suture of the clavus pale, the cuneus entirely pale. Membrane deeply infuscated, the nervure pale except at base. Legs greenish, the tibiæ more dusky, the apex of the tarsi black.

Described from numerous examples taken from willows about Fallen Leaf Lake, near Lake Tahoe, Calif., in July, 1915. Best distinguished from *molliculus* by the narrower and more rounded anterior margin of the pronotum, the linear pale vitta on the scutellum, the narrower blackish lateral vitta beneath, the want of a fuscous ray in the pale costal area, and the dark olive-green antennæ which become blackish at times. Male genital hooks much more developed and very characteristic.

Type, male, and allotype in collection of University of California. Paratypes in Museum of California Academy of Sciences (Nos. 320, 321), collection of the University of California and in author's collection.

### 23. *Orthotylus angulatus* Uhler.

Smaller and more slender than *dorsalis*; dark fuscous-brown, base of the pronotum sometimes paler, the base of the corium and the cuneus whitish. Length 4mm. to tip of membrane.

Head short. Vertex short, with an impressed line before the obtuse basal carina; in the female this line connects with two fovæ which are nearly obsolete in the male. Clypeus large, prominent. Eyes large, about two-thirds as wide as the vertex; viewed from the side oval, nearly reaching the line of the gula. Antennæ stout and rather long, the basal joint longer than the head viewed from above; third and fourth slender, together about as long as the second. Pronotum rather short, the sides nearly rectilinear, the anterior angles rounded; callosities large, approximate, little elevated. Anterior lobe of the scutellum

covered or nearly so. Elytra parallel, narrow, apex of the abdomen but little surpassing the base of the cuneus in the male, hardly attaining its apex in the female. Rostrum and hind tibiæ unusually long, the former attaining the base of the hind coxæ.

Redescribed from two females, one taken by me at Denver, Colo., July 12, 1900, the other, also from Colorado, was sent to me by Prof. Carl F. Baker with the label *Diommatius angulatus* Uhler; they, however, differ from Uhler's description in several points. The clypeus is paler in one of my specimens and not darker in the other, the hind lobe of the pronotum is distinctly paler and the clavus is deep fuscous and not pale yellowish as described by Uhler. There is, however, just such a pale area on the base of the corium adjoining the claval suture. The apex of the cuneus is also but little darkened. These discrepancies can all be accounted for by the ordinary variations found in this genus except the pale clavus, a character found in no species of this genus known to me. It is not unlikely that Dr. Uhler thoughtlessly mistook the cuneate pale mark on the base of the corium for a pale clavus. Unfortunately I have no males of this form.

An examination of one of Uhler's types, kindly sent to me for study by Prof. Gillette, confirms in every respect my determination as given above.

#### 24. *Orthotylus angulatus brunneus*, new subspecies.

This form is very close to that described above as *angulatus* except that the pale mark on the base of the corium is reduced to a line along the claval suture, and the costal margin is narrowly pale.

Male genitalia small; dextral hook ovate at apex; the sinistral lying along the margin of the sinistral notch, its apex curved upward and acute.

Founded on numerous examples taken on willows at many localities in San Diego County, Calif., from April to June. It is possible that an examination of the male genitalia of *angulatus* will show this to be a distinct species, but that is not likely to be the case.



Type, male, and allotype in author's collection. Paratypes in Museum of California Academy of Sciences (Nos. 322, 323), collection of the University of California and in author's collection.

25. *Orthotylus cuneatus*, new species.

Very near *angulatus brunneus*, but larger with longer elytra and darker colors; marked as in *angulatus* with a pale wedge-shaped area along the claval margin of the corium. Length 5mm.

Head as in *brunneus*, the vertex with a deep foveate impression before the prominent basal carina. Front feebly convex. Clypeus small, prominent. Antennæ long; basal joint rather longer than the head; second longer than the third and fourth together. Pronotum short, the sides very oblique, sinuated; humeri subacute, prominent; the anterior angles rounded; callosities large, prominent. Elytra long, parallel.

Male genitalia small; dextral hook small, longer than broad; sinistral a little longer, lying in the sinistral notch, its hind edge rounded.

Color sooty-black, a little piceous in immature examples, the antennæ piceous. Legs dark chestnut, the anterior paler or brownish-testaceous in some individuals; coxæ and base of the femora pale testaceous. Elytra with a large wedge-shaped whitish mark lying against the claval suture; apex of the corium and base of the cuneus covered by a rather large whitish spot. Membrane nearly black, a little clearer toward the apex, the nervures black.

Described from two males and five females taken by me about the lower end of Fallen Leaf Lake, Calif., in July, 1915. Structurally this species is very near *brunneus*, but its larger size and stronger coloring, together with the cuneate mark on the base of the corium, will readily distinguish it.

Type, male, and allotype in collection of University of California. Paratypes in Museum of California Academy of Sciences (No. 324), collection of University of California and in author's collection.

26. *Orthotylus pullatus*, new species.

Closely allied to *brunneus*; blackish, the costal margin narrowly pale; male genital segment long and unusually slender. Length  $4\frac{1}{2}$  mm. to tip of membrane.

Basal impression of the vertex large, including two conspicuous pits, the basal carina prominent; front but moderately convex. Eyes, viewed from the side, ovate, reaching nearly to the gula. Pronotum proportionately shorter than in *brunneus*, the sides distinctly arcuated with the humeral angles subacute and upturned; callosities large and prominent. Elytra a little more widened toward the apex of the corium than in the allied species. Antennæ a little thinner than in *brunneus*, the third and fourth joints together scarcely as long as the second.

Genital segment of the male in *brunneus* triangular, hardly longer than broad at base; in *pullatus* nearly cylindrical, about twice as long as wide at base, the apex elliptically rounded. Genital hooks small and black; the dextral elongate ovate, curved inward and backward at apex; the sinistral elongated, lying along the sinistral notch, its apex rounded.

Color blackish-fuscous. Head black, apex of the clypeus sometimes touched with castaneous. Antennæ black. Pronotum at times showing a mere tinge of castaneous behind the callosities. Coxæ at base and the middle of the sternum and venter pale. Elytra a shade paler than the body, the costal margin narrowly pale and extended nearly to the apex of the cuneus. Membrane nearly black, the nervures concolorous or barely touched with pale at apex. Legs dark castaneous. Upper surface clothed with pale pubescence.

Described from one male and eight female examples taken by me May 13, 1915, on willows growing among the sand dunes at San Francisco, Calif. This species is best distinguished from the closely allied *brunneus* by the darker color, the prominent, subacute, humeral angles, and the long, narrow male genital segment.

Type, male, and allotype in collection of University of California. Paratypes in Museum of California Academy of Sciences (No. 325), collection of University of California and in author's collection.

27. *Orthotylus cruciatus*, new species.

Allied to *lateralis* but much larger with a black scutellum. Aspect somewhat of *Plagiognathus obscurus* Uhl., but larger and more clearly marked. Length  $5\frac{1}{2}$ -6mm. to tip of membrane.

Head small, polished. Vertex slightly depressed, the basal carina slender and inconspicuous; front convex, highly polished; clypeus small, prominent. Eyes very large, much wider than the vertex; viewed from the side ovate, reaching about to the gula; the apex of the head projecting more than in *lateralis*. Antennæ long, the first joint longer than the head; second scarcely thinner, fully four times the length of the first; apical two together about equal to the second. Pronotum long, nearly flat, the sides feebly concave, the anterior angles subacute; callosities large, little elevated, extending much farther back than in *lateralis*; basal margin feebly concave, leaving the base of the scutellum less exposed. Elytra long, parallel, the apex of the abdomen just passing the base of the cuneus in the male, reaching nearly to its middle in the female; cuneus narrow and acute, its length fully twice its basal width.

Male genitalia pale testaceous; dextral hook long-triangular, its lower angle subacute, the upper rounded; sinistral ligulate and incurved.

Color black and nearly white. Head black, polished; a dot against the inner angle of each eye and sometimes a basal spot pale testaceous or fulvous. Antennæ black. Pronotum with the callosities and broad lateral margins black, the disk pale. Scutellum black, the basal lobe marked with fulvous. Elytra whitish, the clavus and a broad transverse band across the apex of the corium black; cuneus with a fuscous spot before its apex. Upper surface sparsely clothed with short, pale hairs. Beneath pale with a broad black vitta along either side and covering the genital segment. Legs pale yellowish-brown, becoming lighter at base, the tips of the tarsi black.

Described from seven examples, two males and one female, taken by me at Portland, Maine, July 9, 1910; a female taken by Mr. Metcalfe at St. Hilaire, P. Q., July 4, 1907; one male taken by Mr. C. A. Frost at Sherborn, Mass., June 24, 1914, a female taken at Marshfield, Mass., in August, from the

collection of the Boston Society of Natural History, the last two kindly sent me for study by Mr. H. C. Parshley, and a male taken at Stowe, Vt., July 4, by G. P. Engelhardt. This is a large, clearly marked species and may be known by the black lateral margins of the pronotum and conspicuous cruciate black markings on the elytra.

Type, male, and allotype in author's collection. Paratypes in Museum of California Academy of Sciences (No. 326), collections of the Boston Society of Natural History of Mr. H. C. Parshley, and in the collection of the author.

### 28. *Orthotylus lateralis*, new species.

A little larger and broader than *brunneus*; pronotum pale with the lateral margins broadly black. Length  $4\frac{1}{2}$ mm. to the tip of the membrane.

Head more oblique than in *dorsalis* and its allies. Vertex flat, the foveate depression rather obscure and the basal carina feeble. Front convex, polished, the clypeus small and prominent. Eyes very large, in the female as wide as the vertex, wider in the male; when viewed from the side, ovate, reaching to the gula and but little surpassed by the apex of the head. Pronotum long and much narrowed anteriorly, the sides very slightly arcuated, the anterior angles subacute; callosities very small and placed close to the anterior margin, leaving the impressed bounding line behind them at about the anterior one-third of the pronotum; hind margin a little concave, leaving the basal lobe of the scutellum broadly exposed. Elytra broader than in *brunneus*, about as in *modestus*, nearly parallel, the apex of the abdomen reaching the middle of the cuneus in the male and its apex in the female.

Male genitalia prominent; dextral hook long, pennate, the ventral edge smooth, the dorsal "feathered" or flattened and serrated on the apical half, tapering to an acute point; sinistral long, nearly straight, toward its apex triangularly widened and armed within with a stout tooth.

Color fuscous-brown; head at base and below becoming pale yellowish. Antennæ black. Pronotum pale yellowish, the sides broadly black both above and below. Basal lobe of the scutellum fulvous, apical pale yellowish. Clavus blackish-

fuscous, the commissure and apex whitish; corium fuscous, the claval suture, slender costal nervure and a ray along the principal nervure, whitish; cuneus fuscous with the basal half almost white. Membrane lightly infuscated, with a darker ray beyond the angle, the nervures fuscous. Sides of the pleural pieces and venter fuscous, the middle line broadly whitish. Legs tinged with yellow, deeper toward the apex of the hind femora; tip of the tarsi black. Upper surface sparsely clothed with pale hairs. In the female the pale colors are much extended.

Described from two males and two females taken by me at Effingham, Kansas, Pueblo and Denver, Colo., all in July, 1900. This species is readily recognized by the yellowish tinge to the vertex and pronotum with conspicuous black lateral margins to the latter and the fulvous base of the scutellum.

Type, male, and allotype in author's collection. Paratypes in collection of the author and in Museum of California Academy of Sciences (No. 327).

### 29. *Orthotylus knighti*, new species.

Allied to *lateralis*, but longer winged and darker colored, the elytra black with a subcostal pale vitta, which in the female reaches and largely covers the cuneus. Length 5mm. to tip of membrane.

Head short as in *lateralis*. Vertex much depressed and sunken below the level of the eyes; basal impression triangular with the fovæ discernable, the basal carina slender but distinct. Front but little convex, polished; clypeus small, strongly arched before. Eyes very large and prominent; in the male as wide as the vertex, about one-half narrower in the female; viewed from the side, broad ovate, reaching nearly to the gula. Pronotum much narrowed anteriorly; sides distinctly arcuated, the humeri prominent and the anterior angles subacute; callosities prominent, oblique. Elytra long, parallel, the costa straight; cuneus slender. Basal lobe of the scutellum well exposed. Antennæ as in *lateralis*, the basal joint perhaps a little longer.

Dextral hook of the male genitalia black, subtriangular, transverse, its lower edge straight, the upper oblique with the

obtuse apex incurved; sinistral finger-like or a little thickened toward its apex, a little shorter than the dextral.

Color black, polished on the front and clypeus; vertex, occipital margins and antennal sockets obscurely fulvous. Disk of the posterior lobe of the pronotum in the female broadly dull fulvous, the callosities tinged with the same color. In the male this fulvous disk is much reduced. Coxæ and legs pale fulvous, the apex of the femora and tibiæ becoming infuscated, in the male almost black, the tip of the tarsi black. Disk of the corium in the female with a whitish vitta, broadest near the base and expanded on the cuneus so as to cover all but the inner angle and apical margin. In the male this pale ray is much reduced and confined to the base of the corium. Membrane black with a pale line along the apical margin of the cuneus, which sometimes encroaches upon the apex of the nervures.

Described from one male and three female examples taken on willow at Batavia, N. Y., July 5, 1914, by Mr. H. H. Knight, who has kindly sent them to me for study and to whom it gives me pleasure to dedicate this interesting species.

Type, male, and allotype in collection of H. H. Knight. Paratype in author's collection.

### 30. *Orthotylus ornatus*, new species.

Size of *formosus*, but proportionately broader. Pale greenish varied with fuscous and sometimes tinged with sanguinous; median line of the pronotum and apical field of the scutellum in the female pale. Length 6mm. to tip of the membrane.

Head vertical. Vertex flat, but little depressed; the fovæ obscure, basal carina distinct. Front scarcely convex; clypeus narrow, moderately prominent. Eyes large, about two-thirds the width of the vertex; viewed from the side broad ovate, but little narrowed below, reaching nearly to the gula. Pronotum broad, rather flat; sides a little concavely arcuated, the humeri prominent; anterior angles but little rounded; surface opaque and distinctly shagreened; callosities little elevated. Antennæ short; first joint as long as the head; second nearly as long as the head and pronotum together; third and fourth conjointly about two-thirds the length of the second. Basal lobe of the scutellum somewhat exposed. Elytra broad, the costa a little

bowing; cuneus long and narrow, scarcely attaining the tip of the abdomen in the female, surpassing it in the male. Rostrum short, reaching on to the intermediate coxæ.

Dextral hook of the male genitalia broad on its basal half, the ventral margin abruptly produced and incurved at the apex which nearly attains the sinistral margin of the segment; sinistral hook slender and incurved.

Color pale green; sides of the venter and pectus more or less infuscated or black, almost entirely fuscous in the male. Head greenish or reddish-brown; the basal fovæ and two approximate spots on the base of the front fuscous, the latter sometimes forming vittæ; clypeus pale anteriorly. Pronotum dark reddish fuscous, becoming black laterally and behind the callosities or entirely black in the male; median line sometimes enlarged so as to cover the disk posteriorly; lateral edges and the surface anterior to the callosities pale or whitish in the female. Scutellum black, the basal lobe sometimes with a red spot on either side, the disk of the apical lobe pale. Elytra pale or tinged with reddish, the clavus infuscated, at least apically; apical half of the corium irregularly fuscous, omitting the slender costal and apical margins; cuneus whitish, fuscous at apex in the male. Membrane infuscated, the disk of the areoles nearly black, with a darker ray beyond them. Antennæ rufo-testaceous, infuscated at apex, the basal joint brown or black. Legs pale; hind femora infuscated on the apical two-thirds; tips of the tarsi black.

Described from three females and one male taken at Honeye Falls, New York, in June and July, 1915, by Mr. M. D. Leonard and kindly sent to me for study by Mr. H. H. Knight. The large size and maculated membrane will distinguish this species. It has somewhat the aspect of *Lopidea cuneata* Van D. or of a *Plagiognathus*, but the free connivent arolia and other characters show it to be a true *Orthotylus*.

Type, male, and allotype in collection of H. H. Knight. Paratypes in collections of H. H. Knight and the author.

### 31. *Orthotylus submarginatus* Say.

Allied to *lateralis*, but rather more slender. Color above, pale salmon yellow, median vitta and slender costal line on the

elytra and the pronotal margins black. Length 4mm. to tip of the membrane.

Head vertical; base of the vertex depressed, the basal carina prominent. Pronotum a little narrower than in *lateralis*, the humeral angles more prominent; surface sloping, scarcely convex, nearly smooth. Basal lobe of the scutellum well exposed. Elytra nearly parallel; the apex of the abdomen nearly attaining the tip of the cuneus.

Color light salmon-yellow. Tip of the head with a polished black spot covering the apex of the front, inner cheeks and base of the clypeus. Margins of the pronotum rather broadly black both above and below, the black being continued around the humeral angles for a little way. Apical lobe of the scutellum infuscated. Elytra salmon-yellow; a straight commissural vitta covering about one-third of their width and a subcostal line reaching nearly to the apex, black; cuneus pale, its extreme tip touched with fuscous. Beneath pale with a broad black vitta along each side, meeting on the genital segment. Legs pale, the hind tibiæ infuscated or black; tarsi black at apex.

Redescribed from two female examples, one from Kingston, R. I., taken in August, the other taken by me at Hamburg, N. Y., July 10, 1898. The salmon color with the black median vitta and pronotal margins and the submarginal black line on the costa will readily distinguish this pretty species.

### 32. *Orthotylus candidatus*, new species.

Aspect of *formosus*, but smaller, more nearly allied to *submarginatus*. Almost white, a little tinged with yellow or fulvous; median line of the head and scutellum and the sides of the pronotum narrowly black. Length 5mm.

Head as in *formosus*, more oblique than in most of our species. Vertex considerably depressed, the basal carina prominent and conspicuous. Front polished, but little convex. Clypeus almost tumidly prominent, highly polished. Eyes large, viewed from the side oval and reaching nearly to the gula. Rostrum scarcely attaining the base of the intermediate coxæ. Pronotum as in *submarginatus*, the callosities large, little elevated, their inner margins parallel and closely approximated,



behind distinguished by a feebly arcuated conspicuous transverse impressed line. Basal lobe of the scutellum moderately exposed. Elytra subhyaline.

Color very pale testaceous, almost white, tinged with yellow on the pronotum, scutellum and legs, and with fulvous on the head, the basal carina of the vertex being of a deeper fulvous. Middle line of the vertex and front, a transverse line between the antennæ, narrow lateral margins of the pronotum, a median vitta on the scutellum, expanded on the basal lobe, and the slender scutellar and commissural edges of the clavus, black. Beneath with a broad percurrent black vitta on either side. Basal joint of the antennæ black; the second ferruginous, fuscous on apical third; third fuscous. Tips of the tibiæ and the tarsi darker. Elytra whitish-testaceous, subhyaline, with an obscure fuscous line inside the principal nervure; the apex of the costal area touched with fulvous. Membrane faintly infuscated, the nervure brownish, the surface of the areole milky-hyaline. Surface very minutely pale pubescent.

Described from a single female example taken by Mrs. Annie Trumbull Slosson on Mt. Washington, N. H. This interesting addition to our Capsid fauna may be distinguished by its whitish color marked with a black line on the vertex, scutellum, sides of the body beneath, and narrow lateral margins of the pronotum. The male is likely to be more broadly marked with black.

Type, female, in collection of Mrs. A. T. Slosson.

### 33. *Orthotylus necopinus*, new species.

Allied to *dorsalis*, but much larger and a little more widened posteriorly; dark fuscous brown with an obscure dorsal vitta and a pale arc at the base of the cuneus. Length  $6\frac{1}{2}$ mm. to tip of membrane.

Head as in *dorsalis*, the vertex much flattened, almost excavated before the very prominent basal carina. Front rather prominent, polished; clypeus less prominent than in the allied species, its incised base a little below the line of the antennæ. Eyes large, viewed from the side ovate and reaching nearly to the gula. Pronotum as in *dorsalis*, well narrowed anteriorly; callosities small, prominent; posterior lobe transversely rugose;

hind margin a little concave, leaving the basal lobe of the scutellum moderately exposed. Elytra gradually widened almost to the apex of the corium, the abdomen nearly attaining the tip of the cuneus. Tibial bristles short and weak, concolorous with the tibiæ. Rostrum short, hardly attaining the base of the intermediate coxæ.

Dextral hook of the male genitalia large, mushroom-shaped, with its distal margin oblique and parallel with the edge of the segment, its apices rounded; sinistral hook linear and strongly incurved; both hooks pale.

Color brownish-fuscous, becoming black on the front of the head and along either side of the body beneath. Base of the vertex, an elongated spot against the inner margin of each eye and the median line pale or greenish. Anterior margin of the pronotum before the callosities and the middle of the posterior disk pale or greenish, the anterior margin sometimes tinged with ferruginous. Median vitta of the scutellum pale or somewhat ferruginous. Commissural and costal nervures slenderly pale; a pale ray on the base of the corium within the costa extending a little beyond the tip of the scutellum, and a less conspicuous commissural mark from the tip of the clavus to the base of the membrane; incisure at base of the cuneus pale. Membrane deeply infuscated with its nervures pale and with a whitish mark against the apex of the cuneus. Antennæ black. Rostrum and legs brownish-testaceous, the tarsi becoming black. Beneath black and polished with a broad indefinite whitish median vitta extending as far as the genital segment.

Described from one male taken on Mt. Washington, N. H., by Mrs. Annie Trumbull Slosson; a female taken on Mt. Washington, July 5, 1914, and sent to me by Mr. H. H. Knight; a female taken by me at Bretton Woods at the foot of Mt. Washington, June 30, 1909; and another taken at Spring Brook, near Buffalo, N. Y., June 25, 1911. The large size and dark brown color of this species will readily distinguish it. In the male the basal pale ray on the corium is considerably extended.

Type, male, in collection of Mrs. A. T. Slosson. Allotype, female, in collection of the author. Paratypes in Museum of

California Academy of Sciences (No. 328), collection of H. H. Knight, and author's collection.

34. *Orthotylus fumidus*, new species.

A large fuscous form clothed with gray pubescence. Length 6mm. to tip of membrane.

Head distinctly oblique; vertex scarcely flattened, the basal carina apparently wanting; front hardly convex, transversely striate; clypeus large, but little prominent; apex of the cheeks tumid. Eyes large, prominent; viewed from the side a little oblique, almost attaining the line of the gula. Pronotum moderately sloping, nearly flat, the sides almost rectilinear; callosities large, flat. Basal lobe of the scutellum narrowly exposed. Abdomen reaching to the tip of the cuneus. Legs long for this genus. Rostrum short, not attaining the base of the intermediate coxæ.

Color a uniform fuscous-brown, probably nearly black when fully mature; tinged with rufous on the head, apex of the pronotum, and base of the legs; sides of the venter with a black vitta. Membrane blackish, the nervures of the smaller areole pale. Whole surface clothed with short white deciduous hairs.

Described from one female example taken by me at Ft. Collins, Colo., July 28, 1898. This individual may be somewhat immature, but, while not typical of this genus, the species evidently belongs here and is included to complete the enumeration of our species, so far as they are known to me.

Type, female, in author's collection.

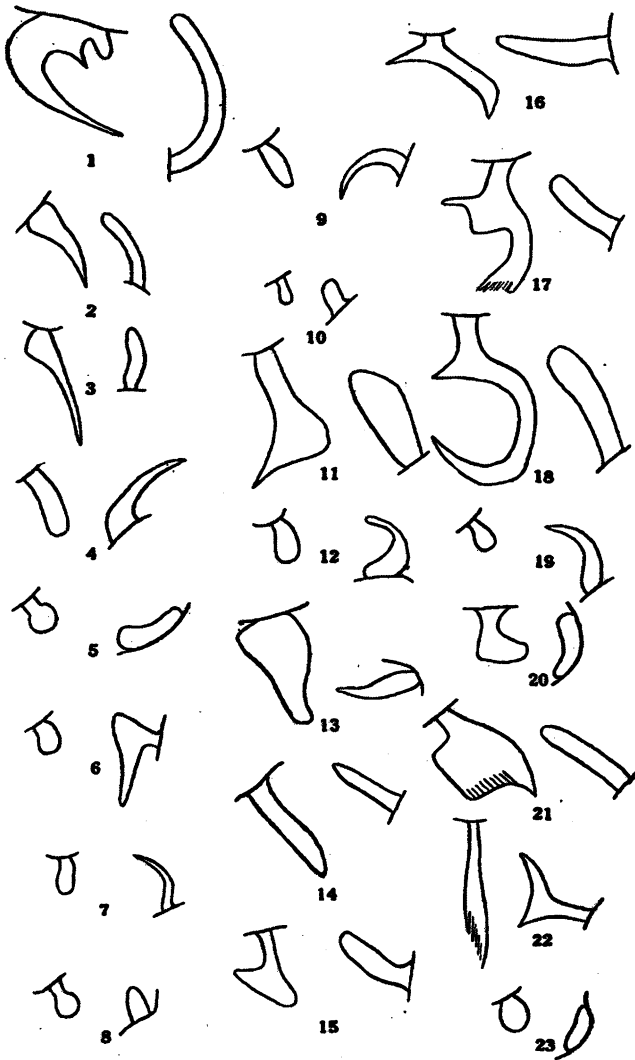


Fig. 1. Male genital hooks of the species of *Orthotylus*, as viewed from a point vertical to the plane of the hook.

1, *Orthotylus insignis*; 2, *tibialis*; 3, *ferox*; 4, *viridicatus*; 5, *coagulatus*; 6, *flavosparsus*; 7, *chlorionis*; 8, *fraternus*; 9, *uniformis*; 10, *translucens*; 11, *ovatus*; 12, *catulus*; 13, *languidus*; 14, *modestus*; 15, *dorsalis*; 16, *marginatus*; 17, *molliculus*; 18, *affinis*; 19, *brunneus*; 20, *pullatus*; 21, *cruciatu*; 22, *lateralis*; 23, *cuneatus*.

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