The Pharma Innovation Journal 2022; SP-11(8): 971-979

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(8): 971-979

www.thepharmajournal.com
Received: 14-06-2022
Accepted: 19-07-2022

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Effect of growth retardants on dwarfing of syngonium for ornamental gardening

Anusha Velangini B, T Padmalatha, T Suseela and DR Salomi Suneetha

Abstract
The present investigation entitled "Effect of growth retardants on dwarfing of syngonium for ornamental gardening" was carried out during December 2021 to May 2022 at college of Horticulture, Dr. Y.S.R Horticultural University, Venkataramannagudem, West Godavari with two replications in Completely Randomized Design. In the experiment, there were thirteen treatments consisting of three growth retardants viz., PBZ B-Nine and cycocel each at four concentrations and a control (water spray). The treatments were imposed as foliar sprays at 30 and 60 DAT. Plant height (28.58 cm) and growth index (24.30) were reduced to the maximum extent by T_4 (paclobutrazol @ 200 ppm) followed by T_3 (paclobutrazol @ 150 ppm) at 150 DAT. Least percent increase of plant height (9.39%), plant spread (40.69 cm), leaf length (13.96 cm), leaf width (8.09 cm), leaf area (110.56 cm^2), petiole length (12.06 cm), fresh weight of shoot (64.36 g) and dry weight of shoot (22.03 g) were observed in T_4 (paclobutrazol @ 200 ppm) which was found to be at par with T_3 (paclobutrazol @ 150 ppm) (32.10 cm). In contrast, maximum petiole girth (3.87 cm) and SPAD chlorophyll value (57.97 SPAD) was recorded in T_4 (paclobutrazol @ 200 ppm). From the above results obtained it could be concluded that, among the 13 treatment combinations, foliar sprays of paclobutrazol @ 150 ppm was found very effective in reducing vegetative growth parameters of syngonium.

Keywords: Syngonium, growth characters, growth retardants, dwarfing, ornamental gardening

Introduction

Landscape gardening has become an important component to beautify the surroundings and also to improve mental and physical health of people. Due to rapid urbanization and concretization, more and more people started living in multi storied buildings or apartments, with little or no open space available for gardening. This has paved a way for interiorscaping with indoor plants having attractive foliage and variability for a touch of green. Ornamental plants are placed indoors to beautify inside and outside residential houses, bungalows (corridors, balconies, large size window boxes, verandahs, rooms and terraces), showrooms, hotels, restaurants, public institutional buildings, offices etc. Among the wide range of foliage plants, *Syngonium podophyllum* is one such plant which is commonly called as arrowhead vine. Although rapid vigorous growth of foliage plants is encouraged to attain a saleable size, once this size is attained, further growth may decrease the attractive appearance of the plant causing a reduction in sale value. In case of syngonium, it is hard for it to be used as table tops, terrariums and in vertical gardening due to its vigorous growth, long petioles and climbing nature. In addition, due to its vigorous growth they sometimes become disproportionate to the pots grown in. This often makes the plants appear unattractive which requires regular pruning and trimming to maintain its shape.

A method of reducing growth at a specific time without causing discoloration or disfiguration of the plant would be beneficial for the foliage grower as well as the home owner or indoor landscape supervisor (Poole, 1970) [11]. In this context, plant growth retardants are useful in controlling growth, manipulating shape and size making them more compact by reducing petiole length for use as attractive indoor plants (Anderson and Andersen, 2000) [1]. Controlling plant height in foliage plants by growth retardants will make them sturdy and attractive. Use of growth retardants in production of tropical ornamental foliage plants is not a routine practice and little attention has been given on growth retardants to regulate growth and improve appearance of foliage plants. Keeping these points in view, an investigation was carried out at College of Horticulture, Dr. Y. S. R. Horticultural University, Venkataramannagudem, West Godavari District to study the effect of plant growth retardants on dwarfing of syngonium during December 2021 to May 2022.

Material and Methods

Polybags of size 12”x12” (30 cm x 30 cm) size were filled with soil, sand and Farm Yard Manure in 2:1:1 proportion and one month old plants of syngonium were transplanted leaving a gap of 2 cm from the top. Immediately after planting the plants were watered with rose can and were kept under partial shade. The experiment was laid out in Completely Randomized design and replicated twice. Total thirteen treatments T_1 (PBZ @ 50 ppm), T_2 (PBZ @ 100 ppm), T_3 (PBZ @ 150 ppm), T_4 (PBZ @ 200 ppm), T_5 (B-nine @ 1000 ppm), T_6 (B-nine @ 1500 ppm), T_7 (B-nine @ 2000 ppm), T_8 (B-nine @ 2500 ppm), T_9 (CCC @ 1000 ppm), T_{10} (CCC @ 1500 ppm), T_{11} (CCC @ 1500 ppm) and T_{12} (CCC @ 2000 ppm) and T_{13} control (water spray) were imposed as foliar sprays at 30 and 60 days after transplanting at the rate of 50 ml of spray solution per plant. Observations for plant height and spread, percent increase of plant height (Final Height - Initial height/Initial height x 100), leaf area, leaf length and breadth, number of leaves, petiole length and girth, and chlorophyll content of the leaves (SPAD) were recorded at 30, 60, 90, 120 and 150 days after transplanting. Data regarding fresh and dry weight of shoot and growth index (plant height+ plant spread/2) was recorded at the end of the experiment (150 DAT).

Results and Discussion

Plant height (cm)

The data regarding plant height recorded at 30, 60, 90, 120 and 150 days after transplanting (DAT) under the influence of different treatments with plant growth retardants is presented in Table 1. At 30 DAT, non-significant differences were observed among growth retardant treatments means. However, the treatments varied significantly on plant height of syngonium when observed at 60, 90,120 and 150 days after transplanting. At 60 DAT (30 days after application of growth retardants), the lowest plant height (22.35 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) followed by B-nine @ 2500 ppm (T_8) (23.72 cm) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (24.62 cm). Highest plant height (30.19 cm) was recorded in control plants (water spray) followed by B-nine @ 1000 ppm (T_5) (28.67 cm) and B-nine @ 1500 ppm (T_6) (26.81 cm). At 90 DAT, minimum plant height (24.10 cm) was recorded with paclobutrazol @ 200 ppm (T_4) followed by paclobutrazol @ 150 ppm (T_3) (26.95 cm). Highest plant height (39.95 cm) was recorded in control (T_{13}) plants followed by in B-nine @ 1000 ppm (T_5) (33.50 cm). At 120 DAT, T_4 (paclobutrazol @ 200 ppm) produced shortest plants (26.12 cm) followed by T_3 (paclobutrazol @ 150 ppm) (29.85 cm) and T_{12} (30.75 cm) (cycocel @ 2500 ppm). Control treatment produced plants with maximum height (49.81 cm) followed by T_5 (B-nine @ 1000 ppm) (38.94 cm) and T_9 (cycocel @ 1000 ppm) (37.59 cm). At 150 DAT (three months after second application of growth retardants), lowest plant height (28.58 cm) was registered with the treatment T_4 (paclobutrazol @ 200 ppm) followed by T_3 (paclobutrazol @ 150 ppm) (32.10 cm) and T_2 (paclobutrazol @ 100 ppm) (34.66 cm). Highest plant height (59.92 cm) was recorded in T_{13} (control) followed by T_5 (B-nine @ 1000 ppm) (45.25 cm) and T_6 (B-nine @ 1500 ppm) (43.61 cm).

From the above results, it was clear that after application of growth retardants plant height was decreased in comparison to control plants. Among the three growth retardants, paclobutrazol treatments were found more effective in retarding plant height of syngonium. According to Wang and Blessington (1990) [13] paclobutrazol results in shorter plants by retarding stem and petiole elongation and has a great significance in limiting the shoot growth and reducing plant height. The remarkable inhibition of plant height may be attributed to the effect of this growth retardant on gibberellin biosynthesis as anti-gibberellin, i.e., it prevents the conversion of kaurene to kaurenoic acid which leads to the formation of gibberellin (Rademacher *et al.*, 1991, Zeevaart *et al.*, 1993 and Bekketa *et al.*, 2003) [12, 15]. These results are in line with Hagiladi and Watad (1992) [6] who stated that in *Cordyline terminalis* ‘Prince Albert’ foliar spray of paclobutrazol effectively reduced plant height by increasing concentrations (8, 40 and 200 ppm).

Table 1: Effect of plant growth retardants on plant height (cm) in syngonium

Plant height (cm)					
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	20.71	26.04	30.48	34.35	36.41
T_2 - PBZ @ 100 ppm	20.99	25.20	29.13	32.83	34.66
T_3 - PBZ @ 150 ppm	21.42	24.63	26.95	29.85	32.10
T_4 - PBZ @ 200 ppm	20.12	22.35	24.10	26.12	28.58
T_5 - B-nine @ 1000 ppm	21.74	28.67	33.50	38.94	45.25
T_6 - B-nine @ 1500 ppm	21.28	26.81	30.95	35.83	43.61
T_7 - B-nine @ 2000 ppm	20.94	25.65	29.54	33.65	39.38
T_8 - B-nine @ 2500 ppm	20.55	23.72	27.10	32.25	37.00
T_9 - Cycocel @ 1000 ppm	20.55	26.25	32.81	37.59	40.93
T_{10} - Cycocel @ 1500 ppm	21.35	26.15	31.17	35.45	40.75
T_{11} - Cycocel @ 2000 ppm	20.43	24.73	28.60	32.37	38.23
T_{12} - Cycocel @ 2500 ppm	21.33	24.88	28.55	30.75	36.85
T_{13} - Control (Water spray)	20.98	30.19	39.95	49.81	59.92
CD at 5%	N/A	0.98	1.26	1.32	1.42
S Em (±)	0.30	0.32	0.41	0.43	0.46

Plant spread (cm)

At 30 DAT, non-significant differences were observed among growth retardant treatment means (Table 3). However, the treatments varied significantly on plant spread of syngonium when observed at 60, 90,120 and 150 days after transplanting. At 60, the least plant spread (27.00 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (28.125 cm). Highest plant spread (34.19 cm) was recorded in control plants (water spray) followed by cycocel @ 1000 ppm (T_9) (31.31 cm) which was at par with B-nine @ 1000 ppm (T_5) (30.81 cm). At 90 DAT, minimum plant spread (30.68 cm) was recorded in paclobutrazol @ 200 ppm (T_4) which was at par with paclobutrazol @ 150 ppm (T_3) (32.06 cm). Maximum plant spread (37.68 cm) was recorded in control (T_{13}) plants and was at par with Cycocel @ 1000 ppm (T_9) (36.82 cm). At 120 DAT, T_4 (paclobutrazol @ 200 ppm) produced the plants with lowest plant spread (33.18 cm) which was at par with (T_3) paclobutrazol @ 150 ppm (34.56 cm) and (T_2) paclobutrazol @ 100 ppm (35.94 cm). Control treatment produced plants with highest plant height spread (42.69 cm) which was found to be at par with T_5 (B-nine @ 1000 ppm) (41.00 cm) and (T_6) B-nine @ 1500 ppm (40.56 cm). At 150 DAT, minimum plant spread (40.69 cm) was registered with the paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (41.72 cm) and paclobutrazol @ 100 ppm (T_2) (41.75 cm). Maximum plant spread (45.70 cm) was recorded in T_{13} (control) which was found to be at par with B-nine @ 1000 ppm) (T_5) (44.30 cm) and B-nine @ 1500 ppm (T_6) (44.23 cm). Reduced petiole length due to application of growth retardants was reported by Wang and Blessington (1990) [13] in *Syngonium podophyllum.* Henny (1990) and Hagildi and Watad (1992) [7, 8] found that spray application of paclobutrazol effectively controlled growth of *Codiaeum variegatum* and *Ficus benjamina* and *Cordyline terminalis* respectively.

Table 2: Effect of plant growth retardants on percent increase in plant height in syngonium

Percent increase in plant height (%)				
Treatments	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	25.72	17.04	12.71	14.13
T_2 - PBZ @ 100 ppm	20.07	15.57	12.71	12.27
T_3 - PBZ @ 150 ppm	15.02	9.46	10.76	11.28
T_4 - PBZ @ 200 ppm	11.16	7.83	8.37	9.39
T_5 - B-nine @ 1000 ppm	31.91	16.85	16.25	16.21
T_6 - B-nine @ 1500 ppm	26.05	15.44	14.59	16.02
T_7 - B-nine @ 2000 ppm	22.51	15.15	13.92	14.30
T_8 - B-nine @ 2500 ppm	15.44	14.24	13.45	13.61
T_9 - Cycocel @ 1000 ppm	27.73	25.05	15.77	14.97
T_{10} - Cycocel @ 1500 ppm	22.49	19.22	13.73	14.25
T_{11} - Cycocel @ 2000 ppm	21.09	15.63	13.22	12.90
T_{12} - Cycocel @ 2500 ppm	16.64	14.77	12.96	12.73
T_{13} - Control (Water spray)	43.92	32.37	24.72	20.30
CD at 5%	5.09	5.30	4.68	2.63
S Em ($\pm$)	1.65	1.72	1.52	0.85

Percent increase in plant height

The treatments varied significantly on plant height of syngonium when observed at 60, 90,120 and 150 days after transplanting (Table 3). At 60 DAT (30 days after application of growth retardants), the least percent increase of plant height (11.16%) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (15.01%) and B-nine @ 2500 ppm (T_8) (15.44%). Highest percent increase of plant height (43.92%) was recorded in control plants (water spray) followed by B-nine @ 1000 ppm (T_5) (31.91%) which was at par with cycocel @ 1000 ppm (T_9) (27.73%). At 90 DAT, minimum percent increase of plant height (7.83%) was recorded in paclobutrazol @ 200 ppm (T_4) which was at par with (T_3) paclobutrazol @ 150 ppm (9.46%) and B-nine @ 2500 ppm (T_8) (14.24%). Maximum percent increase of plant height (32.37%) was recorded in control plants (T_{13}) followed by cycocel @ 1000 ppm (T_9) (25.05%) and cycocel @ 1500 ppm (T_{10}) (19.22%). At 120 DAT, T_4 (paclobutrazol @ 200 ppm) recorded less percent increase of plant height (8.37%) and was at par with paclobutrazol @ 150 ppm (T_3) (10.75%) and paclobutrazol @ 100 ppm (T_2) (12.70%). Control treatment (T_{13}) produced more percent increase of plant height (24.72%) followed by T_5 (B-nine @ 1000 ppm) (16.24%) and T_9 (cycocel @ 1000 ppm) (15.77%). At 150 DAT (three months after second application of growth retardants), lowest percent increase of plant height (9.39%) was registered with paclobutrazol @ 200 ppm (T_4) which was found to be at par with paclobutrazol @ 150 ppm (11.28%) and paclobutrazol @ 100 ppm (12.27%). Highest percent increase of plant height (20.30%) was recorded in T_{13} (control) followed by T_5 (B-nine @ 1000 ppm) (16.21%) which was at par with B-nine @ 1500 ppm (T_6) (16.02%). The observations from table 2 confirm that three months after the application of growth retardants, percent increase in plant height was least in paclobutrazol @ 200 ppm and 150 ppm compared to control. This might be possibly due to persistent effect of paclobutrazol in reducing the plant height when compared to other PGRs, and hence the plants treated with paclobutrazol @ 200 ppm and 150 ppm resulted in a least percent increase in plant height.

Table 3: Effect of plant growth retardants on plant spread in syngonium

	Plant spread (cm)				
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	24.93	29.31	35.69	40.05	42.25
T_2 - PBZ @ 100 ppm	24.63	28.31	33.25	35.94	41.75
T_3 - PBZ @ 150 ppm	25.79	28.13	32.06	34.56	41.72
T_4 - PBZ @ 200 ppm	25.35	27.00	30.68	33.19	40.69
T_5 - B-nine @ 1000 ppm	24.18	30.81	35.50	41.00	44.30
T_6 - B-nine @ 1500 ppm	24.58	29.13	34.06	40.56	44.24
T_7 - B-nine @ 2000 ppm	25.10	29.38	32.25	39.75	42.75
T_8 - B-nine @ 2500 ppm	25.67	29.94	32.31	37.25	42.69
T_9 - Cycocel @ 1000 ppm	24.63	31.31	36.82	39.24	43.50
T_{10} - Cycocel @ 1500 ppm	24.58	30.25	35.63	38.63	42.06
T_{11} - Cycocel @ 2000 ppm	25.73	30.38	35.38	37.38	42.38
T_{12} - Cycocel @ 2500 ppm	23.90	28.63	34.31	37.19	41.80
T_{13} - Control (Water spray)	25.95	34.19	37.69	42.69	45.70
CD at 5%	N/A	2.31	2.96	2.48	1.46
S Em (±)	0.82	0.75	0.96	0.80	0.47

Table 4: Effect of plant growth retardants on leaf length in syngonium

	Leaf length (cm)				
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	15.29	15.46	15.26	14.95	14.76
T_2 - PBZ @ 100 ppm	15.77	15.44	15.15	14.60	14.46
T_3 - PBZ @ 150 ppm	15.02	14.80	14.69	14.44	14.23
T_4 - PBZ @ 200 ppm	16.53	14.55	14.46	14.11	13.96
T_5 - B-nine @ 1000 ppm	15.73	15.98	16.33	16.48	16.87
T_6 - B-nine @ 1500 ppm	15.39	15.62	16.12	16.33	16.55
T_7 - B-nine @ 2000 ppm	16.10	16.34	16.68	16.86	17.10
T_8 - B-nine @ 2500 ppm	15.56	16.56	16.80	17.00	17.03
T_9 - Cycocel @ 1000 ppm	16.14	16.50	16.65	16.48	16.58
T_{10} - Cycocel @ 1500 ppm	15.75	16.23	16.51	16.26	16.40
T_{11} - Cycocel @ 2000 ppm	16.25	16.46	16.66	16.43	16.57
T_{12} - Cycocel @ 2500 ppm	16.05	16.30	16.41	16.17	16.34
T_{13} - Control (Water spray)	16.04	18.86	19.35	20.68	20.93
CD at 5%	N/A	1.06	1.21	1.27	1.39
S Em (±)	0.32	0.34	0.39	0.41	0.45

Leaf length (cm)

The data regarding leaf length at 30, 60, 90, 120 and 150 days after transplanting (DAT) under the influence of different treatments with plant growth retardants is presented in Table 4. The treatments varied significantly on leaf length of syngonium when observed at 60, 90, 120 and 150 days after transplanting. At 60 DAT, (30 days after application of growth retardants), minimum leaf length (14.55 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (14.80 cm) and paclobutrazol @ 100 ppm (T_2) (15.43 cm). Maximum leaf length (18.86 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (16.56 cm) which was at par with cycocel @ 1000 ppm (T_9) (16.50 cm). At 90 DAT, (60 days after application of growth retardants), the lowest leaf length (14.46 cm) was registered in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol at 150 ppm (T_3) (14.70 cm) and paclobutrazol at 100 ppm (T_2) (15.15 cm). Highest leaf length (19.35 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (16.80 cm) which was at par with B-nine @ 2000 ppm (T_7) (16.68 cm). At 120 DAT, least leaf length (14.11 cm) was registered in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol 150 ppm (T_3) (14.44 cm) and paclobutrazol 100 ppm (T_2) (14.60 cm). Highest leaf length (20.68 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (17.00 cm) which was at par with B-nine @ 2000 ppm (T_7) (16.86 cm). At 150 DAT, lowest leaf length (13.96 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (14.23 cm) and paclobutrazol @ 100 ppm (T_2) (14.46 cm). Highest leaf length (20.93 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2000 ppm (T_7) (17.10 cm) which was at par with B-nine @ 2500 ppm (T_8) (17.03 cm).

It is clear from the data presented table 4 that among all growth retardants, paclobutrazol @ 200 ppm, 150 ppm and 100 ppm reduced the leaf length most effectively. The plants treated with paclobutrazol showed a linear decrease in leaf length (16.53 cm), (14.55 cm), (14.46 cm), (14.11 cm) and (13.96 cm) at 30, 60, 90, 120 and 150 DAT respectively which might be due to the fact that paclobutrazol inhibits the gibberellic acid biosynthesis which is generally responsible for cell elongation (Rademacher, 1991) [12]. As there was inhibition of cell elongation in the treated plants, the plants not only resulted in reduced plant height but the leaf length also decreased.

Leaf width (cm)

The observations regarding leaf width at 30, 60, 90, 120 and 150 days after transplanting (DAT) under the influence of different treatments with plant growth retardants is given in Table 5. At 30 DAT non-significant differences were observed among growth retardant treatments means.

However, the treatments varied significantly on leaf width of syngonium when observed at 60, 90, 120 and 150 days after transplanting. At 60 DAT, (30 days after application of growth retardants), the minimum leaf width (7.54 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (8.03 cm) and paclobutrazol @ 100 ppm (T_2) (8.20 cm). Maximum leaf width (10.18 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (8.88 cm) which was at par with B-nine @ 2000 ppm (T_7) (8.55 cm). At 90 DAT, (60 days after application of growth retardants), the least leaf width (7.69 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (8.23 cm) and paclobutrazol @ 100 ppm (T_2) (8.30 cm). Highest leaf width (12.08 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (9.30 cm) which was at par with B-nine @ 2000 ppm (T_7) (8.96 cm). At 120 DAT, the treatment paclobutrazol @ 200 ppm (T_4) recorded lowest leaf width (7.84 cm) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (8.40 cm) and paclobutrazol @ 100 ppm (T_2) (8.50 cm). Highest leaf width (13.28 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (9.45 cm) which was found to be at par with B-nine @ 2000 ppm (T_7) (9.22 cm). At 150 DAT (three months after the second application of growth retardants), paclobutrazol @ 200 ppm (T_4) registered lowest leaf width (8.09 cm) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (8.56 cm) and paclobutrazol @ 100 ppm (T_2) (8.86 cm). Highest leaf width (14.88 cm) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (9.80 cm) which was found to be at par with B-nine @ 2000 ppm (T_7) (9.42 cm).

It is evident from the data presented in Table 5 that the application of growth retardants had significantly reduced the leaf width especially with paclobutrazol @ 200 ppm, 150 ppm and 100 ppm. This is possibly due to the effect of paclobutrazol as a gibberellin biosynthesis inhibitor at the level of leaf cell elongation thus causing limited elongation in the leaf cells (Hagiladi and Watad, 1992) [6].

Table 5: Effect of plant growth retardants on leaf width in syngonium

	Leaf width (cm)				
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	8.10	8.47	8.57	8.77	9.13
T_2 - PBZ @ 100 ppm	8.15	8.20	8.30	8.50	8.86
T_3 - PBZ @ 150 ppm	7.34	8.03	8.23	8.40	8.56
T_4 - PBZ @ 200 ppm	7.83	7.54	7.69	7.84	8.09
T_5 - B-nine @ 1000 ppm	7.83	8.25	8.73	9.00	8.90
T_6 - B-nine @ 1500 ppm	7.86	8.26	8.75	9.06	9.23
T_7 - B-nine @ 2000 ppm	8.06	8.55	8.96	9.22	9.42
T_8 - B-nine @ 2500 ppm	8.26	8.88	9.30	9.45	9.80
T_9 - Cycocel @ 1000 ppm	7.12	8.33	8.68	8.85	9.08
T_{10} - Cycocel @ 1500 ppm	7.66	8.34	8.65	8.85	9.01
T_{11} - Cycocel @ 2000 ppm	8.07	8.47	8.77	8.97	9.13
T_{12} - Cycocel @ 2500 ppm	8.29	8.49	8.88	9.05	9.25
T_{13} - Control (Water spray)	7.93	10.18	12.08	13.28	14.88
CD at 5%	N/A	1.13	1.32	1.20	0.75
S Em (±)	0.38	0.37	0.43	0.39	0.24

Leaf area (cm^2)

The results regarding leaf area at 30, 60, 90, 120 and 150 days after transplanting (DAT) under the influence of different treatments with plant growth retardants is presented in Table 6. At 30 DAT non-significant differences were observed among growth retardant treatments means. However, the treatments varied significantly on at 60, 90, 120 and 150 days after transplanting. At 60 DAT, (30 days after application of growth retardants), the lowest leaf area (115.51 cm^2) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (118.41 cm^2) followed by paclobutrazol @ 100 ppm (T_2) (127.25 cm^2). Highest leaf area (146.96 cm^2) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (137.29 cm^2) which was at par with cycocel @ 1000 ppm (T_9) (137.00 cm^2). At 90 DAT, (60 days after application of growth retardants), the least leaf area (113.11 cm^2) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (120.58 cm^2) and paclobutrazol @ 100 ppm (T_2) (125.84 cm^2). Highest leaf area (160.59 cm^2) was recorded in control plants (T_{13}) which was at par with B-nine @ 2500 ppm (T_8) (151.21 cm^2) and B-nine @ 2000 ppm (T_7) (146.23 cm^2). At 120 DAT, paclobutrazol @ 200 ppm (T_4) recorded lowest leaf area (111.75 cm^2) followed by paclobutrazol @ 150 ppm (T_3) (117.94 cm^2) and paclobutrazol @ 100 ppm (T_2) (126.68 cm^2). In control plants (T_{13}) highest leaf area (164.41 cm^2) was recorded which was followed by B-nine @ 2500 ppm (T_8) (149.35 cm^2) and B-nine @ 2000 ppm (T_7) (145.97 cm^2). At 150 DAT, paclobutrazol @ 200 ppm (T_4) registered minimum leaf area (110.56 cm^2) which was found to be at par paclobutrazol @ 150 ppm (T_3) (115.86 cm^2) and paclobutrazol @ 100 ppm (T_2) (122.18 cm^2). Maximum leaf area (169.42 cm^2) was recorded in control plants (T_{13}) followed by B-nine @ 2500 ppm (T_8) (146.06 cm^2) and B-nine @ 2000 ppm (T_7) (143.41 cm^2).

Reduction in leaf area of syngonium with PBZ treatments might possibly be due to reduced leaf length (table 4) and leaf breadth (table 5) after application of paclobutrazol. Jill and David (2007) reported that the unique structure of paclobutrazol that allows it to bind to an iron atom with the enzymes essential for the production of gibberellins resulted in reduced cell division and elongation, reduced leaf area and improved leaf colour and bract colour in some red poinsettia cultivars with little effect on leaf production. Morphological modifications of leaves induced by paclobutrazol such as smaller stomatal pores; thicker leaves would have also resulted in the production of low leaf area (Chaney, 2004) [5]. The same trend was observed by Chaitanya *et al*. (2017) [4] in *Syngonium podophyllum.*

Petiole length (cm)

The results regarding petiole length recorded at 30, 60, 90, 120 and 150 days after transplanting (DAT) under the influence of different plant growth retardants is presented in Table 7. At 60 DAT, (30 days after application of growth retardants), the lowest petiole length (14.04 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (14.73 cm) and paclobutrazol @ 100 ppm (T_2) (14.86 cm). Highest petiole length (19.46 cm) was recorded in control plants (T_{13}) which was at par with cycocel @ 1000 ppm (T_9) (18.10 cm) and B-nine @ 1000 ppm (T_5) (17.90 cm). At 90 DAT, paclobutrazol @ 200 ppm (T_4) recorded minimum petiole length (13.18 cm) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (14.06 cm) and paclobutrazol @ 100 ppm (T_2) (14.61 cm). Control plants (T_{13}) recorded maximum petiole length (23.46 cm) followed by cycocel @ 1000 ppm (T_9) (18.82 cm) and was at par with B-nine @ 1000 ppm (T_5) (18.52 cm). At 120 DAT, the least petiole length (12.31 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (13.61 cm) and paclobutrazol @ 100 ppm (T_2) (14.14 cm). Highest petiole length was recorded in control plants (T_{13}) (27.85 cm) followed by B-nine @ 1000 ppm (T_5) (19.43 cm) which was at par with B-nine @ 1500 ppm (T_6) (19.26 cm). At 150 DAT, the lowest length of the petiole (12.06 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) followed by paclobutrazol @ 150 ppm (T_3) (13.43 cm) and paclobutrazol @ 100 ppm (T_2) (15.09 cm). Highest petiole length was registered in control (T_{13}) (30.35 cm) followed by B-nine @ 1000 ppm (T_5) (20.21 cm) and was at par with B-nine @ 1500 ppm (T_6) (19.96 cm).

Leaf petiole length was reduced at all paclobutrazol concentrations (200 ppm,150 ppm and 100 ppm) pronouncing the effectiveness of foliar treatment of paclobutrazol (up to 60% reduction in petiole length compared with the control). There was a linear decrease of petiole length from 16.10 cm at 30 DAT to 12.02 cm at 150 DAT in the plants treated with paclobutrazol @ 200 ppm. The reason could be attributed to the reduced gibberellic acid synthesis which is responsible for cell elongation by paclobutrazol, resulting in limited cell elongation and reduced petiole length. The results are in conformity with the findings of Wei-hui and Li-feia (2008) [14] who stated that foliar spray of paclobutrazol at 3000 ppm concentration produced dwarf plants with reduced petiole length in *Altemanthera versicolor* compared to control.

Petiole girth (mm)

At 30 DAT non-significant differences were observed among growth retardant treatments means. However, the treatments varied significantly on petiole girth of syngonium when observed at 60, 90, 120 and 150 days after transplanting (Table 8). At 60 DAT (30 days after application of growth retardants), highest petiole girth (2.67 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) followed by paclobutrazol @ 150 ppm (T_3) (2.19 cm) and was at par with paclobutrazol @ 100 ppm (T_2) (2.09 cm). The least petiole girth (1.20 cm) was recorded in control plants (T_{13}) followed by cycocel @ 1000 ppm (T_9) (1.67 cm) and B-nine @ 1000 ppm (T_5) (1.75 cm). At 90 DAT, (60 days after application of growth retardants), highest petiole girth (3.08 cm) was recorded with paclobutrazol @ 200 ppm (T_4) followed by paclobutrazol @ 150 ppm (T_3) (2.74 cm) which was found to be at par with paclobutrazol @ 100 ppm (T_2) (2.54 cm). The lowest petiole girth (1.60 cm) was recorded in control plants (T_{13}) followed by cycocel @ 1000 ppm (T_9) (2.02 cm) which was found to be at par with B-nine @ 1000 ppm (T_5) (2.11 cm). At 120 DAT, highest petiole girth (3.62 cm) was recorded at paclobutrazol 200 ppm (T_4) followed by paclobutrazol @ 150 ppm (T_3) (2.94 cm) which was found to be at par with paclobutrazol @ 100 ppm (T_2) (2.81 cm). In control plants (T_{13}), lowest petiole girth (1.62 cm) was recorded followed by B-nine @ 1000 ppm (T_5) (2.46 cm) which was found to be at par with B-nine @ 1500 ppm (T_6) (2.53 cm). At 150 DAT, maximum petiole girth (3.87 cm) was recorded in paclobutrazol @ 200 ppm treatment (T_4) followed by paclobutrazol @ 150 ppm (T_3) (3.51 cm) and paclobutrazol @ 100 ppm (T_2) (3.31 cm). The minimum petiole girth (1.53 cm) was recorded in control plants (T_{13}), followed by B-nine @ 1000 ppm (T_5) (2.62 cm) which was found to be at par with B-nine @ 1500 ppm (T_6) (2.73 cm).

Wang and Blessington (1990) [13] stated that paclobutrazol results in shorter plants by retarding stem and petiole elongation and has a great significance in shortening the petioles and limiting the plant growth. This decrease in petiole length is often accompanied by an increase in its thickness. This might be the reason for the increased petiole girth as the petiole length got decreased in the paclobutrazol treated plants as evident from data presented in table 7. These results are in agreement with the findings of Chaitanya *et al.* (2017) [4] in *Scindapsus aureus* and Wei-hui and Li-feia (2008) [14] in *Altemanthera versicolor*.

Chlorophyll content (SPAD units)

The data regarding chlorophyll content recorded as SPAD chlorophyll value at 30, 60, 90, 120 and 150 days after transplanting (DAT) under the influence of different treatments with plant growth retardants is presented in Table 9. The treatments varied significantly on chlorophyll content of syngonium when observed at 60, 90, 120 and 150 days after transplanting. At 60 DAT, (30 days after application of growth retardants), the highest SPAD chlorophyll value (48.93) was recorded with paclobutrazol @ 200 ppm (T_4) which was at par with paclobutrazol @ 150 ppm (T_3) (47.06 SPAD) and paclobutrazol @ 100 ppm (T_2) (44.80 SPAD). The least content of chlorophyll (34.78 SPAD) was recorded in cycocel @ 2500 ppm (T_{12}) which was at par with cycocel @ 2000 ppm (T_{11}) (37.31 SPAD). At 90 DAT, (60 days after application of growth retardants), the highest chlorophyll content (55.97 SPAD) was recorded in paclobutrazol @ 200 ppm treatment (T_4) which was at par with paclbutrozol @ 150 ppm (T_3) (50.60 SPAD) and paclobutrazol @ 100 ppm (T_2) (49.50 SPAD). The lowest chlorophyll content (32.28 SPAD) was recorded in cycocel @ 2500 ppm (T_{12}) which was at par with cycocel @ 2000 ppm (T_{11}) (34.81 SPAD). At 120 DAT, paclobutrazol @ 200 ppm (T_4) recorded the highest chlorophyll content (56.47 SPAD) which was at par with paclobutrazol @ 150 ppm (T_3) (53.05 SPAD) and B-nine @ 1000 ppm (T_5) (52.55 SPAD). The lowest chlorophyll content (33.81 SPAD) was recorded in cycocel @ 2500 ppm (T_{12}) which was at par with cycocel @ 2000 ppm (T_{11}) (35.31 SPAD). At 150 DAT, paclobutrazol @ 200 ppm (T_4) recorded highest chlorophyll content (57.97 SPAD) which was at par with paclobutrazol @ 150 ppm (T_3) (54.75 SPAD) and B-nine @ 1000 ppm (T_5) (54.15 SPAD). Lowest chlorophyll conent (33.15 SPAD) was recorded in cycocel @ 2500 ppm (T_{12}) which was at par with cycocel @ 2000 ppm (T_{11}) (35.33 SPAD).

The results from table 9 revealed that plants treated with paclobutrazol had darker green leaves suggesting high chlorophyll content compared to control. Application of triazole plant growth regulators commonly produces plants with darker green leaves than untreated plants as the result of increased chlorophyll concentration (Wang and Gregg 1994). The possible reasons for this response were given by Chaney (2004) [5]. According to him, the leaves of both treated and untreated plants will have the same number of cells but because the cells in leaves of treated plants are smaller, the chlorophyll is more concentrated in the reduced cell volume. Similar trend is also reported by Chaitanya *et al*. (2017) [4] in foliage plants like *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina at* paclobutrazol 100 ppm spray.

Fresh weight of shoot (g)

At the end of the experiment (150 DAT), fresh weight of shoot of syngonium was found significant by the treatments (Table 10). Among various treatments, maximum fresh weight of shoot (106.97 g) was registered in B-nine @ 2500 ppm (T_8) which was at par with B-nine @ 2000 ppm (T_7) (105.14 g) and control (water spray) (T_{13}) (105.07 g). The minimum fresh weight of shoot (64.36 g) was recorded in paclobutrazol @ 200 ppm (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (65.85 g) and paclobutrazol @ 100 ppm (T_2) (67.77 g). The data from table 10 confirmed that paclobutrazol showed most pronounced effect on suppression of growth which occurs due to the blockage of three steps in the terpenoid pathway for the production of gibberellins by binding with compounds and inhibiting the enzymes that catalyse the metabolic reactions (Chaney, 2004) [5]. This reduced above ground portion in the plants treated with paclobutrazol might probably be the reason for least fresh weight of shoot. B-nine has the lowest level of activity and it has less persistent effect when compared to other plant growth retardants (Currey and Lopez, 2009) which might be the reason for the plants treated with B-nine to report highest fresh weight of shoot. According to Bhat *et al.* (2010) B-nine is not effective in controlling plant height and shoot elongation in *Erysimum marshallii*.

Dry weight of shoot (g)

According to results showed in Table 10, it is evident that there was a significant difference between the treatments for dry weight of shoot at 150 DAT. Highest dry weight of shoot (36.37 g) was registered in B-nine @ 2500 ppm (T_8) which was found to be at par with B-nine @ 2000 ppm (T_7) (35.29 g) and B-nine @ 1000 ppm (T_7) (34.65 g). Lowest dry weight of shoot (22.03 g) was recorded in paclobutrazol @ 200 ppm (T_4) which was found to be at par with paclobutrazol @ 150 ppm (T_3) (23.92 g) and paclobutrazol @ 100 ppm (T_2) (25.00 g). These results from table 11 indicated that the least dry weight of shoot was recorded in the plants treated with paclobutrazol. The possible reason might be reduced shoot growth by gibberlins biosynthesis inhibitor (paclobutrazol) leading to less accumulation of dry matter and lowest fresh weight of the shoot. These results are in line with conclusions of Ahmad *et al.* (2015) who stated that with an increase in paclobutrazol concentration, plant growth (plant height and diameter, shoot fresh weight, or dry weight) was controlled for all potted ornamentals tested. However, highest dry weight of shoot was recorded in B-nine @ 2500 ppm which might be due to less persistent effect of B-nine resulting in more above ground portion and highest accumulation of dry matter there by contributing to highest dry weight of the shoot.

Growth index

The data presented in Table 10 regarding the growth index revealed that the application of growth retardants had significant differences between the treatment means.

At 150 DAT, it was observed that minimum growth index (24.30) was recorded in the plants treated with paclobutrazol @ 200 ppm (T_4) followed by paclobutrazol @ 150 ppm (T_3) (27.22) and paclobutrazol @ 100 ppm (T_2) (30.75). Maximum growth index (58.18) was recorded in the plants treated with water spray (control) (T_{13}) followed by cycocel @ 1000 ppm (T_9) (43.17) which was at par with B-nine @ 1000 ppm (T_5) (43.14)

The results from table 10 confirms that the plants treated with paclobutrazol had least growth index and this was due to the reduced plant growth (plant height and spread) as the triazole compound (paclobutrazol) impairs the oxidation of *ent*-kaurene to *ent*-kaurenoic acid resulting in depletion in the levels of active GAs throughout the plant leading to reduced vegetative growth likely a kind of dwarfism (Ribeiro *et al.*, 2011).

Table 6: Effect of plant growth retardants on leaf area in syngonium

	Leaf area (cm^2)				
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	123.96	128.25	130.64	128.95	127.60
T_2 - PBZ @ 100 ppm	128.67	127.25	125.84	126.68	122.18
T_3 - PBZ @ 150 ppm	125.35	118.41	120.58	117.94	115.86
T_4 - PBZ @ 200 ppm	125.47	115.51	113.11	111.75	110.56
T_5 - B-nine @ 1000 ppm	123.29	131.79	142.40	143.05	143.24
T_6 - B-nine @ 1500 ppm	120.87	128.25	136.45	145.64	140.78
T_7 - B-nine @ 2000 ppm	129.78	133.74	146.23	145.97	143.41
T_8 - B-nine @ 2500 ppm	128.61	137.29	151.22	149.35	146.06
T_9 - Cycocel @ 1000 ppm	122.83	137.00	143.18	138.04	135.33
T_{10} - Cycocel @ 1500 ppm	125.85	136.95	140.22	136.68	134.74
T_{11} - Cycocel @ 2000 ppm	127.98	134.36	138.49	133.62	133.75
T_{12} - Cycocel @ 2500 ppm	128.08	133.24	135.62	131.46	131.71
T_{13} - Control (Water spray)	127.06	146.96	160.59	164.41	169.42
CD at 5%	N/A	6.72	15.46	4.32	8.80
S Em (±)	5.99	2.18	5.01	1.40	2.85

Table 7: Effect of plant growth retardants on petiole length in syngonium

Petiole length (cm)					
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	16.14	15.65	15.48	14.65	15.85
T_2 - PBZ @ 100 ppm	15.10	14.86	14.61	14.14	15.09
T_3 - PBZ @ 150 ppm	17.01	14.73	14.06	13.61	13.43
T_4 - PBZ @ 200 ppm	16.11	14.04	13.18	12.31	12.06
T_5 - B-nine @ 1000 ppm	16.93	17.90	18.52	19.43	20.21
T_6 - B-nine @ 1500 ppm	15.72	16.72	17.68	19.26	19.96
T_7 - B-nine @ 2000 ppm	16.02	16.48	17.22	17.85	18.77
T_8 - B-nine @ 2500 ppm	15.59	16.35	16.65	17.35	17.85
T_9 - Cycocel @ 1000 ppm	17.10	18.10	18.82	18.85	19.19
T_{10} - Cycocel @ 1500 ppm	16.12	17.42	18.27	18.44	19.77
T_{11} - Cycocel @ 2000 ppm	17.09	16.91	17.61	17.46	18.31
T_{12} - Cycocel @ 2500 ppm	15.61	15.70	16.29	17.58	18.09
T_{13} - Control (Water spray)	16.46	19.46	23.46	27.85	30.35
CD at 5%	N/A	1.58	1.37	1.36	0.86
S Em (±)	0.66	0.51	0.44	0.44	0.28

Table 8: Effect of plant growth retardants on petiole girth in syngonium

Petiole girth (mm)					
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	1.17	1.96	2.31	2.66	3.13
T_2 - PBZ @ 100 ppm	1.38	2.09	2.54	2.81	3.31
T_3 - PBZ @ 150 ppm	1.13	2.19	2.74	2.94	3.51
T_4 - PBZ @ 200 ppm	1.16	2.67	3.08	3.62	3.87
T_5 - B-nine @ 1000 ppm	1.28	1.75	2.11	2.46	2.62
T_6 - B-nine @ 1500 ppm	1.28	1.83	2.18	2.53	2.73
T_7 - B-nine @ 2000 ppm	1.09	1.96	2.20	2.75	2.88
T_8 - B-nine @ 2500 ppm	1.08	1.98	2.51	2.96	3.03
T_9 - Cycocel @ 1000 ppm	1.27	1.67	2.02	2.54	2.78
T_{10} - Cycocel @ 1500 ppm	1.23	1.87	2.54	2.80	2.96
T_{11} - Cycocel @ 2000 ppm	1.38	1.95	2.65	2.90	3.09
T_{12} - Cycocel @ 2500 ppm	1.06	1.98	2.75	2.95	3.04
T_{13} - Control (Water spray)	1.40	1.20	1.60	1.62	1.53
CD at 5%	N/A	0.30	0.33	0.36	0.29
S Em (±)	0.16	0.10	0.11	0.12	0.09

Table 9: Effect of plant growth retardants on chlorophyll content in syngonium

Chlorophyll content (SPAD)					
Treatments	**30 DAT**	**60 DAT**	**90 DAT**	**120 DAT**	**150 DAT**
T_1 - PBZ @ 50 ppm	40.23	43.64	44.82	47.87	50.07
T_2 - PBZ @ 100 ppm	41.11	44.80	49.50	50.72	52.67
T_3 - PBZ @ 150 ppm	40.74	47.06	50.60	53.05	54.75
T_4 - PBZ @ 200 ppm	41.02	48.93	55.97	56.47	57.97
T_5 - B-nine @ 1000 ppm	40.71	40.11	48.67	52.55	54.15
T_6 - B-nine @ 1500 ppm	39.56	43.41	47.51	49.96	51.91
T_7 - B-nine @ 2000 ppm	40.10	38.11	43.11	44.61	46.66
T_8 - B-nine @ 2500 ppm	39.23	42.89	48.46	50.46	51.96
T_9 - Cycocel @ 1000 ppm	40.00	41.53	40.68	39.22	40.22
T_{10} - Cycocel @ 1500 ppm	40.88	37.80	35.69	37.19	37.69
T_{11} - Cycocel @ 2000 ppm	39.42	37.31	34.81	35.31	35.33
T_{12} - Cycocel @ 2500 ppm	40.90	34.78	32.28	33.81	33.15
T_{13} - Control (Water spray)	40.47	41.06	42.56	44.06	43.00
CD at 5%	N/A	7.62	7.79	5.10	4.52
S Em (±)	0.69	2.47	2.52	1.65	1.46

Table 10: Effect of plant growth retardants on fresh and dry weight of shoot (g) in syngonium

	Fresh weight of shoot (g)	Dry weight of shoot (g)	Plant growth index
Treatments	150 DAT	150 DAT	150 DAT
T_1 - PBZ @ 50 ppm	68.63	25.04	33.49
T_2 - PBZ @ 100 ppm	67.77	25.00	30.75
T_3 - PBZ @ 150 ppm	65.85	23.92	27.22
T_4 - PBZ @ 200 ppm	64.36	22.03	24.30
T_5 - B-nine @ 1000 ppm	102.05	34.56	44.14
T_6 - B-nine @ 1500 ppm	104.17	34.65	38.83
T_7 - B-nine @ 2000 ppm	105.14	35.29	35.48
T_8 - B-nine @ 2500 ppm	106.97	36.37	34.44
T_9 - Cycocel @ 1000 ppm	102.77	33.16	43.17
T_{10} - Cycocel @ 1500 ppm	101.58	33.91	37.64
T_{11} - Cycocel @ 2000 ppm	100.33	31.85	33.73
T_{12} - Cycocel @ 2500 ppm	101.43	32.60	33.92
T_{13} - Control (Water spray)	105.07	32.45	58.18
CD at 5%	8.80	2.95	1.48
S Em (±)	2.85	0.96	0.48

Conclusion

The present investigation has led to certain important points to be stated as valid conclusions for the plants like syngonium to be used in ornamental gardening and indoor scaping. Based on the results obtained it could be concluded that, among the 13 treatment combinations, foliar sprays of paclobutrazol @ 150 ppm gave plants with reduced vegetative growth parameters making it suitable for interiorscaping.

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