Agric. Res. J. Kerala, 1986, 24 (2) 216—218

SPOT-PLANTING TECHNIQUE TO CONFIRM HOST REACTION TO BACTERIAL WILT IN TOMATO

Bacterial wilt caused by *Pseudomonas solanacearum* E. F. Smith is the most serious disease of tomato *(Lycoparsicon esculentum* Mill) in the warm humid tropics. Conventional plant protection methods are not adequate enough to control this disease. Breeding for wilt resistance is considered the most practical way to combat the disease. Many methods are used to evaluate bacterial wilt resistant lines. Winstead and Kelman (1952) found that inoculations either by puncturing the stem through a drop of bacterial suspension placed on the leaf axil or by pouring bacterial suspension over wounded secondary roots were equally effective on susceptible tomato plants. Alternate row planting with a susceptible check is the most conventional method used in field screening for bacterial wilt resistance. These methods failed many times to knock down susceptible line(s) in an otherwise reportedly resistant breeding line. The escape of such plants can cause havoc in a tomato seed production programme. A spot-planting technique involving planting of a known susceptible line along with the breeding line under evaluation, and the consequent wilting of susceptible line and healthy stand of breeding line confirms resistance in the breeding line under evaluaiion.

Four tomato lines, Pusa Ruby, Rutgers, Venus and LE 79 were used for the present study. Root dipping, inoculation of seedlings by puncturing the stem through a bacterial suspension placed on the leaf axil, alternate row planting with known susceptible lines and spot planting methods were compared to identify the efficient method. The first two methods were followed under green house conditions and the remaining methods under field conditions. Soil temperatures were maintained at 24°C and 35°C through regulating flow of steam through green house benches where pots were kept. Pusa Ruby is susceptible to bacterial wilt. Venus, Saturn and LE 79 are resistant to specific isolates of *Pseudomonas solanacearum* (Rajan and Peter 1984). For root dipping, seedlings at 5-6 leaf stage were dipped in a freshly prepared bacterial culture and then planted in sterilised soil. The soil temperature was maintained at 24°C and 35°C. Stem inoculations consisted of pricking the leaf axils with a needle and then pouring a drop of bacterial suspension. The soil temperature was maintained at 35°C. Observations were recorded on days taken for the plants to wilt in both the cases. In alternate row planting, the susceptible line (Pusa Ruby) and line under test (LE 79) were planted in alternate rows in a uniformly wilt sick field. The wilt sick field is developed and maintained through continuous growing of Pusa Ruby which wilted completely after transplanting. The wilting of the susceptible line indicated presence of virulent inoculum in the soil. Spot-planting consisted of combined planting of the susceptible line and the line under test in a wilt sick field. The presence of virulent inoculum at the planting spot was confirmed through wilting of the susceptible check. Data were recorded on susceptibility by counting the number of cases in which both the

susceptible check, and the line under test wilted. Data were also recorded on resistance by counting the number of plants survived in spots where susceptible check wilted.

The root dipping method was found ineffective at lower temperatures (24°C) (Table 1). The stem inoculation method eventhough effective at 35°C was laborous under field conditions and required professional assistance for execution. In the case of alternate row planting, wilting observed was lower than spot-planting in the same line (Table 2). This showed that alternate row planting, though an easy method was hadicapped with high probability of escape of suscepts. Combined planting of line under evaluation and the susceptible check in the same spot (spot-planting) was obviously more effective. Wilting of susceptible check and non-wilting of line under evaluation precluded the chance of escape. A non-wilted suscept was considered an escape. "Spot-planting" can be recommended for future field screening trials for bacterial wilt resistance in tomato.

The senior author wishes to acknowledge the award of ICAR Junior Research Fellowship to him during the course of this study.

Table 1

Evaluation for wilt incidence by root dipping and stem inoculation

Lines	Root dipping				Stem inoculation	
	24°C		35°C		35°C	
	Date of inoculation	Date of wilting	Date of inoculation	Date of wilting	Date of inoculation	Date of wilting
Pusa Ruby	14/10	17/11 (34)	24/9	28/9 (4)	24/9	28/9 (4)
LE 79	14/10	—	24/9	—	24/9	—
Venus	14/10	—	24/9	29/9 (5)	24/9	29/9 (5)
Rutgers	14/10	12/11 (29)	24/9	29/9 (5)	24/9	29/9 (5)

Data in parenthesis indicate days taken to wilt after inoculation

Table 2

Evaluation for wilt incidence by alternate row planting and spot-planting

Lines	Alternate row planting		Spot-planting	
	Number of plants	Wilt (%)	Numberof plants	wilt (%)
LE 79	59	18.64	63	29.54
Pusa Ruby	61	100.00	65	100 00

സംഗ്രഹം

തക്കാളിയെ ബാധിക്കുന്ന ബാക്ടീരിയാ മൂലമുള്ള വാടൽ രോഗത്തെ പറ്റിയും രോഗപ്രതിരോധ ശക്തിയുള്ള ഇനങ്ങളെ ഉരുത്തിരിച്ചെടുക്കുന്നതിനെപ്പറ്റിയും പഠനങ്ങൾ നടത്തി. വാടൽ വരുന്ന ഇനങ്ങളും പരീക്ഷണത്തിനുള്ള ഇനങ്ങളും വാടൽ രോഗത്തിന് ഏറ്റവും അനുയോജ്യമായ മണ്ണിൽ ഒന്നിച്ച് ഒരേ സ്ഥാനത്ത് നടുമ്പോൾ വാടൽ വരുന്ന ഇനം വാടുകയും പരീക്ഷണ ഇനങ്ങൾ വാടാതിരിക്കുകയും ചെയ്യുന്നത് പ്രതിരോധ ശക്തി ffl^ejd>06>6rnano" വരുന്നു. വാടൽ വരുന്ന ഇനം വാടാതിരുന്നാൽ ഗവേഷണ ഫലങ്ങൾ പൂർണ്ണമല്ല എന്നും അനുമാനിക്കാം.

College of Horticulture
Vellanikkara 680 654, Trichur, Kerala

C. Narayanankutty
K. V. Peter

References

Rajan, S. and Peter. K. V. 1984. LE 79 — a tomato line resistant to *Pseudomonas solanacearum*. E. F. Smith. *Tomato Genetics co-operative* 34, 14.

Winstead, N. N. and Kelman, A. 1952. Inoculation techniques for evaluating resistance to *Pseudomonas solanacearum*. *Phytopathology* **42**, 628-634.