



Impact of time of sowing and *in situ* sun drying of cotton stalks and on the management of cotton stem weevil, *Pempherulus affinis* Faust

N. Murugesan, N. Balakrishnan, R. Vimala, N. Shunmugavalli and A. Ramalingam

ABSTRACT

Impact of time of sowing and sun drying of cotton stalks and on the management of cotton stem weevil, *Pempherulus affinis* Faust was studied at Cotton Research Station, Srivilliputtur, Tamil Nadu. In early sown cotton crop infestation and plant mortality was more compared to the late sown cotton crop. It was also observed that off season crop (*i.e.*, Winter season crop in the Summer Cotton Tract) was much affected compared to the regular season crop (*i.e.*, Summer season crop in the Summer Cotton Tract). Weevil emergence was nil from sun dried cotton stalks kept under sun *in situ* after pulling out. But weevil emergence was observed in stored / heaped cotton stalks. Importance of *in situ* drying of cotton stalks after pulling out the cotton stalks to arrest the carry over of the pest to next season is brought out in the present study.

Key words: Cultural method of pest control, cotton, stem weevil, *Pempherulus affinis*, effect of sun drying, time of sowing

INTRODUCTION

Stem weevil, *Pempherulus affinis* is not a serious menace in regular season crop and only less than 10 % mortality of plants is encountered. Of the economically important insect species, next to bollworms, the cotton stem weevil, *Pempherulus affinis* has been reported as a major pest in South India (Murugesan, 1988; Chandramani *et al.*, 2006). While discussing the seriousness of stem weevil in South India compared to Northern parts Krishnaayyar (1942) opined that extremes of climatic conditions in South India are not sufficient great to offer an effective check on its multiplication as in other parts of India. Growing cotton during the dry (winter) season avoids many insect pests endemic in the wet season (summer) and could permit the reintroduction of cotton to the semi-arid tropics in many parts of the world (Yeates *et al.*, 2010).

In the recent years, farmers tend to raise cotton during the off-season *i.e.*, during winter season in summer irrigated cotton tract *viz.*, Madurai, Theni, Salem, Erode, Dindigul and Virudhunagar districts. Similarly, farmers of winter cotton tract opt for an additional summer crop. Under such conditions, mortality of cotton plants due to stem weevil is more than 60 % and becoming serious botheration to cotton growers. Moreover, in the off season (winter season in summer irrigated cotton tract) management tactics also miserably fail, as they could not be carried out in time due to prevailing unfriendly weather conditions. In some tracts like Sivakasi dry land farmers

who raise cotton as winter rainfed crop, allow the crop in summer also, to reap an additional yield from the summer flush. Such continuous availability of cotton, throughout the year, favours this pest to scourge the cotton crop severely in the off-season. Already, it has been recorded that cotton is the most preferred plant that support to complete its life cycle apart from *Triumfetta rhomboidea*, a wild Tiliaceous plant (Krishnaayyar, 1942; Dastur *et al.*, 1960). This seriousness of the habit of cotton growers to rise an off -season crop has been realized from the beginning of 20th century itself. Then Government imposed legislation to have a cotton free period of at least one month; Madras Agricultural Pests and Diseases Act 1919 was enforced in erstwhile Salem, Madurai and Coimbatore districts stipulating that the previous crop of cotton should be removed not later than 1st August and the succeeding crop should not be sown earlier than 1st September each year (David and Kumaraswami, 1994). Hence, the present studies were made to know the impact of staggered sowing and sun drying of pulled out cotton stalks after the completion of harvest on the incidence of cotton stem weevil

MATERIALS AND METHODS

The investigation was carried out at Cotton Research Station, Srivilliputtur during 2006-09. In the first experiment, cotton crop was sown at different dates. The infestation and plant mortality due to stem weevil were

Table 1. Emergence of cotton stem weevils from cotton stalks

Lot	Sun drying <i>in situ</i>			Heaped		
	Winter			Winter		
	2006	2007	2008	2006	2007	2008
1	0.00	0.00	0.00	69	33	48
2	0.00	0.00	0.00	74	68	76
3	0.00	0.00	0.00	56	75	82
Mean	0.00	0.00	0.00	66.33	58.67	66.67

recorded at different stages of the crop. Staggered sowing of SVPR 2 cotton variety was taken up *viz.*, 1.3.06, 7.3.06, 16.3.06 and 22.3.06 in Summer 2006; 21.9.06, 28.9.06., 5.10.06, 15.10.06, 22.10.06 in Winter 2006 and 15.2.07, 22.2.07, 31.3.07 and 7.4.07 in Summer 2007; 28.2.08, 8.3.08, 17.3.08, and 25.3.08 in Summer 2008; and 9.9.08, 20.9.08, and 4.10.08 in Winter 2008. In the second experiment, the infested cotton stalks and stem were kept for 5 days in the field under the sunlight. The adult emergence was recorded. Similarly, observations were recorded in the heaps of cotton stalks kept in the field.

RESULTS AND DISCUSSION

The results of the studies on the impact of sun drying and staggered sowing on the incidence of stem weevil are presented in Tables 1-2.

Impact of *in situ* sun drying

It was observed that there was no weevil emergence in sun dried cotton stalks in Winter 2006, 2007 and 2008. Mean number of adult stem weevils Emerged from the cotton stalks, which were just pulled out and stored/

heaped was 66.33 Winter 2006; whereas, it was 58.67 in winter 2007 and 66.67 in winter 2008 (Table 2). Even though the stems dried automatically in heaping condition, the weevils were able to emerge out; whereas, the weevils were not able to emerge out from the sun dried cotton stalks.

Infestation by stem weevil on staggered sown cotton plants

It was observed that the plants sown early *viz.*, 1.3.06 in Summer 2006, 21.9.06 in Winter 2006 and 15.2.07 in Summer 2007 showed more damage of 46.33, 62.92, 49.67, 76.67, 37.67 and 97.67 per cent in Summer 2006, Winter 2006, Summer 2007, respectively compared to other late sown plants (Table 2). Similarly, the plant mortality was also more in the off season crop (23.41 % in Winter 2006; 21.33 in Winter 2007 and 58.67 % in Winter 2008) compared to regular season crop (5.10, 6.03, and 8.07% in Summer 2006, 2007 and 2008, respectively).

Present study brought out the importance of *in situ* drying of cotton stalks after pulling out the cotton stalks to arrest the carry over of the pest to next season. Generally, crop sown early in the season escapes severe infestation as in

Table 2. Stem weevil infestation and plant mortality on different dates of sowing (Summer 2006- 2008)

Date of sowing	Plant Infestation (%)	Plant mortality (%)	Date of sowing	Plant Infestation (%)	Plant mortality (%)
Summer 2006			Winter 2007		
1.3.06	46.33	5.10	18.9.08	76.67	21.3
7.3.06	42.74	3.37	30.9.08	48.67	16.33
16.3.06	28.99	1.43	7.10.08	36.33	7.67
22.3.06	26.29	1.17	15.10.08	15.33	1.33
Winter 2006			Summer 2008		
21.9.06	62.92	23.41	28.2.08	37.67	8.0
28.9.06	56.92	20.86	8.3.08	21.53	3.33
5.10.06	42.01	7.30	17.3.08	13.20	1.10
15.10.06	21.49	2.54	25.3.08	8.10	0.00
Summer 2007			Winter 2008		
15.2.07	49.67	6.03	9.9.08	97.67	58.67
22.2.07	32.53	3.23	20.9.08	85.53	33.67
31.3.07	21.20	2.00	4.10.08	73.20	17.67

the case of sorghum shoot fly in Southern districts of Tamil Nadu (David and Kumaraswami, 1994, Nayar *et al.* (1976). In studies conducted at Maharashtra by Nagargoje *et al.* (2002), 16th March sowing recorded the lowest incidence of leafhoppers, aphids, and whitefly and bollworms, whereas delayed sowing at 1st May recorded the highest incidence of pests. According to Rajendran and Jain (2004), higher incidence of pink bollworm and leafhoppers has been recorded in late sown cotton. Studies in bhendi by Mandal *et al.* (2006) also revealed that earliest sowing generally gave the highest okra yield, which decreased with each other sowing date since the crop escaped the pest infestation. However, the present investigation showed that earlier sown cotton crops were affected severely by the stem weevil compared to late sown crops. Parameswaran and Chelliah (1985) reported that within the normal winter cotton sowing season, the crop sown during the first week of September registered low weevil infestation, while the crop sown during first week of August recorded high infestation. Srinivasan *et al.* (2003) reported higher incidence of stem weevil in the crop sown on August 1 compared to that sown in August 16 and August 30. Acharya and Singh (2007) have observed higher incidence of whitefly, *Bemisia tabaci* in early sown cotton crops. The reason behind the higher incidence of stem weevil in early sowing might be due to the emerged adults from the previous season crop. This might be one of the reason for imposing of the Madras Agricultural Pests and Diseases Act III of 1919 as amended by Act VII of 1925, whereby Removal of cotton sticks by 1st August is compulsory, by about a month before the sowing of succeeding crop (Sohi, 1967) and according to Sohi (1967) it was said to keep this pest under check at that time..

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N. Murugesan*, N. Balakrishnan, R.Vimala, N. Shunmugavalli and A. Ramalingam

Cotton Research Station, TNAU, Srivilliputtur- 626 125, Tamil Nadu, India. Phone: 04563 – 260736, Fax : 04563-260736, *E-mail: n_murugeson@yahoo.co.in,

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