

Pathogenic Variability in *Sarocladiumoryzae* Isolates

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Abstract

The studies were conducted to determine the pathogenic variations among twenty two isolates of *Sarocladiumoryzae* designated as S.o.-1 to S.o.-22 collected from different areas of Chhattisgarh State. Variation in disease severity was recorded among the 22 isolates when tested on 4 varieties. The severity of the disease measured in terms of lesion length clearly indicated that isolates responded differently with the 4 test cultivars. On Pant-4, isolates S.o.- 2, 10, 13, 19, 6 and 22 showed more disease severity as compared to others. The Chapti variety recorded more disease with isolate S.o.-14, 6, 10 and 18. Similarly Bamleshwari and IET-8585 had more disease severity with S.o.- 1, 16, 18, 14 and 2 and S.o.- 10, 8, 19, 13 and 18 respectively. These results confirm that the isolates varied in their pathogenicity.

Key words: Rice, sheath rot, *Sarocladiumoryzae*, virulence

Introduction

With the introduction of high yielding varieties in rice, the incidence of the disease increased tremendously. Diseases are one of the major constraints to the stability of the production. Of the various diseases that affect the rice crop sheath rot caused by *S. oryzae* is most damaging. The disease was of minor importance till few years back, but recently it has assumed a serious proportion in major rice growing areas in the country. It attacks uppermost leaf sheath which results incomplete or partial

Materials and Methods

The uppermost leaf sheath of rice plants with the sheath rot symptoms were collected from twenty two rice varieties from different locations of Chhattisgarh State. The pathogen isolation was made following the routine procedure. The fresh infected samples were cut into small bits, and surface sterilized with the sodium hypochlorite solution and gently placed on the previously poured Potato Dextrose Agar medium. The plates were incubated

emergence of the panicle. The disease reduces grain yield by retarding or aborting panicle emergence, and producing unfilled seeds and sterile panicles. Sheath rot also reduces grain quality by causing panicles to rot and grains to become discolored. Thus it poses a potential threat to rice cultivation and causes 80-85% yield losses^[2,3]. Keeping in view a survey were conducted to collect the isolates of *S. oryzae* prevailing in different areas and on different rice varieties of Chhattisgarh State.

at $28 \pm 2^{\circ}$ C till the further use. These isolates were designated as S.o.-1 to S.o.-22. The relative virulence of the isolates were studied by inoculating them on four popular varieties viz. Bamleshwari, Chapti, Pant-4 and IET-8585.

Twenty one days old seedlings of each variety were transplanted in 2 m. row length with a spacing of 20x15 cm between row to row and plant to plant respectively. Artificial inoculation was

done by randomly inoculating the 20 tillers separately with each isolate at boot stage. For preparation of the inoculum half cooked rice grain bits were first gently rubbed over the fungal growth (25 days) cultured in plates. This has helped the spore and mycelium in adhering to the grain bits. Such coated grain bits were

Results and Discussion

To study the degree of lesion development all the 22 isolates isolated from different varieties/locations were inoculated on four popular varieties grown in Chhattisgarh region. There were variations among the isolates in disease severity, recorded 21 days after inoculation. Each isolate when inoculated to the four cultivars also showed variation in disease development.

On IET - 8585 isolate S.o.- 8,10,13,18 and 19 showed maximum severity as compared to other isolates. On Chapti variety, isolate S.o.- 6, 10, 14 and 18 showed more disease severity than other isolates. On Bamleshwari variety, isolate S.o.- 1, 14, 16 and 18 showed maximum disease severity as compared to

inserted gently into the boot. Plants inoculated with the rice grain bits without spore coating of the test fungus were kept to serve as control. Observation was recorded at 21 days after inoculation for the disease severity. The disease severity was recorded in terms of lesion length.

other isolates. On Pant – 4 variety isolates S.o.- 2, 6, 10, 13 and 19 showed more disease severity as compared to other isolates and isolate S.o.- 2 showed maximum disease severity as compared to other isolates and lesion length was maximum among other varieties. This data clearly indicated that there was variation within the isolates in their pathogenicity, on the set of 4 varieties. The average lesion development was maximum in isolates S.o.-10 followed by S.o.- 19, 2, 13 and 6. The minimum average lesion length was recorded in S.o.- 4 followed by S.o.-21, 15, 22 and 7. Other isolates showed lesion length in between these isolates ranges (table 1).

Table 1 : Relative virulence of 22 isolates

S.No.	Isolates of <i>S. oryzae</i>	Average lesion length (mm) 21 DAI*				Average
		IET-8585	Chapti	Bamleshwari	Pant-4	
1.	S.o.-1	69	80	84	70	75.75
2.	S.o.-2	59	80	79	130	87.00
3.	S.o.-3	63	57	60	43	55.75
4.	S.o.-4	43	62	33	55	48.25
5.	S.o.-5	69	58	78	65	67.50
6.	S.o.-6	71	96	66	91	81.00
7.	S.o.-7	56	31	74	61	55.50
8.	S.o.-8	96	64	68	65	73.25
9.	S.o.-9	68	57	59	63	61.75
10.	S.o.-10	106	94	78	128	101.50
11.	S.o.-11	69	56	31	67	55.75
12.	S.o.-12	68	52	76	34	57.50
13.	S.o.-13	86	61	78	115	85.25
14.	S.o.-14	58	97	83	66	76.00
15.	S.o.-15	64	49	29	69	52.75
16.	S.o.-16	57	55	84	50	61.50
17.	S.o.-17	60	63	71	29	55.75
18.	S.o.-18	82	87	80	49	74.50
19.	S.o.-19	89	78	70	111	87.00
20.	S.o.-20	54	61	66	63	61.00
21.	S.o.-21	36	80	30	56	50.50
22.	S.o.-22	73	28	34	87	55.50
	Average	68	65.73	64.18	71.23	

The degree of lesion development showed that maximum lesion length was recorded from Pant-4 variety i.e. 130 mm with the isolate S.o.-2. For the sake of explanation the isolates which showed less than 5mm difference in lesion length on different varieties were grouped and

presented in Table-2. In all the varieties IET-8585, Chapti, Bamleshwari and Pant-4, five isolates showed degree of lesion length between 69-73, 61-65, 74-78 and 61-65 mm respectively. But the same isolate not responding the same for all the varieties.

Table 2: Isolates which showed less than 5mm difference in lesion length within them on different varieties

Variety	Range of lesion length (mm)	Corresponding isolates
IET-8585	54-58	S.o.-7, 14, 16, 20
	59-63	S.o.-2, 3, 17
	64-68	S.o.-9, 12, 15
	69-73	S.o.-1, 5, 6, 11, 22
	86-90	S.o.-13, 19
Chapti	28-32	S.o.-7, 22
	49-53	S.o.-12, 15
	55-59	S.o.-3, 5, 9, 11, 16
	61-65	S.o.-4, 8, 13, 17, 20
	78-82	S.o.-1, 2, 19, 21
	94-98	S.o.-6, 10, 14
Bamleshwari	30-34	S.o.-4, 11, 21, 22
	59-63	S.o.-3, 9
	66-70	S.o.-6, 8, 19, 20
	74-78	S.o.-5, 7, 10, 12,13
	79-83	S.o.-2, 14, 18
	84-88	S.o.-1, 16
Pant-4	49-53	S.o.-16, 18
	55-59	S.o.-4, 21
	61-65	S.o.-5, 7, 8, 9, 20
	66-70	S.o.-1, 11, 14, 15
	87-91	S.o.-6, 22
	111-115	S.o.-13, 19
	128-132	S.o.-2, 10

The relative virulence in terms of disease produced by the isolates on 4 popular varieties clearly indicated that variation exists among the isolates. Isolates responded differently in their disease severity with a particular variety and also among the varieties in general.

However, few isolates also had close proximity in disease severity within a variety. The differences in pathogenic ability of different isolates might be due to the capacity to secrete different cell wall degrading enzymes. A positive correlation was reported between these two^[1].

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