BODY SIZE VARIATION OF *CULISETA MORSITANS* IN RELATION TO VECTOR POTENTIAL FOR EASTERN EQUINE ENCEPHALOMYELITIS VIRUS

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ABSTRACT. Variation in the body size of wild *Culiseta morsitans* collected from Massachusetts was examined. No significant size variation was detected at any time during the collection period, nor was there a significant size difference between parous and nulliparous mosquitoes. We conclude that size variation in this species does not affect survivorship, an important aspect of vectorial capacity.

Culiseta morsitans (Theobald) has been suggested as a secondary, enzootic vector of eastern equine encephalomyelitis virus (EEE) (Morris and Zimmerman 1981, Howard et al. 1988) in the northeastern United States. Morris and Zimmerman (1981) hypothesized that the vector potential of *Cs. morsitans* for EEE is due to its ornithophilic feeding habits and to its long life span. Body size has been suggested as a useful indicator of survivorship for some mosquito species (Nasci 1986, 1988; Kittayapong 1989[3]), but it has not been examined for *Cs. morsitans*.

Resting, adult *Cs. morsitans* were collected from wooden resting boxes from May to August in 1987, 1988 and 1989. In 1987, 31, 59 and 23 mosquitoes were collected during June, July and August, respectively. In 1988, 97, 109 and 8 were collected during the same months, and in 1990, 34 mosquitoes were collected during July. Adult females were examined for evidence of recent blood feeding and the presence of eggs. The left wing was removed from all individuals and measured from the axillary wing incision to the distal wing margin, not including fringe scales (Nasci 1988). Parity was determined for nonblood fed, nongravid females by the tracheolar method of Detinova (1962). Parous, blood fed and gravid females (grouped as gonoactive) were considered to be relatively older than nulliparous individuals, and wing length was used as an index of body size (Lorenz et al. 1990). The mean wing lengths, by year, of gonoactive and nulliparous *Cs. morsitans* are given in Table 1. Differences between the mean wing lengths of gonoactive and nulliparous females were determined by the 2 sample *t*-test (Statistix, NH Analytical Software, Roseville, MN). The coefficient of variation of *Cs. morsitans* wing lengths was determined to indicate the total amount of variability in body size of the populations under study (Fish 1985).

Wing lengths of female *Cs. morsitans* are given in Table 1. There was no significant difference between the wing length of gonoactive and nulliparous *Cs. morsitans* during 1988 and 1989. No significant difference was detected between monthly samples from the same season, thus all samples were combined on a yearly basis. The coefficient of variation for 1987, 1988 and 1989 is given in Table 2. The variation in size of *Cs. morsitans* is much less than that for *Aedes triseriatus* (Say), a species for which body size has been demonstrated to be important to survival (Nasci 1988). The low amount of variation in body size of *Cs. morsitans* may explain why no significant difference was observed between the older, gonoactive mosquitoes and younger nullipars in terms of body size. The observed low variation in body size for the populations of *Cs. morsitans* may be due to the larval ecology of this species in that development time is long and larval densities are very low (Joseph and Bickley 1969). This creates the ecological parameters that allow mosquitoes to reach or nearly reach their genetic potential for body size (Fish 1985). Although large body size has been experimentally related to increased survival in adult *Ae. triseriatus* (McCombs 1980[4]), there does not appear to be sufficient difference in body size between large and small *Cs. morsitans* to confer a selective advantage. It is reasonable to conclude that body size is not an important determinant of vectorial capacity for *Cs. morsitans* in terms of survivorship. It may be important to vectorial capacity based on other parameters.

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Table 1. Mean wing length (in mm) of gonoactive and nulliparous *Culiseta morsitans* collected from the Hockomock Swamp, Raynham, MA.

	Nullipars		Gonoactive		Combined	
Year	*n*	$\bar{x}$ (SD)	*n*	$\bar{x}$ (SD)	*n*	$\bar{x}$ (SD)
1987[a]		—		—	113	5.51(±0.25)
1988	169	5.51(±0.24)	45	5.57(±0.20)	214	5.52(±0.23)
1989	11	5.51(±0.19)	23	5.50(±0.33)	34	5.50(±0.29)

[a] No mosquitoes were dissected for parity in 1987.

Table 2. Coefficient of variation (CV) of wing length of *Culiseta morsitans* collected in Raynham, MA.

Year	*n*	Mean wing length (mm)	CV
1987	113	5.51	4.6
1988	214	5.52	4.2
1989	34	5.50	5.3
Overall	361	5.51	4.7

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