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THE EFFECT OF CULTURE AGE ON THE INFECTIVITY OF PREPARASITES OF THE MOSQUITO PARASITE *ROMANOMERMIS CULICIVORAX*

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The mermithid nematode *Romanomermis culicivorax* Ross and Smith has been studied extensively over the past few years as a biological control agent of larval mosquitoes. It has been mass cultured in several laboratories with mosquito larvae as the *in vivo* host for the parasitic stage and moist sand for the free living stages. In this procedure, sand cultures are flooded to induce the hatch of preparasitic (infective-stage) nematodes.

In studies of effect of culture age on the yield and survival of preparasites, Petersen (1978) found that cultures of *R. culicivorax* require about 8 wk to mature before substantial numbers of preparasites are produced at ambient temperatures. Peak hatches can be obtained when cultures are 11–19 wk old. Hatch steadily decreases thereafter and essentially ceases after about 36 wk. After hatching, the preparasite is highly infective for only 36–48 hr, but may remain motile for an additional 24–36 hr (Brown and Platzer 1977, Kurihara 1976). This loss of infectivity with retention of motility undoubtedly accounts for the low levels of infection sometimes reported when cultures are used immediately after being shipped long distances. The preparasites are known to hatch prematurely under these conditions, and many are rendered non-infective by the time they are used. This should not occur in laboratories where the cultures are produced. However, while using standard procedures and dosage rates, the author often observed widely fluctuating infection levels during week-to-week mass rearing. Since a rather common practice was to flood older cultures (20–30 wk old) to obtain the inoculum for the weekly mass-rearing cycle, the infectivity of the preparasites from these older cultures became suspect as the cause of lower-than-normal levels of infection. Therefore, a study was conducted to determine if the infectivity of preparasites was significantly different between older and younger cultures.

The test consisted of flooding 10-, 20-, and 30-wk-old cultures for 16 hr and then carefully counting the preparasites from each culture with volumetric dilutions. Only actively swimming nematodes were counted. The mean for 6 counts was used to determine the volume of preparasite-containing water to add to the test container. Four replications of 50 first-instar *Culex pipiens* were exposed to 500 preparasites each in 500 ml of water for each of the 3 cultures (12 exposures per test). The tests were conducted at ambient temperatures 26–27C) and were replicated 5 times (60 exposures total). The extent of parasitism was determined visually 7–8 days after exposure. Each value reported in Table 1 is the mean for 4 replications. Test means were separated with Duncan's multiple range test.

In each test but one, the mean percentage infection was highest for preparasites from 10-wk-old cultures; in Test 4, the infection levels at 10 and 20 wk were essentially the same. Parasitism for 10-wk-old cultures (80.2%) was significantly higher ($P = <0.05$) than for 20-wk-old cultures (53.2%). The 30-wk-old cultures averaged 41.6% parasitism, which was not significantly different than that of the 20-wk-old cultures; however, the difference between the 10- and 30-wk-old cultures was highly significant ($P = <0.01$).

Though this is a relatively simple observa-

Table 1. Percentage parasitism of *Cx. pipiens* after exposure to the infective stage of *R. culicivorax* from three age groups.[1]

Test	Age of cultures		
	10 wk	20 wk	30 wk
1	37	26	21
2	100	46	46
3	89	25	42
4	99	100	34
5	76	69	65
$\bar{X}$	80 a[2]	53 b	42 b

[1] Hosts exposed at 1:10 ratios in the laboratory.

[2] Values followed by the same letter do not differ significantly ($p < 0.05$) according to Duncan's multiple range test.

tion, it can be an important factor in laboratory experimentation, mass production, or field releases with *R. culicivorax* and perhaps other mermithid nematodes. Though the age of a culture is by no means the sole factor responsible for fluctuations in levels of parasitism during mass production, it is undoubtedly an important contributing factor. Therefore, it is recommended that normal exposure rates be increased about 30 and 50%, when preparasites are obtained from cultures more than 18 and 25 wk old, respectively.

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RESULTS OF SYSTEMATIC TRAPPING OF THE MOSQUITO POPULATIONS IN SARATOGA COUNTY, N.Y.

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During the summer of 1979 a systematic trapping technique was used to survey and examine by municipality, the relative diversity, abundance and distribution of adult mosquito species found in Saratoga County, N.Y.

In order to capture representative samples of the native mosquito population, regular trap sites were chosen. Selection of trap sites was based primarily on former trapping success and arboviral isolate areas (high risk areas). Other, secondary determining factors involved in site selection were known locations of adult resting spots, predetermined high density larval sites, complaint calls and accessibility. Lastly, each site was chosen for its significance as a comparative factor in assessing total mosquito populations for each municipality (community) trapped.

Trapping procedures were performed on a nightly basis utilizing CDC light traps, (Sudia and Chamberlain 1962) supplemented with dry ice (Newhouse, et al. 1966) and were conducted on each of the first 3 consecutive nights of a normal work week. Each week, one of 4 sites in each of 9 municipalities was trapped for a total of 4 sites per month/municipality.

A total of 16,557 mosquitoes representing 5 genera and 12 species were collected from Saratoga County in 1979.

The number of mosquito species trapped is compared by month in Table 1 and seasonally by community in Table 2. As expected, because of favorable spring conditions, i.e., above normal precipitation and humidity, an early adult mosquito population emerged and was most apparent during the months of May and June,