Influence of different pollen grains on biological parameters of
Chrysoperla zastrowi sillemi (Esben-Peterson) adults *

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Chrysoperla zastrowi sillemi (Esben-Peterson) is a general predator found in
different agro-ecosystems. It has been used in augmentative release programs because of
its cost effective mass production technology. Quality of food provided to the larvae and
adults play an important role in the successful completion of their development and
subsequent adult performance (Principi and Canard, 1984). The adults of C. zastrowi
sillemi feed on pollen, nectar and honeydew which provide nutrients that help in
maintaining metabolism and enhance its overall performance. The information on impact
of different pollen grains on biological attributes of the predator is meagre. To study the
same an experiment was carried out at Biocontrol Research Laboratory, Anand
Agricultural University, Anand (Gujarat) during 2011-12.

A laboratory study was conducted in Completely Randomized Design with nine
different treatments repeated thrice. The treatments of maize, castor, cotton and okra
pollens alone and in combination with honey (50%) were evaluated. Honey (50%)
dissolved in distilled water was used as check. For the purpose, 10 plants each of castor,
cotton, maize and okra were raised in the Biocontrol Research Farm and maintained
without the use of any chemical treatment. There were a set of 5 pairs of C. chrysoperla
adults in each replication. The pollen grains were obtained from the flowers of respective
crops and fed to the freshly emerged adults. The observations on longevity, pre-
oviposition, oviposition, post-oviposition and fecundity were recorded. The data obtained
were analyzed statistically and are presented in Table 1.

Data (Table 1) indicated that maximum (26.56 days) longevity of males was
observed when fed on honey (50%) alone followed by combination of cotton pollen +
honey (25.73), castor pollen + honey (25.17) and maize pollen + honey (23.95). Males
fed with honey along with pollen grains of cotton, castor or maize registered significantly
higher longevity (23.95 to 26.56 days) than those fed on okra pollen + honey, maize and
cotton pollen alone. Among the various food sources, significantly shorter (11.43 to
12.09 days) longevity of males was found when fed with castor or okra pollen alone.

Highest (35.48 days) longevity of females was registered in cotton pollen than rest of the
other food sources. Females fed with honey (50%) alone and pollen grains of castor or
maize + honey exhibited 30.52 to 32.48 days longevity. Maize pollen (alone) and okra pollen + honey (50%) had more or less same influence on female longevity. As like male longevity, the female longevity also found significantly less when fed on pollen grains of castor or okra. Addition of castor pollen with natural food (honey) has no significant impact on longevity of males and females of C. zastrowi sillemi. Similar opinion has been expressed by Adane and Gautam (2002) who reported that there was no significant effect of adult food supplements with castor pollen and yeast in combination with 50% honey evaluated against C. carnea.

Shorter (3.77 days) pre-oviposition period was recorded when females were fed with cotton pollen + honey followed by maize pollen + honey (4.12 days). Among the various food sources, significantly longest (9.71 days) pre-oviposition period was registered on honey (50%) alone. Females fed with pollen grains of maize, cotton, okra and okra + maize exhibited 6.57, 6.23, 5.99 and 5.77 days longevity, respectively. Longest duration (24.99 days) for oviposition was revealed when females were provided cotton pollen + honey followed by castor pollen + honey (23.41 days). Both these food sources registered significantly longer oviposition period than rest of the other food sources. Maize pollen + honey also showed markedly longer duration of oviposition. Significantly, shorter oviposition periods were recorded when the females fed with castor and okra pollen alone. The females did not survive after oviposition when fed with only castor and okra pollen. Females fed with okra pollen + honey lived for short period (1.63 days), however when they fed with castor pollen + honey lived markedly longer (4.44 days) after oviposition. Significantly longest (10.41 days) post-oviposition period was registered on honey alone. Females fed with cotton pollen + honey and maize pollen + honey registered 7.08 and 5.40 days as post-oviposition period, respectively.

Maximum (249.08 eggs/female) egg-laying potential of C. zastrowi sillemi was recorded when the females were fed on castor pollen + honey followed by cotton pollen + honey (230.54 eggs/female). Both these food sources differed significantly from rest of the food. This is in conformity with the report of Deotale et al. (1998) who found that the egg production of C. carnea females was highest with castor pollen which was about two times greater than the standard diet. Maize pollen + honey also exhibited a markedly higher (169.28) fecundity. Females fed with castor and okra pollen alone produced only 9.23 and 12.39 eggs/female, respectively (Table 1). These results imply that the reproductive success of C. zastrowi sillemi could be obtained when females fed with pollens and honey. Either honey or pollen grains applied alone produce fewer eggs. Similar opinion has been expressed by Venzon et al. (2006). They revealed that the females of C. externa fed on castor bean pollen or on honey alone did not oviposit. Maximum (79.71%) number of eggs were hatched when females fed on cotton pollen + honey followed by castor pollen + honey (76.17%). The latter food sources were found at par with maize pollen + honey. These three food diets registered significantly higher (68.89 to 79.71%) egg-hatching than the combination of other food sources, except cotton pollen alone. On the other hand, females fed with castor and okra pollen alone exhibited 33.03 and 37.06% of egg hatching, respectively.

Results show that use of either pollen grains or honey as diet for adults of C.
zastrowi sillemi may not be a adequate to fulfill their nutritional requirement as it resulted in poor longevity of adults and fecundity of females. Among the various combinations evaluated, castor pollen + honey (50%) and cotton pollen + honey (50 %) proved to be the most appropriate combination of pollen as feed.

Table 1. Influence of different pollen grains on biological parameters of C. zastrowi sillemi adults

<table>
<thead>
<tr>
<th>Treatments (food source)</th>
<th>Male</th>
<th>Longevity (Days)</th>
<th>Female</th>
<th>Pre-oviposition</th>
<th>Duration (Days) Oviposition</th>
<th>Post-oviposition</th>
<th>Fecundity (Eg Fem)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
<td>Range</td>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize pollen (alone)</td>
<td>7 - 20</td>
<td>18.90</td>
<td>6 - 23</td>
<td>20.03</td>
<td>6.57</td>
<td>9.96</td>
<td>3.79</td>
</tr>
<tr>
<td>Okra pollen (alone)</td>
<td>6 - 18</td>
<td>12.09</td>
<td>3 - 12</td>
<td>10.67</td>
<td>5.99</td>
<td>4.42</td>
<td>0.00</td>
</tr>
<tr>
<td>Cotton pollen (alone)</td>
<td>10 - 24</td>
<td>20.68</td>
<td>12 - 30</td>
<td>25.31</td>
<td>6.23</td>
<td>15.71</td>
<td>3.38</td>
</tr>
<tr>
<td>Castor pollen (alone)</td>
<td>8 - 13</td>
<td>11.43</td>
<td>5 - 15</td>
<td>11.49</td>
<td>7.32</td>
<td>4.32</td>
<td>0.00</td>
</tr>
<tr>
<td>Maize pollen + honey (50%)</td>
<td>15 - 26</td>
<td>23.95</td>
<td>12 - 34</td>
<td>30.52</td>
<td>4.12</td>
<td>20.81</td>
<td>5.40</td>
</tr>
<tr>
<td>Okra pollen + honey (50%)</td>
<td>13 - 19</td>
<td>17.64</td>
<td>16 - 25</td>
<td>21.15</td>
<td>5.77</td>
<td>15.14</td>
<td>1.63</td>
</tr>
<tr>
<td>Cotton pollen + honey (50%)</td>
<td>18 - 30</td>
<td>25.73</td>
<td>16 - 40</td>
<td>35.48</td>
<td>3.77</td>
<td>24.99</td>
<td>7.08</td>
</tr>
<tr>
<td>Castor pollen + honey (50%)</td>
<td>17 - 28</td>
<td>25.17</td>
<td>18 - 35</td>
<td>31.61</td>
<td>4.30</td>
<td>23.41</td>
<td>4.44</td>
</tr>
<tr>
<td>Honey (50%) as check</td>
<td>19 - 29</td>
<td>26.56</td>
<td>19 - 39</td>
<td>32.48</td>
<td>9.71</td>
<td>13.35</td>
<td>10.41</td>
</tr>
</tbody>
</table>

S. Em. ± (0.69 - 0.80 - 0.80 - 0.18 - 0.63 - 0.22 - 0.2)
C. D. at 5% (2.04 - 2.37 - 2.37 - 0.52 - 1.88 - 0.65 - 0.2)
C. V. (%) (5.88 - 5.68 - 5.68 - 5.08 - 7.47 - 9.49 - 3.0)

*Figures are and ** are sine transformed values, whereas those in parentheses are re-transformed values.
References:


