

# **SESAME AND SAFFLOWER NEWSLETTER**



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## FOREWORD

The Sesame and Safflower Newsletter, is the only Global Newsletter which deals with these high quality, widely adapted and, as yet, relatively neglected oilseed crops. The issue No. 16 includes 28 contributions, 19 on sesame and 9 on safflower. For both crops topics included genetics and breeding, agronomy and plant protection. As in previous years, it was not possible to publish all the articles received. because lack of space. Priority was given to articles received early and those including news, reports and reviews. The rest of the articles which were evaluated and accepted will be considered for the forthcoming issue.

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J. Fernández-Martínez  
Editor

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## PREDATORY BEHAVIOUR OF SEVEN SPOTTED LADY BEETLE (*Coccinella septempunctata* L.) ON *Dactynotus carthami* (HRL). A LAB STUDY

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### ABSTRACT

Searching and predatory behaviour of seven spotted lady beetle larvae on *Dactynotus carthami* (HRL) was studied in the laboratory under room conditions. The searching speed was quick at middle and high prey densities. The third and fourth instar larvae were significantly more efficient in aphid predation, which declined towards pupation.

**Key Words:** Predatory efficiency, sevenspotted beetle, *Dactynotus carthami*.

### INTRODUCTION

Ladybird beetles (*Coccinellidae: Coleoptera*) feed on aphids, coccids and other insects, helping in reducing the insect pest populations. *Rodalia cardinalis* (Muls) is an example of biological control against *Icerya purchasi* Mask (Clausen, 1952). The sevenspotted beetle *Coccinella septempunctata* L. has been observed feeding on various aphid species throughout the year at Tando Jam (Moghuk *et al.*, 1985). Since predatory beetles can play a key role in the integrated management of aphid control in field crops, the present study was conducted to determine the searching and predatory efficiency of *C. septempunctata* on safflower aphid under laboratory conditions.

### MATERIAL AND METHODS

The adults of *C. septempunctata* were collected from oilseed crop fields and reared in the laboratory to maintain the culture for experimentation.

#### *Comparative predatory behaviour*

The grubs of the first, second, third and fourth instar were obtained from the culture maintained in the laboratory. Each grub of the four instars was provided with 25 aphids (*Dactynotus carthami* HRL) in Petri dishes along with safflower leaves. The experiment was replicated five times. The consumption of aphids was recorded daily and continued till the grubs entered into the next developmental stage. The number of dead aphids due to injury was also recorded.

#### *Searching behaviour*

Model plants were made of white sticker paper wrapped around on iron wire. Five flat oval leaves (ca. 5 x 3 cm) were arranged alternately along the stem (18 x 0.6 cm). The experiment was started by placing a grub (fourth instar) at the base of the stem and the aphids were glued on the ventral side of the leaves. The plants

were held upright and placed at the table in small earthen pots. The test grub was observed continuously for fifteen minutes. The duration of the visit was recorded with the help of stop watch. The distance covered was also measured.

The data recorded on predatory behaviour and searching was subjected to analysis of variance. Further DMR test was applied to compare treatment means.

## RESULTS AND DISCUSSION

### *Predatory behaviour*

The results on the comparative predatory behaviour of different grub instars of *C. septempunctata* on *D. carthami* (Table 1) revealed that predatory behaviour varied significantly with the larval life stage. The number of aphids consumed per grub increased with the age, with the fourth instar grubs having a significantly higher feeding potential than rest of the instars. However, the variation between third and fourth instars was statistically non significant. Similarly, differences between first and second instar were non-significant ( $P=0.05$ ). The feeding percentage was significantly influenced by the larval stage ( $P=0.05$ ). The feeding percentage of aphids provided was significantly higher (72.76%) in case of fourth instar and minimum in first instar (7.76%). The mortality of aphids due to injury caused by the beetle grubs was significantly higher in first instar, thereafter decreasing with the age of the grubs. The daily record of the aphids consumed indicated that consumption increased with the age of the grub and decreased at the time of moulting.

Table 1. Comparative predatory behaviour of different larval instar of *Coccinella septempunctata* L. on safflower aphid.

Instar	Aphids consumed per grub	Feeding (%)	Injured aphids (%)
First	1.94b	7.76d	15.28a
Second	4.68b	18.72c	13.48a
Third	13.42a	53.68b	11.60c
Fourth	18.19a	72.76a	4.08d

Means sharing the same letter are statistically non-significant ( $P=0.05$ )

The results of this investigation demonstrated that the predatory potential increased with the age of the grubs. The fourth instar grub was found to be a significantly more voracious feeder. Pirzada *et al.*, (1996) while working on the efficacy of another beetle, *M. sexmaculatus* Fab. as a predator of *Rhopalosiphum maidis* Fictch. reported that third and fourth instar grubs consumed significantly more prey than earlier instars.

### *Searching behaviour*

The results on the searching behaviour of *C. septempunctata* grubs at different aphid densities (Table 2) indicated that larvae moved quickly before feeding. At low prey density (5 aphids) the most efficient searching was observed, and the predators covered significantly larger distances (3.8 cm/sec). When the prey density was increased, searching speed decreased and less distances were covered. The searching efficiency was 15 times higher at the lowest aphid density than at higher densities.

Table 2. Searching behaviour of *Coccinella septempunctata* L. grubs at different aphid densities

Aphid densities	Grub speed cm/s	Feeding (%)
5	3.80a	100.00a
10	2.50b	9.025a
15	1.05c	90.70b
20	2.55d	86.76b
25	0.25d	72.80c

The feeding percentage of aphids was significantly higher at low density. Murakami and Tsubaki (1986) also reported that searching efficiency of *C. septempunctata* grubs and adults was most efficient at low prey densities than at higher prey densities.

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