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BIONOMIC NOTES ON THE BLOOD-SPOT SKIPPER [HESPERIIDAE: *PHOCIDES LILEA SANGUINEA* (SCUDDER)]

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ABSTRACT. Observations on the life cycle of *Phocides lilea sanguinea* are reported. An additional larval foodplant, notes on egg and larval stages, and adult oviposition behavior are described.

Phocides lilea sanguinea (Scudder) is a large-sized skipper which exhibits a metallic blue background with a prominent red spot on each dorsal forewing. Basically a tropical species, *sanguinea* has established breeding populations in the Brownsville, Cameron County, Texas area. This population has been known as *Phocides polybius lilea* (Reakirt) but H. A. Freeman (*in litt.*) prefers treatment of *lilea* at the species level with subspecific rank being accorded *sanguinea*. My initial interest in this species arose because of the significance of establishment of permanent populations on non-native larval foodplants. Field observations have yielded various new bionomic facts concerning this insect.

The only plant previously known to support larvae of *sanguinea* in either the United States (Lipes, 1961) or Mexico (Comstock and Vasquez, 1961; Kendall and McGuire, 1975) is common guava, *Psidium guajava* (Myrtaceae). My observations in Brownsville have revealed that a congeneric plant, *Psidium cattleianum* Sabine (strawberry guava) is also utilized as a larval foodplant by *sanguinea*. Identification of the foodplant was verified using comparative herbarium specimens and characters given by Bailey (1949: 729). All references below to *Psidium* refer to *P. cattleianum*.

Newly-laid eggs are a pale but distinct aqua in color. A glistening wet appearance is noticeable for several minutes following oviposition. Within eighteen hours of oviposition, the contents of the egg begin to turn reddish as embryogenesis proceeds. Red coloration appears initially as individual foci which enlarge until the whole egg appears red. Similar egg color changes during development have been reported in *Agathymus* (Roever, 1964). This red color involves the internal constituents only, as the chorion appears whitish in color. The egg is hemispherical in shape with a diameter of approximately 1.5 mm. A hole encompassing the top one-third of the egg reveals a hatched egg. The egg shell is not eaten by the larva.

Larvae of *sanguinea* go through a dramatic change in coloration during development. First instar larvae have a bright red body similar in color to the mature egg, but the head is brownish, varying extensively in darkness. Body length is 3.0 to 3.25 mm while the head capsule measures approximately 1.0 in width. Second instar larvae are about 8.0 mm long with a head capsule of 1.5 mm in width. The head of the second instar remains basically brown but is somewhat closer in coloration to the red body color than is the head of the first instar larvae. Larvae of Mexican and South American populations of *Phocides* were reported to have yellowish intersegmental bands (respectively, Comstock and Vasquez, 1961; Miles Moss, 1949); no such bands were observed on Texas larvae. Larvae of intermediate instars were not observed. Mature larvae are whitish with a slight "bloom" similar to that reported for *Phocides pygmalion okeechobee* (Worthington) by Srohecker (1938). This "bloom" is a white, powdery exudate which is present on the body of the larva. The body also exhibits a large number of black "pin-prick" marks. The head capsule is reddish-brown with a yellowish "eyespot" on each side.

Retreats are formed by the larvae utilizing leaves of the foodplant. Miles Moss (1949) described initial shelters as "small oval, of cutleaf" while older larvae were "content to hide by day between several leaves held together by a few strands of glutinous silk." The following observations add to the above information: neither Lipes (1961) nor Kendall and McGuire (1975) mention these retreats *per se*. Immature larvae make two cuts from the leaf margin inward about five mm. This leaf section is then pulled flat over toward the midrib so that a small retreat is formed. This folded-over upper portion is then attached to the lower portion by a plug of silk. The flatness of the retreat in comparison to that formed by *Calpodes ethlius* (Stoll) on *Canna* is probably caused by the thick stiff nature of mature *Psidium* leaves as opposed to the thin, pliable leaves of *Canna*. While most retreats are formed from two leaves as reported by Comstock and Vasquez (1961), one retreat consisted of three leaves—the apical pair and one of the leaves on the penultimate node. The larva rested on the top leaf or "ceiling" in an upside-down orientation.

Mortality is extremely high in the early instars. A check of a single *Psidium* shrub yielded twenty-seven hatched eggs, but only five living first and second instar (and dead bodies of seven other) larvae in larval folds. Construction of the larval retreat is a task which many *sanguinea* larvae are not able to complete. Leaves supporting hatched eggs but no

larvae occasionally have a single cut similar to the two required to form a retreat.

Only a few chrysalids were observed during these studies. The chrysalis is loosely attached to the upper part of the retreat by silk strands. A parasitized chrysalis with many wasp (probably *Apanteles*) exit holes was found in one retreat. This chrysalis measured 28 mm in length and 8.25 mm at greatest width (second abdominal segment).

Adult female flight behavior in the vicinity of *Psidium* is quite distinctive. The imago "flits" or "skips" along and above the periphery of the bush. Suddenly the adult will drop to the level of the bush and quickly land on a leaf. Always facing outward toward the tip of the leaf, she quickly lays an egg, and flies upward and around the bush again. If undisturbed, the behavior sequence is repeated.

Although both male and female adults were observed flying, only females alighted on any substrate. All but one of these observations involved ovipositional landings on *Psidium* leaves. One female was observed to land on a leaf of a bottlebrush shrub, *Callistemon citrinus* Staph. (= *lanceolatus* DC.), which is also an introduced member of the Myrtaceae. After remaining on the leaf for about ten seconds, the adult flew off; no egg was laid. The relatively long period of time spent on the bottlebrush leaf indicates that after initial selection of a prospective plant from a short distance (about 0.5 m) in the air, confirmation of proper ovipositional substrate is required on the leaf surface. The means of confirmation is unknown at this time, but it can be made in a very short time if the substrate possesses the correct phytochemicals.

Placement of the eggs is highly predictable as a result of the rigid ovipositional behavioral sequence. Of twenty-seven egg shells found on 23 December 1970 all but one were on the upper surface of the leaf. Terminal leaves tend to be selected for oviposition. Numerical data and probable adaptive significance of this selection will be presented elsewhere.

Adults in July were observed visiting flowers of an introduced ornamental, lilac-flowered golden dew drop (Verbenaceae: *Duranta repens* L.). Adults expressed no interest in the flowers of the bottlebrush shrub tentatively selected for oviposition.

Knowledge of the seasonal presence of the various life history stages of *sanguinea* is desirable. Observations of a mature larva revealed no apparent movement or feeding during a ten-day period from Dec. 1970–Jan. 1971. Weather conditions at this time were quite mild; live eggs and immature larvae were present at the same time. In contrast, December 1976 was cold and wet; no eggs or larvae were found on the same bush at that time.

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