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PLACEMENT AND FATE OF MONARCH BUTTERFLY PUPAE IN NORTHERN CALIFORNIA

The placement on a substrate and the subsequent fate of *Danaus plexippus* (L.) (Danaidae) pupae were determined on a roadside strip at two sites SE of Davis, Yolo Co., California, in the Sacramento Valley from mid-July to October 1966.

The first site was 3 km south of Davis. It was a strip 4 m wide and about 400 m long containing several clumps of *Asclepias fascicularis*, other green plants, and dry grass between a paved road and a woven wire fence. The second site was similar and 6 km SSE of Davis. Both were in flat, mostly agricultural land, and near alfalfa, sugar beets, and grains. The only trees were around a dwelling and an old church and cemetery.

Each site was thoroughly searched on weekends and occasionally during the week from 14 July to 30 October 1966. Each pupa was marked with a paper tag located nearby with a serial number and date of discovery.

Vertical distributions of pupae were from ground level to 1 m. One pupa was found 4 m high on an old creosoted pole.

Choices of substrate for 409 pupae were: *A. fascicularis*, 17.7%; other green plants, 6.2%; dry grass, 47.7%; wire fence, 25.5%; and wooden fence posts, 2.9%. Only 4% of the pupae on the *A. fascicularis* were placed after 31 August. On the wire fence, 6% were placed in July, 25% were placed in August, 53% in September, and 16% in October. On dry grass, 24% were placed in August, 53% in September, and 23% in October. Pupae are rarely placed on *Asclepias* spp. in southeastern Canada (Urquhart 1960, *The Monarch Butterfly*, Univ. Toronto Press, 361 pp.).

Following initial observations, several categories of pupal fate were defined but only three are reported (Table 1). The latter are: discolored and dead, empty shell left after eclosion, and disappeared leaving no evidence of fate (because pupae were marked with white tags, passersby may have taken some, but predation seems more likely).

TABLE 1. *Danaus plexippus* pupal fate by substrate, Davis, California, 1966.

Fate	Number of pupae				
	Dry grass	<i>Asclepias fascicularis</i>	Other green plants	Wire fence	Total
Died	83	25	9	21	138
Eclosed	74	32	14	35	155
Disappeared	54	18	4	23	99
Total	211	75	27	79	392

Without regard to substrate' 39.4% eclosed, 35.1% died, and 25.5% disappeared (Table 1). Of the 99 that disappeared, 55% were on dry grass, 28% on the wire fence, and 24% on green plants. The data were analyzed in a standard contingency table; $\chi^2 = 7.18$, $df = 6$, $.500 > P > .250$. The sample may be too small, but tentatively, pupae on green plants appear to be safest from predators. A higher percentage of pupae eclosed on green plants than on dry grass or the wire fence.

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