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EFFECT OF TRANSPLANTING DATES ON THE INCIDENCE OF INSECT AND MITE PESTS OF CHILLI (*CAPSICUM ANNUM* L.) AND ITS YIELD

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ABSTRACT

The investigation on effect of transplanting dates on the incidence of insect and mite pests of chilli (*Capsicum annum* L.) and its yield was conducted at Horticulture farm, Rajasthan College of Agriculture, Udaipur (Rajasthan) during *kharif* 2006–07 and 07–08. Results showed that there was comparatively lower insect pests infestation in chilli transplanted on 15th July, which also exhibited higher green chilli yield as compared to the crop transplanted on 30th August, which exhibited maximum insect pests infestation and less fruit yield during both the years.

Key words: Incidence, transplanting dates, chilli, insect, mite, marketable yield

INTRODUCTION

Chilli is an important vegetable and condiment crop belonging to the family solanaceae. It is cultivated throughout the country in about 7.67 lac hectares with annual production of 12.30 lac tonnes and average productivity of 1600 kg ha^{-1} (Anonymous, 2010). Several insect and mite pests damage the chilli crop soon after transplanting to maturity and causes severe losses to the crop. The yield losses ranges from 50–90 per cent due to insect pests of chilli (Nelson and Natrajan 1994 and Kumar 1995). Reddy and Puttaswamy (1984) reported 51 insects and 2 mite species belonging to 27 families and 9 orders on chilli. The major insect pest fauna of chilli includes thrips (*Scirtothrips dorsails* Hood), whitefly (*Bemisia tabaci* Genn.), tobacco caterpillar (*Spodoptera litura* Fab.) and fruit borer (*Helicoverpa armigera* Hub.), aphid (*Aphis gossypii* Glover) and the mite (*Polyphagotarsonemus latus* Banks). Among them, sucking pest complex is noxious to the crop. Their pest population flactuatees at the various stages of crop growth and influenced by time of sowing due to ecological factors.

MATERIALS AND METHODS

The present investigation was conducted at Horticulture farm, Rajasthan College of Agriculture, Udaipur (Rajasthan) during *kharif* 2006–07 and 07–08. The experiment was laid out in a randomized block design (RBD) with four treatments (dates of transplanting) and five replications. The plot size was 4.5 m × 3 m with row to row and plant to plant spacings of 30 and 45 cm, respectively. The variety was Pusa Jwala. The chilli seedlings were transplanted on four different dates i.e. 15th July, 30th July, 15th August, 30th August. The mean population of thrips, whitefly, aphid, mite and fruit borer were recorded on five randomly selected plants in each plot at weekly interval. Observations on population of thrips, whitefly and aphid were recorded from three leaves i.e. one each from top, middle and bottom of every tagged plant. The base of leaf was held between finger and thumb and twisted gently nymphs and adults were counted quickly and carefully with least disturbance. For counting population of mite, three leaves representing top, middle and bottom canopy were plucked randomly from each of the five tagged plants and kept in separate polythene bags, which were properly labeled and brought to the laboratory for assessing the mite population. In all, a total of 45 leaves (15 leaves/replication from 15 plants were observed at one time from each experimental plot. The density of mite (eggs and mobile stages) was recorded under stereo binocular microscope on 2 × 2 cm leaf bit area. The population of fruit borer and leaf eating caterpillar was counted on five plants in each plot which were selected randomly, tagged and examined carefully with the help of magnifying glass. All the observations were taken during morning hours between 6:30 AM to 8:30 AM.

RESULTS AND DISCUSSION

The data presented in the Table 1 revealed that during both the years of investigation, the population of insect and mite pests (*Scirotothrips dorsalis* Hood, *Bemisia*

tabaci Genn, *Aphis gossypii* Glover, *Polyphagotarsonemus latus* Bank, *Helicoverpa armigera* Hub. and *Spodoptera litura* Fab.) increased with the delay in transplanting of chilli from 15th July to 30th August resultantly the yield decreased significantly. The crop transplanted on 15th July, 2006 and 2007, exhibited the population of insect and mite pests *viz.,* 36.24 and 39.66 thrips; 22.87 and 24.65 whiteflies; 41.38 and 45.08 aphids; 52.28 and 53.69 mites; 6.40 and 6.60 fruit borer larvae and 12.00 and 12.40 tobacco caterpillar larvae per five plants on peak time of infestation, which was minimum as compared to the other dates of transplanting. When the crop was transplanted on 30th July, 15th August, 30th August, 2006 and 2007, exhibited 69.68, 74.58, 128.24, 126.15, 217.30 and 223.33 thrips per five plants, 35.09, 35.20, 61.99, 64.36, 119.07 and 118.55 whiteflies per five plants, 74.58, 76.75, 129.38, 127.29, 194.26 and 198.22 aphid per five plant, 87.07, 88.33, 170.99, 169.72, 247.33 and 246.43 mites per five plants, 9.80, 10.80, 15.20, 16.60, 20.60 and 22.80 fruit borer larvae per five plants and 19.00, 20.60, 27.40, 29.00, 36.60 and 38.40 tobacco caterpillar per five plants, respectively. The maximum infestation of thrips (223.33), aphid (198.22), fruit borer larvae (22.80) and tobacco caterpillar larvae (38.40) per five plants were recorded on crop transplanted on 30th August, 2007. While the maximum infestations of whitefly (119.07) and mite (247.33) was recorded on crop transplanted on 30th August, 2006. However, thrips, whitefly, aphid and mites were remain active throughout the year but their sever infestation reported from mid August to early October and the fruit borer and tobacco caterpillar infestation started from last August to November. The maximum green chilli yield of 146.90 and

Table 1. Effect of transplanting dates on the incidence of major insect and mite pests and green chilli yield during *kharif* 2006–07

S. No.	Dates of transplanting	Insect pests population per five plants at the time of maximum infestation						
		Thrips	Whitefly	Aphid	Mite	Fruit borer	Tobacco caterpillar	Green chilli yield (q/ha)
1.	15th July, 2006	6.10 (36.24)	4.88 (22.87)	6.50 (41.38)	7.32 (52.28)	2.71 (6.40)	3.60 (12.00)	146.90
2.	30th July, 2006	8.41 (69.68)	6.00 (35.09)	8.69 (74.58)	9.38 (87.07)	3.28 (9.80)	4.47 (19.00)	138.62
3.	15th Aug, 2006	11.37 (128.24)	7.94 (61.99)	11.41 (129.38)	13.11 (170.99)	4.02 (15.20)	5.33 (27.40)	125.57
4.	30th Aug, 2006	14.77 (217.30)	10.95 (119.07)	13.97 (194.26)	15.76 (247.33)	4.65 (20.60)	6.13 (36.60)	118.22
	S Em ±	0.11	0.14	0.15	0.11	0.07	0.067	6.125
	CD (P=0.05)	0.35	0.44	0.48	0.33	0.21	0.21	18.87

Figure in parenthesis are $\sqrt{x + 0.5}$ transformed values

Table 2. Effect of transplanting dates on the incidence of major insect and mite pests and green chilli yield during *kharif* 2007–08

S. No.	Dates of transplanting	Insect pests population per five plants at the time of maximum infestation						
		Thrips	Whitefly	Aphid	Mite	Fruit borer	Tobacco caterpillar	Green chilli yield (q/ha)
1.	15th July, 2007	6.37 (39.66)	4.92 (24.65)	6.79 (45.08)	7.39 (53.69)	2.75 (6.60)	3.66 (12.40)	147.81
2.	30th July, 2007	8.69 (74.58)	6.02 (35.20)	8.82 (76.75)	9.45 (88.33)	3.43 (10.80)	4.65 (20.60)	139.19
3.	15th Aug, 2007	11.27 (126.15)	8.08 (64.36)	11.32 (127.29)	13.07 (169.72)	4.19 (16.60)	5.48 (29.00)	126.04
4.	30th Aug, 2007	14.97 (223.33)	10.93 (118.55)	14.11 (198.22)	15.72 (246.43)	4.88 (22.80)	6.28 (38.40)	119.53
	S Em ±	0.13	0.12	0.14	0.13	0.061	0.053	6.430
	CD (P=0.05)	0.41	0.38	0.43	0.39	0.19	0.16	19.813

Figure in parenthesis are $\sqrt{x + 0.5}$ transformed values

147.81 q/ha was recorded when the crop was transplanted on 15th July during 2006 and 2007, while the crop transplanted on 30th July and 15th August, 2006 and 2007 gave 138.62, 139.19 and 125.57, 126.04 q/ha green chilli yield. The minimum yield of 118.22 and 119.53 q/ha was recorded from 30th August transplanted crop during the 2006 and 2007, respectively. Results clearly showed that flowering and fruiting of chilli concided with insect pest appearance and the attack was severe. The early transplanted crop had early flowering and fruiting stage, hence could escape the stage of severe attack, whereas the late sown crop suffered heavily with low yield. Similar observations were recorded by Bagel (1993) and Borah and Lahgthasa (1995) who reported that incidence of thrips and yield losses were increased with delayed sowing. However, similar reports were also recorded by Kumar *et al.* (2000) on cabbage, who reported significant difference in infestation of *Agrotis ispiton, Pieris brassiae, Plusia orichalca, Lipaphis erysimi, Brevicoryne brassicae* and *Helicoverpa armigera* due to different in transplant dates. The present findings also corroborate with the findings of Nagaraj *et al.* (2008) who found low thrips and mites infestation and more yield in June Ist fortnight transplanted crop, while maximum thrips and mites infestation and lesser yield in August IInd fortnight transplanted crop. Gayatri Devi and Giraddi (2009) also reported that less thrips and mite infestation and higher yield in 15th July transplanted crop.

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