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Research paper
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EFFECTS OF FOOD ON THE ADULT COCCINELIDS *Coccinella septempunctata* L.

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ABSTRACT

The seven spotted lady bird (*Coccinella septempunctata* L.) were the first time reared in a laboratory in Slovenia. The adults were fed with aphids *Myzus persicae* Sulz. Frozen *Myzus persicae* Sulz. were less suitable than living ones. Females fed on frozen aphids laid fewer eggs than those fed on living aphids. Females fed on an artificial diet laid no eggs. The longevity of adult was in procedure a) 21-533, b) 48-77 in c) 25-480 days.

IZVLEČEK

VPLIV PREHRANE NA ODRASLE POLONICE *Coccinella septempunctata* L.

Sedempika polonica (*Coccinella septempunctata* L.) je v Sloveniji prvič laboratorijsko gojena. Odrasli osebkovi so hranjeni s sivo breskovo ušjo (*Myzus persicae* Sulz.). Zmrznjene uši so manj primerna hrana kot žive. Samice hranjene z zmrznjenimi ušmi so odložile manj jajčec kot tiste prehranjene z živimi. Samice prehranjene na umetni hrani niso odlagale jajčec. Življenjska doba polonic pri postopku a) je 21-533 dni, b) 48-77 dni in c) 50-480 dni.

INTRODUCTION

Coccinelids represent one of the most important pest predator group. Lady bird beetles (*Coccinella septempunctata* Linnaeus, Coleoptera, Coccinellidae) feed on soft bodied insects (aphids, coccids) and help in reducing the insect pest populations.

Quite a big amount of research has been done on the possibility of using lady birds for biological control of insect pests. To attain the maximum rate of reproduction, the effects of quantity and quality of food on the fecundity of lady birds has been investigated (Ali *et al.*, 1992, Michels, Flanders, 1992, Rizvi *et al.*, 1992). Hodek (1967) divided the acceptable food of lady birds into two groups. Using suitable food the females lay eggs and the larvae develop faster. Any other diet isn't suitable for reproduction purposes.

The purpose of the present study was to ascertain the effects of the living green peach aphid (*Myzus persicae* Sulz.), the frozen one and the artificial diet on the longevity of adult seven-spotted lady birds (*Coccinella septempunctata* L.).

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MATERIALS AND METHODS

The adult *Coccinella septempunctata* were collected from grasslands which are near forests (Ljubljana, Postojna, Ilirska Bistrica) and reared in the laboratory.

Rearing of Brussel sprouts and aphids

Brussel sprouts (*Brassica oleracea* L. var *gemmifera* DC) were used as hosts for *M. persicae*. Germination of Brussel sprouts took place in a laboratory at 15-30°C and 12-14 h light, 20.000 lx. Young plants were isolated in plastic flower pots (3: 15,5 cm, H: 13,5 cm) in a humus/sand mixture. Watering was carried out every 3rd day. When the plants had reached the five leaf stage (a size of about 15 cm) they were used for aphid rearing. Rearing of aphids took place in cages (30,0 x 25,0 x 20,3 cm).

Feeding of lady birds

The lady birds were fed in Petri dishes (3: 8,5 cm, H: 1,0 cm) with filter paper on the bottom.

There were four research procedures:

- a) Feeding of lady birds with the living *Myzus persicae*
- b) Feeding of lady birds with the frozen *Myzus persicae*
- c) Feeding of lady birds only with artificial diet
- d) Feeding of lady birds with mixture of a) and c).

The artificial food which was developed by the author alone included:

- Kalčko (Sub Sole, d.o.o. Celje)
- fructose (E. Merck, Darmstadt)
- fresh milk
- hen's eggs
- honey (Medex international, d.d. Ljubljana)
- yeast (Suhi pivski kvas, Biotop, Mediacor d. o. o. Celje)

Females (10) and males (5) were placed in each Petri dish (procedures a, b, c, d) and about 100 aphids per lady bird were provided daily for research procedure a) and 50 aphids for research procedure d). Artificial food was offered on a paper strip and a water mixture of honey on a cotton pad. Eggs were deposited on the filter paper which was removed daily.

The data of some parameters was recorded at every 24 hour intervals. The aphids consumed by lady bird beetles were counted.

RESULTS AND DISCUSSION

The study concerns the seven spotted lady bird (*Coccinella septempunctata* L.) which is the predominant predator of aphids in Slovenia. The adult beetles were collected from the field and kept in Petri dishes. The results of the feeding and of the longevity are presented in Table 1. The type of food had a considerable effect on longevity of adults and their diapause (a-6 months, c-3-months together). The type of food also had an effect on egg-laying. Living aphids were more suitable than frozen aphids. Hamalainen and Markkula (1972) found that frozen aphids rapidly dry up at room temperature and the lady birds consequently find them unappetising.

The artificial food proved to be unsuitable for the reproduction of lady birds but it was suitable for the maintenance of them. They found that adults of *C. septempunctata* did

not lay eggs when fed on artificial food developed by Smirnof (1958). Therefore we created a new kind of artificial food. However, the predator survived on our artificial food even though his egg-laying abilities were impeded.

Tab. 1 Predation potential and longevity of *Coccinella septempunctata* L.

No. of aphids consumed/ individual/day	living aphids	frozen aphids
Minimum	4	0
Maximum	40	25
Average	29	16
Total No. of living aphids consumed/individual	722/25 days	
Longevity of <i>Coccinella septempunctata</i> after different feedings	Longevity	
Research procedure a	21 - 533 days	
b	48 - 77 days	
c	25 - 480 days	
d	*	
Egg-laying of <i>Coccinella septempunctata</i> fed on different kind of food	No. of females	No. of eggs per day
Research procedure a	10	190
b	10	96
c	10	0
d	10	8.6

* no data available

CONCLUSIONS

1. The adults of coccinellid *Coccinella septempunctata* L. were the first time reared in laboratory in Slovenia.
2. They were fed with aphids *Myzus persicae* Sulz.
3. Frozen *Myzus persicae* Sulz. were less suitable than living ones.
4. Females fed on frozen aphids laid fewer eggs than those fed on living aphids.
5. Females fed on an artificial diet laid no eggs.
6. The longevity of lady bird in procedures a) was 21-533 days, b) 48-77 days and c) 25-480 days.

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