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Effect of Dates of Transplanting on Incidence of Sucking Pests in Chilli, *Capsicum annum* L.

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Abstract

The experiment to examine the effect of five dates of transplanting on the incidence of major sucking pests was laid out in a randomized block design with four replications. The sowing of chilli variety RCH-1 was done at 10 days intervals in different nursery beds in landscape nursery. One month old seedlings were transplanted in the plots measuring 3.6×4.5 m^2 at ten days interval starting from 15th Feb. to 27th March, 2010. The effect of five dates of transplanting, 15th Feb., 25th Feb., 7th March, 17th March and 27th March were evaluated on occurrence of major sucking pests of chilli *i.e.* thrips (*Scirtothrips dorsalis* Hood), whitefly (*Bemisia tabaci* Genn.), aphid (*Aphis gossypii* Glover), jassid (*Amrasca biguttula biguttula* Ishida) and mite (*Polyphagotarsonemus latus* Banks). The experiment on five dates of transplanting revealed that early transplanting 15th Feb. had the minimum and 27th March had maximum infestation of sucking pests *viz.,* thrips (18.45 per three leaves and 20.30 per three leaves, respectively), whitefly (21.63 per three leaves and 29.50 per three leaves, respectively), aphid (0.43 per three leaves and 14.55 per three leaves, respectively), jassid (9.50 per three leaves and 18.63 per three leaves, respectively) and mite (2.50 per three leaves and 7.75 per three leaves, respectively). The maximum green chilli yield (24.04 q ha^{-1}) was obtained from the crop transplanted in 15th Feb. followed by 25th Feb. (21.49 q ha^{-1}) 7th March (19.09 q ha^{-1}). However all these treatments were statistically at par. The minimum yield (14.19 q ha^{-1}) was recorded in the crop transplanted on 27th March followed by the crop sown on 17th March (16.75 q ha^{-1}).

Keywords: Dates of transplanting, thrips, whitefly, jassids, aphid, mite, yield

1. Introduction

Chilli (*Capsicum annuum* L.) is the most extensively cultivated spices as well as vegetable crop of the world. There are two main species of chilli *viz., Capsicum annum* and *Capsicum frutescence* of which Indian chilli, *C. annum* is an important vegetable crop due to its adaptability to varied climatic conditions. In India the area of chilli was about 7.89 lakh ha with a production of about 13.89 lakh tones (Anonymous 2015). In Rajasthan it occupies about 9778 ha area with an annual production of 12920 tonnes and average productivity of 1321 kg ha^{-1} (Anonymous, 2015). But many factors are responsible for low productivity and production with time but the magnitude of insect pest have been reported to damage the chilli crop from sowing to maturity is most important. About 51 insect and 2 mites species, belonging to 27 families and 9 orders were found infesting chilli (Reddy and Puttaswami, 1985). Among these, thrips (*Scirtothrips dorsalis* Hood), whitefly (*Bemisia tabaci* Genn.), aphid (*Aphis gossypii* Glover), jassid (*Amrasca biguttula biguttula*) and mite (*Polyphagotarsonemus latus* Banks) are major sucking pests contributing 60 to 75 per cent yield loss in green chilli (Patel and Gupta, 1998). However, the control of these sucking pests was mainly achieved through the use of insecticide but excessive and indiscriminate use of insecticide has created many pests problems like development of resistance to most of available insecticides, a insecticide induced resurgence and disruption of population of predator and parasitoids. This situation warrants search for more effective alternate strategy to manage these pests and overcome the crises.

In integrated pest management a system oriented approach in needed in crop protection practices. In this context a clear understanding of impact of ecological factor on the population dynamics of the concerned cohort is a pre requisite before formulation an I.P.M. schedule. It is needless to cite the importance of the cohort taken in this pursuit *i.e.* major sucking pests in chilli agro ecosystem. Thus the study on seasonal incidence of major sucking pests is needed to be worked out in relation to environmental conditions prevailing at Bikaner in agro climate zone I C.

2. Materials and Methods

The present investigations were conducted at Agronomy farm,

College of Agriculture, Bikaner during summer 2010. Seeds of chilli variety RCH-1 were sown in the well prepared nursery beds in the landscape nursery for obtaining the seedlings for different experiments. One month old healthy seedlings were taken and transplanted in well prepared experimental plots at row to row spacing of 60 cm and plant to plant spacing of 45 cm. The experiment to examine the effect of five dates of transplanting (15th Feb, 25th Feb, 7th March, 17th March and 27th March) on the incidence of major sucking pests was laid out in a randomized block design with four replications. The sowing of chilli variety RCH-1 was done at 10 days intervals in different nursery beds in landscape nursery. One month old seedlings were transplanted in the plots measuring 3.6×4.5 m^2 at ten days interval starting from 15th Feb. to 27th March, 2010. The row to row and plant to plant distance of 0.60 m and 0.45 m was maintained. The crop was allowed to have natural insect infestation. The observation on population of major sucking pest of chilli were recorded on five randomly selected tagged plants from each experimental plot soon after the appearance of sucking pests and then at weekly interval till harvesting the crop. Green chilli yield was also recorded after harvesting the crop. The data obtained on population of sucking pests from experimental plots were transformed into √x + 0.5 values and subjected to analysis of variance. The yield kg^{-1} $plot^{-1}$ was converted into q ha^{-1} and then statistically analyzed compared by critical difference.

3. Results and Discussion

3.1. Thrips

The data on the effect of dates of transplanting on incidence of thrips revealed that the population of thrips remained very low up to June in all dates of transplanting (15th Feb, 25th Feb, 7th March, 17th March, 27th March), thereafter, increased gradually and reached to its peak in the month of May and then declined gradually. At the peak, the maximum population of thrips was recorded on the crop transplanted on 27th March and minimum on 15th Feb transplanted crop. On the basis of overall mean, the minimum population of thrips (7.05/three leaves) was observed on the crop transplanted on 15th Feb. followed by 8.26, 9.68 and 10.72 per three leaves on 25th Feb, 7th March and 17th March transplanted crop, respectively (Table 1). The present results are in conformity to these of Hosmani (1982) and Borah and Langthasa (1995) who reported that increase in population of thrips with the increase of planting dates.

3.2. Whitefly

The data on the effect of dates of transplanting on incidence of whitefly revealed that population remained very low up to the last week of July in all dates of transplanting. (15th Feb, 25th Feb, 7th March, 27th March) thereafter, increased gradually and reached to its peak in the month of May and then declined gradually. At the peak, the maximum population of whitefly was recorded on the crop transplanted on 27th March and minimum 15th Feb. transplanted crop. On the basis of overall mean the minimum population of whitefly (7.91/three leaves) was observed on the crop sown in 15th Feb. followed by 8.93, 10.32 and 11.62/three leaves on 25th Feb, 7th March and 17th March transplanting crop, respectively and maximum 13.09/three leaves on 27th March (Table 2). The present findings are in agreement with those of Bishnoi et al. (1996) and Nagargoje et al. (2002) who reported that early sown crop, was not affected by slight development of population of whitefly but as sowing time delayed, the plant become more sensitive to infestation. These present results are not in conformity with those of Giri et al. (1993); Dhawan et al. (1998) who reported that sowing dates did not influence population buildup of whitefly.

3.3. Jassid

The population remained very low up to the last week of May

Table 1: Effect of dates of transplanting on the incidence of thrips during summer 2010

Sl. No.	Treatments	Population*/3 leaves in different standard weeks												
		13	14	15	16	17	18	19	20	21	22	23	24	25
1.	15th Feb	6.38 (2.62)**	9.25 (3.12)	9.70 (3.19)	10.00 (3.24)	11.98 (3.53)	13.63 (3.76)	18.45 (4.35)	15.13 (3.95)	9.23 (3.12)	5.31 (2.41)	4.25 (2.18)	3.44 (1.98)	3.38 (1.97)
2.	25th Feb	7.98 (2.91)	11.75 (3.50)	12.50 (3.61)	13.13 (3.69)	13.43 (3.73)	15.18 (3.96)	20.30 (4.56)	16.25 (4.09)	10.63 (3.34)	6.69 (2.68)	3.75 (2.06)	4.08 (2.14)	3.68 (2.04)
3.	7th Mar	10.10 (3.26)	12.63 (3.62)	13.81 (3.78)	14.50 (3.87)	17.50 (4.24)	16.88 (4.17)	22.93 (4.84)	17.00 (4.18)	12.56 (3.61)	7.44 (2.82)	4.38 (2.21)	5.49 (2.45)	5.45 (2.44)
4.	17th Mar	11.88 (3.52)	13.30 (3.71)	12.75 (3.64)	14.81 (3.91)	20.30 (4.56)	19.80 (4.50)	24.98 (5.05)	18.29 (4.33)	14.25 (3.84)	8.43 (2.99)	4.94 (2.33)	7.85 (2.89)	5.93 (2.53)
5.	27th Mar	10.50 (3.32)	14.19 (3.83)	15.25 (3.97)	15.43 (3.99)	23.18 (4.87)	23.68 (4.92)	27.25 (5.27)	20.43 (4.57)	16.23 (4.09)	10.18 (3.27)	6.25 (2.60)	9.93 (3.23)	6.25 (2.60)
SEm±		0.07	0.07	0.11	0.09	0.05	0.04	0.07	0.04	0.06	0.05	0.08	0.05	0.05
CD (p=0.05)		0.21	0.22	0.34	0.27	0.16	0.14	0.24	0.13	0.19	0.16	0.24	0.15	0.16

Table Continue...

Sl. No.	Treatments	Population*/3 leaves in different standard weeks					Over all mean
		26	27	28	29	30	
1.	15th Feb	2.50 (1.73)	2.13 (1.62)	1.05 (1.24)	0.63 (1.06)	0.43 (0.96)	7.05
2.	25th Feb	3.25 (1.94)	2.75 (1.80)	1.38 (1.37)	1.05 (1.24)	0.88 (1.17)	8.26
3.	7th Mar	3.98 (2.12)	4.19 (2.17)	2.38 (1.70)	1.88 (1.54)	1.25 (1.32)	9.68
4.	17th Mar	4.88 (2.32)	4.50 (2.24)	2.13 (1.62)	2.38 (1.70)	1.68 (1.47)	10.72
5.	27th Mar	5.81 (2.51)	5.55 (2.46)	3.13 (1.90)	2.88 (1.84)	2.13 (1.62)	12.12
SEm±		0.05	0.08	0.09	0.11	0.1	
CD (*p*=0.05)		0.17	0.23	0.27	0.34	0.31	

*Mean of four replications, **Figures in parentheses are √x+0.5 transformed values

Table 2: Effect of dates of transplanting on the incidence of whitefly during summer 2010

Sl. No.	Treatments	Population*/3leaves in different standard weeks												
		14	15	16	17	18	19	20	21	22	23	24	25	26
1.	15th Feb	9.05 (3.09)**	10.35 (3.29)	11.25 (3.43)	12.25 (3.57)	17.13 (4.20)	21.63 (4.70)	15.18 (3.96)	15.75 (4.03)	14.13 (3.82)	12.13 (3.55)	7.75 (2.87)	6.25 (2.60)	3.19 (1.92)
2.	25th Feb	10.25 (3.28)	12.06 (3.54)	12.80 (3.65)	13.38 (3.72)	18.25 (4.33)	23.38 (4.89)	17.63 (4.26)	16.25 (4.09)	15.50 (4.00)	13.38 (3.72)	9.13 (3.10)	7.13 (2.76)	4.63 (2.26)
3.	7th Mar	11.19 (3.42)	13.36 (3.72)	14.25 (3.84)	14.63 (3.89)	20.50 (4.58)	26.50 (5.20)	19.13 (4.43)	17.25 (4.21)	17.55 (4.25)	15.23 (3.97)	10.75 (3.35)	7.94 (2.90)	5.38 (2.42)
4.	17th Mar	12.50 (3.61)	14.13 (3.82)	14.68 (3.90)	16.23 (4.09)	21.25 (4.66)	27.18 (5.26)	20.50 (4.58)	19.50 (4.47)	19.25 (4.44)	17.88 (4.29)	12.50 (3.61)	8.50 (3.00)	7.30 (2.79)
5.	27th Mar	12.88 (3.66)	15.25 (3.97)	15.85 (4.04)	17.30 (4.22)	23.18 (4.87)	29.50 (5.48)	23.10 (4.86)	21.50 (4.69)	21.13 (4.65)	19.68 (4.49)	13.88 (3.79)	11.25 (3.43)	8.68 (3.03)
SEm±		0.04	0.07	0.04	0.05	0.04	0.08	0.06	0.08	0.08	0.08	0.07	0.07	0.09
CD (*p*=0.05)		0.12	0.20	0.12	0.14	0.13	0.25	0.18	0.24	0.24	0.26	0.22	0.23	0.28

Table 2: Continue...

Sl. No.	Treatments	Population*/3 leaves in different standard weeks										Over all mean
		27	28	29	30	31	32	33	34	35	36	
1.	15th Feb	5.38 (2.42)	7.18 (2.77)	3.75 (2.06)	1.80 (1.52)	1.13 (1.27)	1.98 (1.57)	1.23 (1.31)	1.13 (1.27)	1.28 (1.33)	1.15 (1.28)	7.91
2.	25th Feb	6.38 (2.62)	8.25 (2.96)	4.38 (2.21)	2.10 (1.61)	1.25 (1.32)	2.38 (1.70)	2.38 (1.70)	1.38 (1.37)	1.85 (1.53)	1.25 (1.32)	8.93
3.	7th Mar	7.44 (2.82)	9.75 (3.20)	5.81 (2.51)	4.41 (2.22)	2.25 (1.66)	3.68 (2.04)	3.06 (1.89)	2.13 (1.62)	2.50 (1.73)	2.74 (1.80)	10.32
4.	17th Mar	8.50 (3.00)	12.05 (3.54)	7.50 (2.83)	5.25 (2.40)	3.25 (1.94)	5.05 (2.36)	4.25 (2.18)	3.63 (2.03)	3.38 (1.97)	2.98 (1.86)	11.62
5.	27th Mar	10.63 (3.34)	13.93 (3.80)	9.25 (3.12)	6.23 (2.59)	3.93 (2.10)	5.93 (2.53)	5.75 (2.50)	4.38 (2.21)	4.18 (2.16)	3.75 (2.06)	13.09
SEm±		0.09	0.08	0.09	0.06	0.05	0.06	0.06	0.06	0.05	0.06	
CD (*p*=0.05)		0.27	0.25	0.27	0.17	0.16	0.19	0.18	0.18	0.16	0.17	

*Mean of four replications, **Figures in parentheses are √x+0.5 transformed values

in all dates of transplanting (15th Feb, 25th Feb, 7th March, 11th March, 27th March), thereafter, increased gradually and reached to its peak in the month of July and then declined gradually. At the peak the maximum population (7.03/three leaves) of jassid were recorded on the crop transplanting on 27th March and minimum (3.14/three leaves) on 15th Feb was observed then followed by 3.68, 4.40 and 5.73/three leaves in 25th Feb, 7th March and 17th March transplanting crop respectively (Table 3). Like were the jassid population was also recorded minimum on the crop transplanted early (15th Feb.) and the maximum on the late transplanted crop (27th March) during both the years. The present results corroborate with that of Nagargoje et al. (2002) who reported that jassid incidence was increased as sowing dates delayed.

3.4. Mite

The population of mite remained low throughout the crop season in all dates of transplanting. The overall mean of mite population recorded during the season in all dates of transplanting ranged from 1.72 to 5.74 mite per three leaves. The minimum population was found on the crop transplanted on 15th Feb. followed by 25th Feb. transplanted crop. The maximum number of mites observed from the crop transplanted on 27th March followed by 17th march transplanted crop (Table 4). The present result are inconformity with those of Murthy (1984) and Lingeri et al. (1998 a&b) who reported that mite population was recorded less in early sown crop as compared to late sown chilli crops.

3.5. Aphid

Table 3: Effect of dates of transplanting on the incidence of jassid during summer 2010

Sl. No.	Treat-ments	Population*/3leaves in different standard weeks												
		17	18	19	20	21	22	23	24	25	26	27	28	29
1.	15th Feb	0.31 (0.90)**	1.93 (1.56)	1.81 (1.52)	1.55 (1.43)	1.19 (1.30)	1.61 (1.45)	2.75 (1.80)	1.25 (1.32)	2.63 (1.77)	4.88 (2.32)	4.05 (2.13)	6.75 (2.69)	9.50 (3.16)
2.	25th Feb	0.56 (1.03)	2.19 (1.64)	2.25 (1.66)	1.68 (1.47)	1.94 (1.56)	2.13 (1.62)	3.50 (2.00)	2.13 (1.62)	3.25 (1.94)	5.75 (2.50)	4.25 (2.18)	7.38 (2.81)	10.50 (3.32)
3.	7th Mar	0.69 (1.09)	2.63 (1.77)	2.75 (1.80)	2.63 (1.77)	2.05 (1.60)	2.75 (1.80)	3.75 (2.06)	2.56 (1.75)	3.06 (1.89)	5.93 (2.53)	4.63 (2.26)	8.50 (3.00)	13.68 (3.76)
4.	17th Mar	1.11 (1.27)	3.44 (1.98)	3.30 (1.95)	2.38 (1.70)	4.65 (2.27)	3.25 (1.94)	4.75 (2.29)	3.25 (1.94)	4.88 (2.32)	6.25 (2.60)	5.63 (2.47)	10.75 (3.35)	15.73 (4.03)
5.	27th Mar	1.38 (1.37)	4.24 (2.18)	4.06 (2.14)	2.50 (1.73)	6.25 (2.60)	5.13 (2.37)	6.05 (2.56)	4.13 (2.15)	6.38 (2.62)	7.69 (2.86)	6.50 (2.65)	13.00 (3.67)	18.63 (4.37)
SEm±		0.08	0.05	0.06	0.06	0.07	0.06	0.08	0.05	0.09	0.06	0.09	0.07	0.10
CD (p=0.05)		0.25	0.16	0.19	0.17	0.23	0.18	0.25	0.15	0.27	0.20	0.27	0.20	0.30

Table 3: Continue...

Sl. No.	Treatments	Population*/3 leaves in different standard weeks						Over all mean
		30	31	32	33	34	35	
1.	15th Feb	8.18 (2.95)	6.25 (2.60)	2.80 (1.82)	1.69 (1.48)	1.05 (1.24)	0.43 (0.96)	3.14
2.	25th Feb	9.10 (3.10)	7.38 (2.81)	3.06 (1.89)	2.05 (1.60)	1.18 (1.29)	0.63 (1.06)	3.68
3.	7th Mar	10.25 (3.28)	8.88 (3.06)	4.05 (2.13)	3.60 (2.02)	2.50 (1.73)	1.80 (1.52)	4.40
4.	17th Mar	13.93 (3.80)	10.35 (3.29)	5.98 (2.54)	4.80 (2.30)	4.25 (2.18)	3.25 (1.94)	5.73
5.	27th Mar	15.63 (4.02)	12.05 (3.54)	8.3 (2.97)	5.63 (2.47)	5.50 (2.45)	5.05 (2.36)	7.06
SEm±		0.07	0.09	0.07	0.06	0.08	0.06	
CD (p=0.05)		0.22	0.27	0.22	0.20	0.24	0.18	

*Mean of four replications, **Figures in parentheses are √x+0.5 transformed values

The aphid incidence was started on chilli crop just after transplanting in all dates of transplanting. The data indicated that it remained on chilli crop only up to last week of April thereafter, it could not be observed on chilli crop transplanted on different dates throughout the season. At the peak, means first week of April, the minimum number (3.71/three leaves) of aphid recorded on the crop transplanted on 15th Feb. which was found at par to the crop transplanted on 25th Feb. The highest population (9.11/three leaves) was observed on the crop transplanted on 27th March followed by the crop transplanted in 17th March (Table 5). However these were at per to each other. The data obtained in the present findings indicated that there was a definite pattern of aphid incidence in relation to different dates of transplanting of chilli. It was apparent that there was corporately best incidence of aphids on chilli crop in 15th Feb. (early sowing). The later transplanting crops were progressively more infested and these results are in close conformity with the findings of Nagargoje et al. (2002) who has reported the maximum population of aphids on late transplanting crop of chilli.

Table 4: Effect of dates of transplanting on the incidence of mite during summer 2010

Sl. No.	Treatments	Population*/3leaves in different standard weeks												
		13	14	15	16	17	18	19	20	21	22	23	24	25
1.	15th Feb	1.60 (1.45)**	2.13 (1.62)	2.44 (1.71)	2.50 (1.73)	2.06 (1.60)	1.63 (1.46)	1.56 (1.44)	1.88 (1.54)	2.98 (1.86)	1.06 (1.25)	0.55 (1.02)	0.63 (1.06)	1.13 (1.27)
2.	25th Feb	2.31 (1.68)	3.30 (1.95)	3.24 (1.93)	3.24 (1.93)	2.38 (1.70)	2.05 (1.60)	2.25 (1.66)	2.38 (1.70)	3.50 (2.00)	2.00 (1.58)	0.80 (1.14)	0.93 (1.19)	2.50 (1.73)
3.	7th Mar	2.88 (1.84)	4.19 (2.17)	4.13 (2.15)	3.93 (2.10)	3.18 (1.92)	2.60 (1.76)	3.68 (2.04)	3.18 (1.92)	4.48 (2.23)	3.18 (1.92)	1.49 (1.41)	1.60 (1.45)	3.23 (1.93)
4.	17th Mar	3.43 (1.98)	5.75 (2.50)	5.68 (2.48)	5.18 (2.38)	4.18 (2.16)	3.63 (2.03)	4.68 (2.27)	4.28 (2.19)	6.55 (2.66)	4.18 (2.16)	2.23 (1.65)	3.30 (1.95)	3.50 (2.00)
5.	27th Mar	4.88 (2.32)	6.75 (2.69)	7.13 (2.76)	7.75 (2.87)	5.10 (2.37)	5.25 (2.40)	6.38 (2.62)	6.13 (2.57)	7.55 (2.84)	5.23 (2.39)	3.50 (2.00)	4.13 (2.15)	4.63 (2.26)
SEm±		0.07	0.09	0.07	0.08	0.04	0.04	0.08	0.06	0.06	0.06	0.04	0.05	0.05
CD (*p*=0.05)		0.22	0.27	0.21	0.25	0.12	0.13	0.24	0.19	0.18	0.19	0.13	0.15	0.16

Table 4: Continue...

Sl. No.	Treatments	Population*/3leaves in different standard weeks		Over all Mean
		26	27	
1.	15th Feb	2.50 (1.73)	1.13 (1.27)	1.72
2.	25th Feb	3.38 (1.97)	1.50 (1.41)	2.40
3.	7th Mar	4.18 (2.16)	2.05 (1.60)	3.20
4.	17th Mar	6.30 (2.61)	3.75 (2.06)	4.44
5.	27th Mar	6.75 (2.69)	4.93 (2.33)	5.74
SEm±		0.09	0.09	
CD (*p*=0.05)		0.27	0.29	

*Mean of four replications, **Figures in parentheses are √x+0.5 transformed values

Table 5: Effect of dates of transplanting on the incidence of aphid during summer 2010

Sl. No.	Treatments	Population*/3leaves in different standard weeks				Mean
		13	14	15	16	
1.	15th Feb	8.13 (2.94)**	5.55 (2.46)	0.73 (1.11)	0.43 (0.96)	3.71
2.	25th Feb	9.25 (3.12)	6.18 (2.58)	1.38 (1.37)	0.60 (1.05)	4.35
3.	7th Mar	10.75 (3.35)	9.50 (3.16)	2.68 (1.78)	2.19 (1.64)	6.28
4.	17th Mar	13.40 (3.73)	10.38 (3.30)	4.38 (2.21)	3.18 (1.92)	7.83
5.	27th Mar	14.55 (3.88)	11.93 (3.52)	5.63 (2.47)	4.35 (2.20)	9.11
SEm±		0.10	0.07	0.07	0.06	
CD (*p*=0.05)		0.31	0.21	0.23	0.19	

*Mean of four replications, **Figures in parentheses are √x+0.5 transformed values

4. Conclusion

The experiment on five dates of transplanting 15th Feb., 25th Feb., 7th March, 17th March and 27th March were evaluated on occurrence of major sucking pests of chilli *i.e.* thrips (*Scirtothrips dorsalis* Hood), whitefly (*Bemisia tabaci* Genn.), aphid (*Aphis gossypii* Glover), jassid (*Amrasca biguttula biguttula* Ishida) and mite (*Polyphagotarsonemus latus* Banks). The experiment on five dates of transplanting revealed that early transplanting 15th Feb. had the minimum and 27th March had maximum infestation of sucking pests *viz.,* thrips, whitefly, jassid, mite and aphid, and highest green chilli yield on compared to the late transplanted crop 27th march.

5. References

Anonymous, 2015. Agricultural Statistics at a Glance Government of India Ministry of Agriculture Department of Agriculture and Cooperation Directorate of Economics and Statistics.

Anonymous, 2015. Rajasthan Agricultural Statistics at a glance 2016–17, 108.

Bishnoi, O.P., Singh, M., Rao, V.U.M., Niwas, R., Sharma, P.D., 1996. Population dynamics of cotton pests in relation to weather parameter. Indian Journal of Entomology 58(2), 103–107.

Borah, R.K., Langthasa, S., 1995. Incidence of thrips *scirtothrips dorsalis* Hood in relation of data of transplanting on chilli in hill zone of Assam. PKV Research Journal 19(1), 92.

Dhawan, A.K., Simwat, G.S., Dhaliwal, G.S., 1998. Population dynamics of whitefly. *Bemisia tabaci* (Gennadius) on cotton: an eco-behavioural approach. Ecological agriculture and sustainable development Vol.1 Proc. int. Conf. Eco. Agri. Towards Sus. Dev. Chandigarh India. 435–448.

Giri, D.G., Daware, D.G., Dahiphale, V.V., 1993. Population level of whitefly (*Bemisia tabaci*) as influenced by different agronomic regime J. Cotton Res. & Dev., 7(1), 168-169.

Hosmani, M.M., 1982. Cultural practices for chilli, In: Chilli edited by Hosmani, M.M., Rajashri Printing press, Tadakocbni, Dharwad, 100–128.

Lingeri, M.S., Awaknavar, J.S., Lingappa, S., Kulkarni, K.A., 1998. Seasonal occurrence of chilli mites (*Polyphagotarsonemus latus* Banks) and thrips (*Scirtothrips dorsalis* Hood). Karnataka Journal of Agricultural Sciences 11(2), 380–385.

Lingeri, M.S., Awaknavar, K.A., Kulkarni, S., Lingappa, S., Madalagni, B.B., 1998b. Screening of chilli genotypes against *polyphegotarsomemens latus* (banks) and thrips (*Scirtothrips dorsalis* Hood.). Karnataka Journal of Agricultural Sciences 11, 39–44.

Murthy, N.S., 1984. Chilli cultivation in Andhra Pradesh India cocoa. Arecanut and spices J., 7, 103–105.

Nagargoje, C., Mehetre, S.S., Patil, S.D., 2002. Effect of different sowing dates and irrigation methods on insect pests of cotton. J. Cotton. Res. Dev., 16 (2), 227–229.

Patel, V.N., Gupta, H.C.L., 1998. Estimation of losses and management of thrips infesting chillies in National Seminar on "Entomology in 21st Century" Biodiversity, Sustainability, Environmental Safety and Human Health pp 99. Rajasthan Agriculture University, Udaipur.

Reddy, D.N.R., Puttaswamy, 1985. Pests infesting chilli (*Capsicum annum* L.) in the nursery. Mysore journal of agricultural sciences 18(2), 122–125.