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DISEASES AND INSECT PEST MANAGEMENT STRATEGIES IN FIELDPEA

Popular Article

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ABSTRACT

Diseases and insect pests are the major bottleneck to attain the full potential of productivity in fieldpea. It has been witnessed that during 1970's, when the area of fieldpea reduced to just half due to wide spread occurrence of only one disease *i.e.* powdery mildew. Therefore adoption of proper management practices and available resistant varieties for respective diseases and insect pests is the best strategy to avoid yield damage and to get higher yield. In this particular article we just elaborated about major diseases and insect pests and their management strategies.

Introduction

Fieldpea (*Pisum sativum* L.) is the one of the most important cool season food legume crops in the world and occupies a very prominent place because of its high productivity and multiple uses. In India, the crop is being cultivated in northern and central parts of the country. It is an important *rabi* pulse crop grown in about 0.97 m ha with annual production of 0.89 m tonnes. The major fieldpea growing states are Uttar Pradesh, Madhya Pradesh, Jharkhand, Bihar, Assam and Maharashtra. The average productivity of this crop has increased considerably over the years which is now to the tune of 1t /ha that is very much lower as compare to other countries likely France (>4300 kg/ha), Germany (>3000kg/ha), USA (>2100 ka/ha) and Canada (>2100 kg/ha). The reason behind low productivity of pea is its susceptibility to several diseases and insect pests. The fungal, bacterial, viral and nematode pathogen causing various diseases and insect-pests affecting the crop at different stage of its growth is given in Table1.

Table 1. Major diseases and insects of fieldpea

Sl.No.	Biotic Stresses	Causative agents
1.	Rust	*Uromyces fabae*
2.	Powdery Mildew	*Erysiphe polygoni*
3.	Downy Mildew	*Perenospora pisi*
4.	Seedling rot	*Rhizoctonia solani*
5.	Aschochyta blight	*Aschochyta pinodes*
6.	Stem rot	*Sclerotinia scleriotiorum*
7.	Fusarium wilt	*Fusarium oxysporum f. Sp. pisi*
8.	Pea enation mosaic	*Pea enation mosaic virus*
9.	Pea leaf roll	*Pea leaf roll virus*
10.	Root knot	*Meloidogyne sp*
11.	Aphid	*Aphis gossipii*

Diseases cause heavy reduction to both quality and quantity of fieldpea seed and grain production. Some environmental conditions like high humidity and moderate temperature enhance the possibility of development of diseases. The major diseases and insects of fieldpea are rust, powdery mildew, downy mildew, wilt, root rot, aphids, stem fly, leaf miner and pod borer.

Powdery mildew

Powdery mildew is the most important disease of field pea. This air borne disease is caused by *Erysiphe pisi*, which is a biotrophic ascomycete fungus. Usually it develops at pod formation stage or just before harvest of the crop. As the name implies, a white powdery coating covers the aerial plant parts including leaves and pods. Eventually, the speckles turn into spots and the plant turns purple, bluish-green and lastly brown. Warm-dry days and cool nights are critical for the development of diseases. Late-sown crop is typically at higher risk. Frequent heavy dews in the absence of rain accelerate the disease's progression. The number and weight of the pods are reduced. However, several powdery mildew resistant varieties have been developed by the NARS.

Management strategies:

1. Grow resistant varieties
2. Late planting should be avoided
3. Collect and burn the plant debris/stubbles that left on the field after crop harvest
4. Grow early maturing short duration varieties in high disease prone areas.
5. The diseases can be managed by alternate spray of any of the wettable sulphur (0.3%), karathane (0.05%) or carbendazim (0.05%). Give the first spray after the appearance of the diseases in the crop. Second spray should be given 15 days after the first spray and the third spray only if there is a need for it.
6. Avoid excess irrigation in the field.

Rust

The disease is caused either by *Uromyces viciae-fabae* or *U. pisi*. It is an autoecious fungus completing its entire life cycle on the same host. The pathotypes develop particularly in regions with warm and humid climate and the disease generally appears at flowering or podding stage. In the tropical and subtropical regions such as India and China, the principal causal agent of pea rust has been reported as fungus *U. viciae-fabae*, where warm humid weather is suitable for the appearance of both the uredial and the aecidial stage. This disease is serious in north india. The stem of plant become malformed and the affected plant dies out. The earliest symptoms are the yellow spot having aecia in round or elongated clusters. Then the uredopustules develop which are powdery and light brown in appearance. High humidity and cloudy weather with temperatures of 20-22^{0}C favor disease development.

Management strategies

1. The affected plant debris and trash should be burnt after harvesting.
2. Management of volunteer plants over the summer and removal of infected plant debris.
3. Preventive fungicide sprays of mancozeb (0.25%), Propiconazole (0.1%) and Hexaconazole (0.1%) at early disease development stage have been recommended
4. Grow tolerant varieties.

Downy Mildew

It appears early on young plants, in the form of downy growth on the under surface of leaves. As the disease advances the affected tissues turn brownish grey, dry up and the leaves drop off prematurely. If the young

growing stems are systemically infected, they become distorted and is checked growth, with subsequent stunting of the entire plant. On pods, the disease is first noticed when they are green and flat. The patches are as pale green, more or less elliptical in shape, blotches on the sides, or more irregular, elongated lesions along the pods. The lesions gradually become bright brown in colour

Management strategies

1. Sanitation and crop rotation.
2. Deep summer ploghing during the month of May-June.
3. Spraying of Ridomyl @1.0ml/Litre and Mancozeb @ 2.5gm/Litre of water at 15 days intervals.

Fusarium Wilt

This disease is caused by soil borne fungus *Fusarium oxysporum* which enters into the host vascular system through root tips or wound, consequently caused progressive chlorosis of the leaves and stems, wilting and collapse of the root systems.

Management strategies:

1. Soil improvement with decomposed *Sesbenia aculata*, mustard cake and Farm yard manure.
2. Deep summer ploughing should be done during the month of May-June.
3. Seed treatment with fungicides (Carbendazim @2.5g/kg seeds) is feasible and protects the seedlings from infection and ensures better plant stand.
4. Treatment of fieldpea seeds with bioagents (*Trichoderma harzianum* @ 6 g/kg) and fungicide (vitavax 1.0g/kg).
5. Early sowing should be avoided in badly infested areas.

Stem rot/White rot

Sclerotinia sclerotiorum (Lib.) de Bary, is a cosmopolitan necrotrophic fungal pathogen with a very broad host range and it infects a variety of broadleaf crops and weeds. This fungus is a soil-borne fungus that attacks plant in all stages of growth including young seedlings. It is a major disease of field pea under favourable conditions; it may cause serious losses to the crop. Symptoms appear as wet, soft and white rotting of the tissues on all arial part of the plants including pods.

Management strategies:

1. Seed cleaning is essential to remove the sclerotial mixer during threshing and processing period.
2. Deep ploughing, low land with continuous stagnation of water reduces the sclerotial population.
3. Alternate spray of recommended fungicides at 10-15 days intervals is essential.
4. All infected plant parts must be collected and burnt before drying of the plants.
5. Removal of the weeds from the fields.

Insect pests:

Fieldpea crop is infested by a number of insect pests which are causing yield reduction are described below:

Pea Stem Fly

The adult fly lays eggs in the plant tissue and the maggots damage the internal tissue of the stem and ultimately the entire plant dies. More severe damage can be causes by stem fly when crop is early planted.

Management strategies:

1. In the soil (before sowing), 30 kg Carbofuran (Furadon) 3% granules or 10kg Phorate (Thimet) 10% granules should be incorporated.
2. Early planting should be avoided

Leaf miner

The Larvae of leaf miner causes serious damage by making tunnels in the leaves. Its incidence is serious during the month of December-March.

Management strategies:

1. Seed should be treated with 2% Phorate or 1Kg phorate /hectare should be incorporated in soil.
2. Spray of 250 ml of Phosphamidon 85 SL (Dimecron) or 1 litre of Metasystox 20 EC in

1000 litre of water per hectare when the attack begins and repeat at 15 days interval.

Pea Aphids

They suck the sap of the cells owing to which the leaves turn pale and yellow. In case of severe infestation, the plant growth is checked.

Management strategies:

1. Seed should be treated with 2% Phorate or 1Kg phorate /hectare should be incorporated in soil.
2. Spray of the 0.03% Dimethoate or 0.05% Metasystox, 0.05% Melathion, 0.04 and Monocrotophos should be done. Repeat the spray after 10-12 days.

Pod borer

It bores into the pod and feed on the grains inside. Generally a late sown crop is damaged more by this insect pest. This insect infestation is more in north India.

Management strategies:

1. Spray crop with 0.04% Monocrotophos at 10-15 days interval is safe and effective.

Summary

Fieldpea is a pulse crop of immense economic importance in our country due to its high productivity and multiple uses. It is being imported in highest amount among the all pulses. The supply of pulses is not as per requirement of vegetarian population of India. Therefore, owing to its high productivity this pulse crop can be helpful in achieving the target of pulses production to meet the requirement. But a wide array of pests and pathogens are available in fieldpea which causes many diseases and insect pests. These include many fungi, bacteria, viruses, mycoplasma, nematodes, and parasitic phanerogams. Nevertheless, if farmers adopted aforementioned management practices they can get higher yield of fieldpea. On the contrary if resistant varieties is available for diseases and insects that will be the unparallel strategy to manage yield penalty through disease and pests infestation.

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