CHAPTER-V

DISCUSSION

The present investigations were carried out with a view to observe the role of whitefly (*Bemisia tabaci* Genn.) in transmission of leaf curl virus disease of tomato in relation to application of various Insecticidal treatments and to evaluate the susceptibility/resistance of different tomato varieties/strains against whitefly and leaf curl Virus disease. The results obtained thus are being discussed in the light of findings earlier workers under the following appropriate heads.

5:1 Screening of different varieties/strains of tomato against whitefly and leaf curl virus disease

Screening of varieties/strains of tomato against whitefly with an ultimate aim to find out the resistant varieties/strains against leaf curl virus disease had been carried out during kharif 2007-2008 the observations with regards to whitefly population and incidence of disease started after 15 days after transplanting Up to 75 days with an interval of two weeks.

The mean white fly population revealed that none of the varieties/strains were found to be free from whitefly infestation as recorded after 15 days of transplanting. Anoorlata proved significantly superior than all other varieties/strains with minimum 4.55 flies/plant. except KT-1, 8730 And 7804, respectively, having 5.39, 5.65 and 6.22 flies/plant.
Although, these treatments were at par to each other for their performance to resist the attack of the flies but later three treatments viz. KT-1 8730 and 7804 where also found at par with KS-17 and KS-24 having 7.32 & 7.99 flies/plant, respectively. The varieties Azad T-2 and Azad T-3 did not contribute their best performance regarding the attack of the whiteflies as they mentioned comparatively more population of the flies/plant. As far as the incidence of disease is concerned, it was minimum 5.88, 6.27, 8.29 and 9.39 percent in Angoorlata, KT-1, 8730 and 7804. Further, treatments KS-162, KS-131, KS-15 and KS-118 being at par among themselves but superior to Azad T-2 and Azad T-3 in which maximum percentage of disease incidence 33.77 and 32.65, respectively, was observed.

The data collected on the related aspects after 30 days of transplanting revealed that Angoorlata, KT-1, 8730 and 7804 proved to be at par to each other having 6.03, 7.16, 7.36 and 8.13 flies/plant. Angoorlata having minimum flies population proved superior over all other varieties/strains where as KT-1, 8730 & 7804 infected statistically equally with KS-17 and KS-24. The varieties viz. Angoorlata, KT-1, 7804, 8730 and KS-17 observed to be significantly at par having 9.65, 10.09, 12.70, 16.01 and 16.63 per cent infected plants against Azad T-2 and Azad T-3 which were highly susceptible to leaf curl virus disease having 42.07 and 39.60 per cent infection, respectively.
With the progress of the crop, the third observation was made after 45 days of transplanting revealed that the population of the flies/plant increased accordingly by on the same varieties/strains of tomato as noted after 30 days of transplanting. Here also, the least preferred treatments included Angoorlata, KT-1 and 8730 being at par to each other. Angoorlata having 5.24 flies/plant proved the best varieties/strains whereas slight increasing population was observed in 7804, KS-17 and KS-24 having 8.94, 9.96 and 10.54 flies/plant. The remaining varieties came in the intermediate group of the treatments but superior to Azad T-2 and Azad T-2 and Azad T-3, which had 19.95 and 16.82 flies/plant, respectively. The spread of the disease was observed minimum in Angoorlata and KT-1 being 12.05 and 15.92 per cent. Further, KT-I gave performance equal to those of KS-17, 7804 and 8730. More or less other varieties showed their same performance in respect of virus disease incidence as recorded in case of whitefly population. With the crop growth, the intensity of the flies increased resulting heavy infection of the disease among the various varieties/strains simultaneously.

As per Table 5, Fig 6, it is apparent that the population of the flies/plant is slightly decreasing in various varieties/trains which ranged from 1.64 to 14.73 as recorded after 60 days of transplanting. Here also, Angoorlata, KT-1, 8730 and 7804 proved at par to each other having 1.64, 2.23, 3.15 and 3.77 flies/plant, respect and better than all other varieties tested for their susceptibility/resistant in the present experiment. As far as, the spread of the disease is concerned, it was found
to be slightly increasing in different treatments as compare to previous observations. The incidence of the disease ranged from 14.96 to 63.63 per cent being minimum 14.96 in Angoorlata closely followed by KT-1 having 15.92 per cent incidence of the disease. As observed in previous observations, the maximum disease incidence was observed in Azad T-2 and Azad T-3.

The final observation regarding the whitefly population and incidence of disease observed after 75 days of transplanting revealed more or less similar performance as observed after 60 days of transplanting. A slightly decreasing population of flies/ plant and increasing incidence could also be seen from the Table 6, Fig 7. The treatments Angoorlata, KT-1 and 8730 proved significantly superior than rest of the varieties/ strains except 7804 and KS-21.

From the foregoing discussion it can be concluded that none of the varieties/ strains were observed to be resistant against the whitefly infestation and incidence of the leaf curl virus disease. The varieties/ strains showed their better performance included Angoorlata, KT-1, 8730 and 7804 in which less than four flies/ plant Angoorlata found. 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-1-7, KS-131, KS-15, Azad T-3 and Azad T-2 in which 8.192, 8.46, 9.42, 13.79 and 14.10 flies/plant, respectively, were observed at final observation. As regards the disease incidence, the order of the performance of various varieties/
strains remained more or less similar at the time of concluding observations. It ranged from 17.99 to 76.99 per cent among the different varieties/strains being minimum in Angoorlata, KT-1 and 7804.

Since no authentic report on the screening of tomato varieties/strains against Bemisia tabaci Genn. and leaf curl virus disease is available so far in literature, seeing its phytophagous nature, the work off Ahmad (1974) may however, be considered in the sense that he found six cultures of cucumber infested by three pest including Bemisia tabaci as one of them. The author in this case has concluded that the resistant to the pests was directly related to low protein and amino acid content of leaves of tested resistant varieties. Aviles Baeza (1995) determined host plant of the whitefly associated with tomato and reported 58 wild and 14 cultivated species were found to be host the pest at some phase of its life cycle. The most important families, of the wild species were *Leguminaceae*, *Euphorbiaceae*, *Asteraceae*, *Convolvaceae* and *Malvacae*. The resistant in 13 genotype of egg plant to jassid, whitefly arid fruit borer was worked out by Choudhary et. al. (1995). As a results of experiment it. revealed that non of them. have resistant against *B. tabaci*.

The factors involved in respect of intensity of whitefly incidence of the disease among the various varieties/strains may be what so ever but it may be probably due to determinate and indeterminate nature of the different varieties/strains. As, varieties/strains included Angoorlata, KT-I, 8730, 7804 and KS-17 being of plants of spreading character did not
indeterminate nature having spreading allow the whitefly harbour and multiply in large number. Therefore, the results obtained at various intervals regarding the intensity of the pest and incidence of the disease remained minimum among these varieties/strains tested. The all other varieties/strains included in the study particularly Azad T-2 and Azad T-3 are of determinate nature having compact and bushy plants favour the multiplication of the whiteflies, in large scale with the result maximum incidence of leaf curl virus disease was noticed throughout the investigations among these varieties.

5:2 To evolve an effective and economic control measures of whitefly and leaf curl virus disease of tomato

From the results as presented in foregoing chapter related with the efficacy of different treatments against whitefly and leaf curl virus disease, it is evident that the gradation of the effectiveness of different insecticidal treatments at certain interval of time is needed and to be discussed in the light of findings of the earlier scientist. The findings on the above aspects, are being discussed as under.

Efficacy of different insecticidal treatments applied for the control of whitefly with an ultimate aim to minimize the incidence of days of each spraying. A perusal of the data documented in the previous 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 spraying of Methyl-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 far as the efficacy after seven days of each spraying is concerned, the superiority of the M ethyl-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, 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 insecticidal treatments seven days after IIIrd spraying revealed that Chlorpyriphos, Phorate and Carbofuran granules belong next effective having 5.78, 7.08 and 7.48 flies/plant and 16.13, 19.70 and 22.21 per cent incidence of disease, respectively, against 24.18 flies/plant and 75.66 per cent disease incidence in control.
The efficacy of these chemicals have also been advocated by a number of workers which are more or less in agreement. Among those the work of Singh and Singh (1989) is worth mentioning who reported three spraying of Phosphamidon (0.02%) or Methy-o-demeton (0.025%) or soil application of Phorate @ 15 kg/ha. have reduce the number of whitefly/plant in okra crop. Similarly in a field trial against *Bemisia tabaci* conducted by Bhattacharjee (1990) revealed that the application of Phorate @ 1.5 kg a.i./ha. at the time of sowing followed by three spraying of Endosulfan (0.07%) just after 10 days of germination and subsequently at 15 days intervals and on wards may proved effect-I-C. The present work is in conformity with the findings of Chander and Singh (1991) who applied Monocrotrophos (0.04), Dimethoate (0.03%) and Chlorphyriphos (0.05%) as foliar application on green gram after 55 days of sowing and reported the effectiveness these treatments in reducing the incidence of cotton whitefly and How mosaic virus. In the present investigation 1 ion three spraying schedule have been suggested for the control of whitefly (*B. tabaci*) and leaf curl, virus disease. Contrary, Sammour et. al. (1993) indicated that three sprayings on tomato crop to check the application of *B. tabaci* were not sufficient but frequent application up I to seven sprays would be necessary with most toxicant to insure pest free Plant. Later on Gupta and Singh (1983) evaluated the effectiveness of six granular insecticides and expressed their results about the superiority of carbofuran 3G @ 2.02 kg a.i./ha either in summer or in rainy season for the maximum reduction of whitefly population.