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Wilt disease of guava caused by *Botryodiplodia theobromae* Pat.

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The wilt of guava was studied in the field and laboratory. It was found that wilt of guava was caused by *Botryodiplodia theobromae* Pat. All the isolations made from the tip to the bottom of the wilted plant were found to be *B. theobromae* alone. The vessels and other elements of the wilted plant was found to be filled up by the mycelia of *B. theobromae* and the fungus caused considerable destruction of the wood elements resulting in the development of the wilted symptoms.

Key words : Guava, *Botryodiplodia theobromae*, histopathology, wilt

INTRODUCTION

Guava (*Psidium guajava* L.) is commonly known as apple of tropics and is one of the most choicable fruits of India. In West Bengal, it is commercially cultivated in an area of about 550 ha in Baruipur of South 24 Parganas, and in isolaed areas of Sainthia, Jhargram, Bankura and Purulia.

The cultivation of guava is associated with several diseases of which wilt of guava is most important. Several investigators have studied the wilt disease of guava (Chattopadhyay and Bhattacharyya, 1968 ; Mehta, 1987 ; Sabag and Khera, 1986) but the causal organisms could not be indentified properly. Pandit and Samajpati (2002) have reported for the first time that the wilt disease of guava is caused by the infection of *Botryodiplodia theobromae* Pat.

In the present investigation an attempt has been made to find out the nature of destruction caused by *B. theobromae* on the host plant, *Psidium guajava.*

MATERIALS AND METHODS

The infected guava plants were cut into pieces and brought in to the laboratory for further observations. In the field the symptoms of the wilted plants were noted and photographed. In the laboratory the different parts of the wilted plants were cut into small rectengular pieces and preserved in FAA fixative for cutting sections and for histopathological studies.

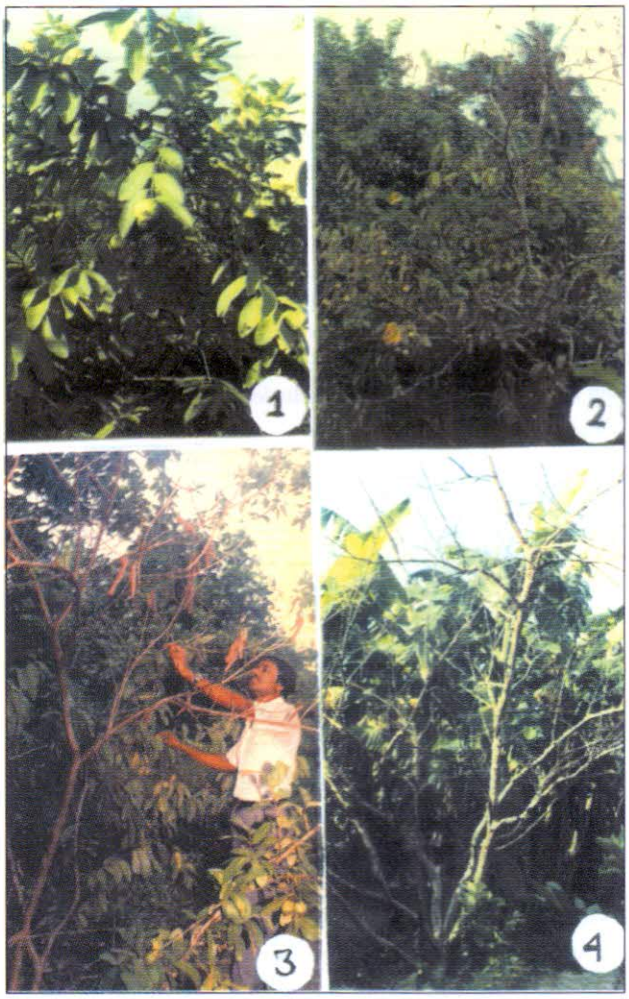
Several isolations were made from different parts of the wilted plants stating from base to the tip portions. Isolations were made in PDA medium and after purification of the cultures all cultures were maintained in PDA medium.

Several thin sections of the wilted plants were made and stained in Cartwright stain and observed under microscope for finding out the effect of *B. theobromae* on host cells. These observations were photographed by photomicrographic system. Other experimental procedures were same as deseribed in Pandit and Samajpati (2002).

RESULTS AND DISCUSSION

The first externally visible symptom in the field was the drying up of twigs and terminal branches of the tree (Fig. 2) in contrast to healthy and lustro us green branches (Fig. 1). Gradually the drying up of

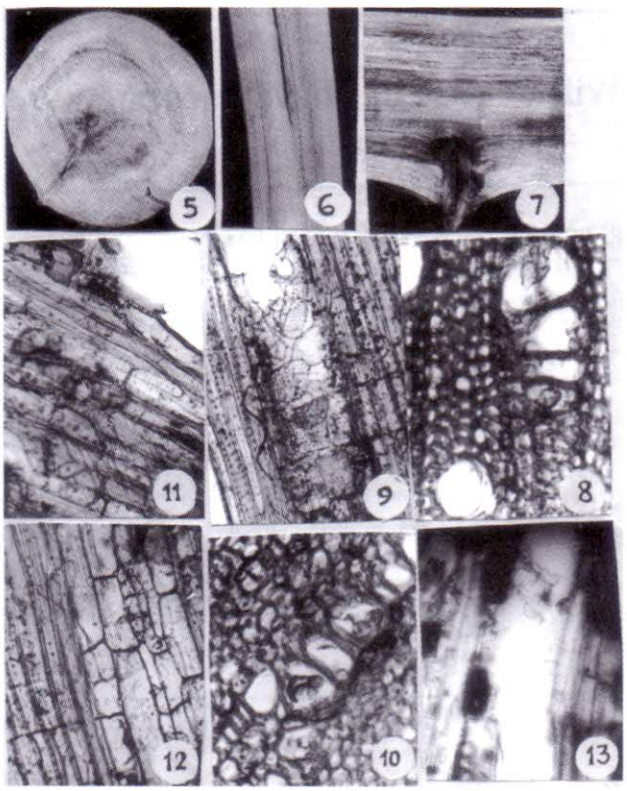
the branches descended back towards the main stem (Fig. 3) and finally the whole plant became wilted (Fig. 4).



Explanation of Figures : Fig. 1 : A healthy fruit bearing branch of guava plant (X 1/4) ; **Fig. 2 :** A terminal branch of guava plant showing die-back symptoms (X 1/10) ; **Fig. 3 :** A side branch of guava plant showing wilt symptom (X 1/10) ; **Fig. 4 :** A complete wilted guava plant (X 1/10).

Cross scetion of the infected stem revealed that decay started from the periphery and then expanded at the centre encircling the central core tissues. (Fig. 5). Longitudinal seetions revaled that the decay moved and spread longitudinally after reaching the central core tissues (Fig. 6), exhibiting black narrow zones. The decayed wood became bleached.

The cross section of the decayed wood further revealed that the fungus get entry into the wood through broken branches or stubs (Fig. 7).



Explanation of Figures : Fig. 5 : A cross section of the stem of wilted plant showing decaying areas (X 1/4) ; **Fig. 6 :** A longitudinal section of the stem of wilted plant showing the path of decay (X 1/10) ; **Fig. 7 :** A longitudinal section of the stem of wilted plant showing the entry of pathogen through broken branch stub (X 1/10) ; **Fig. 8 :** Microphotograph of transverse section of the infected wood showing the vessels full of fungal hyphae (X 100) ; **Fig. 9 :** Microphotograph of longitudinal section through the infected stem showing the distribution of hyphae in the vessel and adjacent tissue (X 100). ; **Fig. 10 :** Microphotograph of transverse section of the infected wood showing hyphae in the distorted vessels and adjacent cells (X 100) ; **Fig. 11 & 12 :** Microphotograph of longitudinal sections of hyphae through ray parenchyma cells (X 100). ; **Fig. 13 :** Microphotograph of longitudinal section of wood showing the complete distribution of vessels and presence of dark coloured cylindrical deposits along the line of vessels.

All the isolations made from the top to the bottom of the wilted plants were found to be *B. theobromae* alone, which indicated its nature as causal organism of the disease.

The decayed wood was cut into small pieces and were kept immersed in a glass beaker with gently boiling water till they became completely waterlogged and sank. Then these decayed wood pieces were transferred to a mixture of equal volumes of glycerine and rectified spirit and kept for 3 days before section cutting. Several transverse, radial-

longitudinal and tangential-longitudinal sections were cut by free hand and selected sections were stained by the combination stains of Saffranin and Picro-Aniline blue as suggested by Cartwright (1929).

After staining the sections of the decayed wood pieces, the preparations showed the lignified cell-walls of the tissues with various shades of red colour and the fungal hyphae appeared in deep blue colour.

The fungal hyphee were found to be confined in the vessels and wood parenchyma (Fig. 8). The vessels became distorted and adjacent ray cells were also broken down (Fig. 10). In advanced stage vessels were completely distorted and became full with fungal hyphae (Fig. 9). Ray cells and parcerehyma cells were also distorted and cell walls became thinner and cells were full of fungal hyphae (Figs. 11 and 12). Lastly the vessels were completely destroyed and several dark stained black cylindrical deposits were found to be associated with the distorted empty vessels (Fig. 13).

The fungus was found to spread from top of the tree to the bottom of the infected tree. The decay also extended from the top to the bottom of the tree exhibiting first drying of the top branches and finally the plant exhibited wilt or die back symptoms.

The hyphae after entering the healthy plants through the broken branch stubs ramified both longitudinally and transversely. The decay of the wood was also found to start in the periphery and then extended towards the centre. It was found from the present study that *Botryodiplodia theobromae* causes die-back and wilt diseases symptoms of guava in the field. Similar reports had already been published on the role of *B. theobromae* in causing wilt and die back diseases of cocoa (Ang et al. 1987 ; Bastos and Evans. 1979), rubber (Chattopadhyay et al. 1982), mango (Rath et al., 1978 ; Gonzaler et al. 1982), *Albizia* (Sharma and Sankaram, 1988).

Further research works are in progress to find out the control measures of the disease.

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