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CUTTER ANT (HYMENOPTERA:
FORMICIDAE) DETRITUS

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SCIENTIFIC NOTES

PASSALID BEETLE (COLEOPTERA: PASSALIDAE) INHABITANTS OF LEAF-CUTTER ANT (HYMENOPTERA: FORMICIDAE) DETRITUS—This is a summary of what is known concerning the relations between passalid beetles and leaf-cutter ants, including new information I have obtained recently in Guatemala.

The microhabitat characteristic of Passalidae is rotting wood (Schuster. 1978. Coleopt. Bull. 32: 21-8). Only 1 species of passalid, *Ptichopus angulatus* (Percheron),¹ is commonly found associated with leaf-cutter ants. All life stages have been found, in various parts of Mexico, in the detritus chambers or piles of *Atta mexicana* Fr. Smith (Hendrichs and Reyes-Castillo. 1963. Ciencia Mex. 22: 101-4; Reyes-Castillo. 1970. Folia Ent. Mex. 20-22: 1-240). This is apparently the primary microhabitat of this species. Though Reyes-Castillo (1970) mentions that adults are occasionally found in rotting wood, larvae and pupae haven't been found in wood. Laboratory preference tests showed preference for leaf-cutter detritus over rotting wood (Reyes-Castillo. 1970). In 7 years of collecting passalids in Guatemala, I have never found *Ptichopus* in rotting wood. They have been found under cattle droppings (Reyes-Castillo. 1970) and there is 1 record from under stones covering the entrance of a *Pogonomyrmex* nest (Hendrichs and Reyes-Castillo. 1963), but this record needs confirmation (Reyes-Castillo. 1970).

On 10 April 1982, I found 10 dead and 1 live specimens of *P. angulatus* in the detritus pile of a nest of *Atta cephalotes* L. near Ojo de Agua on a dirt road to San Lorenzo, Zacapa Department, Guatemala. This is the first record of *Ptichopus* associated with leaf-cutters other than *A. mexicana*. The pile was ca. 1 m wide and ca. 1 m below the exit of the ant nest from a roadside precipice where detritus was dropped. The live adult was found 30-40 cm deep in the pile. Though I excavated most of the mound, I found no immature stages; nor did Reyes-Castillo (1970) find immature stages in the dry season in Mexico. The nest was located in a dry, scrub habitat near the source of a spring at 350 m elevation in the Motagua Valley (see Stuart. 1954. Contrib. Lab. Vert. Biol., Univ. Mich. 65: 1-26, Plate VI, for photos of this region's habitat).

Later, on 15 June, I found the remains of 1 *P. angulatus* in a detritus chamber of *Atta* in a grassy area at 1525 m on Volcan Jumay near Jalapa. At 1800 m the cultivated area ends and a wet oak, perhaps cloud, forest begins. On the same day, my students encountered 6 dead individuals in a detritus pile of *A. cephalotes* at 1260 m and 4 live adults (1 teneral) with eggs in another pile at 1125 m near Laguna del Hoyo in Jalapa Dept. No larvae or pupae were found. This area, now extensively cultivated, was probably originally covered with pine-oak forest. These findings in Jalapa and Zacapa departments suggest a wide range of habitats for *P. angulatus* in Guatemala.

The variety of habitats occupied by *P. angulatus* and *Atta mexicana* in Mexico is also quite broad. Hendrichs and Reyes-Castillo (1963) and Reyes-Castillo (1970) report them from dry areas of the altiplano (e.g., Durango) to wet lowland forest (e.g., Catemaco, Veracruz). In the latter area, they

¹Reyes-Castillo (pers. comm. 1982) thinks *P. angulatus* may be a species complex, or perhaps a single polymorphic species.

were taken from detritus chambers 1 to 1.2 m deep (Reyes-Castillo, 1970). This author also mentions the occurrence of *P. angulatus* from 0 to 2000 or 2100 m elevation in habitats including semidesert, pine, pine-oak, tropical deciduous, and tropical rain forests. He mentions the occurrence of *A. mexicana* to 2300 m. *A. cephalotes* apparently doesn't occur above 1560 m in Guatemala (pers. comm. Margaret Dix, 1982).

Migration of *P. angulatus* apparently occurs during the wet season which begins in late April or early May in Guatemala. My 11 Guatemalan records of this species at lights are from April 22 to June 24. This coincides fairly well with the period May to August when they are attracted to lights in Mexico (Hendrichs and Reyes-Castillo, 1963).

P. angulatus ranges from the U.S.-Mexican frontier at Matamoros (Schuster, In press. Coleopt. Bull.) to Colombia (pers. comm. P. Reyes-Castillo, 1982). *A. mexicana* does not extend as far south as *P. angulatus*. Other *Atta* species are present, however, and their detritus probably is host to *P. angulatus*, as in the case of *A. cephalotes* in Guatemala. The only other species in the genus, *P. melzeri* Leuderwaldt, occurs in Brazil, but nothing is known concerning its ecology (Reyes-Castillo, 1970).

Concerning other passalids associated with ants, the remains of 1 individual of *Heliscus yucatanus* Bates were found in a nest of *A. cephalotes* in the Yucatan Peninsula (Reyes-Castillo, 1970). Occasionally, *Passalus punctiger* Lapeletier & Serville and *Passalus inops* Truqui have been found associated with *Atta* (Reyes-Castillo, 1970), but they apparently have not developed as close a relationship with their host as has *Ptichopus*. These species are usually found in rotting wood. *P. punctiger*, the commonest of these 2 species of *Passalus*, ranges from northern Mexico (Arizona?) to Argentina (Schuster, In press). *P. inops* is found in Mexico and Guatemala (pers. comm. P. Reyes-Castillo, 1982), though I have never collected it in Guatemala. The *P. inops* larva is extremely distinct from those of all other passalids, except *Ptichopus angulatus* (Schuster and Reyes-Castillo, 1981. An. Esc. nac. Cienc. biol., Mex. 25: 79-116). In both species, the larvae possess long, stout hairs scattered over most surfaces of the body. Could these be adaptations for living in *Atta* detritus? If so, *Passalus inops* may represent an early stage in the evolution of obligate colonization of *Atta* detritus chambers.

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