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The Physlo-morphic Influence of Some Latest Spray Schedules Against Cotton Variety FH-672

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Abstract: The physio-morphic influence of 10 different insecticides from 4 major groups of modern synthetic insecticides, compounds with new pesticidal chemistry, surfactants and emulsifiers in form of five different latest recommended schedules were studied on newly released cotton cuitivar FH-672 at Faisalabad (Pakistan). The experiment was laid out in randomized complete block design (RCBD) with four repeats. The physio-morphic characters under present research investigations were plant height, weight of dry leaves, weight of dry branches, weight of dry stem, number of leaves, number of branches, number of unopened bolls, number of opened bolls, leaf area index, leaf area and seed cotton yield. Results revealed that spray-schedules influenced only 4 physio-morphic characters like seed cotton yield, plant height, leaf area index and leaf area. The final performance was negatively correlated with leaf area index and leaf area. All other characters did not show any correlation to seed cotton yield.

Key words: Physio-morphic characters, cotton, spray schedules

Introduction

Cotton crop in Pakistan is attacked by 145 species of insects and mites (Hushrui, 1994), Like other developing countries sole reliance is being given to insecticides to control insect pests by farmers of our country till now. These not only kill the pests but also bring an upset in entire ecosystem of the crops (Metcalf and Luckmann, 1994). Most of the studies with the insecticides are confined with the mortality counts of the pest on treated crop or their influence on yield. Jones *et al*. (1986) reported that subtle non-visible effects of pesticides on crop physiology and its yield has generally been ignored by the entomologists responsible for developing pesticide recommendations. So studies on the physio-morphic influence of various pesticides is badly needed on cotton and other crops. This article describes the influence of some latest spray schedules with some surfactants, emulsifiers and oils which has been sprayed on cotton with same modern synthetic insecticides. Previous efforts on these line include those of Hopkins and Moore (1982), Reddy and Rao (1981), Regupathy and Subramanian (1981) and El-Shoikuwavr *et al.* (1991) front other geographical areas of the world. A scan through the findings of the above scientists shows that different insecticides were used along with different characters of *Gossypium hirsutum* L. for studies. in all most all cases pyrithroid gave better yield and differential effects on various physico-morphic characters under study. Studies carried out on these lines in Pakistan mainly include those of Ali and Artiquer (1957) and Ali *et al.* (1988), proved that insecticides have no effect on seed cotton yield and number of matured bolls/ha on MNH-93. However, Ali *et al*. (1988) proved different effects of insecticides on two cotton cultivars B457 and 407126. They found that insecticides under trial Parathion methyl, chlorpyriphos, monochrotophos, carbaryl, fenvelrate and permethrin increased the yield of both oultivars but disulfoton and aldicarb did not show any effect on yield.

Materials and Methods

The materials employed in present research investigations were field grown crop of FH-672 cotton and following 5 different spray schedules mentioned with treatments and doses of active ingredients (a.i.).

T_1 (Methamidophos 50SL + Surfactant super) twice + Polo 500 tic (diafenthiuran) + Arrivo 10 EC (cyperrnethrin), thrice Doses: 250 + 126, 126 + 125
T_2 (Methamidophos 5081 + Surfactant ordinary) twice + Polytrin C 440EC (cypermethrin + profenophos), thrice Doses: (250 + 6001 + 264
T_3 (Methamidophos 5091ernulcifier) twice + Karate (cyhalothrin) + endusulfan, thrice Doses: (250 + 5001 + 410
T_4 Emulcifier, twice + Baythroid T.M. 525 EC (cyfluthrin + methamidophos), thrice Doses: 500 + 210
T_5 (Methamidophos 50SL) Match 050 EC + (decarafluron), thrice Doses: 250 + 40
T_e Control

The experiment was laid out in randomized complete block design (RCBD) with four repeats at the Ayub Agricultural Research institute, Risalewala in cotton research area. The spray materials were prepared on v/v basis and sprayed over the crop at an interval of fortnight from r August, 1994 by means of solo knap sack sprayer. The crop was sprayed over till maturity in 6 installments.

The data for the various physio-morphic characters plant height, weight of dry leaves, weight of dry branches, weight of dry stem, number of leaves, number of branches, number of unopened balls, number of opened bolls, leaf area index, leaf area and seed cotton yield was collected on the basis of single plant, from five plants selected at random from each treatment. The data thus collected was finally presented in the form of mean values of five plants per plot. The data were analyzed statically through DMR test (Steel and Torrie, 1980) after analysis of variance for

Table 1: A multiple comparison of mean values (plant^{-1}) of different physiomorphic characters of FH-672 cotton

Treatment	Seed Cotton yield (g/plant)	Plant height (cm/plant)	Weight of dry leaves (g/plant)	Weight of dry branches (g/plant)	Weight of dry Stem (g/plant)	Number of leaves (plant^{-1})	Number of branches (plant^{-1})	No. of unopened bolls (plant^{-1})	No. of opened bolls (plant^{-1})	Leaf area Index (plant^{-1})	Leaf area (cm^2 (plant^{-1})
T_3	43.21**a	141.61**a	42.18$^{n.s.}$a	102.46$^{n.s.}$a	57.21$^{n.s.}$	109.99$^{n.s.}$	17.08$^{n.s.}$	12.08'	2.16$^{n.s.}$	2.40**b	5529**b
T_2	37.O5ab	140.29a	33.54	121.95	43.79	82.74	16.16	12.83	2.66	2.35b	5384b
T_4	36.60ab	141.03e	40.95	104.97	58.78	127.06	17.57	13.61	3.33	2.37b	5487b
T_1	33.21bc	120.64b	49.58	117.74	50.88	111.99	16.83	12.99	2.66	2.22b	5111b
T_5	32.23bc	122.49a	34.80	112.18	48.11	81.08	18.41	13.31	3.99	2.40b	55415
T_5	26.78c	113.74b	25.36	70.59	51.11	100.74	13.66	10.24	2.40	4.200	9602a

Table 2: Correlation matrix of different physio-morphic characters of FH-672 cotton

Characters	1	2	3	4	50	6	7	8	9	10	11
Seed cotton yield (g)	1.00										
Plant height	0.29	1.00									
Weight of dry leaves	0.24	0.07	1.00								
Weight of dry branches	0.31	0.36*	0.54**	1.00							
Weight of dry stems	-0.02	0.38*	0.42	0.32	1.00						
Number of leaves	0.03	0.18	0.89**	0.47**	0.53**	1OO					
Number of branches	-0.03	0.39*	0.14	0.23	0.16	0.29	1.00				
Number of unopened bolls	0.29	0.10	0.68**	0.42**	0,33	0.56**	0.02	1.00			
Number of opened bolls	-0.08	0.15	-0.28	0.045	0.33	0.25	0.31	-0.05	1.00		
Leaf area index	-0.36*	-0.55**	-0.16	-0.44**	-0.02	-0.08	-0.51**	-0.26	-0.02	1.00	
Leaf area	-0.35*	-0.55**	-0.16	-0.44**	-0.01	-0.08	-0.51**	-0.25	-0.01	0.99**	1.00

significance of statistical difference through micro-slat computer software.

Results and Discussion

The data collected on various parameters regarding the influence of the spray schedules on various characters of FH-672 variety is presented through the Table 1. A perusal of the data reveals that the mean values of the four physio-morphic characters viz. Seed cotton yield, plant height, leaf area index and leaf area showed significant differences to various spray schedules in present investigations while remaining physio-morphic characters i.e. weight of dry leaves, weight of dry branches, weight of dry stem, number of leaves, number of branches, number of opened and unopened bolls were found to be non significantly influenced. This suggests that physio-morphic influence of insecticidal spray schedules is character specific. A further analysis of the *mean* variation in the spray affected characters revealed that the mean values in T_6 where no insecticide was used were found to be very low except leaf area index and leaf area as compared to the others from T_1 to T_5 where different spray schedules (mentioned in materials and methods) were applied, which are also statistically at par.

As the seed cotton yield is an ultimate measure of phsio-morphic performance of plant. The comparison of the changes on the plant growth were found to be associated with reciprocal changes in the other characters. in order to verify the situation the correlation of the changes in the seed cotton yield with those physio-morphic characters was calculated *and* is presented in Table 2. It is interesting to note that (from the correlation matrix) the changes in only two of the physio-morphic characters were correlated negatively to the seed cotton yield except all other characters, which include leaf area index and leaf area. All other characters did not show any correlation. The findings of the present research studies can not be compared in absolute terms with those of Reddy and Rao (1981), Regupathy and Subramanian (1981) and El-Shoikuwavr *et al.* (1991) because of different insecticides, varieties and different ecological conditions. But the results can be compared in terms of seed cotton yield which was also significant from one chemical to other. These studies can be compared in similar fashion with Ali *et al.* (1988) in which not all the insecticides increased the yield for different cultivars. The studies also deny the results of Ali and Artiquer (1957) regarding the seed cotton yield and confirm the results for other characters like the number of matured bolls.

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