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SALDIDAE OF THE AMERICAS (HEMIPTERA)

C. J. DRAKE and F. C. HOTTES

During the past few years, the authors have had the pleasure of studying numerous collections of shore bugs, or Saldidae, kindly loaned by private individuals and various institutions. The present paper contains data on 17 species, including the description of a species new to science. Three European species — *Teloleuca bifasciata* (Thomson), *Teloleuca pellucens* (Fabricius) and *Saldula c-album* (Fieber) — are recorded as new to the fauna of the Americas. *Acanthia bellatrix* Bueno is suppressed as conspecific with *Teloleuca bifasciata*, and *Chartoscrita* (*Chartolampra*) *cursitans* Bueno is synonymized with *T. pellucens*. Information on other synonymies and new combinations are listed under the various species concerned. The left paramere of a number of species has been figured.

CHILOXANTHUS STELLATUS (Curtis)

Acanthia stellata Curtis, in Ross' 2nd Voy., App., 1835, p. 75.
Salda borecalis Stal, Ofv. Vet. Ak. Forh., 9:391. 1868. (new synonymy)
Salda latifrons J. Sahlberg, K. Vet. Ak. Forh., 16(4):148. 1878.

A comparison of *C. stellatus* (Curtis) from Alaska and Northern Canada with specimens of *C. borecalis* (Stal) from northern Europe and Siberia show that these two names apply to the same species, and that the latter must be placed in synonymy. Specimens of *C. stellatus* from Arctic America were sent to Dr. R. J. Izzard, British Museum, who concurs in this new synonymy. A left paramere of a specimen from Alaska is figured.

CALACANTHIA TRYBOMI (Sahlberg)

Salda trybomi J. Sahlberg, K. Vet. Ak. Handl., 16(4):35, 158. 1878.
Calacanthia trybomi VanDuzee, Canad. Arc. Exp., 1913-18, 3(F):4F. 1919.

The occurrence of the genus and species was first reported in the Americas by VanDuzee. The typical form and var. *apicola* have been listed for Alaska and Canada.

MICRACANTHIA QUADRIMACULATA (Champion)

Salda quadrimaculata Champion, Biol. Centr.-Amer., Rhynch., 2:399, pl. 20, fig. 8, 1900.
Micracanthia pusilla VanDuzee, San Diego Soc. Nat. Hist., 11:32. 1914.
Micracanthia pusilla VanDuzee, Cat. Hemip. Amer. N. Mex., 1917, p. 447.
Micracanthia pusilla Hungerford, Sci. Bull. Univ. Kan., 11:75. 1919.

This species, described as *Salda 4-maculata* Champ., from specimens collected in Panama, belongs to the genus *Micracanthia* Reuter. As *Micracanthia pusilla* VanDuzee from California is inseparable from *quadrifasciata*, it is here placed in synonymy. We are indebted to Dr. R. J. Izzard for comparing specimens of *pusilla* (including a paratype) with the types of *4-maculata* in the British Museum. Specimens have been examined from Mexico, United States (Calif., Ore., Wash., Ut., Ida., Colo., Nev., and Fla.) and Canada (Brit. Col.). The long-winged forms are larger than brachypterous individuals.

TELOLEUCA BIFASCIATA (Thompson)

Acanthia bellatrix Bueno, Can Ent., 56:298, 1924. (new synonymy)
Salda bifasciata Thompson, Op. Ent., 4:404, 1871.
Salda riparia Zetterstedt, Fauna Lapp., p. 478, 1828.
Salda scrior J. Sahlberg, K. Vet. Ak. Handl., 16(4):35, 1050, 1878.

This is the first record of the Genus *Teloleuca* Reuter in the Americas. The members of the genus seem to be primarily northern and are found in mountainous regions. The American specimens were taken along small streams in deep, narrow ravines in the mountains. Both *T. bifasciata* and *T. pellucens* inhabit similar types of ecologic habitats.

A comparison of a paratype and other specimens of *Acanthia bellatrix* Bueno from Canada and United States with specimens of *T. bifasciata* Thoms. shows these two names to apply to the same species, the latter having priority by many years. Specimens of *bifasciata* have been studied from Canada (Jasper, Aug. 15, 1896, and Waterton, Alberta, Aug. 30, 1924, H. L. Seamans; Lac. Nominque, Labelle Co., Que., D. Davenport) and United States (Georgetown, Colo., Aug. 27, 1909, W. J. Gerhard; Glacier National Park, Mont., Aug. 25, 1923, R. F. Hussey). One specimen was also recently examined from Dawson, Yukon, Can., June 23, 1916. It also occurs in Siberia. The color of the legs and hemelytral markings vary considerably in specimens from the same locality. The males are usually much smaller than the females. *T. bifasciata* may be readily separated from *pellucens* by the subbasal, marginal, yellowish spot on each side of the pronotum. A left paramere of a male from Colorado is figured.

TELOLEUCA PELLUCENS (Fabricius)

Acanthia pellucens Fabricius, Reise Norwegen, 1779, p. 234.
Salda riparia Fallen, Suppl. Mon. Cim., 2:1, 1826.
Salda affinis Zetterstedt, Ins. Lapp., p. 267, 1840.
Salda luteipes Merrich-Schaeffer, Wanz. Ins., 6:40, fig. 597, 1841.
Salda conspicua Douglas and Scott, Ent. Monthl. Mag., 4:93, pl. 1, fig. 5.

Chartoscrita (*Chartolampra*) *cursitans* Bueno, Bull. Brookl. Ent. Soc. 18:151, 1923. (New Synonymy)
Acanthia celeripedis Bueno, Can. Ent., 56:296, 1924. (New synonymy)

This species is native of Northern Europe and Siberia; it is new to the fauna of North America. Specimens are at hand from Canada (Alberta and Ontario) and United States (Colorado, New York and Montana). They were taken in the same habitat and at the same time as *T. bifasciata*. The pronotum of *pellucens* is uniformly colored and without yellowish marginal spots. The females are also much larger than the males. On account of the variation in color of legs and hemelytral markings, both *pellucens* and *bifasciata* have been described several times as new.

Bueno, 1923, erected the subgenus *Chartolampra* of the genus *Chartoscrita* for his species *cursitans*. This makes his subgenus a synonym of *Teloleuca* as *cursitans* is identical with *T. pellucens*. A year

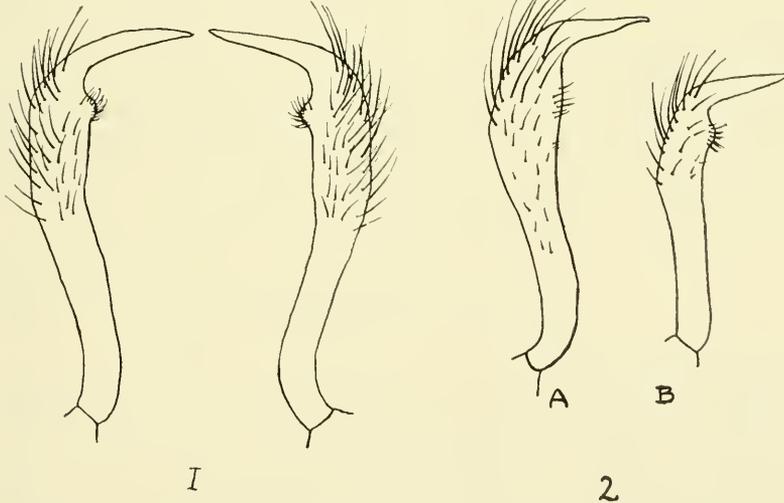


Fig. 1. Right and left parameres
Saldula fernaldi Drake.

Fig. 2. A. Right paramere
Saldula sulcicolis Champ.
B. Right paramere
Saldula varionis n. sp.

later, Bueno also described *Acanthia celeripedes*, which must also be suppressed as a synonym of *T. pellucens*. A left paramere of a specimen of *pellucens* from Glacial National Park, Montana, is figured.

SALDA BOUCHERVILLEI (Provancher)

Scrodopterus bouchervillei Provancher, Nat. Can., 4:106, 1872.

Salda coriacea Uhler, Hayden's Surv. Terr., Rep. for 1871, p. 421. 1872.

This is the commonest and most widely disseminated member of the genus *Salda* in the Americas. It ranges from Alaska (Rampart, July, 1915, J. A. Kuschee) clear across Canada and northern United States and then south into Arizona and Tennessee. It is quite variable in size and degree of wing development. Small specimens, especially brachypterous individuals, are often found in collections labeled *Salda obscura* Provancher. VanDuzee, Cat. Hemip. Amer. N. Mex., treated *obscura* as a synonym of *Salda littoralis* Linnaeus. It will be necessary to study the type of *S. obscura* Prov. before its status can be definitely settled. The type is in Provancher's collection, Quebec, Canada.

S. bouchervillei may be easily separated from *S. buenoi* and *S. littoralis* by its deep black shining color and extremely sparse pubescence. The pubescence is very short, golden, almost erect, very thinly scattered and scarcely noticeable. In the short-winged form the membrane is abbreviated and more or less coriaceous, sometimes even as coriaceous as the corium. The callus of the pronotum varies greatly in the degree of swelling or convexity. As a rule short-winged specimens have a larger callus than individuals with fully developed hemelytra. *S. bouchervillei* is very similar in size, color, vesture and general appearance to *S. morio* Zetterstedt of Europe. The latter tends to have a larger pronotal callus.

SALDA ANTHRACINA Uhler

Salda anthracina Uhler, Bull. U. S. Geol. Surv., III, p. 438. 1878.

Separated from *S. bouchervillei* Provancher by its narrower, strongly convex and campanulate pronotum and very strongly arched or convex hemelytra with sides decurved over upper edge of the abdomen. The dorsal surface is deep black, shining and very sparsely clothed with thinly scattered, short pubescence. The convexity of the dorsal surface of pronotum and hemelytra is peculiar to *anthracina*. Specimens have been examined from New Hamp., N. Y., Penna.

SALDA BUENOI (McDunnough)

Acanthia buenoi McDunnough, Can. Ent., 57:257. 1925.

This species has been generally confused in collections and publications with *Salda littoralis* (Linn.), *Saldula lugubris* (Say) and occa-

sionally with *Salda bouchervillei* (Provancher) and *S. anthracina* Uhler. It is easily separated from the latter two species by its dull black color and grayish-brown pubescence. The first cell of the membrane of *buenoi* projects forward as in the genus *Salda* Fabr., and thus does not form at the base a gradient series with the other cells as in *Saldula lugubris*. *S. littoralis* (Linn.) is densely clothed with distinctly longer, semi-reclining, yellowish-brown pubescence, which almost conceals the dorsal surface of the body. In *buenoi*, the pubescence is much shorter, somewhat matted down basally and does not hide the dorsal surface. The species of the genus *Salda* of the Americas are quite distinct and easily separated from one another by the density, length, color, character of the pubescence and shape of the pronotum.

S. buenoi is fairly common in northern United States and Canada, and apparently it is much more frequently collected than *littoralis*. It ranges clear across Canada and northern United States. Specimens have been examined from Canada (Br. Col., Sask., Alta. and Ont.) and United States (Wash., Calif., Mont., Nev., Ore., Ida., Ut., Colo., Neb., N. Dak., S. Dak., Ia., Ill., Mich., Wisc., Mass. and N. Hamp.). It is often taken on wet ground in thin vegetation near ponds, lakes and streams. As the short-winged form is not capable of flight, sparse vegetation affords some protection from its enemies. Both long- and short-winged forms are commonly found in the same habitats.

SALDA LITTORALIS (Linnaeus)

- Cimex littoralis* Linnaeus, Syst. Nat. Ed. X, 1758, p. 442.
Acanthia pellucens Fabricius, Reise Norw., 1779, p. 234.
Salda zosteræ Burmeister, Handlb., 2:216. 1835.
Salda flavipes Fieber, Wien. Ent. Mon. III, p. 238, 15, 1859.

This European and Siberian species is widely distributed in Canada and United States. As pointed out above, it may be separated from its congeners by the dense, long, pubescence and its very neat appearance. Specimens have been examined from Colo., Mont., Ida., N. Dak., Utah and Maine. It undoubtedly occurs in most northern states, but published records of United States and Canada probably refer largely to *S. buenoi*, or to both species confused in the same paper.

SALDULA LUGUBRIS (Say)

- Acanthia lugubris* Say, Het. N. Harm., 1832, p. 34.
Salda major Provancher, Nat. Can., 1872, p. 107. (New synonymy)
Salda lugubris Uhler, Bull. U. S. Geol. Surv. 1:442. 1876.
Salda deplanta Uhler, Bull. U. S. Geol. Geog. Surv., 3: 442. 1876.

As the descriptions of *S. major* (Uhler) and *S. lugubris* (Say)

refer to the same species, the latter name must supercede because of priority. Specimens of *lugubris* have been examined from Mo., Kan., Ill., Ia., Ind., Wis., Minn., Mich., Ohio., N. J., Mass., R. I., N. Y., N. H., Me., Md., Penna., N. Dak., S. Dak., Mont., Colo., Ut., Tex., N. Mex., and Wyo. Specimens have also been studied from Ont., Sask., Que., and Br. Col., Canada. The right paramere of a specimen from Mitchell, Neb., is figured. The general color is dull blackish with or without brownish or yellowish spots on the hemelytra. In some specimens the pale hemelytral spots are quite prominent. The pubescence is rather dense, moderately long and dark golden in color. The first cell of the membrane forms a gradient series with the other cells and does not project anteriorly as in the genus *Salda*. Both long- and short-winged specimens are common.

SALDULA FERNALDI Drake

Salda fernaldi Drake, Psyche, 56(4):191. 1949.

In addition to the type series from Flower's Cove, Newfoundland, many specimens have been examined from Alaska (Valdez, low tidal flat at low tide, July 15, 1947, F. R. DuChanois; Anchorage, June, 1947, J. C. Chamberlain), Canada (Coal Harbor, Vancouver Is., Brit. Col., Sept. 1921, W. Downes) and United States (Chanook, Wash., Sept. 16, 1936; Taft, Ore., Feb. 1935, E. S. Ross; Waldorf Post, Ore., June 3, 1923; E. P. VanDuzee; Santa Cruz, Calif., June 3, 1919, E. P. VanDuzee; Pitsburg, Calif., No., 1922, E. P. VanDuzee; Marion Co., Calif., July 13, 1919, W. M. Gifford).

This species is distinguished from *pallipes* Fabr. by its larger size and the longer, denser, golden pubescence on the hemelytra. In good specimens, the pubescence on the side margins of the pronotum is also quite conspicuous. The pronotum and scutellum are moderately shining. As *fernaldi* frequents low, muddy, tidal flats, specimens are at times smeared with mud as netted or picked up by hand. Removing the mud and cleaning the specimens as they are mounted often denudes them of pubescence.

SALDULA SULCICOLIS (Champion)

Salda sulcicolis Champion, Biol. Centr.-Amer., Rhynch., 2:340, pl. fig. 1900.

A left paramere of a male from Vara Blanca, Costa Rica, is figured. The type series were taken in Panama, Guatemale and Mexico.

SALDULA COXALIS (Stal)

Salda coxalis Stal, Svensk. Vet.-Ak. Handl., 11(2):140. 1873.

Salda argentina Berg, Hemip. Ar., 1879, p. 293. (New synonymy)

Saldula argentina Drake, Bull. Brookl. Ent., 45(1):3. 1950.

The type of *S. coxalis* Stal is a pinned, female specimen in Naturhistoriska Rikemusem, Stockholm. The pin bears four separate labels as follows: "Cuba," "Stal," "*coxalis* Stal," and "162." The third label from the top "*coxalis* Stal" is in Stal's own handwriting. A comparison of the types of *coxalis* and *argentina* Berg (La Plata Mus.) show that these species are conspecific and not separate entities. As *coxalis* is the older by several years, it becomes the valid name of the species.

In size and general appearance, *S. coxalis* is quite similar to *S. pallipes*, but it may be readily separated by the pale stripes on the outer margins of the pronotum. These stripes, as a rule, terminate a little before reaching the front and hind pronotal margins.

SALDULA VARIONIS Drake and Hottes, sp. new

Small, ovate, brownish-black, with or without narrow marginal stripes on sides of pronotum, sometimes with small or large yellowish spots in front of humeral angles, the hemelytra largely pale brownish, the pubescence short, brownish or golden, rather dense, recumbent. Head black, with a few long bristly hairs in front, with a small rounded pale spot between each ocellus and eye; frons broad, light brown; the transverse apical ridges whitish, strongly swollen, separated by a brownish line concave above, becoming narrower ventrally. Clypeus yellowish-brown, tumid, rectangular in form, with a small yellowish callus on each side near the middle. Genae and bucculae black, with long silvery white pile; labrum brownish. Antennae brownish black, shortly pilose, the last two segments with scattered long bristly hair; segment I stoutest, yellowish brown, with large elongate black spot; II becoming brown apically; III and IV brownish black; proportions— I, 10; II, 20; III, 13; IV, 14. Rostrum ferruginous black, shining, reaching between the coxae. Body beneath blackish, with long grayish pile.

Pronotum black, deeply excavated behind; stripe along lateral margin as seen from above narrow, brown to testaceous, sometimes barely visible or wanting, beneath much broader, always visible and yellowish brown; humeral angles within often with a small to large brownish spot or patch; lateral margins narrowed anteriorly, slightly reflexed, distinctly rounded. Callus moderately convex, not extending

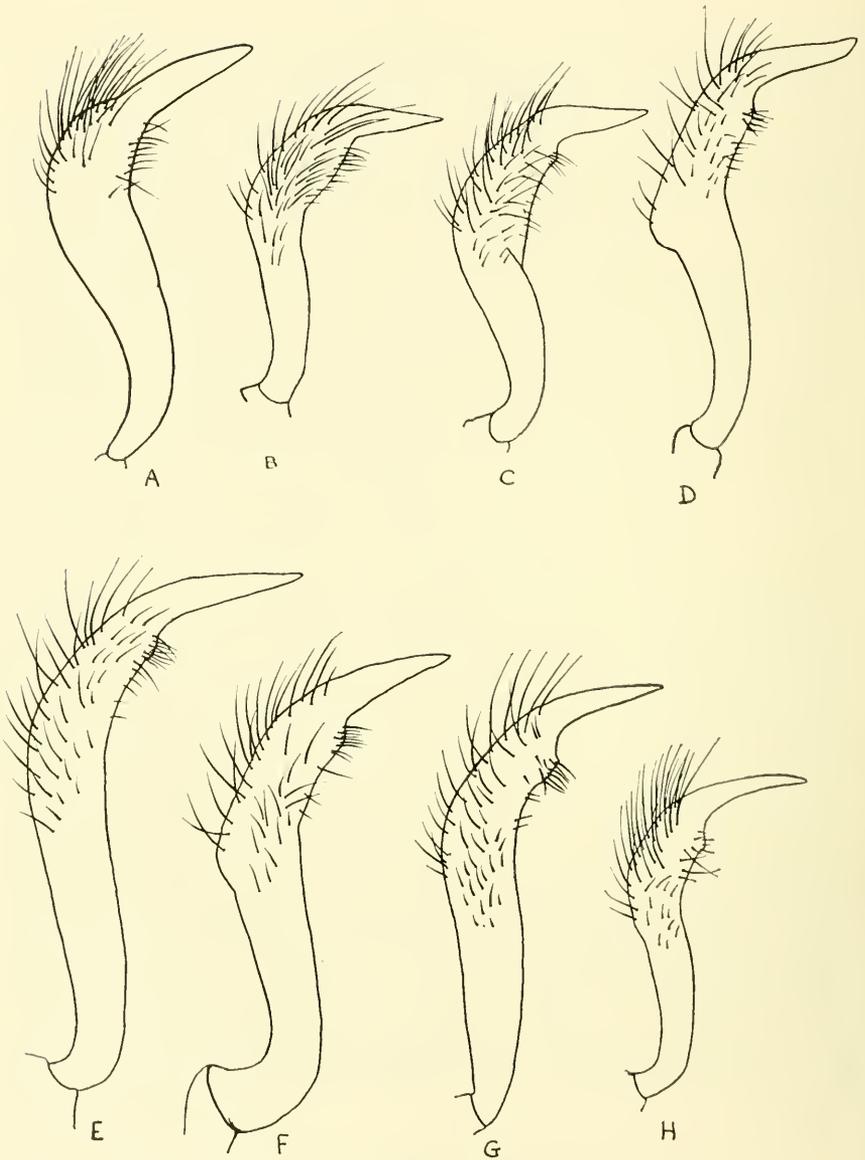


Fig. 3. A. Right paramere *Chiloxanthus stellatus* Curtis.
 B. Right paramere *Teloleuca bifasciata* (Thoms.).
 C. Right paramere *Teloleuca pellucens* F.
 D. Right paramere *Saldula lugubris* (Say).
 E. Right paramere *Salda bouchervillei* (Provancher).
 F. Right paramere *Salda buenoi* (McDunnough).
 G. Right paramere *Salda littoralis* (L.).
 H. Right paramere *Saldula illinoiensis* Drake.

on explanate margins, with large deep impressions on the disc; transverse furrow behind callus arcuate, moderately deep, pitted at bottom; hind lobe about one-half as long as callus. Scutellum nearly as wide as long, with discal impression just in front of middle, pubescence as on pronotum. Hemelytra largely brownish, with small blackish and yellowish white areas; clavus with large whitish apical spot, generally blackish, but sometimes largely brown, pubescence about as on scutellum; corium somewhat variable in color, largely brownish, with small basal area and one to three marginal blackish spots; median area with some pale and darker brown areas; membrane yellowish or yellowish white, with four cells, each cell with a long brownish streak beyond middle. Legs yellowish brown; femora with small brown spots beneath largely black and the pale hairs longer. Presternal plates of fore coxae largely white.

LENGTH, 3.55 mm.; width, 1.30 mm.

TYPE (male), *allotype* (female) and paratypes, Gateway, Colorado, Sept.-Oct., 1949, C. J. Drake and F. C. Hottes; 2 paratypes, Skyway, Colo., Oct., 1949, F. C. Hottes. Several paratypes, Escalante Desert, Kane Co., Utah, Aug., 1949, D. E. Beck, Grand Junction, Colo., Apr.-May, 1950, many specimens, F. C. Hottes. Type in collection of C. J. Drake; paratypes in collection of both authors, also Brigham Young University and Museum Comparative Zoology, Harvard University.

This species is most closely allied to *S. balli* Drake, but it is a little larger and with pronotal markings and color of hemelytra. The pronotum is quite variable in color; sometimes the pronotal stripes are not visible from above, but they are always present on the underside. The spot in front of each humeral angle may be small, large or entirely absent. The pronotal stripes are not visible on the dorsal surface in the type, allotype and some of the paratypes. At the present time, it seems better to treat *S. varionis* as a species rather than as a variety of *S. balli* Drake. *S. coxalis* (Stal) and *S. xanthochila limbosa* Horvath are much larger species.

SALDULA C-ALBUM (Fieber)

Salda c-album Fieber, *Wine. Ent. Mon.*, 3:256, sp. 10. 1859.

This European species has heretofore not been reported as occurring in the Americas. In collections and literature, it is confounded with *S. pallipes* (Fabr.). It may be separated from *saltatoria* by the large c-shaped, marginal spot just in front of the middle of each heme-

lytron and shape of pronotum. The anterior tibiae have the long basal stripe interrupted as in *saltatoria*. The basal tibial stripe is long and solid in *pallipes*. Specimens of *c-album* have been examined from Alaska, Canada (Ontario and British Columbia) and United States (Washington, D. C.; Golden, N. Y., E. P. VanDuzee; Cranberry Lake, N. Y., 1918, C. J. Drake; Ames, Iowa, March 23, 1928, G. S. Walley; Barrien Co., Michigan, 1918; Fort Collins, Colo., 1898, E. D. Ball; Logan, Utah, July 10, 1923, T. O. Thacher; Sidney, Ill., June 20, 1898, E. L. McElfresh; Santa Cruz Mts., Calif., Koeble.

SALDULA ANDREI Drake

Saldula andrei Drake, Ark. Cor. Zool 42B(3), 1949.

Salda lariniac Hodgden, Jr. Kan. Ent. Soc., 22(4):158, figs. 11 & 12, 1949.

Saldula andrei Drake and Hottes, Proc. Biol. Soc. Wash., 62:177, figs. 11, 1949.

An examination of a paratype of *Salda lariniac* Hodgden shows that this name must be suppressed as the species is conspecific with *Saldula andrei* Drake. Specimens have been examined from Texas, Ariz., N. Mex., Calif., Ariz., Nev., Ore., Wash., Ida., Wyo., Utah and Colo. It was also taken by the writers at Cranbrook, Br. Col., Canada, Aug., 1949.

S. andrei is primarily saxicolis, and is commonest in very stony situations where the shores of streams are almost completely covered with stones several inches in diameter. It is found resting as individuals on the sides of stones not far from the water's edge. Small streams, flowing on beds of solid rock with rocky shores are also lightly populated. Occasionally, it may be taken sparingly on wet, sandy-gravelly beaches of streams.

SALDULA ILLINOIENSIS Drake

Saldula illinoiensis Drake, Ark. Cor. Zool., 42B(3):2, 1949.

This moderately, shaggy species was described from three specimens labeled "III", in the Naturhistoriska Ritsmuseum, Stockholm. Since then, specimens have been received from Ill. (Urbana, July 9, E. L. McElfresh), Mich. (Marine Is., July 23, 1923, T. H. Hubbell), Colo. (Georgetown, July 27, 1909, W. J. Gerhard; Happy Hollow, July 7, 1898, E. D. Ball; Pingree Park, Aug. 17, 1924, C. J. Drake), New York (Cranberry Lake, Aug. 22, 1923, C. J. Drake), Mich. (Marion Is., Grand Traverse Co., July 25, 1923, T. H. Hubbell), Wis., (Madison, July 14, 1918, E. D. Ball), Neb. (Sioux Co., 1918, Myron T. Swenk), Hamp., Minn. and Mass.

This species is often taken in both short- and long-winged forms in the same habitat. In brachypterous individuals, the membrane of the hemelytra is greatly abbreviated and extend very little beyond the tip of the abdomen. It is one of the few species of *Saldula*, which has seta-like hairs growing out of its compound eyes. The color and markings of the hemelytra are very similar to *S. orthochila* (Fieber) of Europe, but it is easily separated from it by the dorsal vestiture of moderately dense, erect, dark hairs and hairy eyes.