

brood as having sharp, almost black, thin lines on the veins of the hind wing underside, whereas the summer brood has no black striping on the veins (Fig. 2). In both broods the underside ground color on the hind wing and apex of the front wing is yellowish. Of the 18 collected on 1 July 1975 only three were females. The females are more seclusive and thus better protected for reproduction. Occasionally a few *P. n. oleracea* left the bog, flying into an adjoining open field. A few *P. rapae* likewise flew into the bog, mingling with *P. n. oleracea*.

I found two separate colonies of *P. n. oleracea* in the bog, one at the eastern end of the Pigeon River camp grounds and the other at the western end. The two colonies were about one quarter of a mile apart. Collecting in the bog can be somewhat dangerous, not only because of the ever-present poison sumac, but because of the sponge-like soil, which makes the collector feel as if he were walking on a spring coil mattress. When I occasionally lost my footing, I simply fell forward and the vegetation easily supported my weight. Surprisingly, by 10 July 1975, I found only three *P. n. oleracea* in the bog, but by 31 July their numbers had greatly increased. Again I collected 18 and saw dozens more. The highlight of the day came when I found a pair *in copula*. It was 1235 EST and the temperature was 90°F. The pair was settled low in the grass and did not fly, even when I placed the net over them. When I touched the male through the net, it lifted the female upward. In the *Pieridae* I have found that only the males are the flight partners. After making these observations, as a conservation measure, I released the mating pair, which remained *in copula*.

On 18 August 1975, Dr. David L. Eiler and I collected in the two colonies at Mongo. I netted 25 *P. n. oleracea* but released six of them. Dr. Eiler caught seven, the first he had ever seen in their natural habitat. Dozens more were seen flying and feeding in the bog, and a few in the open field. In the bog itself, the *P. n. oleracea* far outnumbered the *P. rapae*.

These data show that there were at least two broods of *P. n. oleracea* in the Mongo bog in 1975 and that the species seems to be well established in LaGrange Co., Indiana.

ERNEST M. SHULL, 402 North Wayne Street, North Manchester, Indiana 46962.

#### AN ECOLOGICAL NOTE ON *POLITES SABULETI SABULETI* AT THE NORTHERN LIMIT OF ITS RANGE (HESPERIIDAE)<sup>1</sup>

The Sabuleti Skipper, *Polites sabuleti sabuleti* (Boisduval), is reported here for the first time as occurring in southern Canada, at Penticton in the Province of British Columbia. This locality represents the most northerly distribution of this skipper, the known geographic range of which extends from Washington State to Baja California, the Great Basin east to Colorado, and through western Arizona south into Mexico (MacNeill 1975, Family HesperIIDae, p. 423-578 in Howe, ed., The butterflies of North America, Doubleday & Co., Inc., New York). Its presence as an abundant and apparently established species at Penticton was discovered only recently. Previous faunal studies in southwestern Canada have omitted any mention of this skipper (Gregory 1975, Checklist of the butterflies and skippers of Canada, Lyman Ent. Mus. & Res. Lab. Mem. 3, 44 p.). Its range, therefore, seems to have been extended into southern British Columbia at some time during the quite recent past.

Field observations indicate that this skipper is bivoltine at Penticton. The flight period of the adults extends from late May to early July and occurs again during

<sup>1</sup> This paper was presented at the joint meeting of the Washington State Entomological Society and the Oregon Entomological Society in Pullman, Washington on 25 September 1976.

the latter part of August and early September. The bivoltine condition prevails in Washington State as well (MacNeill, *op. cit.*).

At Penticton, the observed nectar sources visited by adults of this skipper comprise two groups of plants in particular; namely, phlox and knapweed. During the flight period of the first generation, the major nectar source is *Phlox longifolia* Nutt. This plant possesses pink or lavender-coloured blossoms from May into June, and it is found abundantly as far north in the dry interior as Peachland (Lyons 1974, Trees, shrubs and flowers to know in British Columbia, J. M. Dent & Sons (Canada) Ltd., Toronto, Vancouver). During the flight period of the second generation, the predominant flowering plant is one of several species of knapweed. At an observation site near the Penticton Industrial Park, the knapweed present is diffuse knapweed, *Centaurea diffusa* Lam. This Eurasiatic plant is common in southern British Columbia, and individual plants possess either white or purplish flowers (Frankton & Mulligan 1970, Weeds of Canada, Canada Department of Agriculture Publ. 948).

The Sabuleti Skipper seems to have pioneered this territory successfully, presuming that it truly was absent during the time of previous faunal studies. A rapid flying, small species of skipper, it is difficult to capture. However, it has recently been numerous in and around developed and inhabited areas, making it difficult to overlook. To accomplish a pioneering extension of range, the adults of this species had to be able to find adequate nectar sources during two periods of the growing season. Without a substantial and acceptable nectar source in the fall, second generation adults presumably would starve. Diffuse knapweed is the only abundant nectar source that this skipper has been observed to visit during the fall in the vicinity of Penticton. The presence of this particular species of introduced knapweed, therefore, may have been directly associated with the success of northward pioneering and apparent establishment by this skipper in the dry interior region of British Columbia.

#### ACKNOWLEDGMENT

I thank the staff of the Lyman Entomological Museum & Research Laboratory, Ste.-Anne-de-Bellevue, Quebec, Canada, for making available work facilities and a reference collection of skippers during June 1976, at which time I determined the identity of the skipper species involved in this study. Voucher specimens have been deposited at that institution.

J. ALLAN GARLAND. 2-1491 Government Street, Penticton, British Columbia V2A 4V9, Canada.

#### LARVAL HIBERNATION OF GEOMETRIDAE IN EASTERN UNITED STATES

Over the past few years, I often encountered partially grown gray stick-like geometrid larvae in autumn well after leaf fall at various localities in Pennsylvania, New Jersey, and Massachusetts. Similarly, such larvae were also found in early spring before leaf development. They were found hanging by silken threads from low limbs or shrubs or on my clothing in fall and crawling actively in spring.

I placed such larvae in small glass jars with tight lids and left them outside for the winter. Absorbent paper was placed in the jar for the larva to rest on. The larvae usually spun silken pads and attached themselves to the paper. The paper was occasionally dampened, often by placing a small amount of melting snow in the jar. The larvae usually survived until spring but most died in March, apparently from desiccation or excessive exposure to sunlight resulting in part from neglect.

The few surviving ones were fed in spring whatever deciduous trees or shrubs that were readily available. In all cases mixtures of *Rosa* spp., *Pyrus* spp., *Prunus*