SUSCEPTIBILITY OF PIERIS NAPI MICROSTRIATA (PIERIDAE) TO APANTELES GLOMERATUS (HYMENOPTERA, BRACONIDAE)

The braconid wasp Apanteles glomeratus (L.) is probably the commonest parasitoid attacking Pieris rapae (L.) in North America, where it was apparently introduced in the 19th Century (Scudder, 1889, Butterflies of E. U.S., Scudder, Cambridge, Mass.). Although Klots (1951, Field Guide to the Butterflies, Houghton Mifflin, Boston) suggested that the decline of Pieris virginiensis Edw. populations might be due to "the parasitic wasps that breed in great numbers in rapae," almost nothing is known of the interactions of this Palearctic parasitoid with the native pierid fauna. Most native pierids, like their crucifer hosts, are active in spring. In North America A. glomeratus is multivoltine, rare early in the season and commonest in autumn. We might thus predict a small impact on the native, vernal fauna. This is particularly true in California, where the Mediterranean climate enforces vernal unior bivoltinism and only two species of pierines (P. protodice Bdv. & LeC., P rapae) fly after June at low elevations. In Yolo Co. up to 70% of large collections of rapae larvae may be parasitized by A. glomeratus from September through November; parasitism of P. protodice rarely exceeds 10% at the same season (Shapiro, 1979, J. Res. Lepid., 17: 1-16, and unpublished data) but may reach 30% when populations are low.

In the Vaca Hills, Inner Coast Ranges, Solano Co., the following crucifer-feeding pierids occur in sympatry: *P. rapae*, *P. napi microstriata* Comstock, *P. sisymbrii* Bdv., *Anthocharis sara* Lucas, and *Euchloe ausonides* Lucas. Of these, *rapae* is multivoltine, *sisymbrii* strictly univoltine, and the others facultatively bivoltine (*ausonides* strongly, the others weakly). From 1972 through 1979 I collected and reared over 700 wild larvae, representing good samples of all of these species from the Vaca Hills, and reared *A. glomeratus* only from *P. rapae* and only after early May. Of the native species, *P. sisymbrii* has been found to harbor *A. glomeratus* at 1500 m in the Sierra Nevada.

In 1980 A. glomeratus was exceptionally common in spring. The frequency of Apanteles attack in wild larvae collected in the Vaca Hills in April was: P. rapae, 6/6; P. n. microstriata, 0/16; A. sara, 0/6; E. ausonides, 0/24. Some of the ausonides came from the same individual hosts as some of the rapae. There is a strong suggestion that A. glomeratus had access to, but discriminated against, the native vernal fauna in the Vacas in 1980.

Sato (1976, Appl. Ent. Zool., 11: 165–175) found that in Japan, *P. napi nesis* Fruhstorfer and *P. melete* Mén. were resistant to *A. glomeratus*, but *P. n. japonica* Shirôzu was not. S. R. Bowden has suggested (*in litt.*) that members of the *napi* complex in the northwest Pacific and California might be related; resistance to *Apanteles* would bear on this hypothesis. The *A. glomeratus* culture established from the 6 Vaca *rapae* was used to test the susceptibility of *P. n. microstriata* to attack. Lab-reared second-instar larvae from ova laid by a female from Lang Crossing, Nevada Co., 1400 m, on the Sierran west slope, were exposed to gravid female *A. glomeratus* and were seen to be stung repeatedly. The host plant was *Brassica kaber* (DC.) Wheeler. The culture was maintained at 25°C under continuous light.

Of the 8 larvae stung 9 May, one died in the 3rd and two in the 4th instars; one pupated and entered diapause; one pupated and eclosed normally 9 June; and three produced parasitoids in the normal manner, yielding 17, 21, and 24 wasps. The initial Vaca *rapae* had produced 17, 29, 23, 16, 19, and 38 wasps.

This quite uncontrolled experiment does not establish the relative attractiveness of *P. rapae* and *P. n. microstriata* as hosts. It merely demonstrates that there is no *absolute* barrier to attack by, and development of, *A. glomeratus* in the native species, and the apparent discrimination against it in the field must reflect behavioral or ecological factors.

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