

IMPACT OF DIFFERENT DATES OF TRANSPLANTING ON INCIDENCE OF MITES IN BRINJAL

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ABSTRACT

An experiment was conducted to study the impact of different dates of transplanting (2nd fortnight of July, 1st fortnight of August, 2nd fortnight of August, 1st fortnight of September and 2nd fortnight of September) on incidence of mites in brinjal under field condition at College Agronomy Farm, Navsari Agricultural University, Navsari during kharif 2014-15. Of the different five transplanting dates evaluated, crop transplanted during 2nd fortnight of September recorded significantly the minimum mite population in comparison to rest of the transplanting dates. The data on fruit yield revealed that the crop transplanted during 2nd fortnight of September recorded significantly higher fruit yield (257.1 q/ha) than rest of the transplanting dates.

KEY WORDS: Brinjal, fruit yield, mite, transplanting, *Tetranychus urticae*

INTRODUCTION

Brinjal (*Solanum melongena* Linnaeus) also known as eggplant is considered as a “King of vegetables”, originated from India where a wide range of wild types and land races occur (Thompson and Kelly, 1957) and is now grown as a vegetable throughout the tropical, sub-tropical and warm temperate areas of the world. Brinjal crop suffers severely due to the attack of various insect pests, which reduces its yield and quality of fruits. In India, about 44 pests have been reported to attack brinjal (Lal, 1975). Patel *et al.* (1970) recorded 16 pest species attacking brinjal crop in Gujarat. Of which, shoot and fruit borer, *Leucinodes orbonalis* Guenee; jassid, *Amrasca biguttula biguttula* (Ishida); whitefly, *Bemisia tabaci* Gennadius; aphid, *Aphis gossypii* Glover and mites, *Tetranychus urticae* Koch are the major and important insect pests. Of these, red spider mite, *T. urticae* poses serious threat as a major pest next to shoot and fruit borer to the cultivation of brinjal (Basu and Pramanik,

1968). The reduction in yield due to mite infestation was up to 14 per cent at Bangalore and 31 per cent at Varanasi (Anonymous, 1996). Patil and Nandihali (2008) estimated the yield losses in the range of 12.18 to 32.21 per cent due to infestation of mite at Dharwad. Palanisamy and Chelliah (1987) noticed the reduction of 28.00 per cent fruit yield due to spider mite infestation in brinjal. On an average 16.16 per cent yield loss in brinjal due to *T. urticae* was noticed in India (Anonymous, 2007).

Mites producing injury primarily by removing cell contents by penetrating stylet into leaf tissues resulting into appearance of yellowish spots. Both nymphs and adults of mites suck the sap usually from the lower surface of leaves producing small white specks, which gradually dry and drop off. Infested plant become yellowish, wilted and droop rapidly particularly during dry periods. The dense web produced by spider mite often covers the plant where dust particles adhere in windy weather which in turn affects the

physiological activity of the plant, making it stunted. The entire plant becomes yellowish giving poor unhealthy look. Infested leaves wither and eventually fall off. The decreased vitality and leaf drop adversely affects the plant growth, flowering and fruiting. In severe infestation, it webs profusely and may form a thick sheath of webbing that covers the entire plant (Butani and Mittal, 1992).

The date of sowing is an important tool in IPM programme, which make asynchrony between the infestation of pest and the susceptible stages of the crop. By adjusting proper dates of sowing or transplanting, the population of phytophagous insects could be managed which can be used as a good tool in the IPM programme. Hence, the present investigation was carried out to study the impact of different dates of transplanting on incidence of mites in brinjal.

MATERIALS AND METHODS

In order to study the impact of different dates of transplanting on incidence of mites, *T. urticae* on brinjal, a field experiment was conducted during *kharif* 2014-15 using randomized block design replicated thrice at College Agronomy Farm, Navsari Agricultural University, Navsari. Brinjal seedlings (cv. Pant Bahar) were transplanted during different five dates (2nd fortnight of July, 1st fortnight of August, 2nd fortnight of August, 1st fortnight of September and 2nd fortnight of September) in a plot size of 20 x 10 m in spacing of 90 x 60 cm and raised successfully by adopting recommended suitable agronomical practices. The impacts of different dates of transplanting were evaluated on the basis of number of mites/4 cm² leaf area and brinjal fruit yield. For recording observations of mites, five plants were randomly selected and tagged in each net plot area. The observations on mite population was recorded from 2 x 2 cm² area of three leaves (upper, middle and lower) of same selected plants. The fruit yield was recorded picking wise from each plot. The observations were made at weekly interval starting from the third week after transplanting till to the harvesting of the crop.

The whole experimental plot was kept free from any acaricides. The periodical data on number of mites/4 cm² leaf area recorded at weekly interval were subjected to analysis of variance (ANOVA) after transforming them to square root. However, the data on fruit yield were analyzed without any transformation. The data on mites were analyzed periodically as well as pooled over periods.

RESULTS AND DISCUSSION

Mite population

Impact of different dates of transplanting on incidence of mites in brinjal was significant (Table 1). The order of impact of different dates of transplanting (Table 1 and Figure 1) on mite population (with number of a mite/4 cm²/leaf given in brackets after each treatments) was 2nd fortnight of September (3.32) < 1st fortnight of September (6.60) < 2nd fortnight of August (11.88) < 1st fortnight of August (12.58) < 2nd fortnight of July (18.73). The difference among the treatments was significant. Crop transplanted during 2nd fortnight of September recorded significantly the minimum mite population in comparison to rest of the transplanting dates. Crop transplanted during 1st fortnight of September was the next best date, as it was significantly superior in reducing mite population as compared to crop transplanted during July and August. Crop transplanted during 1st and 2nd fortnight of August did not significantly differ from each other, but both the dates recorded significantly the lower mite population as compared to crop transplanted during July. The population of natural enemies of mites was not observed throughout the cropping period under field condition.

In present investigation, the crop transplanted during 2nd fortnight of July and 1st and 2nd fortnight of August harboured more mite population. However, the crop transplanted during 2nd fortnight of September is the appropriate date for transplanting brinjal for reducing mite population followed by 1st fortnight of September.

Many research workers studied the impact of sowing time on mite infestation on different crops. Gangopadhyay and Sarkar (2001) concluded that mite infestation could be minimized by shifting the date of sowing to the period between the second fortnight of March and the first fortnight of April in okra. Hath and Ghosh (2001) noted that the mite population on jute was higher on early sown crop, but decreased gradually with delay in sowings. Gayathridevi (2007) recorded significantly lowest mite population in the chilli crop planted during 15th July followed by 30th July planting. According to Nagaraja *et al.* (2008), crop sown during 1st and 2nd fortnight of June as well as 1st fortnight of July emerged as better and optimum dates for chilli to reduce the activity of mite. Naga (2012) noticed the lowest population of mite and maximum yield from okra sown during 1st week of July as compared to okra sown during 2nd, 3rd and 4th week of July. It was indicative that no work has been found on impact of dates of transplanting on incidence of mites infesting brinjal while splashing the available literature. Hence, the results could not be compared with the research carried out elsewhere.

Brinjal fruit yield

The data on brinjal fruit yield are presented in Table 2 and Figure 2. The order of impact of different dates of transplanting (Table 8) on fruit yield (with q/ha given in brackets after each treatments) was 2nd fortnight of September (257.1) > 1st fortnight of September (217.9) > 2nd fortnight of August (192.9) > 1st fortnight of August (167.9) > 2nd fortnight of July (157.1). The difference among the treatments for brinjal fruit yield was significant. Crop transplanted during 2nd fortnight of September recorded significantly the higher fruit yield than rest of the transplanting dates. Crop transplanted during 2nd fortnight of August was at par with 1st fortnight of September on one hand and with 1st fortnight of August on another hand of chronological order for fruit yield. Crop transplanted during 2nd fortnight of July recorded significant minimum fruit yield

among the different date of transplanting but it was at par with 1st fortnight of August transplanting date. Overall, it was concluded that crop transplanted during 2nd fortnight of September is the appropriate date for transplanting brinjal for reducing mite population and higher fruit yield followed by 1st fortnight of September.

CONCLUSION

Of the different five dates of transplanting (2nd fortnight of July, 1st fortnight of August, 2nd fortnight of August, 1st fortnight of September and 2nd fortnight of September), crop transplanted during 2nd fortnight of September recorded significantly the minimum mite population in comparison to rest of the transplanting dates. Crop transplanted during 1st fortnight of September was the next best date as it was significantly superior in reducing mite population as compared to crop transplanted during July and August. The crop transplanted during 2nd fortnight of September exhibited significant higher fruit yield (257.1 q/ha) than rest of the transplanting dates. However, crop transplanted during 2nd fortnight of July recorded significant minimum (157.1 q/ha) fruit yield among the different date of transplanting but it was at par with 1st fortnight of August transplanting date.

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Table 1: Impact of different dates of transplanting on incidence of *T. urticae* in brinjal

Treatments	Number of Mites/4 cm ² Leaf Area at Indicated Weeks After Transplanting*						
	III	IV	V	VI	VII	VIII	IX
2 nd fortnight of July	2.83 (07.55)	2.47 (05.61)	3.13 (09.31)	3.64 (12.78)	3.57 (12.29)	4.64 (21.06)	5.29 (27.62)
1 st fortnight of August	2.35 (05.08)	2.06 (03.77)	2.59 (06.26)	3.00 (08.59)	2.95 (08.25)	3.81 (14.15)	4.35 (18.56)
2 nd fortnight of August	2.29 (04.79)	2.01 (03.56)	2.52 (05.90)	2.92 (08.11)	2.87 (07.79)	3.71 (13.36)	4.23 (17.52)
1 st fortnight of September	1.96 (03.36)	1.87 (03.01)	2.25 (04.63)	2.46 (05.63)	1.79 (02.71)	2.54 (06.10)	3.39 (11.69)
2 nd fortnight of September	1.58 (02.06)	1.41 (01.54)	1.80 (02.76)	1.97 (03.43)	1.36 (01.46)	1.53 (01.90)	2.66 (07.79)
S. Em. $\pm$ N	0.12	0.11	0.12	0.15	0.15	0.19	0.37
N x P	-	-	-	-	-	-	-
C.D. at 5% N	0.37	0.34	0.38	0.45	0.46	0.60	1.15
N x P	-	-	-	-	-	-	-
C. V (%)	11.01	11.23	10.11	10.42	11.99	11.92	18.79

Table 1: Contd.....

Treatments	Number of Mites/4 cm ² Leaf Area at Indicated Weeks After Transplanting*							
	X	XI	XII	XIII	XIV	XV	XVI	Pooled over periods
2 nd fortnight of July	5.57 (30.68)	6.25 (38.69)	5.87 (34.11)	5.40 (28.81)	3.86 (14.42)	3.42 (11.26)	2.91 (07.97)	4.38 (18.73) ^e
1 st fortnight of August	4.58 (20.61)	5.13 (25.99)	4.82 (22.92)	4.44 (19.35)	3.18 (09.69)	2.83 (07.56)	2.41 (05.36)	3.60(12.58) ^{cd}
2 nd fortnight of August	4.45 (19.46)	4.98 (24.54)	4.69 (21.63)	4.32 (18.27)	3.09 (09.15)	2.75 (07.14)	2.35 (05.06)	3.50 (11.88) ^c
1 st fortnight of September	3.34 (11.95)	3.71 (13.43)	3.31 (11.14)	2.97 (09.30)	1.74 (03.46)	2.04 (04.25)	1.39 (01.78)	2.65 (06.60) ^b
2 nd fortnight of September	2.66 (07.52)	2.61 (06.81)	1.85 (03.67)	1.82 (03.55)	1.17 (01.18)	1.56 (02.48)	0.87 (00.34)	1.95 (03.32) ^a
S. Em. $\pm$ N	0.38	0.26	0.39	0.33	0.33	0.29	0.19	0.16
N x P	-	-	-	-	-	-	-	0.21
C.D. at 5% N	1.18	0.80	1.21	1.02	1.00	0.89	0.60	0.49
N x P	-	-	-	-	-	-	-	NS
C. V (%)	18.59	11.46	19.18	17.54	24.97	22.80	19.55	9.81

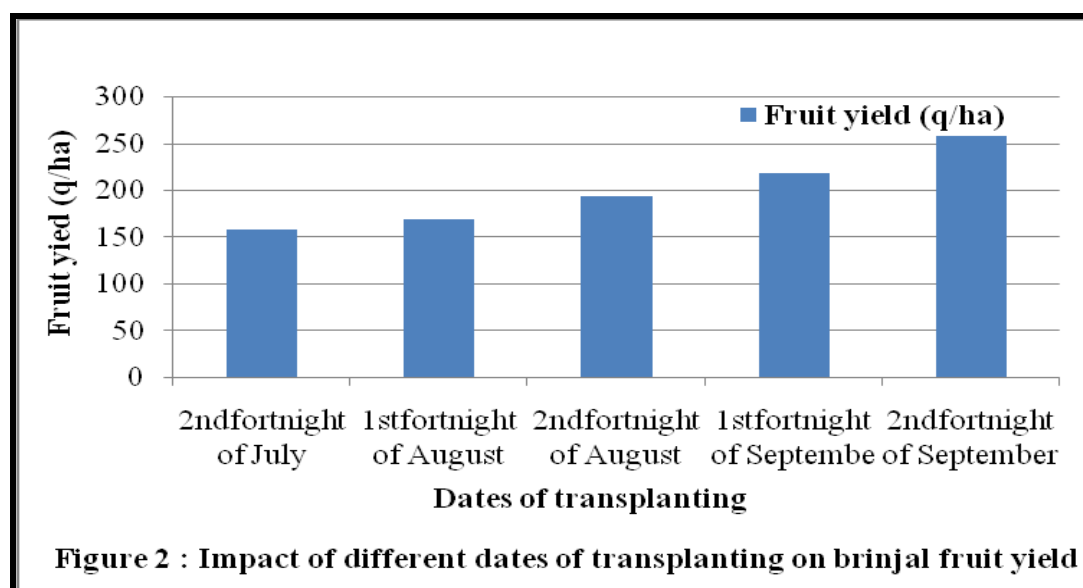
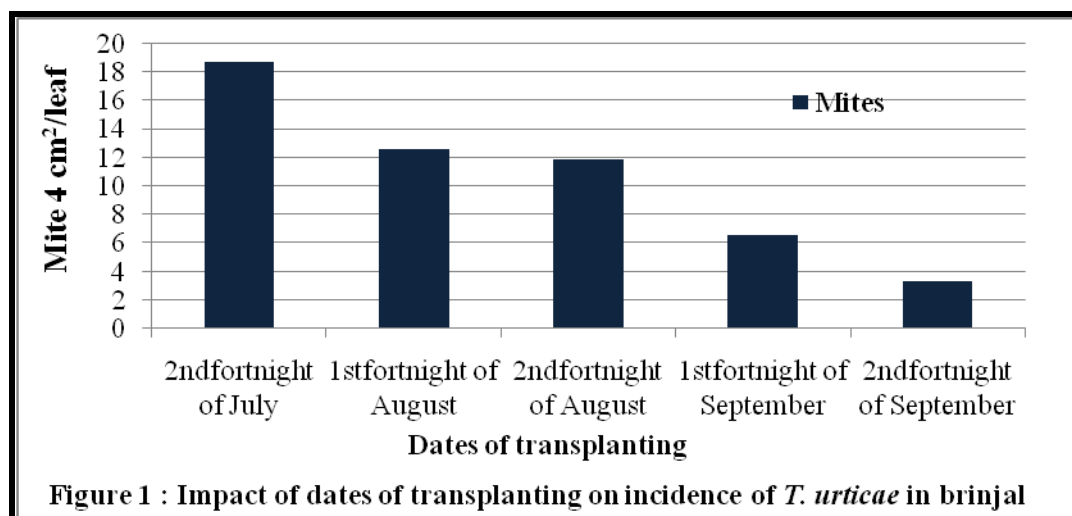
Note: 1. Treatment means with letter(s) in common are not significant at 5 % level of significance in respective column

2. Figures in parentheses are retransformed values; while, those outside are $\sqrt{X + 0.5}$ transformed values

Table 2: Impact of different dates of transplanting on brinjal fruit yield

Treatments	Fruit yield (q/ha)
2 nd fortnight of July	157.1 ^d
1 st fortnight of August	167.9 ^{cd}
2 nd fortnight of August	192.9 ^{bc}
1 st fortnight of September	217.9 ^b
2 nd fortnight of September	257.1 ^a
S. Em_±	11.34
C. D. at 5%	34.93
C. V. (%)	11.42

Note: Treatment means with letter(s) in common are not significant at 5 % level of significance



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