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PGR DEPENDENT GROWTH RESPONSES IN *ELEUSINE CORACANA* GAERTN

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Among millets, ragi or finger millets has an unique place and is only millets which has been able to touch an average productivity level of more than a tonn per hectare. The crop has a wide range of seasonal adaptation and is grown in varying soil and temperature conditons. Expriments were conucted for assessing effect of various concentrations of plant growth regulators on net photosynthesis rate and stomatal resistance at different developmental stages, *in vivo*. PGR played an important role in order to maintain the physical environment suitable for plant growth.

Keywords : PGR; Photosynthesis.

The crop can be grown through out the year if moisture is adequate and if temperatures are above 15°C. It has adapted to condition prevailing from sea level to an altitude of 3000m. Though finger millet is a warm season crop, recent developments in breeding have brought out varieties which can tolerate cold. As growing conditions differ from state to state, the choice of appropriate variety for a place depends on the agro climatic situations of the region. As finger millet has a remarkable capacity for recovery, it is considered an excellent dryland crop. The minimum water requirement for successful growing of the crop is 400 mm.

Hot arid zones are regularly faced with problems of draught and famine. Other biotic interactions also exert severe stresses on the resource. Regular problems of drought and famine in hot desertic areas not only affects plant growth and development but also the physiological and biochemical processes by altering enzyme activity.

Plant growth regulators not only regulate growth and developments of plants but also induce tolerance towards heat, draught, salinity and mineral stresses. Finger millet is one of the hardiest among millets, it requires between 40 and 65 cm water when irrigated at an optimum level of moisture depletion of 50-60% available soil moisture at the surface 30 cm depth of soil[1,2]. Water stress has been shown to decrease net photosynthesis in crop plants[3-6]. As water stress inducces stomatal closure, it slows down photosynthesis and leads to dehydration, but in the range of flaccidity only mesophyll resistance factor can decrease photosynthesis rates[7,8].

Seeds were grown in earthen pots for *in vivo* studies. Garden soil with farm yard manure (FYM) in the ratio of 3 : 1 was used as medium for seeds to grow. Seeds in pots were treated with 500 ml of required chemical solution. Different concentrations of PGR's were given to plants. Treatment was repeated after an interval of 5 days. Measurement of net photosynthesis rate, stomatal resistance on intact leaves was carried out using CI-301 CO_2 gas analyser (CI1 Inc. Vancouver Washington State USA). After each treatment analysis were done at intervals of certain days.

Net photosynthetic rates were recorded as per different treatments. Paclobutazol generally has little effect on leaf area basis as far as the photosynthesis rate is concerned[9-13]. The impact may be due to the property of compound, as it reduces the leaf area, ultimately reducing the net photosynthesis per plant basis. Plant treated with Methylester (50 mg/l) responded by increased net photosynthetic rate at early stage Salicylic acid (50 mg/l), Methylester (50 mg/l) and Paclobotrazol (5 mg/l) at pre and Salicylic acid, Butylester and Paclobotrozol at post flowering stage showed increased net photosynthetic rate with respect to their control plants (Table 1).

It was observed that plants treated with Salicylic acid (50 mg/l), Butylester (50 mg/l) and Paclobotrazol at early, Salicylic acid (100 mg/l), Butylester (50 mg/l) and Paclobutrazol (20 mg/l) at pre flowering stage showed increased net photosynthetic rates with respect to their control plants (Table 2).

Transpiration rates and stomatal resistance showed definite trends of increase/decrease with rates of net photosynthesis. Inhibitory rates of net photosynthesis were coupled with high stomatal resistance with low transpiration rates and *vice-versa.* These variable rates of net photosynthesis and stomatal resistance showed that

Table 1. Effect of PGR's on net photosynthetic rate and stomatal resistance after 5th day of I and II treatment in *E. coracana* growth *in vivo.*

Treatmetns (mg/l)	Net photosynthetic rate (μmol/m²/s)			Stomal resistance (m²/s/mol)		
	Early	Pre	Post	Early	Pre	Post
Control	7.9	8.2	10.2	11.0	49.5	40.4
Salicylic acid						
50	7.1	10.2	12.2	42.5	40.6	38.2
100	8.1	9.4	13.4	45.0	42.2	40.2
Butyl ester						
50	8.4	11.1	14.0	40.0	22.2	20.1
100	8.5	11.1	11.8	42.1	38.2	40.1
Methyl ester						
50	8.2	11.0	14.2	30.1	20.1	18.2
100	6.3	8.1	12.3	62.2	25.1	28.1
Paclobutrazol						
5	6.2	11.5	15.3	32.2	25.1	18.1
20	5.4	8.1	12.2	71.1	25.2	16.1

Table 2. Effect of PGR's on net photosynthetic rate and stomatal resistance after 8th day of I and II treatment in *E. coracana* growth *in vivo.*

Treatmetns (mg/l)	Net photosynthetic rate (μmol/m²/s)			Stomal resistance (m²/s/mol)		
	Early	Pre	Post	Early	Pre	Post
Control	11.2	16.1	31.6	40.3	13.1	12.0
Salicylic acid						
50	12.5	13.4	21.9	79.3	70.0	20.6
100	16.0	16.8	21.2	19.5	60.1	30.4
Butyl ester						
50	16.1	17.9	32.3	78.8	25.4	14.3
100	12.1	14.2	32.0	43.2	12.4	12.1
Methyl ester						
50	10.1	11.9	32.5	116.1	31.5	17.2
100	11.9	16.2	33.3	45.5	25.3	25.2
Paclobutrazol						
5	11.2	12.1	34.0	38.9	27.3	22.4
20	14.1	18.9	35.3	25.9	27.0	21.3

PGR plays and important role in promoting plant growth in order to maintain physical and physiological activities.

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