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NOTES ON THE HABITS, DISTRIBUTION, AND STATUS OF SOME SPECIES OF PLEOCOMA

(Coleoptera, Scarabæidæ)

BY E. GORTON LINSLEY

University of California

The species of *Pleocoma* constitute one of the most interesting and remarkable genera of North American Scarabæidæ. The group owes its uniqueness in part to the peculiar habits of the males, which fly and seek their mates during the early winter rains, and in part to the slow-moving, subterranean females, which are flightless, thus greatly inhibiting dispersal and distribution of species.

A survey of the literature of *Pleocoma* indicates that interest in the group has been more or less cyclical. If published notes and records are a valid criterion, there have been five main periods of interest set apart by intervals of ten to fifteen years. The first period was that of 1856-57, when Dr. J. L. LeConte made known the type species. A second period occurred between the years of 1870 and 1874, when three additional articles appeared. The third and greatest period of activity was that of 1883-1890, when the characters and habits of many of our species were made known through the medium of eleven published papers and notes. This period was characterized by a great controversy over the systematic position of the genus, and reached its climax in the excellent revision of Dr. George Horn¹, in 1888. A revival of interest occurred between 1906 and 1918, when four papers upon southern California species appeared, three from the pen of Dr. H. C. Fall and one from Mr. A. C. Davis. Again, in 1933 and the two years following, seven additional articles on *Pleocoma* were published, notable among which were a revision of the genus by Mr. A. C. Davis², and an article on some old and new species by Mr. E. R. Leach³. These two papers shed

¹Horn, G. H., 1888, *Review of the species of Pleocoma, with a discussion of its systematic position in the Scarabæidæ*. Trans. Am. Ent. Soc. 15:1-17, figs.

²Davis, A. C., *A revision of the genus Pleocoma*. Bull. So. Calif. Acad. Sci., 33:123-130; 34:4-36, figs.

³Leach, E. R., 1933. *Two old and two new Pleocomas*. Pan-Pac. Ent. 9:184-187.

much new light on the status and distribution of certain species, but raised a few questions which seem to call for further comment.

PLEOCOMA FIMBRIATA LeConte and P. TULARENSIS Leach

The status of these two species has been discussed so often by Mr. Davis and myself, both in print^{4,5} and in friendly correspondence, that I hesitate to approach the subject again. However, in his recent revision of the genus, Mr. Davis treats *P. tularensis* as a variety of *fimbriata*. Whatever the status of this much disputed *Pleocoma* may really be, it can hardly be considered a variety of the latter, since the two forms differ both morphologically and geographically. An examination of the type specimen (July, 1937) has confirmed the opinion expressed previously by the writer⁴ that the true *fimbriata* is that species which occurs commonly in the vicinity of Placerville, California (as has been stated by Horn, Fall, and Leach). In the LeConte type the pronotum is broadly rounded behind, the antennal club barely long enough to surpass the base of the funicle. In *tularensis* the pronotum is subangulate behind and the antennal club is long enough to reach nearly to the base of the scape. Both of these characters are evident to the naked eye and are more distinctive than the difference in the shape of the basal segments of the funicle and the sculpturing of the elytra, which also separate the two species. A long series of *tularensis* from Tulare, Fresno and Madera counties, has been compared with an equally long series of *fimbriata* from Placer County and no intergradation has been observed within these characters, although both species are variable within well defined limits. Mr. Davis, in an attempt to determine the status of these two species, published a careful set of measurements of the segments of the antennæ. His conclusions were unfortunately weakened, however, by the fact that his comparisons were made between Tulare County examples and specimens from Fresno County (both obviously *tularensis*) rather than the true *fimbriata* from the north.

PLEOCOMA EDWARDSI LeConte and P. ULKEI Horn

A very important contribution in Mr. Davis' recent paper was

⁴ Linsley, E. G., 1935, Pan-Pac. Ent., 11:13.

⁵ Davis, A. C., 1935, Bull. So. Calif. Acad., Sci., 34:19

the straightening out of a part of the confusion which has existed in the literature between *P. staff* Schauffuss and *P. edwardsi* LeConte. Mr. Davis demonstrated that *edwardsi*, known to him only by the type labelled "Calif.", is a valid species and differs from *staff* in the absence of hair from the scutellum, etc. Recently, Mr. Leach⁶ recorded *edwardsi* from Nevada County, California, under the name "*ulkei* Horn." In *ulkei*, however, the fourth segment of the antenna is not lamellate, the pronotum is widest anterior to the middle, the basal angles both distinct, the scutellum as long as broad, and the posterior tarsi nearly as long as the tibiae.

Additional examples of *edwardsi* before the writer are from Brownsville, Yuba County, Calif., collected by J. J. DuBois. The female has apparently never been described. Some of its characters follow:

Female: Oblong oval; dark reddish-brown; clypeus narrowly emarginate at middle of apex, vertical horn obsolete, represented by a vague transverse ridge; pronotum a little more than one and one-half times as broad as long; anterior angles obtusely rounded, separated by less than one-half the basal width of the pronotum, lateral margins nearly parallel over basal half; disk with an indistinct transverse ridge, declivous in front, posterior angles obtusely angulate; scutellum glabrous, with a few scattered punctures; elytra widest at apical one-fourth, sutural and geminate striae deeply and distinctly impressed; pubescence of underside golden. Length 31 mm.

Described from an example with the antennae missing. In general, however, the female of this species may be recognized by the oblong form and deeply impressed elytral striae.

PLEOCOMA STAFF Schauffuss and *P. DUBITALIS* Davis

Pleocoma staff was described from "California mer." and the specimen in the Horn collection (Philadelphia Academy of Sciences) labelled "*staff*" is likewise from California. Since this latter example seems to be an authentic specimen, agreeing with Schauffuss' description in the pubescent scutellum, size, color, etc., there seems little reason to longer doubt that *staff* is truly a California species. The writer suspects that it occurs in the Sierra Nevada Mts., somewhere near the range of *edwardsi*.

In the collection of Mr. E. R. Leach there is a series of bi-

⁶ Leach, E. R., 1933, Pan-Pac. Ent., 9:184.

colorous males from Colton, Clackamas County, Oregon, in the foothills of the Cascades, that run to *staff* in Mr. Davis' key. Material at hand from Forest Grove, Oregon, in the foothills of the Coast Ranges, all agrees with the "variety" *dubitalis* Davis. It appears, however, that neither of these represents the *staff* of Schaufuss, and it would therefore seem best to consider *dubitalis* Davis as a distinct species having two races, one concolorous, the other bicolorous, both occurring in Oregon. The bicolorous race may be designated as *P. dubitalis leachi* Linsley, new subspecies (Holotype male, and numerous paratypes, in the collection of Mr. Leach), all from Colton, Oregon, found along the edges of a clearing in a forest of *Pseudotsuga taxifolia*. A male and female from West Linn, Oregon (J. J. DuBois) also represent this form. The races may be separated as follows:

Male with pronotum dark brown, elytra black or fusco-piceous, pubescence ochraceous; female with pronotum dark ferruginous, elytra ferruginous, oblong, truncate behind, anterior projection of clypeus scarcely one-third as long as broad, apices acute, median incision shallow, pronotal punctures shallow and indistinct, pubescence ochraceous....*dubitalis* s. str.

Male with pronotum fusco-piceous, elytra fulvous or brown, pubescence golden yellow; female with pronotum dark brown, elytra fulvous, oval, broadly rounded behind, anterior projection of clypeus at least one-half as long as broad, apices broadly rounded, median incision moderate, pronotal punctures deep and distinct, pubescence golden yellow.....
.....*dubitalis leachi* n. subsp.

Pleocoma minor Linsley, new species

Male: Relatively small, oval, dull, brownish-black, clothed with golden yellow pubescence. Head moderately sparsely pubescent; frons coarsely closely punctured; vertical horn conical, pointed, not emarginate; ocular canthi broadly rounded; clypeus coarsely, contiguously and subcontiguously punctured, sides arcuate, apex triangularly emarginate, apices acutely rounded; antennæ pale reddish, scape subconical, second segment moniliform, broader than long, third slender, about three and one-half times as long as greatest width, apex a little wider than base but not as wide as second, fourth with a short process, five to eleven forming the club, lamella of fifth segment scarcely one-third as long as that of sixth. Pronotum nearly twice as wide as long, broadest a little behind the middle, very feebly declivous in front and without a

transverse discal ridge, median longitudinal impression distinct, apical one-third closely punctured and clothed with short, erect hairs; surface very finely and obscurely punctured. Scutellum clothed with golden yellow hairs. Elytra not quite one and one-half times as long as broad, but little wider behind the middle; sutural striæ feeble, geminate barely evident, interstriæ weakly rugose. Legs slender, tarsi shorter than tibiæ, pale reddish. Ventral surface densely clothed with long, golden yellow pubescence. Length: 18 mm.; breadth 10 mm.

Holotype, male and one paratype (collection of Dr. W. J. Chamberlin) from Hood River, Oregon, October 23, 1930, D. C. Gillespie collector. The writer is indebted to Mr. A. T. McClay and Dr. W. J. Chamberlin for the privilege of studying these specimens.

This species shows some relationship with *P. dubitalis* Davis, but differs at once in the distinct and pubescent longitudinal pronotal impression and absence of the transverse pronotal ridge, as well as in the smaller size (18 mm. as compared with 23-29 mm.), dull luster, feeble punctation and striæ, and pale reddish antennæ and tarsi. If the type specimens are of average size this is one of the smallest known species of *Pleocoma*, being rivalled only by small examples of *P. hirticollis vandykei* Linsley.

Pleocoma crinita Linsley, new species

Male: Moderate sized, oval, castaneous, clothed with pale yellow hair. Head rather densely clothed with erect hairs; frons coarsely, closely punctured; vertical horn conical, pointed at apex; ocular canthi subquadrate; clypeus prominent, sides slightly arcuate, apex triangularly emarginate, apices angulate; antennæ reddish brown; scape moderately stout, subconical, second segment moniliform, about twice as broad as long, third about three and one-half times as long as basal width, anterior margin obtusely angulate, fourth with a short process, segments five to eleven forming club, lamella of fifth segment less than half as long as that of sixth segment. Pronotum nearly twice as broad as long, widest at the broadly rounded posterior angles; median longitudinal impresssion distinct, coarsely and subcontiguously punctured, densely clothed with long erect yellow hairs; remaining surface shining, moderately coarsely, irregularly punctured. Scutellum very densely clothed with long hairs. Elytra together barely longer than broad, sub-oval; sutural and geminate striæ deep, interstriæ coarsely punctured. Legs densely fimbriate, reddish brown, the apices and serrations darker; posterior and intermediate tarsi distinctly shorter than the tibiæ; ventral surface densely clothed with hair. Length 20 mm.; breadth 12 mm.

Holotype male, and one paratype male, from Glenwood, Klickitat County, Washington, May 1936, in the collection of Dr. M. H. Hatch. The writer is indebted to Dr. M. H. Hatch and Mr. A. T. McClay for the opportunity of studying these examples.

This very distinct species differs at once from all others except *hirsuta* in the dense longitudinal band of erect hairs on the pronotum, and from all except *hoppingi*, *simi*, and *badia* in the uniform castaneous color. In Mr. Davis' key it runs near *P. hirticollis* and *P. hoppingi*, but may be distinguished from both of these by the shape of the ocular canthi and clypeus, pubescent scutellum, deeply striate elytra, etc. This is the first Washington record for a species of *Pleocoma*.

PLEOCOMA CONJUNGENS Horn

This species was described in 1888 from three males taken near Santa Cruz, California, and from that year until 1933 it was not recognized again. In the latter year Mr. Leach recorded four males from Mokelumne Hill, Calaveras County, California, which apparently represented *conjungens*. These examples were larger than the measurements given by Horn, but otherwise agreed rather well with the characters enumerated by that author. Since the Santa Cruz record had remained unverified for nearly fifty years and many early records of Coleoptera had proven notoriously incorrect, it was not unreasonable to suppose that the Calaveras County specimens were really the Horn species. Recently, however, the writer has examined a male of *conjungens* from Waddell Creek, Santa Cruz County, collected on December 12, 1929, by Mr. Fred Blanchi. A female from Santa Cruz, November 30, 1936, submitted for determination by Mr. J. W. Tilden, likewise appears to represent this species. It is similar to *hirticollis*, but differs in the more deeply cleft clypeal margin, less coarsely punctured pronotum, and slightly different antennal structure (fourth segment not angulated internally and the lamella of the fifth segment shorter).

A second female from the Santa Cruz region (5 miles south of Carmel, Monterey Co., August 5, 1924, L. S. Slevin collection, Calif. Acad. Sci.) belongs in another part of the genus near *behrensi* Lec., differing in the proportions of the antennal seg-

ments (third segment shorter and more cylindrical, fourth and fifth moniliform, sixth angulated, seventh with a process nearly as long as that of the eighth). This example apparently represents an undescribed species.

Pleocoma blaisdelli Linsley, new species

Male: Large, robust, oval, dark brownish to black. Head moderately coarsely, closely punctured; clypeus reflexed, apex broadly emarginate, anterior angles acute, surface clothed with coarse, golden hairs, vertical horn elongate, sides subparallel but narrowing slightly to the apex which is subangularly emarginate; antennæ reddish-brown, scape elongate, conical, second segment moniliform, not quite as long as broad, third about four times as long as broad, angulate, fourth with a short lamella, segments five to eleven forming the club. Pronotum dullish, about twice as broad as long, widest at base; anterior angles very obtuse, basal margin sinuate; disk closely punctured, most of the punctures less than one puncture-width apart except along median line which is polished, impunctate; lateral margin with a semi-transparent reddish spot at middle; scutellum polished, punctures elongate, pit-like. Elytra black, about one-eighth longer than broad, barely widest at apical one-third; sutural striæ shallow, geminate striæ very feeble. Ventral surface rufo-castaneous, clothed with yellowish-brown pubescence. Femora rufo-castaneous, tibiæ and tarsi reddish-brown, the latter longer than the tibiæ. Length: 27 mm.

Holotype male (No. 4591, Calif. Acad. Sci., Ent.), and two paratypes, both males, taken at Mokelumne Hill, Calaveras County, California, in October, by Dr. F. E. Blaisdell.

P. blaisdelli is related to *P. conjungens* Horn, but is larger (27-28 mm. as compared with 22-23.5 mm.) and differs in having the first segment of the funicle angulate, the pronotum dullish, more closely punctured, with the posterior margin sinuate, and the scutellum with elongate pits, rather than with shallow punctures. This is the species recorded by Mr. Leach¹ as *conjungens*.

PLEOCOMA HIRTICOLLIS Schaufuss

Two rather well-marked races of this species exist. One occurs in the foothills of the Sierra Nevada Mountains, the other in the region of San Francisco Bay. The males of these two subspecies may be distinguished as follows:

¹ Leach, E. R., 1933, Pan-Pac. Ent., 9:185.

Third segment of antenna angulate, lamella of fourth segment more than one-half as long as that of fifth, lamella of eighth segment usually longest; elytra chestnut brown; clypeus separated from ocular canthi by a distinct notch. 25-27 mm. Yuba and Nevada Counties, Calif.....*hirticollis* s.str.

Third segment of antenna not angulate, lamella of fourth segment much less than one-half as long as that of fifth, lamella of ninth segment usually longest; elytra piceous to black; clypeus not separated from ocular canthi by a notch. 17-20 mm. Sonoma and Alameda Counties, Calif.....

.....*hirticollis vandykei* n. subsp.

Holotype male (No. 4592, Calif. Acad. Sci., Ent.) from Sonoma Co., Calif., Oct. 10 (Van Dyke collection, C.A.S.). Paratypes: five males, Sonoma Co., Calif. (Van Dyke collection, C.A.S.); one male, Sonoma Co., Calif. (Blaisdell collection, C.A.S.); one male, Sonoma Co., Calif., (M. Robinson collection); and one male, hills back of Oakland, Calif. (C.A.S. collection).

PLEOCOMA BEHRENSI LeConte

As far as is known to the writer, this species occurs only in the region immediately surrounding San Francisco Bay. An examination of the specimen upon which Mr. Davis' based his Mt. St. Helena, Napa Co., record reveals that it is *P. sonomæ*, and the same is probably true of his Sonoma County examples, although I have not seen all of these. The host plant of *P. behrensi* is the chapparal broom, *Baccharis pilularis*.

Pleocoma carinata Linsley, new species

Male: large, broadly oval, black, clothed with golden yellow pubescence. Head sparsely clothed with erect hairs; vertical horn large, stout, conical, coarsely and closely punctured; ocular canthi broadly rounded, concave, almost impunctate; oblique supra-orbital carina prominent; clypeus short, sides feebly sinuate, apex slightly emarginate, surface coarsely, closely punctured; antennæ brownish, scape subconical, second segment not quite twice as broad as long, third angulate anteriorly, a little more than twice as long as basal width, fourth nearly as long as broad, fifth shorter than fourth, angulate anteriorly, segments seven to eleven forming club, the tenth longest; lamella of seventh segment less than one-half as long as that of eighth. Pronotum twice as broad as long, widest a little behind the middle, posterior angles broadly rounded; surface distinctly but not coarsely punctured, the punctures mostly from less than one to nearly three puncture-widths

apart on disk, nearly contiguous in the groove of the broad anterior median impression, which is sparsely hairy; lateral impressions distinct but shallow. Scutellum about as long as broad, moderately coarsely, closely, but shallowly punctured, sparsely clothed with coarse, yellow-brown hair. Elytra about one-eighth longer than broad, surface shining, sparsely and shallowly punctured; sutural striæ distinct toward apex, evanescent toward base; geminate striæ very feeble, indicated over basal two-thirds by shallow punctures. Legs dark brown; posterior and intermediate tarsi shorter than tibiæ. Ventral surface clothed with golden yellow hairs. Length: 22mm.; breadth 13 mm.

Holotype male (No. 4593, Calif. Acad. Sci., Ent.) and one paratype male, in collection of author, taken at the base of Mt. McLoughlin, near Butte Falls, Jackson Co., Oregon, December 15, 1937, by Mr. C. P. North. The specimens were very kindly presented to the writer by Mr. D. F. Tillotson.

This species is apparently related to *P. simi* Davis and *P. shastensis* Van Dyke. From the former it differs in the black, rather than canstaneous, color, the sculpturing of the elytra and pronotum, the strong supra-orbital carina, and the lamellate seventh segment of the antennæ. From *shastensis* it may be distinguished by the shape of the clypeus and ocular canthi, the distinct antero-median impression of the pronotum, and the golden, rather than dark brown, pubescence, etc.

Pleocoma trifoliata Linsley, new species

Female: Narrowly oval, not quite twice as long as broad; reddish brown. Head coarsely, irregularly punctured, the punctures poorly defined; clypeus broader than long, apical margin reflexed, feebly sinuate, middle with a small angular notch, surface clothed with moderately long, erect, golden pubescence; ocular canthi subtriangular, anterior and posterior margins feeble, equally arcuate; vertical horn very short, broad, emarginate; antennæ tri-lamellate, second segment broader than long, third subconical, its width at apex about two thirds its length, segments four and five wider than long, subangulate, sixth transverse, angulate, eighth with a short process which is less than one-half as long as the lamella of the ninth, segments nine to eleven forming the club. Pronotum about twice as broad as long, widest just behind the middle, posterior angles obtusely rounded; surface coarsely, moderately closely punctured, punctures of disk tending to become confluent; pubescence short, scattered, suberect, golden; scutellum glabrous, with a few shallow punctures at base. Elytra one and

one-fourth times as long as broad, widest about middle, geminate striæ very feeble, surface shining, slightly roughened but without distinct punctures. Ventral surface clothed with moderately long, dense, golden pubescence. Length 28 mm., breadth 16.5 mm.

Holotype, female, collected at Seward, Alaska, May 1913, by Mr. J. A. Kusche, and "found dead in root of *Abies douglasi* while digging for *Cychrus marginatus*". The type is deposited in the collection of Mr. Mark Robinson, who very kindly submitted the example to the writer for study.

This interesting species is most similar to *P. rickseckeri* Horn, but differs in the narrower form, more elongate elytra which are less broadened apically, the more coarsely and closely punctured pronotum with the discal punctures becoming confluent, the absence of the short median impunctate line just anterior to middle of disk, etc. In *rickseckeri* the clypeus is bilobed with the lobes broadly rounded, the vertical horn is larger, and the lamella of the eighth antennal segment is more than one-half as long as that of the ninth, thus producing a quadri-lamellate rather than a tri-lamellate club.

The discovery of this species in a locality nearly fifteen hundred miles north of any previously known record for the genus, immediately raises a question as to the validity of the data. It is a fact that the late Mr. Kusche collected in Alaska in 1913, and the other species with which the *Pleocoma* was supposed to have been found ("*Cychrus marginatus*") is known to occur at Seward (also in British Columbia, Washington, Oregon). It is problematical as to what Mr. Kusche meant by "*Abies douglasi*", however, since there is no *Abies* of that name. *Pseudotsuga taxifolia* is commonly known as "Douglas Fir", and if this is the plant which he had in mind, it does not occur north of British Columbia, although there are other trees growing at Seward which might possibly have been mistaken for it. In any event, the species which Mr. Kusche collected appears to be distinct from any which have been described and, until the locality can be either verified or corrected, it seems best to accept it at its face value. The first record of *Pleocoma* from Utah was viewed with similar skepticism but Mr. Davis has recently described a second species from that State.

(To be continued)