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Short Communication

Comparative Studies on Virulence of *Claviceps africana and C. sorghi* and Their Effect on Hybrid Seed Production of Sorghum

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Ergot of sorghum (*Sorghum bicolor* (L.) Moench), is a serious constraint, since it poses a major threat to the sorghum seed as well as grain production. Sorghum ergot is caused by three different species of *Claviceps*, viz. *C. sorghi* in India [1], *C. africana* in Africa [2], and *C. sorhgicola* in Japan [3].

In India, the occurrence of *C. sorghi* and *C.africana* is reported [4, 5]. Recent studies have shown that the pathogen *C. africana* is predominantly occurring in India, over the native pathogen *C. sorghi* [5, 6]. The present study, therefore, was conducted to investigate the comparative virulence and disease causing potential of *C. africana* and *C. sorghi* on CMS line of sorghum hybrid.

The present work was done at National Research Centre for Sorghum (NRCS), Hyderabad, with 4 isolates of *C. africana* and one isolate of *C. sorghi*. The isolates NC1, NC2, NC3 and NC4 all belonged to *C. africana* were collected from NRCS, Hyderabad; Acharya N.G. Ranga Agricultural University (ANGRAU), Hyderabad; UAS, Dharwad; Karnataka and Indore in Madhya Pradesh, respectively. The isolates NC5, belonged to *C. sorghi* was obtained from ICRISAT, Patancheru, Hyderabad, where it was artificially maintained. The sorghum male sterile line 296A was taken as the test plant through out the investigation and the plants were grown in plastic pots filled with red soil. The pathogens were isolated from the fresh *sphacelia* (before honeydew secretion), obtained by inoculation of the panicle with conidial suspension (1×10^6 conidia mL^{-1}), which was cultured on T_2 agar medium [6, 7]. The isolates were studied for cultural characteristics, morphology of macroconidia and microconidia to confirm their identity.

To test the pathogenicity, conidial suspension (1×10^6 conidia mL^{-1}) prepared from 7 days old honeydew of different isolates was spray inoculated over the panicle of male sterile plants (296 A), at 50% flowering stage. A total of 10 plants were made into one lot and for each isolate three such lots were allocated. The inoculated panicles were covered with paper bags to avoid external source of infection. The bags were removed after one week, and the observation on disease incidence and severity were recorded.

To evaluate the disease causing potential of different isolates in terms of comparative ability to colonize the ovary in competition with germinating pollen grains on the same stigma, the plants (at 50% flowering) were inoculated with various isolates. After inoculation the panicles were covered with paper bags except while pollination. Immediately after drying, a set of plants (three plants for each isolate) were pollinated the same day with pollen grains of CSV 15 (Restorer line), by tapping the fully flowered panicle over the test plants. Subsequently the pollination was done daily upto 5 days. Control was maintained by not pollinating the inoculated plants. Observations were made on the seventh day on all the test plants, which were inoculated and pollinated at different days after inoculation (DAI),

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Table 1. Variation in percentage DI and severity of ergot, on inoculation with different isolates and pollination at different days of interval.

Isolates	DI %	Severity %	Severity of ergot with pollination of different DAI*													
			Same day		1 DAI		2 DAI		3 DAI		4 DAI		5 DAI		Control	
			NIS	G	NIS	G	NIS	G	NIS	G	NIS	G	NIS	G	NIS	G
NC1	100	14	7	1	14	1	21	2	46	2	87	3	89	3	91	3
NC2	100	17	13	1	17	1	24	2	51	3	92	3	113	4	107	4
NC3	100	11	6	1	9	1	16	1	40	2	73	3	93	3	103	4
NC4	100	22	11	1	12	1	27	2	49	2	87	3	107	4	111	4
NC5	100	3	0	0	3	1	9	1	7	1	26	2	43	2	52	3
			SEM+		Isolates				DAI				Isolates x DAI			
			l.sd.		0.782				0.914				1.23			
			(5% level)		2.102				2.618				4.03			

* Mean of three replications; values are made absolute numbers
NIS - Number of infected spikelets
G - Grade (1-5 scale); DI - Disease Incidence
DAI - Days after inoculation.

for the ergot development. The disease grade (1-5 scale) was given for the ergot - infected panicles based on the report of [8].

The observation on the cultural characteristics, and morphology of the macro conidia showed that the isolates. NC1, NC2, NC3 and NC4 belong to *C. africana*. The cultures of the isolates were compact, fleshy and non-sporulating. The isolate NC5 was *C. sorghi*, with the cultures having velvety growth and sporulation on the T2 agar medium. The size and shape of the macroconidia of NC1, NC2, NC3 and NC4 tallied with the description given [2] while describing *C. africana*. In the same way the size and shape of macroconidia of NC5 tallied with the description given [1]. Of the five isolates observed to be more virulent as compared to *C. sorghi* isolate (table 1), the isolate NC4 recorded maximum per cent severity (22%), followed by NC2 (17%). The least severity (3%) was recorded in NC5. while testing the disease causing potential of various isolates followed by pollination at different stages, it was found that the disease incidence as well as severity increased with progressive delay in pollination (table 1). The disease causing potential of *C. africana* isolates was higher as compared to *C. sorghi*.

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