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NOTES ON FOREST INSECTS.

III. TWO NEW SPECIES OF PITYOPHTHORUS FROM COLORADO.

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Pityophthorus bassetti sp. nov.

Reddish brown $2\frac{3}{4}$ times as long as broad.

Male—length 2.2 mm. The *front* with distinct elevated transverse carina at level of upper inner angle of eye; above carina coarsely punctured, somewhat rugose and shining; below carina slightly excavated, more finely and densely punctured with moderately short and fine hairs; epistomal margin bordered with longer, coarser hairs; *eyes* rather elongate oval, not coarsely granular, with anterior emargination as broad as deep; *antennal* club short oval with segments sub-equal, first suture straight, second and third procurved ventrally; outer part of funicle one third longer than pedicel.

Pronotum very little longer than broad, sides of basal half nearly parallel but widest at the middle and very slightly arcuate; front broadly rounded and rather weakly serrate on the margin; anterior half armed with moderately coarse, acute asperities which are often arranged in fairly regular concentric lines, with their bases often continuous; summit fairly prominent with slight but distinct transverse depressed area immediately posterior to it which is divided by a smooth slightly elevated median area and bordered laterally by fainter elevated lines; depression more deeply and densely punctate; punctures becoming finer and sparser posteriorly and finer laterally; basal marginal line fine but distinct, slightly sinuate. Ventral surface of prothorax grooved and smooth behind but distinctly punctured with fine hairs in front.

Elytra equal in width to the thorax; sides nearly parallel but slightly widest near middle, suddenly and strongly rounded behind origin of the declivity with tips sub-acuminate; strial punctures moderately large and deep, not entirely regular near suture; striæ not impressed; interstitial punctures very sparse and of moderate size; nearly glabrous above but with a few fine

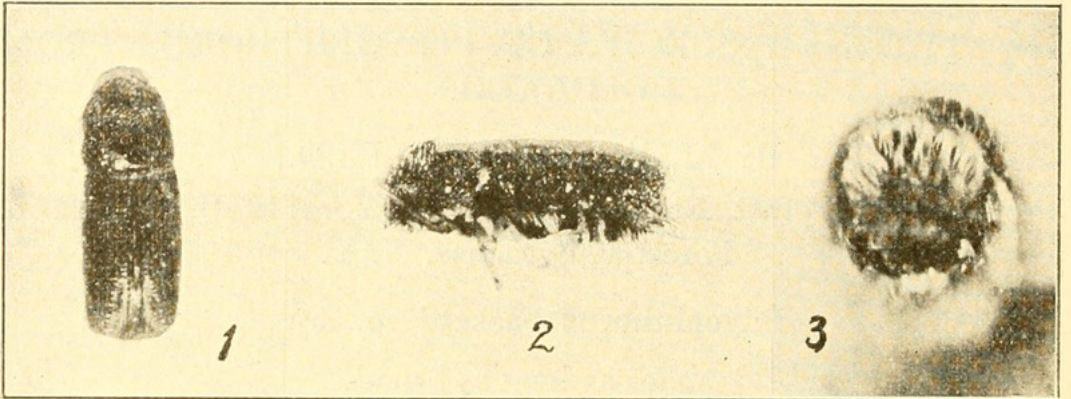


Fig. 1. 1, Dorsal view of male paratype of *Pityophthorus bassetti*, *sp. nov.*, magnified 11 diameters; 2, lateral view of male, magnified 12 diameters; 3, front view of head of female, showing the circular pubes-cent area bordered by longer and coarser hairs, magnified 32 diameters.

short hairs, these becoming more abundant and longer at sides and behind. Declivity steep with deep wide sulcus; suture wide, elevated, with several coarse granules near apex; lateral elevations with fairly sharp serrate edge armed with 10 to 12 moderate sized, black teeth, each with a stiff tactile hair arising from its inner base. Last ventral abdominal segment deeply and very broadly emarginate.

Female, slightly longer (2.4 mm.) and of same width. Differs from male in having the frons very slightly concave, with a nearly circular area finely and densely punctured and pubescent and bordered with longer coarser incurved hairs. Elytra much less hairy at sides and rear than in male. Lateral elevations of the declivity with serrations of the male replaced by a sparse row of minute granules, long tactile hairs absent.

From Pitkin, Colorado. Bred from material brought in by Mr. R. O. Bassett, Jr.

Host tree: *Picea engelmanni* Engelm. Will also breed successfully in *Abies balsamea* (Linn.) Miller.

The material from which *Pityophthorus bassetti* was bred consists of several slabs taken from the base of an Engelmann spruce near Pitkin, Colorado by Mr. R. O. Bassett, Jr., a former student. These were received at Syracuse Nov. 23, 1915 and upon examination the bark was found to contain numerous living nearly full grown larvæ of a scolytid. Further examination yielded the dead parent beetles and these proved to be an unknown species of *Pityophthorus*. The slabs were placed in a breeding jar in the laboratory and a considerable number of beetles emerged during the first two weeks of December. Part of these were preserved as specimens while the rest were left in the breeding jar and several pieces of a freshly cut limb of balsam fir about 1 inch in diameter were introduced. The adults readily entered not only the fresh balsam, but also some reentered the slabs of Engelmann spruce from which they had emerged—breeding in both. The new second generation of adults emerged from these two hosts during the summer of 1916 and many of them were still alive in September, at which time also a few small larvæ doubtless of a third generation were found. It would appear that normally there is not more than one generation per year.

The bark on the Engelmann spruce in which the beetles originally bred was about $\frac{3}{16}$ of an inch thick, while that of the balsam limbs to which the new brood readily transferred was only $\frac{1}{16}$ of an inch thick. In the former the larvæ worked nearly entirely in the inner and middle bark usually not even grooving the sapwood while in the latter the larval mines were excavated partly from the sapwood. Aside from this the engravings in the two are similar. In their general characteristics the engraving is not unlike those of other species of this genus. It consists of an entrance gallery leading diagonally upward and inward to the junction of bark and sapwood where it is expanded into an irregular nuptial chamber. From this a variable number of egg-galleries branch off from all sides, but these soon take a general longitudinal direction. In number the egg-galleries vary from 4 to 9 and the average in 13 engravings in balsam fir is 6.9. The effect of this large proportionate number of females to each male upon their relative fecundity could not be determined satisfactorily because of the injuries to the engravings by the numerous brood.

The egg-galleries which have a general longitudinal direction are

not excessively long when compared with those of several other species of this genus. In the material at hand they vary from $3\frac{1}{2}$ cm. to 7 cm. with an average length of 4.2 cm. The egg niches, where these are still recognizable, occur on both sides of the gallery and are not closely arranged—usually being 2 mm. or more apart so that the number of eggs laid by each female is probably not great.

***Pityophthorus occidentalis* sp. nov.**

Reddish brown to nearly black in color; 2.8 times as long as broad.

Male. Length 2.5 mm. *Front* convex with distinct rough transverse carina below level of upper inner angle of eyes, coarsely and roughly punctured above, slightly excavated and more finely punctured below carina, with distinct median vertical carina from transverse carina to margin of epistoma; fine short hairs over entire front but becoming more conspicuous cephalad; edge of epistoma emarginate and bisinuate, bordered with coarser and longer hairs; eyes oval with rather wide and deep emargination; antennæ light reddish-brown, club oval, with first three segments sub-equal and fourth segment shorter; first and second sutures on ventral face nearly straight, third strongly arcuate; outer part of funicle one-half longer than pedicel.

Pronotum slightly longer than broad (14:13), widest behind the summit; sides of basal half slightly arcuate, faintly constricted in front of middle, broadly rounded in front, with distinct nearly regular serrations, slightly more than the cephalic half armed with well developed asperities arranged in concentric nearly regular rows; summit prominent; posterior area shining, with rather numerous moderate sized punctures, except on the impunctate slightly elevated area in the median line; basal marginal line distinct and continued diagonally downward along the sides as a margined ridge easily distinguishable to a point anterior and dorsal to the base of the prothoracic leg. Ventral surface of the prothorax punctured in front, smooth behind except immediately adjacent to the base of the leg.

Elytra of same width as prothorax; sides subparallel, widest before the middle, slightly narrowed behind the middle to the level of the origin of the declivity, from which point it is strongly and



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