

Research Note

*SPECULATIONS ABOUT PHORESY BY A DEUTONYMPH (ACARINA) ON ATRACTOCERUS BRASILIENSIS (COLEOPTERA:LYMEXYLONIDAE)*¹

Phoresy is a widespread biological phenomenon, in which one animal actively seeks and attaches itself to another animal, for a limited length of time without feeding or molting; this action results in the dispersal of the first species or the phoretic animal. The second animal is called the associate. It is known that this dispersal is necessary for the completion of the life cycle of the phoretic species. In the Acarina, the phoretic species attaches itself to its carrier by means of claws, chelicerae, an anal pedicel, or by a ventral sucker plate. Deutonymphs or adults of several mite families have developed phoretic relationships with a variety of arthropods. In the mite discussed here the deutonymph is the stage involved in phoresy. It should be remembered that acari usually pass through six instars after eclosion: prelarva, larva, protonymph, deutonymph, tritonymph, and adult. Deutonymphs are very similar to adults but are sexually immature.

The members of the coleopterous family Lymexylonidae are uncommon. They live under the bark of trees where they tunnel into the wood, perhaps causing minor damage. One species regularly causes damage to chestnut trees in the United States. The few species in the family are not very prolific; consequently they are seldom seen and collected. They are poor, slow fliers. Their small triangular hind or flying wings barely support them in flight; the elongated abdomen hangs from the anterior part of the body. Nothing is known about the biology of *Atractocerus brasiliensis*, Laporte and Serville, the only species reported from Puerto Rico. This species is occasionally collected, usually at night, and most records are from the western half of the Island.

A female of this species was observed, at night, in the senior author's laboratory at Cayey, July 1981. After it alighted on a concrete wall, it first waved the long abdomen from side to side. Then it downcurved the abdomen and started softly poking the wall as a person would hit a surface with a curved finger of a resting hand. The specimen was observed with a hand lens. The last three abdominal terga were noticed to be completely covered, at least dorsally, with closely packed mites. None were observed on the remaining segments. Each time the tip of the abdomen touched the wall several mites rapidly abandoned the beetle and slowly crawled away spreading in a slowly growing circular area.

¹ Manuscript submitted to Editorial Board November 8, 1982.

The movements of the body, the crowding of the deutonymphs on the last three abdominal segments only, and the timing of the escape of the mites strongly suggest an established pattern of behavior. In order to check part of this hypothesis, we obtained specimens of *A. brasiliensis* on loan from the National Museum of Natural History, Washington, D.C. Examination of three females and two males, one of the latter from



FIG. 1.—Habitus of male of *Atractocerus brasiliensis*, Laporte and Serville; Note a single mite on the antepenultimate abdominal segment.

Puerto Rico, corroborated part of our initial observation. The three females had numerous mites on the last three abdominal segments. Figure 1 shows a single specimen that was found on one of the males. Examination at 40 \times of the segments show no apparent differences in the distribution and shape of the micropilosity of the abdominal segments in both sexes. The pilosity does not totally cover the segments; some areas are bare.



FIG. 2.—Apex of abdomen of female of *Atractocerus brasiliensis*, L. & S. Note numerous mites on antepenultimate segment.

The deutonymphs of the species under discussion attach themselves to the associate by means of an anal pedicel. This attachment indicates that sticking to the abdominal segment is not a simple mechanical action. Because the nymphs attach themselves only to the females' last three abdominal segments (fig. 2), the other segments being apparently similar, we can speculate that a hidden chemical factor is involved. Cross and Bohart² have noticed the influence of season and sex in the relationship of alkali bee mites and their hosts.

Krantz and Mellot³ concluded that some chemical influences affect the

² Cross, E. A. and G. E. Bohart, 1969. Phoretic behavior of four species of alkali bee mites as influenced by season and host sex, *J. Kansas Ent. Soc.* 42:195-219.

³ Krantz, G. W. and J. L. Mellot, 1972. Studies on phoretic specificity in *Macrocheles mycotrupetes* and *M. peltrupyretes* Krantz and Mellot (Acari: Macrochelidae), associates of geotrupine Scarabaeidae. *Acarologia* 14 (3): 317-44.

phoretic relationship between *Marocheles mycotrupetes* and *M. pelitru-pyretes* (Acari: Microchelidae) and their geotrupine scarabaeid carriers.

Another speculation that should be explored is that possibly the abdominal movements of the female somehow trigger an escape reaction in the mites. As this mite is associated with a borer, chances are that it is a tunnel inhabiting species. The fact that the nymphs moved to a wall, a totally different habitat, when the female was swinging its abdomen, points to the possibility of an escape reaction.

The two sets of observations, namely, abdominal movements by the associate and attachment of phoretic nymphs to apical abdominal segments of females only, back the hypothesis that phoresy, in some cases at least, is not a simple mechanical event but an elaborate behavioral process affected by physical and chemical stimuli.

The mite specimens were sent for identification. The fact that these are nymphs makes the identification difficult.

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