Biological Forum – An International Journal **14(3): 111-117(2022)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Survey on the Status of Sheath Rot Disease Complex in Major Rice Growing Districts of Telangana State

M. Manasa, T. Kiran Babu, S. Ameer Basha, N. Rama Gopala Varma and S.N.C.V.L. Pushpavalli

[1]*P.G. Scholar, Department of Plant Pathology, College of Agriculture, PJTSAU, Hyderabad (Telangana), India.*
[2]*Scientist, Department of Plant Pathology, Rice Research Centre, Agriculture Research Institute, Rajendranagar, Hyderabad (Telangana), India.*
[3]*Associate Professor, Department of Plant Pathology, College of Agriculture, Rajendranagar, Hyderabad (Telangana), India.*
[4]*Principal Scientist, Department of Entomology, Rice Research Centre, Agriculture Research Institute, Rajendranagar, Hyderabad (Telangana), India.*
[5]*Assistant Professor, Institute of Biotechnology, College of Agriculture, Rajendranagar, Hyderabad (Telangana), India.*

(Corresponding author: M. Manasa)*
(Received 25 April 2022, Accepted 25 June, 2022)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: Rice sheath rot is an emerging fungal disease which is majorly caused by *Sarocladium oryzae*, spreading over rice-growing areas of Telangana state and causing an estimated yield losses ranging from 3-85 % depending upon the severity of the disease. Roving surveys were undertaken during *kharif,* 2021 to determine the status and distribution of the sheath rot in major rice growing districts of Telangana state *viz*., Nirmal, Jagtial, Nizamabad, Peddapalli, Kamareddy and Karimnagar districts of Northern Telangana Zone, Nalgonda, Suryapet, Nagarkurnool and Mahabubnagar districts in Southern Telangana Zone and Medak, Sangareddy, Siddipet, Warangal and Khammam districts in Central Telangana Zone. The sheath rot was widespread in all the locations at varying proportions. Sheath rot incidence (%) in the surveyed fields ranging from 3.0 to 37.7 per cent. The highest incidence (37.7%) was recorded in Nagarkurnool district, whereas the lowest incidence (3.0%) in Nalgonda district. Out of 84 samples were collected during survey, 40 isolates of sheath rot causing pathogen was isolated. The cultural, morphological, pathological characterisation and molecular identification revealed that, 38 fungal cultures were belongs to *S. oryzae* and two cultures belong to *Fusarium proliferatum* causing sheath rot disease in Telangana state.

Keywords: Sheath rot disease, *Sarocladiumoryzae*, *Fusarium proliferatum*, Per cent Disease Incidence.

INTRODUCTION

Rice is the second most important staple food crop of the world consumed by more than half of the world's population. Asian continent itself accounting for 90% of the world production (IRRI, 2019). China is the leading rice producer followed by India, Indonesia and Bangladesh**.** The estimated area, yield and production of rice crop in the world is 162.46 million ha, 4.63 metric tonnes per ha and 504.17 million metric tonnes respectively, during 2020-21. Globally, India accounts for 27.08 % and 23.99 % of the total acreage and production. In Telangana, rice is mostly cultivated under wells, tanks and canals in an area of around 129.78 lakh acres during *kharif* and *rabi,* 2021-22. The crop is grown in 41.85 lakh acres during *kharif*, 2021, whereas 52.80 lakh acres during *rabi,* 2020-21 (Department of agriculture). A remarkable increase in rice area was recorded during 2020-21 in Telangana state is due to increased irrigation facilities, availability of high yielding varieties and farmer pro-government policies.

Although, the crop suffers from many diseases caused by fungi, bacteria, virus, nematodes and other parasites. Among the fungal diseases, sheath rot once a minor and geographically limited disease is becoming major threat and gained momentum in many parts of the world (Bigirimana *et al*., 2015) as well as in India (Saravanakumar *et al*., 2009). It is a serious menace to rice cultivation and considered as an important emerging rice production threat causing yield losses ranging from 3-85% depending upon disease severity (Chakravarthy and Biswas 1978) and complete suppression of panicle exertion (Raina and Singh 1980). Sheath rot of rice is a complex disease that can be caused by various fungal and bacterial pathogens depending on the area, varieties grown, prevailing environmental conditions, farming systems and

involvement of other insect-pests. The major pathogen associated with sheath rot in rice are *Sarocladium oryzae*, *Fusarium fujikuroi* complex and *Pseudomonas fuscovaginae* (Bigirimana *et al*., 2015)., Recently, *Albifimbria terrestris* from northern India (Sharma *et al*., 2021) and *Fusarium proliferatum* from eastern India (Prabhukarthikeyan *et al*., 2021) have been reported incausing sheath rot, grain discolouration, sterility and chaffiness of therice panicles. The various described sheath rot pathogens will cause similar disease symptoms in rice (Cottyn *et al*., 1996). Although, several pathogens have been associated with rice sheath rot, but *Sarocladium oryzae* (sawada W. Gams and D. Hawksw) is a major important seed borne fungal pathogen reported in India.

Sheath rot pathogen infects upper most flag leaf sheath that enclose the emerging young panicles during the boot leaf stage. The major symptoms of sheath rot according to Ou, (1985), the lesions are oblong or irregular oval spot and usually expressed as reddish-brown discoloration of flag leaf sheath. Early infection affects the panicles, so that it partially emerges. The un-emerged portion of the panicle rots, turning florets red-brown to dark brown. Grains from damaged panicles are chaffy and the disease is appropriately known as "empty earhead" and is familiar as "rice abortion" (Kindo, 2012) and it affects seed viability, nutritional and market value (Sakthivel, 2001; Gopalakrishnan *et al*., 2010). The symptoms of *Fusarium proliferatum* is more or less similar to the symptoms caused by *Sarocladiumoryzae*. However, little information is available on the prevalence and distribution of the disease in Telangana state. Hence, the present investigation was undertaken to study the disease distribution during *kharif*, 2021 by following a survey of major rice growing districts of Telangana state.

MATERIALS AND METHODS

A. Collection of diseased/infected plant samples

A roving survey was conducted to collect sheath rot infected plant samples from major rice growing areas of Northern Telangana Zone (Nirmal, Jagtial, Nizamabad, Peddapalli, Kamareddy and Karimnagar), Southern Telangana Zone (Nalgonda, Suryapet, Nagarkurnool and Mahabubnagar) and Central Telangana Zone (Medak, Sangareddy, Siddipet, Warangal and Khammam) of Telangana state during *kharif,* 2021. Survey data collected includes crop and field details such as sample number, name of the village, mandal and district, field location, variety grown, crop stage, previous crop, source of irrigation, panicle type and percent disease incidence (PDI) of sheath rot disease.

Infected plant samples were collected for isolation of sheath rot pathogen *Sarocladium oryzae*. The external signs and symptoms such as the presence of reddish-brown oblong lesions or irregular oval spots on flag leaf sheath were used to determine the incidence of the sheath rot disease in the fields surveyed.

Five plots measuring 1 m × 1 m were selected such that one plot was in the centre of the field and the rest were randomly placed on the four corners leaving 1 m from the border.

The total number of productive tillers were counted in each plant and then counted the number of sheath rot infected panicles and finally computed the sheath rot incidence percentage. Ten plants were randomly selected per one sq. m area and above procedure followed to obtain sheath rot disease incidence percentage. Percent disease incidence was calculated by the following formula:

$$\text{PDI} = \frac{\text{Number of infected tillers}}{\text{Total number of tillers observed}}$$

Isolation of sheath rot associated pathogen

The leaves showing the typical symptoms of sheath rot were selected and washed with sterile distilled water. Small piece of diseased tissue along with some healthy tissue was cut with the help of a sterile scalpel and surface sterilized with 0.1% sodium hypochlorite solution for one min, rinsed thrice in sterile distilled water and dried with sterilized filter paper. The surface sterilized samples were placed on Potato Dextrose Agar (PDA) medium with the help of sterilized forceps and placed in BOD incubator at 28±2 ºC. The pathogens were isolated from the infected tissue and further purified by hyphal tip method (Lilly and Barnett 1951). Sheath rot associated pathogen was identified based on cultural and morphological characters of the isolated fungi.

RESULTS AND DISCUSSION

A roving survey was conducted to collect the information on occurrence of sheath rot in major rice growing areas of Northern Telangana Zone (Nirmal, Jagtial, Nizamabad, Peddapalli, Kamareddy and Karimnagar), Southern Telangana Zone (Nalgonda, Suryapet, Nagarkurnool and Mahabubnagar) and Central Telangana Zone (Medak, Sangareddy, Siddipet, Warangal and Khammam) of Telangana state during *kharif,* 2021. The roving survey was carried out in 72 villages of fifteen major rice growing districts of Telangana state. A total of 84 samples were collected during survey. The data was collected on GPS coordinates, varietal pattern, disease incidence along with district, mandal and village. The data regarding the survey was tabulated in the (Table 1).

Data collected during the survey indicated that majority of the farmers opted for mono-cropping of rice in total surveyed districts except in the Nagarkurnool district where groundnut crop was grown in one season (during *rabi*) and rice crop was grown in another season (during *kharif*). 50% of the farmers in the surveyed villages were cultivating the MTU1010 and BPT5204 rice varieties.

Table 1: Details of survey on incidence of sheath rot disease in major rice growing districts of Telangana state during *Kharif,* 2021.

S. No	Isolate	District	Mandal	Village	Latitude	Longitude	Variety	Stage of Crop	Irrigation source	DI%*
1	SO1	Nalgonda	Gurrampodde	Gurrampodde	16.8677° N	79.1139° E	Swarna	Ma	C	8.5
2	SO2	Nalgonda	Kondamallepalli	Pendlipakala	16.6656° N	78.9917° E	Kaveri	Ma	C	3.0
3	SO3	Nalgonda	Kondamallepalli	Gudithanda	16.7781° N	79.4987° E	BPT5204	D	C	13
4	SO4	Nalgonda	Gurrampodde	Gummadavally	16.7484° N	79.0038° E	Pooja	D	C	10.5
5	SO5	Nalgonda	Chityal	Chityal	17.2320° N	79.1261° E	MTU1010	Ma	B. W	6.0
6	SO6	Nalgonda	B. pochampalli	Jalalpur	17.5965° N	78.7157° E	MTU1055	D	B. W	33.3
7	SO7	Nalgonda	B. pochampalli	Jalalpur	17.5965° N	78.7157° E	BPT5204	D	B. W	14.0
8	SO8	Nalgonda	B. pochampalli	Beemanapally	16.9516° N	78.9295° E	BPT5204	D	B. W	14.7
9	SO9	Nalgonda	Choutuppal	Girakpally	17.2041° N	79.1965° E	Swarna	D	B. W	9.5
10	SO10	Nalgonda	Choutuppal	Kalmugla	17.3149° N	78.8659° E	MTU1010	Ma	B. W	8.0
11	SO11	Nalgonda	Choutuppal	Jiblakpalle	17.3146° N	78.8564° E	BPT5204	D	B. W	14.7
12	SO12	Nalgonda	Chityal	Peddakaparthi	17.2405° N	79.0737° E	BPT5204	D	B. W	13.5
13	SO13	Nalgonda	Narkatpally	Yadavalli	17.3313° N	79.6418° E	MTU1010	Ma	C	7.2
14	SO14	Nalgonda	Narkatpally	Yadavalli	17.3313° N	79.6418° E	BPT5204	D	C	14.0
15	SO15	Nalgonda	Narkatpally	Nemmani	17.2306° N	79.2282° E	BPT5204	Mi	C	16.2
16	SO16	Nalgonda	Narkatpally	Juvvigudem	17.2461° N	79.2332° E	MTU1010	Ma	C	19.2
17	SO17	Nalgonda	Narkatpally	Thondalvai	17.2435° N	79.2508° E	MTU1010	Ma	C	18.5
18	SO18	Nalgonda	Miryalaguda	Japthiveerappagudem	16.8739° N	79.5662° E	JGL24423	Ma	C	3.5
19	SO19	Nalgonda	Tripuraram	Babusaipet	16.8304° N	79.4754° E	JGL21078	Mi	C	5.5
20	SO20	Nalgonda	Tripuraram	Yallamagudem	17.0788° N	79.5026° E	Ankurpooja gold	Mi	C	11.7
21	SO21	Nalgonda	Tripuraram	Tripuraram	17.1148° N	79.8917° E	Cinfoo	Ma	C	5.2
22	SO22	Nalgonda	Tripuraram	ARS, kampasagar	16.8579° N	79.4535° E	BPS2874	Ma	C	7.2
23	SO23	Nalgonda	Tripuraram	Babusaipet	16.8579° N	79.4754° E	HMT sona	D	C	3.9
24	SO24	Suryapet	Suryapet	Suryapet	17.1314° N	79.6336° E	MTU1010	Ma	C	8.5
25	SO25	Suryapet	Sirikonda	Sirikonda	17.1688° N	79.8031° E	BPT5204	Mi	C	12.7
26	SO26/FP1	Suryapet	Suryapet	Ramannagudem	17.1865° N	79.5668° E	MTU1010	Ma	C	5.2
27	SO27	Suryapet	Suryapet	Pinnaipalem	17.1985° N	79.5575° E	MTU1010	Ma	C	3.6
28	SO28	Suryapet	Suryapet	Balemla	17.2114° N	79.5962° E	MTU1010	D	C	3.7
29	SO29	Suryapet	Mothey	Sarvaram	16.8800° N	79.7736° E	BPT5204	Ma	C	8.5
30	SO30	Suryapet	Kodad	Gumpula	16.9947° N	79.9750° E	MTU1010	Ma	C	6.2
31	SO31	Suryapet	Suryapet	Pillalamarry	17.1680° N	79.5832° E	BPT5204	D	C	14.7
32	SO32	Suryapet	Mothey	Burkacherla	17.2246° N	79.8156° E	MTU1010	Ma	C	7.2
33	SO33	Suryapet	Mothey	Namavaram	17.2368° N	79.8258° E	MTU1010	Ma	C	6.0
34	SO34	Nirmal	Bhainsa	Badgoan	19.0751° N	77.9442° E	MTU1010	Ma	B. W	6.2
35	SO35	Nirmal	Sarangapur	Gopalpet	19.1610° N	78.3290° E	MTU1010	Ma	B. W	7.2
36	SO36	Nizamabad	Morthad	Morthad	18.8118° N	78.3973° E	JGL24423	Mi	B. W	3.4
37	SO37	Nizamabad	Bheemgal	Jaggirial	18.7207° N	78.4418° E	MTU1010	Ma	B. W	5.6
38	SO38	Nizamabad	Dharmaram	Dharmaram	18.6499° N	78.1664° E	BPT5204	D	B. W	6.6
39	SO39	Nizamabad	Dharmaram	Dharmaram	18.6499° N	78.1664° E	MTU1010	Ma	B. W	5.4
40	SO40	Nizamabad	Rudrur	Rudrur	18.5817° N	77.8782° E	BPT5204	D	B. W	5.2
41	SO41	Kamareddy	Kamareddy	Reddypet	18.4081° N	78.4151° E	MTU1010	Ma	B. W	4.6
42	SO42	Medak	Medak	Medak	18.0352° N	78.2740° E	Amani	D	B. W	11.1
43	SO43	Medak	Medak	Medak	18.0570° N	78.2549° E	Basmati	D	B. W	4.5

S. No	Isolate	District	Mandal	Village	Latitude	Longitude	Variety	Stage of Crop	Irrigation source	DI%*
44	SO44	Medak	Ghanpur	Navipet	18.0403° N	78.2501° E	KNM 118	D	B. W	3.0
45	SO45	Medak	Medak	Ghanpur	18.0626° N	78.2402° E	Amani	Ma	B. W	9.5
46	SO46	Medak	Medak	Mambojipally	18.0570° N	78.2740° E	KNM 118	Ma	B. W	14.0
47	SO47	Medak	Medak	Machavaram	18.0181° N	78.2405° E	KNM 1638	Ma	B. W	6.0
48	SO48	Medak	Chilichedu	Chandur	17.8754° N	78.1008° E	Daptari1008	Ma	B. W	10.5
49	SO49	Medak	Chilichedu	Chandur	17.8763° N	78.1007° E	RNR 21278	D	B. W	13.3
50	SO50	Mahabubnagar	Bhutpur	Bhutpur	16.7008° N	78.0495° E	MTU1010	Ma	B. W	3.3
51	SO51	Mahabubnagar	Bhutpur	Medigatla	16.6451° N	78.0598° E	Telanganasona	Mi	C	13.3
52	SO52	Jagtial	Jagtial	RARS, Jagtial	18.7895° N	78.9120° E	JGL24423	Mi	B. W	11.1
53	SO53	Jagtial	Jagtial	Thatipally	18.7656° N	78.8930° E	MTU1010	Ma	B. W	33.3
54	SO54	Jagtial	Dharmapuri	Dharmapuri	18.9480° N	79.0948° E	BPT5204	D	B. W	24.4
55	SO55	Jagtial	Jagtial	RARS, Jagtial	18.7895° N	78.9120° E	JGL 3844	D	B. W	24.4
56	SO56	B. Kothagudem	Sathupally	Lingapalem	17.1501° N	80.7971° E	BPT5204	D	C	11.1
57	SO57	Karimnagar	Dimidi	Jammikunta	18.2891° N	79.4739° E	RNR 21278	D	B. W	13.3
58	SO58	Karimnagar	Huzurabad	Sivsapally	18.5171° N	79.2701° E	RNR 28361	D	B. W	33.3
59	SO59	Peddapalli	Kalvasrirampur	Mangapet	18.2499° N	80.5166° E	MTU1341	Ma	C	28.8
60	SO60	Siddipet	Koheda	samudrala	18.0867° N	79.0975° E	JGL 28545	Mi	B. W	11.1
61	SO61	Siddipet	Jagadevpur	Chatlapally	17.7680° N	78.8080° E	JGL24423	Mi	B. W	13.3
62	SO62	Siddipet	Rimmamguda	Burugupally	18.5006° N	78.3558° E	RNR 15459	D	B. W	14.4
63	SO63	Sangareddy	Choutikur	Choutikur	18.5002° N	78.3459° E	JGL24423	Mi	B. W	11.1
64	SO64	Sangareddy	Choutikur	Choutikur	18.5013° N	78.3454° E	RNR 29325	D	B. W	11.1
65	SO65	Sangareddy	Andole	Annesagar	17.8499° N	78.7833° E	RDR 1200	D	B. W	28.8
66	SO66	Sangareddy	Andole	Posanipet	17.8564° N	78.7833° E	MLT4	Mi	B. W	13.3
67	SO67	Sangareddy	Andole	Annesagar	17.8499° N	78.7833° E	Black rice	Mi	B. W	11.1
68	SO68	Warangal	Kothapet	Kothapet	18.0249° N	79.6558° E	BPT5204	D	B. W	13.3
69	SO69	Warangal	Paidipally	Paidipally	18.2084° N	79.7057° E	WGL 915	D	B. W	24.4
70	SO70	Nagarkurnool	Achampet	Vanguru	16.6086° N	78.6243° E	MTU1010	Ma	B. W	11.1
71	SO71	Nagarkurnool	Achampet	Achampet	16.3990° N	78.6370° E	BPT5204	Ma	B. W	12.2
72	SO72/FP2	Nagarkurnool	Kalvakurthy	Amangal	16.8494° N	78.5303° E	MTU1010	Ma	B. W	13.3
73	SO73	Nagarkurnool	Kalvakurthy	Kalvakurthy	16.6685° N	78.4906° E	BPT5204	D	B. W	11.1
74	SO74	Nagarkurnool	Kalvakurthy	Madgula	16.6685° N	78.6576° E	MTU1010	Ma	B. W	33.3
75	SO75	Nagarkurnool	Kalvakurthy	Veldhanda	16.7434° N	78.5420° E	BPT5204	Ma	B. W	24.4
76	SO76	Nagarkurnool	Kollapur	Kollapur	16.1060° N	78.3192° E	MTU1010	Ma	B. W	24.4
77	SO77	Nagarkurnool	Nagarkarnool	Bijinepally	16.5337° N	78.2048° E	BPT5204	D	B. W	11.1
78	SO78	Nagarkurnool	Nagarkarnool	Nagarkurnool	16.4939° N	78.3102° E	MTU1055	Ma	B. W	13.3
79	SO79	Nagarkurnool	Achampet	Lingala	16.3890° N	78.6364° E	BPT5204	D	B. W	37.7
80	SO80	Nagarkurnool	Kollapur	Pedhakaparthy	16.1060° N	78.3192° E	MTU1010	Ma	B. W	28.8
81	SO81	Nagarkurnool	Nagarkarnool	Nagarkarnool	16.5337° N	78.2048° E	BPT5204	Ma	B. W	11.1
82	SO82	Nagarkurnool	Kalvakurthy	Kalvakurthy	16.8494° N	78.5303° E	MTU1010	Ma	B. W	33.3
83	SO83	Nagarkurnool	Nagarkarnool	Thimmajipet	16.5337° N	78.2048° E	BPT5204	D	B. W	14.4
84	SO84	Nagarkurnool	Nagarkarnool	Nagarkurnool	16.6326° N	78.3404° E	BPT5204	Ma	B. W	11.1
							CD			5.4
							SE(m)±			2.0

**Mean of 5 replications B.W- Bore wells, C- Canal DI % - Disease incidence percentage Ma- Maturity stage, D- Dough stage, Mi- Milky stage*

Fields were majorly irrigated through canals in Nalgonda and Suryapet and remaining districts through borewells tabulated in Table 1.

During the survey, stage of the rice crop was milky to mature stage. The maximum sheath rot incidence was observed in the surveyed fields were seen at mature stage of the rice crop. Percent disease incidence of sheath rot in the surveyed fields ranging from 3.0 to 37.7 per cent. The highest incidence of sheath rot (37.7%) was noticed at Lingala village of Achampetmandal of Nagarkurnool district followed by Jalalpur village of Bhoodan Pochampallimandal of Nalgonda district and Thatipally village, Jagtialmandal of Jagtial district with a disease incidence of (33.33%) while the lowest incidence (3%) was recorded in Pendlipakala village, Kondamallepally mandal of Nalgonda district followed by Navipet village, Ghanpurmandal of Medak district. Out of 84, samples of sheath rot, forty six samples from fine grain varieties and thirty eight samples from coarse grain varieties of rice. The maximum sheath rot incidence was noticed in fine grain varieties range from (10.5 to 37.7%) when compared to coarse grain varieties range from (3.0 to 33.0 %) indicating that most of the fine grain varieties were having compact nature of the panicle favouring the sheath rot disease initiation. Majority of the rice area in Telangana during *kharif,* 2021 was under fine grain varieties where sheath rot disease affected the farmer fields drastically. If the fine grain varieties cultivation occupies 60-70% of the total cultivated rice area in Telangana, the yield losses estimated to be nearly 60%. Among the 84 samples were collected from farmer fields in different villages 9 data points were showing the severe (25-70%) incidence, 67 data points showed moderate (6-25%) incidence and 8 data points showed less (0-5%) incidence of sheath rot disease (Fig. 1). Bar graph was drawn with varied PDI and total samples which is represented in Fig. 2.

Similar findings were reported by Kumar *&* Priya (2016), Vengadeshkumar *et al*. (2019). Kumar *et al*. (2017) reported highest incidence of sheath rot was recorded in Orathur (30.5) village and the least incidence was noticed in Vennankuzhi (12.1) village of Tamil Nadu state. Vengadeshkumar *et al.* (2019) reported the disease incidence ranged from 12.32 to 30.43 per cent in Nagapattinam district of Tamil Nadu state.

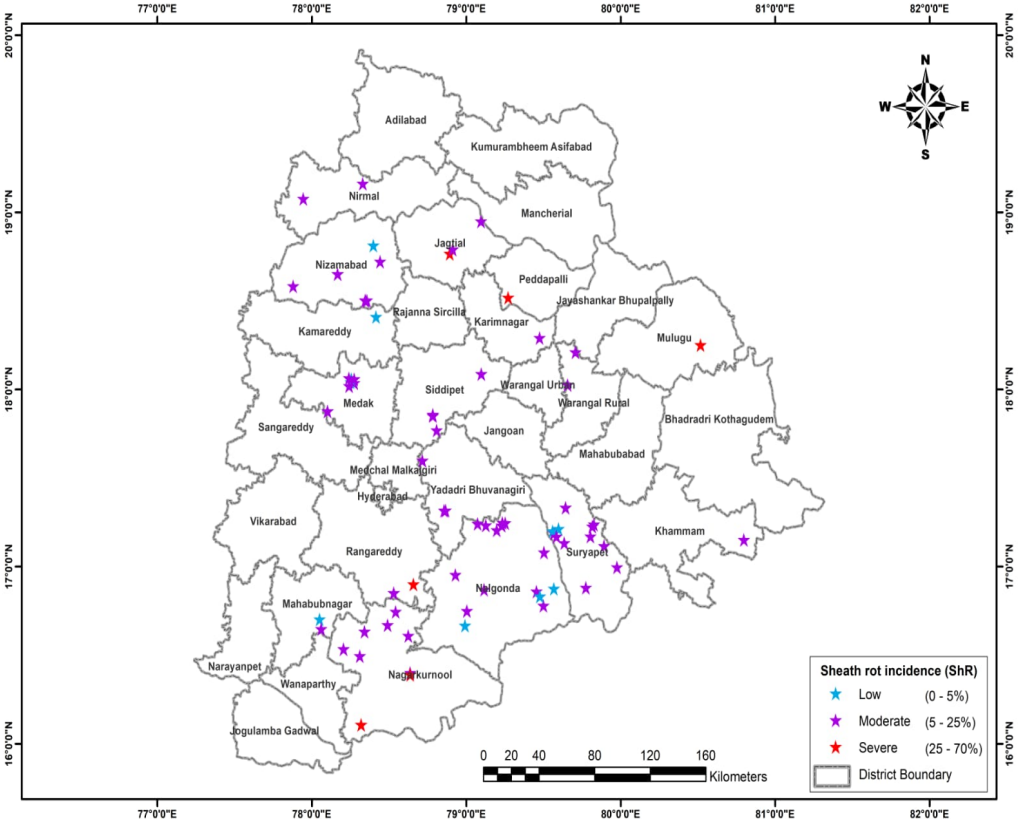


Fig. 1. Telangana map showing incidence of sheath rot disease in different rice growing districts of Telangana state during *Kharif*, 2021. Village wise incidence data was used to generate the distribution maps using QGIS map Software. Different colours of symbols used indicate the intensity of the disease in a particular location.

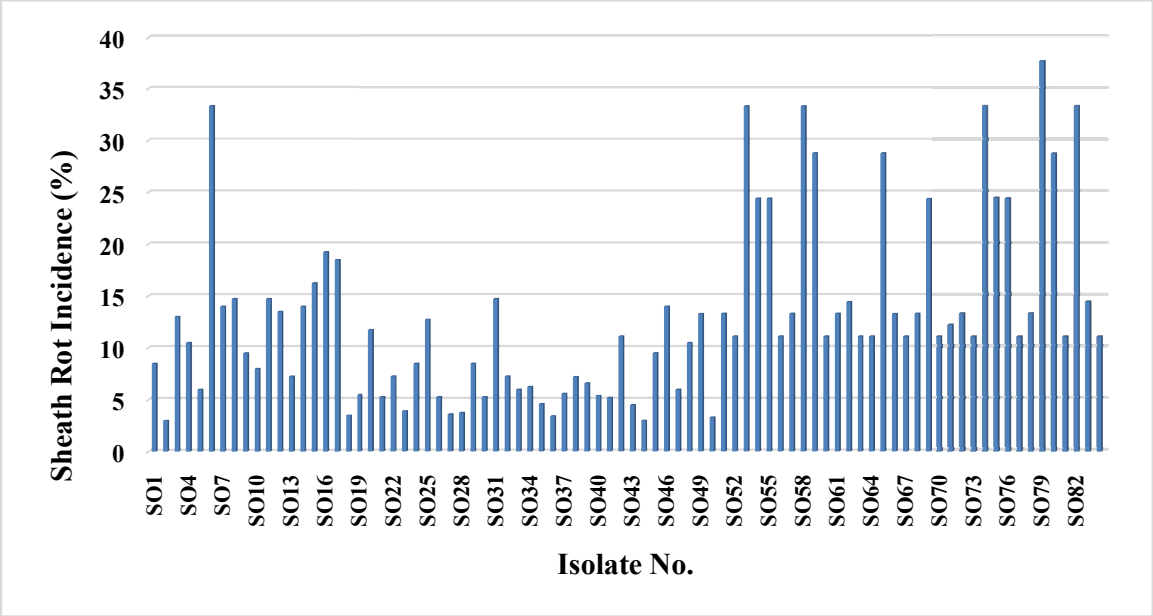
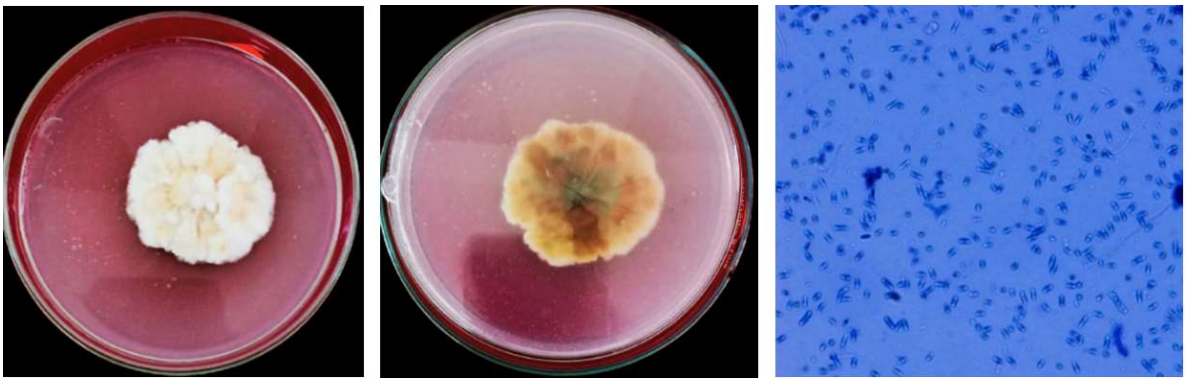
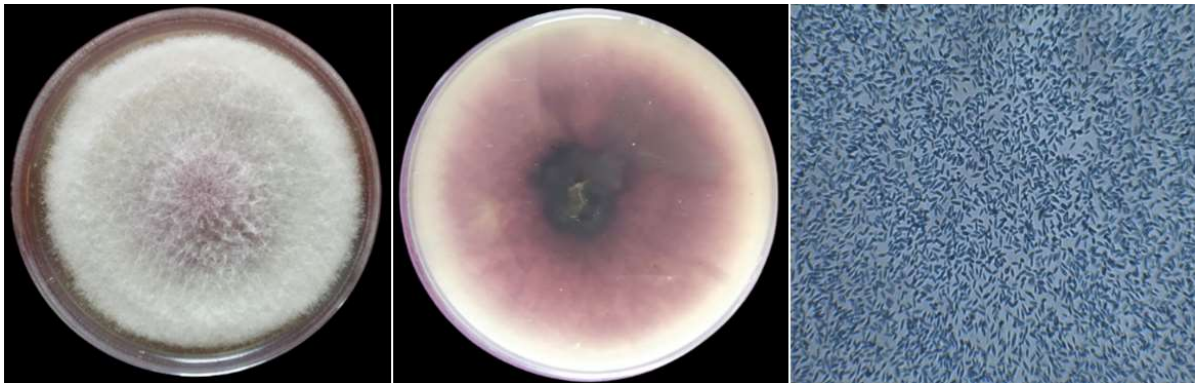


Fig. 2. Bar graph representing disease incidence% of different sheath rot disease samples collected during survey with name of the sample/isolate on *X*-axis and disease incidence % on *Y*-axis.



(a) (b) (c)

Fig. 3. (a) Colony growth of *Sarocladium oryzae* on top of petri plate (b) Colony growth of *S. oryzae* on bottom of the petri plate (c) Cylindrical, single-celled and aseptate conidia of *S. oryzae.*



(a) (b) (c)

Fig. 4. (a) Colony growth of *Fusarium proliferatum* (Top), (b) Colony growth of *F. proliferatum*(bottom) (c) Abundant single-celled, oval shaped microconidia.

Identification of *Sarocladium oryzae* was done based on the cultural and morphological characterstics such as colony colour varied from white to pale orange. Pigmentation on the bottom of the plate varied from white to brown. Conidiophores were simple or branched. Conidia was cylindrical, aseptate and hyaline, 4-7 x 1-2 µm in size, and arranged in slimy heads (Bigirimana, 2016) (Fig. 3). Identification of *Fusarium proliferatum* was done based on the cultural and morphological characterstics such as the colonies produced white aerial mycelium with violet to pink pigmentation. Hyphae was hyaline and septate. Abundant single celled, oval shaped microconidia were produced, whereas macroconidia was not produced (Prabhukartikeyan *et al*., 2021) (Fig. 4). Finally, 38 isolates of *Sarocladium oryzae* and 2 isolates of *Fusarium proliferatum* were obtained from infected rice leaf sheaths. The two *Fusarium* isolates were obtained from sample no SO26 and SO72.

CONCLUSIONS

The present study concludes that generally sheath rot disease of rice is present in almost all the surveyed rice fields with variable disease incidence. Highest Percent Disease incidence was recorded in the sample/Isolate SO79 collected from Nagarkurnool district. Nalgonda and Nagarkurnool are among the predominant areas with respect to sheath rot disease of rice. *S. oryzae* and *F. proliferatum* are responsible for causing sheath rot disease of rice in Telangana. Majority of the farmers are growing fine grain varieties which are highly susceptible to sheath rot in farmer fields. The yield of fine grain varieties was significantly affected due to sheath rot especially grain discolouration drastically reduce the market value of the produce. In continuation of the survey work, the samples collected during survey will be identified based on molecular basis. Further, proceed for proving pathogenicity of the isolates.

FUTURE SCOPE

Therefore, similar kind of studies should be regularly carried out in different rice growing areas to assess the status of sheath rot disease and making appropriate management strategies for future.

Acknowledgement. Authors are thankful to the Rice Research Centre, ARI, Rajendranagar, Hyderabad for constant encouragement and support. Authors are also thankful to the Senior Professor and University Head, Department of Plant Pathology and other faculty members of PJTSAU for providing necessary technical support during course of investigation.

Conflict of Interest. None

REFERENCES

Bigirimana, V. P. (2016). Characterisation of sheath rot pathogens from major rice-growing areas in Rwanda. Ph.D. thesis, Ghent University, Belgium. 1-159.

Bigirimana, V. P., Hua, G. K. H., Nyamangoku, O. I. and Hofte, M. (2015). Rice sheath rot: An emerging ubiquitous destructive disease complex. *Frontiers in Plant Science*, *1066*: 1-16.

Chakravarthy, D. K. and Biswas, S. (1978). Estimation of yield loss in rice affected by sheath rot. *Transactions of British Mycological Society*, *62*: 226-227.

Cottyn, B., Cerez, M. T., Van Outryve, M. F., Barroga, J., Swings, J and Mew, T. W. (1996). Bacterial diseases of rice; Pathogenic bacteria associated with sheath rot complex and grain discolouration of rice in the Philippines. *Plant Disease, 80*: 429-437.

Department of Agriculture. 2021. http://www.agri.telangana.gov.in.

Gopalakrishnan, C., Kamalakannam, A. and Valluvaparidasan, V. (2010). Effect of seedborne *Sarocladium oryzae,* the incitant of rice sheath rot on rice seed quality. *Journal of Plant Protection and Research, 50*: 98-102.

IRRI. (2019). Standard evaluation system for rice. 5th ed, *International Rice Research Institute*; Manila, the Philippines.

Kindo, D. (2012). Studies on management of sheath rot disease of rice. *M.Sc. Thesis*, Indira Gandhi Krishi Vishwa Vidyalaya, (IGKV), Raipur, Chhattisgarh, India.141-152.

Kumar, N. R. and Priya, M. R. (2016). Survey and evaluation of efficacy of some fungicides against virulence of *Sarocladium oryzae* inciting sheath rot disease of rice. *Oryza*, *53*(4): 464-469.

Lilly, V. G and Barnett, H. L. (1951). *Physiology of the fungi*. *McGraw Hill Book Company*., New York. 251.

Ou, S. H. (1985). *Rice Diseases*. Wallingford: *CAB International.*127.

Prabhukarthikeyan, S.R., Keerthana, U., Nagendran, K., Manoj, K., Parameswaran, C., Panneeselvam, P and Rath, P.C. (2021). First report of *Fusarium proliferation* causing sheath rot disease of rice in Eastern India. *Plant Disease, 105*(3): 704.

Raina, G. L and Singh G. (1980). Sheath rot outbreak in Punjab. *International Rice Research News, 5*(1): 16.

Sakthivel, N. (2001). "Sheath rot disease of rice: current status and control strategies", In Major Fungal Diseases of Rice*: Dordrecht: Springer*, *10*: 271-283.

Saravanakumar, D., Lavanya, N., Muthumeena, K., Raguchander, T and Samiyappan, R. (2009). Fluorescent pseudomonad mixtures mediate disease resistance in rice plants against sheath rot *(Sarocladium oryzae*) disease*. Biocontrol*., *54*: 273-286.

Sharma, A. B., Kumar, A. and Javeria, S. (2021). Pathogenic association of *Albifmbria terrestris* with rice seeds. *Indian Phytopathology, 74*: 849-850.

Vengadeshkumar, L., Meera, T., Bababaskar, P. and Jaiganesh, V. (2019). Survey of the incidence of rice sheath rot disease and assessing the cultural characters and pathogenicity of *Sarocladium oryzae*. *Plant Archives*. *19*(1): 1677-1683.

How to cite this article: M. Manasa, T. Kiran Babu, S. Ameer Basha, N. Rama Gopala Varma and S.N.C.V.L. Pushpavalli (2022). Survey on the Status of Sheath Rot Disease Complex in Major Rice Growing Districts of Telangana State. *Biological Forum – An International Journal*, *14*(3): 111-117.