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STUDIES ON DIVERSITY OF STORED GRAIN PESTS

R. N. Patil, J. A. Chavan, J. S. Kadam, P. C. Yadav and P. V. Thorat

P. G. Department of Zoology, Sadguru Gadage Maharj College, Karad.
Karad , Dist. - Satara (MS), India

Abstract:

In the present study an attempt has been made to study insect pests associated with stored grains from Karad region. In the present study in all twelve species were recorded. From these order Coleoptera was dominant with ten species followed by order Lepidoptera with two species. Order Coleoptera was reported by four families Viz., Bruchidae, Curculionidae, Tenebrionidae and Anobiidae and order Lepidoptera recorded two families Viz., family Galleridae and Gelechiidae.

KEY WORDS:

Stored grain, insects pests, diversity, Coleoptera, Lepidoptera.

INTRODUCTION

Insect constitute the largest class of phylum Arthropoda belongs to Kingdom Animalia. It includes about 80% of the described species of entire animal life on earth. They show different habits, habitats, structures and mode of life. Insects feed on wood, book, cloths and various raw materials. They are having great economic importance, some are harmful as well as some are beneficial also. Some of them work as vector for transmissions of several diseases. They also help in pollination in flowering plants, few of them provide us silk, honey and medicine.

The storage of food grains has been an age long practice with cultivators and traders. More pest free storage is needed for handling crops at harvest time and to carry over reserves from year to year. Insects destroy 5-10% of stored grains every year in India. The insects which act as pests of stored grains are, *Rhyzopertha dominica* (Lesser grain borer), *Oryzaephilus surinamensis* (Sawtoothed grain beetle), *Sitophilus oryzae* (Rice weevil), *Trogoderma graaeria* (Khapra beetle), *Tribolium castaneum* (Red floor beetle), *Plodia interpunctella* (Indian meal moth). (P. G. Fenemore and Alka Prakash, 2006).

Insects feed on stored grains and cause direct effect on grain weight, nutritional value and germination of grains. Infestation by insects cause contamination, odour, mold and heat damage problems that reduces the quality of grain and made unfit for processing food for humans and animals (Manson and Obermevers, 2006). Seifelnasr (1991) studied on problems associated with traditional storage system of grains and made suggestions for improvement. Rao et al., (2003) made detailed studies on biology, mating behavior, sex ratio and natural mortality of the cigarette beetle, *Lesioderma serricorne*. Grieshop et al., (2006) made fruitful efforts on biological control of Indian meal moth, *Plodia interpunctella* by using the hymenopteran egg parasitoids. Burges (2008) studied in depth on the temperature conditions required to maintain effective long term control of *Trogoderma granarium*.

Thus the above mentioned literature shows that very scanty information is available on diversity of insect pests associated with stored grains. Therefore, in present investigation efforts were made to study diversity of stored grain insects from Karad region.

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MATERIAL AND METHODS

The insect pests of grains like weevils, moths, beetles etc. were collected from store houses and godawns at various places in Karad region during November 2013 to February 2014. The samples were brought to the laboratory in plastic bags of 1kg capacity containing their respective food commodities. Then they were transferred to plastic containers of 1/2kg capacity. Observations were made daily so as to get maximum diversity. Larval and adult insect stages were considered for present study. The larvae and adult were separated and photography of the same was made. Identification was done with the help of available literature on insects by Delvare and Aberlence (1989) and the key of identification of insects of stored products in sub Saharan region by Delobel and Tran (1993).

RESULTS AND DISCUSSION

The present study revealed that, in all twelve species of insects pests were recorded (Table:1) and illustrated by photographs in Plate - I and II. *Callosobruchus maculatus* (Plate-I, Fig.-3, 4 and 8), *Bruchus* spp. (Plate-I, Fig.-6), *Callosobruchus* spp. (Plate- I, Fig.-9), *Callosobruchus chinensis* (Plate-1, Fig.-11), *Callosobruchus analis* (Plate-1, Fig.-13), *Bruchus* spp. (Plate-I, Fig.-14), *Corcyra cephalonica* (Plate- I, Fig.-16), *Sitotroga cerealella* (Plate-II, Fig.-19), *Sitophilus oryzae* (Plate-II, Fig.-20), *Tribolium castaneum* (Plate-II, Fig.-26), *Lesioderma serricorne* (Plate-II, Fig.-28), *Sitophilus zeamais* (Plate-II, Fig.-32). Out of them order Coleoptera comprises ten species and remaining two species belongs to the order Lepidoptera.

In the present study it was observed that, order Coleoptera recorded maximum species with four families. From which family Bruchidae was dominant (6 species), followed by family Curculionidae (2 species), Tenebrionidae (1 species) and Anobiidae (1 species). Similar order Lepidoptera recorded two families Viz., family Galleridae (1 species) and Gelechiidae (1 species).

Among all commodities *Vigna mungo*, *Vigna anguiculata* and *Oryza sativa* having two species of stored grain pests. Nineteen species of Coleoptera from the families Carabidae, Staphylinidae, Rhizophagidae, Cryptoplagidae, Biphylidae, Lathridiidae and Tenebrionidae from stored cereals in Australia were recorded by Winks (1969).

The faunal and seasonal abundance of *Carphophilus* species were studied by James et al., (1995) using traps baited with synthetic aggregation pheromones of *Carphophilus* hemipterans, *C. mutilates* and *C. davidsoni* and fermenting bread dough. His study revealed seven species of *Carphophilus* and one unidentified species.

From eighteen different commodities six species of *Carphophilus* reported by Basak and Pal (2007). From these *Carphophilus freeman*, *C. obsoletus*, *C. pilosellus*, *C. delkeskampi* and *C. marginellus* are new records from stored products from India.

Aland et al., (2009) studied fourteen species from the order Coleoptera and three species from the Lepidoptera from different commodities in Kolhapur district. His study revealed that maximum species belong to order Coleoptera and to family Bruchidae.

Raoul and Leonard (2013) reported the diversity of stored grain insect pests in the logone valley, from Northern Cameroon to Western Chad Republic in Central Africa and found ten species belongs to order Coleoptera and two from order Lepidoptera. Five Coleopterans species are harmful to legume seeds, with only one secondary pest. All the major legume pests belong to the Family Bruchidae.

Similar results were observed in present study. Stored grain pest recorded maximum from Bruchidae family on different commodities in Karad region.

CONCLUSION

From the results obtained in the present investigation it is conclude that the collected pests belong to the order Coleoptera and Lepidoptera which is divers group of class Insecta. Most destruction by pest is found in pulse grains which are damaged by mostly *Bruchus* species. These species feed on more than one host therefore they are polyphagous. Damage the pulses like *V. mungo*, *V. radiata* and *V. anguiculata* etc.

Therefore, there is need to control the stored grain pest by using various control methods Viz., Biological control, Chemical control, Fumigation and insecticide etc. with low adverse effects on human beings and environment and also improve the different storing methods of grains which helps for maintenance the good nutritive level of grains.

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PLATE – I

1. *Vigna radiate*
2. Larvae of *Callasobruchus maculatus*
3. *Callasobruchus maculatus* (male – female mating behavior)
4. *Callasobruchus maculatus* (Female)
5. *Lens esculenta*
6. *Bruchus* spp.
7. *Vigna unguiculata*
8. *Callasobruchus maculatus*
9. *Callasobruchus* spp.
10. *Vigna aconitifolia*
11. *Callosobruchus chinensis*
12. *Vigna mungo*
13. *Callosobruchus analis*
14. *Bruchus* spp.
15. *Pennisetum americanum*
16. *Corcyra cephalonica*

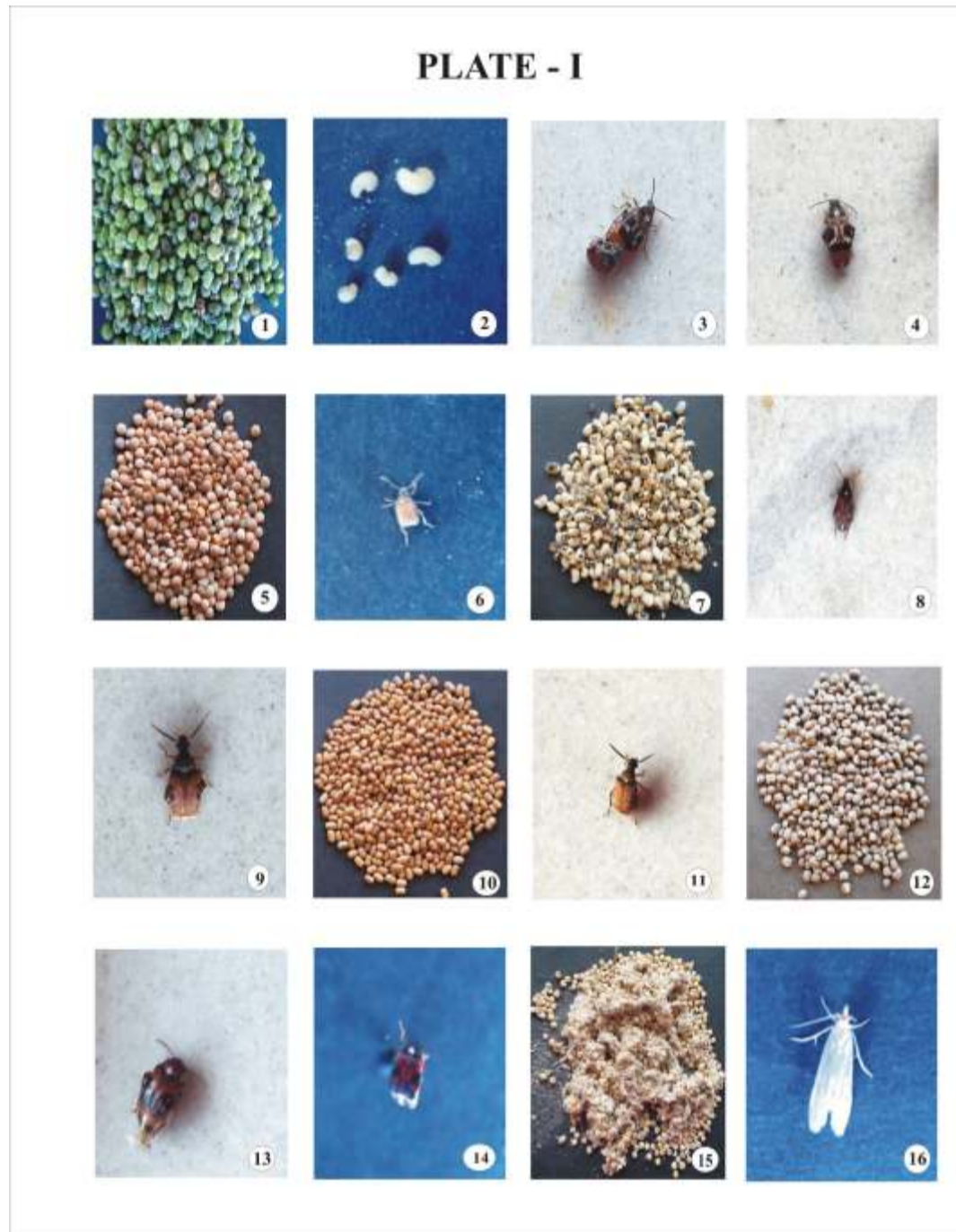


PLATE - II

1. *Oryza sativa*
2. Pupal stage of *Sitotroga cerealella*
3. *Sitotroga cerealella*
4. *Sitophilus oryzae*
5. *Pennisetum americanum*
6. Larvae of *Sitophilus oryzae*
7. *Sitophilus oryzae*
8. *Triticum aestivum*
9. Larvae of *Tribolium castaneum*

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- 10. *Tribolium castaneum*
- 11. *Coriandrum sativum*
- 12. *Lesioderma serricorne*
- 13. *Triticum aestivum*
- 14. *Sitophilus oryzae*
- 15. *Zea mays*
- 16. *Sitophilus zeamais*

PLATE - II



STUDIES ON DIVERSITY OF STORED GRAIN PESTS

Table: 1
Insect pests collected from various commodities from Karad region.

Sr. No.	Order/ Family	Commodities
Order : Coleoptera		
Family : Bruchidae		
1.	<i>Callasobruchus maculatus</i>	<i>Vigna anguiculata, Vigna radiata</i>
2.	<i>Bruchus spp.</i>	<i>Lens esculenta</i>
3.	<i>Callasobruchus spp.</i>	<i>Vigna anguiculata</i>
4.	<i>Callasobruchus chinensis</i>	<i>Vigna aconitifolia</i>
5.	<i>Callasobruchus analis</i>	<i>Vigna mungo</i>
6.	<i>Bruchus spp.</i>	<i>Vigna mungo</i>
Family : Curculionidae		
1.	<i>Sitophilus oryzae</i>	<i>Oryza sativa</i>
2.	<i>Sitophilus zeamais</i>	<i>Zea maise</i>
Family : Tenebrionidae		
1.	<i>Tribolium castaneum</i>	<i>Triticum aestivum</i>
Family : Anobiidae		
1.	<i>Lesiodema serricorne</i>	<i>Corriandrum sativum</i>
Order : Lepidoptera		
Family : Galleridae		
1.	<i>Corsyra cephalonica</i>	<i>Pennisetum americanum</i>
Family : Gelechiidae		
1.	<i>Sitotroga cereallela</i>	<i>Oryza sativa</i>

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