

laboratory, larvae of *L. marina* left the host material to pupate. Pupae were attached to the substrate by a cremaster and a silken girdle. The pupation period lasted seven days.

The only nectar source at which I observed adults was Brazilian Pepper (*Schinus terebinthifolius* Raddi; Anacardiaceae). The small white flowers of Brazilian Pepper attract a large number of hymenopteran and dipteran visitors, but few, if any other Lepidoptera. Ornamental *Cassia* sp. (Fabaceae) and *Lantana* sp. (Verbenaceae) are used occasionally as perching substrates, but I never observed *L. marina* nectaring on these plants. Although the butterfly literally may swarm around the host, I never observed *L. marina* nectaring on the larval host. This probably is due to the long corolla compared to the length of the butterfly's proboscis (Opler, P. & G. Krizek 1984:32, Butterflies east of the Great Plains, Johns Hopkins Univ. Press, 294 pp.).

A small noctuid larva, inadvertently collected while gathering inflorescences of plumbago, produced an adult of *Heliothis virescens* (Fabricius) (Noctuidae). This was the only other lepidopterous larva observed feeding on plumbago.

On 13 August 1989, 1130 hours, I observed a female *L. marina* that had been captured by a green lynx spider [*Peucetia viridans* (Hentz); Oxyopidae] on a *Cassia* bush. These spiders ambush their prey, which consists primarily of moths, both adults and larvae, but also many other kinds of insects (Whitcomb, W., M. Hite & R. Eason 1966, J. Kansas Entomol. Soc. 39:259-267).

*Leptotes marina* is one of few native North American butterflies that has benefited from the activities of man by its remarkable switch to a new larval host introduced from South Africa and to a nectar source and an ant introduced from South America, none of which are closely related to the butterfly's native resources. This flexibility undoubtedly has led to an expansion in range, at least ecologically and temporally, over the past 60 years, resulting in the butterfly's invasion and successful colonization of urban environments.

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#### NORTHWARD DISPERSAL OF *EUPTOIETA CLAUDIA* (NYMPHALIDAE) IN CALIFORNIA AND NEVADA IN 1988

**Additional key words:** distribution, biogeography.

The Variegated Fritillary, *Euptoieta claudia* (Cramer), is a highly dispersive species whose late-summer range in North America frequently extends far beyond those areas where it is a permanent resident. Because of its frequent and occasionally massive northward movements, dot maps of its distribution tend to disguise its transient nature. J. A. Scott (1986, The butterflies of North America, Stanford University Press, Stanford, California, pp. 335-336) maps its transient range as covering most of North America, but it is conspicuously unmapped on the Pacific Coast north of the California Transverse Ranges. Except for a passing reference to a record in Mono County (J. A. Comstock, 1927, Butterflies of California, published by the author, Los Angeles, California, 334 pp.), the

California literature, both antique and recent, consistently treats *E. claudia* as a rare species confined to the southeastern corner of the state. This is especially significant given the long history and intensity of collecting in the state.

At least three *E. claudia* were taken far north of previous records in California in 1988. S.O.M. took an apparently very fresh female near Queen Lily Campground, N Fork Feather River, 4.8 km N Highway 70 near Belden, Plumas Co., el. 730 m, 19 August 1988 at almost exactly 40°00'N Lat. A.M.S. took an also apparently fresh female at the Burrowing Owl Reserve adjacent to the Recreation Pool at the University of California campus at Davis, Yolo Co., el. 17 m, 7 October 1988, 38°33'N. Both of these were taken nectaring at Yellow Star Thistle, *Centaurea solstitialis* L. (Compositae). O.S. took yet another very fresh female at Jerseydale, 13.6 km NE Mariposa, Mariposa Co., 1070 m, 23 October 1988, 37°34'N.

Although spread over two months, these records together suggest a significant northward movement in 1988, an interpretation borne out by the Nevada records compiled by G.T.A. Prior to 1988, Nevada records were as follows: Churchill Co. (1), Clark Co. (11), Douglas Co. (1), Lincoln Co. (3), Nye Co. (1) and White Pine Co. (1), distributed among years as follows: one each in 1969, 1972, 1975, 1978, 1981, 1983 and 1986; two (both Clark Co.) in 1968 and 7 in 1984 (4 Clark Co., 2 Lincoln Co., 1 Douglas Co.). G.T.A.'s 1988 records total 6: Lincoln Co.: Meadow Valley Wash, Grapevine Canyon, 12 April (sight); Lander Co.: Reese River Valley, U.S. 50, 4 mi E Reese River, 28 June (1 male); Clark Co.: Spring Mts., Lee Canyon Ski Area, 29 June (1 male) and Kyle Canyon Ski Area, 24 July (1 male); Elko Co.: Ruby Valley, NV 229, 3.5 km N jct. NV 789, 28 July (1 male); Pershing Co.: Humboldt Mts., Buena Vista Canyon, 30 July (1 male).

The early-season Nevada records combined with the apparently fresh condition of all the northern California specimens suggest that early immigrants west of the Sierra, themselves undetected, succeeded in breeding in 1988. It is not possible on internal evidence to rule out cross-Sierran dispersal, however. Two of the three California localities were in the Sierra Nevada and relatively close to the Great Basin localities apparently reached by *E. claudia* in 1988.

Our collective field experience of over a century leads us to regard this as a very unusual and noteworthy event which may or may not be significant in terms of the long-range dynamics of the species. No northern California records are known to us for 1989 or the first half of 1990. Atmospheric circulation in western North America was highly unusual in late winter-early spring 1988, producing an unprecedented ten-week drought from mid-January to March. Summer 1988 was one of the two hottest of record in much of northern and central California west of the Sierra Nevada; flight seasons of many low-altitude species were advanced by as much as a month, and extremely large northward migrations of the Painted Lady, *Vanessa cardui* L. (Nymphalidae) were observed beginning in February. Correlation is interesting, but cannot prove causation.

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