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A STUDY OF NORTH AMERICAN GRASS-BUGS
OF THE GENUS IRBISIA

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Four species of *Irbisia* have heretofore been reported from North America: *sericans* Stål, from Alaska; *brachycerus* Uhler, from Colorado; *solani* Heidemann, from California; and *mollipes* Van Duzee, from California. Six new forms are now added, making ten known species, for the separation of which a key is appended.

1. *Irbisia castanipes*, new species

Surface dull black, less polished than in most of our species; vestiture pale, rather long, appressed; legs uniformly castaneous; dextral male clasper long. Length 6 mm.

Head oblique, its length beyond eye one-third greater than greatest length of eye; vertex flattened; temporal areas conspicuous, shagreened; antennal segment II three times length of I, III and IV equal. Pronotum transversely rugose or obscurely punctate, the callosities small, shagreened; scutellum minutely transversely wrinkled; elytral punctures obscure. Vestiture very minute and sparse, cinereous; sides of pronotum with a few longer erect pale hairs anteriorly. Rostrum reaching apex of intermediate coxæ; lower surface polished. Sinistral clasper of male rather narrow, broadly curved, the sub-acute apex straight; dextral clasper short, little exceeding ventral apex of genital segment.

Color, opaque bronze-black above and on sides of pronotum; beneath deep polished black; legs castaneous, the femora and tarsi usually darker; apex of coxæ and base of trochanters pale; anterior margin of intermediate and posterior coxal cavities and the orifices polished ivory white.

Described from two males and nine females taken by me on pine at Keen Camp, San Jacinto Mts., Calif., June 6-12, 1917, at an altitude of 5000 to 7000 feet. This species agrees with *sericans* Stål, in the opaque surface, but the latter has the vestiture much longer and conspicuously gray, the dextral male clasper much longer, head less produced beyond eye, knees and tibiæ mostly pale, and all coxal cavities white. Of *sericans* I have before me two males, one macrop-terous and one brachypterous, taken by Dr. E. C. Van Dyke in Unalaska, the former at Glacier River, July 2, 1907, the latter at Mokushin Bay, July 15, 1907, one pair from Vancouver Island taken by the late Geo. W. Taylor, and a series taken by Dr. G. Dallas Hanna on the Pribilof Islands, Alaska.

Holotype, male, No. 798, and *Allotype*, female, No. 799, Mus. Calif. Acad. Sci.

Type locality, Keen Camp, San Jacinto Mountains, Calif.

2. *Irbisia californica*, new species

Polished black; vestiture long, golden-gray, suberect; legs fulvous or fulvo-testaceous; membrane with pale mark at apex of cuneus; sinistral male clasper large, abruptly el-bowed. Length about 7 mm.

Head oblique, produced beyond eye for a space one-half greater than length of eye; eye produced and much narrowed below; vertex flattened between antennæ; clypeus abruptly depressed at tip; temporal areas poorly distinguished; segment II of antennæ three times length of I; III and IV equal, together four times length of I. Pronotum rugosely punctured, the callosities large, shagreened; scutellum strongly wrinkled; elytra distinctly, closely punctured. Vestiture close long, golden-gray, erect on head and pronotum, somewhat appressed on the elytra; antennæ minutely gray-pubescent, this pubescence black on segment I and base of II, with a few longer bristles on base of I. Beneath mostly polished black, the venter with minute pale pubescence, the genital segment with a few long pale hairs; rostrum attaining middle of intermediate coxæ. Sinistral male clasper large, broad, abruptly elbowed at apex of genital segment, its apical portion longer than basal, triangularly expanded immediately before its truncated apex; dextral clasper long, thick and terete, nearly attaining apex of sinistral.

Color, black, polished; rostrum and legs fulvo-testaceous, femora more or less marked with brown, beneath usually with a row of brown dots; tibial spines and tarsi black; coxæ mostly, margins of coxal cavities and orifices, white; membrane fuscous with small pale mark at apex of cuneus.

Described from numerous examples of both sexes representing the following localities in California: Hills back

of Oakland, April 12, 1908, April 30, 1911, and May 8, 1910; Lagunitas, Marin Co., April 24, 1910, and Muir Woods, Marin Co., May 17, 1908, Dr. E. C. Van Dyke; Mt. Diablo, April 29, 1917; Leona Heights, Oakland, May 5, 1918; Ross, Marin Co., March 31, 1918; San Mateo Co., May 19, 1918; Carmel, Monterey Co., March 23, 1918, and Bradley, Monterey Co., April 23, 1917, E. P. Van Duzee; Portola Valley, San Mateo Co., May 4, 1917; Santa Cruz Co., June 9, 1917; Dublin Canyon, Alameda Co., May 6, 1917, W. M. Giffard; Santa Clara, April 20, 1914, Leroy Childs; Alameda Co., May, 1915, M. C. Van Duzee; Piedmont, Alameda Co., April 22, 1917, J. C. Bradley; Oakland, April 3, 1905, and Pasadena, April 30, and July 25, 1909, Fordyce Grinnell.

This species is found from Los Angeles Co., north at least to Marin Co., and probably much farther. About the Bay region it is often excessively abundant on grass on open hillsides. I have formerly determined this species as *sericans* Stål, but a study of typical specimens of the latter from Alaska shows them to be very distinct. The Pasadena specimens are a little smaller than those from farther north.

Holotype, male, No. 800, and *allotype*, female, No. 801, Mus. Calif. Acad. Sci.; E. C. Van Dyke collector.

Type locality, hills back of Oakland, Calif.

Paratypes in Academy collection, also in that of the author.

3. *Irbisia mollipes* Van Duzee

(Proc. Calif. Acad. Sci., Ser. 4, VII, p. 264, 1917.)

Polished black; pronotal punctures distinct, scarcely showing traces of transverse rugæ; vestiture long, gray; legs fulvous; sinistral male clasper broadly curved. Length $5\frac{1}{2}$ to 6 mm.

Head oblique; length beyond eye hardly more than greatest length of eye; eye well produced and narrowed below; vertex flattened between the antennæ; temporal areas scarcely distinguished. Segment II of antennæ three times length of I; III scarcely longer than IV, these together one-sixth longer than II. Pronotum deeply, distinctly punctured, showing scarcely a trace of the transverse rugæ; scutellum obscurely wrinkled; elytra closely, obscurely punctured. Vestiture long, dense, pale, erect on head and pronotum; rostrum attaining base of intermediate coxæ. Sinistral male clasper wide and convex at base, broadly curved, its acute apex short and

straight; dextral short, but little surpassing the subacute ventral apex of the genital segment.

Color, polished black obscured by the heavy vestiture above; beneath polished black. Rostrum, apex of coxæ and legs fulvous; margin of coxal cavities and orifices yellowish white; rostrum and tibiæ infuscated at apex; membrane uniformly smoky or with a very faint pale mark at apex of the cuneus.

This species was founded as a variety of *californica*, then misidentified as *sericans*. It is readily distinguished from *californica* by the form of the male claspers and the red legs. Material is before me from the following localities in California in addition to those listed in the original description: Ross, Marin Co., March 31, 1918; San Luis Obispo, April 24, 1919; Santa Cruz Island, May 17, 1919; Keen Camp, San Jacinto Mountains, June 8, 1917, Alpine, San Diego Co., March 11, 1914, E. P. Van Duzee; Pasadena, April 9 to May 1, 1909, Fordyce Grinnell; top of Las Vegas Range, N. M., June 28, 1902. The holotype was taken in Santa Cruz Co. by Mr. W. M. Giffard.

4. *Irbisia arcuata*, new species

Black, polished; vestiture white, short, appressed; face in profile regularly convex; legs fulvo-testaceous or castaneous on the femora, the tibiæ paler. Length 6 mm.

Head nearly vertical, produced beyond eye for a space nearly twice length of eye; eyes small, oval, little produced and narrowed below; vertex seen from side regularly arcuated from base to apex of clypeus; temporal areas scarcely elevated, a little shagreened posteriorly. Segment II of antennæ $2\frac{1}{2}$ times length of I; III one-half longer than IV, these together one-fourth longer than II. Pronotum strongly, transversely, rugosely punctured; callosities moderately elevated, shagreened, not conspicuous; scutellum strongly transversely wrinkled; elytra closely, distinctly punctate. Vestiture not dense, short, white, appressed. Beneath polished, minutely shagreened, the venter with longer appressed white hairs. Sinistral male clasper rather wide, broadly curved, flattened and obtuse at apex; dextral clasper long, surpassing the genital segment by one-half its length and attaining apex of sinistral.

Color, deep polished black; rostrum and legs fulvo-testaceous; femora more or less rufous or castaneous; tibiæ paler, their spines black; tarsi black; prosternum anteriorly, apex of coxæ and margin of coxal cavities whitish.

Described from one pair taken by me at Sunset, Colo., July 19, 1907, at an elevation of 8000 feet, and one pair labelled "Colo." received in exchange from Prof. C. F. Baker. The latter have the apical half of segment I of the antennæ castaneous. One male taken by me at Sunset with

the foregoing I believe to be the true *brachycerus* Uhler. It has the gray vestiture long and erect as described by Dr. Uhler, the vertex flattened between the antennæ, rostrum and legs piceous, becoming castaneous on the tibiæ, prosterum concolorous, coxal cavities and orifices broadly ivory-white and the dextral clasper short, scarcely surpassing ventral aspect of genital segment. Another male of this form was sent to me by Prof. Aldrich from Moscow, Idaho. In both these species the membrane is uniformly infuscated.

Holotype, male, No. 802, Mus. Calif. Acad. Sci.; *allotype* and paratypes in collection of the author.

Type locality, Sunset, Colo., at 8000 feet elevation.

5. *Irbisia setosa*, new species

Polished black, coarsely punctured and somewhat bronzed on the pronotum; vestiture of long erect fuscous hairs and minute white appressed ones; legs mostly black. Length 5-6 mm.

Head short, nearly vertical, produced beyond eyes for a space equal to length of eye; eyes large, ovate, narrowed below; vertex flattened between the antennæ; clypeus much incurved at apex; temporal areas prominent, shagreened. Segment II of antennæ three times length of I; III and IV equal, together a little longer than II. Pronotum coarsely, distinctly punctate, scarcely rugose; scutellum finely wrinkled; elytra roughened or obscurely punctate. Vestiture of erect stiff black hairs as long as thickness of femora, and very minute appressed white hairs. Beneath highly polished, black, with scattering pale hairs along middle to apex of genital segment. Sinistral male clasper broad and convex at base, curved and sickle-shaped, its acute apex scarcely exceeding the dextral clasper.

Color, deep black a little bronzed above, especially on pronotum; rostrum and legs dark castaneous or almost black on femora, the tibiæ paler, margins of coxal cavities scarcely touched with white; membrane uniformly infuscated.

Described from one pair taken by me at Cazadero, Sonoma Co., Calif., April 12-14, 1918; another pair taken by me at Bradley, Monterey Co., Calif., April 23, 1917; one male taken at Fairfax, Marin Co., Calif., May 7, 1919; and two males from the hills back of Oakland, Calif., taken May 12, 1908, by Dr. E. C. Van Dyke. This form may be distinguished by the long erect fuscous vestiture, which, however, is easily rubbed off, the short vertical head, black legs and male genital characters.

Holotype, male, No. 803, and *allotype*, female, No. 804, Mus. Calif. Acad. Sci.

Type locality, Cazadero, Sonoma Co., Calif.

6. *Irbisia sita*, new species

Polished black, head smooth; vestiture rather dense, long, gray; legs fulvous to castaneous; sinistral male clasper large, elbowed. Length 5-5½ mm.

Head nearly vertical; hardly longer below eye than length of eye; vertex slightly convex between antennæ, polished and impunctate; temporal areas scarcely distinguished; eyes long, much contracted below; clypeus strongly arcuate; second antennal segment 2½ times length of I; III and IV subequal, together a little longer than II. Pronotum deeply closely punctured, scarcely rugose, callosities scarcely elevated; scutellum feebly wrinkled: elytra obscurely punctate; rostrum attaining apex of intermediate coxæ. Beneath polished, clothed with conspicuous white hairs, a few on anterior coxæ, prosternum and disk of male venter and genital segment longer and suberect. Sinistral male clasper broad, abruptly elbowed as in *californica*, its broad flattened apex a little exceeded by the terete dextral clasper; vestiture long, soft, white, more erect on head and pronotum.

Color, deep polished black, bronzed on pronotum and scutellum and less so on elytra, not at all on head and beneath; rostrum and legs fulvous to castaneous, paler or more testaceous on tibiæ; extreme tip of tibiæ and tarsi black; prosternum, broad margins of coxal cavities, orifices and usually apex of coxæ white; tibial spines black; sutures of face sometimes pale.

Described from five male and five female examples taken by me in San Diego Co., Calif., in April and May, 1913-1914, one male and three females taken by me at Atascadero, Calif., April 23, 1919, and three males and one female taken by Fordyce Grinnell at Pasadena Calif., in April, 1909. This species, with *setosa* and *pæta*, constitutes a group of smaller forms more characteristic of the southern portion of the state. Of these, *pæta* may be distinguished by its small round eyes, *setosa* by the long stiff fuscous vestiture and black legs, and *sita* by its soft white vestiture and castaneous legs.

Holotype, male, No. 805, and *allotype*, female, No. 806, Mus. Calif. Acad. Sci.; *paratypes* in Academy's collection, also in that of the author.

Type locality, Foster, San Diego Co., Calif.

7. *Irbisia pæta*, new species

Polished black, coarsely punctate on pronotum; vestiture long, soft, white; eyes small, but little elongated; legs fulvous. Length 5½ mm.

Head moderately oblique, produced beyond eye for a space rather more than length of eye; vertex flattened between antennæ; clypeus strongly arcuate; temporal areas large, obscure, nearly smooth; antennæ short; segment II less than three times length of I; III and IV subequal, together nearly as long as I and II together. Pronotum coarsely punctate: scutellum obscurely rastrate but scarcely wrinkled. Vestiture long, white, nearly erect on head and pronotum. Beneath polished, with sparse, rather long white pubescence, longer on the male genital segment. Sinistral male clasper broadly curved, its apex exceeded by the long dextral clasper.

Color, deep polished black, a little bronzed on the pronotum; rostrum and legs fulvous, tibiæ becoming whitish testaceous as are the coxæ; orifices and narrow margin of coxal cavities white; membrane uniformly fuscous; apex of first antennal segment sometimes castaneous.

Described from three males taken by me in Balboa Park, San Diego, Calif., April 9, 1913. This species may be distinguished by the small, nearly round eyes, the fulvous legs and pale coxæ.

Holotype, male, No. 807, Mus. Calif. Acad. Sci.

Type locality, Balboa Park, San Diego, Calif.

A study of this genus with larger material at hand has enabled me to correct some former errors made by me. All the species in this genus have the head somewhat exserted with a black calloused area on the posterior face of the eye about which is a pale arc. As will be seen, many of our species, especially *solani* Heid., have the pronotum distinctly punctate, thus throwing them into Division Capsaria, according to my key of 1916, where they would run to *Lygidea* nearly, but their broader form, more hairy surface, black color and more exserted eyes, with the ocular callous mentioned above, will separate them. In the key of 1916, under *Irbisia* (page 207) the word "close," beginning the last line, should read "closer." The following key will distinguish our species:

Surface dull, opaque or nearly so 1
 Surface distinctly polished 2

1. Posterior lobe of pronotum coarsely, transversely wrinkled, impunctate; head shorter; vestiture conspicuous, yellowish; legs black, apex of coxæ, trochanters and tibiæ in part pale, 1, *sericans* Stål
 Posterior lobe of pronotum finely, transversely wrinkled and obscurely punctate; head longer; upper surface sparsely clothed with very minute gray pubescence; legs castaneous, darker on the femora. 2. *castanipes*, new species.
2. Face, viewed from side, regularly arcuated from base of vertex to tip of clypeus, not flattened between antennæ; vestiture sparse, white; legs fulvo-testaceous, the femora invaded with black; length 6 mm. 6, *arcuata*, new species.

- Face, viewed from side flattened between the antennæ. 3
3. Eyes small, nearly round; vestiture rather long, dense, white, membrane uniformly black; legs fulvous. 9, *pæta*, new species
Eyes larger, ovate, distinctly produced and narrowed ventrally. 4
4. Longer, 6 mm. or over. 5
Shorter, under 6 mm.; membrane uniformly infuscated. 7
5. Sinistral male genital clasper abruptly elbowed, the apical half vertical to the margin of the ventral segments. 6
Sinistral male genital clasper curved; sickle-shaped; vestiture rather dense and long, gray; membrane uniformly infuscated; legs blackish. 4, *brachycerus* Uhler.
6. Pronotum transversely rugose or rugosely punctate; vestiture golden-gray; legs soiled fulvo-testaceous, the femora, at least in part, apex of the tibiæ, and the tarsi black. 3, *californica*, new species.
Pronotum distinctly punctured; vestiture close, gray; legs fulvous. 5, *mollipes* Van Duzee.
7. Sinistral male genital clasper abruptly elbowed as in *californica*; vestiture dense, whitish; legs fulvous to castaneous; beneath with a percurrent white vitta either side. 8, *sita*, new species.
Sinistral male genital clasper curved, sickle-shaped. 8
8. Surface subopaque, vestiture long, brownish, especially on head and pronotum; sides of pronotum distinctly sinuated, its surface minutely punctate. 7, *setosa*, new species.
Surface polished; vestiture short, gray, appressed, the head and pronotum usually denuded; sides of pronotum rectilinear, its surface more coarsely punctate. 10, *solani* Heid.



Van Duzee, Edward P. 1921. "A study of North American grass-bugs of the genus *Irbisia*." *Proceedings of the California Academy of Sciences, 4th series* 11, 145–152.

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