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EFFECT OF GA_3 ON GROWTH AND FLOWERING OF *AGERATUM CONYZOIDES*

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Many pharmaceutical companies in the world using *Ageratum conyzoides* as a raw material for phytochemicals. The demand is increasing year by year and this situation warrants further scientific research to develop both agricultural and medical usage. GA_3 has been found to show marked variation in response to growth and development depending mainly on the time of application and stage of growth in *Ageratum conyzoides*. Different concentration of GA_3 like10, 50 and 100 ppm are taken to study the effect on growth and flowering of *Ageratum conyzoides*. The application of 100 ppm of GA_3 shows increase in plant height. The effect of 50 ppm GA_3 shows increase in plant height with early and better flowering capacity.

Keywords : *Ageratum conyzoides;* GA_3; Growth & flowering; Phytochemicals.

Introduction

Ageratum conyzoides L., Asteraceae is an annual herb with a long history of traditional medicinal uses in several countries of the world and also has insecticidal and nematecidal bioactivity. This tropical species appears to be a valuable agricultural resources.

Ageratum conyzoides' center of origin is in central America and the Caribbean but now is found in several countries in tropical and sub tropical regions, including India as a weed[1,2].

A. conyzoides is an erect, annual herb 30-80 cm tall; stems are covered with fine white hairs, leaves are opposite, pubescent with long petioles and include glandular trichomes. The inflorescence contain 30 to 50 violet flowers arranged as a corymb and are selfincompatible[3]. The fruit, an achene with an aristae pappus, is easily dispersed by wind. In some countries the species is considered as a weed, and control is often difficult[4]. Seeds are positively phatoblastic, and viability is often lost within 12 months[5]. The optimum germination temperature ranges from 20 to 25°C[6]. The species has great morphological variation, and appears highly adaptable to different ecological conditions.

There is high variability in the secondary metabolites of *A. conyzoides* which include flavonoids, alkaloids, cumarins, essential oils, and tannins. Many of these are biologically active.

A. conyzoides is widely used as traditional medicine world wide, although application vary by region. In central Africa it is used to treat penumonia, but the most common use is to cure wounds and burns[7]. Traditional communities in India use this species as a bacteriocide, antidysenteric, and antibiotic[8].

A. conyzoides has bioactive activity that may have agricultural use, as shown by several research investigation in different countries. The insecticide activity may be the most important biological activity of this species.

Magalhaes *et al.*[9] evaluated fertilizers and plant density on biomass production of *A. conyzoides* in Brazil. The higher the N level, the higher the biomass production (dry weight basis).

There are some pharmaceutical companies in Brazil using *A. conyzoides* as a raw material for phytochemcicals. The demand is increasing year by year and this situation warrants further scientific research to develop both agricultural and medical usage. Positive preliminary clinical assays of *A. conyzoides* clearly demonstrate that this species may be an important economic resource in several tropical countries. The use of this species as a natural biocide or agent for pest management requires further investigation.

Growth substances and various other chemicals have been found to regulate growth and flowering in *A. conyzoides*. These factors have been found to show marked variation in response to growth and development depending mainly on the time of application and stage of growth[10]. Present investigation is undertaken with the object of studying the influence of growth regulator like GA_3 at different concentrations on growth and flowering of *A. conyzoides* under local conditions.

Material and Method

The *Ageratum conyzoides* was used for all the experiments. Seeds were collected from the Rajasthan University Campus, Jaipur and sown in month of December with lines

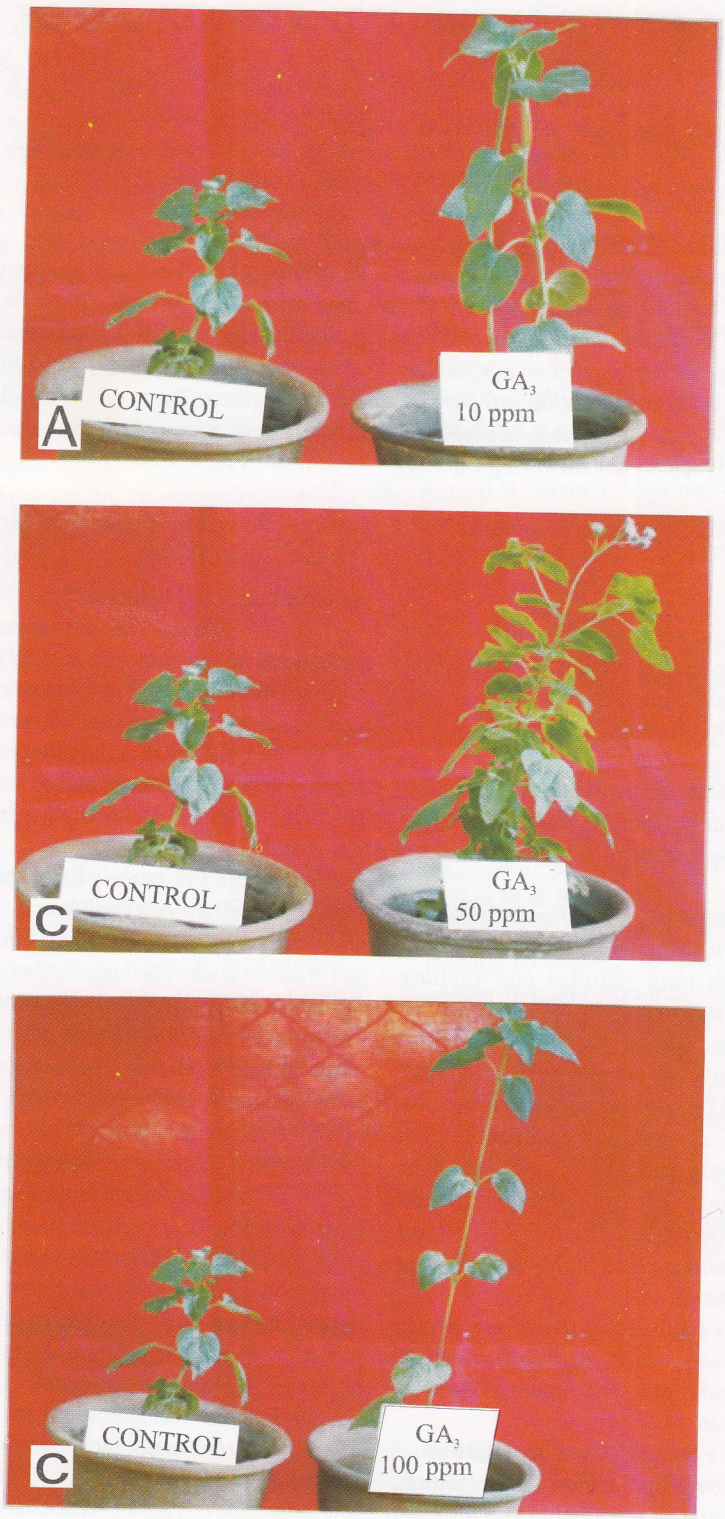

Fig.1 (A-C). Effect of GA, on growth & flowering of *Ageratum conyzoides.*
(A) Effect of GA, (10 ppm) on plant height & flowering.
(B) Effect of GA, (50 ppm) on plant height & flowering.
(C) Effect of GA, (100 ppm) on plant height & flowering.

in well prepared nursery beds. The seed beds of 0.5m x 1.5m. were prepared and suitable amount of Farmyard manure (FYM) was also added. The seed beds were irrigated once every day in the morning till the seeds germinated and on every third day after germination of seeds. Healthy and uniform sized seedlings around three weeks old were selected, removed carefully and transplanted in 30 cm size pots. All experiments were conducted in the Department of Botany, University of Rajasthan.

The main growth regulator employed was GA_3. Three concentrations of GA_3 i.e. 10,50 and 100 ppm were used with distilled water.

The experiment was laid out in a "Complete randomized design" with five replications. Two foilar sprays of each concentration of GA_3 was made on fifteen days and one month after transplantation of the seedlings. The spraying consisted a complete drenching of individual plant approximately 10 and 20 ml solution with the help of a sprayer. Tween 20 was added as wetting agent. Control plants were sprayed with distilled water plus tween 20. The spray treatment was done in the evening.

Results and Discussion

1. Plant height : Application of growth regulator GA_3 resulted in significant variation in plant height in comparison to control (Table 1, Fig. 1). The maximum plant height (80.36 cm) was recorded in GA_3 100 ppm treatment whereas minimum plant height was (68.3 cm) observed in 10 ppm concentration of GA_3 (Fig. 1). Among GA_3 concentration , 100 ppm gave significantly higher growth than 10 and 50 ppm. The difference in response between 10 and 50 ppm are also significant. Thus the increased concentrations of GA_3 showed increase in the plant height.

2. Time required for flowering : In the case of *A. conyzoides,* the application of growth regulator GA_3 shows significant variation in the time required for flowering in comparison to control (Table2). Generally, GA_3 reduced the time required for flowering. The minimum time required for flowering was recorded in 50 ppm GA_3 treatment (9.3 average days, Table

Table 1. Effect of GA_3 on plant height at different concentrations.

Treatment	Plant Height (cm)							
	Control	Pot-1	Pot-2	Pot-3	Pot-4	Pot-5	Mean	S.EM.±
10 ppm	40	68.5	68.2	68.4	68.4	68.2	68.340	0.060
50 ppm	40	73.4	73.9	74.5	74.2	74.5	74.100	0.207
100 ppm	40	80.2	80.2	80.5	80.4	80.5	80.360	0.068

F- ratio = 24816.02
F-Value = 3.24
CD at 5% = 0.33
"F" test = Significant

Table 2. Effect of GA_3 on time required for flowering at different concentrations.

Treatment	Flowering (Days)							
	Control	Pot-1	Pot-2	Pot-3	Pot-4	Pot-5	Mean	S.EM.±
10 ppm	12.00	11.00	11.5	11.5	11.00	11.5	11.300	0.122
50 ppm	12.00	9.00	9.5	9.5	9.2	9.85	9.340	0.103
100 ppm	12.00	13.5	13.5	14.00	14.00	14.5	13.900	0.187

F- ratio = 234.16
F-Value = 3.24
CD at 5% = 0.36
"F" test = Significant

2; Fig. 1), whereas maximum time required (13.9 average days, Table 2; Fig. 1) for flowering was observed in 100 ppm treatment. Overall best result has been recorded with 50 ppm treatment of GA_3 in which plant height increases with minimum time requirement in days for flowering in comparison to the control. In the case of 100 ppm treatment plant height was maximum but the time required for flowering was more.

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