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SOME NEW BEES OF THE GENUS *PERDITA*.

BY T. D. A. COCKERELL.

In Cresson's catalogue of 1887, there are given thirteen species of *Perdita*, four of which, however, are considered only doubtfully referable to the genus. Of these species 2 are from Cal., 2 Cal., 2 Nev., 1 Tex., 1 Col., Nev., 1 Col., Tex., N. Mex., 1 Ga., 1 U. S., 1 N. Am. Lately, Mr. Fox has described three from Lower California. The opinion, which might have been derived from these facts, that the genus is especially characteristic of the arid region, is strengthened by the information given below. Without any special search for the genus, the writer has discovered ten new species in New Mexico during the season of 1894, though one of them had previously been captured by Prof. Townsend.

Mr. Fox, to whom I am very greatly indebted for comparing the types with those of Cresson, has suggested the preparation of a synoptic table. This, however, is deferred for the present, as it is confidently expected that more new species will be found when they are systematically looked for next year.

The specific differences offered by these bees present a very interesting problem to the Darwinian, and it is hoped to dwell at some length on this phase of the subject hereafter. But attention may be called to the peculiar and apparently constant (within narrow limits) markings of the bees, which seem to fall under Wallace's class of "recognition marks."

All of the bees now described appear to me to be conspecific in the strictest sense. It has not been deemed necessary to mention in each description those characters which run throughout the series; it is assumed that anyone using the descriptions has made himself familiar with the generic type.

With regard to the extent of the pale markings on the face, the New Mexican species of *Perdita* form a series thus:—

Semicrocea + *phymata* + *maculata*, *hyalina*, *albipennis*, *albopilata*, *vestita*, *capitata*, *madella* + *forti*, *martini*, *luteola*.

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All of the bees now described appear to me to be congeneric in the strictest sense. It has not been thought necessary to mention in each description those characters which run throughout the series; it is assumed that anyone using the descriptions has made himself familiar with the generic type.

With regard to the extent of the pale markings on the face, the New Mexican species of *Perdita* form a series thus:—

Semicrocea + *phymatæ* + *sexmaculata*, *hyalina*, *albipennis*, *alboritata*, *austini*, *canina*, *nitidella* + *foxi*, *martini*, *luteola*.

The known distribution of the species in New Mexico is thus:—

(1.) Mesilla valley, about 3,800 ft. above tide.—*Hyalina*, *albipennis*, *phymatæ*, *martini*, *semicrocea*, *luteola*, *nitidella*, *austini*. = 8 spp.

(2.) San Augustine, on east side of Organ Mts.—*Albovittata*. = 1 sp.

(3.) Santa Fé, about 7,000 ft. above tide.—*Sexmaculata*, *canina*, *foxi*. = 3 spp.

Thus the species of each locality are different.

P. luteola has been described in another paper; it is easily known by its entirely yellow color. The other new species are described herewith. All the types are now in Coll. Amer. Ent. Society.

Perdita phymatæ n. sp. ♀.

About $4\frac{1}{2}$ mm. long: head and thorax shining olive-green, scutellum bluish, metathorax green. Abdomen shining piceous.

Face without pale marks; mandibles brown; antennæ dark brown, last four joints of flagellum pale brown beneath. Crown of head finely punctured. A distinct ridge between antennæ, replaced posteriorly by a groove, which extends to the middle ocellus. A short, shallow groove near and parallel with inner margin of eye.

Thorax very finely punctured, with a few scattered pale hairs. Metathorax with a distinct fovea.

Abdomen piceous, sparsely clothed with pale hairs at tip.

Legs dark brown; wings hyaline, iridescent, venation brown.

Recognized among the species with a dark face, by its dark brown abdomen and legs.

Hab.—The type was taken out of the clutches of an example of *Phymata fasciata* Gray, at Las Cruces, N. M., on the campus of the Agricultural College, beginning of October. (Ckll., 2,492.) The *Phymata* was on yellow (Compositæ) flowers, which it deceptively resembles in color.

Mr. Fox remarks that *semicrocea*, *martini*, *sexmaculata*, and *phymatæ* are "all good and so distinct as to scarcely require comparison."

Perdita sexmaculata n. sp. ♀.

About 5 mm. long: head and thorax shining indigo-blue; clypeus, mesothorax, and scutellum black; prothorax slightly greenish in some lights, in others blue. Ends of mandibles rufous. Scape black; flagellum dark brown, paler beneath. Face and clypeus with distinct but very sparse punctures.

Thorax smooth and very sparsely punctured, except the blue metathorax, which appears rough from extremely minute and close punctures—one should say rugulose rather than punctured.

Abdomen piceous, shiny, apex with pale hairs. Sides of 2d, 3d, and 4th segments with a large, pale yellow spot or blotch. First segment with a deep longitudinal groove extending from its base to a little beyond its middle.

Metathorax with a distinct fovea. A groove near front margin of eye as in *phymatæ*. Legs dark brown, tips of anterior femora, anterior tibiæ beneath, and anterior tarsi, yellow. Wings hyaline, iridescent, venation brown.

Recognized among the species with a dark face, by the piceous abdomen with six yellow spots, and the not entirely brown legs.

Hab.—Santa Fé, N. M., July 25th. (Ckll., 1,647.)

Perdita semicrocea n. sp. ♀.

About 4 mm. long: head and thorax black, with a bronze-green tint in certain lights. Thorax sparsely punctured, vertex of head finely rugulose.

Face wholly dark; antennæ brown, flagellum yellowish beneath. Cheeks behind eyes with white hairs. Metathorax finely rugulose.

Abdomen above orange, deepening in tint towards apex; first segment mostly fuscous, second with an ill-defined fuscous band along its sides and hind margin, third with rudiments of such a band. Under side of abdomen orange.

Legs with coxæ and femora, except at ends, dark. Ends of femora, and whole of tibiæ and tarsi of anterior and middle legs primrose-yellow; corresponding parts of hind legs brownish.

Wings hyaline, veins colorless, stigma pale lemon-yellow. Third discoidal cell distinct.

Recognized among the species with a dark face, by its orange abdomen.

Hab.—Las Cruces, N. M., on yellow (Compositæ) flowers on campus of N. M. Agric. College, beginning of October. (Ckll., 2,500.)

Perdita austini n. sp. ♂.

About 3½ mm. long: head and thorax shining black, head with a slight greenish, metathorax with a bluish tinge. Crown of head very finely granular. White hairs on head and thorax sparse. Tegulæ canary-yellow. * Clypeus yellow with a minute black dot on

each side; sides of face, in front of eyes, yellow, the yellow extending upward about the length of scape above the level of insertion of antennæ. Scape yellow, funicle and flagellum yellowish below and above brownish below.

Abdomen shining, smooth, with a very few hairs near apex; sepia brown, with broad, yellow bands (not reaching the lateral margin on second segment) occupying the anterior halves of the 2d, 3d, and 4th segments, with another obscurely indicated at hind margin of 4th. The bands are somewhat suffused, not clean cut, at their edges.

Underside of abdomen yellow, brownish towards the tip. Legs yellow and black. Anterior tibiæ and tarsi canary-yellow, femora yellow with a black blotch on inner side, and mostly black without. Middle legs duller, femora mostly black, tibiæ partly so. Hind legs with femora and tibiæ black except their ends, tarsi darkened.

Wings hyaline; stigma almost, veins quite, colorless. Third discoidal absent.

Recognized among the species with partly yellow face by the yellow extending above level of insertion of antennæ along the margin of the eyes but not in the median line, and by the small size and suffused tints.

Hab.—Las Cruces, N. M., on campus of N. M. Agric. Coll., September. (Ckll., 2,398.)

Mr. Fox writes of *austini* that it is "near *zebrata* but differs by the more slender legs, 2d submarginal cell narrower at the top; the head retreats more rapidly behind the eyes. It differs principally from *ventralis* by this latter character."

Perdita martini n. sp. ♂.

About 4 mm. long; head and thorax dark metallic-blue moderately hirsute with white hairs. Crown very finely punctured. Face up to level of anterior ocellus, including clypeus, entirely pale primrose-yellow; except for a black dot close to anterior margin of eye on each side, as far from nearest lateral ocellus as that is from the opposite lateral one.

Antennæ pale primrose-yellow, and with first 8 joints of flagellum above largely dark brown. Cheeks below middle of eyes pale yellow.

Thorax, except the minutely roughened metathorax, sparsely punctured.

Prothorax pale primrose-yellow with a median transverse metallic-blue band.

Abdomen with about equally broad bands of pale yellow and piceous, the piceous bands being at base of 1st, at junction of 1st and 2d, at distal margin of 2d and 3d, at junction of 4th and 5th, and at distal margin of 5th segment.

Legs primrose-yellow, posterior tibiae and femora more or less fuscous above. Wings hyaline, venation extremely pale; outer margin of 3d discoidal very faint.

Abdomen beneath entirely yellow, tip tinged with orange.

Recognized among the species with partly yellow face, by the yellow extending upwards to the level of the anterior ocellus, and the almost entirely yellow legs. The face is practically all yellow.

Hab.—Las Cruces, N. M., on the College Farm, April 26th. (Ckll., 731.)

I have ventured to name this and the next preceding after my two little sons, the elder of whom has gone to the undiscovered country.

Perdita albobittata n. sp. ♀.

About $5\frac{1}{2}$ mm. long; head and thorax shining dark indigo-blue, with the white hairs more prominent than in *sexmaculata*, forming quite a conspicuous white pubescence on cheeks and face. Antennæ dark brown, paler, but still dark, towards their ends. Mandibles brownish. Clypeus and a large patch on each side of it ivory-white; clypeus with a blackish mark rather in the form of a horse-shoe, but very faint medially and broadened laterally.

Head rather sparsely punctate. Thorax very sparsely punctate. Metathorax shiny, not roughened as in *sexmaculata*.

Abdomen piceous, with dense, rather coarse white hairs at tip. 1st segment with a deep groove, extending somewhat beyond its middle. 2d and 3d segments each with a broad yellowish-white band, 4th with two bands. Band on 2d segment narrowly interrupted medially; it is situated along the upper margin of the segment, except at sides, where it bends hindward. Band on 3d segment similar, but only constricted, not interrupted, medially. 1st band on 4th segment similar, but only notched medially on its hind margin, broader, and evanescent at sides. 2d band on 4th segment placed along its hind margin, straight, and evanescent at sides; it represents the band of 5th segment pushed forward.

Underside of abdomen piceous, with pale marks at sides, resembling the upper side of abdomen of *sexmaculata* considerably.

Legs black. Wings hyaline with a milky tint, iridescent. Venation pale brown.

Recognized among the species with partly white face, by its denser hairs on head and thorax, white bands on abdomen, and black legs.

Hab.—San Augustine, N. M., August 29th. (Ckll., 2,270.) Another example, from the same locality and taken on the same day (Ckll., 2,277, a ♂), differs a little, having the dark marks on clypeus reduced, mesothorax above very dark, slightly greenish, not blue (metathorax and pleura blue), band of 2d segment of abdomen constricted, not interrupted medially.

Mr. Fox writes: "*albovittata* also very distinct by dark legs, immaculate pronotum and long marginal cell."

Perdita nitidella n. sp. ♂.

About 4 mm. long; head and thorax greenish-blue. Face (including clypeus) up to level of insertion of antennæ bright yellow, furthermore, the yellow extends as much beyond the insertion of the antennæ as the length of the scape, but is divided by two incursions of the dark blue, which descend to the bases of the antennæ, their sides forming right angles thereat. Antennæ yellow, funicle, flagellum, and tip of scape more or less dark brown above.

Head and thorax finely rugulose. Borders of prothorax, and tegulæ, yellow. Abdomen shiny, yellow, becoming darker towards the tip, with dark brown bands. These bands are one at base of 1st segment and one at its distal border, these two connected by a longitudinal median line; a broad one at distal border of 2d segment, bulging (especially posteriorly) in the middle; a linear one at proximal border and a broad one at distal border of 3d segment, and rather broad ones about the distal borders of 4th, 5th, and 6th segments.

Legs primrose-yellow, hind tibiæ and tarsi brownish.

Wings hyaline, iridescent, veins dark brown, 3d discoidal excessively indistinct.

Recognized among the species with partly yellow face, by the yellow extending over the whole of that portion of the face beneath the level of the antennæ, but not to the middle ocellus; by the yellow legs; and by the small size and shiny abdomen with yellow and brown bands.

Hab.—Las Cruces, N. M., on the campus of the Agricultural

College, September. (Ckll., 2,405.) Another specimen had previously been taken at Las Cruces, by Prof. C. H. T. Townsend.

Mr. Fox writes: "*nitidella* is new, unless the ♂ of some known species, which, however, I think unlikely." I do not myself entertain any serious doubts as to the validity of the species.

Perdita canina n. sp. ♂.

About 5 mm. long; head and thorax dark metallic-blue, the white pubescence moderately abundant. Crown of head minutely granular, with punctures interspersed, showing that the granulations do not represent minute punctures of the ordinary sort.

Clypeus yellowish-white, this color extending upwards to level of antennæ and there abruptly truncate, with a slight indentation in the middle. On each side this is touched by a heart-shaped spot situated beneath the antennæ, the whole so placed as to suggest the head of a hound, with drooping ears, seen from behind. A minute, black dot on each side of clypeus, as in *austini*. Besides these markings a narrowing band of yellow borders the eyes in front, coming to a point a little above the level of the antennæ. Antennæ yellow beneath and black above.

Thorax shiny, sparsely punctured, tegulæ pale yellow.

Abdomen yellow and dark sepia-brown; 1st segment brown; 2d and 3d segments, with the disc broadly yellow, margined with brown, this margin not covering the sides, which are yellow at the angles. 4th segment yellow with its upper margin brown, the brown extending hindward at the sides to about the middle of the segment. Just below this brown margin, medially, is a minute dot of brown. Hind margin of 4th segment narrowly brown, with a squarish brown mark on each side about half-way between lateral margin and centre. 5th segment yellow, very narrowly margined with brown above at centre, and with a brown spot on each side near lateral margin, and near hind margin a pair of brown marks representing the squarish marks of previous segment. Remaining segments yellow. Abdomen shiny, obscurely punctate.

Legs yellow marked with black; anterior femur and tibia each with a black patch behind; middle femur with an oblique black patch behind, middle tibia mostly black, middle tarsus pale brownish. Hind femur with a large elongated black patch above, hind tibia and tarsus blackish.

Wings hyaline, veins dark brown, stigma margined with brown, 3d discoidal very weak.

Abdomen beneath yellow, the anterior margins of the segments narrowly black.

Hab.—Santa Fé, N. M., July 19th. (Ckll., 1,572 and 1,571.)

Mr. Fox writes: "*canina* may be the ♂ of *zebrata*, although I had previously referred two ♂ specimens, different from yours, to that species."

There was taken, however, at Santa Fé (Ckll., 1,270, July 5th) a specimen of which Mr. Fox writes: "No. 1,270 I had named as *P. albipennis*, but I now find it differs from that species and is perhaps the ♀ of *canina*."

This example differs principally from *canina* (♂) by the face markings being white; the clypeus not entirely pale, but with the pale color terminating on its upper half in three projections; the yellowish above the clypeus represented by a pair of oval, white marks; the dog's-ear-like marks absent; the 1st segment of abdomen with a narrow interrupted band, the bands on the other segments continuous in the middle; antennæ darker; size larger.

I think this is a distinct (and new) species, but it may be wiser to leave it unnamed until its relationship with *canina* can be made clearer. In *P. albipennis*, the sexes differ very much in the coloration of the abdomen, but I find the face markings practically the same in ♂ and ♀. Hence it seems likely that the dog's-head markings are characteristic of *canina* in either sex. In its face markings, this ♀ form is intermediate between *canina* and *albipennis*, but quite different from both.

Perdita foxi n. sp. ♂.

About 5 mm. long or slightly more; head and thorax very dark blue; face mostly yellow. Abdomen black. Legs rufous. The white pubescence reduced to a minimum, though sufficiently evident, if scattered, on the posterior tibiæ and tip of abdomen.

Head almost exactly circular; vertex finely roughened, clypeus distinctly punctate. Mandibles large, canary-yellow inclining to orange, with piceous tips. Clypeus quite prominent, canary-yellow with a black dot on each side. In addition to the clypeus, the whole of the face is canary-yellow up to the level of the insertion of the antennæ; the yellow at the sides, just before the eyes, extending still further upward, in a broad band which is deeply notched at its ex-

tremity, the termination of this band being about (or hardly) as far above the level of the insertion of the antennæ as the length of the scape. Cheeks yellow. Antennæ dull chrome-yellow, funicle and flagellum blackened above.

Thorax, seen from above, much the shape of a Goodale pear (see Downing), metathorax abruptly truncate and rapidly descending, rugulose.

Lateral margin of prothorax yellow. Tegulæ pale testaceous. Legs pale rufous, or one might say brownish-orange.

Wings hyaline, beautifully iridescent, veins and stigma distinct, dark (sepia) brown. The recurrent and transverso-cubital nervures more or less broken by hyaline spots. 3d discoidal distinct. Marginal about as long as stigma.

Abdomen pitch-black, shiny, hind margins of 3d and 4th segments obscurely brownish.

Recognized by its black abdomen and orange-rufous legs; nearest to *nitidella* in its face markings, but still quite distinct.

Hab.—Santa Fé, N. M., June 25th. (Ckll., 1,096.)

Mr. Fox remarks that this is "very distinct and new." I owe to him the opportunity of describing it, as I had sent it to him before I became interested in the genus, and he kindly returned it that it might be included in the present paper.

NOTES ON SOME SPECIMENS OF PYrenomycetes IN THE SCHWEINITZ
HERBARIUM OF THE ACADEMY.

BY J. B. BLISS.

Some time during the past year (1894) there was found in the Herbarium of the Academy of Natural Sciences of Philadelphia a package that had lain unnoticed for many years. The package was found to contain many of the missing specimens mentioned in the preface to *The North Am. Pyrenomycetes*. These specimens are evidently authentic and reliable, the writing on the papers in which they are wrapped being in Schweinitz's own hand, with the abbreviation L. v. S.¹ after the name of the species described by him. In only a few cases are the habitats given, but almost all are marked as collected either at Bethlehem, Pa., or Salem, N. C. They are all very small—many of them old and without fruit.

From a careful examination of the specimens the following notes were made to enable one to recognize some of the Schweinitzian species that have hitherto been only imperfectly understood. Dr. Karl Starbäck in his "Studier i Elias Fries Svamparherbarium," Bihang till K. Svenska Vet. Akad. Handl., Band 19, Afd. III, No. 2, 1894, has also examined some of the specimens noted and his observations agree with those here recorded:—

Chaetomium olivaceum C. & E. Gräv., VI, p. 96.

Sphaeria Douglasii Schw., in Herb. Schw.

On dead herbaceous stems. Stems of Lake Huron (Prof. Douglas). Conn. Dr. Torrey.

Venturia cincinnata Fr., Summ. Vag. Scand., p. 493.

Sphaeria cincinnata Fr., S. M., II, p. 451.

Perithecia clustered, ovate-globose, 150 μ diam., clothed with black, spreading spines 25-40 x 4-5 μ . Asci subsepte, clavate-cylindrical, 40-50 x 8-10 μ , paraphysate. The spores were not fully mature and the sporidia could not be accurately made out.

On the lower surface of leaves of *Passiflora*. Bethlehem, Pa. (Schw.).

¹ L. v. S. is the abbreviation used by Schweinitz to indicate his name: Ludovicus vesp. Schweinitz.