University of Florida Book of Insect Records
Chapter 16 *Shortest Sexual Life Cycle*

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8 May 1995

The mosquito Psorophora confinnis *(Diptera: Culicidae), probably has the shortest sexual life cycle. Temperature and geographical origin are the most important factors affecting how quickly the cycle is completed. In California's Coachella Valley, under optimum environmental conditions,* Psorophora confinnis *can complete an entire life cycle within a week.*

The sexual life cycle of insects depends on species characteristics and environmental conditions. Most insects can complete their entire life cycle within one year. Some may be much longer, while others may be only a few weeks or less (Borror et al. 1981). For the mosquitoes, the time spent in the immature stages depends largely upon temperature (Breeland & Pickard 1963). In this paper I will attempt to identify the insect requiring the shortest time to complete a sexual life cycle under optimum environmental conditions.

Methods

Professors and graduate students were asked to nominate candidates. AGRICOLA, *Biological Abstracts* and *CAB Abstracts* were searched from 1970 to the present. Secondary literature, mainly text books in entomology and life history, were consulted.

Results

Gunstream (1967) reported that the developmental times, hatching to emergence, of 18 broods of *Psorophora confinnis* Lynch Arribalzaga, observed in irrigated date groves in the Coachella Valley of California ranged from 78 to 126 hours with a mean of 97 hours at average water temperature of 77-88 °F. The usual incubation period is 1 to 3 hours (Breeland & Pickard 1963), and the preoviposition period is 2 to 3 days (J. Jackson, USDA, Medical & Veterinary Entomological Research Laboratory, Gainesville, FL, personal observation). Therefore, the entire life cycle (egg to egg) of *Psorophora confinnis* can be completed within a week.

Discussion

Psorophora confinnis is the most abundant mosquito in the desert agricultural regions of southeastern California. The aquatic stages develop in shallow temporary pools formed by irrigation water, especially in crops irrigated by flooding. Usually these pools persist only 1-5 days. *Psorophora confinnis* must tolerate high temperatures and develop rapidly to use such habitats (Azawi & Chew 1959 and Gunstream & Chew 1967).Several investigators have studied the effect of temperature on the growth rate of immature *Psorophora* mosquitoes (Chew & Gunstream 1964, Gunstream & Chew 1967, McHugh & Olson 1982, and others). According to Chew & Gunstream (1964), the developmental time of *P. confinnis* from hatching to emergence is between 86 hrs at 32 C and 108 hrs at 23 C. The developmental times reported by Gunstream & Chew (1967), 78-126 hrs, are much shorter than the previously reported times of 144-168 hrs at similar water temperatures of 30-35 C in Arkansas ricefields (Horsfall 1942) and 133-266 hrs at somewhat cooler average water temperatures of 22-29 C in Alabama

(Breeland & Pickard 1963). This fact suggests that the shorter developmental time of *P. confinnis* in the Coachella valley is an adaptation evolved under selective pressure of rapidly drying irrigation water.

Compared with *P. confinnis*, the develop-mental times of *P. columbiae, P. cyanescens*, and *P. ciliata* were 105 hrs (McHugh & Olson 1982), 118 hrs and 114 hrs (Breeland & Pickard 1963) respectively. For two other promising candidates, the horn fly (*Haematobia irritans*), and certain parasitic chalcid wasps, the developmental time (hatching to emergence) are 9.3d (Depner 1961) and within one week respectively (Wootton 1984). *Psorophora confinnis* is apparently the insect with the shortest sexual life cycle.

Acknowledgements

I thank Dr. D. Hall for his advice on this paper, and Dr. T. Walker for his critical review of the manuscript.

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