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INVESTIGATION ON PREVALENCE OF RICE BROWN LEAF SPOT IN CAUVERY DELTA REGION OF TAMILNADU INDIA

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ABSTRACT

Rice is the major food crop in India. Rice is affected by many fungal, bacterial and viral diseases. Among them, Rice brown leaf spot caused by *Bipolaris oryze* is a important disease which reduces the yield of the crop. The present investigation was carried out to study the prevalence and occurrence of Rice brown spot in Cauvery Delta Region of Tamilnadu. Among the five districts surveyed, the disease incidence was more in Sirkazhi of Mayiladuthurai district which recorded 35.5% incidence. Aananthathandavapuram from Mayiladuthurai recorded second maximum incidence (30.5%). Thiruparaithurai village of Trichy district has recorded lowest Brown leaf spot incidence (18.5%) compared to other areas. Brown spot disease incidence was more in cultivar BPT 5204 and ADT 43 compared to other cultivars. Brown spot incidence was more in milking and maturity stage compare to other stages of rice crop.

Keywords **:** Rice, Brown spot, Prevelence, Sirkazhi, Bipolaris

Introduction

Rice is grown at about 11 percent of the world's cultivable land and is used as a staple food by about half the world's population and two third of India's population. Rice is grown on an area of 162.06 million hectares producing 755.4 million tons of rice worldwide. The largest producer of rice in the world is China with 210.87 million tons (FAO, 2019). India is the second largest rice-producing country in the world next to China. According to the data released by government of India in Agriculture at a glance 2019, in India rice is grown on 43.79 million hectares, with an annual production rate of 116.42 million tons and a production of about 2.66 t / ha. in the year 2018-2019.

Rice crop yield is severely affected by several biotic (Insect, Disease, Weeds) and abiotic (nutritional disorders). Among them, brown spot is caused by *Bipolaris oryzae* (Breda de Hann) is one of the important disease affecting paddy crop. It is also known as Sesame leaf spot. It occurs almost all rice growing countries especially in south and South east Asian countries like India, China, Japan, Burma, Sri Lanka, Bangladesh, Philippines, Malaya, Thailand, Iran, Africa, Russia, America (Ou 1985; Chakrabarti 2001; Padmanabhan 1973; Savary *et al*., 2000). In India Brown spot is first reported from Madras by Sundraraman in 1919. It affects almost all rice growing states of India especially in Bihar, chhattisgarh, Madhya Pradesh, Odisha, West Bengal, Assam, Jharkhand, Andhra Pradesh, Tamil Nadu and Karnataka (Gangopadhyay and Chakrabarti 1987; Ou 1985). The loss due to Brown spot was both in quantitatively and qualitatively. Heavily infected plants show reduced no of tillers and grains, lowered the quality and weight of individual grain and reduce the seed germination resulting in a loss of 30-24 % Heavily infected grains are not suitable for consumption. Grain may be discolored, partly filled or chaffy. Therefore the present experiment was conducted to study the prevalence and occurrence of rice brown spot caused by *Bipolaris oryzae* in Cauvery delta region of Tamilnadu.

Materials and Methods

A fixed plot survey was conducted to study the incidence of Brown leaf spot in Karur, Thiruchirapalli, Thanjavur, Mayiladuthurai, Cuddalore districts of Tamil Nadu. The survey was taken during Samba and Navarai seasons of rice cultivation in 2019-2020. Totally 15 places from the above mentioned districts were selected for survey. 100 plants from different plots of each location was randomly selected and observed for disease scoring. Disease scoring for brown spot disease was visually evaluated and recorded using standard disease rating scale recommended by Mayee and Datar (1986)

Disease rating scale

Grade	Disease Index
0	No disease
1	Less than 1% of the leaf area affected
3	1-5% of the leaf area affected
5	6-25 % of the leaf area affected
7	26-50% of the leaf area affected
9	51-100% of the leaf area affected

The Percent Disease Index (PDI) was calculated using the following formulae given by (Mc Kinny 1923)

$$PDI = \frac{\text{sum of individual ratings} \times 100}{\text{Total number of leaves observed} \times \text{Maximum rating}}$$

Results and Discussion

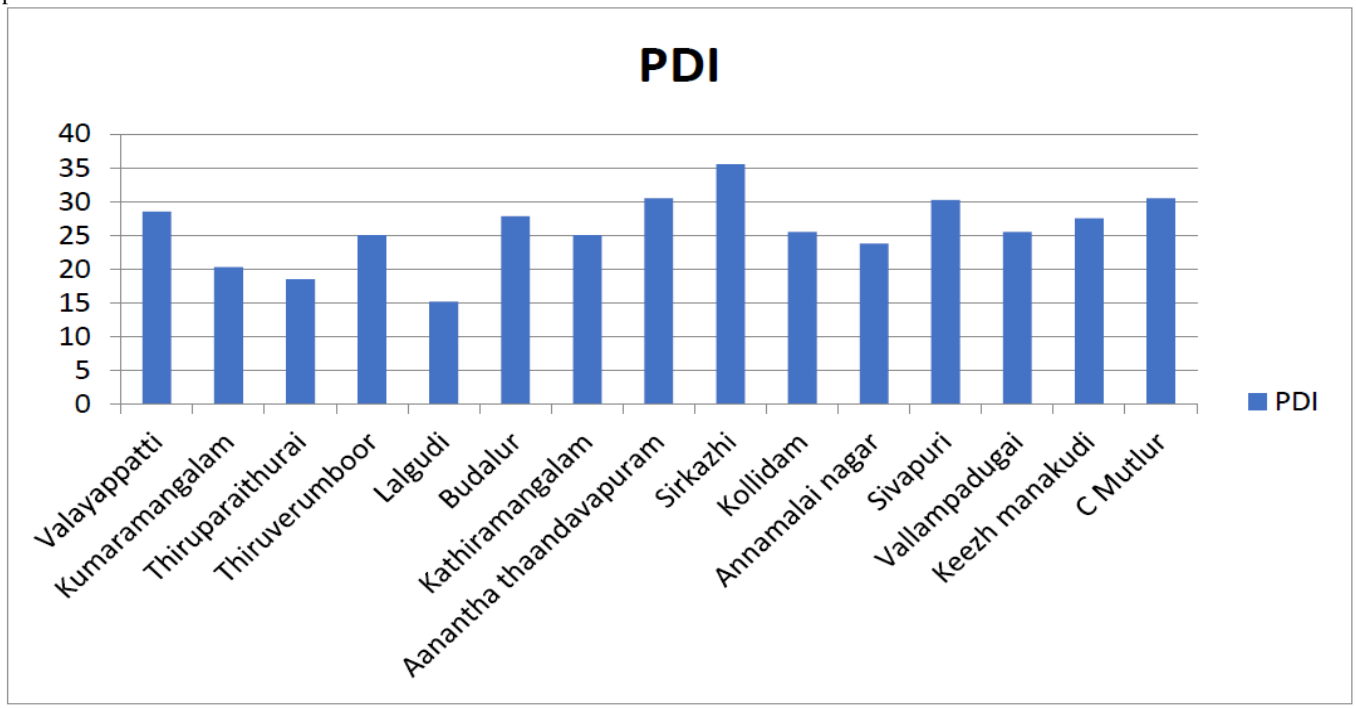
The fixed plot survey conducted during the year 2019-2020 in Cauvery Delta region of Tamil Nadu, India during Samba and Navarai seasons indicated the endemic nature of rice brown leaf spot disease and results are presented in table 1. Among the different locations surveyed, the maximum per cent disease index was recorded in Sirkazhi (35.5%) followed by Aananthathandavapuram (30.5%), C Mutlur (30.5%), Sivapuri (30.2), valayappatti (28.5%), Budalur(27.8%), Keezh manakkudi(27.5%), Kollidam (25.5%), Vallampadugai (25.5%), Kathiramangalam (25.0%), Thiruverumboor (25.0%), Annamalai nagar (23.8%), Kumaramangalam (20.3%), Thiruparaithurai (18.5%), in the decreasing order of merit. The minimum Brown spot per cent disease index was recorded in Lalgudi (15.2%). In general Brown spot disease incidence was more in cultivar BPT 5204 and ADT 43 compared to other cultivars. Brown spot incidence was more in milking and maturity stage compare to other stages of rice crop. The present results are in accordance with Sudhasha *et al*. (2020) who conducted a survey in Northern districts of Tamil Nadu to study the prevalence of rice brown spot incidence. They reported that Cuddalore district recorded the maximum incidence (34.31%) followed by Vellore (28.25%) and Thiruvannamalai (27.65%) and the lowest incidence was recorded from Kancheepuram (15.22%).

Similarly, Sumathra and Jaiganesh (2020) conducted a survey in Nagapattinam and Cuddalore districts of Tamil Nadu during 2019 Navarai season. They reported that Kollidam region of Nagapattinam recorded maximum incidence (35.89%) of Brown leaf spot followed by Vaitheeswaran koil (29.67%), Parangipettai (26.25%) and Bhuvanagiri (21.42%). The results are also in accordance with Channakeshava and Pankaja (2019) and Jabran *et al*. (2019).

Table 1: Survey on the incidence of Brown Leaf Spot of Rice in Cauvery Delta Region of Tamil Nadu

S.No	District	Place	Variety	Crop stage	Soil type	PDI*
1	Karur	Valayappatti	BPT 5204	Booting stage	Clay	28.5^{cd} (32.27)
2	Karur	Kumaramangalam	AKSHAYA PONNI	Panicle initiation	Clay	20.3^{f} (26.78)
3	Trichy	Thiruparaithurai	BPT 5204	Panicle initiation	Clay loam	18.5^{g} (25.47)
4	Trichy	Thiruverumboor	BPT 5204	Milking stage	Clay loam	25.0^{e} (30)
5	Trichy	Lalgudi	JGL 1798	Maturity stage	Clay loam	15.2^{h} (22.95)
6	Thanjavur	Budalur	ADT 43	Maximum tillering	Clay loam	27.8^{d} (31.82)
7	Thanjavur	Kathiramangalam	ADT 43	Maximum tillering	Clay loam	25.0^{e} (30)
8	Mayiladuthurai	Aanantha thaandavapuram	ADT 45	Maturity stage	Clay	30.5^{b} (33.52)
9	Mayiladuthurai	Sirkazhi	ADT 43	Maturity stage	Clay	35.5^{a} (36.57)
10	Mayiladuthurai	Kollidam	ADT 43	Maturity stage	Clay	25.5^{e} (30.32)
11	Cuddalore	Annamalai nagar	CO 51	Milking stage	Clay	23.8^{e} (29.20)
12	Cuddalore	Sivapuri	BPT 5204	Maximum tillering	Clay loam	30.2^{bc} (33.34)
13	Cuddalore	Vallampadugai	CO 51	Maturity stage	Clay loam	25.5^{e} (30.33)
14	Cuddalore	Keezh manakudi	BPT 5204	Milking stage	Clay loam	27.5^{d} (31.63)
15	Cuddalore	C Mutlur	BPT 5204	Milking stage	Clay loam	30.5^{b} (33.52)

*Values in each column followed by the same letter are not significantly different according to the DMRT method (p=0.05). Values in the parenthesis are arcsine –transformation.



Conclusion

Rice cultivated in most of the countries in the world. Rice yield and quality was reduced by various diseases. Among the diseases, Rice brown leaf spot is one of the serious concerns. So, it is important to assess the occurrence of the disease. Cauvery delta region was taken as a study area. Survey indicated the epidemic nature of disease in study area. Among the surveyed area, sirkazhi from mayiladuthurai district shows maximum disease incidence whereaas Thiruparaithurai from Trichy district shows lowest disease incidence.

References

Agricultural Statistics at a Glance (2019). Government of India, Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation and Farmers Welfare, Directorate of Economics and Statistics.

Chakrabarti, N.K. (2001). Epidemiological and disease management of brown spot of rice in India. In: Major Fungal Diseases of Rice: *Recent Advances, Kluwer Academic Publishers* p 293-306

Channakeshava, C. and Pankaja, N.S. (2019). Status of Brown Leaf Spot of Paddy in Cauvery Command Areas of Mandya District, Karnataka, India. *Int. J. Curr. Microbiol. App. Sci*, 8(4): 1654-1660.

FAO. (2019). FAO STAT Database. Availableat: http://www. fao.org/faostat/en/#home.

1.

Gangopadhyay, S. and Chakrabarti, N.K. (1987). Epidemiology of brown spot disease of rice. In: Advances in Rice Pathology. *Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India* pp484

Jabran, M.; Abbas, A.; Sabar, G.; Mustafa, G. and Ali, M.A. (2019). Prevalence, incidence and severity of brown spot of rice in major rice growing areas of Punjab, Pakistan. *Pakistan Journal of Phytopathology,* 31(2): 193-199.

Ou, S.H. (1985). Rice Diseases 2nd edn. CMI, Kew, England pp370

Padmanabhan, S.Y. (1973). The great Bengal Famine. *Annual Review of Phytopathology* 11: 11 –26

Sato, H.; Ando, I.; Hirabayashi, H.; Takeuchi, Y.; Arase, S.; Kihara, J. *et al.* (2008). QTL analysis of brown spot resistance in rice (*Oryza sativa* L.). *Breeding Science,* 58: 93 –96

Sudhasha, S.; Balabaskar, P.; Kumar, K.S. and Sivakumar, T. (2020). Prevalence Of Rice Brown Spot Disease Incidence In Northern Districts Of Tamilnadu, India And Observations On Morpho Pathogenic Variability Among Isolates Of Bipolaris Oryzae. *Plant Archives*, 20(2): 3819-3825.

Sumathra, S. and Jaiganesh, V. (2020). Survey for the incidence of brown spot caused by Bipolaris oryzae. *Plant archives* 20(2): 4032-403.