

in rock specimens. Johnson *et al*<sup>6</sup> investigated the magnetic behaviour of some specimens from North Pacific deep sea sediments and reported the presence of multidomain structures since the  $J_r/J_m$  value was found to be less than 0.5. Radhakrishnamurty *et al*<sup>1</sup> made a granulometric analysis of basalts and concluded that an  $R$  value less than 0.5 indicated a mixture of SD and MD grains while the  $R$  value close to 0.5 indicated the presence of large percentage of SD grains. The theoretical value of 0.5 for  $J_r/J_m$  ratio is expected for SD particles distributed in nonmagnetic matrix<sup>4,12,13</sup>. The increase in  $H_c$  and saturation remanence reflects the increase in  $J_r/J_m$  ratio as the fraction of single-domain regions increase<sup>14</sup>. The samples (35,46) showing high  $J_r/J_m$  ratio and exhibiting high  $H_c$  probably indicate a predominance of SD particles. Similar interpretations have been given by Day *et al*<sup>15</sup>. Radhakrishnamurty *et al*<sup>12</sup> suggest the presence of MD grains if the  $J_r/J_m$  is less than 0.2. In the present study it is found that the majority of the samples have a value less than 0.2 and it is probable that they contain mostly MD grains, and in the samples where the  $J_r/J_m$  value is above 0.2 but below 0.5 there may be a mixture of MD and SD grains. Similar interpretations have been given by Davis and Evans<sup>5</sup>.

It may be inferred from the magnitude of  $R$  value that the samples of magnetite-quartzites contain MD grains in the majority of the samples and a mixture of SD and MD grains in a few cases. The relative remanence ratio is found to show a linear variation with coercive force ( $H_c$ ).

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## OCCURRENCE OF TOMATO BUNCHY-TOP VIRUS IN INDIA

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DURING survey of tomato plantations at Ganeshkhind Fruit Research Station, Pune in 1979 a few tomato plants of var. Pusa ruby showed extensive abnormal growth with apical proliferation. The new leaves arising from the axillary buds gave closely crowded bunchy appearance. The leaflet margins curled towards the undersurface, the tips frequently twisted downwards and the surfaces showed a puckered condition. Necrosis of the leaves and stems also were characteristic symptoms. The diseased plants had a few flowers with 1-2 very small sized fruits. These types of diseased symptoms on tomato plants were new to the locality. The nature of the disease was studied and the findings reported here.

Under glass house tests, the transmission studies revealed that the disease is readily transmissible through sap on the healthy tomato seedlings. Before extraction of the juice, the diseased leaves were kept in deep freeze for a few minutes. Extraction of the sap from the diseased leaves was made in phosphate buffer at pH 7.0 (0.01M) and was inoculated to the celite dusted test plants.

The inoculated tomato seedlings, after 3-4 weeks, produced small curled or rolled leaves and the plants were stunted. Further disease development revealed veinal necrosis of leaves and occasionally of stems too. However, ultimately a large number of small leaves were formed giving a bushy appearance to the plants (figure 1).

The host range studies indicated that *Solanum gilo* Raddi; *S. melongena* L.; *S. nigrum* L.; *S. tuberosum* L.; *Nicotiana tabacum* L. var. White Burley; *N. glutinosa* L. and *Petunia hybrida* Vilm. are symptomless carriers of the virus and was confirmed by back inoculations to tomato.





Figure 1. A typical tomato bunchy-top virus affected tomato plant.

Other hosts viz., *Arachis hypogaea* L.; *Dolichos lablab* (Roxb.) L.; *D. biflorus* Roxb.; *Chenopodium amaranticolor* Coste and Reyn; *C. murale* L.; *Crotolaria juncea* L.; *Gomphrena globosa* L.; *Pisum sativum* L.; *Phaseolus vulgaris* L.; *Vigna unguiculata* (L.) Walp and *Capharanthus roseus* Linn G. Don. tested gave negative results.

The physical properties indicated that the virus in crude sap withstood heating upto 80°C for 10 min but not 85°C, dilution upto 1:1000 and not 1:10,000 and longevity *in vitro* at room temperature upto 8 days.

The possibility of it being tomato spotted wilt is eliminated based on the symptoms of the diseased tomato plants are a typical of bunchy top virus (TBTv) as described by Smith<sup>1</sup>. In addition, it is seen that *Chenopodium amaranticolor*, *Crotolaria juncea*, *Gomphrena globosa* and *Vigna unguiculata* give local lesions with tomato spotted wilt virus as reported by Prasada Rao *et al*<sup>2</sup> while these hosts reacted negatively with the virus under investigations.

Based on the symptom expression, host range studies and physical properties, the virus under report resembles a strain of bunchy top virus disease of tomato as reported by Ladipo<sup>3</sup> from Nigeria and McClean<sup>4,5</sup>, from South Africa. The virus under report has a higher thermal inactivation point (TIP)

85°C, longevity *in vitro* (LIV) upto 8 days while the virus reported from South Africa has (TIP) 60-70°C (LIV) 12-24 hr and that of Nigerian isolate has (TIP) 75°C, (LIV) 96 hr.

From the literature<sup>6</sup>, it is seen that tomato bunchy-top disease on tomato has not been reported so far and this is the first record of the occurrence of bunchy-top disease on tomato from India. Further detailed investigations are in progress.

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## THE GENUS MYCELIOPHTHORA FROM INDIA

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DURING the studies on thermophilic fungi, an interesting fungus was isolated from a soil sample kept in an incubator at 50°C in 1978. The isolate under Culture No. FIM<sub>3</sub> when studied in detail on oat meal agar and 2% malt agar at 37°C was found to be a species of genus *Myceliophthora* Cost. This genus was first described by Costantin<sup>1</sup> as *M. lutea* which was made a synonym of *Chrysosporium* Corda by Carmichael<sup>2</sup>. Oorschot<sup>3</sup> reintroduced this genus with its type species, *i.e.*, *M. lutea* Cost., and proposed two new combinations, *M. thermophila* and *M. fergusii*. It is characterised by blastoconidia with narrow basal attachments, generally borne directly on hyphae or pedicels but sometimes also on ampulliform swellings, and has no arthroconidia.

The present isolate resembles the species *M. thermophila* (Apinis) Oorschot in having colonies growing moderately on 2% malt agar, thin, powdery in appearance, pale brown in colour, conidia obovoid to elongated, one-celled, smooth to rough, hyaline and with a narrow basal attachment; but differs in having thin, effuse, concentric rings of growth; sporulation good at 37°C, conidia slightly larger,