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Observations on the Mosquitoes Visiting the Flowers of Spindle Trees, *Euonymus japonica*

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Introduction

Regarding the habits and the meaning of visiting flowers in mosquitoes, there have been a number of reports, e.g., Robertson (1889), Knab (1907), Raup (1930), West and Jenkens (1951), Hocking (1953), and Hollece (1963).

The author had a change of observations on mosquitoes visiting at night on the flowers of spidle tree, *Euonymus japonica* in Summer, 1963 in the campus of Nagasaki University School of Medicine the result of which will be reported here.

The author wishes to express his sincere appreciation to Prof. N. Omori for criticism and reading manuscript.

Material and methods

Before and along the animal house standing on the west border of the campus of our Medical School, a row of about ten spindle trees, *Euonymus japonica*, are being planted. The flowering time of the tree lasts from the beginning of June to mid July. Mosquitoes attracted to the nectar of the flowers were captured nearly every night at about 9 p.m. for 30 minutes by a sucking tube and a hand net applying a flashlight. The catches were made during from 17th June to 16th July, 1963, that is, from about the days of full blossom to the end of the flowering time.

Results of observations

The total number of mosquitoes of both sexes and the rate of them collected during the observation period are tabulated in Table 1 by mosquito species.

* Contribution from the Research Institute of Endemics, Nagasaki University No. 461 and Contribution No. 134 from the Department of Medical Zoology, Nagasaki University School of Medicine.
Observations on the Mosquitoes Visiting Flowers

Table 1  Number and sex ratio of mosquitoes collected at night on the flowers of spindle trees, *Euonymus japonica* in Summer, 1963

<table>
<thead>
<tr>
<th>Species</th>
<th>Number of adults</th>
<th>Sex ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. ♀</td>
<td>No. ♂</td>
</tr>
<tr>
<td><em>C. p. pallens</em></td>
<td>184</td>
<td>304</td>
</tr>
<tr>
<td><em>C. tritaeniornyrhynchus</em></td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td><em>C. vorax</em></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Ae. albopictus</em></td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td><em>Ae. vexans</em></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Ar. subalbatus</em></td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>202</td>
<td>314</td>
</tr>
</tbody>
</table>

Of six mosquito species collected, *Culex pipiens pallens* is positively more numerous than the others; *Aedes albopictus*, *Armigeres subalbatus*, and *Culex tritaeniornyrhynchus* come next in that order; while *Culex vorax* and *Aedes vexans* are very rare. The relative abundance of the mosquitoes collected on the flowers appears to depend roughly on the breeding number of adults of each species in the near vicinity of the Medical School. *C. p. pipiens* was breeding in residential quarters surrounding the school campus; *Ae. albopictus* and *Ar. subalbatus* were breeding in water in some earthen jars being placed on the rooftop of the school building and containing animal borns to be refined for medical specimens; *C. tritaeniornyrhynchus* was breeding slightly in nearby drains and riverside pools, but fairly in some paddy field and fertilizer pits locating rather far from the school at about 500—800m distances.

Regarding the sex ratio, in *C. p. pallens* the males are markedly abundant; in *Ae. albopictus* and *Ar. subalbatus* both sexes are roughly equal in number; while in *C. tritaeniornyrhynchus* only females are collected. The facts may suggest that when the breeding places are near a larger number of males or in some cases both sexes come to feed on nectar, while in the case of breeding places being far distant more females may be attracted to it on the way of longer flight for searching food than males.

Among the females collected, there were

Table 2  Number of unfed and blood fed females, and those having developed eggs, collected on the spindle tree flowers

<table>
<thead>
<tr>
<th>Species</th>
<th>Number of females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>unfed</td>
<td>fed</td>
</tr>
<tr>
<td><em>C. p. pallens</em></td>
<td>140</td>
<td>18</td>
</tr>
<tr>
<td><em>C. tritaeniornyrhynchus</em></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><em>C. vorax</em></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Ae. albopictus</em></td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td><em>Ae. vexans</em></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Ar. subalbatus</em></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>151</td>
<td>24</td>
</tr>
</tbody>
</table>
found those unfed, fed with blood, and with developing eggs. The numbers are given by species in Table 2.

Generally speaking, it is of interest that the females of every physiological conditions were coming to feed on nectar suggesting that the nectar or the likes are another necessary food substance for maintenance of the life of blood sucking mosquitoes excepting C. vorax which is uncertain whether it feeds on warm blooded animal or not. In most cases, unfed ones exceed fed or gravid ones suggesting that unfed ones may feed readily and early on nectar or the likes before they can feed on animals. In the case of C. tritaeniorhynchus, however, a larger number of fed females were found probably because of relatively far distance of its breeding place.

Daily total numbers for both sexes of C. p. pallens collected on the flowers during the observation period are illustrated in Fig. 1 which shows marked irregularity in number. It seems to be due to the changeable meteorological conditions during the rainy season covering usually from the beginning of June to mid July. Strong wind, heavy rain, or combined effects of wind and rains hindered the activity of mosquitoes from coming to the flowers and when the hindrance was severe the number of mosquitoes increased, in some cases, markedly on the next night.

Generally speaking, however, it seems that the members of the house mosquito decrease with the decrease in blossom.

In Fig. 2, the numbers of mosquitoes shown in the preceeding Figure are arranged and illustrated by sex and in total in five days comparing with the grade of blossom in each five days. The Figure shows that the male nearly always exceeds the female and the numbers decrease nearly in parallel with the decrease in the rate of the blossom.

**Fig. 1** Prevalence of adults of *Culex pipiens pallens* collected on the spindle tree flowers during the observation period in 1963
Observations on the Mosquitoes Visiting Flowers

Fig. 2 Relation between the grade in blossom of the spindle tree flowers and the number of adults of C. p. pallens collected on them in 1963

Summary

1) The author had a chance to observe mosquitoes visiting flowers of spindle tree, Euonymus japonicus planted in a row before the animal house standing at the west border of the campus of our Medical School. Collections of mosquitoes were made nearly every night at about 9 p.m. for 30 minutes during from 17th June to 16th July, 1963, i.e., from full blossoms to the end of the flowering time. The meteorological conditions during the period was very changeable because it was in the rainy season of the year.

2) Of six mosquito species collected on the flowers, C. p. pallens was abundant; Ae. albopictus, Ar. subalbatus, and C. tritaeniorhynchus were small in number; C. vorax and Ae. vexans were few. The relative abundance appears to depend on the breeding number of each species in a very near vicinity of the school.

3) From the fact that the adults of both sexes and the females of every physiological condition i.e., unfed, fed and gravid states, were feeding on the nectar, it may be thought that the nectar or the likes are another necessary food substance for maintenance of the life of mosquitoes.

4) Daily prevalence in number of C. p. pallens attracted to the nectar has a close
relation to the grade of blossoms, fluctuating, however, by the influence of strong
wind and rains at the time of observation.

Literatures

-219, 1907.
4) West, A. S. and Jenkens, D. W. : Plant feeding habits of northern mosquitoes
6) Hollee, A. and Rogern, D. : Field observations on the nectar feeding habits of

摘 要

1) 著者は長崎大学医学部構内西端の動物小舎の前に一列に植えられたマサキ, Euonymus japonica
の花に夜間蚊が集まることを発見したので継続的に採集してみた。この花は普通6月上旬に開き始め下
旬頃満開となり7月中旬には花期が終る。採集は1963年の6月17日の満開の頃から花期の終り迄殆ど
毎日午後9時から約30分間行なったが、この時期は雨期中であったので採集時の天候は可成り不順であ
った。

2) 花で採集された6種の蚊の内アカイエカは最も多く、ヒトスジシマカ、オクロヤブカ、及びコ
ガタアカイエカは大々僅かで、トラフガタイカとキノイロヤブカは全く個体に過ぎなかった。各種類
の個体数の多寡は校舎附近での蚊の発生量と或る程度の関係があるように思われた。

3) 花の蜜に誘引された蚊の中には、が多数に混れており、♀では無吸血のもの、既に吸血してい
たもの、及び卵を持っていたものなどが混っていたことから考えると、この花の蜜及びこれに類するも
のは蚊の生命保持の上に、♀にとっては勿論、♂にとっても動物血以外に尚必要な食物であろうと考え
られる。

4) 貧に集まるアカイエカの経日の消長は、満開時に最も多く、大体に於いては開花の程度に比例する
が、観察時の強風や降雨によって可成り抑制される。