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Hooghly-wilt of jute in retrospect (1949-2000)

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In Hooghly district and contiguous area where jute (*Corchorus olitorius* L.) is raised immediately after potato, a severe wilt of jute had been of annual recurrence observed since 1949. The malady was so widespread and the damage to crop was so severe that a new Pest and Disease Control Centre had to be established at Tarakeswar in the heart of Hooghly district. (Ann. Rep. JARI, 1949-50). Farmers' plots totaling around 200 acres were brought under the scope of investigation. The benchmark survey estimated 30 to 34% loss of jute crop each year between 1950 and 1954 Ann. Rep. JARI 1949-56).

The symptoms of the wilt is so different from the root-rot caused by *Rhizoctina bataticola* (Taub) Butler that it warranted a separate identity. Ghosh (1961) coined the name HOOGHLY WILT; it appears that the term has been accepted by working pathologists (Chattopadhyay *et al* 1970).

Investigations were continued to find in what way Hooghly-wilt was different from root-rot and whether some other pathogen were involved. By repeated isolation seven fungi and a bacterium were obtained from dying or dead plants. Ghosh (1961) short listed them to *R. bataticola* (Taub) Butler, *Fusarium solani* Kuhn and *Pseudomonas solanacearum* Smith as the cause of Hooghly-Wilt (these three hereafter to be referred to as R, F and P respectively). Bradbury (CABI, Mycological Institute) however found the P isolated from jute by Mandal and sent for identification, more close to *P. cepacia* rather than *P. solanacearum*. (Herbarium No. B-12463).

Mandal and Mishra (2001) recognized the nematode *Meloidogyne incognita* (Kofoid and White) Chitwood as pathogenic on jute in wilt-ridden (to be referred as M hereafter). (cf. Dutta *et al* 1973).

Root-rot, Root-knot and Hooghly-wilt of jute are often confused by laymen because of some similarity in the visible symptoms. The distinguishing characters are as under :

Root-rot

Signs of rot are first manifest at the tip of stem where the leaves drop and the lamina curve inwards. The colour of the stem fades from green to various shades of brown. Generally all leaves are shed from tip downwards. The stem withers, turn into a dry brown stick.

Pycnidia (Pycnidial phase of *Rhizoctonia*) may or may not cover the stem but when they do, their number is countless.

The plants infected by R alone slowly succumbs. It was also observed that when minor branch roots are invaded the plant often survives. This is possible as R does not produce any transportable toxin. The killing of the jute plant is due to destruction of root tissues impeding water and nutrient uptake. Hence death due to R is a slow process.

Root-knot

In infected plants, the leaves at the tip first show signs of yellowing (chlorotic) days before they wilt. Usually older plants (90 days or beyond) are infected and killed. The nematode M may form galls in younger jute plants, but only when their number increases and galls enlarge, the jute plants start showing symptom of sickness. Singh and Ghosh (1981) stated that fissures appearing in older galls facilitate entry of R; only then plants wilt rather quickly.

Besides yellowing of leaves mentioned earlier other symptoms simulate that of root-rot. Plants

withers and turn into a deep brown dry stick.

Hooghly-wilt

In jute affected by Hooghly-wilt, drooping of leaves start at the base and proceeds upwards, they turn ashen and cling to the stem and later rot. The stem loses the green fast and turn black. The stem on pressing invariably exude slimy, turbid fluid laden with bacteria.

The symptoms start with mid-June when monsoon showers start and the wilt appears very fast. Dead plants are mostly covered with *Fusaria* spores that give the black stem an ashen look.

The relative role of R,P,F and M remained somewhat obscure till Mandal and Mishra (2001) carried out tests with the four pathogens, the results are given in Table 1.

Table 1. Results of Artificial Inoculation with R, P, F and M on jute (var. JRO 524)

	Percent plants with typical wilt symptom				
Organism	1997	1998	1999	2000	Mean
R	0	0	0	0	0
F	0	0	3.3	0	0.8
P	10	13	12.6	12	11.9
M	0	0	0	0	0
RF	3.3	0	0	0	0.8
RP	18.3	20	26.3	23.3	21.9
RM	0	0	3.3	0	0.8
FP	13.3	13	15.3	15	13.9
FM	3.3	0	0	0	0.8
PM	23.3	28.6	26.6	26.3	26.1
RFP	25	24.6	24	26.6	25
RFM	3.3	0	3.3	0	1.6
RPM	35	35.3	36.6	35	35.4
FPM	23.3	26.6	26	26.3	25.5
RFPM	33.3	38.6	36.3	35	35.8
Control	0	3.3	0	3.3	1.6

From Mandal and Mishra (2001) in Environment and Ecology 19 (4) : 969

The table confirm for the first time that P is a primary pathogen on jute (*C. olitorius*) causing wilt. The data also proves that P in combination with any or all of the other three viz., R,F and M prove more destructive.

Farmers' Practice and Spread of Hooghly wilt

a. Farmers, more often than not, dump rotten potato tubers directly into the field. Such tubers are the live substratum for P and F. The two pathogens even survive in illdigested compost pit.
b. The left over potato plant debris harbours R, F and often M.
c. The stubbles shelter scerotia of R.
d. Brinjal, chilli, tomato and some other *solanaceaous* crops grown by farmers are alternate hosts of P and M; it has been traced in cucurbits as well.

Control

Control measures evolved by researchers been practiced since 1960, adding and modifying measures on the basis of new findings from time to time. The techniques adopted were as under.

a. To break the cropping sequence of "jute after potato". Farmers are reluctant to replace the highly remunerative potato. Instead jute is replaced by paddy for two years. Later on however good yield of the high yielding paddy varieties convinced the farmers, in many cases, to replace even potato with paddy or in some cases by wheat.
b. Replacement of jute with edible *Colocasia* where wilt proved pernicious.
c. To discontinue the practice of dumping rotten tubers in cultivated field. When such tubers are used for composting, some paddy-straw and cowdung must accompany for complete digestion.
d. Cultivation of *solanaceaous* crop like brinjal, tomato, chilli and also cucurbits to be discontinued for a year or two.
e. After harvest, care is to be taken to remove potato pant debris and jute stubbles.
f. Seed treatment with Bavistin gives protection in the early stages. Four sprays of Bavistin beginning with monsoon rains, at ten days intervals is effective.
g. Mandal stated that of six elite *olitorius* varieties JRO 524 proved more tolerant

than the rest (Ann. Rep. JARI, 1983 and 1985).

Current situation

By 1995-96 the yield of jute per hectare in Hooghly district rose to 27 quintals the highest in India (Ghosh 1996). This is because besides normal fertilizer application, jute receives residual nutrients from potato crop which is always heavily manured and fertilized. It is now observed that wilt of jute too, has been significantly reduced by the end of 1995. These two factors gave a boost to yield of jute.

Mandal surveyed the incidence of wilt in jute for eighteen years without break starting with 1983. he selected plots at random in Singur in the heart of jute potato area in Hooghly and in Jaguli and Nagarukhra of Nadia district where jute potato cropping system has spread since late seventies of the last century. The result of the survey is illustrated in figure 1.

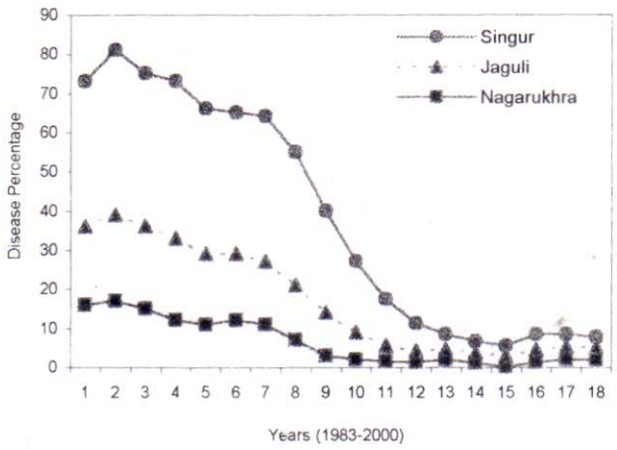

Fig 1. Hooghly Wilt Incidence

It is seen that incidence has been significantly reduced by the fourteenth year (1996). However since 1998 incidence has been rising to a small measure, may be due to laxity generated amongst farmers and extension workers from self complacency that naturally follows success.

Work is being refurbished.

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