Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 03, Issue: 01 (JAN-FEB, 2023)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Sunflower Disease and Its Management

(Mahavir Bishnoi[1], *Anu[2], Rizwana Rehsawla[1], Neeru[1] and Satender Yadav[1])
[1]Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana (125004)
[2]Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore, Madhya Pradesh, India
*Corresponding Author's email: anunaruka8@gmail.com

Abstract
Sunflower crop output throughout the world is highly impacted by illnesses. This is a result of several diseases attacking often and severely. As a result, there are large yield losses or a decline in product quality. Although there are many diseases that can harm sunflower, just a few to a dozen, depending on the area and cultivar, are thought to be significant. I'm concentrating especially on these important pathogens in this post. The focus will be on recent discoveries and insights made by scientists in the fields of pathogen biology, host resistance, and control. The efforts of the scientists have improved our understanding of certain illnesses and highlighted their importance in the development of sunflower management.

Key words: Leaf blight –Alternaria helianthi, Host resistance, Pathogen biology

Introduction
Sunflower seeds have a wide variety of phathogenic fungus in or on them that cause pre- and post-emergence fatalities in the field. Alternaria, Fusarium, Macrophomina, and Plasmopara are a few diseases that can damage seedlings that are spread by seeds. Sunflower plants that are still growing are vulnerable to alternaria blight, downy mildew, rust, and a wide range of diseases that harm leaves, such as Aalternata and Septoria helianthi. Charcoal rot or dry root rot (Macrophomina Phaseolina) and stem or collar rot (Sclerotium rolfsii) are two stem and root diseases that cause damage in patches in numerous locations. On spring-sown crops, head rot (Rhizopus sp.) has frequently been seen in Punjab, Haryana, and Uttar Pradesh. Pseudomonas solanacezarum, fusarium wilt, and bacterial infections are all present in sunflower at the moment. These are now intermittent but may develop into major issues in the future. It has been estimated that infections cause a 30% drop in production during Kharif and roughly 5-10% during post-Kharif seasons, despite the fact that precise estimates of yield losses due to diseases of sunflower have not been examined.

Leaf blight - *Alternaria helianthi*
Symptoms: Brown spots are produced by the pathogen on the leaves, but they can also be visible on the stem, sepals, and petals. The lesions are dark brown with light edges and have a

Fig1: Symptoms of *Alternaria helianthi* on leaf & head

yellow halo on the leaves. Later, concentric rings grow the spots' size, and they take on an uneven form. A number of spots combine to form larger irregular lesions, which result in drying and defoliation.

Favourable circumstances: Winter climate, rainy weather, and late-sown crops are all major risk factors.

Management

• Deep summertime ploughs.
• Proper distances
• Sanitary field maintenance and clean cultivation.
• Using tolerant or resistant varieties, such as B.S.H.1.
• Applying thoroughly rotted manures.
• Using crop rotation techniques.
• Mid-September planting.
• Discard and remove the sick plants.
• Use 2 g/kg of carbendazim or thiram to treat the seeds.

Mancozeb should be sprayed at a rate of 2 kg/ha.

Head rot - *Rhizopus* sp.

Symptoms: The damaged heads have water-soaked sores on their bottom surface that eventually turn brown. The stalk and head may both exhibit discolorations. The damaged areas of the skull get mushy and pulpy, and putrefied tissues are often seen to be accompanied by insects. The head-attacking insects and larvae open the door for the fungus, which assaults the inside of the head and the growing seeds. The seeds are transformed into a powdery black mess. The head eventually droops down with thick fungal mycelial nets as it withers.

Fig 2: Symptoms of *Rhizopus* sp on Head

Favourable circumstances: Prolonged rain during blooming; Caterpillar and insect-related damage.

Management

• Apply 2g/kg of carbendazim or thiram to the seedlings.
• Keep the caterpillars from eating the heads.

If the humid weather continues for more than 10 days, spray the head with Mancozeb at a rate of 2 kg per hectare during the intermittent rainy season.

Powdery mildew - *Erysiphe cichoracearum*

Symptoms: On the upper surface of the older leaves, the disease causes a white powdery buildup that eventually turns grey. Areas of white mildew can be seen as the plant ages and

develops black pinhead-sized spots. The afflicted person loses more shine, curls, turns chlorotic, and eventually dies.

Fig 3: Symptoms of - *Erysiphe cichoracearum* on leaves

Favorable Conditions: Until the end of the winter, the sickness is more common under dry conditions.

Administration

• Complete crop and field sanitation.
• Early varieties ought to be chosen.
Debris from sick plants must be removed.
• It has been discovered that applying karathane or calixin at a rate of 1L/ha or wettable sulphur at a rate of 2kg/ha effectively lowers disease occurrences.

Root rot or charcoal rot - Rhizoctonia bataticola (*Pycnidial stage: Macrophomina phaseolina*)

Symptoms: The pathogen, which is seed-borne, is chiefly responsible for the early stages of collar rot and seedling blight. After the blooming stage, grown plants continue to exhibit symptoms. Plants with the infection exhibit leaf drop, and death occurs in spots. The bottom stem's roots and bark peel off, and a lot of sclerotia are present there. The lowest part of the stem also develops tiny, dark-colored pycnidia.

Fig 4: Symptoms of Rhizoctonia bataticola on root

Conditions That Favor Development of the Illness: Moisture stress and warmer temperatures favor disease development.

Management

• Avoid putting the seedling too closely together.
• The plant's vigour should be maintained by giving it the best nourishment possible.
• Irrigation should be supplied if the soil becomes dry and the soil temperature rises.

• Seed treatment with a formulation of Trichoderma viride at a dosage of 4 g/kg of seed
Long crop rotation should be practised in endemic regions. Seeds should be treated with carbendazim or thiram at a rate of 2/kg, and spots should be sprayed with carbendazim at a rate of 500 mg/liter of water.

Basal rot - *Sclerotium rolfsii*

Symptoms: The first signs of a disease appear 40 days into the sowing cycle. The sickly look of the diseased plants makes them easy to spot. Due to the disease's infection, plants are drying out. White or brownish white fungal colonies have colonised the lowest portion of the stem. The plants are withering and dying in severe situations. Near the ground, dark brown lesions develop on the stem's base and cause it to wither. There are several sclerotia present.

Fig 5: Symptoms of *Sclerotium rolfsii* on root

Favourable Conditions

- Infection occurs in the crop in the months of July and August.
- The fungus survives through sclerotia in soil and plant debris.

Management

• Deep summertime ploughs.
• Total crop and field sanitation.
• Using tolerant or resistant plant cultivars.
• Gather and remove plant debris.
To lessen wilt, apply Trichoderma to soil and seed.
Before planting, use the fungus Coniothyrium minitans to infiltrate the soil and kill the pathogen.
• Pseudomonas fluorescens or P. putida strains applied to the seeds protect sunflower seedlings from sclerotinia infection.
• Captan or thiram treatment of seeds at a dosage of 3 g/kg of seed.
• Applying chestnut compound to the plant's base at a rate of 3 g per litre of water.
• Spraying carbendazim at a rate of 0.2% on 15-day-old seedlings and applying Trichoderma harzianum at a rate of 10 g/kg soil.

Necrosis -*Tobacco streak virus* (TSV)

Symptoms: The abrupt necrosis of a portion of the lamina, followed by the bending of the leaves and the systemic mosaic, are the

Fig 6: Symptoms of Black streak on stem

symptoms that define them. Lamina, petiole, stem floral calyx, and corolla necrosis are also seen.

Fig 7: Advanced symptoms lead to plant death.

Management

- Removal of weed hosts
- Management of the vector population`
- Changing planting dates

Rust - *Puccinia helianthi*

Symptoms: On the underside of the lower leaf, there are tiny, rusty-dust-coated pustules (uredia) that are reddish brown in colour. Later, more leaves and even the green sections of the head get infected. Numerous pustules that form on the leaves after a severe illness cause them to turn yellow and dry. On the bottom surface, uredia and the black-colored telia are also visible. Autoecious corrosion is the illness. During the off-season, volunteer crops go through the pycnial and aecial phases.

Fig 8: **Symptoms - *Puccinia helianthi of leaves***

Favorable Conditions: Day temperature of 25.5° to 30.5°C with relative humidity of 86 to 92% enhances intensity of rust attack.

Management

- Use of tolerant and resistant varieties
- Crop rotation should be followed.
- Previous crop remains should be destroyed.
- Removal of crop residues
- Spray Mancozeb at the rate of 2kg/ha.

Conclusion

An increasing challenge to India's sunflower producing system is the illness known as sunflower necrosis. Due to their devastation in the majority of the places where sunflowers are grown, a number of viral infections that affect sunflowers have acquired notoriety. The genetic foundation of the farmed sunflower is limited, and it lacks genes for resistance. The main focus of disease resistance breeding must be this. Finding resistance genes in domesticated and wild animals is crucial for solving this issue. However, the genetics or inheritance pattern of this illness is unclear. As a result, the transfer into cultivated crosses and other issues associated with the use of wild species in sunflower development programmes will become quite problematic. Incompatibility, structural heterozygosity, ploidy variations, and restricted gene exchange in hybrids involving resilient wild species typically prevent this.

References

1. Harvir Singh 2005. Thrips incidence and necrosis disease in sunflower (Helianthus annuus L.). J. Oilseeds Res., 22(1): 90-92.
2. Nagaraju and Hanumantha Rao C. 1999. Information on sunflower necrosis. Directorate of Oilseeds Research, Hyderabad, p. 4.
3. Shirshikar SP. 2008. Integrated management of sunflower necrosis disease. Helia, 31 (49): 27-34. Shirshikar SP. 2010. Sunflower necrosis disease management with Thiomethoxam. Helia, 33 (53): 63-68.
4. Browning JA and Frey KJ. 1969. Multiline cultivars as a means of disease control. Ann. Rev. Phytopathol., 7: 355–382.
5. Anonymous 1999. Annual Progress Report of AICRP on Oilseeds (Sunflower), Directorate of Oilseeds Research, ICAR, Hyderabad, India, pp. 128.