

A VARIETY OF BRINJAL (*SOLANUM MELONGENA* LINN) RESISTANT TO BACTERIAL WILT

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BACTERIAL wilt disease of solanaceous crops like tomato, brinjal, chilli, and tobacco is a common and troublesome disease in the wetter parts of Ceylon especially on soils which tend to have an alkaline reaction. Most of those who cultivate vegetable gardens in the wet zone are familiar with the disappointment experienced when well-grown plants, which are about to bear fruit, suddenly wilt and die.

The disease is caused by the bacterium *Bacillus solanacearum* E.F.Sm. The parasite has a wide host range, including all species of the *Solanaceae* and numerous plants outside this family. The disease first manifests itself in the wilting of one or more branches or of the entire plant. In brinjals, this wilting is accompanied by a yellowing and then a browning of the leaves. In some plants, the bacterium may stimulate the development of adventitious roots at the collar and the epinastic curvature of leaves. If a recently-diseased stem is cut across with a sharp knife, the xylem will be found to be discoloured brown, and the discoloured tissue exudes a greyish-white or brownish slime, which consists of large numbers of bacteria. In advanced cases of the disease, the discoloration may extend to the pith and bark. A number of the roots of diseased plants is usually completely rotted. In mild cases of infection, under conditions unfavourable to the disease, the plant may recover.

The bacterium, which is a soil inhabitant, enters the roots of the host through openings produced by the extrusion of lateral roots or through wounds caused in transplanting or through insect-punctures. It then multiplies within the host and eventually induces wilting either by occluding the water-conducting vessels or by excreting a toxin into the transpiration stream.

The control of bacterial wilt disease is difficult, the only direct method being the sterilization of the soil in order to kill

all the parasitic bacteria in it. This method is uneconomic in all conditions except those of very intensive cultivation, which do not occur in Ceylon. The measures generally recommended are those of evasion of the disease by the rotation of non-susceptible crops in soils in which the organism occurs, and by the immediate destruction of all diseased plants. These measures do not appeal to the public, especially to the village cultivator, and attention has been given during the last two years to the possibility of obtaining or breeding strains or varieties of solanaceous crops which are resistant to the disease. The value of a variety or strain of plant resistant or, if possible, immune to a disease is obvious. It often happens that an immune variety, when discovered, is of little commercial value, but it may be possible to breed from that immune variety and to evolve one that is both immune to the disease and of good quality.

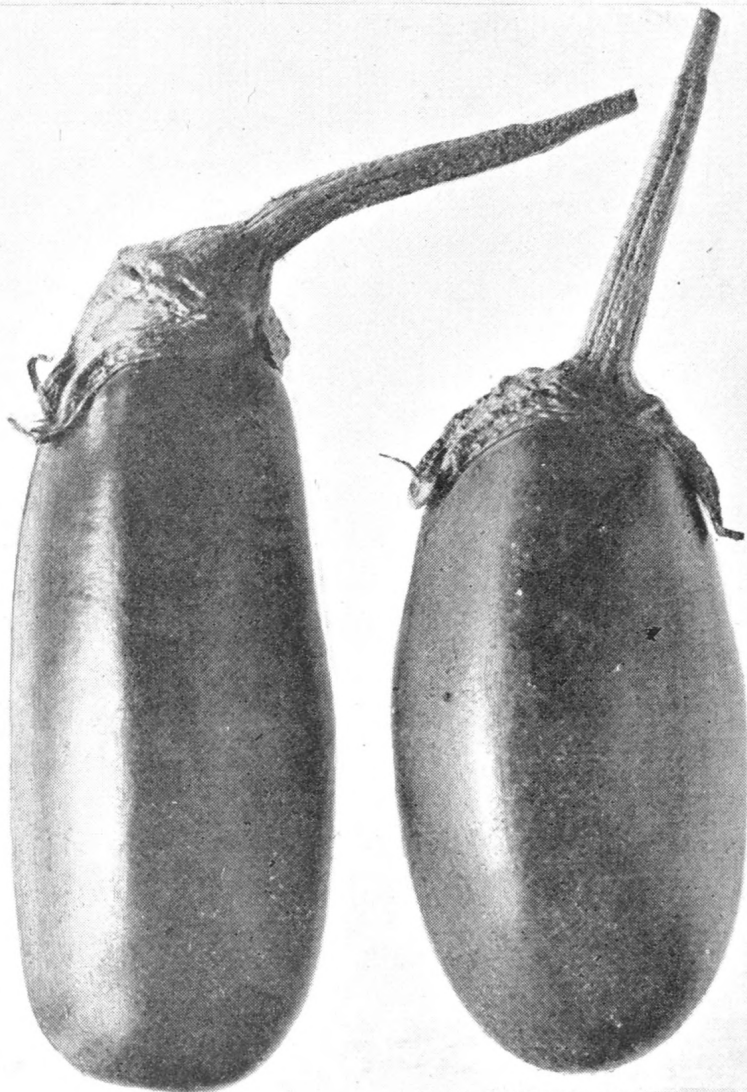
Work on tomatoes with the object of finding a strain resistant to bacterial wilt has been only partially successful, but it has been possible to demonstrate differences in susceptibility between the different varieties tested and this alone is an encouraging discovery. With brinjals, on the other hand, we have been very fortunate for a variety has been discovered which is almost completely immune to bacterial wilt disease, and this note has been written with the object of making this known. It is felt that the discovery of this highly resistant variety is of interest and of some importance since we have been unable to trace any record from any other part of the world of the occurrence of a variety of brinjal so resistant to bacterial wilt disease.

Seeds of the variety of brinjal or eggplant (*Solanum melongena* Linn.) under discussion were originally obtained from Raitalawela in Matale South, where it had been grown for a number of years, and had probably been naturally selected in that area for wilt resistance. In the *maha* season, 1937, this variety which was considered to be promising from the point of view of quality, was planted out by Dr. J. C. Haigh, Botanist, alongside an imported variety, at the Matale Vegetable Station. The imported variety was almost completely wiped out by bacterial wilt. In the Matale variety, on the other hand, the percentage wilt in a total of 1,450 plants, was only 1.0. In this trial, no information was available regarding the distribution of the wilt organism in the soil, and it appeared possible that the Matale variety might have been merely seated on uninfested land.

In order to test this point, seed was obtained and planted in an area where the level of infestation by bacterial wilt had been deliberately raised by growing in successive seasons solanaceous



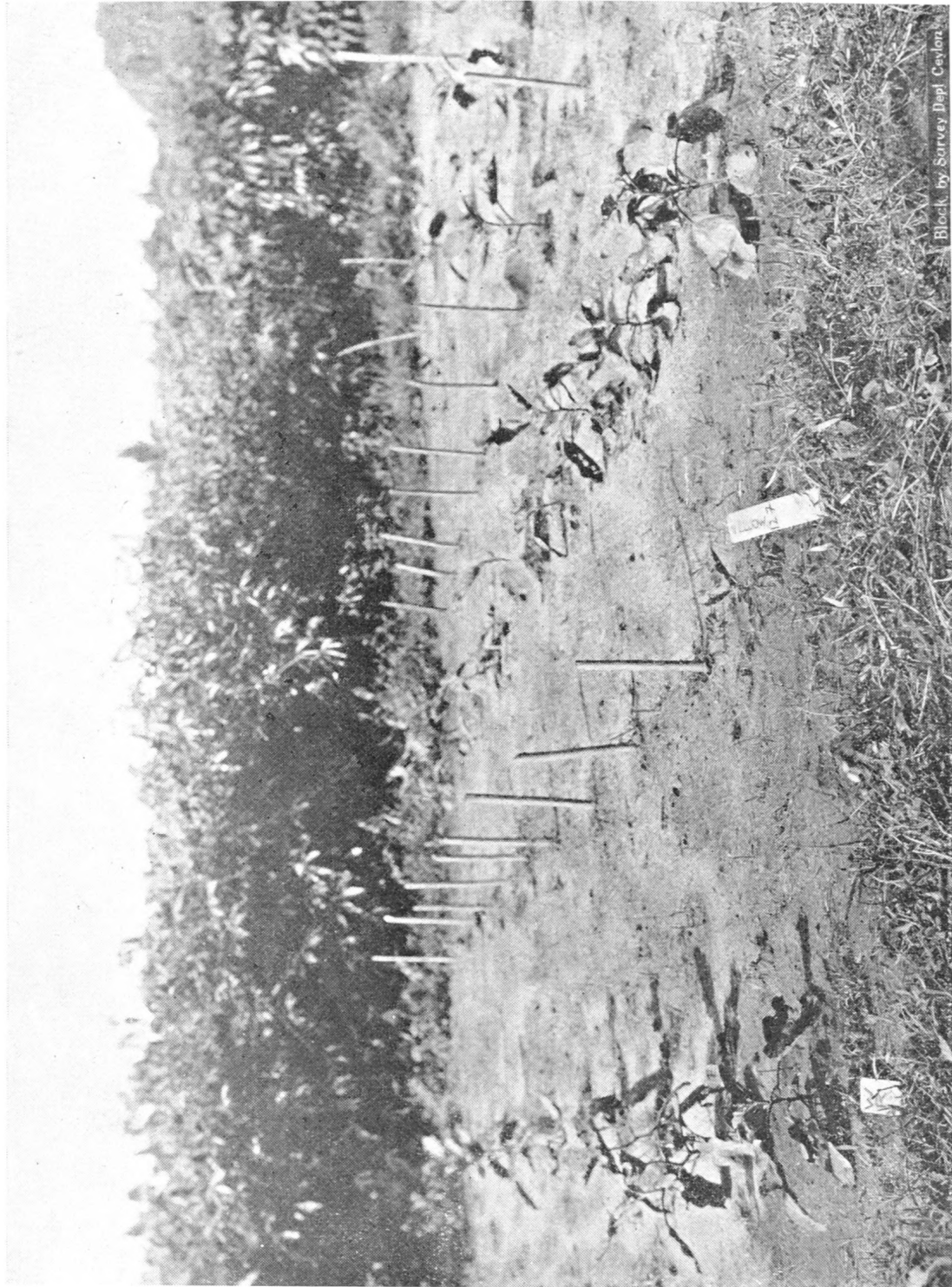
(1)



(2)

BLOCK BY SURVEY DEPT. CEYLON.

PLATE II.—A WILT-RESISTANT BRINJAL.



Block by Survey Dept. Ceylon

PLATE I.—A WILT-RESISTANT BRINJAL GROWING IN HEAVILY-INFESTED SOIL.

plants. The Matale variety exhibited complete immunity to bacterial wilt disease. A further trial was therefore laid down using the Long Yellow variety, which is known to be susceptible, as a control. The Matale variety showed in this trial 0·9 per cent. infection whereas the Long Yellow developed wilt to the extent of 69·1 per cent.

For demonstration purposes, a small plot was laid down in which alternate rows, 3 feet apart, were planted with the Matale variety and the Long Yellow variety. In Plate I. is reproduced a photograph of this plot. Points at which plants have died from bacterial wilt disease are indicated by pegs. It will be seen that the Long Yellow variety was almost wiped out by the disease whereas the Matale variety was not affected.

The growth-habit and the appearance of the fruit of the Matale wilt-resistant variety are illustrated in Plate II. Figs. 1 and 2. The plant is a low, erect perennial, with an average height of 37 ± 7 inches, and an average spread of 51 ± 11 inches. Lack of height is an undesirable feature; many of the fruits trail on the ground and are liable to invasion by soil-inhabiting parasites. The plant produces a harvest in about $3\frac{1}{2}$ months, and is relatively prolific. The fruit is elongated, purple-skinned, white-fleshed, and of average cooking quality. It is about 6 inches long and about 2 inches in diameter. Spines occur on the persistent calyx and on the pedicel. The flowers are coloured purple, and are either solitary or borne in inflorescences of 2-5. A small fraction of plants bear short-styled flowers. No exact information is available regarding the extent of natural crossing, and it is not possible, at this stage, to make a pronouncement on the stability of the variety in the field.

Experiments on the genetics of wilt resistance and on the hybridization of this variety with other commercially valuable varieties, are in progress. These experiments should provide information regarding the nature of wilt resistance and should lead to the evolution of a strain which will both be resistant to the disease and produce prolifically fruits of superior quality.