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AN OVIPOSITION "MISTAKE" BY *BATTUS PHILENOR* L. (PAPILIONIDAE)

Although oviposition on plants unsuitable for larval development occurs among the Lepidoptera (Berenbaum 1981, J. Lepid. Soc. 35:75 and references therein), the actual egg-laying episodes have rarely been witnessed. I report here direct field observation of an oviposition "mistake" by the pipevine swallowtail, *Battus philenor*. This record is particularly noteworthy because the errant female was one for which a detailed field record of egg-laying activity over three weeks was accumulated.

On 7 April 1981, at a field site in Kirby State Forest, Tyler Co., Texas, Mark D. Rausher and I observed a *Battus* female deposit a single egg on a leaf of *Smilax laurifolia* L. (Liliaceae). This event represents the only oviposition by this butterfly species on a plant outside the genus *Aristolochia* (Aristolochiaceae) noted in more than eight years of fieldwork on the Texas population by me and colleagues. Our studies included observations of hundreds of ovipositing butterflies and tens of thousands of landings on nonhost foliage. No *Aristolochia* plants were present within 2 m and the female had not discovered any host plants in the previous 2 min of observation. Although I intended to follow the progress of larval development on the plant, both egg and leaf were gone on the third day after oviposition. Nevertheless, 25 larvae freshly hatched from eggs laid by captive females on the native E Texas host plants, *A. reticulata* Nutt. and *A. serpentaria* L., and placed on cuttings of young *Smilax* foliage failed to consume any leaf material and did not survive to the second instar. By contrast, another 25 larvae fed on cuttings of both *Aristolochia* hosts progressed normally through the first instar and many eventually pupated.

Most remarkable about the egg deposition on *Smilax* was the insect's extended period of investigation; several minutes of fluttering over the leaf and circling about the plant preceded the aberrant oviposition. During oviposition, *Battus* females alight frequently on nonhost plants upon which they drum their foretarsi, presumably tasting the leaf surface with tarsal chemoreceptors (Feeny, Rosenberry & Carter 1983, pp. 27–76 *in* Herbivorous insects: Host-seeking behavior and mechanisms, Academic Press, New York, and references therein). Most individuals leave nonhost plants immediately after landing and resume searching for host plants.

The extensive history of searching by this particular *Battus* female suggests several explanations for the anomalous egg deposition. First, the female may have been more prone to oviposit on an unsuitable plant due to low rates of discovery of the principal *Aristolochia* hosts. The rate of discovery of *Aristolochia* plants in the minutes before the *Smilax* oviposition was indeed low (0.19 host plants/min vs. a mean of 1.02 host plants/min for 6 other observation periods). Since no eggs were laid on several hosts discovered just minutes earlier, however, the female was not evidently "desperate" to lay eggs.

Alternatively, the female may have suffered some deterioration of the sensory apparatus required to identify a host plant after landing. Extremely worn and tattered at the time she oviposited on *Smilax*, the female had been first marked two weeks previously. Only 1 other butterfly of almost 200 marked was followed as long. The efficiency with which the aging female landed on host plants did indeed decline in successive recaptures (Fig. 1). Since relative host density did not change significantly over this period, the female was apparently identifying host plants before landing less accurately as she aged. Possibly, she was discriminating between hosts and nonhosts less accurately after landing as well.

Finally, the mistaken deposition may have resulted from the female's previous experience with host plants. Pipevine swallowtail butterflies learn to search for the leaf shape of preferred host plants (Papaj 1986, Anim. Behav. 34:1281–1288). This particular female, for example, almost always alighted on broad nonhost leaves resembling the broad-leaved *A. reticulata* (Fig. 1). The *Smilax* plant on which an egg was laid consisted of a solitary, newly formed broad leaf on a short stem, and bore a striking visual resemblance

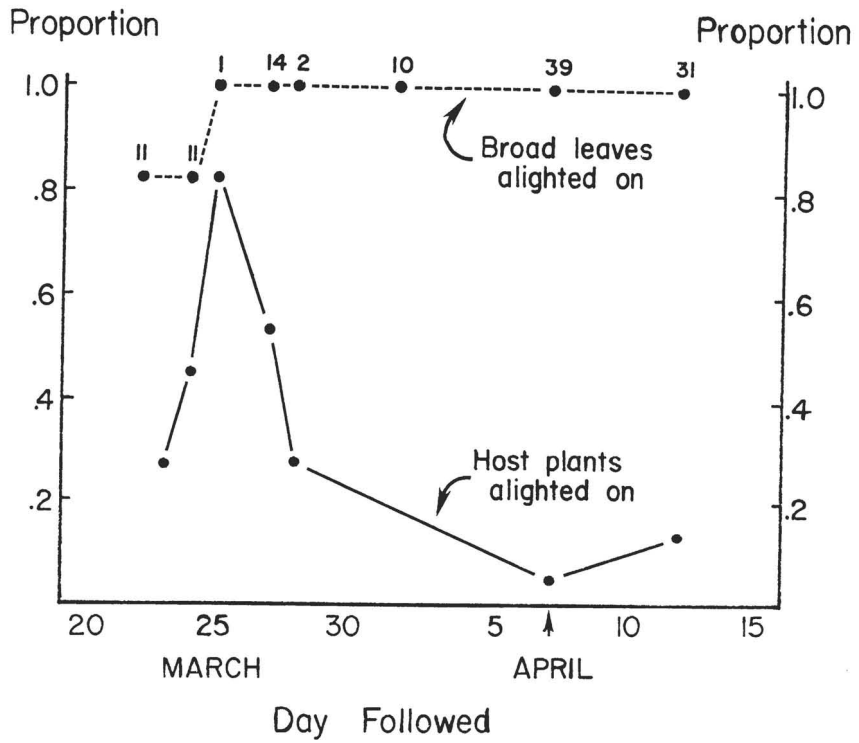

FIG. 1. Record of host-landing efficiency and leaf-shape response over time. Solid line indicates time course of host-landing efficiency, expressed as proportion of all plants alighted on that were *Aristolochia*. Dotted line indicates time course of leaf-shape preference, expressed as fraction of all nonhost leaves alighted on that were broad. Number above each point indicates sample size on each observation day. Arrow indicates day of anomalous egg deposition.

in color, leaf shape, and growth form to phenologically young *A. reticulata* plants which are highly preferred for oviposition (Rausher 1980, Evolution 34:342–355; Papaj & Rausher 1987, Ecology, in press). Possibly, the experienced female became so positively responsive to the visual stimuli of young *A. reticulata* foliage (which the young *Smilax* leaf mimicked well enough to deceive two human observers) that conflicting negative responses to nonhost chemotactile cues were eventually suppressed.

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