Studies on seasonal incidence of phytophagous mite species on selected germplasms of banana in West Bengal

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Abstract

In the changing agricultural scenario mites are gaining importance as pest in most of the crops and banana is no exception. Experiment conducted at banana research unit of AICRP on tropical fruits, Bidhan Chandra Krishi Viswavidyalaya, Mondouri, Nadia, West Bengal during 2005-06 revealed that banana was infested by seven phytophagous mite species viz., Oligonychus oryzae (Hirst), Panonychus ulmi (Koch) Tetranychus urticae Koch, Petrobiia sp. Murray, Brevipalpus phoenicis (Geijs), Raoiella sp. Hirst, and Phyllocoptruta sp. Keifer. Among the seven species, O. oryzae was found to be most damaging producing conspicuous characteristic damage symptoms on the ventral surface of the banana leaves. Other species were found to be sporadic in occurrence without causing any significant damage. Therefore, detail study on seasonal occurrence and mode of feeding of the most damaging mite species – O. oryzae was conducted on the susceptible banana cultivar- Krishna vazai (AAB). Incidences of other six mite species were studied on five selected banana cultivars.

Introduction

Banana is fourth most important commodity in the world after rice, wheat and corn. It is cultivated over 130 countries in the tropical and subtropical world (Anonymous, 2000). The fruit is preferred for high nutritive value, year round availability and low price (Robinson, 1996). Banana contains high quantities of energy but without any cholesterol. It contains high carbohydrate, low sodium and high potassium (Chandler, 1995). Banana is attacked by more than 200 species of insect and non-insect pests (Simmonds, 1966 and Singh, 1970). The literatures reveal that very little work has been conducted on banana mites though a number of phytophagous mite species viz., Tetranychus cinnabarinus, T. neocaledonicus (Gupta, 1985), T. gloveri (Simon, 1993), T. urticae (Colombo, 1993), T. tenuis (Ramos and Rodriguez, 1995), Oligonychus sapienticus, O. indicus, O. mangiferus (Gupta, 1985); Phyllocoptruta musae (Umapathy et al., 2001), have been reported from banana. Recently, banana cultivars observed to be heavily infested by O. oryzae during the hot and dry summer months (Karmakar and Dey, 2004). It is suspected that in the changing agricultural scenario mite may take upper hand and occupy the key pest status (Natarajan, 2001). Keeping these in mind the present experiment has been laid out emphasizing exploration, symptoms of damage and seasonal occurrence of major phytophagous mite species attacking banana cultivars.

Key words: Banana, Exploration and identification, phytophagous mites, Oligonychus oryzae, Seasonal occurrence.

Material and Methods

The field experiment was conducted at banana research unit of AICRP on tropical fruits, BCKV, Mondouri, Nadia, West Bengal during January 2005 to February, 2006. Observations were taken from five germplasms viz; Krishna vazai (genomic group- AAB), Kalibow (AAB), Barsai (AAA), Kanchkala (ABB) and Kanchkala (unknown) (ABB) to record all kind of phytophagous mites associated with them. Field observations were carried out regularly to collect the phytophagous mite species for their identification and to observe their seasonal occurrence.

Considering the most damaging species, seasonal occurrence of Oligonychus oryzae was studied on susceptible germplasm Krishna vazai. The field was laid out with three replications, each having five plants. Three plants from each replication were tagged at the beginning of the season. One leaf from each plant was selected for taking data on mite population. Numbers of mites were counted from undersurface of the leaf from three spots each of ten square cm areas. Observations were taken regularly at 15 days intervals.

Results and Discussion

Seven phytophagous mite species viz., O. oryzae, T. urticae, P. ulmi, Petrobiia sp. belonging to the family Tetranychidae; B. phoenicis, R. sp. of the family Tenuipalpidae and Eriophyid mite Phyllocoptruta sp. were found to be associated with banana and all the species were confined at the ventral surface of leaves. Among these, O. oryzae, were observed to be abounded over other species causing conspicuous damage symptoms to the plants. Populations of other six mite species were scanty and found to be sporadic in nature.

Panonychus ulmi was recorded from all five banana cultivars during January to February; 2005. Their population was very low and produces little damage symptoms by sucking sap from the leaf.
Incidence of phytophagous mite species of banana

The species was recorded only from two germplasms viz. *Krishna vazai* and *Kalibow*. They feed from the leaves and produced whitish specks at feeding zone but their population suddenly disappeared after first week of April. *Petrobia* sp. was found during second week of February to first week of March, 2006. The species observed only on young fully opened top leaves. They were very shy in spinning web and were remained scattered on undersurface of immature leaves producing whitish spots at the feeding site and were recorded from all five germplasms. The Tenuipalpid mites *B. phoenicis* and *Raoiella* sp. were recorded during second fortnight of June, 2005. They caused damage by producing pale brownish patch on the leaf surface. The Eriophyid mite *Phyllocoptura* sp. has been recorded from two germplasms viz. *Kanchkala* and *Kanchkala* (unknown). The mite maintained very low population throughout the year. They were leaf vagrant and infested matured leaves. Feeding injury caused reddish discoloration of leaves.

Among the seven phytophagous mite species *O. oryzae* was found to be most potential mite pest. This mite found to be maintained their population throughout the year under field conditions. All five banana germplasms were infested by this mite of which *Krishna vazai* was found to be the most susceptible. Therefore, experiment on seasonal occurrence of *O. oryzae* was studied on this germplasm.

**Nature and Symptoms of damage: O. oryzae** was found to live on the under surface of banana leaves covered by thin web. They developed colony within the grooves of parallel veins as well as along the mid rib. The mite sucked sap from the ventral surface. The feeding zone developed whitish appearance. The whitish patches along with the eggs, cuticular exuvae of mites and dust particles developed characteristic symptoms. Later, the whitish patches turned brown and the leaf withered.

**Fig.1.** Seasonal Occurrence of *Oligonychus oryzae* during 2005 (January to December).

The result of present investigation regarding the population dynamics of *O. oryzae* has been presented in the Figure 1. It was observed that the mite persisted in the field through out the year. During January-February the mite populations were found to be very low. Considerably high populations were found during 2nd fortnight of March (10/10 sq cm area) to 1st fortnight of June (16.6/10 sq cm area) reaching the peak during 1st fortnight of May (26.67/10 sq cm area). The prevailing high temperature coupled with low humidity was observed very congenial for rapid multiplication of the mite species and thereafter, their population declined with increase of atmospheric relative humidity on the onset of monsoon. Population maintained in an inconsistent manner during rest of the year. Lowest population of the mites was observed in the 1st fortnight of January (0.63/10 sq cm) followed by 2nd fortnight of December (0.83/10 sq cm). Therefore, it might be concluded that though there were seven phytophagous mite species attacked banana plants, immediate precautionary measures have to be taken especially against the *O. oryzae* during summer months for sustainable production of banana.

**References**


