# BIONOMICS OF *CULISETA PARTICEPS* IN SOUTHERN CALIFORNIA

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The distribution of *Culiseta particeps* (Adams) in California appears to be restricted in California to the Pacific coastal areas and scattered patches in the Riverside and San Bernardino counties (Darsie and Ward 1981). However, little information exists on the adult ecology and abundance of this species. Larvae have been found in marshes, margins of streams, residual pools in stream beds and margins of large *Typha*-filled pools (Seamen 1945, Bohart and Washino 1978). In biting and light trap collections, adults have been collected in small numbers in barns (Seamen 1945). Colonization of this species has been accomplished by Chapman and Barr (1969) for at least half a year. Although an unidentified bunyavirsus was recently isolated from a pool of adult females (Emmons et al. 1988), *Cs. particeps* has yet to be considered as an important pest or vector of any disease (Bohart and Washino 1978).

Studies relating to adult population abundance and host-seeking activities were initiated at a dairy operation near Norco, Riverside Co., California. The study site and sampling methods have previously been described (Schreiber et al. 1988). Briefly, the study area was located at a dairy/truck crop farm 1 km west of the city of Norco, adjacent to backwater from the Santa Ana River. During this study, five distinct habitats were monitored by unlit dry ice baited CDC traps: Habitat 1, east of the dairy proper in the truck crop field; Habitat 2, the dairy/lagoons proper; Habitat 3, tree rows adjacent to the dairy and lagoons; Habitat 4, just west from the lagoons in a tree row along the interface of the dairy and a horse/cattle pasture; and Habitat 5, in a riparian habitat with backwater from the Santa Ana River and lagoon overflow. In each habitat, two sites were used to trap host-seeking adult mosquitoes on a twice a month basis from June 4, 1987, through June 9, 1988; no collections were made during January 1988. Landing and biting activity of female mosquitoes was assessed at night in a location near the dairy lagoons. Ten minute landing counts were made on a human subject (ETS), and the alighting mosquitoes were collected with a battery-powered aspirator. These studies were conducted throughout the night on each trapping occasion. Since landing counts were 10 min in duration, and the CDC traps (10) were run on an hourly basis, comparison between the two methods was corrected for a per hour effort basis. Parity was determined by dissection of females from both the dry ice traps and landing counts. Tracheation of the ovaries was examined following the methods of Detinova (1962).

In southern California, *Cs. particeps* was found to be a vernal species with the peak abundance in April and May (Fig. 1). Low levels of *Cs. particeps* adults present during the summer months may indicate that they aestivate during this time. A decrease in activity during the winter months (November–February) may be indicative of some sort of hibernation similar to Canadian strains of *Cs. inornata* (Reisen 1987). In our study, low numbers of adult females were collected from October through February, and 2nd and 3rd instar larvae of *Cs. particeps* were retrieved by dipping in early March 1989. The larvae were collected from *Typha*-filled marshes directly adjacent to the dairy lagoons (pH 7.2 and conductivity = 1,180 μmhos) and in the backwater from the Santa Ana River (pH 7.3 and 900 μmhos). These larvae were found associated with *Culex erythrothorax* (Dyar) and *Cx. tarsalis* Coq. larvae.

The majority of 277 adult *Cs. particeps* were collected in Habitat 5 (43.6%), the riparian habitat, and Habitat 4 (31.7%), both of which had dense vegetation. Habitats 1 and 2 had low levels of vegetation with 10.1 and 8.3% of the catch, respectively. Habitat 3, though in an eucalyptus grove, also contained few *Cs. particeps* females (6.3%). The peak of host-seeking activity occurred ca. 1 h after sunset, with no morning peaks (Schreiber et al. 1988). Adults however, were occasionally active during the daylight hours if the vegetation was disturbed. There was no difference between the number of adult females collected in the CDC traps and aspirations of the human host over five time intervals throughout the study ($t_s = 2.26$, $df = 5$, $P = 0.05$) paired *t*-test.

Chi-square analyses were used to detect if parous individuals were attracted preferentially to either the CDC traps or the human host at four discrete intervals of time. In both cases, the percentage of parous females caught was independent of the time of night; (CDC traps; $\chi^2 = 7.83$, $df = 4$, $P = 0.05$; human landing $\chi^2 = 4.41$, $df = 4$, $P = 0.05$). Additionally, despite the apparent disparity in the total nulliparous: parous ratios between the two collection methods

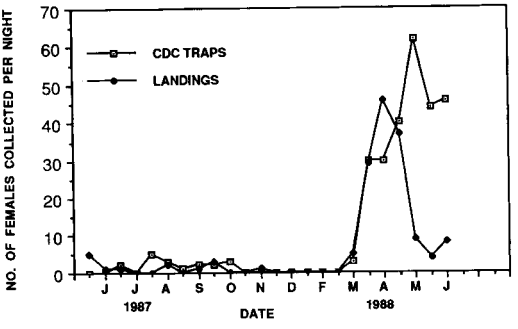


Fig. 1. Seasonal abundance of *Culiseta particeps* collected in a dairy at Norco, Riverside Co., California, June 1987–June 1988.

(CDC 1.97:1 number dissected = 104; human landings 35:1 number dissected = 137), no differences in the percentage of parous individuals were noted between CDC or human landings, over time discrete time intervals throughout the study ($t_s = 2.42$, $df = 4$, $P = 0.05$).

In southern California, *Cs. particeps* appears to be a species with its greatest abundance in the spring months. Low levels were collected during the summer and no adults collected in the winter months. The aestivation and overwintering mechanisms of this species still are to be determined. The parity state of these mosquitoes appears not to influence host-seeking behavior. Host choice may be of some relevance however, since many were alighting on the dairy cattle in close proximity to our study.

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