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NOTES ON THE ECOLOGY OF *PHYCIODES BATESII BATESII* (LEPIDOPTERA: NYMPHALIDAE)

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ABSTRACT.– A scrubby limestone ridge habitat of *Phyciodes batesii batesii* (Reakirt) in eastern Ontario is described. At this location, eggs and larvae of *P. b. batesii* were found on *Aster ciliolatus* and *A. cordifolius* (Compositae), and were reared to adults on these foodplants. Larvae can be readily located by searching for plants with pale brownish, curled and ventrally rolled leaves. Larval development requires 30-40 days, while the pupae emerge after 5-7 days, but some larvae stop feeding when 7-10mm long.

KEY WORDS: Anacardiaceae, behavior, Betulaceae, Compositae, Cupressaceae, Canada, eggs, Georgia, Gramineae, habitat, hostplants, Labiatae, larvae, larval behavior, Nearctic, New York, North America, Ontario, oviposition, Pinaceae, pupae, Quebec, Rosaceae, Rutaceae, Salicaceae, USA.

The range of the dark crescent, *Phyciodes batesii* ssp. *batesii* (Reakirt), extends from Quebec and eastern Ontario, south in the Appalachians to Georgia (Scott, 1994). Most of the colonies in the southern part of the range, from New York to Georgia, have been extirpated (Opler and Malikul, 1992; Scott, 1994). The decline is believed to be a result of loss of the dry scrub or savanna habitat to agriculture and development, or succession to thick woody cover as a consequence of fire prevention (Scott, 1994). Recently, careless spraying of chemicals and use of parasites to control gypsy moths have also been implicated. The decline is recent, many of the colonies having disappeared between 1960 and 1990. Considering the areas within which various authors have reported disappearance, *P. b. batesii* has been reduced to at least half of its former range. Conservation, management and reintroduction require accurate information on habitats and foodplants, but as noted by Scott (1994), the larval foodplants of *P. batesii* are poorly documented, and the only definite record is that of *Aster undulatus* (Compositae) from North Carolina. The following observations from the northern limit of the *P. batesii* are, thus, potentially useful.

Several colonies of *P. batesii* exist in the Marlborough Forest area of eastern Ontario (45°05' N, 75°51' W). In this area, a strong population occurs on a semi-open, dry limestone ridge with scattered trees of eastern white cedar (*Thuja occidentalis*) (Cupressaceae), jack pine (*Pinus banksiana*) (Pinaceae), paper birch (*Betula papyrifera*) (Betulaceae), and poplars (*Populus* spp.) (Salicaceae), plus thickets of prickly ash (*Zanthoxylum americanum*) (Rutaceae), staghorn sumac (*Rhus typhina*) (Anacardiaceae), and choke cherry (*Prunus virginiana*) (Rosaceae). Small openings in the woods are dominated by herbs such as *Aster ciliolatus, Aster cordifolius, Chrysanthemum leucanthemum, Hieracium pilloselloides, Senecio pauperculus, Solidago juncea*, and *Solidago nemoralis* (Compositae); *Danthonia spicata* and *Poa compressa* (Gramineae); *Fragaria virginiana* (Rosaceae); *Origanum vulgare* (Labiatae); and *Rhus radicans* (Anacardiaceae). The recent history of the site includes fire, wood cutting and use as low grade pasture. During the early June flight period, 2-6 adults are generally in view at one time at this colony. On 21 June 1996, three *Phyciodes batesii batesii* egg masses of 50-80 pale green eggs were found on the underside of leaves of robust plants of *Aster ciliolatus*. In each case the egg mass was on the undersurface of a leaf on the central part of the plant (Fig. 1). These eggs hatched between 24-28 June. The eggs were reared to adult, half of each egg lot on *Aster cordifolius* and half on *A. ciliolatus*.

Fig. 1-3. Drawings showing *Aster ciliolatus* with eggs or larvae of *Phyciodes batesii batesii*: 1) Plant showing location of egg masses (black dots). 2) Plant with first instar larvae in webs on the laterally inrolled undersurface of two recurved leaves. 3) Plant with second instar larvae and all leaves eaten, ventrally inrolled and recurved.

At the same location, on 15 July 1996, webs with communal larvae were found on large *Aster* plants 2-8m from other plants. Two of these plants were *Aster ciliolatus* and three were *A. cordifolius*. The larvae had already consumed most of the plants and were in webs in either the uppermost or lowermost leaves. Forty larvae were reared on each *Aster* species. In all cases, the adults were typical *P. b. batesii*. The use of *Aster ciliolatus* and

A. cordifolius is not surprising in view of the report of the closely related *A.. undulatus* in North Carolina (Scott, 1994).

Younger larvae associate on the underside of leaves, eating all tissue except the upper epidermal layers. A group of 50 second instar larvae consumed a leaf 6-8cm long in 1-3 days. Groups of larvae moved up or down plants, consuming most of the leaves. In one case, a group on a middle leaf split into two approximately equal groups, one travelling up to higher leaves, the other established on the underside of the lowest leaf. The original egg mass had been on a centrally located leaf which was consumed, from which the entire group had descended to the next lowest leaf. The consumed leaves become pale brownish and curled, with the lower surface covered with larval webs. Leaves also become strongly recurved (convex on the upper surface, Fig. 2). Since all or most of the leaves on a plant are consumed, larvae can be readily located by searching for large plants with convex curled leaves (Fig. 3).

Larvae required 30-40 days to reach the pupal stage under conditions of constant light and temperature of 75-85°F [24-29°C]. A few larvae from most groups developed more slowly than others and diapaused when 7-10mm long, but at least 80% of all larvae pupated. Adults emerged from pupae after 5-7 days.

Voucher specimens are in the Canadian National Collection, Agriculture Canada, Ottawa (CNC), and the Royal Ontario Museum, Toronto (ROM), and private collections (Paul Catling, James Scott). Voucher specimens of larval foodplants were deposited in the Agriculture Canada herbarium, Ottawa (DAO).

LITERATURE CITED

Scott, J. A.

1994. Biology and systematics of *Phyciodes (Phyciodes). Papilio* (Lakewood, Co), (n.s.) 7:1-120.

Opler, P. A., and V. Malikul

1992. *A Field Guide to the Eastern Butterflies*. New York: Houghton Mifflin. 396pp, 48 pl.