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TWO NEW SUBGENERA OF NORTH AMERICAN BEES

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PERDITA Smith

Although bees have been collected for many years in the vicinity of Boulder, Colorado, it has remained for Dr. Frank E. Lutz to discover one of the most interesting and peculiar forms which exists in this region. On June 5, 1922, in the immediate vicinity of White Rocks, not far from Boulder, Dr. Lutz observed that the flowers of *Opuntia greenei* evidently contained some insects, revealed by the movements of the stamens. Expecting to find beetles, he parted the masses of stamens, and extracted numbers of small bees. Others of the same species were caught flying around. On June 13, the spot was revisited, and Mrs. Cockerell, Dr. Lutz, and his son obtained an additional supply of these bees. Both sexes were represented in about equal numbers. On making microscopical mounts, cleared in caustic potash, it was found that both males and females had eaten large quantities of *Opuntia* pollen, which could be seen in the abdomen.

The bees belong to the genus *Perdita*, in the broad sense, but are so peculiar that they must be considered typical of a new subgenus which, according to the views of some authors should rather rank as a full genus. In dealing with the segregates from *Perdita*, one meets with very excellent characters which appear to be of generic value, but they are modified and combined in various ways, so that it becomes difficult to know how to define and limit the possible series of genera. Either we must recognize a number of small or monotypic genera for aberrant species, or we must apparently divide the group into somewhat arbitrarily defined units, into which certain forms will fit with difficulty. No doubt the tendency will be to recognize more genera at the expense of the old aggregate *Perdita* and, if the present insect is then considered to typify a distinct genus, no great harm will be done.

LUTZIELLA, new subgenus

Bees of the genus *Perdita*, peculiar in the following characters, or combination of characters. Mandibles simple in both sexes, but longer and more curved in the male. Labial palpi four-jointed, the first much longer than the other three combined. Maxillary palpi six-jointed, more than half the length of the blade; second joint longest.

Stigma narrow and lanceolate. Marginal cell long for *Perdita*, obliquely truncate. First recurrent nervure ending some distance BEFORE first intercubitus. Claws with an inner tooth in both sexes. Spurs on middle and hind legs pectinate, curved at end, in both sexes. Second ventral segment of male with a broad thickening on apical margin. Margin of fifth dorsal segment of male with a series of stout finely pubescent spine-like structures, actually modified bristles. Apex of male abdomen with a pair of widely separated elongate lobes, which are actually on the sixth segment. Sting palpi well developed, with long plumose hairs at end, but apparently the sting is not functional, as it is short and not very acute; the sheath is narrow and elongate, emarginate at apex.

Type.—*Perdita (Lutziella) opuntia*, new species.

The details of the genitalia will be discussed at another time, in connection with a more general study of the Panurgidæ. The figures drawn by Miss Elizabeth McKay, from dissections made by her, bring out other interesting structural characters.

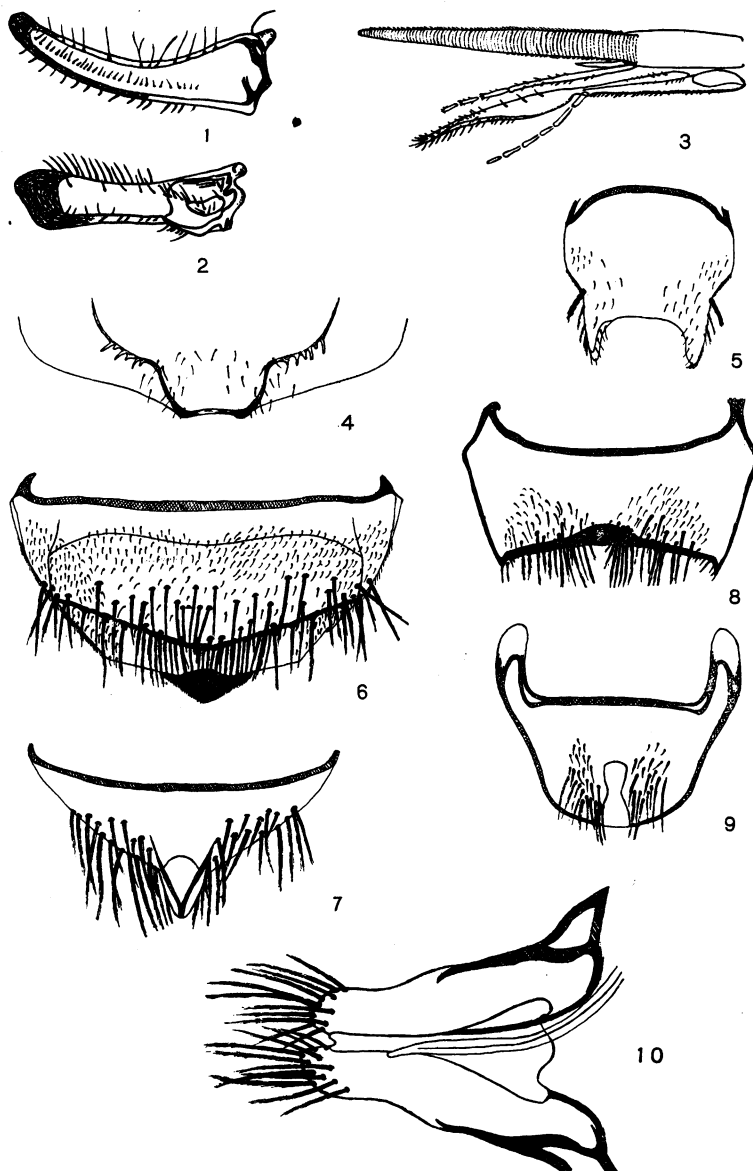
***Perdita (Lutziella) opuntia*, new species**

Figures 1 to 10

♂. (Type).—Length 5.5 mm.; robust, with broad abdomen; head very large and broad, quadrate, the eyes diverging below; the broad and low clypeus (except minute dots and slightly reddish lower margin), lateral face-marks filling the broad space between clypeus and eye and sending a dentiform process a short distance up orbits, labrum, and mandibles except reddened apex, all cream-color; head otherwise black, the front and vertex dullish, the occiput and cheeks shining; antennæ rather short, pale reddish below, dark above; ocelli small; head and thorax with thin white hair; thorax black, the tubercles brownish; mesothorax polished, extremely finely punctured; mesopleura dullish; metathorax fringed on each side with white hair, its surface mainly dull, but the upper corners of the truncation swollen and shining; tegulæ reddish; wings hyaline, nervures and stigma pale brown; stigma narrow and lanceolate; marginal cell large, unusually long for a *Perdita*, broadly obliquely truncate; basal nervure falling very far short of nervulus; first recurrent nervure ending some distance before first intercubitus; femora dark, but coxæ and trochanters reddish; tibiæ dark, the anterior ones light reddish in front; tarsi pale reddish; abdomen entirely very bright ferruginous, a large dusky spot at each side of first segment sub-basally; surface of abdomen polished and shining; apex with a pair of widely separated long dentiform lobes; second ventral segment with the margin thickened and somewhat bilobed in middle.

♀.—Similar to the male, but with the abdomen duller, without the special structural features, the apex with a dark reddish sharply pointed pygidial plate; head ordinary, the face and labrum entirely black, but mandibles ferruginous, becoming whitish basally and darkened at apex; scape dark; legs black, the tarsi brownish; first abdominal segment with large black areas.

The mandibles are simple, and the claws dentate in both sexes. The maxillary palpi are six-jointed, the second joint longest; the palpi much more than half the length of the maxillary blade, whereas they are much less than half the length in *P. halictoides* Smith, the type of the genus.



Figures 1 to 10.—Structures of *Perdita (Lutziella) opuntiae*, new species.

1, Mandible of Male. 2, Mandible of Female. 3, Mouth-parts of Male. 4, Second Ventral Abdominal Segment of Male. 5, Sixth Dorsal Abdominal Segment of Male, showing the Spine-like Structures at the end of the Abdomen. 6, Fifth Dorsal Abdominal Segment of Female. 7, Sixth Dorsal Abdominal Segment of Female. 8, Fifth Ventral Abdominal Segment of Female. 9, Sixth Ventral Abdominal Segment of Female. 10, Sting, with Sheath and Sting-palpi.

The labial palpi are four-jointed, the first joint much longer than the other three combined; the third longer than the fourth, and the second than the third.

The male of the Californian *P. macrostoma* Cockerell, by the red abdomen bilobed at apex, resembles *P. opuntiae*, but it has the second ventral segment unmodified, the head and thorax green, and the first recurrent passing beyond the first intercubitus. It also has a supra-clypeal band, lacking in *P. opuntiae*, and distinct dog-ear marks, represented by very small spots in *P. opuntiae*. The stigma of *P. macrostoma* is much larger. The stigma of *P. opuntiae* resembles that of *Macroteropsis lator* (Cockerell), but the marginal cell is not so obliquely truncate, and the maxillary palpi are quite different. The mandibles also are quite different in *Macroteropsis*, being bifid apically. The mandibles and face-markings of male *P. opuntiae* closely resemble those of *P. crassiceps* Cockerell, but that has the abdomen dark brown.

In Annals and Magazine of Natural History, December 1899, p. 414, there is given a table showing the relation between the lengths of the first and remaining joints of the labial palpi in species of *Perdita*. At that time the measurements of *P. halictoides*, the type of *Perdita*, could not be given, but we now know that the first joint is about 544μ , and the other three combined about 224μ , the latter about 41% of the former. In *P. opuntiae* the first joint is about 832μ , the last three together 480μ , the latter about 58% of the former. Thus, in respect to the labial palpi, *P. opuntiae* resembles the species of the subgenus *Perditella*, though it differs in most other respects, the venation, for example, being extremely different. In the Argentine there is a Panurgid, *Camptopoeum opuntiarum* Joergensen, which appears to be oligotropic upon *Opuntia*. It has no resemblance to the Colorado bee.

From the *Opuntia* flowers at White Rocks, June 13, Mrs. Cockerell also took a male *Lithurgus apicalis* Cresson, a female *Agapostemon texanus* Cresson, and a female *Colletes*. There were also specimens of *Epicauta* on the cacti, and a single specimen of *Moneilema*, which I am unable to identify with any of the species indicated by Casey.

EXOMALOPSIS Spinola

PACHYCERAPIS, new subgenus

Male antennæ with the flagellum greatly thickened, the middle portion dentate or serrate beneath; clypeus and labrum of male yellow; three submarginal cells; hind tibiae of male greatly swollen, their tarsi with very long white hair; hind margins of abdominal segments with broad bands of tomentum. The hind femora are quite ordinary, and the hind tarsi are not dentate. The stigma is small and short, and the

marginal cell is not sharply pointed.

Type.—*Exomalopsis* (*Pachycerapis*) *cornigera*, new species.

Related to the genus or subgenus *Anthophorula* Cockerell, but easily known by the peculiar antennæ. The swollen tibiæ and some other characters remind one of *Ancylosceles*, but there is no close affinity. So far as I can determine from the description, *E. serrata* Friese, from Orizaba, Mexico, is also a species of *Pachycerapis*.

***Exomalopsis* (*Pachycerapis*) *cornigera*, new species**

♂.—Length about 5 mm.; black, with the clypeus and labrum yellow (reddened by cyanide in type); mandibles ferruginous; face (especially sides), lower part of cheeks, and pleura with white hair; occiput and thoracic dorsum with very pale yellowish-tinted hair; front polished and shining, with a deep median groove; ocelli in a line; scape yellow, long and rather thick; flagellum strongly incrassate, pale orange-yellow, joints 10 to 12 more or less dusky above, middle joints dentiform beneath, apical joint flattened and curved; mesothorax and scutellum shining, with fine punctures; tegulæ dark rufous; wings pale brownish, stigma and nervures dusky reddish; extreme base of wings clear ferruginous; legs black, small joints of tarsi rufescent; all the tibiæ swollen, but the hind ones greatly so; abdomen closely and quite strongly punctured, first segment hairy all over, segments 2 to 5 with broad bands of grayish tomentum; apex with no special armature.

Sabino Basin, Sta. Catalina Mts. Arizona, 32° 22' N., 110° 46.5' W.; about 3800 feet above sea-level; July 8–20, 1916; (Lutz).

Easily known from *E. serrata* Friese, the latter being densely fulvous-haired, with yellowish-white mandibles. There can be little doubt, however, that the two are closely allied. *E. serrata* is larger than *E. cornigera*, being 7 to 8 mm. long.

***Exomalopsis solani* Cockerell**

This is a typical *Exomalopsis*, but its known distribution is greatly extended by the American Museum materials, collected by Dr. Lutz.

Colorado.—1 ♀; Pueblo; August 9, 1920; on a vacant lot in town. This is the first *Exomalopsis*, *sensu stricto*, from Colorado.

Texas.—5 ♀; Marathon, Brewster County; July 1–2, 1916; at *Cassia*.

Arizona.—1 ♀; north side of Kits Peak, Baboquivari Mts., Pima County, 32° N., 111° 36' W.; about 3650 ft. alt.; August 7–9, 1916. 1 unusually small ♀; west side of Santa Rosa Valley, near the Comobabi Mts.; about 3425 ft. alt.; August 9–10, 1916.

In New Mexico, it is known to occur in the Middle Sonoran zone, from Mesilla to Albuquerque.

