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GROWTH RESPONSE OF WHEAT CULTIVARS TO NAPHTHALENEACETIC ACID (NAA) AND ETHREL

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Abstract

Study was conducted at experimental farm using two growth regulators i.e. naphthaleneacetic acid (NAA) and ethrel at concentrations of 0, 10, 20 and 30 ppm each on the growth of three wheat cultivars viz., Sarsabz, Soghat and S-232. It was observed that 20 ppm concentration of either NAA or ethrel showed better results in enhancing the straw and grain yields of the wheat cultivars.

Introduction

Several growth regulators such as GA_3, NAA, salicylic acid (SA), Disprin, IBA, IAA, ethrel, Depeg, Alanap etc., have been extensively used for the enhancement of growth and yield of cereal, medicinal, vegetable and horticultural crops (Havazuidi, 1992; Kasel *et al.*, 1993; Khan & Spilde, 1992; Lilani *et al.*, 1991; Ma & Smith, 1992; Sekhon & Gurbaksh, 1991; Szoke, 1990 and Taylor *et al.*, 1991). A combination of 200 mg/L ethrel and 1.5% D-WK produced defoliation (Larsen, 1973). Similarly, a combination of three growth regulators i.e. ethrel or ethephon, depeg and alanap when sprayed on pear and apple trees also resulted in tree defoliation (Larsen & Higgins, 1999). It has also been reported that sprays of growth regulator on different crops like chilies, tomatoes, mangoes increase the yield parameter. The present report describes the effect of naphthaleneacetic acid and ethrel as growth regulators on the growth of three wheat cultivars viz., Sarsabz, Soghat and S-232 under field condition.

Materials and Methods

In a field experiment at the NIA, Tandojam, growth regulator NAA and ethrel @ 10, 20 and 30 ppm was applied on 3 varieties of wheat viz., Sarsabz, Soghat and S-232, with four replications. Each plot was measuring 3x4 meter. Sowing was done in the first week of November. First dose of fertilizers were applied before sowing and second dose along with first irrigation after 35 days of sowing. Spray was carried out when the plants were about two months old. Normal cultural practices were followed throughout the growth period. Plants were harvested at maturity. Plant height, tillers per plant, earhead length, straw and grain yields were recorded.

Results and Discussion

Plant height in Sarsabz and S-232 showed a decrease, while in Soghat it increased when growth regulator NAA and ethrel were used as compared to control (Table 1). Number of tillers in all the varieties were unaffected. Weight of earhead in Soghat and S-232 decreased, but it slightly increased at higher levels of ethrel. Length of earhead was unaffected in all the varieties. The straw and grain yields increased in all the three varieties at 20 ppm of the levels of NAA and ethrel. The wheat cultivar Sarsabz was observed to be a better variety than Soghat and S-232 in producing higher straw and grain yields.

Table 1. Response of wheat cultivars to NAA and ethrel at maturity.

Growth regulators treatment	Plant height (cm)	Tillers/ plant	Dry weight/ earhead (g)	Earhead length (cm)	Straw weight (g)	Grain weight (g)
			Sarsabz			
Control	105±3.51	4.0±1.00	39.95±27.11	10.10±0.40	24±4.62	26.37±7.47
NAA-10	104±7.18	7.7±4.27	36.2±23.17	11.64±1.34	28±10.25	29.32±7.66
NAA-20	105.5±7.32	6.2±2.06	36.12±9.41	11.00±1.13	29±11.00	31.90±16.22
NAA-30	101.2±262	5±1.4	35.5±13.47	11.76±1.32	31±2.64	30.30±1.52
Ethrel-10	100.5±0.50	4±0.8	27.12±8.15	12.54±3.51	28±5.43	27.40±3.40
Ethrel-20	97.5±3.77	5.25±1.39	44.11±14.18	10.72±1.39	34±10.37	32.62±2.16
Ethrel-30	98±4.80	4.93±2.18	47.47±13.80	11.72±0.89	30±7.11	31.11±2.21
			Soghat			
Control	84.62±6.65	4.37±0.92	39.95±12.11	10.76±1.31	25±12.37	33.5±14.00
NAA-10	86.5±5.02	3.87±0.59	36.2±10.17	10.22±1.57	23.55±13.0	24.7±13.70
NAA-20	88.12±4.87	4.06±0.89	36.12±9.41	10.14±0.89	23±5.23	26.12±4.66
NAA-30	85±5.43	4.18±0.74	35.52±13.47	9.46±1.43	17±7.23	20.97±5.98
Ethrel-10	92±5.18	4.12±1.60	27.122±8.15	9.87±1.28	22±9.27	23.07±8.51
Ethrel-20	88±2.64	4.5±1.13	35.47±12.34	10.09±0.54	22±9.48	28.5±3.98
Ethrel-30	88±6.92	4.31±1.10	35.87±12.65	9.74±1.16	19±6.59	22.27±5.41
			S-232			
Control	96±3.09	4.87±0.92	39.85±17.29	8.93±5.19	29±8.98	24.1±6.70
NAA-10	101±5.75	3.87±0.59	39.12±15.26	10.91±0.35	25±25.07	20.32±2.72
NAA-20	98±4.83	4.06±.89	43.32±24.13	11.28±1.48	29±15.2	26.00±8.50
NAA-30	98±4.83	4.18±0.74	42.4±8.59	11.60±1.70	28±5.85	24.87±2.97
Ethrel-10	97±6.65	4.12±1.60	43.42±23.59	11.94±0.50	33±16.42	27.35±9.83
Ethrel-20	92±3.79	4.5±1.13	45.85±15.74	11.666±0.55	27±7.27	28.85±8.86
Ethrel-30	98±3.17	4.31±1.37	34.85±17.71	11.12±1.92	29±9.00	21.97±7.88

The beneficial effects of ethrel and NAA on the growth and yield of cereal and horticultural crops have been reported by other workers (Alam & Naqvi, 1989; Naqvi *et al.*, 1998; Szoke, 1990; Ma & Smith, 1992; Sekhon & Gurbaksh, 1991; Harazuidi, 1992). In a greenhouse study, application of 100 mg/L ethrel increased the grain yield of wheat (Kasel *et al*, 1993).

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