Short Communications


Short Day Photoperiod Accelerates the Oviposition in the Oriental Green Stink Bug, Nezara antennata Scott (Heteroptera: Pentatomidae) ¹

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The oriental green stink bug, Nezara antennata Scott, is widely distributed in Japan except for Hokkaido. This species is a polyphagous pest and attacks about 80 species of plants belonging to 25 families (KOBAYASHI, 1959). KIRITANI et al. (1963) reported that this bug has two or three generations a year in Wakayama Prefecture, and KOBAYASHI (1972) reported that it has two generations a year in Shikoku. After hibernation, the females begin laying eggs when the maximum temperature reaches 14 to 15°C, and adults of the first generation appear from late June to the middle of September (KOBAYASHI, 1972). Although adults emerging in September seem to hibernate without ovipositing, the critical photoperiod for the induction of diapause is unknown. The present paper investigates the response of N. antennata to photoperiod.

Insects were collected from soybean fields in Ibaraki Prefecture. Egg masses were kept in plastic petri dishes (9 cm in diameter), and nymphs were reared on soaked green soybeans at 25°C under a 16-hr light: 8-hr dark photoperiod (16L–8D). Adults used for experiments were those of the second laboratory generation. Newly emerged adults were placed in pairs in plastic cups (9 cm in diameter × 5 cm) (KADOSAWA and SANTA, 1981) with soaked green soybeans. Ten pairs each were transferred to 10L–14D, 12L–12D, 14L–10D, and 20L–4D, at 25°C, and another group of ten pairs was maintained at 16L–8D without transfer. Oviposition was recorded every day.

Under long-day photoperiods, 16L–8D and 20L–4D, the oviposition of N. antennata was delayed; the mean pre-oviposition periods were 42–45 days (Table 1). Under short-day photoperiods of less than 16-hr, the mean pre-oviposition periods were less than 23 days. The non-diapauing females that had been reared as nymphs under 16L–8D thus respond to a short-day photoperiod by shortening the pre-oviposition period. KADOSAWA and SANTA (1981) reported that N. antennata reared on soybeans at 25°C, 16L–8D required about 80 days to begin oviposition, while it took 67.5 days to do so when they were transferred to 14L–10L. How-

Table 1. Duration of the pre-oviposition period and fertility of the female N. antennata at 25°C

<table>
<thead>
<tr>
<th>Photoperiod</th>
<th>No. of females</th>
<th>No. of oviposited</th>
<th>Pre-oviposition period in days (mean±S.E.)</th>
<th>Fertility a (mean±S.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20L–4D</td>
<td>10</td>
<td>7</td>
<td>42.7±12.0</td>
<td>— b</td>
</tr>
<tr>
<td>16L–8D</td>
<td>10</td>
<td>8</td>
<td>46.0±3.0</td>
<td>145.6±30.3</td>
</tr>
<tr>
<td>14L–10D</td>
<td>10</td>
<td>8</td>
<td>20.9±1.9</td>
<td>183.3±27.9</td>
</tr>
<tr>
<td>12L–12D</td>
<td>10</td>
<td>10</td>
<td>22.1±1.0</td>
<td>82.7±14.5</td>
</tr>
<tr>
<td>10L–14D</td>
<td>10</td>
<td>8</td>
<td>22.9±2.8</td>
<td>176.6±27.2</td>
</tr>
</tbody>
</table>

a Number of eggs per female.
b No data.

Fig. 1. Oviposition and survivorship of the female *N. antennata* at 25°C, under four different photoperiods. After 130 days of rearing, surviving females did not oviposit.

However, in their experiment, the range of the pre-oviposition period under the two photoperiods overlapped greatly. Both of these values are much longer than those reported here. This might be due to the geographic variation in photoperiod response. The mean fertility under 12L−12D appeared to be less than that under any of the other photoperiods tested, but the individual variation in fertility was too great to establish the significance of this difference.

Figure 1 shows the oviposition patterns under four photoperiods. Most females transferred to 14L−10D laid eggs continually till death, while some of those transferred to 12L−12D or 10L−14D ceased laying eggs after ovipositing one or two egg masses. As adult diapause is induced by a 14-hr or shorter photoperiods during the nymphal stage (in preparation), *N. antennata* has a facultative adult diapause as does *Riptortus clavatus* THUNBERG. (NUMATA and HIDAKA, 1982).

In the southern green stink bug, *N. viridula* L., the critical photoperiod is approximately 12 hr of light per day in the suburbs of Cairo (ALI and EWIES, 1977). *N. antennata* and *N. viridula* are sympatric in southern Japan (HASEGAWA, 1954), so it would be interesting to compare the critical photoperiods between sympatric populations of the two species. The stage sensitive to photoperiod and the interaction between photoperiod and temperature are also important aspects to be investigated further.

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REFERENCES


KORAYASHI, T. (1972) *JARQ* **6:** 212−218.