

Integrated pest management in jute

S K Sarkar*, S Satpathy and R K De

ICAR-Central Research Institute for Jute and Allied Fibres, Barrackpore, Kolkata 700 120

Jute (Tossa jute: Corchorus olitorius and White jute: Corchorus capsularis) is an important natural bast fibre yielding crop with considerable commercial, environmental and socio-economic importance. It has multifarious end users and mostly grown in the tropical and south-east Asian countries particularly in India and Bangladesh. Incidence of different pests in jute is the most limiting factor in productivity improvement. Different pests and diseases of jute witnessed a great transformation in the backdrop of climate change with respect to intensity of incidence, development of new strains and susceptibility of host. Any single method of pests control cannot address the management of jute pests in totality. Therefore, holistic approaches through the Integrated Pest Management (IPM) methods starting from sowing to harvesting should be used to address the management of jute pests with economic viability.

Keywords: Diseases, Integrated pest management, Jute, Pests

JUTE is an eco-friendly and biodegradable bast fibre crop cultivated mostly in eastern and north-eastern parts of the country and provides livelihood to more than 40 lakh farm families, 10 lakh industrial workers and gains about ₹3000 crores/annum through exports. With the backdrops of environmental concern and Government policy to ban 'single use plastics', jute sector will definitely grow further which will demand more fibre in coming years. The growing demand of jute fibre may be achieved through scientific cultivation that can boost the fibre productivity at least to 32 q/ha from the existing level of 25 q/ha even with existing technologies. Normally 20% loss occurs in fibre productivity due to attack of various pests (Yellow mite, Grey weevil, Semilooper and Hairy caterpillar). A single method of management practice cannot address any pest because of complexity of life cycle/disease cycle. Moreover, environmental problem caused by excessive use of chemical pesticides

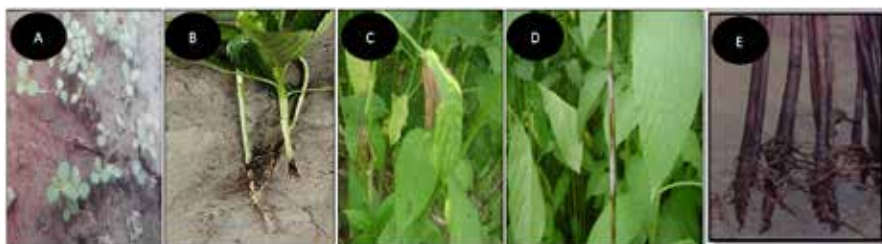
is an important concern in present day context. Therefore, Integrated Pest Management (IPM) comprising of cultural, biological and chemical methods provide the most effective and environment friendly methods for controlling pests. In the present article, integrated management considering the vulnerable stages of life cycle/disease cycle of pests starting from land preparation to harvesting were addressed in a holistic way which can manage the jute pests in totality with economic benefit.

Major diseases of Jute

Stem rot (Macrophomina phaseolina): It is the most important disease of jute. Dark brown lesion

appear on stem which extend up to 10–15 cm or higher, both vertically or horizontally due to which plants may wilt or break. It is prevalent in all the jute growing areas of the world. In India, this disease is severe particularly in Assam, West Bengal, Bihar and Orissa. It causes significant reduction in yield and quality of the fibre. Average yield loss due to this disease is about 10%, but it can go up to 35–40% in severe cases.

Root rot (Macrophomina phaseolina): Young rootlets or branch roots or even the main roots turn light brown which become rotted ultimately causing wilting from the top. The pathogen is soil (crop debris) and seed borne.



A, Seedling diseases; B, Collar rot; C, Stem rot infection starting from leaf; D, Stem rot; E, Root rot.



Anthrachnose of jute

The pycnidia and pycnidiospore produced on the infected leaves are dispersed by wind or water and spread the disease. High soil temperature, structure (sandy loam), soil reaction (pH below 5.8) and potash deficient soil favour the disease.

Management: Deep ploughing, clean cultivation, adjustment of soil pH with lime @2–4 tonnes/ha, seed treatment with carbendazim 50 WP @2 g/kg, sowing in second week of April, crop rotation like, jute-paddy-paddy, jute-paddy-wheat, jute-paddy-winter vegetables, foliar application of carbendazim 50 WP@2 g/litre or cu-oxychloride @5–7 g/litre or dithane M 45 @5 g/litre provides good management.

Anthrachnose (*Colletotrichum corchorum* in white jute and *C. gloeosporioides* in tossa jute): Black spot on the stem followed by deep necrosis showing cracks on stem and expose the fibre. White jute is mostly affected by this disease. In recent years tossa jute is also affected by anthracnose. Generally it is prevalent in Assam and West Bengal. The disease is primarily seed borne, but soil borne inoculum also serves as source of infection. High rainfall, high humidity and temperature around 35°C are congenial for spread of the disease. Close spacing and more weed population increase severity.

Management: Clean and weed free cultivation, foliar application

of carbendazim 50 WP @2 g/litre of water or cu-oxychloride @5–7 g/litre of water or dithane M 45 @5 g/litre of water provides good control.

Hooghly wilt (*Ralstonia solanacearum*): Wilting of leaves starts from the base upwards. Affected stems are soft and slimy fluid comes out on slight pressing—ooze test positive. Plants infected with root rot alone can survive for a pretty long time but those attacked by Hooghly wilt where a number of organisms are involved, survival of the infected plant is not possible. The primary causal agent survived in the soil and enters in the plant through wound.

Management: Crop rotation with non-solanaceous crop like jute-paddy - paddy, jute - paddy - wheat, jute - paddy - winter vegetables reduces the disease pressure.



Hooghly wilt of jute

Important insect pests of jute

Indigo caterpillar: The farmers are advised to be vigilant on the infestation of indigo caterpillar particularly in the newly emerged seedlings which are cut from the ground level. The infestation will be more after rain or irrigation. The larva hides below the clods at the base of the plant.

Management: For control of indigo caterpillar, chlorpyrifos 20 EC @2 ml/litre of water may be sprayed in the afternoon at 8–10 days interval.



Infestation of indigo caterpillar



Spraying of yellow mite infested crop

Yellow mite: The mite damaged symptoms appears at 30–35 days after sowing (DAS) as thickening and interveinal crinkling in the terminal young leaves which later turn coppery-brown. Avoid water stress, maintain soil moisture to reduce the damage by mite infestation.

Management: Foliar spray of fenpyroximate 5 EC @1.5 ml/litre, spiromesifen 240 SC @0.7 ml/litre or propargite 57 EC @2.5 ml/litre alternatively in rotation at 10 days interval should be done, if infestation persists beyond 10 days. In case of rain, wait for at least 5–6 days to initiate the acaricide spray if symptoms initiates/persists.

Hairy caterpillar: Farmers should be alert about the initial infestation of hairy caterpillar after rain when the temperature rises with high



Hairy caterpillar infested jute crop



Grey weevil infested jute crop

humidity. The pest spreads quickly and damages the leaves. Monitor to spot early infestation.

Management: Remove the egg masses and newly emerged larvae in bunch. Spray lambda cyhalothrin 5 EC @1 ml/litre or indoxacarb 14.5 SC @1.0 ml/litre in extreme cases.

Grey weevil: Unopened tender leaves of 30–50 day old jute crop may damage by grey weevils usually after rain. The damage portions in leaves broaden as the plant grows. Weevils are grey in colour with dark white spots, elongated head, visible on plants.

Management: Spray combination of chlorpyrifos 50 EC + cypermethrin 5 EC @1–1.5 ml/litre or chlorpyrifos 20 EC @2 ml/litre or quinalphos 25 EC @1.25 ml/litre is recommended for good management.

Semilooper: Semilooper causes foliar damage in almost all the jute growing tracts. Slender, greenish larvae with light yellow head, narrow dark green dorsal lines are easily noticed when they crawl by producing a loop in the middle. The crop is most susceptible at 50–80 DAS. Damage starts in all cases from unopened leaves in upper part of the plant which represent the most susceptible portion. The edges of the tender leaves are eaten, serrated, diagonal cuts occurs in apical leaves. Sometimes damaged stem induce branching.

Management: Whenever the damage by semilooper reaches 15% then insecticide such as profenophos 50 EC @2 ml/litre, fenvalerate 20 EC @1.0 ml/litre or cypermethrin 25 EC @0.5 ml/litre may be applied. The insecticidal sprays need to be



Semilooper infested jute crop

targeted towards the apical portion of the plant rather than covering the whole plant.

Integrated management of pests and diseases of jute

- Cultivation of tolerant/less susceptible varieties: Yellow mite - JRO 204, JRO 524, JROG1 and JRO 8473; Stem rot: JRO 204, S-19.
- Follow ideal sowing time to minimize the incidence of stem weevil, grey weevil, yellow mite and stem rot (1st – 2nd week of April).
- Deep ploughing, soil pH adjustment in acid soil with lime or dolomite @2–4 t/ha is recommended about one month before sowing.
- Seed treatment with carbendazim 50 WP @1 g/kg at least 4 hour before sowing.
- Monitoring in seedling growth stage for indigo caterpillar damage and spary chlorpyrifos @2 ml/litre in case of any damage.

SUMMARY

Incidence of insect pests and diseases of jute is one of the limiting factors in its productivity improvement. On an average 20% of fibre yield is reduced by incidence of various pests and diseases under normal condition but in certain condition like waterlogging, high temperature, high humidity etc. the reduction in fibre yield may go up to 50% or more. Although a number of information is available to control the pests but a single method of management practice cannot address any pests and disease because of complexity of life cycle/disease cycle of individual pest/disease. Therefore, in the present article integrated management considering the vulnerable stages of life cycle/disease cycle of pests starting from land preparation to harvesting were addressed in a holistic way which can manage the pests and disease problem of jute in totality with economic benefit.

*Corresponding author's e-mail: surjapath@gmail.com