



Study on Major Insect Pests And Major Diseases of Banana of Malda, West Bengal, India

KEYWORDS

Diversity, Banana Insect pests, Diseases, Malda.

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ABSTRACT *The aim of this study is to focus yield loss of Banana fruit by different Banana insect pests and major diseases and their effect on economic condition of mada peoples as well as national trading system. This study is totally field base which was conducted during 2014-2015 in many public Banana garden of Malda-district to assess the fruit loss in different genotypes of Banana due to Banana insect pests and diseases. The principle insect pests and diseases of banana are Thrips, Aphids, Corm weevil, Stem weevil, Hard scale, Tingid or Lace wing bug. Information about damage and fruit loss of Banana were collected from farmers using questionnaire and group discussion and cross check by aged people. The observation from field report revealed that yield loss and damages of Banana affected by organ specific pests and disease irrespective of banana genotypes.*

Introduction : Banana ranks fourth as the world's most important starch crop after cassava and sweet potatoes since its yields of carbohydrates per unit area are very high. It is the fourth most widely-grown food crop after rice, wheat and maize. It is an important staple food in many Asian countries including those in India. In India, it is mainly grown in Western, Central, Eastern and Coastal regions mainly by small-scale farmers for home consumption and income generation. In mitigating food shortage, bananas are playing a key role, as they are becoming a common staple food for most communities India. They have gained popularity because of their adaptability to different environments, easy to produce and has a ready market. The average acreage allocated to banana is larger than that for other fruits in Western Kenya (KARI, 1998). The crop produces all year round and is appropriate for inter-cropping with various crops including cereals, legumes, root crops, vegetables, fruit crops like paw paws and cash crops like coffee. Banana crop has multiple uses. It is consumed as green and ripe fruits as well as other value added products such as alcohol, canned banana slices, flour, juice and jams which are sold for income generation. The leaves can be used to make mats, hats, baskets and ropes for sale especially in the urban markets or for thatching houses and as plates for serving food among some communities. The pseudo stems and the leaves are mainly used as live-stock feed during the dry season. Due to their importance, nationally, the acreage is estimated at 78,000 ha, which is about 2% of the total arable land in Kenya.

Unfortunately, banana production has been on the decline in Kenya (Okumu, 2007). The annual production in Kenya was 580,100 tons in 2002 with yields of 4 tons per hectare which is below the potential yields of 30 tons per hectare (Onyango *et al.*, 2002). This can be attributed to a number of factors including; poor crop production and management practices, insect pests and diseases, declining soil fertility and socio-economic factors such as inadequate capital, labor and marketing. Overall, pests and diseases pose a serious threat to banana production. Some banana cultivars have been severely damaged by a wide range of pests and diseases, resulting in heavy yield losses. For example, losses of up to 100% have been reported in fields infested with banana *Xanthomonas* wilt or *Fusarium* wilt (AATF, 2003). It is important to note that the bacterial wilt is predominant in Western and Kisii areas in

Kenya. Other important and widespread diseases include black and yellow Sigatoka leaf spots, cigar end rot, banana bunchy top virus disease, and post-harvest diseases. Banana thrips, nematodes and the banana weevil are among the most important pests of banana in most banana growing regions in Kenya. The banana weevil, (*C. sordidus*) is a major pest of bananas in all banana growing regions of Kenya (Kung'uet *al.*, 1996). Yield losses associated with the weevil range from 40% to 100% (Mitchel, 1980; INIBAP, 1986). The damage by the weevils is generally more severe in highland cultivars (Gold *et al.*, 1998). Weevils are mainly managed by trapping leading to physical destruction, use of insecticides and biological control measures (Gold and Messiaen, 2000). Other production constraints could be compounded in poor management of the banana orchard in the area. Unfortunately, most farmers are not well equipped with skills to identify the pests and diseases as well as the prerequisite management of the farms. In this region, the banana production is characterized by many forms of subsistence and traditional agriculture which represent the accumulated experiences of farmers who normally lack access to external inputs, capital, or external scientific knowledge in the management of banana (Bridge, 1996).

The ability of the farmer to identify insect pests and diseases affecting bananas is an important milestone to increased banana production. Farmer empowered to identify pests and diseases at the initial stage will take caution which may prevent the spread of the pests and disease and continuous attack to the crop. The control measures should be available to the farmers for selection. These measures range from biological, chemical to cultural. The current study was therefore to identify and characterize the banana growing zones of India and the farmers' perception of major constraints in banana production. The study also assessed insect pest and disease incidence in the banana production zone of India.

2. Materials and Methods:

The field studies for recording the pest diversity and Diseases on Banana plants were conducted Kaliachak-II Block of Malda - district during the period from March, 2014-February, 2015 to record the distribution of banana as well as insect pests associated with the plant along with their mode of damage. The insects along with their

immature stages were collected by traditional methods of hand picking and by using hand nets from study area. Collected insects were killed using ethyl acetate and later on pinned, stretched and finally oven dried for about half an hour at 35°C -- 40°C to avoid fungal infection. General morphological descriptions of all the stages of insect pest were made under different magnifications of stereoscopic microscope. Feeding behaviour of larval stages was made both in the field as well as in the laboratory.

3. Results and Discussions : During the period of observation, a total of 7 insect pests and 5 Diseases belonging to different families were recorded by the investigator from the Malda region of W.B.state. These insects were found to be sap suckers. A general description of each insect species along with their damage pattern is discussed below:

Major insect pests:

1. Thrips (*Chaetanaphothrips signipennis*)

Symptoms: Distinctive reddish brown oval stains on the finger, which can extend the entire length. In severe cases peel splits and the exposed flesh quickly discolours.

2. Aphids (*Pentalonia nigronervosa*)

Symptoms: Banana leaves are bunched into a rosette appearance with leaf margins becoming wavy and upward rolling thereby reducing the growth and vigour of plant. Severely infected plants do not produce bunches and act as a vector of bunchy top disease. Noticed in colonies on leaf axils and pseudo stem.

3. Corm Weevil (*Cosmopolites sordidus*)

Symptoms: The young grub tunnels into the base of suckers, roots and rhizome/corm.

Presence of larval tunnels on the entire length of pseudostems. Yellowing and withering of leaves, reduced plant vigour, root destruction, reduced fruit production and are easily blown over by the wind.

4. Stem Weevil / pseudostem borer (*Odoiporus longicollis*)

Symptoms: Presence of small pinhead-sized holes on the stem. Jelly exudation on the stem is the initial symptom of damage. Due to secondary infection of pathogens, rotting occurs and a foul odour is emitted. After flowering, when tunnelling occurs in the true stem and peduncle, the fruits do not develop properly.

Burrowing Nematode (*Radopholus similis*)

Symptoms: Reddish-brown to black, elongated discoloured area seen parallel to the root axis which eventually blacken and die. Lack of vigour in infested plants and poor fruiting observed. Infested plants are readily toppled and the roots get exposed.

5. Hard scale: *Aspidiotus destructor*

Symptoms of damage: Grubs bore into the rhizome and cause death of the plant. Presence of dark coloured tunnels in the rhizomes. Death of unopened pipe, withering of outer leaves.

6. Tingid or Lace wing bug: *Stephanitis typicus*

Symptoms of damage : Grubs bore into the rhizome and cause death of the plant. Presence of dark coloured tunnels in the rhizomes. Death of unopened pipe, withering of outer leaves.

Major diseases:

1. Sigatoka Leaf Spot (*Mycosphaerellae umusae*)

Symptoms: Small, pale spots on leaves that turn dark purplish-black with grey centres. Disease more prevalent on shallow, poorly drained soil. Severity of symptoms depicts burnt appearance of leaves. Poor filling and quality of bunches. Fruits don't mature uniformly.

2. Anthracnose (*Colletotrichum musae*)

Symptoms : Small, circular, black spots develop on the affected fruits. At the initial stage dark brown patches on immature fruits. Severe infestation leads to shrivelled and black coloured rotten fruits covered with pink spore masses, which gradually spreads and affects the whole bunch.

3. Banana Bract Mosaic Virus (*BBMV*)

Symptoms: Presence of spindle shaped pinkish to reddish streak on pseudostem, petiole, midrib and peduncle. At emergence, suckers exhibit unusual reddish brown streaks and separation of leaf sheath from central axis. Crowding of leaves at crown which appears like palm leaf frill with elongated peduncle and half-filled hands.

4. Banana Bunchy Top Virus (*BBTV*)

Symptoms: Yellowing of leaf margin initially and dark green streaks on the leaves. New leaves emerge with difficulty, are narrower than normal, are wavy rather than flat, and have yellow (chlorotic) leaf margins. Leaves form a bunch at the top. Usually fruiting doesn't occur in severely infected banana plants but if produced, the banana hands and fingers are likely to be distorted and twisted.

5. Cigar End Rot (*Verticillium theobromae*)

Symptoms: Black necrosis from the perianth to the tip of immature fruits causing shrinkage and folding of the tissues. Fingers that appear rotten are full of grey conidia, which look like the ash of cigar.

6. Erwinia Rot (*Erwinia carotovora*)

Symptoms: Affected young suckers show rotting and emits foul odour. The rot progresses up the Pseudostem causing internal decay often with vascular discoloration.

If affected plants are pulled, it comes out from the collar region leaving the corm with their roots in the soil. Infection at late stage shows splitting of Pseudostem in some cultivars. Yellowish to reddish ooze seen when affected plants are cut open at collar region. Soft rotting may spread radially towards growing point through the cortical tissues.

7. Panama Wilt (*Fusarium oxysporum f. sp. cubense*)

Symptoms: Visual observations show yellowing of lower leaves, longitudinal splitting of Pseudostem and wilting of plants. Advanced stages of disease shows plants with a spiky appearance due to prominent upright apical leaves. The xylem (water conducting) vessels turn reddish-brown as the fungus grows through the tissues.

4. CONCLUSION

From this study, it is clear that there are several constraints affecting banana production of Malda. These are both a biotic and biotic in nature. They include the banana pests and diseases, declining soil fertility, poor crop management, lack of clean planting material, poor marketing infrastructure, postharvest losses among others which needs to be addressed for funding the study.

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Fig:1 Rust thrips infested fingers



Fig:2 Aphid infestation

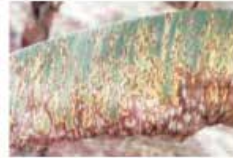


Fig:1 Leaf Spot



Fig:2 Anthracnose



Fig: 3 BBMV



Fig: 4 BBTV

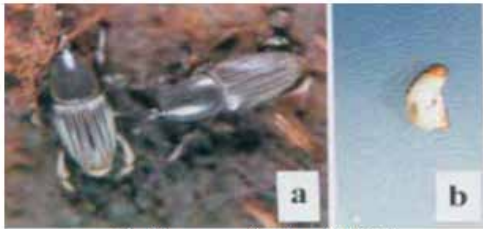


Fig:3 Corm weevil a) Weevil, b) Grub



Fig:5 Cigar end rot

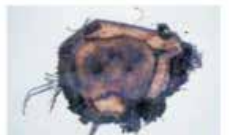


Fig:6 Erwinia rot infected corm



Fig:4 Stem weevil



Fig:5 Burrowing nematode



Fig:7 Fusarium wilt infected plant and corm



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