

X. *Two new species of Pulvinaria from Jamaica.*

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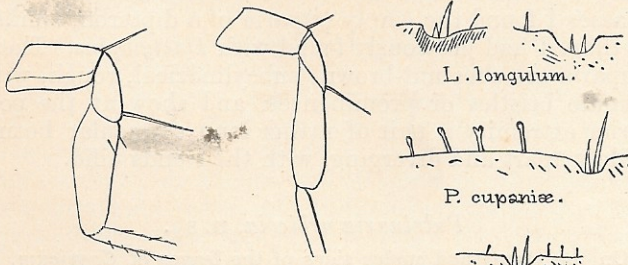
[Read February 8th, 1893.]

THE Coccid genus *Pulvinaria*, Targ., consists of about twenty-four described species, some of which are decidedly injurious to cultivated plants. Of these, eighteen are European, two or three inhabit North America, two are from Australia, and one from Mauritius. *P. cestri*, Bouché, was found in greenhouses, and its native country is uncertain. *P. camellicola* has been introduced in New Zealand, but Mr. Maskell, who has so carefully studied the *Coccidæ* of that country, has met with no native species there. In the neotropical region the genus has been unknown; until recently a new species was mentioned, but not named or described, from Montserrat ('Insect Life,' vol. iii., p. 408).*

Pulvinaria cupaniæ, n. sp.

Coxa, Trochanter & Femur.

Marginal Spines & Hairs.

*Pulvinaria cupaniæ*.*Lecanium longulum*.*P. dendrophthoræ*.

Very abundant on the leaves of akee (*Cupania edulis*, Camb.) in Kingston, Jamaica. The females, with egg-sacs, on the under

* The occurrence of the genus in Jamaica has been referred to in 'Insect Life,' vol. iv., p. 333; and Journ. Instit. Jamaica, vol. i., pp. 55, 142, 143.

sides of the leaves, not clustered together. The green walking females without sacs are extremely abundant on the midrib. Length of ♀ with sac about 5 mm.; without sac, about 3 mm. long, and 2½ or less broad. Although the scales are green, they turn red-brown on being boiled in caustic soda.

The antennae are of eight joints. The 3rd joint is distinctly the longest; the 4th next longest; the 5th and 2nd, about equal, next; the 6th, 1st, and 8th subequal, next longest; and the 7th shortest of all. The 1st joint is about as broad as long; the 2nd joint has one long and one very short hair; the 3rd has two very short ones; the 5th and 6th have each a long hair; the 7th has one or more; and the 8th five or six hairs, none apparently longer than itself. Femur rather longer than tibia; tibia about twice as long as tarsus. Tarsal knobbed digitules about as long as breadth of tarsus; the knobbed hairs are longer, but not *much* longer, and very slender. The tibia has a few shorter bristles. A long hair springs from the trochanter, and a shorter one from the distal end of the coxa. The scale, seen by transmitted light after boiling in dilute soda solution, shows, at least in places, very many round gland-spots, as in *Lecanium longulum*. The margins of the scale exhibit short hairs, which are distinctly knobbed, some apparently with a slight tendency to divide at the truncated ends. The margin is almost squarely incised at the junction of the segments, and from the incision springs a short spine; or sometimes two, one longer than the other.

This insect apparently suffers from a dipterous parasite, as on boiling some of the old females with egg-masses I found the empty puparia of a dipterous, similar to those I had previously found with *Dactylopius*. These puparia are chestnut-brown, subcylindrical, rough, with minute bristles or prominences, and show at the posterior extremity a pair of rather long spiracular horns, widely apart and diverging, with their ends bifid.

Pulvinaria urticollis, n. sp.

On the stems and under sides of the leaves of *Capsicum*, in Kingston, Jamaica; attended by ants. September, 1892.

♀. Length, including ovisac, over ¼ in.; width less than ⅓ in. Ovisac white, depressed, somewhat inclined to be longitudinally ribbed, parallel-sided, fairly firm. Scale shrunken so as to be broadly oval, oliveaceous brown. A specimen found later (Dec. 18th) has the ovisac 9 mill. long and 2 mill. broad, distinctly ribbed.

♀ without ovisac, like the *hesperidium* group of *Lecanium*, oval, somewhat elevated, more or less transversely ridged, shiny, pale brown. Anal plates conspicuous, sometimes ochraceous.

The edge of the scale has short simple hairs of the ordinary sort. There are also the four larger bristles where the segmentation should be, just as in *P. vitis* (as figured by Signoret). The posterior incision (as in *Lecanium*) is well pronounced, with the sides contiguous. In some individuals the cephalic portion of the scale is more or less separated by a lateral constriction from the rest. The tarsus is about two-thirds the length of the tibia, and the tibia about two-thirds the length of the femur. There are slender clubbed tarsal hairs, extending beyond end of claw, with the club very small. Claw with a small curved clubbed digitule. Antennae with eight joints; the 3rd longest, then the 2nd, then the 1st, then the 4th, then 5, 6, and 7 subequal, then 8th shortest; 2nd joint with a very long hair; 5th joint with two long hairs; 6th with about seven long hairs.

Larva.—Active, oval, pale yellow, with dark or black eyes. The young larva has two caudal hairs, not so long as the greatest diameter of body; these hairs curve so as to cross near their ends. The sides of the posterior cleft are not contiguous in the larva.

Parasites.—The scales often show one to four holes, where parasites have escaped; and from the ovisacs project one or more pupa cases, evidently dipterous. These pupa-cases are colourless, with the antennal coverings separate, like horns, from the body; thus resembling the pupa of *Sciara*. The leg-coverings are blunt at the extremity, with a small sublateral bristle. In the scales of females which have not yet developed the ovisac, I find a dark vandyke-brown dipterous parasite, with long finely pubescent legs and a very large straight tibial spur. The tarsus does not show any joints, and, besides its covering of short hairs, it shows a row of eight short stiff bristles on its inner side. The femur is rather shorter than the tibia. It seems possible that the holes in the scales may have been due to a Chalcidid parasite, and the puparia in the ovisacs must be those of a dipterous Inquiline (compare the notes in 'Entomologist,' 1892, pp. 180—182). The dipterous found in the females without ovisacs is no doubt a parasite, but it cannot be identified until specimens are reared.

Note on the relationships of *Pulvinaria*.

Pulvinaria, before it has produced the cottony ovisac, is practically identical with *Lecanium*, and resembles the species of the group of *L. hesperidium*. Compare *Pulvi-*

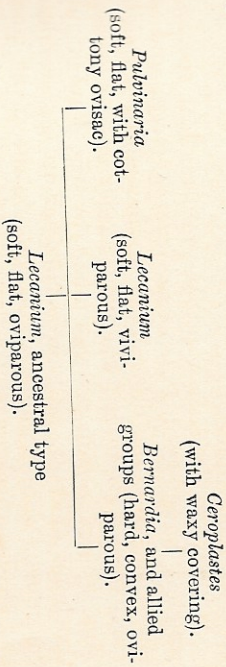
navia cupaniæ with *Lecanium longulum*, Dougl., for instance, and the similarity is very striking. The gland-spots, the marginal spines, the hairs upon the coxa and trochanter, all are closely similar; and the antennæ have the same number of joints.* The knobbed and truncated hairs on the margin of the scale of *P. cupaniæ* suggest the remarkable branched hairs of *Lecanium mangiferae*, which were probably knobbed in an earlier stage of their evolution.

We have in Jamaica a rather problematical species, which I have called *Putinarina dendrophthoræ*, and it shows very well the difficulty of distinguishing a *Putinarina* from a *Lecanium*, when the former has no ovisac. This *P. dendrophthoræ* was found by Mr. Fawcett at Cinchona (5000 ft. alt.) on *Dendrophthora cupressoides*. Specimens were extremely numerous on the plant, and had all the appearance of a flat *Lecanium*; but I found a single example with a cottony ovisac, and hence referred them to *Putinarina*. Nevertheless, it is impossible to say with perfect certainty that the single *Putinarina* was really of the same species, and, if it was not, it would be necessary to refer the specimens without ovisacs to *Lecanium*! Dr. Riley, to whom I sent only specimens without ovisacs, referred the species to *Lecanium*. These insects are greenish, the colour of the *Dendrophthora*, and resemble very much the females of *P. cupaniæ* at the same stage. The two pairs of spines on each side are very conspicuous, the anterior spine of each pair being considerably shorter than the posterior. The marginal hairs are more slender than in *P. cupaniæ*, yet they show a slight tendency to be knobbed. I do not doubt that when the species comes to be better known it will prove to be a true *Putinarina*, but it may be seen from these notes how slight are the characters of that genus.

Putinarina has no doubt been evolved from the flat type of *Lecanium*, which may be regarded as the most primitive form of the subfamily. The order of evolution seems to have been guided by the supreme necessity for protecting the eggs, which are known to be severely

* The characters of *L. longulum* here noted, except as to the antennæ, are not mentioned by Mr. Douglas in his original description (Ent. Mo. Mag., 1887), but were observed by me in specimens found in Antigua (*Barber*) and at Kingston, Jamaica.

attacked by parasites and predaceous enemies. The original, flat, unprotected type has been preserved in forms which are now *viviparous*; it has diverged on the one hand into *Putinarina*, which protects its eggs by a cottony ovisac; on the other into *Bernardia*, which has a hard scale firmly fixed down to the plant. And, as if this were not enough, *Bernardia* has given rise to *Ceroplastes*, in which the scale is covered with wax.



It follows from this view of the relationship that the tribe *Putinarini*, given in Mr. Ashmead's 'Generic Synopsis of the Coccidae,' has no standing.