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Occurrence of Anthracnose (*Colletotrichum gloeosporioides*) in *tossa* jute (*Corchorus olitorius*) in India

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Information on occurrence of anthracnose (*Colletotrichum gloeosporioides*) in *tossa* jute in India was restricted to Assam since 1960s. The regular survey conducted during last seven years (2008-2015) at various jute growing states revealed that the disease is spreading in all jute grown states. Studies on symptoms as well as on pathogen are in conformity with earlier reports. Differential disease reaction was also observed on different breeding materials. The disease was well established in Bangladesh since 1950s due to its congenial weather condition as well as cultivation of varieties developed from susceptible materials. Fortunately the susceptible materials were not allowed to enter in India during 1950s. The recent spread of the disease may be due to exchange of germplasms over the years and conduction of national hybridization programme all over the jute growing areas of the country.

Key words: Jute, *Corchorus olitorius*, Anthracnose, *Colletotrichum gloeosporioides*

Jute (*Corchorus olitorius*: *tossa* jute and *C. capsularis*: *white* jute) is an important commercial bast fibre crop grown in Eastern and Northeastern part of the country with maximum area and productivity in West Bengal. One of the important diseases of jute is anthracnose (*Colletotrichum corchorum* attacking *white* jute and *C. gloeosporioides* attacking *tossa* jute). The anthracnose in *white* jute was described and studies in details by Itaka (1940) in Japan, Ghosh (1957) and Purakayastha and Sen Gupta (1975) in India. But very little information on anthracnose in *tossa* jute is available. The disease was first reported in 1966-68 at Nagaon, Assam on JRO 514, JRO 878, JRO 524 (Anon, 1966) and since then it is firmly established in Assam. But in other parts of the country no report/information of such disease was found.

During monitoring of various new-work trials on jute at different centres of All India Network Project on Jute and Allied Fibres (AINPJAF) during 2008-2014, severe incidence of anthracnose was recorded in Barrackpore and Kalyani (West Bengal), Katihar (Bihar) at harvesting time (July to September) in fibre as well as in seed crop of newly released varieties like JBO 2003H, S-19, JRO 8432. Information on anthracnose disease in *tossa* jute is largely lacking. In view of recent severity of the disease, the samples were collected for further study under laboratory condition.

Jute crop was sown at various AINPJAF centres - Barrackpore and Kalyani (West Bengal), Nagaon (Assam), Katihar (Bihar), Behraich (Uttar Pradesh) during the month of April (for fibre purpose) and August (for seed purpose). The fibre crop was monitored at the time of harvest i.e. during end of

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Table 1: Incidence and severity of anthracnose at various AINPJAF Centres

AINPJAF Centres*	Incidence (%)	Severity (no. of spots/plant)	PDI (%)
Barrackpore (West Bengal)	1-30 (fibre crop) 70 -80 (seed crop)	15-30 (fibre crop) 15-50 (seed crop)	15 30
Kalyani (West Bengal)	20-30	10-60 (fibre crop)	30
Katihar (Bihar)	5-10	15-40 (fibre crop)	44
Nagaon (Assam)	5-20	40-80 (fibre crop)	62
Berhaich (Uttar Pradesh)	5-20 in capsularis	30-50 (fibre crop)	36

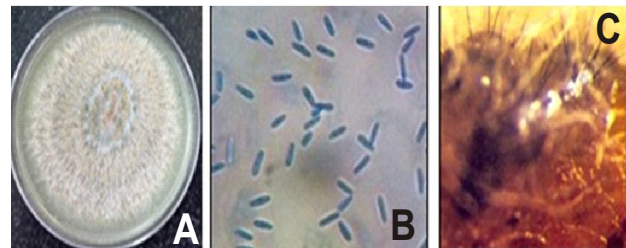
* AINPJAF= All India Network Programme on Jute and Allied Fibres

Table 2: Average rainfall (mm) pattern during April–August at various AINPJAF centres during 2008-15

AINPJAF Centres [†]	April	May	June	July	August
Barrackpore (West Bengal)	32 (0-68)*	144 (58-179)	235 (39-387)	256(135-357)	365(240-587)
Kalyani (West Bengal)	26 (0-63)	80 (14-148)	130 (19-309)	150 (20- 410)	214(30-646)
Nagaon (Assam)	100 (43-273)	216 (94-315)	247 (88-540)	352(233-498)	330(264-367)
Berhaich (Uttar Pradesh)	20 (0-77)	54(30-72)	140 (72-317)	297(204-421)	292(254-368)

[†] AINPJAF= All India Network Programme on Jute and Allied Fibres

*Figure in the parentheses represents range of rainfall, Source: Annual reports of AINPJAF, 2008-09 to 2014-15

**Fig. 1 :** Field view of anthracnose**Fig. 2 :** Close view of anthracnose**Fig. 3 :** a. Colony of *Colletotrichum gloeosporioides*, b. Conidia, c. Acervuli with setae

July to August. Under field condition the incidence (%) and severity (no. of spot/plant) of the disease was recorded. Based on the number of spots/plants (i.e. severity), the disease reactions are grouped into five [G0=no spot, immune), G1=1-15 spots/plant (resistant), G2 16-30 spots /plants (moderately susceptible), G3= 31-50 spots/ plants (susceptible) and G4=more than 51 spots/plant and coalesces (highly susceptible)]. The PDI was calculated using the following formulae [(\sum of all disease rating/ total number of plant rated x maximum grade) x100]. The pathogen was isolated (in PDA media) from the infected samples collected from various centres using standard protocol and studied their characteristics.

Symptoms: Black coloured, irregular (eye to oval or round shaped) spots (size: 3-6mm x 2-5 mm) mostly appeared in lower portion of the stem i.e. upto 1.5 m height of plant (Fig. 1 and 2). The central

portion of the spot is light brown to ash coloured. The disease was mostly observed in late stage (after 80-90 days of sowing) with maximum incidence at harvesting time (120 days of sowing). Initially the spots are small and isolated, later on it coalesces and exposed the fibre causing loss in fibre quality. In severe condition the stem may break also. Differential disease reaction was clearly noticed in different breeding materials.

Incidence and severity: The incidence (Table 1) of the disease varies from place to place, in Assam, the incidence is as high as 20 % (with 40 -80 spot/plant) whereas it is about 1-30% (with 15-30 spots/plant) in fibre crops at West Bengal (Barrackpore and Kalyani). At Barrackpore, seed crop is severely affected. At Katihar the incidence was also recorded (5-10% with 15-40 spots/plant) whereas at Uttar Pradesh the capsularis jute is also affected year after year with average incidence of 5-20%. It was also observed that at early phase of the crop, rainfall is less in all the centres whereas in later stage (after 60-70 days of sowing) peak rainy season starts which initiate the infection and the severity of the disease increased at the harvesting stage (Table 2).

Pathogen: The pathogen *Colletotrichum gloeosporioides* was isolated from infected spots in PDA medium. The fungal colony was slow growing and pale white with golden tinge in colour with concentric zones (Fig. 3a). The mycelia are hyaline; conidia (12-20 μ x 4 μ) - hyaline, single/double celled (fig. 3b), formed in acervulus after five days of incubation at 28 \pm 1 $^{\circ}$ C in BOD, black coloured setae was observed at later stage (Fig.3c). The description of the pathogen is in conformity with Ghosh (1957, 1983) and Gautam, (2014).

The disease was well established in Bangladesh since 1950s due to its congenial weather condition (high rainfall and humidity) as well as cultivation of varieties developed from susceptible materials. Fortunately the susceptible materials were not allowed to enter in India during 1950s (Ghosh, 1999). Thus the recent spread of the disease may be due to exchange of germplasms over the years and conduction of national hybridization programme all over the jute growing areas of the country. Therefore, it is essential to screen the breeding materials to check the spread of the disease.

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