CHAPTER-VI

SUMMARY

India is second largest producer of vegetables next to China. Tomato (*Lycopersicon esculentum* Mill.) is most widely grown vegetable crop in India. It is highly nutritive vegetable, consumed both raw and cooked and is put to more than 115 varieties of table uses. Its fruits are used in various preparations such as juice, salad, pickles, sauce and ketchup etc. Unlike other crops, the tomato is also attack of various insect pests, mites and nematodes. The insect pests of tomato includes whitefly (*Bemisia tabaci* Germ.), tomato fruit borer (*Helicoverpa armigera* Hubner), aphid (*Apis gossypii* Glover), Green bug (*Nezara viridula* Linn.), spotted leaf beetle (*Epilachna vigina*-Tioctopunctata F.), cut worm (*Agrotis ipsilon* Hufn), and root knot nematode (*Meloidogyne* sp.). Besides, the crop is also suffers from the diseases as tomato leaf curl, tomato mosaic, blossom end rot, fusarium wilt, early blight, fruit rot, powdery mildew and septoria leaf spot etc.

Out of the above insect pests listed, whitefly (*B. tabaci*, Germ.) is the most serious. It is a polyphagous insect pest, feeding on several host plants belonging to different families. It plays a important role in transmission of leaf curl virus disease of tomato. Besides, causing direct loss to vigour of the plant by sucking cell sap, it is also potential vector of several virus diseases. From economic point of virus, it is necessary to protect the crop in early stage from the attack of whiteflies as well as leaf
curl virus disease. To overcome the problem of this virus in tomato a systematic approach is essential to understand its causal virus, mode of infection, spread virulence and other properties in order to formulate the effective the problem of this virus in tomato a systematic approach is essential to understand its causal virus, mode of infection, spread, virulence and other properties in order to formulate the effective Control measures. Keeping the gravity of problem in mind a systematic study was undertaken with the following objectives.

(1) To study the role of whitefly (B. tabaci Genn.) in transmission of tomato leaf curl virus.

(2) Screening of varieties/strains of tomato against whitefly and leaf curl virus disease.

(3) To evolve an effective and economic control measures of whitefly/leaf curl virus disease performed to overcome with the problem of incidence of whitefly and leaf curl virus.

For this purpose, experiments were carried out during kharif 2007-2008 at insectory, Department of Entomology, C. S. Azad University of Agri. & Teach., Kanpur. The seedling were obtained from the Economic Botanist (Vegetable), Vegetable Research Station, Kalyanpur, Kanpur and were transplanted in the field on 8-8-2007 for screening trial and on 9-8-2007 for conducting insecticidal trial. Inscreening trial, fourteen varieties/strains were replicated thrice in randomized block design. The insecticidal trial included nine treatments with one control (no treatment)
also replicated 3 times in a plot size 4.0 x 3.0 m in randomized block
design. The observations regarding whiteflies/plant and incidence of
disease in different varieties/strains were observed after 15,30,45,60 and
75 days of days of transplanting the efficacy of different insecticidal
treatment and seven days of respective sprayings. In all three sprayings. In
all three sprayings were performed to overcome with the problem of
incidence of whitefly and Leaf curl virus disease.

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6.1 Screening of different varieties/strains of tomato against whitefly and leaf curl virus disease

It is clear from the results as presented and discussed in the foregoing chapters that none of the varieties/strains were found to be free from the attack of whiteflies and incidence of the disease as recorded at different interval of the crop growth. The varieties included Angoorlata, KT-1, 7804 and 8730 proved better than all other varieties having less than four flies/plant as recorded at final observations after 75 days of transplanting The group of the varieties/strains having 4-8 flies/plant were KS-21, KS-24, KS-115, KS-162 and KS-118 showing superiority over KS-17, KS-131, KS-15, Azad T-3 and Azad T-2 in which 8.92, 8.46, 9.42, 13.79 and 14.10 flies/plant, respectively, were observed. As regards the incidence of disease, the order of performance of different varieties/strains remained more or less similar as recorded in case of intensity of the
insect pest. It ranged from 17.99 to 76.99 being minimum in Anglorlata, KT-1, 7804 and KS-- -17 (17.99, 19.38, 34.88 and 38.99), respectively. The maximum incidence 76.99 and 72.71 was observed in Azad T-2 and Azad T-3. The probable reason of pest & disease incidence as observed under the influence of various treatments may be due to determinate and indeterminate nature of the varieties/ strains tested under the present investigation. As, varieties/ strains included Anglorlata, KT-1, 8730, 7804 and KS-17 being of indeterminate nature having plants of spreading character did not allow the whitefly to harbour and multiply in large number. The all other varieties/ strains included Azad T-2 and Azad T-3 are of determinate nature having compact and bushy plants favour the whitefly multiply in large number resulting maximum incidence of lead curl virus disease among these treatments.

6:2 To evolve an effective and economic control measures of whitefly and leaf curl virus disease of tomato

Efficacy of different insecticidal treatments applied for the control of whitefly with an ultimate aim to minimize the incidence of the leaf curl virus disease have been observed after one and seven days of each spraying. A perusal of the data documented in the foregoing chapter, it is clear that all the insecticidal treatments have shown their efficacy comparatively better than control in lessening the flies/plant and percentage incidence of the disease. The sprayings of M ethyl-o-demeton and Dimethoate proved to be superior than all other treatments after each
spraying as these treatments registered 0.5 flies/plant against 17.34 in control one day after first spray. It was also minimum 3.44, 3.65 and 4.14, 4.64 flies/plant, respectively, one day after second and third spray in Methyl-o-demeton and Dimethoate treated plants. As for as the efficacy after seven days of each spraying is concerned, the superiority of the Methyl-o-demeton and Dimethoate over other insecticidal treatments remained unchanged having 1.76, 3.41 and 3.78, 4.41 and 4.59, 4.99 flies/plant, respectively, after first, second and third spraying.

As regards the infection of the disease under the influence of various treatments is taken in to consideration, the same treatments viz. Methyl-o-demeton and Dimethoate proved the best insecticidal treatments as the plots treated with these insecticides showed minimum percentage of the diseased plants as compared to other treatments. Further, it could also be seen from the results that all the insecticidal treatments found to be better than control after each spraying in minimizing the incidence of disease. The observational data as presented in Table 12 regarding the efficacy of treatments seven days after IIIrd spraying revealed that Chlorpyriphos, Phorate and Carbofuran granules belong next effective group of insecticide having 5.78, 7.08 and 7.48 flies/plant and 16.13, 19.70 and 22.71 per cent incidence of disease, respectively, against 24.18 flies/plant and 75.66 per cent disease incidence in control.

From the results obtained on different aspects of the present investigations, it is concluded that varieties/strains viz. Angoorlata, KT-1.
8730, 7804 may be recommended to breeder (vegetable crop) to incorporate these varieties/strains in their breeding programme to get the resistant/less susceptible variety of tomato against whitefly and leaf curl virus disease. It may also be advised to vegetables grower to apply three sprayings either of the M ethyl-o-demeton (0.025%) or Dimethoate (0.03%) or Chlorpyriphos (0.05%) to minimize the incidence of whitefly and leaf curl virus disease in tomato crop to gain the maximum return form tomato crop.