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# INSECT PEST COMPLEX OF PEA CROP (*PISUM SATIVUM* LINN.) AND THEIR SUCCESSION IN AGRO-ECOSYSTEM OF MANIPUR

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The studies on insect pest complex and their succession conducted under the prevailing agro-climatic conditions of Manipur during 2004-2005 revealed that 19 insect pests belonging to 6 orders and 13 families were recorded to infest the pea crop. Jassid, (*Empoasca* sp.), aphid (*Myzus persicae* Sulzer) and semiloopers (*Plusia signata* Fabr., *Thysanoplusia orichalcea* Fabr.) appeared first while pea pod borer (*Lampides boeticus* Linn.), thrip (*Megaleurothrip distalis* (Karny)) and pea aphid (*Acrythosiphon pisum* (Harris)) started infestation in the third and first week of December and January, respectively. Pea pod borer, thrip and pea aphid were recorded as the serious pest while *M. persicae*, semilooper and pea leaf miner, *Phytomyza horticola* Glover noticed as the moderate pests of pea.

**Key words :** Agro-ecosystem, pea crop, insect pest complex, pest succession..

## INTRODUCTION

Pea is one of the best-known grain legumes because of its universal popularity as a fresh vegetable and for dry seed purposes. In India, the total area under pea cultivation is 0.58 million hectare with an annual production of 600,000 mt (Anonymous, 1998), having per hectare yield of 1034 Kg. Although, a marked increase in area and productivity of pea has been obtained at the state as well as country level in past few decades, it is still very far from being satisfactory. Among the major problems known to limit the yield of pea crop, incidence of insect-pest are main constraints. Various insect pests attack the crop right from germination to harvesting stage. The researchers at the state have under taken the limited work on pest complex of pea; therefore, the present studies were undertaken.

## MATERIALS AND METHODS

In order to study the insect pest complex of pea crop, survey was conducted in different pea growing areas in the plain of Manipur during 2003-05. Population assessment of insect pests was conducted in the experimental field, Department of life Sciences, Manipur University. Observation on the incidence of insect pests was made at weekly interval throughout the various stages of plant growth on sixty plants randomly selected from the four plots measuring 36sq. m. each.

## RESULTS AND DISCUSSION

***Pest complex*** **:** The pea crop was found to infest by 19 species of insect pests belonging to 6 orders and 13 families with the varying intensity of attack and period of activity (Table I). These pests were associated to pea plant infesting leaf, shoot, stem, flower and fruit part of the plant. Among these pests, pod borer, *Lampides boeticus* (Linn.) was recorded as the

**Table I :** Insect pest-complex of pea crop.

| S.No. | Insect pests | Pest status | Nature of damage | Characteristics of the pests |
|---|---|---|---|---|
| A | **Hemiptera** | | | |
| 1. | Fam. Aphididae *Acrythosiphon pisum* (Harris) | Regular | Both nymphs and adults attack young shoots for sap sucking. Honeydew secretion promotes sooty mould growth on leaves. Acts as vector of many viral diseases. | Body elongated, pale green, pink or yellow in colour. Antennae about as long as the body; eyes are red. |
| 2. | *Aphis craccivora* Koch | - do - | - do - | Body oval in shape with shinning dark-brown or black in colour. |
| 3. | *Myzus persicae* (Sulzer) | - do - | - do - | Body slightly elongated, shiny green in colour with comparatively longer antennae and siphunculi. |
| 4. | Fam. Pentatomidae *Nezara viridula* Linn. | Sporadic | Both nymphs and adults suck the sap from leaves and pods causing plant to wilt and dry up. | Adult is a uniform leafy green in colour with a lighter blotch behind the head. |
| 5. | Fam. Aleyrodidae Cotton whitefly, *Bemisia tabaci* (Linn.) | Occasional | Both nymphs and adults suck sap lowering the plant vitality, honey dew secretion promotes the growth of sooty mould, known be act as vector of many viral diseases. | Adult are minute about 1 - 1.5 mm long with yellowish body covered with white waxy powder. |
| B | **Lepidoptera** | | | |
| 6. | Fam. Lycaenidae Pea blue butterfly, *Lampides boeticus* (Linn.) | Regular | The larva bores into the buds, flower and inside the developing grains. | Adults is medium sized butterfly with violet metallic blue to dusty blue coloured wings. The tail of hindwing is black & tipped with white. Larva yellowish green in colour with black head & dark brown patch on the prothorax &cylindrical body with scattered hair The full-grown larva is yellowish green to yellowish red or sometimes light purple in colour. |

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| 7. | Fam., Phycitidae Lentil pod borer, *Etiella zinckenella* Treitschke | Sporadic | The young larvae bore the way into the floral parts and green pod and feed inside the flower and developing pod. | The adult is a greyish brown snout moth. It has a distinct pale white band along the costal margin of the forewings. The hind-wing is semitransparent with a dark marginal line. The larva is reddish pink, while the pleural and ventral surface of the body are pale green or creamy white. |
| 8. | Fam. Plutellidae Diamond back moth, *Plutella xylostella* Linn. | Sporadic | Caterpillar make small holes in the leaves and soiled the leaves with excreta | Moth is small, greenish brown and has conspicuous pale white spots on the forewings which form diamond patterns when they lie flat over the body, hindwing with frings of long hair. Larva is yellowish green attenuated at both ends with minute short hairs. |
| 9. | Fam. Arctiidae Bihar hairy caterpillar, *Spilarctia obliqua* Walk. | Sporadic | Caterpillar feed on leaves often defoliating the plant completely. | Moth dull yellow with black spots, larva orange coloured with broad transverse band with tufts of yellow hairs that are dark at both ends. Gregarious in early stages. |
| 10. | Fam. Noctuidae Semilopper, *Plusia signata* Fabr. | Regular | Caterpillars are defoliator. | Moth has glistening forewing with a white spots with 3 pair of prolegs, green in colour with several wavy whitish longitudinal lines and a broader whitish longitudinal lateral strips. |
| 11. | Semilooper, *Thysanoplusia orichalcea* Fabr. | Regular | Caterpillars are defoliator. | Moth are light reddish brown with a prominent triangular golden yellow patch on forewings. Larva bright green with white longitudinal strips on the back. |
| 12. | Tobacco caterpillar, *Spodoptera litura* (Fabr.) | Sporadic | Caterpillars are defoliators. | Moth with brown forewings with irregular white markings, hind wings white with a brown patch along the margin. Larva velvety black or greenish black |

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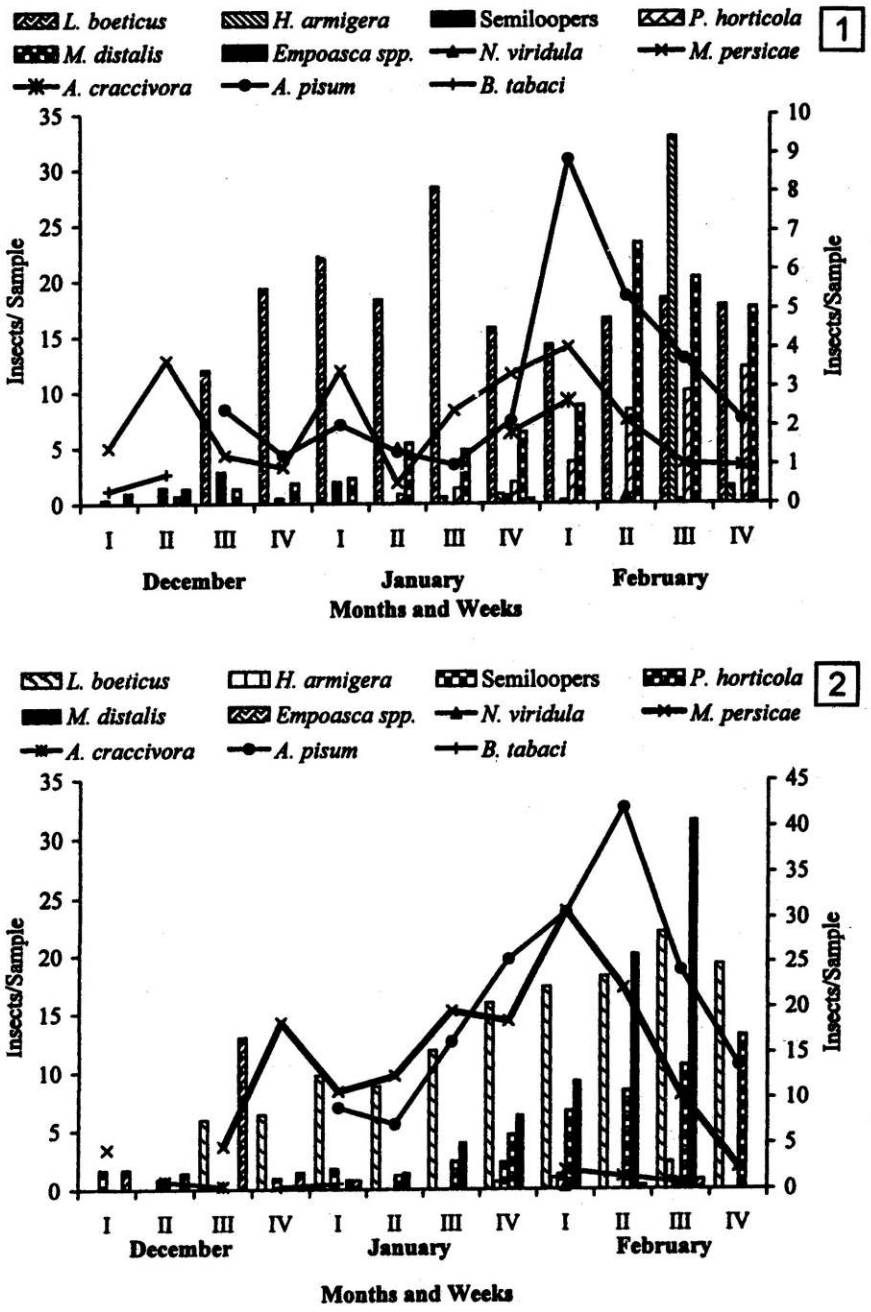
| | | | | with dark markings, gregarious in the early stages. |
| 13. | Cut worm, *Agrotis ipsilon* Huf. | Sporadic | Caterpillars cut young plants at ground level. | Moth with grey forewing with brownish black markings, hindwings hyaline with dark terminal frings. Larva stout, smooth, blackish brown and greasy. |
| 14 | *Helicoverpa armigera* (Hubner) | Occasional | Caterpillars feed on the tender leaf, bud and pods. | Adult moth has pale brown colour on fore wing with the marginal series of dots. Whereas, the hind wings was lighter in colour with dark coloured patch at the apical end. Larva is pale brown with lighter brown coloured head. Longitudinal stripes present on the body. |
| C | **Coleoptera** | | | |
| 15. | Fam. Chrysomelidae Flea beetle, *Phyllotreta nemorum* Goeze. | Sporadic | Adult beetles make small holes in the leaves by feeding. | Adult tiny beetle with enlarged hind femur. |
| D | **Diptera** | | | |
| 16. | Fam. Agomyzidae Pea leaf miner, *Phytomyza horticola* Glover | Regular | Maggots mine the leave and hinder photosynthetic activities | Adults are small fly with yellowish frons. |
| 17. | Fam. Cicadellidae Green jassid *Empoasca* spp. | Sporadic | Both nymphs and adult damage the leaves by sucking sap. | Adults is greenish yellow acquiring a reddish tings in colour. |
| E | **Thysanoptera** | | | |
| 18. | Fam. Thripidae Thrips, *Megaleurothrips distalis* (Karny) | Regular | Both nymph & adult cause damage to leaves by lacerating the epidermal tissue and gradually destroy the leaves. In flower they feed upon pollen. | The adults thrips are small having fringed wings. |
| F | **Orthoptera** | | | |
| 19. | Fam. Acrideidae Short horned grasshopper, *Atractomorpha crenulata* Fabr. | Mild | Both nymphs and adults feed on leaves. | Adults and nymphs green in colour with typical slanted face and pointed head. |

most serious pest of pea while aphid (*Acrythosiphon pisum* (Harris), leaf minor, *Phytomyza horticola* Glover, semiloopers, *Thysanoplusia orichalcea* Fabr. and *Plusia signata* Fabr. were noticed as moderate pests, which sometimes assumed major pest status also. The other pests were of miner importance (Table I).




Figs. 1-2 : Pest succession in pea crop. **1**. During 2003-04; **2**. During 2004-05.

Earlier, Ram *et al.* (1981) reported 7 insect pests belonging to 3 orders and 6 families attacking pea crop from Manipur, out of which 2 pea pod borers (*Etiella zinckenela*; *Catochrysops cnejus* Gb.) were reported as major pests. Several workers (Lakshminarayan, 1980; Mehta & Chandel, 2000) reported that, as many as 33 insect pests attack pea crop, of these, the major pests include pod borer, *E. zinckneella* Treits, pea leaf miner, *P. horticola* Meigen; black aphid, *Aphis craccivora* Koch.; leaf roller, *Hedylepta indicata* Fabr.; pea leaf minor *P atricornis* Meigen; leaf miner *Chromotomyis horhicola* Gour; weevil, *Sitona crinitus* Herbst.; stem fly, *Ophiomyia phaseoli* (Tryon) and pea lopper, *P. orichalcea* Fabr.

***Pest succession*** : The observations on the pest succession revealed that the appearance of jassid (*Empoasca* spp.), aphid (*M. persicae*) and semilooper (*P. signata*; *T. oricalsia*) started during first week of December first (Figs. 1 & 2). The population of jassids was low and irregular pattern of incidence was found, highest being recorded in the third week of December (Fig. 1). The infestation of aphid (*M. persicae*) was observed during third week of December and continued till third week of February with its peak population during second week of February. Other two aphids *i.e. A. craccivora* and *A. pisum* started appearing from second week of December and highest population was recorded during first and second week of February, respectively (Fig. 2). However, *A. craccivora* observed irregular pattern of incidence while *A. pisum* remained active through the cropping season. Meanwhile, semiloppers were observed as a regular pest right from the early vegetative stage (first week of December) till crop maturation period (first week of February). The pod borer, *Helicoverpa armigera* appeared in the field at the flowering and pod formation stages of the crop i.e., last week of January and continued upto third week of February. The leaf miner and thrip were found to appear in the vegetative stage of the crop and remained upto the last week of February. The pea pod borer, *L. boeticus* appeared in the field from third week of December and its activity was increasing gradually with its maximum infestation during third week of January (2003-04) and February (2004-05) and last upto the end of the cropping period (Figs. 1 & 2). The other insect pests were found as occasional and appeared scantly.

Prasad *et al.* (1983), reported a total of 19 insect species infesting the pea crop from seedling to pod maturation stage in Delhi. Srivastava & Singh (1972) observed that maximum incidence (70.50 %) of pea leaf miner was recorded in March and minimum of 40% in December at Kanpur. Saha (1990) mentioned that the infestation of semilopper, *P. orichalcea* started from December and remained upto March. Thrips have been observed attacking peas right from germinating to crop maturity stage (Ananthakrishnan, 1973). The incidence of *A. pisum* appeared from late February till crop harvesting (Chhabra *et al.*, 1993). Observation made by Shantibala & Singh (2003), reported that *L. boeticus* started appearing in the field from third week of January and remained up to first week of March.

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