

Schizopepon bryoniaefolius (Cucurbitaceae) as a Native Host
Plant for *Henosepilachna vigintioctomaculata* (Coleoptera:
Coccinellidae) in Hokkaido¹

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Schizopepon bryoniaefolius MAXIM. (Cucurbitaceae) was recorded as a native host plant of the potato ladybird, *Henosepilachna vigintioctomaculata* (MOTSCHULSKY), in Hokkaido and some related problems were discussed.

INTRODUCTION

The phytophagous ladybird, *Henosepilachna vigintioctomaculata* (MOTSCHULSKY)², is one of the most important pests of the potato (*Solanum tuberosum* LINN., Solanaceae). At the present, this pest mainly depends on the potato as a *host plant*, i.e. a plant necessary for the completion of larval development, throughout its distribution range in Japan. However, its distribution pattern and form differentiation (MAKI, 1966; KATAKURA, 1974b) indubitably suggest that it was present in Japan long before the introduction of the potato, the regular cultivation of which began in this country only about 100 years ago. Therefore, it is of interest that the native host plant(s) of this beetle prior to the arrival of the potato plant in Japan be clarified.

Schizopepon bryoniaefolius MAXIM. (Cucurbitaceae) was first reported as one of the *food plants*, i.e., plants on which only adults feed, of *H. vigintioctomaculata* (Uchida et al., 1949). KUROSAWA (1954) subsequently discovered both the adults and larvae from this plant³. Since *S. bryoniaefolius* is a plant which is native to Japan, it is presumed to have been a native host plant for *H. vigintioctomaculata*, provided similar cases as mentioned above are frequent in natural conditions. The present paper describes some cases of *S. bryoniaefolius* fed upon by *H. vigintioctomaculata* in Hokkaido as confirmed by a survey made in 1973~'74. The life cycle of the beetle in relation to this plant shall be reported elsewhere.

MATERIALS

Materials and records were obtained primarily in the vicinity of Sapporo during 1973 and 1974 and supplemented by brief survey trips to eastern (September 1973) and

¹ Contributions to the knowledge of *Henosepilachna vigintioctomaculata* complex. III.

² Adoption of this scientific name is explained in KATAKURA (1974a).

³ Misidentification to *Trichosanthes kililowii* MAXIM. var. *japonica* (MIQ.) KITAMURA in the paper cited is corrected here with the permission by Mr. T. KUROSAWA.

southern Hokkaido (July 1974). Specimens collected by Mr. H. HINOMIZU at Pankenai, Teshio-Nakagawa and those by Messrs. H. TAMURA and H. HINOMIZU at Mt. Yôtei were also incorporated into this study together with earlier information reported by UCHIDA et al. (1949) and KUROSAWA (1954 and pers. comm.).

RESULTS AND DISCUSSION

Instances of *H. vigintioctomaculata* feeding on *S. bryoniaefolius* were recorded at nine localities (Table 1, Fig. 1). Those cases where adults of *H. pustulosa*², a species closely allied to *H. vigintioctomaculata* but generally known to feed on thistles (*Cirsium* spp., Compositae) or *Caulophyllum robustum* MAXIM. (Berberidaceae) in Hokkaido, were simul-

Table 1. PROVENANCE OF *H. vigintioctomaculata* FEEDING ON *S. bryoniaefolius*

Code no.	Locality	Date	No. of adults recorded	Immature stages confirmed
1.	Pankenai, Teshio Nakagawa	IX 14, 1973	3	—
2.	Kami Charo, near Shiranuka	IX 21, 1973	23	—
3.	Akkeshi	IX 20, 1973	7	Excuviae
4.	Maruyama, Sapporo ^{a, b}	VII 1973~IX 1974	Many	All stages
5.	Kôryû mine, near Lake Shikotsu	VIII 17, IX 9, 1974	2	Larvae
6.	Foot of Mt. Yôtei (400 m alt.) ^a	VII 10, IX 19, X 8, 1974	Many	Larvae, pupae
7.	Kaitorima, Hiyama district	VII 13, 1974	1	—
8.	Tokachi Chikkabetsu ^c	1946, UCHIDA et al. (1949)		
9.	Jyôzankei (Hôheikyô, Mt. Kamui) ^c	1951, KUOSAWA (pers. comm.)		

^a Adult *H. pustulosa* was simultaneously observed.

^b First discovered by KUROSAWA in May, 1951 (pers. comm.).

^c Previous information. Only the year and reference are given.

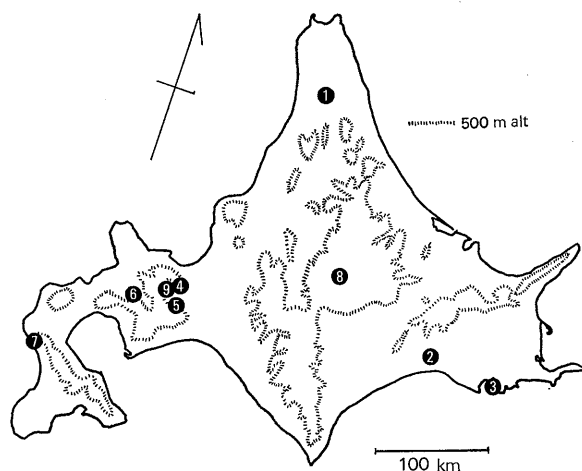


Fig. 1. Distribution of *H. vigintioctomaculata* feeding on *S. bryoniaefolius* in Hokkaido. Code numbers for localities are given in Table 1.

taneously discovered on *S. bryoniaefolius*, are shown together in the table⁴. In all localities except for Tokachi Chikkabetsu and Jyôzankei cited from previous information, no *S. bryoniaefolius* infested by *H. vigintioctomaculata* was found. This high ratio of discovery indicates a close relationship of *H. vigintioctomaculata* with *S. bryoniaefolius*. In all cases, observed adults were morphologically typical of the Hokkaido form (V-II in KATAKURA, 1974b) showing no significant difference with those found in potato fields (UCHIDA et al. and KUROSAWA did not report on morphological features). Immature individuals (including pupal excuviae) were observed at four out of nine localities (Table 1). The separation of *H. vigintioctomaculata* from *H. pustulosa* is difficult in the immature stages and *H. pustulosa* can grow normally with *S. bryoniaefolius* under laboratory conditions (KUROSAWA, 1953). Therefore these immatures, especially those at Mt. Yôtei and Maruyama, might involve some *pustulosa*. However, no *H. pustulosa* has hitherto been recorded from eastern Hokkaido including Akkeshi (KATAKURA, 1974b), and some captured and reared immatures were all *H. vigintioctomaculata* (two larvae and two pupae from Mt. Yôtei, two pupae from Maruyama and a larva from Kôryû mine). Furthermore, no evidence could be obtained regarding the existence of a natural population of *H. pustulosa* feeding on *S. bryoniaefolius* through personal field observations made at Maruyama during May to October, 1974 (in preparation). From these facts, most if not all of the immatures can be regarded as *H. vigintioctomaculata*, *H. pustulosa* observed at Mt. Yôtei and Maruyama are probably immigrants from nearby populations feeding on thistle (Mt. Yôtei, 50 m apart) or thistle and *Caulophyllum robustum* (Maruyama, adjacent), although the presence of a few immatures of *H. pustulosa* on *S. bryoniaefolius* cannot be excluded.

The establishment of populations of *H. vigintioctomaculata* feeding upon *Schizopepon* by dispersal from the stocks of potato-feeding populations is also suspected. However, scattered distribution (Fig. 1) and high frequency of discoveries from this plant do not favor such an explanation based upon sporadic immigrations from potato feeding populations. Furthermore, all localities are situated amid or along margins of forests, and in some cases, apparently separated from the nearest cultivated area (Table 2). Judging from the sedentary nature of *H. vigintioctomaculata* (cf. IWAO, 1970), most of the distances given in the table are probably greater enough to result in isolation of these populations from the potato field populations. Moreover, the population shown for Maruyama has persisted for more than 20 years since its first discovery in 1951 (KURO-

Table 2. ENVIRONMENT AND APPROXIMATE DISTANCE FROM THE NEAREST RURAL AREA OF THE LOCALITIES EXCEPT THOSE BY PREVIOUS INFORMATION

Code no.	Locality	Environment	Approximate distance (km) from the nearest rural area
1.	Pankenai	Streamside, forest margin	2
2.	Kami Charo	Forest margin	unknown
3.	Akkeshi	Forest	1.5
4.	Maruyama	Forest	0.5
5.	Kôryû mine	Forest margin	7
6.	Mt. Yôtei	Forest	1.2
7.	Kaitorima	Streamside, forest margin	1.5

⁴ All individuals of *H. pustulosa* from Mt. Yôtei and Maruyama were morphologically typical Sapporo form (P-III in KATAKURA, 1974b).

SAWA, pers. comm.) (observed in 1973 and 1974 by KATAKURA).

The field and laboratory observations show a higher preference of *H. vigintioctomaculata* for Solanaceae than Cucurbitaceae (TAKAHASHI, 1932; KOYAMA, 1950, 1957). But both Cucurbitaceae and Solanaceae occupy the top rank regarding the number of host plant species for the subfamily Epilachninae (SCHILDER and SCHILDER, 1929; KAPUR, 1951).

Up to the present, three species of Solanaceae and one of Cucurbitaceae have been documented as wild host plants of *H. vigintioctomaculata* in Japan (KOYAMA, 1950, 1954; KUROSAWA, 1954; the present paper; references published before 1950 compiled by KOYAMA, 1950): Solanaceae: *Lycium chinense* MILL., *Scopolia japonica* MAXIM., *Solanum nigrum* LINN. and Cucurbitaceae: *Schizopepon bryoniaefolius* MAXIM.

Among these *L. chinense* and *S. japonica* are not primarily distributed in Hokkaido, although the former was recently introduced from Honshu. *S. nigrum* has been suspected as the most plausible native host plant (UCHIDA et al., 1949; UCHIDA and WATANABE, 1953; KOYAMA, 1950; YASUTOMI, 1974). However, *S. nigrum* is probably a pre-historic immigrant (MAEKAWA, 1943), not intimately linked with forest vegetation, but common rather as a weed growing in and near crop fields and wastes. Thus, *S. nigrum* occupies a position similar to that of potato as far as its relation to *H. vigintioctomaculata* is concerned. The populations of *H. vigintioctomaculata* dependent upon *S. nigrum* are possibly derived from populations feeding on other native hosts or potato. On the other hand, *S. bryoniaefolius* is a plant native to Japan, and grows as a member of primary forest vegetation. Consequently, *S. bryoniaefolius* is the unique native host of *H. vigintioctomaculata* from Hokkaido as far as existing information is concerned. Only few records exist regarding a population of *H. vigintioctomaculata* feeding upon *Schizopepon* in Honshu. However, the record of the adults from this plant in Minmaya, Tsugaru, located at the northernmost part of Honshu (YASUTOMI and FUKUDA, pers. comm.) suggests the presence of such populations at least in northern Honshu. *S. bryoniaefolius* is an annual liana. According to KITAMURA (1943), its distribution range covers north China, Korea, Saghalien, Japan (Hokkaido and mountainous region of Honshu and Kyûshû) and the southern Kuriles, which coincides well with that of *H. vigintioctomaculata*. Closer studies are required on the occurrence and behavior of the populations feeding on *S. bryoniaefolius* in the areas other than Hokkaido.

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