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Effect of thiourea and salicylic acid on growth, flowering and yeild of gladiolus

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Abstract

An experiment entitled “Effect of thiourea and salicylic acid on growth, flowering and yield of gladiolus” was carried out at Floriculture Unit, Horticulture section, College of Agriculture, Nagpur (M.S.) from October, 2017 to April, 2018 with nine treatment combinations in Randomised Block Design. The treatments comprised of different concentration of thiourea and salicylic acid viz., T₁ – Thiourea 1%, T₂ – Thiourea 2%, T₃ – Salicylic acid 100 ppm, T₄ – Salicylic acid 150 ppm, T₅ – Thiourea 1% + Salicylic acid 100 ppm, T₆ – Thiourea 2% + Salicylic acid 100 ppm, T₇ – Thiourea 1% + Salicylic acid 150 ppm, T₈ – Thiourea 2% + Salicylic acid 150 ppm and T₉ – Control. The results revealed that, significantly minimum days for sprouting of corms, maximum sprouting percentage of corms, plant height, leaf area, flowering span, spikes plant⁻¹, length of spike and florets spike⁻¹ were registered with the plants treated with Thiourea 1% + Salicylic acid 150 ppm which was closely followed by Salicylic acid 150 ppm and 50 per cent flowering was recorded earliest with the treatment of Salicylic acid 150 ppm.

Keywords: gladiolus, thiourea, salicylic acid, growth, yield

Introduction

Gladiolus (*Gladiolus grandiflorus* L.) is said to be the “queen of bulbous flowers” which has gained popularity in many parts of the world owing to its unsurpassed beauty. Its magnificent long lasting spike with variety of colour and form has made it attractive for use of herbaceous borders, rockeries, pots as well as cut flowers. However, the quality and production per unit area, particularly in vidarbha region, are still below the international standards.

Demand of gladiolus cut flower is increasing day by day, but its commercial production is still at the initial stage in this country due to lack of scientific information regarding its cultivation technology such as size of planting material, depth of planting, planting time, fertilizer management, use of different growth regulators and chemicals like thiourea, salicylic acid etc. which enhance the production and quality of gladiolus spikes as well as corms and cormels. Various research workers have reported that, the proper application of chemicals like thiourea and salicylic acid helps to increase the yield of good quality spikes and corms in gladiolus. Hence, the present investigation was carried out to find suitable concentration of thiourea and salicylic acid to obtain maximum growth, yield and quality of gladiolus cv. ‘American Beauty’.

Materials and Methods

The investigation was carried out at Floriculture Unit, Horticulture section, College of Agriculture, Nagpur from October, 2016 to April, 2018 under open field conditions with nine treatments in Randomised Block Design and three replications. The treatments comprised of different concentrations of thiourea and salicylic acid viz., T₁ – Thiourea 1%, T₂ – Thiourea 2%, T₃ – Salicylic acid 100 ppm, T₄ – Salicylic acid 150 ppm, T₅ – Thiourea 1% + Salicylic acid 100 ppm, T₆ – Thiourea 2% + Salicylic acid 100 ppm, T₇ – Thiourea 1% + Salicylic acid 150 ppm, T₈ – Thiourea 2% + Salicylic acid 150 ppm and T₉ – Control.

At the time of land preparation, well-rotten FYM @ 20 t ha⁻¹ was mixed uniformly in the soil before last harrowing. The gladiolus corms of the variety “American Beauty” were obtained from Horticulture section, College of Agriculture, Nagpur (M.S). The rested, cold stored, healthy and uniform sized gladiolus corms were given presoaking treatment with different chemicals as per the treatment of 24 hours. Then after giving treatment of fungicide for 15 minutes, corms were planted on raised beds at 5 cm depth.

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30 days after planting foliar spray of thiourea and salicylic acid was given as per the treatments. All the cultural operations viz., weeding, staking, earthing up, pest control etc. were carried out as and when required. Thiourea and salicylic acid was given as per the treatments. All the cultural operations viz., weeding, staking, earthing up, pest control etc. were carried out as and when required. Irrigation was applied through drip irrigation system. Various observations on vegetative and floral traits were recorded at proper stage. The parameters on yield and quality of corms and cormels were studied soon after lifting of corms. Data was analysed statistically by the method suggested by Panse and Sukhatme (1967) [4].

Results and Discussion

Growth

The data presented in Table 1 revealed that, different treatments of thiourea and salicylic acid had significant effect on days for sprouting of corms, sprouting percentage of corms, plant height and leaf area in gladiolus. Minimum days for sprouting of corms and maximum sprouting percentage of corms was recorded with the plants treated with the treatment T₇ i.e. Thiourea 1% + Salicylic acid 150 ppm days (4.38 days and 97.78%, respectively) which was at par with the treatment T₄ i.e. Salicylic acid 150 ppm (4.77 days), T₁ i.e. Thiourea 1% (5.07 days), T₈ i.e. Thiourea 2% + Salicylic acid 150 ppm (5.34 days), T₆ i.e. Thiourea 2% + Salicylic acid 100 ppm (5.71 days) in days for sprouting of corms and T₁ i.e. Thiourea 1% was at par in sprouting of corms (96.46), however, the control treatment recorded maximum days for sprouting of corms (7.74 days) and minimum sprouting percentage of corms (89.43 %). Thiourea and Salicylic acid reduce ABA level, the prime factor imposing dormancy of corms and increase in alternate respiration. Padmalatha *et al.* (2013) also registered the similar findings in gladiolus. The maximum plant height and leaf area in gladiolus were noted with the treatment T₇ i.e. Thiourea 1% + Salicylic acid 150 ppm (53.15 cm and 70.25 cm² respectively) by T₄ i.e. Salicylic acid 150 ppm (52.94 cm and 68.53 cm² respectively) and minimum plant height and leaf area in gladiolus were noted in the treatment T₉ i.e. control (48.98 cm and 57.16 cm² respectively). Plant height and leaf area increased due to cell division and leaf development which increased photosynthetic rate. Ravat and Makhani 2015 [5] also noted similar findings in okra.

Flowering

There was significant effect of thiourea and salicylic acid on days for 50 percent flowering and flowering span.

Significantly earliest 50 percent flowering (86.52 days) was noticed with the treatment T₄ i.e. Salicylic acid 150 ppm and it was found to be at par with the treatments T₇ i.e. Thiourea 1% + Salicylic acid 150 ppm (87.59) and T₈ i.e. Thiourea 2% + Salicylic acid 150 ppm (87.66 days), whereas, the treatment T₂ i.e. Thiourea 2% recorded maximum days for 50 percent flowering (92.38 days) in gladiolus. This might be due to stimulation of alternate respiration and increased vigor of plants. These results are in concurrence with the findings of Padmalatha *et al.* (2014^a). Flowering span was noted significantly maximum with T₇ i.e. Thiourea 1% + Salicylic acid 150 ppm (30.66 days) which was found at par with T₄ i.e. Salicylic acid 150 ppm (30.35 days) and minimum in control treatment (28.84 days) this might be due to increased rate of photosynthesis and enhanced vegetative growth of plants. Similar results were also reported by Singh *et al.* (2016) in gladiolus.

Yield

The effect of Thiourea and Salicylic acid on spike plant⁻¹ was statistically significant (Table 1)). The treatment T₇ i.e. Thiourea 1% + Salicylic acid 150 ppm recorded significantly maximum spikes plant⁻¹ (2.23) which was at par with T₄ i.e. Salicylic acid (2.05), whereas, minimum spikes plant⁻¹ were noted in treatment T₉ i.e. (1.54). This might be due to increase in vigour of gladiolus plants due to application of salicylic acid and thiourea which might had increased length of cell which caused an increase in number of spikes per plant. The results are conformity with the findings of Maniram *et al.* (2012) [6] and Padmalatha *et al.* (2013) [11].

Flower Quality

The effect of Thiourea and Salicylic acid on length of spike and florets spike⁻¹ in gladiolus was found to be significant. Gladiolus plants treated with the treatment T₇ i.e. Thiourea 1% + Salicylic acid 150 ppm recorded significantly maximum length of spike (84.82 cm) and florets spike⁻¹ (11.08) which were statistically at par with the treatment T₄ i.e. Salicylic acid (83.91 cm and 11.02, respectively), whereas, the treatment T₉ (control) noted minimum length of spike (73.78 cm) and florets spike⁻¹ (8.76). This might be due to the fact that, exogenous application of salicylic acid and thiourea, which stimulated the effect of naturally occurring hormones that accelerated and modified the growth and development of plants which might have increased length of spike and thereby number of florets spike⁻¹. The results are supported by Chahal *et al.* (2013) [7] and Padmalatha *et al.* (2014^b) [12] in gladiolus.

Table 1: Effect of thiourea and salicylic acid on growth, flowering, yield and quality of gladiolus.

Treatments	Days for sprouting of corms (days)	Sprouting percentage of corms (%)	Plant height (cm)	Leaf area (cm ²)	Days for 50% flowering	Flowering span	Spikes plant ⁻¹	Length of spike	Florets spike ⁻¹
T1 - Thiourea 1%	5.07	96.46	51.41	62.29	89.34	26.72	1.88	81.06	10.87
T2 - Thiourea 2%	7.46	95.77	49.68	60.75	92.38	26.21	1.66	77.32	9.71
T3 - SA 100 ppm	6.36	91.82	50.41	63.45	91.11	28.33	1.94	81.03	10.73
T4 - SA 150 ppm	4.77	92.38	52.94	68.53	86.52	30.35	2.05	83.91	11.02
T5 - Thiourea 1%+ SA 100 ppm	6.38	94.35	51.48	63.47	90.61	28.19	1.97	75.38	10.58
T6- Thiourea 2%+ SA 100 ppm	5.71	93.79	50.08	61.55	91.26	27.11	1.96	79.66	9.74
T7- Thiourea 1%+ SA 150 ppm	4.38	97.78	53.15	70.25	87.59	30.66	2.23	84.82	11.08
T8- Thiourea 2%+ SA 150 ppm	5.34	94.42	52.54	65.55	87.66	29.09	2.02	82.21	10.74
T9 - Control	7.74	89.43	48.98	57.16	91.49	23.84	1.54	73.78	8.76
SE (m) ±	0.45	0.45	0.14	0.59	0.82	0.33	0.06	0.82	0.34
CD at 5%	1.35	1.35	0.42	1.77	2.46	1.00	0.19	2.46	1.02

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