

## HYMENOPTEROUS PARASITES OF PUPAE OF HOUSE FLIES (*MUSCA DOMESTICA*) AT POULTRY FACILITIES IN TENNESSEE

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**ABSTRACT**— Five species of hymenopterous parasites were found attacking pupae of the house fly (*Musca domestica* Linn.) in poultry facilities: *Spalangia cameroni* Perkins; *Spalangia endius* Walker; *Pachycrepoideus vindemiae* (Rondani); *Muscidifurax raptor* Girault and Sanders; *Trichopria* sp. *Spalangia cameroni* was the most prevalent parasitic species recovered in caged-layer, breeder, and broiler houses.

Parasitic species of Hymenoptera attack pupae of the house fly (*Musca domestica* Linn.) and other muscoid flies in poultry and livestock manure (Rueda and Axtell, 1985a, 1985b, 1985c; Rueda et al., 1990, 1992; Rutz and Axtell, 1980). Indigenous pupal parasites, particularly Pteromalidae, suppress populations of flies (Legner and Dietrick, 1974; Rutz and Axtell, 1979). Mass releases of several indigenous species of pteromalid parasites have been successfully conducted as part of the biological control program at poultry and livestock installations (e.g., Legner and Brydon, 1966; Morgan et al., 1975; Rutz and Axtell, 1979).

Information on the species composition of indigenous parasites in poultry facilities is essential to establish a successful, parasite-release program for control of flies. Little is known about the occurrence of parasites in pupae of flies in Tennessee. Therefore, we conducted a preliminary survey of these parasites from different poultry facilities.

### MATERIALS AND METHODS

The preliminary survey was conducted on poultry farms in Shelby and Bedford counties, Tennessee, in September and October 1992. Caged-layer houses were open-sided structures (100 to 135 m long by 10 m wide; 18,000 to 20,000 bird capacity) with three rows of two-tiered, wire, stairstep cages (three to four birds per cage) suspended above a dirt floor and running the length of the house with concrete walkways between rows of cages. Breeder houses were open-sided structures (90 to 100 m long by 9 m wide; 5,000 to 6,000 bird capacity). Slat platforms (3 to 4 m wide, 0.8 m above the dirt floor) ran the entire length of the house along each wall. Waterers and feeders were placed over the slots, and manure accumulated underneath. The middle part of the house had a dirt floor covered with wood shavings. Broiler houses were open-sided structures (90 to 100 m long by 9 m wide; 20,000 to 25,000 bird capacity) with a dirt floor covered with wood shavings.

Samples of puparia of naturally-occurring house flies were collected from the manure and along the sides of the poultry house. Intact puparia were collected and sorted from the substrate by hand at the location or by the water-floatation method (Morgan, 1986). Individual puparia were placed in small vials and held in the laboratory for 40 to 50 days at 24 to 26°C to allow time for development and emergence of parasites. Percentage of parasitism was calculated by dividing the

number of collected puparia that produced either a fly or a parasite by the number of parasites that emerged from or died in the puparia.

### RESULTS AND DISCUSSION

Five species of parasites were obtained from pupae of house flies collected from poultry houses: *Spalangia cameroni* Perkins; *Spalangia endius* Walker; *Muscidifurax raptor* Girault and Sanders; *Pachycrepoideus vindemiae* (Rondani); *Trichopria* sp. These parasites are species of Pteromalidae with the exception of *Trichopria* sp. which are members of Diapriidae. In all poultry houses surveyed, *S. cameroni* was the most abundant species recovered from pupae of house flies (Table 1). The percentage of parasitism was slightly higher in caged-layer houses (15.8%) than in breeder (13.6%) and broiler houses (12.9%).

In North Carolina (Rueda and Axtell, 1985a; Rutz and Axtell, 1980) and Florida (Morgan and Patterson, 1975), *M. raptor* was the most abundant parasite of house flies along with *P. vindemiae* and *Spalangia* sp. In South Carolina, Ables and Shepard (1976) reported that *M. raptor* and *S. endius* were the most common species in poultry facilities. *Muscidifurax raptor* has been used in many inoculative and sustained releases in poultry farms for control of house flies (Legner and Dietrick, 1974; Rutz and Axtell, 1979). *Spalangia* spp., particularly *S. endius*, also were released in large numbers to suppress populations of house flies in poultry facilities (Morgan et al., 1975). The data from this preliminary survey indicate that more species of parasites of house flies are likely to occur in poultry facilities in various parts of Tennessee. Poultry facilities, as confined systems, are great producers of filth muscoid flies, particularly the house fly. They are suitable sites for the mass releases of hymenopterous parasites for control of flies since they tend to have higher levels of parasitic activity. Additional basic information on populations of indigenous parasites, including their seasonal and relative abundance, are needed before attempting any augmentative releases of parasites at poultry facilities in Tennessee.

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TABLE 1. Parasitic Hymenoptera that emerged from pupae of naturally-occurring house flies (*Musca domestica*) in poultry houses on farms in Tennessee.

Poultry houses and parameters of parasitism	Total collected (n)
Caged-layer houses (n = 2)	
<i>Spalangia cameroni</i>	93
<i>S. endius</i>	20
<i>Muscidifurax raptor</i>	3
<i>Pachycrepoides vindemiae</i>	3
<i>Trichopria</i> sp.	38
Total parasites recovered (n)	157
Total pupae collected (n)	991
Parasitized pupae (%)	15.8
Breeder houses (n = 2)	
<i>S. cameroni</i>	30
<i>S. endius</i>	12
<i>P. vindemiae</i>	3
Total parasites recovered (n)	45
Total pupae collected (n)	330
Parasitized pupae (%)	13.6
Broiler houses (n = 2)	
<i>S. cameroni</i>	34
<i>S. endius</i>	5
<i>P. vindemiae</i>	8
Total parasites recovered (n)	47
Total pupae collected (n)	363
Parasitized pupae (%)	12.9

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