

## The trend of increasing economic importance of sheath blight of rice –A concern

Debanjana Debnath<sup>1</sup>, Shruti Mohapatra<sup>2</sup>, Chinmayee Mohapatra<sup>3</sup>  
<sup>1,2,3</sup>Faculty of Agriculture, Sri Sri University, Cuttack, Odisha, Pin: 754006

### Abstract

With the passing time and changing weather condition number of diseases has been emerging as major disease and causing tremendous losses. This changing status of disease economics is a serious threat as because in the new environment tackling of the disease is also a challenge. Sheath blight of rice caused by *Rhizoctonia solani* is such type of diseases of rice. In this article we have described about the economic losses caused by this disease and its potential reason for this higher damaging trend.

**Keywords** Sheath blight, Rice, *Rhizoctonia solani*, economic losses, trend

### Introduction

Sheath blight or Oriental sheath and leaf blight of rice caused by the pathogen *Rhizoctonia solani* Kuhn [teleomorph: *Thanatephorus cucumeris* (Frank) Donk] was first reported from the Japan by Miyake in 1910 but still the disease is dominating the economic losses of rice that caused by any fungus pathogen. In fact, the trend of this economic losses is getting higher with the passing time and changing environmental condition. The disease has been reported from all the rice growing part of the world and its prevalence was also moderate to severe in different time in different geographical area for the successful integration of disease epidemiological factors *i.e.* the susceptible host, the virulent pathogen and the favourable weather condition.

### Symptoms

Generally, the disease appears in tillering stage mainly on the leaf sheath as a shape of oval to irregular spots first appear as greenish to grey spot and divided by brown margin which looks like snakes' skin from the distance. Although the spots appear on the water line but gradually it spreads in whole leaf sheath then the whole tiller and plant and also spread with very high intensity. Standing

water and moist condition in the canopy of the rice field generally favour the disease. Infected plant also shows the bird nest appearance in severe infection (Hollier et al., 2009).

### Increasing economic importance of RSB - the facts

The occurrence of sheath blight of rice was reported from all kind of weather condition where rice cultivation is possible *i.e.* temperate to tropical or subtropical area including different countries of Africa, Asian even from South or North American countries namely Bangladesh, Brazil, Burma, Colombia, China, Cuba, Germany, Fiji, Formosa, India, Indonesia, Iran, Korea, Liberia, Madagascar, Malaya, Malaysia, Netherland, Nigeria, Papua New Guinea, Philippines, Russia, Senegal, Sri Lanka, Surinam, Taiwan, Thailand, Trinidad, Tobago, UK, USA, Venezuela and Vietnam. In the same way In India this disease was reported to be in severe form from Punjab, Haryana, eastern Uttar Pradesh, Uttarakhand, Bihar, West Bengal, Odisha, Chhattisgarh, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, Jammu and Kashmir, Madhya Pradesh, Assam, Manipur and Tripura (DRR, 2006-2010).

Sl. No	Yield loss or severity	Place	References
1	5-10% of total yield	Tropical and sub-tropical Asia	Willoquet et al., 2011
2	24,000-38,000 tons	Japan	Premalatha Dath, 1990)
3	6 million tons	China	Chen et al., 2014
4	5-15%	Arkansas, USA	Annou et al., 2005
5	Up to 50 %	India	Richa et al., 2016
6	5–10 %	Tropical lowland rice in Asia	Savary et al., 2000).
7	Up to 54.3 per cent	India	Chahal, 2003
8	50 % in susceptible cultivars	USA	Prasad and Eizenga 2008
9	up to 40 %	Bangladesh	Shahjahan et al., 1986
10	severity > 60 %	Mandya and Mysuru district	(Chetana et al., 2016

Not only the total yield loss or productivity the pathogen infection also results in declined grain quality even the lower germination ability. As the pathogen have wide host range of more than 32

families and 188 genera it is difficult to remove the pathogen foci from the area specially where the intensive rice production generally practiced. The disease appeared in severe epidemic form in the districts of Srikakulm and Vijayangaram of Andhra Pradesh during 1993 and 1994 (Mathur et al., 1999). Chahal in 2005 reported the return of the pathogen population in very severe form in 2003 and 2004 almost in the same extent after 1978.

### Increasing economic importance of RSB-The reason:-

The top identified reason that are responsible for the increasing disease severity and huge economical losses has been discussed below:

- 1.Favourable weather condition, rainfall in growing season, uninterrupted moisture supplies due to the stagnant water in rice field.
- 2.Abundance of the alternate or collateral host that helps in survival and continuity of the life cycle.
- 3.Monoculturing, intensive cultivation, dwarf and semi dwarf varieties with dense tillering that provide favourable micro climate for the spore germination and spread.
- 4.Excessive use of nitrogenous fertilizer and less use of potassium fertilizer and deficiency of micro nutrient that can induce host plant resistance.
- 5.Formation of the sclerotia, a hard pathogen survival structure helps the pathogen to survive in adverse weather condition in the absence of the host.
6. Sheath blight severity also increases with insect attack like BPH and rice root nematode, *Hirschmaniella oryzae* because of plants nutrition status depletion and providing the opening for the pathogen entry
- 7.Less availability of resistance cultivar and less known source of resistance gene.
- 8.Development of the resistance against the conventional fungicides by the pathogen *R.solani*.

Generally, it was observed that many of the diseases sometimes turned into severe form even after many years of its first appearance in an area. With this above-mentioned reason the another untold and forgotten reason that should come in the lime light are the ignorance of research and up gradation of the knowledge. That is happening with this disease also where it is appearing in same extent of severity when we almost forgotten the history of its damages.



## Conclusion

Significant research has already been started by different researchers for identifying the solution to control this emerging disease. However further study is needed to identify resistance gene against the pathogen, mechanism and genetics of resistance and biochemical and molecular aspects of disease management along with the new looks on use of efficient bio-control agents and bio-pesticides and overall, the integration of all possible management practices.

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