



## RESEARCH ARTICLE

# Present status of jute anthracnose (*Colletotrichum corchorum* and *C. gloeosporioides*) in India

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**ABSTRACT:** Earlier jute anthracnose (*Colletotrichum corchorum* attacking white jute and *C. gloeosporioides* attacking *tossa* jute) was considered as minor disease and restricted to Bangladesh and Assam in India. In India it is of regular occurrence in *capsularis* belt of India viz. Assam, North Bengal, Bihar, and Uttar Pradesh in endemic form. Anthracnose (*C. gloeosporioides*) in *tossa* jute was restricted to Assam since 1966-68. During survey (2008-2015) at different centres of All India Network Project on Jute and Allied Fibres the disease was recorded in almost all the jute growing states to the tune of 5-20%. Major reasons for such spread and establishment of *tossa* jute anthracnose in all the important jute growing states is either through introduction of pathogen along with seeds of germplasm (about 2500 accession) collected from Bangladesh, South East Asian (China, Indonesia, Thailand, Nepal, Pakistan) and African (South Africa, Kenya, Tanzania) countries over last four decades or use of susceptible materials for national hybridization programme since 1970s for development of new varieties

**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 North-eastern part of the country with maximum area and productivity in West Bengal (about 75%). 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, 1941 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. In recent past increasing trend in 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 jute varieties like JBO 2003H, S-19, JRO 8432. Information on anthracnose disease in *tossa* jute is largely lacking. In view of recent severity present investigation on status of the anthracnose in *tossa* jute was carried out at different jute growing states.

## MATERIALS AND METHOD

Literature survey was made on history of disease, its introduction and spread, germplasm exchange and enrichment at ICAR-CRIJAF and breeding programme. Jute crop (cv. JRO 524, JRO 8432, JRO 128, JBO 2003H) was sown at various centres of All India Network Project

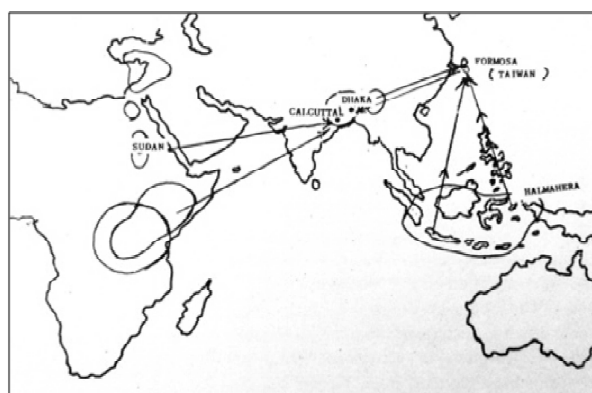
on Jute and Allied Fibres (AINPJAF) - Barrackpore and Kalyani (West Bengal), Naogaon (Assam), Katihar (Bihar), Berhaich (Uttar Pradesh) during the month of April. The fibre crop was monitored at different growth stages i.e. 75 days after sowing (DAS), 90 DAS, 105 DAS during 2008-2015. Under field condition the incidence (%) and severity (PDI) of the disease was recorded. The pathogen was isolated from the infected samples collected from various centres using standard protocol and studied their characteristics.

## RESULTS AND DISCUSSION

### Historical background of anthracnose

Literature revealed that anthracnose of white jute (*Colletotrichum corchorum*) was first observed on "Jap-Red" - a *capsularis* introduction from Formosa (Taiwan) at Dacca (Bangladesh) in 1945 (Ghosh, 1957, Ghosh, 1983). From Dacca the disease spread to other parts of Bangladesh (Fig. 1). The disease entered India through Assam during thirties along with jute germplasm from Southeast Asia, particularly from Taiwan unknowingly. Since the introduction of anthracnose of jute in India it is of regular occurrence in *capsularis* belt of India viz. Assam, North Bengal, Bihar, and Uttar Pradesh in endemic form. Epidemic of anthracnose was noticed in exotic variety, Japanese Red at Chinchura, West Bengal during 1950-55. By preventing release of hybrids involving South Asian susceptible or selections thereof, India was enjoying comparative freedom from anthracnose in white jute while in Bangladesh, anthracnose established itself firmly (Ghosh, 1999). Anthracnose (*C. gloeosporioides*) in *tossa* jute was first reported during 1966-68 at Nagaon and since then it

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**Fig. 1.** Movement of anthracnose disease of white jute (*Corchorus capsularis*), Ghosh, 1999

was restricted in Assam (Anon. 1966; Purakaysatha and Sen Gupta, 1975). But in recent past the disease is spreading very fast in various jute growing areas particularly in high rainfall period.

**Symptoms and pathogen**

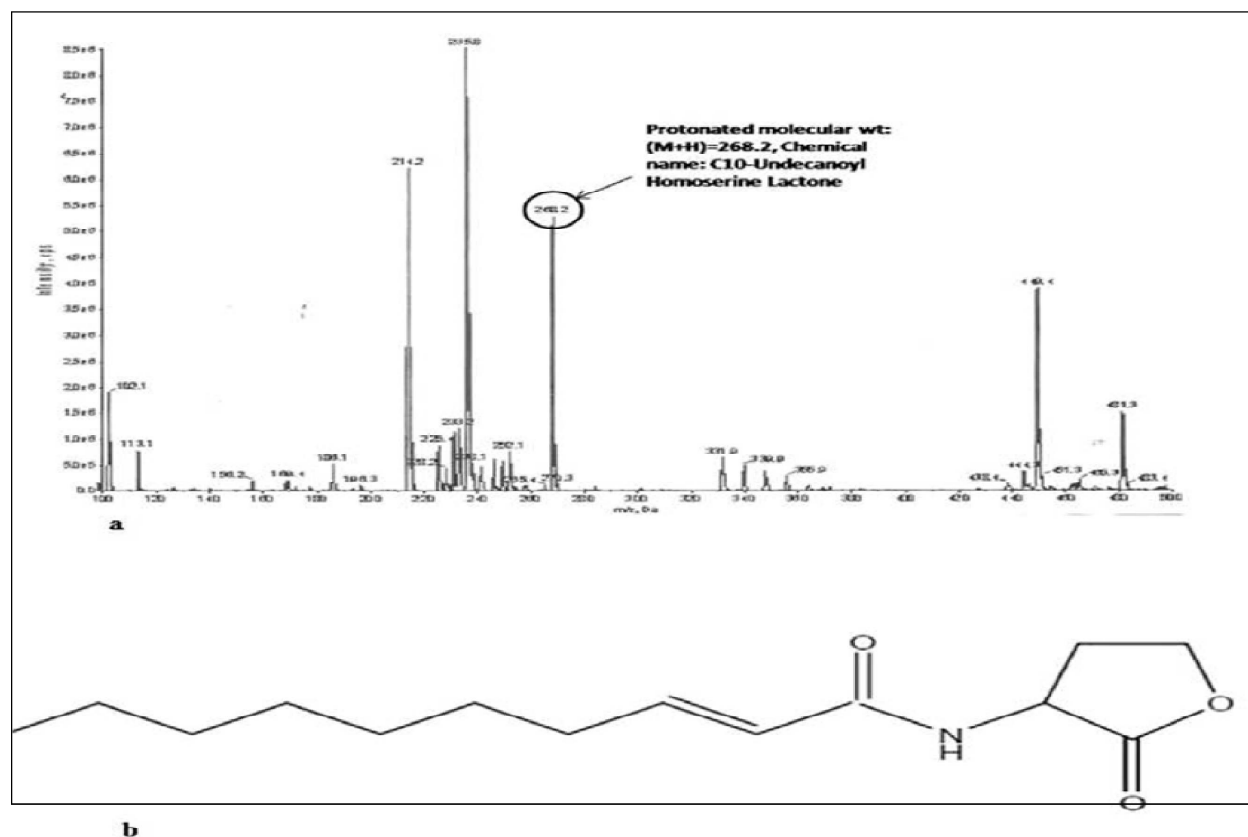
Black coloured, round to irregular, eye to oval shaped spot measuring 3-6mm x 2-5mm on the lower portion i.e. upto 1.0-1.5m of the stem is developed. The centre of the spots are light brown and ash coloured. Initially the spots are small and isolated which later on increase with the crop age, coalesce and exposed the fibre, weaken the plant and stem break occurs. The pathogen, *C. gloeosporioides*, isolated from diseased samples is slow growing, colony is pale white with golden tinge

and concentric zones. The mycelia are hyaline; conidia (12-20µ x 4µ) - hyaline, single/double celled, formed in acervulus after five days of incubation, black coloured setae was observed at later stage. The pathogen is similar as described by Itaka (1941), Ghosh (1957) and Gautam (2014).

**Disease severity**

The incidence 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 (11.8% in 75 DAS to in 19.5 in 120 DAS) (Fig. 2). Varietal difference on disease reaction (Fig. 3) was recorded (6.4 in JRO 128 to 28% in JRO 8432). Based on severity i.e. number of spots/plant, PDI was calculated which is higher Nagaon followed by Katihar and Kalyani (Fig.4).

Major reasons for such spread and establishment of *tossa* jute anthracnose in all the important jute growing states over the years is either through introduction of pathogen along with seeds of germplasm (about 2500



**Fig. 2.** Incidence of anthracnose with crop age

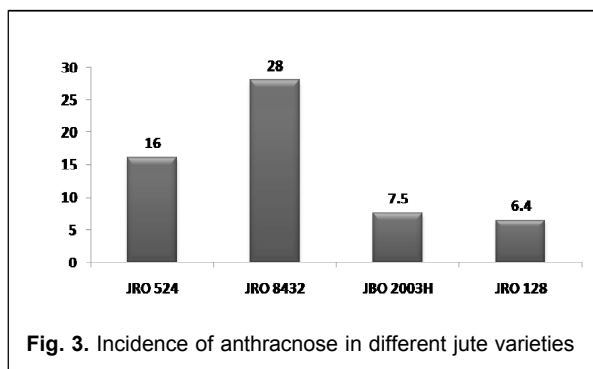


Fig. 3. Incidence of anthracnose in different jute varieties

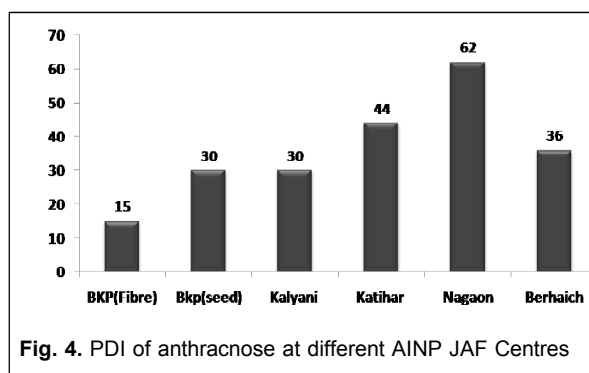


Fig. 4. PDI of anthracnose at different AINP JAF Centres

Table 1. Germplasm collection programme at ICAR-CRIJAF (Mahapatra *et al.*, 1998; Mahapatra and Saha, 2008)

Period	No. of accession	Place of collection	Organization involved
Early 20 <sup>th</sup> Century	300	Sporadic local collection	--
1977-1985	-	Systemic Collection	ICAR-CRIJAF
1987-93	790	South Africa, Kenya, Tanzania	IJO* and IBPGR**
	927	China, Indonesia, Thailand, Nepal, Pakistan	IJO
	251	Pakistan	IJO
1999-2004	655	All over India	ICAR-CRIJAF (under NATP)

\*IJO= International Jute Organization, now as International Jute Study Group (IJS), \*\*IBPGR= International Board of Plant Genetic Resources

accession) collected from Bangladesh, South East Asian (China, Indonesia, Thailand, Nepal, Pakistan) and African (South Africa, Kenya, Tanzania) countries over last four decades (Table 1) or use of susceptible materials for national hybridization programme since 1970s for development of new varieties.

Therefore, adequate precaution is required during collection and exchange of jute germplasms as predicted by Ghosh (1999). Because of less economic importance, so far no research work was directed towards this disease in India. Presently the anthracnose of jute is an important concern. Under such situation strategies like i) screening of breeding materials as well as germplasm ii) epidemiology of the disease iii) management strategies are essentially required.

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