Research Paper :

Screening for natural occurence of tomato leaf curl virus (TLCV) in devipatan mandal of Tarai region of Uttar Pradesh

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SUMMARY

Investigations were made to identify the leaf curl virus associated with tomato under natural conditions. The predominant symptoms evoked by isolate TLC-I were vein banding, yellowing, slight curling,straight branching and stunting while those of isolate TLC-II were vein thickening, puckering, excessive leaf rolling.None of the isolates were sap or seed transmissible. Aphid species also failed to transmit the isolate.But both the isolates were successfully transmitted by grafting and whitefly(*Bemisia tabaci*,Genn.).Both the isolates reacted positively in triple antibody sandwich ELISA (TAS-ELISA) test with the monoclonal antibodies against *Indian tomato leaf curl virus*. Electron microscopic studies reaveled that both the isolates consisted of geminate particales. In immunosorbent electrone microscopy (ISEM), both the isolates exhibited enhanced trapping of virion with antiserum against Indian cassava mosaic virus (ICMV), a geminivirus. Both the isolates were found to be tomato leaf curl virus.

Key words : Tomato , Tomato leaf curl virus (TLCV).

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Tomato(*Lycopersicon esculentum,*Mill.), family solanaceae is one of the most popular and extensively grown fruit vegetable crop in the world. Among the different diseases of tomato, the leaf curl is most widespread and destructive disease, as sometimes it leads to cent per cent crop loss (Butter and Rataul, 1981, Saikia and Muniyappa,1989, Ansari and Tewari, 2004). The tomato leaf curl virus (TLCV) is transmitted by whitefly *(Bemisia tabaci* Genn.) (Vasudeva and Samaraj, 1948). In Uttar Pradesh this disease is widely prevalent and estimated to cause 27-40% loss (Ansari *et al.*, 2005). The predominant symptoms of the disease are vein clearing, vein banding, reduction in leaf size, stunting, marginal and severe curling of leaves. Puckering of leaf is also common. Since the disease causes serious loss,an investigation was made to identify the association of viruses causing leaf curl disease in tarai region of Uttar Pradesh.

MATERIALS AND METHODS

Surveys of tomato fields were conducted in different tehsils of four districts constituting the Devipatan mandal of tarai region of Uttar Pradesh, to record the distribution and incidence of leaf curl disease. Among different varieties of tomato which are most commonly sown in this area, three varieties namely Pusa Ruby, Punjab Chuhara and Pusa Early Dwarf were taken for the study. The diseased and healthy plant counts were taken from 2 x 2m^2. area of five random places in each of five fields in every tehsil and per cent disease incidence (PDI) was calculated by following formula:

$$PDI = \frac{P_1 \times 100}{P_2}$$

where, P_1 = Number of infected plants
P_2 = Total number of plants

At the same time based on symptoms, 14 isolates were designated as T_1 to T_{14} for each variety of tomato chosen for study. These isolates were transmitted to healthy seedlings of tomato by whitefly inoculation under insect proof glasshouse conditions and were maintained separately in isolation chambers. The prominent symptoms induced by 14 isolates of three different varieties were recorded (Table 1, Table 2, Table 3 and Plate 1).

On the basis of their reaction on certain biological indicator plants (Table 1, Table 2 and Table 3), these isolates were further categorised into two groups (Table 4). A representative isolate from each group was selected and redesignated as TLC-I and TLC-II for further detailed investigations on symptomatology, transmission, particle morphology and serology.

Identity of the virus was finally established by triple antibody sandwich ELISA (TAS-