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An Overview of Rice Diseases in Andhra Pradesh and Telangana.

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Abstract

Rice is one of the most important staple food crops of Andhra Pradesh and Telangana. It is the principal cereal crop in India, which stands second in terms of production and consumption in the world. Rice production in AP and Telangana crossed the mark of 20 MT in 2014 – 15 accounting for 10.78% of Indian production in that year. The productivity has mainly affected by different diseases of rice. Rice diseases occur more or less constantly causing what would appear to be insignificant or occasional losses to individual growers, through making a substantial total in the aggregate in the country. Under favorable condition, some diseases occur as epiphytotic and cause considerable loss. It is stated that nearly 80% of crop was lost due to blast in 1920 in combine AP (Including Telangana) one of the major cause of epidemic like brown spot of rice caused by *Helminthosporium oryzae.*

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INTRODUCTION:

Rice is the most economically important staple food in India, China, East – Asia, Africa and America outfitting to nutritional needs of 75% of the population in these countries. Worldwide, rice is grown on 165 million hectares, with an annual production of about 680 million tons of paddy. About 90% of the world's rice is grown and produced in Asia. To meet the global rice demand, it is estimated that about 117 million tons of additional milled rice needs to be produces by 2035, which is equivalent to an overall increase of 25% in the next 15 years. Therefore, the need for extra rice production has to come from a productivity gain. Maximum yields per unit area of land can be achieved and sustained only if indigenous as well as high yielding crop varieties of rice are properly protected against its pest enemies. Amongst the various biotic factors affecting rice production and productivity, rice diseases are one of the most important ones. The annual losses due to rice diseases are estimated to be 10 – 15% on an average basis worldwide.

Rice diseases are caused by wide variety of pathogens including fungi, bacteria, virus and nematodes. However, with the increasing demand for world rice supplies and advent of green revolution resulting in use of improved varieties, high fertilization, irrigation and intensive cultural practices have resulted in great increase in the occurrence and strictness of diseases infesting rice in India.

MAJOR DISEASES OF RICE IN ANDHRA PRADESH AND TELANGANA:

1. **LEAF SPOT DISEASE OF RICE:**

   Leaf spot disease is caused by the fungus *Helminthosporium oryzae,* which affect the rice plant during vegetative stage. This fungus affected the crop in kharif as well as rabi season.

Leaf spot of rice was considered to be a major factor contributing to the Bengal feminine of 1943 as it resulted in a loss in yield amounting to 50 – 90% of 1942 harvest due to its outbreaks. It was found that the September, uniformly favorable temperature ranges of 25 - 30ºC continuously for two months, usually cloudy weather, rain in November and low sunshine hours, which prevailed in Bengal in 1943 had contributed towards the development of this diseases.

Leaf spot is problem mainly during kharif season especially in uplands and hill ecosystem. The diseases also assume a serious proportion in irrigated ecosystem especially on ill – managed plots. The diseases are predominant in East, West Godavari, Krishna, Guntur and Nellore districts in AP and Karimnagar, Medak and Adilabad districts in Telangana.

Irregular, rectangular brown spots appear on leaf blades and leaf sheaths (Fig: 1).

In severely affected seedlings, the leaves dry out and die. Badly affected areas can be distinguished by their brown scorched appearance.

Fig: 1 (Leaf Spot)

2. LEAF BLAST DISEASE OF RICE:

Blast disease is caused by a fungus *Pyricularia oryzae,* which damaged the crop in nursery and vegetative stage. It affected the crops during the seasons, kharif and rabi. In some regions of our AP and Telangana, blast diseases are endemic causing severe damage to the crop every year. In other parts, blast is seasonal in occurrence, severity of which depends upon prevailing weather conditions. The high yielding varieties of rice approved for release in India such as *Adt, 27, Jagannath, Ratna, Cauvery* and *Hamsa* are susceptible to blast diseases.

Leaf blast is favoured by the low night temperature (20-26^0 C), high relative humidity (>95%), dew deposit, leaf wetness for more than 10 hours and high nitrogen. The diseases are a serious problem in upland, irrigated and hilly ecosystems. In Southern India (AP and Telangana) blast mainly occurs in dry season during November-February. During kharif season, the diseases is prevalent throughout the rice growing areas especially in Andhra Pradesh and Telangana.

The symptoms appear first on the leaves as small bluish flecks (Fig: 2). The central portion of the lesion becomes dull greyish green and has water soaked appearance. Similar spots are formed on leaf sheath, inflorescence and ears. The affected plants can very easily be identified by bluish patches on the neck or stem. Due to necrosis of neck tissues the ear tends to break and fall off.

Fig: 2 (Leaf Blast)

3. STEM ROT DISEASE OF RICE:

Stem rot disease is caused by the fungus *Sclerotium oryzae,* during panicle initiation to hacking vegetative stages. This fungus affected the crop mainly during kharif season. Stem rot of rice has become an important diseases of rice

causing substantial loss due to increased lodging. The diseases are favoured by high Nitrogen fertilizers, high relative humidity, high temperature and water logging conditions. The diseases are more in early planted crop because of high temperature and relative humidity prevailing during the susceptible stage of the crop. The diseases are prevalent in Andhra Pradesh and Telangana.

The symptoms of the diseases are lesions are initially small, circular, and bark brown to purple in colour. Fully developed lesions are circular to oval with a light brown to gray center, surrounded by a reddish brown margin caused by the toxin production by the fungi. The base of the stem shows discoloration and dark mycelium develops inside the culm (Fig: 3).

Fig: 3 (Stem Rot)

4. SHEATH ROT DISEASE OF RICE:

Sheath rot disease is caused by the pathogen *Acrocylindrium oryzae,* which damages the crop in post flowering stage. This fungus affected the crop mainly during kharif season. Sheath rot diseases is become a serious problem in recent years especially when there is post – flowering rain. These problems have become wide spread in our Andhra Pradesh and Telangana.

Rooting occurs on the leaf sheath that encloses the young panicles. The lesions start as oblong or somewhat irregular spots, with gray to light brown centers surrounded by distinct dark reddish brown margins. As the diseases progresses, the lesions enlarge and coalesce and may cover most of the leaf sheath. Lesions may also consist of diffuse reddish brown discolorations in the sheath.

An abundant whitish powdery growth may be found inside the affected sheaths, (Fig: 4) although the leaf sheath may look normal from the outside. With early or severe infection, the panicle may fail to emerge completely or not at all; the young panicles remain within the sheath or only partially emerge and most grains are sterile.

Fig: 4 (Sheath rot)

5. FOOT ROT OF RICE:

Foot rot of rice disease is caused by *Fusarium moniliforme,* which affected the crop plants mainly during vegetative stage. Through the diseases is of limited occurrence, it has potentiality to be highly serious. The diseases are prevalent in Andhra Pradesh and Telangana.

The abnormal elongation or hypertrophic growth of the seedling (Fig: 5) caused by the hormone gibberellin, which is produced by the infecting organism.

This rice disorder is also referred to as white stalk in China and was described as a foot rot disease in India.

Fig: 5 (Foot rot)

6. FALSE SMUT DISEASE OF RICE:

This rice disease is caused by the fungus *Ustilaginoides virens,* which affected the crop during post flowering stage and this pathogen affected the crop mainly in kharif season. False smut of rice has emerged as a major disease in the recent years. The incidence of the disease is particularly more in hybrid varieties. The incidence of the disease is more in those years when spells of wet weather coincide with the heading stage. The disease is favoured by the prevalence of relatively low temperature and high humidity with moderate rainfall well distributed during the period of flowering.

The disease occurs in the field at the hard dough to mature stage of the crop. The fungus transforms individual grains of the panicle into greenish spore balls that have a velvety appearance (Fig: 6). The spore balls are small at first and visible in between glumes, growing gradually to reach 1 cm or more in diameter and enclosing the floral parts. They are covered with a membrane that bursts as a result of further growth. The colour of the balls becomes orange and later yellowish green, or greenish black. At this stage, the surface of the ball cracks. The outermost layer of the ball is green and consists of mature spores together with the remaining fragments of mycelium.

Fig: 6 (False smut)

CONTROLLING MEASURES OF DISEASES:

Controlling methods of disease and crop rotation plays important roll to get high yields of crop. Monitor soil nutrients regularly, apply required fertilizers for soils, apply calcium silicate slag before planting. Adjust planting time, sow seeds early, split nitrogen fertilizer application in two or more treatments, flood the field as often as possible.

Use resistant cultivars, burn crop residues after harvest, drain the field balance the use of fertilizer, chemicals, such as thiophanate – methyl, ferimzone and validamycin sprayed at the time of disease initiation. Use healthy seeds, minimize insect infestation in rice field, remove infected stubbles after harvest, and apply fungicide like carbendazim, edifenphos or mancozeb as seed treatment and foliar fungicide like benzoyl and copper oxychloride as foliar sprays.

Use clean seeds, use salt water to separate lightweight, infected seeds during soaking, use fungicides as seed treatments. Keep the field clean, remove infected seeds, panicles, and plant debris after harvest, reduce humidity levels, perform conservation tillage and continuous rice cropping, use moderate rates of nitrogen, use certified seeds, resistant varieties.

DISCUSSION:

The major rice diseases that often because great economic losses are rice blast, sheath blight diseases are especially in South India. Rice blast and brown spot were the major diseases noticed during pre-

independent India and before introduction of high yielding varieties. After introduction of high yielding varieties, leaf blight and sheath blight have become major diseases. Recently diseases like false smut, stem rot and grain discoloration which were minor and occurring sporadically are emerging and causing considerable yield loss. This is primarily due to climate change, crop intensification and changes in practice. Out of the total yield loss due to diseases in rice, 35% is by blast, 25% by sheath blight, 20% by leaf blight and 10% by other diseases.

The various methods used for managing rice disease includes, use of resistant varieties, cultural practices, biological and chemical control. All these methods have varied degrees of success in managing rice diseases. The most important control tactics used worldwide includes use of resistant varieties and chemical control.

Breeding for disease resistant varieties has been long used for managing the rice disease and is one of the most economical methods which contributed immensely to world's rice productivity. But, most varieties are resistant only to a few major diseases that are the subjects of intensive breeding efforts. The rice production environments, particularly in the tropics, are habitats of many rice pathogens causing varying degrees of damage. Even the "minor" diseases collectively could pose a significant threat to production.

Moreover, the pathogen often develops new biotypes resulting in breaking down of resistance in the resistant varieties. Therefore, chemical controlling rice diseases and over last two decades a lot of focus has been shifted towards developing new molecules that can be used for controlling rice diseases. The most critical rice diseases prevalent across the globe are caused by fungus.

CONCLUSION:

In the light of the discussion, it may be mentioned that rice suffers from a number of diseases in South India especially in Andhra Pradesh and Telangana, of which blast and blight are the most important ones. Disease damage can greatly reduce rice yield. They are mainly caused by fungi, bacteria and virus. Planting a resistant variety is simplest and often the cost effective management for diseases.

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