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Occurrence and Incidence of Banana Bunchy Top Disease in Southern Part of Sindh

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Abstract: An investigation was performed to access the occurrence of bunchy top of banana in southern part of Sindh. Five banana fields of southern Sindh viz., Tandojam, Tando Allahyar, Mirpurkhas, Tando-Mohammad Khan and Hala were visited to observe the symptoms and incidence in the field. Infected plants showed the typical symptoms of bunchy top disease including bunchy and brittleness of leaves plus dot-dash dark green streaks on petioles and lamina parallel to veins. It was found that the incidence of bunchy top virus (BBTV) was quite high at Tandojam (75%) followed by Tando-Allahyar (70%) and Tando-Mohammad Khan (50%). It was further observed that the diseased plants significantly reduced the size of fingers, number of fingers per bunch and weight of fingers.

Key words: Banana bunchy top virus, *Pentalonia nigronervosa*, *Musa* spp.

Introduction

Banana is one of the most important fruit crop of Pakistan, grown on an area of 23,500 hectares with annual production of around 210,000 tones (Anonymous, 1993). Banana crop is attacked by a number of viruses viz., banana mosaic virus (BMV), banana streak virus (BSV), cucumber mosaic virus (CMV) and viral leaf streak of banana (VLSB). However bunchy top is the most destructive and the only wide spread virus disease of banana (Stover, 1972).

The banana bunchy top virus was recognized in Fiji as early as 1889 and was introduced from there into Australia in 1913. This disease is commonly distributed in countries like Fiji, Egypt, Ceylon, Australia, Ellice Island and Wallis Island (Magee, 1953). According to Mehta (1964) the disease is widely spread in Kerala, Orissa and west Bengal in India and Burma too.

During 1989-90, banana bunchy top disease spread catastrophically in coastal areas of Sindh like Ghora Bari, Thatta and Badin. Later on the disease spread to Mirpurkhas and some districts of Hyderabad division, where it caused heavy losses (Khalid *et al.*, 1993). The symptoms resembled to those of banana bunchy top virus include bunchy and brittleness of leaves and dot-dash dark green streaks on petioles lamina parallel to veins. The virus was identified on the basis of symptoms, particle morphology and serology (Khalid and Soomro, 1993). In electron microscopy, the virus particles were measured 20-22 nm in diameter (Wu and Su, 1990).

Keeping in view the facts, the present investigation have been carried out to access the occurrence of bunchy top virus of banana in southern part of Sindh and its effects on the production of banana.

Materials and Methods

An investigation was made to assess the occurrence of bunchy top of banana in southern part of Sindh during the year 1999-2000. Banana growing areas like Tandojam, Tando Allahyar, Hala,

Tando-Mohammad Khan and Mirpur Khas were surveyed.

Disease incidence (%): For recording disease incidence, twenty plants per block of banana fields were ear marked diagonally. Every fifth plant in each diagonal was selected for study. Healthy and infected plants were separated by field diagnosis, based on the presence of typical BBTV symptoms. Further studies on purification of virus were conduct at the National Agriculture Research Center, Islamabad and virus particles were observed. Consequently the presence of BBTV in banana has been confirmed.

The disease incidence was calculated according to the following formula (Gibbs, 1983; Allen *et al.*, 1983):

$$\text{Disease incidence (\%)} = \frac{\text{Number of infected plants}}{\text{Number of plants selected}} \times 100$$

Effect of bunchy top virus on length, number and weight of fingers: Length (size) of fingers/bunch (10 fingers from each bunch) from infected plants was measured and their average was taken.

The number of fingers/bunch from infected plants was counted and their average was taken from each location.

The weight of fingers was taken through physical balance (10 fingers from each bunch) and their average was taken.

All the collected data were subjected to analysis of variance, to discriminate the treatment mean, by applying LSD test.

Results and Discussion

Bunchy top disease of banana (*Musa* spp.) is characterized by bunching and brittleness of leaves and dot-dash dark green streaks on pseudostems, petioles, midribs and lamina. The disease is caused by banana bunchy top virus (BBTV), transmitted by banana aphid (*Pentalonia nigronervosa* Coq). However, laboratory studies confirmed the presence of BBTV, it was done by measuring virus particles of 20-22 nm through electron microscopy when selected samples were used for virus purification. The disease, therefore, diagnosed as BBTV on the basis of symptoms produced and particle morphology. Khalid *et al.* (1993) and Khalid and Soomro (1993) reported that the cause of a banana disease in the province of Sindh, Pakistan, was attributed to banana bunchy top virus. Identification was based on symptology, size/morphology of the virus particles (20-22 nm) detected in diseased tissues and serology (DAS-ELISA). Our results are also in agreement with those of Allen *et al.* (1983), Thomas and Dietzen (1991) and Wu and Su (1992).

From the data, it was observed that the incidence of banana bunchy top virus affected the length of fingers, number and weight of the fingers (Table 1). The incidence of the disease was maximum at Tandojam (75%), which affected the length, number

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Table 1: Disease incidence (%), mean length of fingers, mean number of fingers and mean weight of fingers per bunch of banana

Location	Disease incidence (%)	Mean length of fingers/ bunch (cm)	Mean number of finger/ brunch	Mean weight of fingers/ bruch (g)
Hala	5.00	14.00	105.00	110.15
Mirpurkhas	10.00	12.50	89.30	86.50
Tando M. Khan	50.00	8.30	65.00	79.00
Tando Allahyar	70.00	6.00	45.00	65.20
Tandojam	75.00	6.40	30.35	40.45

and weight of the finger. Similarly the minimum disease incidence was recorded at Hala (5%), which failed in deteriorating the parameters. Disease incidence recorded from Tando-Allahyar, Tando-Mohammad Khan and Mirpurkhas proportionately affected the size, number and weight of the fingers (Table 1). These results are in close agreement with those of Stover's (1972). The data are significantly different at 1% level of probability. Khalid *et al.* (1993) conducted the surveyed of banana fields in Thatta, Karachi, Hyderabad, Badin and Mirpurkhas, revealed that one-half of the banana plantation had been destroyed. Soomaro and Khalid (1992) reported that in affected banana field's disease incidence ranged from 5-100%. Our results are also in confirmation with those of Elangovan *et al.* (1990), Allen *et al.* (1983), Thresh (1983) and Jose (1981).

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