

TO STUDY THE SURVEY OF INSECT PESTS ASSOCIATED WITH FIELD (CEREAL) CROPS OF KASHMIR

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ABSTRACT

The insect pests have been reported to infect but only few are serious and require management. Among these, the most serious pests are the stem borers, armyworms, cutworms, aphids etc. The important pests affecting different stages of these crops (Rice, Maize & wheat) are listed below followed by brief explanation. Stem borer a very serious pest of maize found throughout in India. The damaging stage of the pest is larvae. The eggs hatch in about two to five days. The freshly hatched caterpillars migrate towards the central shoot where they first feed on the tender leaves for some time. Later on they bore into top internodes and move downwards. In case of younger plants, the growing point and base of central whorl gets badly damaged resulting into the drying up of the central shoot. It is commonly known as 'dead heart'. This condition, however, does not appear when the plant is attacked in the later stages. Cutworms are the larvae (caterpillars) of several species of night-flying moths in the family Noctuidae. The larvae are called cutworms because they cut down young plants as they feed on stems at or below the soil surface. There are also species of climbing cutworms that move up plants and feed upon foliage, buds and shoots. The adults are night-flying moths and do not cause damage. As general feeders, most cutworms attack a wide range of plants. Some common vegetable hosts include asparagus, bean, cabbage and other crucifers, carrot, celery, corn, lettuce, pea, pepper, potato, and tomato. In addition, a few species feed on turf grass. An aphid, also known's *plant lice*. These are small sap-sucking insects, and members of the super family Aphidoidea. Aphids are among the most destructive insect pests on cultivated plants in temperate regions. The damage they do to plants has made them enemies of farmers and gardeners the world over; though from a zoological standpoint they are a highly successful group of organisms. Their success is due in part to the asexual reproductive capabilities of some species. About 4,400 species of 10 families are known. Historically, far fewer families were recognized, as most species were included in the family Aphididae. Around 250 species are serious pests for agriculture and forestry as well as an annoyance for gardeners. They vary in length from 1 to 10 millimeters (0.04 to 0.39 in).

Key words - Stem Borer (*Chilo partellus*), Cutworm ; (*Agrotis ipsilon*) Aphides :(*Rhopalosiphum spp*)

I.INTRODUCTION

Agriculture is the most important industry of the people of Jammu and Kashmir. Even those engaged in other industries depend on agriculture for raw material. About 80% people in the State are cultivators in one form or the other. The total area of the State according to the 1992 record of India is 24.15 lakh hectares. Out of this area 138, 6867 Sq. K.ms. are rural and only 305.4 Sq. Kms are urban. This signifies that the entire State of Jammu and Kashmir is rural with 6503 villages. Out of the total area of 24.15 lakh hect. Agricultural statistics are available only for about 8.26 lakh hect. The rest of the area is under forests and mountains.

STATUS OF CEREAL CROPS IN J&K:

1. Rice. Cultivation of rice requires hot and moist climate. It is a Kharief crop and is sown in March-April and harvested in Autumn. Sufficient water must cover the fields. It is grown mostly in the valley of Kashmir at 2100 meters above sea level. Total area under rice cultivation in the valley of Kashmir is 374000 acres having a yield of 25.5 quintals per acre.

2. Wheat. It is a rabi crop and its plant requires a cool and somewhat moist climate in the beginning and warm and dry weather at the harvest time. The average rainfall should be between 50 to 70 cms. It is sown in August and harvested in March, April. It is cultivated in the entire Outer Plain and the Outer Hills. Important wheat producing areas of Kashmir are, Kulgam, Bandipora, Baramulla, Anantnag etc. Total area under wheat cultivation in Kashmir is 78000 acres. **3. Maize.** It requires hot dry climate. Rainfall required for maize varies from 75 cms to 125 cms. It is sown in May-July and harvested in August-November. It is cultivated on Karewa lands in the valley of Kashmir on about 303,000 acres. **GRASSHOPPERS: (Acrididae: Orthoptera):-** Grasshoppers are relatively large insects that are capable of doing considerable damage in a very short time. Large numbers of grasshopper nymphs can develop in tall weedy areas, attracting little attention. However, when they become winged adults, they can fly greater distances and suddenly appear in crop fields. Nymphs may consume the entire seedling. On more mature plants, both nymphs and adult grasshoppers eat irregular holes in the leaves. Adult grasshoppers will also feed on pods. **RICE SKIPPERS (*Parnara guttata*):-** The rice skipper is a minor pest of rice, with extensive distribution in rice growing regions. Damage is caused by larvae that defoliate the rice plants. The newly hatched larvae feed on tender leaves. Adults typically visit flowers and hold their wings together while feeding. They hold their wings partially open while resting, with the front wings and hind wings held at different angles. This adult is daintily sipping nectar from a Lantana camera floret. **Stem Borer (*Chilo partellus*):** Stem borer a very serious pest of maize found throughout in India. The damaging stage of the pest is larvae. The eggs hatch in about two to five days. The freshly hatched caterpillars migrate towards the central shoot where they first feed on the tender leaves for some time. Later on they bore into top internodes and move downwards. In case of younger plants, the growing point and base of central whorl gets badly

damaged resulting into the drying up of the central shoot. It is commonly known as 'dead heart'. This condition, however, does not appear when the plant is attacked in the later stages.

II.MATERIAL AND METHODS:

The material used and methodologies followed in conducting studies on “Seasonal incidence and management of insect pests in maize” are described here as under. An extensive survey will be conducted in districts, Srinagar, Anantnag and Kulgam of Kashmir valley (India) in order to study the occurrence of insect pests associated with field crops. In each district, two locations will be selected to be surveyed. In district Srinagar, the locations are Batmaloo, Shalimar & Nishat, while in district Kulgam & Anantnag the locations are Wanpoh, Ashmuji, Qaimoh & Khudwani. The survey will be conducted at weekly intervals on different crops such as rice, wheat & maize. Roving survey will be undertaken to record the different insect pests like stem borer, grasshoppers, rice skippers, armyworm, cutworm, aphid and their natural enemies. In each location, once one spot will be selected for the purpose of counting average incidence of different insect pests. For sampling, 25 plants will be randomly selected in each field, and observed for counting the number of plants infested by grasshoppers, stem borer, armyworm and cutworm. The per cent infestation will be calculated by using the following formula.

$$\text{Per cent infestation} = \frac{\text{Number of infested plants}}{\text{Total No. of plants}} \times 100$$

The number of insects will be counted from one sq cm leaf area on three leaves per plant using five plants for each observation.

Identification of specimens Different insect pests will be collected, reared till adult stage, killed and preserved as per the standard protocol for different types of insects. The different insect pests and natural Enemies will be identified by Division of Entomology, SKUAST Kashmir (J&K).

III.RESULTS

INSECT PESTS OF RICE: GRASSHOPPERS: (Acrididae: Orthoptera):-Grasshoppers are relatively large insects that are capable of doing considerable damage in a very short time. Large numbers of grasshopper nymphs can develop in tall weedy areas, attracting little attention. However, when they become winged adults, they can fly greater distances and suddenly appear in crop fields. Nymphs may consume the entire seedling. On more mature plants, both nymphs and adult grasshoppers eat irregular holes in the leaves. Adult grasshoppers will also feed on pods.

There are three stages in the grasshopper life cycle — the egg, nymph, and adult. The female lays the eggs in the soil and surrounds the eggs with a frothy liquid that hardens to form a protective structure or “pod”. Typically, a

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female grasshopper will lay about 100 eggs during the summer and fall. Egg pods are deposited in the upper few inches of soil in grassy areas of uncultivated land such as roadsides, field margins, and pastures. A long, warm autumn favors better nutrition and increased egg-laying by grasshoppers. Winter is spent in the egg stage. Hatching time is influenced by temperature, with earlier hatching occurring after a warm percent yield reduction. Defoliation of 20 percent during the pod-forming and filling stages will result in similar yield reductions.

RICE SKIPPERS (*Parnara guttata*):-

The rice skipper is a minor pest of rice, with extensive distribution in rice growing regions. Damage is caused by larvae that defoliate the rice plants. The newly hatched larvae feed on tender leaves. Adults typically visit flowers and hold their wings together while feeding. They hold their wings partially open while resting, with the front wings and hind wings held at different angles. This adult is daintily sipping nectar from a Lantana camera floret. The rice skipper belongs to the family Hesperidia. The common English name refers to their quick, darting flight. There are over 3500 recognized species of skipper and they occur worldwide, with the greatest diversity in the tropical regions of Central and South America and found in rice fields of Kashmir. Skippers have the antennae clubs hooked backward like a crochet hook, while regular butterflies have club-like tips to their antenna.

INSECT PESTS OF MAIZE & WHEAT:

Over 130 insect pests have been reported to infect but only few are serious and require management. Among these, the most serious pests are the stem borers, armyworms, cutworms, aphids etc. The important pests affecting different stages of these crops (Rice, Maize & wheat) are listed below followed by brief explanation.

Stem Borer (*Chilo partellus*): Stem borer a very serious pest of maize found throughout in India. The damaging stage of the pest is larvae. The eggs hatch in about two to five days. The freshly hatched caterpillars migrate towards the central shoot where they first feed on the tender leaves for some time. Later on they bore into top internodes and move downwards. In case of younger plants, the growing point and base of central whorl gets badly damaged resulting into the drying up of the central shoot. It is commonly known as 'dead heart'. This condition, however,

Does not appear when the plant is attacked in the later stages.

ARMYWORM: (*Mythimna separata*)

Several species of armyworms can be found in the Midwest every year. However, the development of economically damaging populations depends on a number of factors such as; cropping practices, insect migration patterns, parasites and predators, weather conditions, etc. For example, several weeks of cool wet weather in the spring favour armyworm development and reduce the normal activity of parasites and predators, thus influencing the growth of armyworm populations. The adult armyworm is a pale brown moth with a white dot in the centre of each forewing. The young larva is green in colour and moves about in a looping motion. A full-grown larva is dull-green to brown in colour with alternating light and dark stripes running the length of its body. Upon reaching larval maturity, it is about 1-1/2 inches (38 mm) long. The larvae feed primarily on grain crops and grasses, attacking other plants only when preferred foods are not available. Infestations usually

develop in grass pastures, fence rows, roadsides and in small grain fields where crops have lodged or are matted against the ground. Once the larvae have consumed the readily available food, or small grains mature, they move into other crops, most notably corn. This usually happens during May and early June. An exception to this pattern may develop in no-till corn fields where cover crops are used, or in corn fields with many grassy-type weeds. Armyworm moths are attracted to the grasses in these fields for ovipositor. When the larvae hatch in these fields, they can immediately cause damage throughout the field. This is in contrast to their appearance along the edges of tilled corn fields.

CUTWORMS: (*Agrotis ipsilon*) Cutworms are the larvae (caterpillars) of several species of night-flying moths in the family Noctuidae. The larvae are called cutworms because they cut down young plants as they feed on stems at or below the soil surface. There are also species of climbing cutworms that move up plants and feed upon foliage, buds and shoots. The adults are night-flying moths and do not cause damage. As general feeders, most cutworms attack a wide range of plants. Some common vegetable hosts include asparagus, bean, cabbage and other crucifers, carrot, celery, corn, lettuce, pea, pepper, potato, and tomato. In addition, a few species feed on turf grass.

Life Cycle

Some cutworms migrate into the state from the south each year. However, other species, including, dingy cutworm, bronzed cutworm, and glassy cutworm are native to Minnesota and overwinter as eggs or larvae. Female moths can lay hundreds of eggs, singly or in small clusters. They typically deposit them on low-growing plants and on plant residue. Migrating moths lay eggs on the soil and the larvae hatch to feed on plants. Young larvae feed on the foliage or small roots of weeds or crops until they reach about 1/2 inch in length. Emerging or newly emerged weeds can be very attractive sites for egg laying and feeding by small larvae. At this stage, they can begin feeding on seedling stems, either cutting through them or burrowing into them. Corn, peppers, tomatoes, beans, and the crucifer family are common hosts, but they will attack many kinds of herbaceous plants. Cutworm larvae grow as large as two inches long. They may go through as many as three generations per year. Native cutworms overwinter in weedy areas, grassy fields or pastures. It is often in these areas and along field borders where problems arise. If weeds are permitted to grow in the fall after crop harvest and the fall and winter seasons are mild, large numbers of cutworms may survive to attack vegetables in the spring. Cutworm abundance and development is greatly affected by weather, especially rainfall. Moths mate and lay eggs from early spring (black cutworm) to late summer/fall (dingy, glassy, and bronzed cutworm), beginning the next generation.

Damage: Most cutworm damage occurs on vegetable seedlings early in the season when plants are small and have tender tissue. Although cutworms are active throughout the summer, they are rarely a problem after spring. Cutworm populations can vary greatly from year to year and, when numerous, can devastate a garden. Most of the damage caused by cutworms occurs when they chew stems of young plants at or slightly above or below the soil line. Sometimes the severed plants will drop into their burrows. Some cutworms, e.g. black,

bronzed, and army cutworms, can be very injurious, attacking and cutting new plants nightly. Climbing species of cutworm, (e.g., variegated cutworm) can climb the stem of trees, shrubs, vines, and garden plants and eat the leaves, buds and fruit. Other species, such as glassy cutworms, remain in the soil and feed upon roots and underground parts of the plant.

APHIDS: - (*Rhopalosiphum spp.*) Aphids are also known as *plant lice*. These are small sap-sucking insects, and members of the super family Aphidoidea. Aphids are among the most destructive insect pests on cultivated plants in temperate regions. The damage they do to plants has made them enemies of farmers and gardeners the world over, though from a zoological standpoint they are a highly successful group of organisms. Their success is due in part to the asexual reproductive capabilities of some species. About 4,400 species of 10 families are known. Historically, far fewer families were recognized, as most species were included in the family Aphididae. Around 250 species are serious pests for agriculture and forestry as well as an annoyance for gardeners. They vary in length from 1 to 10 millimeters (0.04 to 0.39 in).

Distribution: This pest is found distributed worldwide in parts of Europe, Asia, Africa, North America, Central America and Caribbean and South America. In India it is reported from Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Punjab, Rajasthan, Uttar Pradesh and West Bengal. In J&K several species of aphids are found in different areas.

Nature of damage: A major pest of cereal crops in the spring. Heavy infestations can cause a reduction of the number of grains per ear and thus a noticeable reduction of the yield. Sooty moulds develop on the honeydew which they secrete. This aphid is also a vector of the barley yellow dwarf virus (BYDV).

Life history: Primary hosts of this aphid belong to the genus *Pubus*. Secondary hosts mostly belong to the *Poaceae* (=Gramineae), including grasses like cocksfoot grass, and also cereals viz., oats, wheat, rye, barley. Winter eggs are laid on the straw of graminaceous plants and hatch in late winter, giving rise to several generations of apterous, virginoparous fundatrigeniae. Winged aphids emerge, spreading to other graminaceous plants and developing on the uppermost leaves before moving to ears as soon as these emerge. When populations are abundant or when the ripening grain hardens, winged aphids appear in a few days, leaving to create new colonies on *Poaceae* which are still green. During mild winters, this species survives parthenogenetically on new growth of winter cereals and other *Poaceae*.

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