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PARASITISM OF *ANCISTROCERUS ANTILOPE* (HYMENOPTERA:EUMENIDAE) BY *LEUCOSPIS AFFINIS* (HYMENOPTERA: LEUCOSPIDIDAE)

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ABSTRACT

The chalcid wasp *Leucospis affinis* has been known to parasitize only megachilid bees. Its rare occurrence as a parasite of the eumenid wasp *Ancistrocerus antilope* indicates that eumenid wasps may be a large resource this chalcid is not exploiting.

Krombein et. al. (1979) recorded *Leucospis affinis* Say as parasitizing seven genera of bees in the family Megachilidae. In general, these bees nest in hollow twigs or vacant insect tunnels in wood. The female of *L. affinis* pierces the twig with her ovipositor and deposits an egg in the bee's cell. The egg hatches and the larva feeds externally on the host larva (Graenicher 1906). This parasite is often abundant and may exert considerable mortality on its hosts, killing up to 80% of a host bee's larvae (Medler 1958).

Many solitary aculeate Hymenoptera nest in hollow twigs and these species are relatively well known (Krombein 1967). Even though megachilid bees and hunting wasps (especially Eumenidae) use the same type of nest site, and are often in close proximity, *L. affinis* has only been reported from the nests of bees.

For a number of years, I have been studying eumenid wasps that occupy trap-nests (artificial nest sites made from sticks of wood with drilled holes) (Cowan 1981, 1984). I have examined thousands of nests of wasps and bees, and with the exceptions mentioned below, *L. affinis* has been associated only with megachilid bees.

During the winter of 1983–1984, I examined a sample of 600 trap-nests that had been in the field during the summer of 1983 in Kalamazoo County, Michigan. Table 1 indicates the hosts examined, number of nests, and rate of parasitism by *L. affinis* for the most abundant bees and eumenid wasps in this sample. *Leucospis affinis* emerged from 44% (96/217) of the megachilid bee cells. In addition, 11 *L. affinis* developed in two eumenid wasp nests. Each wasp nest was composed of six cells. When opened during the winter, 11 cells contained full-grown *L. affinis* larvae and one cell contained a eumenid larva. The eumenid hosts were killed after they had spun their cocoons. Each of the 11 *L. affinis* prepupae transformed into an adult female. Unfortunately, the eumenid larva died.

Because I did not rear any adult eumenids from these nests, the determination of *Ancistrocerus antilope* (Panzer) as the host is conjectural. The nesting materials and structure were typical of *A. antilope* and there was no evidence that either trap-nest had been previously occupied by another wasp or bee. The most convincing evidence that *A. antilope* served as host was the presence of dead adults of the mite *Kennethiella trisetosa* (Cooreman) in three cells of one nest and one cell of the other. This mite is only known to be associated with the wasps *A. antilope* and *Ancistrocerus spinolae* (Saussure) (Krombein 1967, Cowan 1984). Although the nests of these wasps are virtually identical, *A. spinolae* is very rare in Michigan and I think it unlikely that this wasp was involved.

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Table 1. The number of nests, cells, *L. affinis* reared, hosts reared, and percent of parasitism by *L. affinis*, for megachilid bees and eumenid wasps.

Host	No. nests	No. cells	No. *L. affinis* reared	No. hosts reared	Percent parasitized by *L. affinis*
Megachilidae					
Megachile sp.	16	87	27	44	31
Osmia pumila Cresson	14	102	49	39	48
Chalicodoma sp.	6	28	20	1	71
Eumenidae					
Ancistrocerus antilope	23	112	11	74	10
Euodynerus foraminatus (Saussure)	30	127	0	98	0

There is some question as to the ability of this parasitoid to complete its life cycle on eumenid hosts. Normally, young adults of *L. affinis* chew through the partitions that separate the cells of a bee's nest and escape through the original nest entrance. Depending upon the genus of megachilid host involved, this means *L. affinis* chews through partitions made of leaves (*Megachile*), masticated plant material (some *Osmia*), or resins (*Chalicodoma*). Eumenid wasps, however, separate their cells with partitions of dried mud which apparently presents an impenetrable barrier to *L. affinis*. Only two thin, inner mud partitions of the eumenid nests in which the *L. affinis* developed were breached. The others showed no evidence of abrasion or other damage by the parasites, and all of the parasites perished inside the nests without escaping. However, all of the *L. affinis* had chewed at the wood of the trap-nest near the mud partition. In two cases, this gnawing was "directed and purposeful" in that the *L. affinis* excavated tunnels 2–3 mm in diameter at a right angle to the wall of the nests for a distance of 3 and 6 mm, respectively. The longer tunnel came within 1 mm of the outside. However, both of these individuals apparently became exhausted and died before completing their exits. If *L. affinis* were parasitizing wasp nests in hollow stems of plants such as sumac or elderberry, it seems likely that gnawing through the side of the nest would frequently be more successful.

From my observations, it is apparent that eumenid wasps are perfectly adequate as food for the development of *L. affinis*. Because these wasps are abundant and commonly nest in the same places as the normal megachilid hosts of *L. affinis*, one might expect natural selection to expand the behavioral repertoire of *L. affinis* to regularly include eumenid hosts. Why this has not happened is a mystery.

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