

SOME LITHOBIOMORPHA FROM THE REGION OF SAN FRANCISCO BAY.

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Of the six species of the Lithobiomorpha described by Stuxburg from California, the types of four were secured at Sausalito, or near by, on San Francisco Bay. Among these the identification of *Lithobius kochii* and *Lithobius obesus* has been simple; but considerable uncertainty has attached to the forms designated by Stuxberg as *Lithobius megaloporus*, later placed in his subgenus *Pseudolithobius*, and *Lithobius pusio*, placed by its author in his subgenus *Archilithobius*, this difficulty being due to the fact that the types were immature individuals, as I previously showed to be indicated by various points in one description. In order, if possible, to clear up this uncertainty, especially with reference to the species *megaloporus*, which seemed to merit generic rank, I took advantage of an opportunity presented in April of this year to make collections at Sausalito and several other points on the San Francisco Bay (Mill Valley, Oakland and Berkeley). Ample material of the species described by Stuxberg, as well as of other species, including several interesting new ones, was secured.

The anticipations with reference to the species *megaloporus* and *pusio* were fulfilled. Stuxberg gives the length of *megaloporus* as 12 mm., whereas that of adults is from 35 to 39 mm. The species must be given separate generic rank, and will stand as *Pseudolithobius megaloporus*. The species *pusio*, as anticipated, proves to belong to the genus *Bothropols* and to have been based upon a young specimen of a distinct species, and not of *B. monticola*, as was thought possible. *B. monticola* seems not to occur in the Coast Mts. or region, but to be confined to the Sierras and the country northward, being common in Oregon and Washington. Brief descriptions of these two species are given below.

Of the new forms discovered quite unexpectedly, the most interesting is *Buethobius coniugans*, the second species of the genus to become known. Unlike *B. oabitus*, the type species, the new species shows conspicuous sexual dimorphism. The males are uniformly larger than the females, and are remarkable for the very long and distinctly three-jointed gonopods, differing from those of the female in lacking terminal claws and basal spines. In this regard the species suggests a transition from forms presenting no dimorphism to those such as *Lithobius*, in which it is more marked and the male gonopods mostly small and wart-like and

but two- or more often, one-jointed. *Zygethobius sokarienus* is the third species of its genus to be made known.

1. *Bothropolys xanti* Wood.

One specimen was taken at Mill Valley. This species is abundant southward, the author having numerous specimens from Stanford, Pacific Grove and Monterey, Santa Barbara, San Bernadino, Los Angeles, Santa Monica, Claremont, etc.

2. *Bothropolys pusio* (Stuxberg).

1875. *Lithobius pusio* Stuxberg, Ofvers. af Kgd. Vet.-Akad. Forhandl., No. 2, p. 67, No. 3, p. 31.

1909. nec. *Lithobius pusio* Chamberlin, Ann. Ent. Soc. America, p. 187.

Brown, often of reddish caste, the head not darker, concolorous with dorsum; some of the major dorsal scuta in some, with the caudal border very dark, and some with a median dark stripe. Antennæ reddish brown, pale distad. Prosternum and prehensorial feet brown, the posterior ventral plates of same colour; the legs and most of venter lighter brown, the caudal pairs of legs commonly pale distad.

Antennæ short, composed of 20 articles of moderate length, which gradually decrease in size from the second to the ultimate.

Ocelli distinct, usually thirteen in number, and arranged in three series, thus, 1 + 5, 4, 3.

Prosternal teeth 6 + 6-6 + 7, stout, darkened, uniform in size and spacing, all apically, bluntly rounded.

Angles of none of the dorsal plates produced.

Coxal pores of various sizes, small and very small, mostly arranged in two or three series. The caudal series on each coxa consists of the larger pores, usually 4 or 5 in number; the next series is composed of smaller pores, and the third or most anterior of the smallest; the second and third series often confused or forming a single irregular row. Pores in number usually from 7 or 8 (12th coxa) to 12 (13th-15th coxæ) in number on each coxa.

Last two pairs of coxæ armed laterally and ventrally; the last three pairs armed dorsally.

Spines of the first legs 2, 3, 1; of the penult 1°, 3, 3, 2, with two claws; of the anal 1, 3, 2, 1, the claw single.

Genital appendages of the male as usual in the genus, distinctly two jointed.

Claw of gonopods in the female tripartite. Basal spines 2 + 2, cylindrical or clavate at base, the upper portion conical and excavated on one side, and sometimes with accessory points at base of conical portion.

Length, 17.5 mm.; width, ad 2 mm.

Localities.—Sausalito (type locality) and Mill Valley.

The species was found to be common in both these localities. The identification of this species with Stuxberg's *pusio* would have been difficult, or more probably, impossible, had it not been for the statement in regard to the spining of the posterior coxæ: "Pedum analium articulus primus calcaribus binis, majore ventrali, minore laterale, armatus." As among the North American Lithobiomorpha known to the author, only the species of *Bothropolys* have the posterior coxæ armed with a ventral spine, he concluded that the type of *pusio* belonged to this genus, and, since Stuxberg represents the coxal pores as being in a single series and few in number, that it must be immature. As the species above described is common in the type locality and the only member of the genus of the coastal region having all dorsal plates straight, its identity with *pusio* is obvious. Young specimens agree fully with Stuxberg's account.

3. *Lithobius kochii* Stuxberg.

1875. Ofvers. af Kgl. Vet.-Akad. Forhandl., No. 2, p. 69; No. 3, p. 30.

A half dozen specimens conforming fully to the original description were taken at Sausalito, the type locality. It had previously been taken at Ukiah (probably), Stanford, Pacific Grove and Claremont.

4. *Lithobius obesus* Stuxberg.

1875. Ofvers. af Vet.-Akad. Forhandl., No. 2, p. 67; No. 3, p. 31.

This very distinct species was found to be very common at Sausalito, the type locality, from where it seems to range southward to Los Angeles Co., the author having in his collection specimens from Stanford, Pacific Grove and Monterey, Los Angeles, Laurel Canyon, San Bernadino, Claremont and Catalina Island.

5. *Lithobius tiganus* Chamberlin.

1909. *Lithobius utahensis* Chamberlin (ad max. part.), Ann. Ent. Soc. America, p. 187.

1910. *Lithobius utahensis*, var. *tiganus* Chamberlin, P. C. Journ. Ent., p. 374.

Very common under damp leaves, etc., at Berkeley, Sausalito and Mill Valley. Previously known from various other points in California.

6. *Lithobius patonius*, n. sp.

Dorsum dark brown; the head paler and more reddish. Antennæ brown proximally, pale brown or yellowish distally. Venter dark brown, usually a little paler than the dorsum. Legs whitish to grayish brown, the ultimate pairs bright yellow distad.

Antennæ short; composed of twenty articles, which gradually decrease in length from the second to the ultimate, not inclusive.

Ocelli 4 to 6 (7) on each side, in one straight series or sometimes more irregular, and in two imperfect series, thus, 1 + 3 or 1 + 3 (2), 2, those of the upper series well separated and the median one imperfectly divided from the contiguous one of lower row.

Prosternal teeth moderate in size, acute, and but little darkened; 2 + 2, uniform in size and spacing.

Angles of none of the dorsal plates produced.

Coxal pores small, round, 2, 3, 3, 3.

Last two pairs of coxæ laterally armed; last three pairs dorsally armed.

Tarsi of anterior legs undivided (*Monotarsobius*).

Spines of first legs 1, 1 (2), 1; of penult 1, 3, 3, 1, with two claws; of the anal 1, 3, 2, 0, the claw single. Anal and penult legs in both male and female strongly and uniformly crassate, but little larger in male than in female.

Claw of female gonopods relatively wide, tripartite; basal spines 2 + 2.

Length, 5–6.5 mm.

Localities.—Sausalito, Mill Valley, Berkeley.

Common under layers of damp leaves. Related to *L. tiganus* and *L. utahensis*, but readily distinguishable by the decidedly and constantly smaller size.

7. *Lithobius angelus*, subsp. *satanus*, subsp. nov.

Dorsum brown, the caudal margins of major plates cephalad of middle darker. Head dark brown, paler in front of the frontal suture. Prehensorial feet orange, the prosternum brown. Antennæ dark proximally, becoming pale distad. Posterior pairs of legs with their distal joints conspicuously orange-coloured.

Antennæ short, composed of 34 or 35 compactly arranged articles, of which the second is largest, those beyond the third short or very short.

Ocelli 6 on each side, arranged in two series, thus, 1 + 3, 2.

Prosternal teeth 2 + 2, moderate in size, darkened, the inner one on each side larger than the outer.

Angles of the ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores 3, 3, 3, 3, circular.

Last pair of coxæ armed laterally with a short, stout spine; last three pairs armed dorsally with much longer spines.

All tarsi biarticulate,

Spines of the first legs 0, 1, 1-0, 2 (?), 1; of the penult 1, 3, 3, 2, with two claws; of the anal 1, 3, 3, 1, also with two claws.

Anal legs in male slender and moderately long.

Locality.—Oakland, Cal.

Three males were secured, of which two are but partly grown, and the third lacks a little of maturity. The form is very close to *L. Angelus* Chamberlin, described originally from Los Angeles, but also found by the author at Croville (April, 1911); it differs in the greater number of articles of the antennæ, which seems to be constantly 28 or 29 in *angelus* and in their size and form, in the spining of the legs, the form of the anal legs, etc.

8. *Pseudolithobius megaloporus* (Stuxberg).

1875. *Lithobius megaloporus* (Stuxberg, Ofvers. Kongl. Vet.-Akad. Forhandl., and Ann. and Mag. Nat. Hist., p. 190).

1875. *Lithobius megaloporus*, subgenus *Pseudolithobius* Stuxberg, Ofvers. Kongl. Vet.-Akad. Forhandl., No. 3, p. 8.

1910. *Pseudolithobius megaloporus* Chamberlin, P. C. Journ. Ent.

Body wide anteriorly, parallel sided over most of length, attenuated caudad. All dorsal scuta strongly margined laterally, rugose. Sternal plates, especially the more posterior ones, broadly produced caudad, so that each at the middle more or less overlaps the succeeding one.

Dorsum brown, the first dorsal plate commonly darker and more rounded, and the scuta frequently darkened along caudal border. Head and prosternum with prehensorial feet a little darker and more reddish than the dorsum. Antennæ brown, uniform. Venter and legs a paler brown, uniform in most.

Antennæ short, composed of twenty articles, which are moderate and mostly uniform in size.

Eyes small, composed of few ocelli, the number on each side being mostly 5 or 7, which are arranged in two series, thus, 1 + 3, 2-1 + 3, 3.

Prosternal teeth mostly 3 + 3 or 4 + 4, in the latter case the innermost and the outermost on each side decidedly smaller than the two inner ones.

Angles of the ninth, eleventh and thirteenth dorsal plates produced,

Coxal pores rather large, round or oval, each enclosed in a large, circular pale area, which in some might be superficially regarded as the pore ; 3, 4, 4, 4, 4.

Tarsi of all legs biarticulate.

None of the coxæ armed laterally or ventrally, the last five pairs (those bearing pores) with a short, stout spine dorsally.

Spines of the first legs 3, 3, 3 ; of the penult 1, 3, 3, 2, with two claws ; of the anal 1, 3, 3, 1, the claw single.

Anal legs of male of moderate length, slender ; the fifth joint conspicuously bowed ventrad, and flattened and longitudinally furrowed above or dorsally.

Claw of the female gonopods entire or weekly notched at apex ; basal spines 3 + 3.

Length of adults up to 39 mm. ; width, 4 mm. ; length of antennæ and anal legs ad 13 mm.

Localities.—Sausalito (type locality) and Oroville.

Two adult males were secured at Sausalito, and numerous males and females were taken at Oroville. They were found for the most part under stones and other objects lying in open treeless areas. They are slow to take alarm, often lying quite unconcerned after stones have been rolled from over them and they themselves jarred, and seem in every way more sluggish than the species of *Lithobius* and related genera.

9. *Zygethobius sokarienus*, sp. nov.

Conspicuously attenuated from region of the tenth dorsal plate cephalad ; dorsum well arched, shining.

Dorsum reddish brown or chestnut, the head and ultimate segments darker, the coloration of the head uniform. Antennæ dark reddish brown proximally, becoming pale distad ; prosternum with prehensorial feet, and the venter brown, often of reddish tinge, the posterior segments of the venter darker. Legs usually brown, sometimes dark except proximally and distally, and the posterior pairs usually darker than the others.

Antennæ moderately long, but not quite equalling half the length of the body. Articles 38–39, the first two long, the next twelve abruptly and also narrower, those beyond the fourteenth longer and more loosely

joined, and showing a marked tendency for two shorter articles to alternate with one longer one.

Ocellus on each side large, bluish, often showing a slight tendency toward doubling.

Prosternal teeth 3 + 3.

Angles of ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores round, moderate in size; 3, 3, 3-3, 4, 4, 4.

Legs as usual; tibial process well developed, apically spinescent in anterior pairs; all feet ending in three claws; anal legs long and slender.

Claw of gonopods long, entire; basal spines 2 + 2, stout and conical.

Length, 13 mm.; width, 2 mm.; length of antennæ 6-6.5 mm.

Locality.—Mill Valley, Cal.

Ten specimens were secured under leaves and sticks in a very damp, shaded locality such as preferred by the other species of the genus.

This, the third species of the genus to be made known, is very close to *Z. dolichopus* Chamberlin, found originally in the Wahsatch Mts. at elevations above 8,000 feet; but it is larger and more robust, and presents constant differences in coloration and in some structural details.

10. *Buethobius coniugans*, sp. nov.

Light orange in colour, the head and caudal segments darker, but the head pale in front of frontal suture. Antennæ and legs yellow, the caudal pairs of the latter usually darker, orange, especially so proximally.

Antennæ short or moderate in length, being considerably variable, composed of 43-45 articles, of which the first two, or more rarely three, are largest, those immediately succeeding the second or third being very short, the more distal ones becoming again longer; the last two longer than those immediately proximad of them.

Ocelli none.

Prosternal teeth 3 + 3, small, acute, in some darkened apically.

Angles of none of the dorsal plates produced.

Coxal pores 2, 2, 3, 2-3, 3, 3, 3, round.

Ultimate coxæ produced into an acute process at distal end, this projecting caudad as in some Scolopenoridæ.

Tarsi mostly biarticulate, though often very indistinctly so in anterior pairs, and in some the articulation difficult to detect in any of the first thirteen pairs of legs. Each leg of the first fourteen pairs ending in three claws, the anal legs each with but a single claw.

Anal legs both in male and female long and slender.

Genital appendages of male long and conspicuous; composed of three distinct articles, of which the ultimate is conical and terminates in a stout bristle.

Claw of gonopods of female undivided; basal spines 2 + 2, conical distally, cylindrical or somewhat clavate proximally.

Length of male, 10.5 mm.; width at eighth dorsal plate, 1.4 mm. Female shorter, in length 8.5 mm., and more slender, the width at eighth dorsal plate being 1.1 mm. Length of anal legs in male ad 4.6 mm.

Localities.—Berkeley and Mill Valley.

This is the second species of *Buethobius* to become known. In the case of the type species, *B. oabitus* Chamberlin, found in Mississippi, all the specimens found had the gonopods terminating in claws, thus appearing to be females. The character of the appendages in the male is interesting, these appendages differing from those in the female only in lacking the terminal claw and the basal spines. It may be found that in *Lamyctes*, *Zygethobius*, etc., even these differences do not occur, and that the males and females have not been distinguished heretofore in consequence.

THE POTATO BEETLE, *DORYPHORA DECEMLINEATA*, EATING THE EGGS OF ITS KIND.

While ridding some early potatoes of beetles at Westbrook, Maine, in June, 1911, masses of their eggs were frequently noticed, which had part or all of their contents emptied, leaving the shrivelled coverings on the leaf. My curiosity was aroused, but was shortly to be satisfied. In the large tin pail into which the egg-bearing leaves and the beetles were thrown, one of the latter was noticed feasting upon the eggs. There was no mistake. With her mouth-parts upon an egg, and with jaws and antennæ working, the egg was seen to collapse, and she moved to the next, with like result. During the next half-hour not less than a dozen were carefully observed feeding on the eggs in the pail.

It may be of interest to remark that only females were observed to do this.—ARTHUR H. NORTON, Museum of Natural History, Portland, Me.

ERRATA.—Page 356, explanation of fig. 23, line 1, for "b" and "d" read "c;" line 2, for "c" read "b and d;" line 3, for "d" read "e."



Chamberlin, Ralph V. 1911. "Some Lithobiomorpha from the region of San Francisco Bay." *The Canadian entomologist* 43, 378–385.

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