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Effect of different suckericides on yield of fcv tobacco speight G-28

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Abstract

To study the effect of different suckericides on the yield of FCV tobacco Speight G-28, an experiment was conducted using randomized complete block (RCB) design with three replications at Tobacco Research Station, Khan Ghari, Mardan during 2009-2010. Treatments consisted of four suckericides, Myleng2 (13 ml/ 2 litre), Stomp 330 E (20 ml/ 2 litre), Tamex (26 ml/ 2 litre) and Pendimethalin 33 Ec (24 ml/ 2 litre) with manual desuckering. High number of 15 suckers plant^{-1}, fresh weight of suckers 394.5 g plant^{-1} and dry weight of suckers 76.38 g plant^{-1} were obtained for the plots in which desuckering was done manually while lower number of 1.40 suckers plant^{-1}, fresh weight of suckers 60.11 g plant^{-1} and dry weight of suckers 18.43g plant^{-1} were obtained in plots treated with Stomp 330 E. Whereas, maximum leaf area, fresh weight of leaves plot^{-1}, cured weight of leaves plot^{-1}, and leaf yield of 994.5cm^2 were 47.22g, 7.127g and 3195 kg ha^{-1} respectively and that was recorded for Stomp 330 E. The minimum leaf area, fresh weight of leaves plot^{-1}, cured weight of leaves plot^{-1}, and leaf yield were 792.5cm^2, 40.69g, 5.767g and 2585 kg ha^{-1} respectively and that were obtained for manual desuckering. Suckericides were effective in increasing yield and controlling suckers in comparison with manual desuckering; however Stomp 330 E gave maximum leaf area and leaf yield.

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Introduction

Tobacco belongs to the family Solanaceae and genus, *Nicotiana*. Two species, namely, *Nicotiana tobacum* (L) and *Nicotiana rustica* (L) are widely grown all over the world. The former is mainly utilized for the manufacturing of cigarettes, cigars and bidis whereas the latter one is used for making snuff, smoking in hooka and also for chewing. Tobacco industry employs over 1.0 million people, generates Rs.27.5 billion as contribution to GDP and adds Rs.15.17 billion as tax revenue to the economy of Pakistan (MINFAL, 2004). As growers gets higher incomes from tobacco crop, the production of tobacco in Pakistan increased from 23.70 million tones in 1989 to 46.96 million tones in 1997, about 97% increased in production has occurred (MINFAL,1999). The proper methods for topping and desuckering are such functions which help to improve production of tobacco crop.

Topping is the path way for suckers because after topping the leaves in the axil which remains dormant becomes active and put forth shoots which known as suckers. The process of removal suckers from the axil of leaf is called desuckering. After topping suckers also compete for nutrients, light, moisture and space. Tobacco suckers not only influence plants essential nutrients but also provide shelter for insects, pests and disease. Suckers growth efficiency is higher than tobacco leaves. The intra-plant completion takes place which ultimately affect the yield of tobacco crop.

The plant has the ability to produce three suckers in each axils of leaves. To get plant free from suckers during crop life span mostly 4-5 times desuckering is required. Topping and desuckering in tobacco crop enhance yield per hectare (Shah, 1998). Manually Removal of suckers from tobacco plant is requiring considerable time and a lot of labor effort. Tobacco plants free of suckers would of economics importance Patel *et al.* (1996) concluded that pendimethalin, alone or combined with decanol, gave the best sucker control and the highest cured leaf yield. Patel *et al.* (1996) concluded that suckericide alone or combined with decanol, gave the best sucker control and the highest cured leaf yield. Jan *et al.*, (2015) concluded that pendimethalin alone or combined with other suckricides increased leaf area, fresh weight of leafs, cured weight of leaves and also leaf yield. The aim of the study was to improve yield of FCV tobacco variety Speight G-28 by finding out the proper suckericide and its concentration to control suckers.

Materials and methods

Study area

The field experiment was conducted to check the effect of different suckericides on yield of FCV tobacco using variety Speight 28 at Tobacco Research Station, Khan Garhi, Mardan (Khyber Pukhtoonkhawa).

Experimental Design

The five treatments Myleng 2, Stomp 330 E, Tamex, Pendimethalin 33 Ec and manual topping/desuckering were examined in this experiment. The experiment was laid out in Randomized Complete Block (RCB) design with three replications. Each subplot measured six effects of different suckericides on yield of FCV tobacco speight G-28 3.6 m2 with four rows, 6 m long, having 10 plants in each row. The row to row distance was 90 cm, while plant to plant distance was 60 cm. Nursery was prepared in the month of December and transplantation was done during the last week of March.

Experimental Operation

Before transplant, land was ploughed using cultivator and then worked with rotavator for breaking of clods. Ridges were made and transplant was done on ridges according to the mentioned recommended spacing. Irrigation was applied immediately after transplant. Suckericides were applied on 25 June 2010, weeds were removed through hoeing. When the plants reached the bud stage, topping was done in each subplot and then treated with suckericides and manual desuckering. Field was thoroughly prepared, irrigated and weeds were removed according to the standard practices.

Data record and Analysis

The data were recorded on number of suckers plant-1, fresh weight of suckers plant-1, dry weight of suckers plant-1, Leaf Area (Leaf length × leaf breadth × 0.635), fresh weight of leaves plot-1, cured weight of leaves plot-1 and leaf yield (kg ha-1). Leaf area was calculated by measuring the length and breadth of 5th, 10th and 15th leaf. The average leaf size was computed from the leaf position by multiplying with a common factor 0.635. Leaf area= Leaf length × Leaf breadth × 0.635.Leaf yield was measured by taking the weight of cured leaf in each treatment after each picking. The total cured leaf yield was calculated by the following formula:

$$\text{Cured leaf weight (kg ha-1)} = \frac{\text{Cured leaf weight sub-plot-1} \times 10000\text{m}^2}{\text{Area harvested (16.2 m}^2\text{)}}$$

Results and discussions

Statistical analysis of the data revealed that suckericides had highly significant effect for all the parameters given in Table 1. Mean table 2 showed that maximum value of number of suckers plant-1 (15.00) were obtained in those plots where suckers were manually controlled while minimum number of suckers were recorded in plots sprayed with Stomp 330 E (1.400). These results suggested that suckericides were more effective than manual desuckering. These results agree with those reported Mahadevareddy *et al.* (1986) who concluded that best sucker control and leaf yields were obtained with the use of chemical suckericides. Data regarding fresh weight of suckers plant-1 indicated that maximum fresh weight of suckers plant-1 (394.5 g) was obtained from plots in which desuckering was done manually and minimum green weight of suckers plant-1 (60.11 g) was obtained from plots treated with Stomp 330 E. The reason could be that in manual desuckering, suckers were vigorous because of maximum utilization of nutrient, while Stomp 330 E fully suppressed suckers growth. These findings are in close proximity with earlier finding of Bakht *et al.* (2007) who concluded that suckericides reduced sucker weight plant-1 as compared with manual desuckering.

For dry weight of suckers plant-1, the maximum mean value were recorded in plots with manual desuckering (76.38 g) while minimum value (18.43g) was obtained from the plots treated with Stomp 330 E. The reason could be that Stomp 330 E suppressed suckers growth and hence its weight was low, while in manual desuckering suckers growth was rapid due to full utilization of nutrients (Table 2). These results are similar to those by Patel *et al.* (1990) who concluded that chemical desuckering decreased dry suckers weight plant-1 in FCV tobacco.

Mean table 2 showed that maximum value of leaf area were obtained by Stomp 330 E (994.5cm^2) while minimum value by manual desuckering (792.5cm^2). The reason could be the full utilization of plant nutrients by the leaves in chemical desuckering. These finding are in close conformity with the finding of Qahar *et al.* (2006). They observed that application of suckericides increased leaf area of tobacco. For fresh weight of leaves plot^{-1}, the maximum mean value (47.22g) was recorded in plots treated with Stomp 330 E, while minimum mean value (40.69g) for fresh weight of leaves plot^{-1} were obtained in plots in which desuckering was done manually. The above results are concurrent with the findings of Bush and Sims (1974) that uses of chemical suckericides were effective in increasing leaf weight. Data regarding cured weight of leaves plot^{-1} are given in Table 2. Mean table showed that maximum value of cured weight of leaves plot^{-1} were obtained by Stomp 330 E (7.127g) while minimum value by manual desuckering (5.767g).

The results obtained are also in close agreement to Bhat *et al.* (1990) that suckericides gave greater monetary returns than manual desuckering. For leaf yield, Mean value of the data indicated that maximum value of 3195 kg ha^{-1} was produced by those plots which were sprayed with Stomp 330 E followed by the plots (3104 kg ha^{-1}) sprayed with Myleng 2. Its can also be seen that plot in which suckers were controlled manually, produced minimum leaf yield (2585 kg ha^{-1}). The reason may be that optimum dose of Stomp 330 E increased leaf area and ultimately increased photosynthates formation resulting increase in yield

hectare^{-1}. while in controlled plot most of the photosynthates were utilized by suckers resulting low yield (Table 2).

These results are in agreement with Bakht *et al.* (2007) who stated that chemical desuckering effectively increased yield and yield contributing traits in tobacco.

Table 1. Mean square values for all parameters.

Parameters	Replications df=2	Suckericides df=4	Error df=8
Number of suckers plant^{-1}	0.338	97.701**	0.271
fresh weight of suckers plant^{-1}	52.398	53870.77**	3.402
Dry weight of suckers plant^{-1}	27.847	1801.799**	3.865
Leaf area	58.730	26381.64**	347.660
Green weight of leaves plot^{-1}	4.479	21.893**	1.262
Cured weight of leaves plot^{-1}	0.232	0.932**	0.066
Leaf yield (kg ha^{-1})	46602.416	187303.400**	13224.725

**= Highly significant at 0.01 level of probability.

Table 2. Mean performance for all the parameters.

Suckericides	Number of suckers plant^{-1}	Green weight of suckers plant^{-1}	Dry weight of suckers plant^{-1}	Leaf area	Green weight of leaves plot^{-1}	Cured weight of leaves plot^{-1}	Leaf yield (kg ha^{-1})
Myleng-2	2.300 c	98.47 d	17.07 d	985.1 a	46.71 a	6.923 a	3104 a
Stomp-330 E	1.400 c	60.11 e	18.43 d	994.5 a	47.22 a	7.127 a	3195 a
Tamex	3.500 b	150.5 b	34.53 b	816.5 c	42.94 b	6.140 bc	2753 bc
Pendimethalin-33 Ec	2.200 c	105.2 c	25.18 c	922.4 b	44.29 b	6.420 b	2878 b
Mannual desuckering	15.00 a	394.5 a	76.38 a	792.5 c	40.69 c	5.767 c	2585 c
$LSD_{0.05}$	0.9802	3.473	3.702	35.11	2.115	0.4837	216.5

Conclusions

From the above results it was concluded that maximum leaf area and leaf yield were obtained from the plots treated with suckericides in comparison with manual desuckering. Plots treated with suckericides gave higher values for all yield contributing traits except for number of sucker plant^{-1}, fresh and dry weight of suckers' plant^{-1}. Among suckericides Stomp 330 E performed better than the other suckericides in sucker control and producing good quality tobacco.

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