

SHORT COMMUNICATIONS

Aestivating Site of *Chilocorus rubidus* HOPE (Coleoptera: Coccinellidae) in Central Japan¹

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Most species belonging to the genus *Chilocorus* are valuable natural enemies of scale insects (HATTINGH and SAMWAYS, 1991). *Chilocorus rubidus* HOPE is distributed throughout Asia (including Japan) and Australia (SASAJI, 1971), and larvae and adults of this species prey on scale insects of the genus *Kermococcus* (KAMIYA, 1964) infesting *Quercus* trees. In eastern Siberia, the species is univoltine and its dormancy lasts from late August to late April (HODEK, 1973). The life history of Japanese populations of the species, however, is poorly known. We discovered adults aestivating on the undersurface of leaves of *Quercus aliena* BLUME in

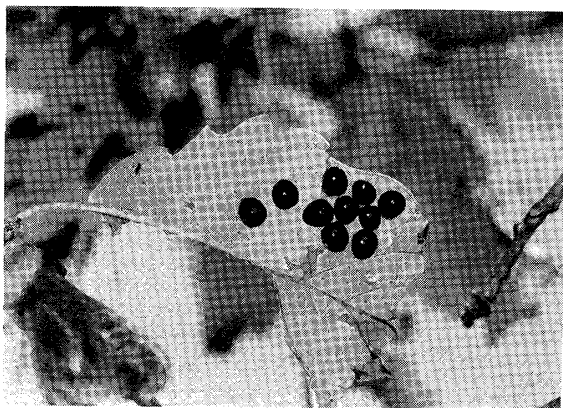


Fig. 1. Adults of *Chilocorus rubidus* aestivating on the undersurface of a *Quercus aliena* leaf.

mid-summer in central Japan, and report some findings of the aestivation observed.

The aestivating adults were discovered on July 31, 1993 in Shiga Town (35°12'N, 135°55'E, alt. 120 m, near Lake Biwa), Shiga Prefecture (Fig. 1). These adults remained sedate on the undersurface of a *Q. aliena* leaf, which was at a height of 6 m on a tree with a trunk diameter of 25 cm at breast height. The ensuing survey revealed some aestivating adults on other leaves of the same tree. A portion of the adults aestivated individually on leaves, and the remainder of the insects were aggregated. The maximum aggregation size observed was 10 adults (Fig. 1), and the frequency distribution of the number of adults per inhabited leaf is shown in Fig. 2.

The vertical distribution of the adults found in the tree is shown in Fig. 3, along with the undersurface leaf temperature measured by a radiation thermometer. Temperature was measured near leaves at a height of 1 m, from 10:40–11:00 h on a sunny day, 25 August, 1993. The aestivating adults tended to distribute in the lower parts of the tree crown, where the temperature was relatively low.

A portion of the aestivating females were collected on 7 August and dissected to observe the degree of ovarian development. None of the females ($n = 24$) showed any ovarian development, corresponding to stage 1 (undeveloped follicle stage) in *Coccinella septempunctata brucki* MULSANT (SAKURAI et al., 1983). *C. rubidus* may be in reproductive diapause in summer, as is the case with *C. septempunctata brucki* in central Japan (SAKURAI et al., 1981). The latter species also prefers cooler sites in a common reed (SAKURATANI and KUBO, 1985) for aestivation. As many exuviae of *C. rubidus* pupa (about 300) were

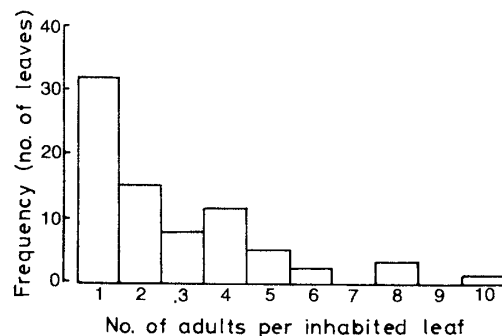


Fig. 2. Frequency distribution of adults per leaf. Adults were found on 78 of the approximately 7,000 leaves on the entire tree.

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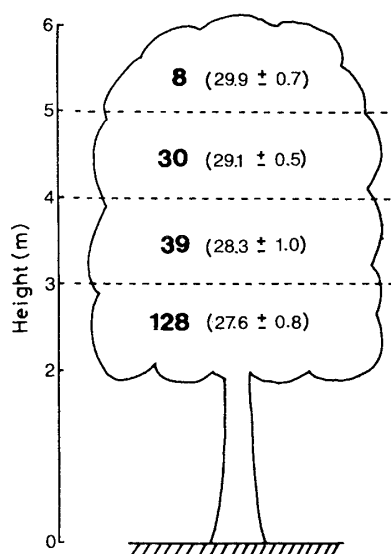


Fig. 3. Vertical distribution of aestivating adults and temperature in the tree crown (from 10:40–11:00 h on 25 August, 1993). Given as number of adults (mean temperature of 10 leaves \pm SD, in $^{\circ}$ C).

found on twigs of the tree that were infested by scale insects, the adults might emerge there and remain in the tree crown for aestivation. Adults, however, were not found on the tree on 5 October of the same year.

We surveyed aestivating adults of this species on other trees growing in the same forest. The number of adults found is shown in Table 1. The insect was only found on *Q. aliena* (4 out of 52 *Q. aliena* trees). This restricted distribution suggests that suitable prey, *Kermococcus* for *C. rubidus* should also be very restricted, as are other congeneric species (HODEK, 1973; HATTINGH and SAMWAYS, 1991), since each *Kermococcus* species infests species specific to *Quercus* species (KAWAI, 1980).

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Table 1. Number of aestivating adult *Chilocorus rubidus* found on *Quercus aliena* and other tree species

Species of tree	No. of trees surveyed	No. of adults observed
<i>Quercus aliena</i>	1 ^a	205
	1	27
	1	13
	1	7
	48	0
Total	52	252
<i>Q. acutissima</i>	20	0
<i>Q. variabilis</i>	20	0
<i>Q. serrata</i>	25	0
<i>Prunus yedoensis</i>	4	0
<i>Camellia japonica</i>	10	0
<i>Acer palmatum</i>	10	0

^a The aestivating adults were first discovered on this tree, and the present report deals mostly with adults on this tree.

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