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Influence of Brassinolide in Mitigating the Adverse Effect of Drought on Yield Attributes in Fenugreek (*Trigonella foenum-graecum* Linn) Genotypes

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A B S T R A C T

The experiment was conducted at the cage house in the Department of Plant Physiology, S.K.N. College of Agriculture, Jobner (Jaipur) to study the effect of brassinolide on yield attributes of fenugreek (*Trigonella foenum-graecum* Linn) under drought conditions. Four fenugreek cultivars namely RMt-1, RMt-361, RMt-305 and Hissar Sonali were grown in ceramic pots under normal conditions till vegetative stage and then plants were sprayed with brassinolide (0.0, 0.25, 0.50, 0.75 and 1.00 ppm concentration) followed by half the plant population subjected to water stress by withholding irrigation. It was observed that 1.0 ppm concentration of brassinolide was most effective under both non-stress and water stress condition. It may be concluded that RMt-305 was drought tolerant, among cultivars studied and brassinolide showed positive response towards all the yield parameters by reducing the adverse effect of drought stress.

Introduction

Fenugreek (*Trigonella foenum-graecum* L.) is grown as vegetable, grain as well as for fodder purpose in India. Fenugreek seeds substantially contain important steroid saponin called "Diosgenin", whose content in seed varies from 0.62-2.20 per cent which is used in synthesis of sex hormones and oral contraceptives. Water stress in India is a serious problem for crop production, as approximately 70 per cent of cultivated land is rainfed. brassinosteroids application under abiotic stress influence hydrolysis of polysaccharides, resulting in increase of soluble sugars and confer resistance against environmental stresses in crop plants and also enhances the crop productivity (Rao *et al.*, 2002 and Vidya Vardhini *et al.*, 2006).

A considerable amount of research has been done on cereal crops under stress condition. However, adequate work has not been done on the effects of water stress on pulse crops.

Keeping this in view, the experiment was undertaken to study the role of brassinolide in mitigating the adverse effect of drought on yield attributes and varietal response of fenugreek genotypes.

Table.1 Influence of brassinolide in mitigating the adverse effect of drought on yield attributes in fenugreek (*Trigonella foenum-graecum* Linn) genotypes

Treatments	Number of seeds per pod	Number of pods per plant	Seed yield per plant (g)	Seed index	Biological yield (g)	Harvest index (%)
Variety						
RMt-1	14.05	38.22	5.72	1.03	19.49	28.86
RMt-361	11.29	36.10	3.15	0.70	13.29	22.29
RMt-305	14.67	40.06	7.64	1.25	24.01	31.29
Hissar Sonali	12.61	37.46	4.32	0.87	16.73	24.78
S.Em.±	0.19	0.29	0.10	0.01	0.18	0.51
C.D. (P=0.05)	0.53	0.83	0.29	0.02	0.50	1.44
Stress						
Non stress	14.15	42.88	6.72	1.07	21.04	31.27
Water stress	12.16	33.04	3.70	0.85	15.72	22.34
S.Em.±	0.13	0.21	0.07	0.01	0.13	0.36
C.D. (P=0.05)	0.38	0.58	0.21	0.02	0.35	1.02
Brassinolide (ppm)						
0.0	11.64	33.38	3.63	0.88	14.51	23.78
0.25	12.64	35.45	4.38	0.92	16.19	25.66
0.50	12.97	37.49	4.97	0.96	17.36	27.29
0.75	13.48	40.31	5.79	1.00	20.47	27.21
1.00	15.05	43.18	7.27	1.05	23.38	30.08
S.Em.±	0.21	0.33	0.12	0.01	0.20	0.57
C.D. (P=0.05)	0.59	0.92	0.33	0.03	0.56	1.61

Materials and Methods

A pot experiment was carried out in the cage house located in the department of Plant Physiology, S.K.N. College of agriculture, Jobner. One hundred twenty ceramic pots were filled with about 10 kg of soil with well-mixed FYM in each pot. The experiment was laid out to study effect of brassinolide on yield parameters of fenugreek (*Trigonella foenum-graecum* Linn) under drought conditions. The four fenugreek varieties RMt-1, RMt-361, RMt-305 and Hissar Sonali were taken to study and were grown both under non-stress and water stress conditions. Brassinolides (BR) of different concentrations (control, 0.25 ppm, 0.50 ppm, 0.75 and 1.00 ppm) were sprayed prior to stress application, at pre flowering stage and next at 10 days after first spray, under both non-stress and water stress conditions. The observations were recorded for number of seedsper pod, number of pods per plant, seed yield per plant, seed index, biological yield and harvest index. All the observations were recorded in triplicates following appropriate methods. The data collected was analyzed statistically using completely randomized design (Panse and Sukhatme, 1970).

Results and Discussion

All the yield attributes have significantly increased with increasing brassinolide concentration with the highest values was obtained at 1.00 ppm concentration spray and minimum at control under both stress and non-stress conditions. Highest seed yield was recorded with 1.00 ppm with variety RMt-305 and lowest with control with RMt-361. Similar results have also been reported by Quasim *et al.*, (2008). Water stress induced reduction in growth parameters was also reflected in number of seeds per pod, number of pods per plant and seed index (Hamid *et al.*, 1990). Brassinolide application caused significant increase yield parameters, under both irrigated and stressed plants (Takemastu, *et al.*, 1983).

Water stress caused decrease in biological yield and harvest index as compared to non-stress condition. biological yield increased with increase in brassinolide application. In case of harvest index, the results showed significant variations. Thus it can be inferred that the fenugreek varieties differed significantly for water stress tolerance. It is suggested that tolerance of RMt-305 to water stress might be due to better management of physiological processes at cellular level. The effect of these parameters and brassinolide were clearly reflected in yield attributes of fenugreek varieties.

On the basis of the present investigation it may be concluded that cultivar RMt-305 preformed better in comparison to all other genotypes with respect to all the yield parameters. Application of brassinolide significantly increased all parameters and 1.00 ppm was found most effective concentration under control and water stress conditions.

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