



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2017; 5(5): 1838-1840

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Received: 23-07-2017

Accepted: 24-08-2017

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Insect- pests composition and natural enemies association on oriental pickling melon, *Cucumis melo* var. *conomon*

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Abstract

The aim of this research study is to provide the basic information on insect pests and natural enemies associated with *Cucumis melo* var. *conomon* at different stages of crop growth. The basic information on insect pests and natural enemies associated with *Cucumis melo* L. var. *conomon* was generated at the University of Horticultural Sciences, College of Horticulture, Bagalkot, Karnataka. Totally 24 insect pests and nine natural enemies have been documented. Among them, 13 were defoliators which belonged to four different insect orders (Coleoptera, Lepidoptera, Orthoptera and Hymenoptera), three tissue feeders belonged to single order (Diptera), eight sucking insects belonged to two different orders (Hemiptera and Thysanoptera) and remaining nine were natural enemies belonged to five different orders (Coleoptera, Mantodea, Hemiptera, Odonata, Hymenoptera and Araneae). The information generated on the insect pests and natural enemies occurring on oriental pickling melon is first of its kind. The study was intended to device management practices and possible preventive measures that can be adopted utilizing the available native natural enemies.

The literature on the insect pests and natural enemies of Oriental pickling melon is scanty. Therefore this information will help to understand the different kinds of insect pests occurring on oriental pickling melon. It is also intended to determine type of control measures can adopt against these pests.

Keywords: Oriental pickling melon; Insects pests; Natural enemies

1. Introduction

Oriental pickling melon (*Cucumis melo* L. var. *conomon*) is one of the vegetables of melon group belonging to the family Cucurbitaceae, with a chromosomal number $2n=24$ as reported by Munshi and Alvarez, 2005 [1]. It is popularly called as golden melon or culinary melon in English. In Karnataka it is called by various local names like *sambar southe*, *Mogghe kayi* or *Mangalore southe*. It is an ideal summer vegetable crop chiefly grown for use as a fresh vegetable, in preparation of curry and for pickling. It has small fruit with smooth tender skin, white flesh usually with little sweetness and odour. George, 2008 reported that fruits possess cooling properties and are used as a skin moisturizer and as a digestive agent [2].

The extent of yield loss caused by the pest in cucurbitaceous vegetables ranged from 30 to 100 per cent depending upon species and the season in different parts of the world was reported by Dhillon *et al.*, 2005 [3]. Like other cucurbits, Oriental pickling melon is also subjected to damage by wide array of insect pests right from the initial stages of the crop growth to harvesting stage. As this vegetable also belongs to the same family, Cucurbitaceae, having identical cultural requirements and almost suffers due to same diseases and insect pests like in other members of cucurbitaceous vegetables. The studies conducted by Choudhary *et al.*, 2012 reveals that melon fruit fly (*Bactrocera cucurbitae* Coq.) is a serious pests against cucurbitaceous crops [4] and also Krishna Kumar *et al.*, 2006 reported that 73.83 per cent damage on cucumber was due to melon fruit fly [5]. Khan *et al.*, 2012 reported red pumpkin beetle, (*Aulacophora foveicollis* Lucas) was also a serious pest of cucurbits, may cause up to 70 per cent damage to leaves and 60 per cent damage to flowers of cucumbers [6]. In West Bengal, epilachna beetle, (*Henosepilachna septima* Dieke), leaf roller, green semilooper, aphids, white fly etc., were also found to be destructive pest on cucurbits as reported by Barma and Jha, 2013 ; Barma and Jha, 2011 and Jha, 2008 [7-9]. From these reports, it is evident that the attack of these insect pests is a key factor in reducing the quality of the oriental pickling melon. But the information on insect pests attacking on Oriental pickling melon not found and this study gives information on the insect-pests encountered on the crop during the study.

2. Materials and Methods

Field experiments were conducted in the farm at College of Horticulture, Udyanagiri, Bagalkot, Karnataka, to record of arthropods associated with Oriental pickling melon, (*Cucumis melo* L. var. *conomon*) crops during September 2015 – January 2016. The cultivar was planted in three replicates with spacing 2metres between the rows and 1metre between the plants. Insects were collected from the day of seedling emergence till harvest at weekly intervals.

2.1 Direct count

From the whole area about one hundred plants were visually examined weekly. Inspection was started from the beginning

of vegetative stage and continued through the flowering and fruiting stages of the plants. Collected specimens were kept in insect bottles and transferred to the laboratory for identification. Specimens of unknown species were kept in glass vials containing 75% ethyl alcohol, for later identification.

2.2 Sweep net

Insects were collected by sweeping nets at weekly intervals from the experimental area. The collected insects were transferred to the laboratory in insect bottles for later identification.

Table 1: Insect pests and natural enemies recorded on oriental pickling melon

Sl. No.	Insect pests	Scientific name	Order: Family	Host/remarks
A. Defoliators				
1.	Red pumpkin beetle	<i>Aulacophora foveicollis</i> Lucas	Coleoptera: Chrysomelidae	√ *
2.	Beetle	<i>Aulacophora impressa</i> (Fabricius)	Coleoptera: Chrysomelidae	√ *
3.	Ground beetle	<i>Rhytinota</i> sp.	Coleoptera: Tenebrionidae	√ *
4.	Dusty brown beetle	<i>Gonocephalum</i> sp.	Coleoptera: Tenebrionidae	√ *
5.	Green weevil	<i>Mylocerus viridanus</i> (Fabricius)	Coleoptera: Curculionidae	√ *
6.	Ash weevil	<i>Mylocerus</i> sp.	Coleoptera: Curculionidae	√ *
7.	Soft winged flower beetle	Unidentified	Coleoptera: Melyridae(Malachiinae)	√ *
8.	Common Evening Brown	<i>Melanitis leda</i> Linnaeus	Lepidoptera: Nymphalidae	√ *
9.	Cucumber moth	<i>Diaphania indica</i> (Saunders)	Lepidoptera: Crambidae	√ *
10.	Triangular-striped Moth	<i>Chalciope mygdon</i> Cramer	Lepidoptera: Noctuidae	√ *
11.	Ant	<i>Camponotus</i> sp.	Hymenoptera: Formicidae	√ *
12.	Cabbage butterfly	<i>Pieris</i> sp.	Lepidoptera: Pieridae	√ *
13.	Grasshopper	<i>Attractomorpha</i> sp.	Orthoptera: Pyrgomorphidae	√ *
B. Tissue feeders				
14.	Fruit fly	<i>Bactocera cucurbitae</i> (Coquillett)	Diptera: Tephritidae	√
15.	Fruit fly	<i>Bactocera correcta</i> (Bezzi)	Diptera: Tephritidae	√ *
16.	Leaf miner	<i>Liriomyza trifolii</i> Burgess	Diptera: Agromyzidae	√ *
C. Sucking insects / Sap feeders				
17.	Seed bug	<i>Spilostethus pandurus</i> (Scopoli)	Hemiptera: Lygaeidae	√ *
18.	Milk weed Bug	<i>Spilostethus hospes</i> (Fabricius)	Hemiptera: Lygaeidae	√ *
19.	Bug	<i>Creantiodes</i> sp.	Hemiptera: Miridae	√ *
20.	Eurybrachid	<i>Eurybrachys tomentosa</i> (Fabricius)	Hemiptera: Eurybrachidae	√ *
21.	Green bug	<i>Acrosternum gramineum</i> (Fabricius)	Hemiptera: Pentatomidae	√ *
22.	Cotton seed bug	Unidentified	Hemiptera: Lygaeidae	√ *
23.	Painted bug	Unidentified	Hemiptera: Pentatomidae	√ *
24.	Thrips	<i>Thrips tabaci</i> (Lindeman)	Thysanoptera: Thripidae	√ *
D. Natural enemies				
25.	Six-spotted zigzag ladybird	<i>Cheilomenes sexmaculata</i> (Fabricius)	Coleoptera: Coccinellidae	√ *
26.	Transverse banded ladybird beetle	<i>Coccinella transversalis</i> (Fabricius)	Coleoptera: Coccinellidae	√ *
27.	Ladybird beetle	<i>Illeis cincta</i> (Fabricius)	Coleoptera: Coccinellidae	√ *
28.	Preying mantid	Unidentified	Mantodea: Mantidae	√ *
29.	Dragon fly	Unidentified	Odonota: Libellulidae	√ *
30.	Chalcid wasp	<i>Brachymeria</i> sp.	Hymenoptera: Chalcididae	√ *
31.	Assasian bug	Unidentified	Hemiptera: Reduviidae	√ *
32.	Spider	Unidentified	Araneae	√ *
33.	Spider	Unidentified	Araneae	√ *

√ - Host or Ecosystem * - New record

3. Results and Discussion

Table 1 contains a taxonomic list of insect pests associated and natural enemies inhabiting oriental pickling melon fields by using direct count and sweep net in Bagalkot. Out of the 33 collected insect species, *Aulacophora foveicollis* Lucas, *Thrips tabaci* Lindeman, *Eurybrachys tomentosa* (Fabricius), *Liriomyza trifolii* Burgess were commonly found feeding on the vegetative part and *Bactocera cucurbitae* Coq., *Spilostethus pandurus* (Scopoli), *Spilostethus hospes* (Fabricius) (Hemiptera: Lygaeidae) were feeding on the fruits

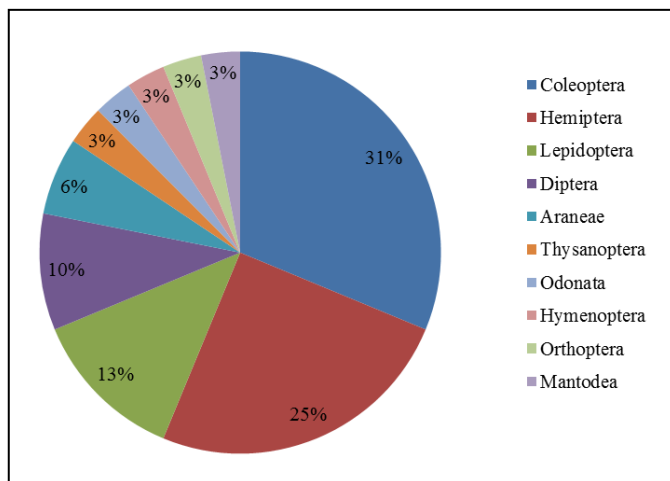
of oriental pickling melon in addition, natural enemy, *Coccinella transversalis* (Fabricius) was the common predator species. Based on the feeding habit pests has been grouped as defoliators, sucking or sap feeders and tissue feeders.

The insect pests, *Rhytinota* sp., *Gonocephalum* sp., *Mylocerus viridanus* (Fabricius), *Mylocerus* sp. *Melanitis leda* Linnaeus, *Diaphania indica* (Saunders), *Chalciope mygdon* Cramer, *Camponotus* sp., *Pieris* sp., *Attractomorpha* sp., *Bactocera correcta* (Bezzi), *Creantiodes* sp., *Acrosternum gramineum* (Fabricius) were recorded in a scarcely numbers.

The cucurbit fruit flies, *B. Cucurbitae*, *B. correcta* (Tephritidae: Diptera) and bugs, *Spilostethus hospes* (Fabricius) and *Spilostethus pandurus* (Hemiptera: Lygaeidae) recorded as pests on the fruits of Oriental pickling melon in Bagalkot. The commonly collected predators were *Cheilomenes sexmaculata* (Fabricius), *Coccinella transversalis* (Fabricius) and *Illeis cincta* (Fabricius) belonging to Coccinellidae; Coleoptera. These predator species were recorded generally in relatively low population densities. In the present study, one parasitoid, *Brachymeria* sp. (Hymenoptera: Chalcididae) and two spiders undetermined species were recorded.

The previous results show that *Bactrocera cucurbitae* (Coq.) on Oriental pickling melon infesting the fruits is considered to be the most important insect pest on oriental pickling melon causing very serious yield losses if no chemical control is applied (Gondi 2015, Shivaprasad, 2013) ^[10, 11].

In figure 1, the percent contribution of pests belonging to different orders have been depicted. The insect pests and natural enemies belonged to Coleoptera (31%), Hemiptera (25%), Lepidoptera (13%), Diptera (10%), Araneae (6%), Thysanoptera, Odonata, Hymenoptera, Orthoptera and Mantodea (3%).



As the crop, Oriental pickling melon, now being popular in Northern Karnataka and no earlier studies on this crop was taken up by the authors. So, this study has helped by encountering number of insect species on this crop for the first time which provides a basic information for the further studies.

4. Conclusion

Data revealed the presence of 33 insect species belonged to 21 genera under 23 families of 9 orders. In addition, some unidentified 2 species of true spiders belonged to order Araneae. The major pests were *Aulocophora foveicollis* Lucas, *Liriomyza trifolii* Burgess, *Thrips tabaci* Lindeman on vegetative part and *Bactrocera cucurbitae* (Coq.) on fruits of oriental pickling melon.

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