



ECO CHRONICLE
ISSN: 0973-4155
Vol. 12, No. 2, June, 2017
PP: 43 - 49

INCIDENCE OF VEGETABLE CROP PESTS IN HOMEYARDS AND AGRICULTURAL FARM OF KUTTIPPURAM PANCHAYATH, MALAPPURAM, KERALA

T.R. Sobha

P. G. and Reseach Deptment of Zoology, FarookCollege, Kozhikode, kerala, India

Corresponding author: sobharaghav@yahoo.co.in

ABSTRACT

Pest problem is one of the major constraints for achieving higher production in agriculture crops. India loses about 30% of its crops due to pests and diseases each year. Most vegetable crops are subjected to pest damage seeds, roots, leaves, stems and fruits are all susceptible damage range to plant vigor to plant depth and crop loss In the present study the incidence of different insect pests on some of the common vegetables crops cultivated in a homeyard and a local agricultural farm in Kuttippuram Panchayath of Malappuram district were studied. The study duration was from October 2015 to May 2016. This study revealed 16 species of insect species belonging to 16 genera and 14 families and 4 orders from a total of seven frequently cultivated vegetable crops both in home yards as well as agricultural farm.

The maximum species diversity of insect pests recorded on the Order Coleoptera, Lepidoptera and Hemiptera constituting 5 species each. Only one Dipteran species was recorded in this study. *Epilachna dodecastigma*, *Cheatoda cuscucurbitoa*, *Cylasformi carius*, *Bemisia tabaci* *Aphis medicagenis* etc were reported as major pests in accordance with the severity of infestation. While other are recorded as moderate and minor pests. A comparative account on insect pests on two study area also revealed little variation in their distribution and abundance with reference to site characteristics and mode of cultivation and climatic factors. The population of insect pest increases with increase in temperature in both sites. The number of insects is relatively a high in maximum temperature of 42°C.

Key words: Home yard, Agricultural farm, vegetable crops, *Epilachna dodecastigma*, *Cheatoda cuscucurbitoa*, *Cylasformi carius*, *Bemisia tabaci* *Aphis medicagenis*

INTRODUCTION

Vegetables are the important components of daily diet. Vegetables are eaten in various ways as part of main meals and as snacks. The nutritional content of vegetables varies considerably though Human civilization and life is impossible to conceive without plant. Generally they contain little protein or fat and varying proportions of vitamins such as Vitamin A, Vitamin K and Vitamin C, provitamins, minerals and carbohydrates. Vegetables contain a great variety of other phytochemicals. Some of which have been claimed to have anti oxidant, anti bacterial, anti fungal, anti viral and anti carcinogenic properties. Thus vegetables crops provide a cheap source of proteins, vitamins and other elements essential for human health and well being.

These vegetable crops attacked in every season by number of fungal disease, bacteria, virus, insect, pests caused high damage to the production. Insects and pests generally attacked because of their liking and to complete their life

cycle. They damage and are every part of the plant and ultimate cause high economic loss to the farm. Insect, plant association begins with the evolution of insects. Almost half of the insect species are phytophagous and thus depends on plant for the food requirement, others feed upon phytophagous insects and indirectly related with the plants as it is the plant that capture solar energy and use it to make organic molecules from inorganic ones. Half of the insect species depends upon plants directly. Plant tissues are major source of sugar protein fats salts water and vitamin. Most plants tissues provides adequate nourishment for insects although different insects do have different nutritional requirement insects feed on all the parts of the plants. They feed externally or internally as borers or leaf minors. They produce galls and other distributions sucking insects imbibe plant juice and may cause weakening and hollowing. Some insects that do not feed on plant tissues also use plant as shelter and some make

still other use of plants. Most of plants are attacked by hundreds of the insect species similarly a single species of insect may attack more than one plant species on the basis of feeding habits insects may be monophagous, oligophagous and polyphagous. Bhatia and Verma (1994) Carried out the seasonal incidence of major insect pests associated with winter crops of cabbage in Himachal Pradesh and they also reported the incidence of insect pests of cabbage in summer season. The insect and mite pest status of subtropical horticulture crops in Himachal Pradesh was reported by Bhatia and Gupta (2003) Bhagath and Bhat (2011) conducted a study on survey on insect pests damaging vegetable crops in Kashmir valley in India and with some new records. Most vegetables crops are subjected to pest damage seeds, roots, leaves, stems, and fruits are all to susceptible damage range to plant vigour to plant depth and crop loss. The extensive studies on Lepidopterous insects associated with vegetables were conducted in different localities of Aravally ranges of Rajasthan by Gaurav Sharma (2011) and recorded 38 species of lepidopterous insects out of 152 species of lepidopterous insects recorded from India. Thousand types of insects can affect vegetables (Bhat Deen Mohammed et al., 2011).

Anjorin *et al* (2012) conducted a survey of incidence and severity of pests and diseases of okra (*Abelmoschus esculentus*) and egg plant *Solanum melongena*. Ofori *et al* (2014) studied the insect diversity and abundance of twelve accessions of tomato, *Solanum lycopersicon* L. grow in a costal savannah agro-ecological zone. Rudra Pratapsingh and *et al* (2015), conducted a field study of pests of cauliflower in eastern plain zone areas. Different insect pests of cauliflower were noticed, Tobacco caterpillar, etc were thoroughly inspected and different insect pests *spodoptera litura*; Diamondback moth, *Plutella xylostella*; were collected. Each specimen were collected by aerial cabbage caterpillar, *Pieris brassicae*. In the Present paper an attempt was made to reveal the incidence of some insect pests on common vegetable crops cultivated in the field as well as home yard vegetable gardens.

MATERIALS AND METHODS

A field survey was conducted in Kuttippuram panchayath at Malappuram district in the state of Kerala in southern India. The study area of the present study included two selected sites, A Home yard and a local farm area which were designated as site 1, site 2 respectively (plate-1). From these sites temperature and Relative humidity were recorded. The fieldsurvey was undertaken on a period of 8 months from October 2015 to May 2016. The selected areas are known to vegetable growing areas and has suitable environment for the production of vegetable like Amaranthus, Garden pea, Okra, Brinjal, Sweet potato, Bitter guard and cassava which were selected for the present

Plate1- Study area



study. The two sites were visited twice in a week and each part of the vegetables namely leaves, stem fruits bunches were thoroughly inspected and different insect pests were collected. Each specimen were collected by aerial insect net and hand picking. The temperature and the humidity of the two areas were noted with the help of a Thermo Hygrometer. The number of each pests, type of damage caused by it, and plant part affected by the pest are also noted down. The collected insects were killed by using benzene and chloroform and it preserve by using 70% alcohol. The samples were brought to the laboratory for identification. The identification was done by using concerned literatures and with the help of experts from Zoological Survey of India.

RESULTS AND DISCUSSION

This study revealed 16 species of insect pests species belonging to 16 genera and 14 families and 4 orders from the two study areas. The maximum species diversity of insect pests recorded on Order Coleoptera, Lepidoptera and Hemiptera constituting 5 species each. Only one Dipteran species was recorded in this study. (Table 1, fig-

Table.1. Taxonomic classification of insect pests

Sl. No.	Scientific name	Order	Family
1	<i>Aphis medicaginis</i>	Hemiptera	Aphidae
2	<i>Copstoma cribraria</i>	Hemiptera	Plataspidae
3	<i>Riptortus pedestris</i>	Hemiptera	Alydidae
4	<i>Nezara viridula</i>	Hemiptera	Pentatomidae
5	<i>Bemisia tabaci</i>	Hemiptera	Aleyrodidae
6	<i>Cylas formicarius</i>	Coleoptera	Curculionidae
7	<i>Metrioria circumdata</i>	Coleopteran	Chrysomelidae
8	<i>Lixusbr achyrhynus</i>	Coleopteran	Curculionidae
9	<i>Epilachna dodecastigma</i>	Coleopteran	Coccinellidae
10	<i>Gracillaria soyella</i>	Lepidoptera	Gracillaridae
11	<i>Euzopher aperticella</i>	Lepidoptera	Pyralidae
12	<i>Phthorimoebla sigona</i>	Lepidoptera	Pyralidae
13	<i>Eublemma olivacea</i>	Lepidoptera	Noctuidae
14	<i>Clavigrella horrens</i>	Coleoptera	Brentidae
15	<i>Hymenia fascialis</i>	lepidoptera	Crumbidae
16	<i>Chaetodacus cucurbitae</i>	Diptera	Tefritidae

1). Out of 14 families, Cucurlionidae and Pyralidae were the dominant families each represented by 2 genera. Aphidae, Plataspidae, Alydidae, Pentatomidae, Aleyrodidae, Brentidae, Chrysomelidae, Coccinellidae, Gracillaridae, Noctuidae, Crumbidae and Tephritidae representing single genera each..Among the 16 species reported the most predominant and frequent ones were *Aphis medicagenis* and *Cylas formicurius* followed by *Clavigrella scutellaris* and *Epilachna dodecastigma*. Remaining species were less frequent and their percentage of occurrence was low.

These pests cause so many damages to vegetable plants and also affect crop production (Table-2). The lepidopterous insects were reported to be mainly leaf rollers, leaf feeders, pod borers and In India many research works provided valuable information on lepidopterous pests of vegetables.(Gupta,1990.,David,2001., Sharma *et al.*, 2008 Sharma and Ramamoorthy.,2009). In the present study also lepidopterans are found to be as leaf

Table 2. Symptoms of damage caused by insect species collected from vegetables

Sl. No.	Vegetable	Insect species	Symptoms of damage	Pest status
1	<i>Solanum melongena</i>	<i>Euzophera perticella</i>	Leaf rolling	Moderate
		<i>Phthorimoeabla psigona</i>	Leaf eating	Minor
		<i>Epilachnadodeca stigma</i>	Scrapping of leaf by converting as net	Major
		<i>Eublemma olivaceae</i>	Leaf eaters	Minor
2	<i>Momordica charantina</i>	<i>Cheatodacus cucurbitoa</i>	Fruit eaters	Major
		<i>Nezara viridula</i>	Laef sap sucking forming yellowing of leaf	Moderate
3	<i>Amaranthus acathochiton</i>	<i>Lixusbra chyrrhinus</i>	Stem boring causing holes	Moderate
		<i>Hymenia fascialis</i>	Leaf eating and Leaf rolling	Minor
4	<i>Abelmoschus esculuntes</i>	<i>Bemisia tabaci</i>	Colonizing on leaf and by sucking causing yellowish brown spots	Moderate
5	<i>Ipomoea balatus</i>	<i>Cylas formicarius</i>	Leaf eating causing holes on leaf	Major
		<i>Metrioria cirumdata</i>	Stem boring causing yellow intermittent sheaths	Mionr
6	<i>Manihot esculenta</i>	<i>Bemisia tabaci</i>	Colonizing on leaf and by sucking causing yellowish brown spots	Major
7	<i>Pisum sativum</i>	<i>Gracillaria soyella</i>	Leaf eater causing yellowing on sides	Moderate
		<i>Clavigrella scutellaris</i>	Sp sucking causing browning	Moderate
		<i>Aphis medicagenis</i>	Colonizing on leaf causing white powdery spots	Major
		<i>Coptosoma cribraria</i>	Yellow coloration on leaves	Minor
		<i>Riptortus pedestris</i>	Leaf eaters	moderate

feeders, leaf rollers and pod borers. The larva folds the seed and stem borers, leaf scrappers etc. The adult is the leaves longitudinally and feeds within the leaf folds by destructive stage. As the insects feed on the plants' scraping the green tissue. The damaged leaves turn brown, reproductive parts, they can cause significant yield losses. wither, and dry. Coleopterans are found to be sap suckers, Continuous feeding of beetles resulted insignificant higher defoliation on plant at the same time also similar leaf damage reported by Obeng-Ofori et al., (2003). According to Clementine L *etal.*, (2009) these pests bore hole into the leaves and as a consequence reduce the photosynthetic Hemipteran species were leaf eaters causing browning of leaf, leaf weltering, cellulose scrapping etc. Both the adults and nymphs suck the plant sap and reduce the vigor of the plant. In severe infestations, the leaves turn yellow and drop off. In the case of Dipterans the uni foliate leaves show several feeding and oviposition punctures on the upper surface with corresponding light yellow spots, especially in the basal portion of the leaf. Similar crop damage caused by these pests also reported earlier (Hutchison. *et al*, 2011). Diptera species was found as fruit as borer. The young larvae attach themselves to the soft seeds inside the pods, and initially feed on the seed surface. Larvae of these insects feed on legumes as internal feeders and leaf miners with the widest distribution

Fig 1.

Species diversity of insect pests in the present study

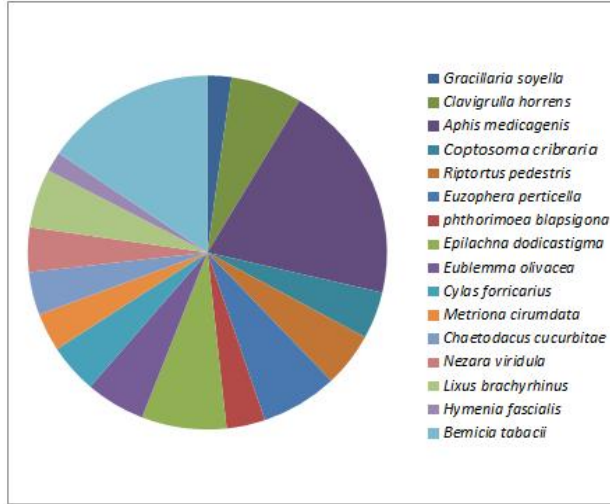


Figure 2. Percentage of occurrence of different orders in site 1 and 2

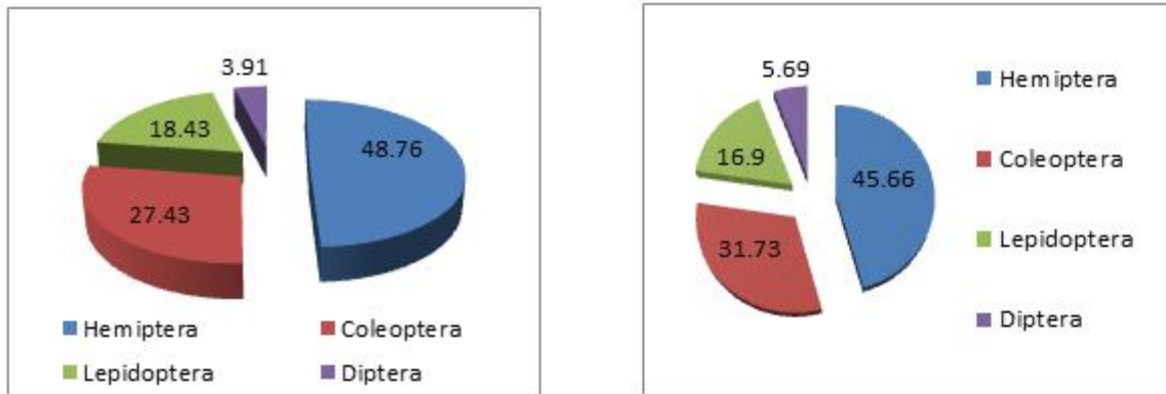


Figure 3. Distribution and abundance of insect pest species in the two sites

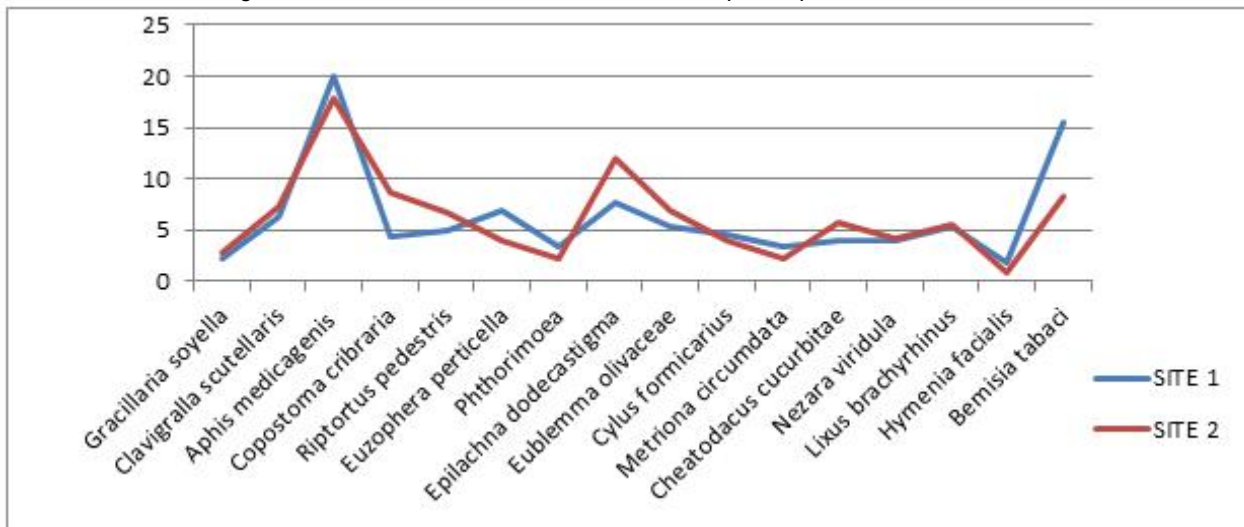


Table 3. Host ranges and relative abundance of insect pests occurred during the survey

Insect / Vegetables	<i>Gracillariya soyella</i>	<i>Clavigrella scutellaris</i>	<i>Aphis medicagenis</i>	<i>Coptosoma cribraria</i>	<i>Riptortus pedestris</i>	<i>Euzophera perficella</i>	<i>Phthorimoea biapsigona</i>	<i>Epilachnado decastrigma</i>	<i>Eublemma olivacea</i>	<i>Cylus formicus</i>	<i>Metriona circumdata</i>	<i>Chaetodacus cucurbitae</i>	<i>Nezara viridula</i>	<i>Lixus brachyrhinus</i>	<i>Hymenia fascialis</i>	<i>Bemisia tabaci</i>
<i>Solanum melongena</i>	-	+	-	-	-	++	+	++ ++	++	-	-	-	-	-	-	+
<i>Momordica charantina</i>	-	+	-	-	-	-	-	-	-	-	-	++ +	++	-	-	-
<i>Amaranthus acanthochiton</i>	-	-	-	-	+	+	-	-	-	-	-	-	-	+++	+	-
<i>Pisum sativum</i>	+	++ +	+++ +	++	++	-	-	-	-	-	-	-	-	-	-	-
<i>Abelmoschus esculentus</i>	-	-	-	-	-	-	-	++	-	-	-	-	-	+	-	++ +
<i>Ipomoea balatus</i>	-	-	-	-	-	-	-	-	-	++ +	++	-	-	-	-	-
<i>Manihot esculenta.</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	++ +

Figure 4. Monthly variation of insect pest population

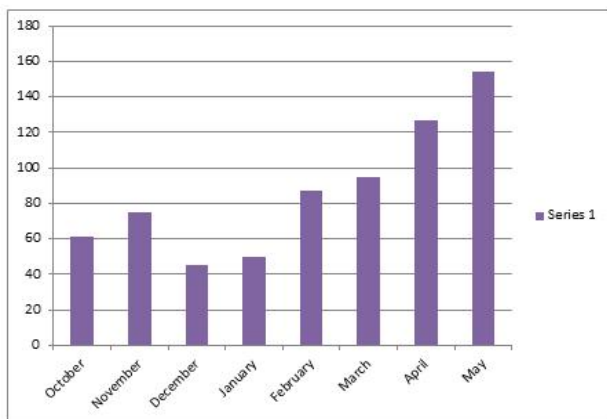
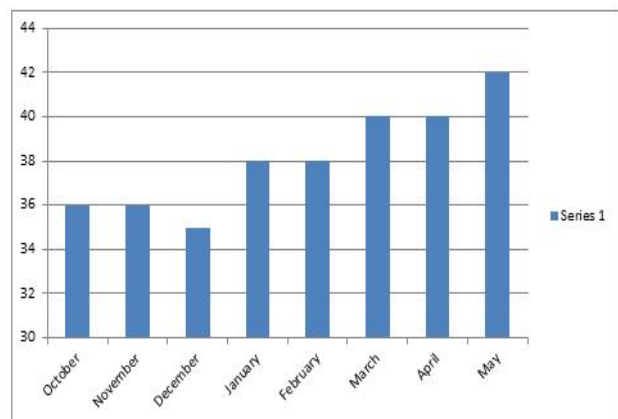


Figure 5. Monthly variation in temperature



and host range, and causes the maximum damage (Talekar 1990.). In the present study based on the intensity and severity of symptoms seven species were found as moderate pests, five of them were major pests and four were minor. The symptoms of damage and their mode of infestation and pest status on different vegetable crops were tabulated and presented in Table 3. The distribution and abundance of insect pests were also found to be related with the host range and host specificity. In the present study *pisum sativum* and *Solanum melongena* showed high host range as it supports maximum number and diverse insects pests and least with *Manihot esculenta* with a single sp of pest (Table 3).

A comparative account on insect pests on two study area also revealed little variation in their distribution and abundance with reference to site characteristics and mode

of cultivation and climatic factors. In site 1 Hemiptera were found to be the dominant order with 5 families comprising 5 species of insects constituting the 48.76% of total insect population, followed with Coleopteran constituting 27.43%, Lepidoptera with 18.43% and Diptera with 3.91% (fig-2). In site 2 also Hemiptera was the dominant order constituting the 45.66% of the total insect population followed by Coleoptera with 31.73%, Lepidoptera with 16.90% and diptera with 5.69% (fig-3). The species wise abundance in two study sites were also presented (figure 4) which clearly indicated that vegetables growing on Site 1 is more susceptible to pest attack compared to that of Site 2, the home yard vegetables. Insects are particularly sensitive to temperature because they are stenotherms (cold-blooded). In general, insects respond to higher temperature with increased rates of development and with less time between generations (Pravitha Reddy, 2013).

Plate 2 Photographs showing the major vegetable pests collected during the study

Order: Coleoptera

Clavigrella scutellaris



Lixus brachyrhinus



Metriona circumdat



Cylas formicarius



Order: Hemiptera

Aphis medicagenis



Copostoma cribraria



Riptortus pedestris



Order: Diptera
Nezera viridulae



Order: Lepidoptera
Chaetodactus cucurbitae



Eublemma olivacea



Plate 3. Photographs showing different development stages of *Epilachna dodecastigma*

Eggs



Larva stage



Damage caused by larva



Adult



Damage caused by Adult



Like that in the present study also the population of insect pest increases with increase in temperature in both sites. The number of insects is relatively a high in maximum temperature of 42°C.) So there should be a increasing trend of pest population with increase of temperature. Normally pest outbreak were reported with flourishing temperatures. Insect population showed a negative trend with that of increasing humidity even though the monthly variation in humidity is of less significance as there is much little variation in humidity is noted during the study period (figures 4 & 5).

CONCLUSION

This study revealed 16 species of insect species belonging to 16 genera and 14 families and 4 orders. The maximum species diversity of insect pests recorded on Order Coleoptera, Lepidoptera and Hemiptera constituting 5 species each. Only one Dipteran species was recorded in this study. A comparative account on insect pests on two study area also revealed little variation in their distribution and abundance with reference to site characteristics and mode of cultivation and climatic factors. The population of insect pest increases with increase in temperature in both sites and the humidity is less significant.

ACKNOWLEDGEMENT

The authors are greatly acknowledged to the chief scientist and entomologist, Dr. Sajeev and Research fellows of KFRI, Peechi for help in identification of insect species in this study.

REFERENCES

- Anjorin, S.T., Jolaoso, M.A. and Golu, M.T. (2012) A survey of incidence and severity of Okra (*Abelmoschus esculentus*) and egg plant (*Solanum melongena* L.) in Abuja, Nigeria. American journal of Research Communication. 1(11):333-349.
- Bhatia, R. and Gupta, D. (2003), "Insect and mite pest status of subtropical horticultural crops in Himachal Pradesh", Journal of Insect Science, Vol.16, No.2, pp. 1-8.
- Bhatia, R. and Verma, A.K. (1994). Seasonal incidence of major insect pests associated with winter crop of cabbage in Himachal Pradesh. Annals of Agricultural Research. 15(2): 222-225.
- Bhagat, R. C., Bhat, D. M. and Qureshi, A. (2011), "A survey of insect pests damaging vegetable crops in Kashmir valley (India), with some new records", Journal Of Entomological Research, 35(1):85-91.
- Clementine, L., Dabire-Binso and Malick, N. (2009), "Preliminary studies on incidence of insect pests on Okra, *Abelmoschus esculentus* L. Moench in central Burkina Faso", African Journal of Agricultural Research. 4(12):1488-1492.
- David, B.V. (2001). Elements of economical entomology. Popular Book Depot. Chennai, 562pp.
- Gupta, S. L. (1990). Key for the identity of some major lepidopterous pests of vegetable in India. Bulletin of Entomology. 3(1): 69-84.
- Gourav Sharma (2011) "Studies on lepidopterus insects associated with vegetables in Aravally ranges, Rajasthan, India". Biological forum-An international Journal 3(1): 21-26.
- Hutchison, W. D., Bolin, P. C. and Hines, R. L. (2011), "Diamondback moth". Department of Entomology, University of Minnesota.
- Obeng-Ofori, D. and Sackey, J. (2003), "Field evaluation of non-synthetic insecticides for the management of insect pests of Okra (*Abelmoschus esculentus* L. Moench) in Ghana". Ethiopian J. Sci, Vol. 26, pp. 145-150.
- Ofori, E.S.K., S. Yeboah, J. Nunoo, E.K. Quartey, W. Torgby-Tetteh, E.K. Gasu and E. A. Ewusie (2014), "Preliminary studies of insect diversity and abundance of twelve accessions of tomato, *Solanum lycopersicon* L. grown in a coastal savannah Agro-ecological zone. Journals of Agricultural Science, Vol.6, No. 8.
- Parvatha Reddy, P. (2013). Impact of climate change on insect pests, pathogens and nematodes Pest Management in Horticultural Ecosystems, Vol. 19, No. 2 pp 225 - 233.
- Rudra Pratap Singh, Mukesh Kumar Misra, Umesh Chandra and Narendrapratap (2015). A Field Study of Pest of Cauliflower in Plain Zone Areas. Plant Archives. Vol.15. No.1, pp.561- 564.
- Sharma, G. and Ramamoorthy, V.V. (2009). A check list of lepidopterous pests of vegetable in India. www.zsi.gov.in/zoological survey of India /zsi-data check list/index.html pp.1-14.
- Sharma, G. and Ramamoorthy, V. V. (2008). Biodiversity of lepidopterous insects associated with vegetables in India - A study. Indian Journal of Entomology. 70(4):369-384.
- Talekar, N. S. (1990). Agronomy of flies of food legumes in the tropics, Wiley Eastern Limited, Delhi, India. p.297.