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Evaluation of Promising Wheat Varieties of Balochistan Against Different Levels of Herbicides

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Abstract: The study was run to determine the susceptibility of major wheat (*Triticum aestivum*) varieties (Zardana, Zarghoon, Sariab-92, Zamindar, Inqalab and local) of Balochistan to registered herbicides (Dicuran, Panther, Tolkan, Buctril-M, 2,4-D and Logran). Different levels of herbicides (Dicuran @ 2.5 & @ 3.75; Panther @ 1.875 & 2.81; Tolkan @ 2.00 & 3.00; Bactril-M @ 1.875 & 2.81; 2,4-D @ 2.5 & 3.75 and Logran @ 2.5 & 3.75 L ha^{-1}, optimum and maximum dose respectively) were used. Best results, in respect of both weed suppression (37 m^{-2}) and wheat grain yield (3.45 tons ha^{-1}), was obtain by the optimum dose (1.875 L ha^{-1}) of Panther.

Key words: Herbicides wheat, Pakistan

Introduction

Wheat is the main crop of Balochistan (Anonymous, 1996-97) which is cultivated over 313,950 ha. The province of Balochistan contributes about 748,670 tons wheat annually (Anonymous, 1998-99). Due to dry weather no significant attack of any pest or disease on this crop in Balochistan is reported (Anonymous, 1995-96). Weeds are the only threat to the crop which may reduce the yield up to 50% (Ahmad *et al.*, 1989; Aness, 1994). Hashmi *et al.* (1995) reported that all the field crops in Pakistan are heavily infested by the weeds. Upadhyay *et al.* (1980) claimed that agriculture land could not be kept free of weeds. Weed compete with the crop plant (Ahmad *et al.*, 1989). Bleasdale (1959) and Furtick (1970) reported that with a good control of weeds one can get batter yield. Palmblade (1968) reported that the first one-third period of any crop is crucial, the crop field for said period must be weed free. A number of weeds attach to the wheat crop in Pakistan (Zafar, 1985). Furtick (1970) reported that weeds retard the growth of the crop. Balochistan is not a rich province thus the farmers have low economic status. Wheat is the main crop of these farmers on which they depend. Thus heavy losses in the crop could not be economically tolerable. Chemical control of weeds is an effective and efficient method (Ahmad *et al.*, 1989). A number of herbicides are reported the best against a number of weeds (Bhan *et al.*, 1976; Sandhu and Randhawa, 1978). Different varieties of wheat may have different tolerance against weeds (Aness, 1994). Different herbicides with their different doses has different efficiency against different weeds in different conditions of crop and field (Pandita *et al.*, 1978)

Keeping in view the above discussion the study was designed to determine the susceptibility of major wheat varieties of the province to some registered herbicides used in Balochistan.

Materials and Methods

A field experiment was conducted, at Agronomic Research Field, Agriculture Research Institute (ARI), Sariab, Quetta during 1995-98, Rabi seasons, to determine the susceptibility of major wheat varieties (Zardana, Zarghoon, Sariab-92, Zamindar, Inqalab and local) of Balochistan to registered herbicides (Dicuran, Chlorotoluron + Isoproturon; Panther, Isoproturon + Diflufenican; Tolkan, Isoproturon; Buctril-M, Bromoxynil; 2,4-D, Phenoxy acid and Logran, Triasulfuron) during 1995-98, Rubi seasons in split plot design. Different levels of herbicides, optimum and maximum (Dicuran @ 2.5 & @ 3.75; Panther @ 1.875 & 2.81; Tolkan @ 2.00 & 3.00; Bactril-M @ 1.875 & 2.81; 2,4-D @ 2.5 & 3.75 and Logran @ 2.5 & 3.75 L ha^{-1}, optimum and maximum dose respectively) were used. The crop sowing was done in the 2nd week of November on well prepared seed beds with single culture hand drill at 30 cm apart rows. A recommended dose of N:P:K fertilizer (120:90:60 kg ha^{-1}) was applied to the field during the preparation of land. All other agronomic practices were kept constant in all the treated plots. The herbicides were sprayed by knapsack at 3-4 leaf stage of weeds.

The data regarding weed density (m^{-2}) and crop grain yield (tons ha^{-1}) were recorded. The crop was harvested in June every year. Computer programme M-State was used for the analysis of data. The analysis of variance (AOVA) for all the character studied were done and least significant difference (LSD) test was applied to separate the means.

Results and Discussion

No significant difference was observed among different tested wheat varieties against different level of herbicides (both in respect of weed's population and wheat grain yield) thus was not further

Table 1: Effect of different levels of herbicides on weed population (m^{-2}) in different varieties of wheat at ARI during 1995-98 Rubi season

Herbicides levels	Varieties						
	*2A	B	C	D	E	F	Mean
Control (*1D)	67	61	65	63	63	65	64
Optimum (D)	37	37	37	37	33	39	37
Maximum (D)	31	33	35	37	35	36	34
*3W x V (D)	45	44	46	46	44	47	46
Control (P)	65	63	64	65	65	67	65
Optimum (P)	36	36	37	37	39	36	37
Maximum (P)	37	34	35	34	48	50	40
W x V (P)	46	45	45	46	50	51	47
Control (T)	51	68	61	63	65	64	62
Optimum (T)	64	67	47	47	48	53	54
Maximum (T)	47	46	47	49	51	49	48
W x V (T)	54	60	52	53	54	56	55
Control (B)	55	57	59	62	57	63	50
Optimum (B)	51	38	40	41	42	42	42
Maximum (B)	43	45	47	53	55	43	51
W x V (B)	47	47	49	48	49	45	48
Control (2D)	47	48	56	52	53	51	50
Optimum (2D)	47	31	32	33	32	34	53
Maximum (2D)	29	30	29	28	27	31	45
W x V (2D)	45	45	44	45	44	44	45
Control (L)	52	47	48	48	48	49	49
Optimum (L)	37	38	39	41	39	40	39
Maximum (L)	41	36	39	37	36	37	38
W x V (L)	43	40	42	42	41	42	41

*1 D = Dicuran; P = Panther; T = Tolkan; B = Bactril-M; 2D = 2,4-D; L = Logran. *2 A = Zardana; B = Zarghoon; C = Sariab 92; D = Zamindar; E = Inqalab; F = Local. *3 W = Weedicides; V = Varieties. There was no significant differences between the varieties at LSD 0.01%.

Table 2: Effect of different levels of herbicides on wheat grain production (tons ha^{-1}) in different varieties of wheat at ARI during 1995-98, Rubi season

	Varieties						
Herbicides levels	*2A	B	C	D	E	F	Mean
Control (*1D)	3.05	3.25	2.72	2.55	2.45	2.10	2.68
Optimum (D)	3.85	4.10	3.05	2.70	2.75	2.50	3.15
Maximum (D)	3.65	3.70	2.40	2.15	2.80	1.67	2.72
*3W x V (D)	3.51	3.68	2.72	2.46	2.66	2.09	2.85
Control (P)	2.95	3.15	2.70	2.52	2.30	2.00	2.60
Optimum (P)	4.05	4.35	3.50	3.00	3.00	2.80	3.45
Maximum (P)	3.80	4.10	2.95	2.95	2.45	1.95	3.03
W x V (P)	3.60	3.86	3.05	2.82	2.58	2.25	3.02
Control (T)	3.10	3.25	2.70	2.63	2.45	2.32	2.75
Optimum (T)	3.05	3.06	2.60	2.58	2.45	2.22	2.66
Maximum (T)	2.80	2.90	2.10	2.30	2.25	1.55	2.31
W x V (T)	2.98	3.07	2.46	2.50	2.38	2.03	2.57
Control (B)	3.20	3.45	2.67	2.70	2.40	2.35	2.79
Optimum (B)	3.95	4.10	3.10	3.31	3.00	2.20	3.27
Maximum (B)	3.10	3.10	2.80	2.65	2.70	1.80	2.69
W x V (B)	3.41	3.35	2.86	2.88	2.70	2.11	2.92
Control (2D)	3.05	3.25	2.72	2.60	2.50	2.00	2.68
Optimum (2D)	3.65	3.75	3.00	3.10	2.90	2.50	3.15
Maximum (2D)	3.25	3.70	2.95	3.00	2.68	2.10	2.94
W x V (2D)	3.31	3.56	2.89	2.90	2.69	2.20	2.92
Control (L)	3.05	3.40	2.71	2.57	2.47	2.05	2.71
Optimum (L)	3.70	3.75	3.30	3.00	3.10	2.65	3.25
Maximum (L)	3.60	3.65	3.55	3.05	2.95	2.00	3.13
W x V (L)	3.45	3.06	3.18	2.87	2.84	2.23	3.03

*1 D=Dicuran; P=Panther; T=Tolkan; B=Bactril-M; 2D=2,4-D; L=Logran. *2 A=Zardana; B=Zarghoon; C= Sariab 92; D=Zamindar; E=Inqalab; F=Local. *3 W= Weedicides; V=Varieties. There was no significant differences between the varieties at LSD 0.01%.

analyzed. Table 1, depicts the effect of different levels of herbicides on weeds density. All the treatments had significant effect on the weed population. The reduction in weed population had direct relation to the herbicides levels while having direct relations to the crop yield (Table 1, 2). Pandita *et al.* (1978), reported that weed density could be checked through different concentrations of herbicides. Randhawa *et al.* (1979) found maximum weed control by the maximum doses of herbicides but the treatment affected adversely to the crop. Optimum doses of Dicuran, Panther and 2, 4-D, as consider to the grain yield (Table 2) gave good results while Buctril-M had poor results. Hassan and Malik (2001) also reported that 2, 4-D, Panther and combination of Dicuran + Graminan provided good control of weeds in the same crop. All other herbicides had no significant effect on the grain yield. Tolkan had adverse effects on the production of wheat grains. Pandita *et al.* (1978) reported yellowing and burning of young leaves after maximum dose application but was recovered by irrigation. It appeared from the results that the maximum levels of all herbicides had adverse effects on the crop. Panther at its optimum dose, 1.875 L ha^{-1}, provided the best production of wheat grains, 3.45 tons ha^{-1}, (Table 2) as reported by Hassan and Malik (2001).

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