purposes later in the study (Fig. 3), the plant grew to a height of about 3.0 m by December 1982, and average leaf size at this time was about half of that at the time oviposition was observed. No other eggs or caterpillars of *P. victorinus* were found on the tree over the following seven years (with about a total of 26 days per year at three different times per year for examining the tree).

Papilio species within the "*scamander*" and "*homerus*" groups appear to be typified as Magnoliales- and Laurales-feeders (Scriber, op. cit.), and as exemplified by the association of *P. victorinus* with *Persea* in both El Salvador (Muyshondt et al., op. cit.) and Costa Rica (Costa Rican National Museum specimen label data) as well as with *Hernandia* (this report). Both the Lauraceae and Hernandiaceae fall within the Laurales (Cronquist, 1981, An Integrated System of Classification of Flowering Plants, Columbia Univ. Press, New York). The similarity of aromatic properties of freshly crushed leaves in both groups, namely flavonoids (L. D. Gomez, pers. comm.), suggests a common ovipositional cue for *P. victorinus*. Yet, since these methylated compounds are also found in the Araliaceae and Umbelliferae, other known *Papilio* larval food plant groups (Scriber, op. cit.), *P. victorinus* must cue into still other factors in the food plant selection process, rendering the insect an excellent phytochemist.

I sincerely thank Luis Diego Gomez, Luis Jorge Poveda, and Gary S. Hartshorn for making initial determinations of the larval food plant, and to an anonymous reviewer who most admirably took the time to check carefully these determinations based upon the plates submitted with an earlier version of the manuscript. A special thanks to Luis Diego Gomez for taking the time in August 1984 to confer further with me on the plant identification, and to Dr. Luis Fournier for his assistance as well. And to whoever placed the "*P. birchalli*" name label on the female *P. victorinus* specimen (one of two specimens in the collection as of 17 August 1984) at the Costa Rican National Museum, please check it since it is a source of confusion with identification of the species. I thank Dr. J. Mark Scriber for reading the earlier draft and for helpful discussions which ensued from the editorial process. In the latter context, I also thank Dr. Thomas D. Eichlin, Journal Editor.

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"EDGE EFFECT" IN OVIPOSITION BEHAVIOR: A NATURAL EXPERIMENT WITH *EUCHLOE AUSONIDES* (PIERIDAE)

The "edge effect," whereby isolated host plant individuals tend to receive disproportionate egg loads, has been documented in a variety of insects, and several authors have commented recently on mechanisms to account for it in butterflies. These mechanisms may be arranged in a proximate-ultimate causal hierarchy and may not be mutually exclusive, but attention has focused primarily on whether the "edge effect" is an adaptive characteristic produced by natural selection, or essentially a statistical artifact with no evolutionary significance (Shapiro, 1981, Am. Nat. 117:276–294; Courtney & Courtney, 1982, Ecol. Entomol. 7:131–137; Mackay & Singer, Ecol. Entomol. 7:299–303).

Another phenomenon affecting egg dispersion in various insects, including butterflies, is "egg-load assessment," wherein ovipositing females react positively or negatively to the presence of previously laid, usually highly conspicuous, eggs (for butterflies see Rausher, 1979, Anim. Beh. 27:1034–1040; Shapiro, 1980, J. Lepid. Soc. 34:307–315; Shapiro, 1981, Am. Nat. 117:276–294; Singer & Mandracchia, 1982, Ecol. Entomol. 7:327–330). The interactions of these two phenomena may be complex and difficult to interpret in analyzing field egg-dispersion data.

TABLE 1. Distribution of *Euchloe ausonides* eggs on *Brassica* inflorescences at Suisun City, California, 28 March 1983.

Number of inflorescences bearing:	Red eggs	Green eggs
8	1	0
14[a]	0	1
3	1	1
6	0	2
1	0	3
3	0	4
19	0	0
Totals: 54 (35 with eggs)	11	44

Mean red eggs/inflorescence having only red eggs: 1.00.
Mean red eggs/inflorescence having both red and green eggs: 1.00.
Mean green eggs/inflorescence having only green eggs: 1.71.
Mean green eggs/inflorescence having both red and green eggs: 1.00.
[a] Includes 1 egg laid on adjacent leaf (Fig. 1).

The large marble, *Euchloe ausonides* Lucas, is a member of the red-egg, inflorescence/infructescence-feeding pierid guild in western North America, and engages in egg-load assessment (Shapiro, 1981, op. cit.): the mean number of eggs/inflorescence bearing any eggs is normally almost exactly unity. During the winter of 1982–83 in northern California, rainfall totals generally exceeded 175% of 30-year norms, and 200% was not unusual. At Suisun City, Solano County, where I have studied a population of *E. ausonides* since 1973, much of the breeding habitat was inundated from 4–11 weeks to a depth of 15–30 cm. This unusual situation permitted a test of the flexibility of oviposition behavior, given a drastic shortage of sites: would the characteristically even dispersion of eggs change as "edge effect" became more important than "egg-load assessment"?

Host plants—weedy mustards of the genus *Brassica*—are normally abundant at Suisun. By late March, from two to four species may be in a suitable phenophase (flower buds present) for oviposition by *E. ausonides* to occur. Between 1973 and 1981, the first flight was between 6–16 March at this site, oviposition commencing almost at once. (1982 populations were so sparse that the dates may not be reliable.) In 1983 the first males were seen on 26 March. By 28 March both sexes were common, and an egg census was done. Every *Brassica* plant in a 1.5 ha field was examined thoroughly. Normally this would be impossible—there would be many thousands—but on this occasion only 140 plants could be found. Of these only 22 had any inflorescences judged suitable for oviposition—a total of 54 of them. At least three females were observed ovipositing on the site on 28 March. The distribution of eggs on the 54 inflorescences is given in Table 1.

More than a third of the inflorescences bearing eggs bore more than one. *Euchloe ausonides* eggs are green when laid, changing to red by the next day. For green (same day) eggs only, the mean number of eggs/inflorescence bearing eggs was 1.71. Before 28 March I had never seen a four-egg inflorescence, but on that day I found three. One female was seen laying on an inflorescence known to bear one green egg. One egg was found on an upper leaf adjacent to a very rudimentary inflorescence, too small to permit the female to balance upon it while laying. This is the first *E. ausonides* egg I have ever found on a leaf. Fig. 1 illustrates some of these situations.

The distribution of the eggs among *Brassica* species is of interest. All four known hosts at the site were present, but their phenologies differ enough that their reactions to the flood were quite different. *B. campestris* L., the first to germinate and bloom, was represented by only three individuals—all past bloom, bearing green fruit and no eggs. *B. Kaber* (DC.) Wheeler, on the average somewhat later, had been harmed most. Six individuals were present, all in flower; three of these had usable buds, and all the susceptible inflorescences received multiple ovipositions. *B. nigra* (L.) Koch, last of the annual mustards to bloom, had germinated as the flood receded and was still mainly vegetative. It was the commonest species, but few plants had well-defined buds—the one

FIG. 1. *Brassica* inflorescences collected at Suisun City, California on 28 March 1983 showing unusual ovipositions by *Euchloe ausonides*. **Upper left:** *B. Kaber* with one red and one green egg. **Upper right:** *B. Kaber* with four green eggs. **Lower left:** *B. geniculata* with four green eggs. **Lower right:** *B. nigra* with egg laid on cauline leaf adjacent to rudimentary buds. (Photos by Samuel W. Woo.)

illustrated, with an egg on a leaf, was one of the two most advanced—and very few eggs were found on them. *B. geniculata* (Desf.) J. Ball, a short-lived perennial, had survived the flood and bolted. It was in prime condition for oviposition—early flowering, with many buds—and received most of the eggs. The most important criterion for oviposition was obviously phenophase and not species or size.

Previous studies (Shapiro, 1981, op. cit.) have shown that newly laid, green eggs are

not deterrent to females in the red-egg guild and have failed to support the existence of an oviposition-deterrent pheromone. This "natural experiment" supports these conclusions. The greatly increased incidence of multiple oviposition suggests that when host density is reduced by 3–4 orders of magnitude while population density is normal, the *entire stand* of hosts may demonstrate "edge effect"—at least early in the flight, when most eggs are green. Theoretically, as the flight proceeds, the presence of more red eggs should deter multiple ovipositions and perhaps encourage female dispersal. Unfortunately, it was not practical to test this prediction, given the rate of turnover of inflorescences and the rapid maturation of the many *B. nigra* at the Suisun site. The ability of "edge effect" to dominate the pattern of egg dispersion in this unusual situation, however, does tend to confirm that "edge effect" is a statistical consequence of female behavior; it does not clarify the evolutionary origin of that behavior.

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EPIBLEMA LUCTUOSANA A. BLANCHARD, A HOMONYM, IS CHANGED TO ***EPIBLEMA LUCTUOSISSIMA*, NEW NAME**

From Dr. Leif Aarvick (Tårnveien 6, N-1430 Ås, Norway), I received the following information, for which I thank him very much: "Blanchard describes a species which he calls *Epiblema luctuosana*. Unfortunately there is another *Epiblema luctuosana* in Europe (*E. luctuosana* Duponchel, which is a synonym of *E. scutulana* Den. & Schiff). Thus *luctuosana* A. Blanchard is a homonym."

I propose to change the name of the species I described as *E. luctuosana* (1979, J. Lepid. Soc. 33(3):184) to *Epiblema luctuosissima* A. Blanchard.

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SCHIZURA RUSTICA (SCHAUS), A NOTODONTID MOTH DEFOLIATING *HERRANIA* AND *THEOBROMA* SPECIES (STERCULIACEAE) IN COSTA RICA

Herein, I report for the first time the association of the "medium-sized" (approx. 37 mm spread wingspan), dull brown and mottled gray notodontid moth *Schizura rustica* (Schaus), with *Herrania albiflora* Goudot (Sterculiaceae) as a larval food plant at one locality in Costa Rica and the acceptability of the closely related *Theobroma cacao* L. (also Sterculiaceae) as an alternate food plant. My report includes observations on the role of this moth as a serious defoliator of *H. albiflora* as well as offering some preliminary autecological and natural history notes on the life cycle and larval feeding behavior. Although much information has accumulated over the years on the insect herbivores