J. Phytol. Res. 8 (1):89-92, 1995

EFFECT OF NATURALLY OCCURING PLANT GROWTH FACTORS ON GROWTH AND YIELD OF RICE

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Root dipping of rice cultivar *IR*-36 in growth factors (gibberellins and auxins) extracted from *Lantana camara* L., a common weed resulted in improved growth, tillering of rice plants, significantly incresed grain yield and flowering date advanced by 14 days.

Keywords: Growth factors; *Lantana camara*; Rice growth; Yield.

Introduction

Dipping roots of many perennials and annuals in plant growth factors such as auxins and gibberellins have been found to either enhance root formation or inhibit growth[1-3] . In an earlier study the authors had recorded a significant and stimulatory effect of growth factors extracted from the weed on callus formation, rhizogenesis and regeneration of rice plantlets[4] . The present investigation reports the effect of extracted naturally occurring gibberellins and auxins from the leaves of common weed, *Lantana camara* on the growth and productivity of rice.

Materials and Methods

Seeds of the rice cultivar **IR**-36 were surface sterilized with 0.1% $HgCl_2$ for 2-3 minutes,washed in several changes of sterile distilled water and germinated in moist chambers. Eight day old seedlings with small uniform root length were dipped for 48 hours in Gibberellins (Natural, 10^{-4} M) — G (N); GA (synthetic, 10^{-4} M) — GA (S); Auxins (natural, 10^{-4} M) — A (N); NAA (synthetic, 10^{-4} M) — NAA (S); Gibberellins + auxins (natural, 1:1) — G + A (N); GA + NAA (synthetic, 1:1) — GA + NAA (S) and Control (sterile water).

The seedlings were then transplanted in pots (12" diameter) @ 3 seedlings/pot. Three replications were maintained for each treatment. NPK @ N_{90} P_{30} K_{30} was applied to all treatments as basal dose 15 days after transplantation and the other half at the time of active tillering. Number of tillers, number of leaves (at maximum tillering stage), plant height, panicle initiation, number of grains and 1000 grain-wt. per plant, dry wt. of plant and moisture content per plant were recorded.

Results and Discussion

In 40 day old seedlings healthy and tall plants were observed in thetreatment with G(N). In the treatment with GA(S) and the mixture of GA and NAA(S), the plants

were tall and lanky resembling the Bakanae symptoms whereas in the control the plants were much shorter in height. The plants were of variable heights in other treatments. At the maximum tillering stage the number of tillers per plant was highest in G(N) followed by A(N) and NAA(S) treatments whereas highest number of leaves were found in G(N), NAA(S) followed by A(N) treatment (Fig. 1).

The flowering data was significantly advanced in the G(N) treated plants by 14 days as compared with the control. However, this effect was not very significant in other treatments (Fig. 2 & 3).

A perusal of the data in table 1 indicates that the best yield was obtained 24.6 gm per pot) in G(N) treated plants, followed by G(N) + A(N) mixture (21 gm). Significant yield was also obtained in A(N) (13.8 gm) and NAA(S) (12.6 gm) treatments. Average dry weight of rice plant was found to be highest in G(N) (3.7 gm) treated plants (Table 1). Poorest growth and yield was observed in the control.

Moisture percentage was found to be highest in G(N) treated plants followed by NAA(S) and AU(N). In treatment with GA(S) and GA + NAA(S), where the plant growth was lanky, the moisture content and the dry wt. of the plants were significantly lesser than in treatments where plant growth was normal (Table 1).

The present finding therefore clearly indicate that crude extraction of growth factors of *Lantana camara* in addition to other factors have a role to play in the luxuriant growth of the weed. The significant advancing of the flowering date along with increased yield indicates that

Table 1. Effect of growth factors of *L. camara* on rice yield, dry wt. and moisture content.

Observation number	Treatments	1000 grain-wt per plant (gm)	Avg. yield per pot (gm)	% moisture	Avg. fresh wt. per plant (gm)	Av. dry wt. per plant (gm)
1.	G(N)	20.812	24.6	68.376	11.7	3.7
2.	GA (S)	15.476	7.8	83.125	3.2	1.5
3.	A(N)	17.692	13.8	65.853	8.2	2.8
4.	NAA(S)	16.8	12.6	67.777	9	2.9
5.	G+A(N)	19.125	21	63.414	4.1	1.5
6.	GA+NAA(S)	15.841	9.6	57.5	4	1.7
7.	Control	15.151	6	46.153	1.3	0.7
S.E.±		0.788	2.6	3.166	0.391	1.412
C.D. at 5%		1.528	5.044	6.142	0.759	2.74

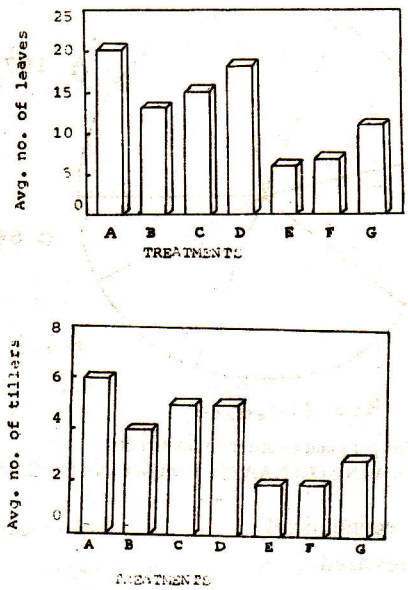

Fig. 1. Number of tillers and leaves at maximum tillering stage as affected by different treatments.

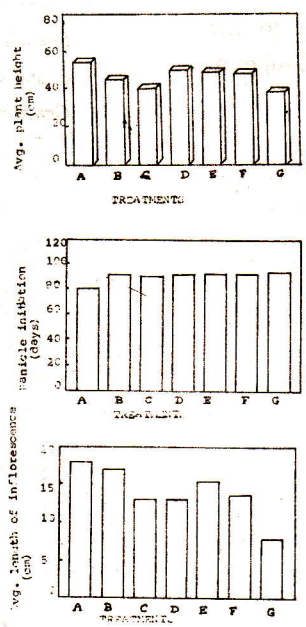

Fig. 2. Panicle initiation, length of inflorescence and plant height in different treatments.

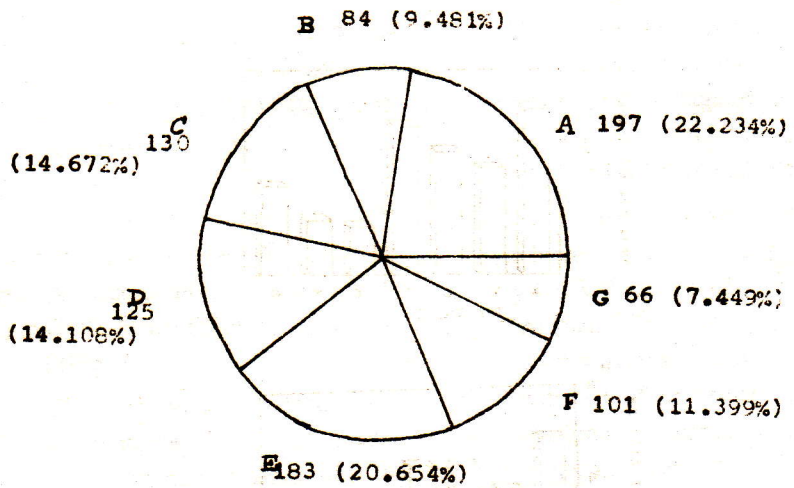

Fig. 3. Average no. of grains per plant in different treatments
A = G (N); B = GA (S); C = A (N); D = NAA (S); E = G+A (N); F = GA+NAA (S); G = Control.

such applications could be economically profitable to the farmer and this needs to be further probed.

Acknowledgement

The senior author is grateful to the University of Kalyani for financial support.

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