LABORATORY STUDIES ON THE BIOLOGY OF SPALANGIA NIGRA
[HYM. : PTEROMALIDAE]

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At 21 °C, Spalangia nigra Latreille (Hymenoptera : Pteromalidae) averaged 29.3 days between exposure and emergence of 1st progeny from host house flies, Musca domestica L. (Diptera : Muscidae). At 27 °C, the average developmental time to 1st emergence was reduced to 26.6 days, and a majority of adult wasps emerged from host house fly puparia between 29 and 40 days postoviposition. The sex ratio of progeny ranged from 1.4 to 1.8 female-to-male, but all progeny of virgin females were male. Male wasps lived from 6.8-15 and females 11-17.8 days at 27 °C; honey as a food source increased longevity. No significant differences in parasitism by S. nigra were associated with host house fly pupal densities ranging from 1 to 200 pupae per female-male pair of wasps, but average percent parasitism decreased at host densities greater than 50. House fly pupae exposed to parasitism at ages ranging from 4 to 96 h did not differ in subsequent production of adult flies. S. nigra did not demonstrate preference for house flies or stable flies, Stomoxys calcitrans L. (Muscidae) as hosts. The results of these studies indicate that S. nigra may contribute significantly to previously unexplained mortality of house flies and stable flies.

KEY-WORDS : House fly, stable fly, Spalangia nigra, parasitism, filth flies.

Spalangia nigra Latreille (Hym. : Pteromalidae) is a widespread, cosmopolitan pupal parasite of many Diptera. In the U.S., its known distribution extends from New York south to South Carolina and west to Texas and California (Krombein et al., 1979). Recorded hosts include Rhagoletis completa Cresson (Tephritidae), Hylemya antiqua (Meigen) (Anthomyiidae), Haematobia irritans (L.), Musca domestica L., and Stomoxys calcitrans (L.) (Muscidae) (Krombein et al., 1979). In the pasture environment, S. nigra has been associated with Sepsis biflexuosa Strobl (Sepsidae), Brontaea arcuata (Stein), Neomyia cornicina (F.), Musca autumnalis De Geer (Muscidae), and Ravenia spp. (Sarcophagidae) (Thomas & Morgan, 1972 ; Wylie, 1973 ; Figg et al., 1983). Although it is the most abundant parasite of stable flies in Missouri, U.S.A. (Smith et al., 1987), S. nigra is less important in eastern Nebraska feedlots (Petersen & Meyer, 1983), possibly because of differences in principal habitat type.

Few reports on the biology of S. nigra are available (Parker & Thompson, 1928 ; Legner, 1969); therefore, we studied this species in the laboratory and the results are reported here.
MATERIALS AND METHODS

LABORATORY COLONY

A colony of *S. nigra* was started with adults that emerged from house flies, *Musca domestica* L., and stable flies, *Stomoxys calcitrans* (L.), collected in central Missouri. These parasites were kept at ca. 21°C (70°F) and 60-70 % R.H. in a plexiglass cage (30 x 30 x 30 cms) (fig. 1). Water was provided daily on cotton dental wick and droplets of honey were provided as a source of carbohydrates for the parasites. When it was being used for experimental purposes, the population of the colony was ca. 1,000 female parasites.

Three times per week, ca. 1,000 one-day-old house fly pupae (World Health Organization standard susceptible) were exposed to adult parasites by placing them in the parasite cage in 10-cm-diameter glass preparation dishes. After 2-3 days the pupae were placed under CO₂ gas and adult *S. nigra* separated by sifting through a 1.6 mm mesh screen. The adult parasites were returned to the cage and the house fly pupae incubated at the aforementioned temperature and R. H. in 500 ml plastic cups with lids of 0.3 mm mesh screen. After ca. 25 days, the lids were replaced with black funnels topped by 111 ml clear plastic vials (fig. 2). Newly emerged adult parasites were attracted by light transmitted through the vials, were trapped therein, and subsequently were transferred to the colony.