CANOPY MANAGEMENT IN FOLIAGE PLANTS FOR INTERIORSCAPING

By

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THESIS

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DECLARATION

I hereby declare that the thesis entitled **"Canopy management in foliage plants for interiorscaping"** is a bonafide record of research work done by me during the course of research and this thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title of any other University or Society.

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Certified that this thesis entitled **"Canopy management in foliage plants for interiorscaping"** is a record of research work done independently by Mrs. V. Chaitanya under my guidance and supervision and that it has not previously formed the basis for award of any degree, fellowship or associateship to her.

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V.Chaitanya

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ABBREVIATIONS

%	- per cent
@	- at the rate
^{0}C	- Degree Celsius
CCC	- cycocel
cm	- centimetre
cm^2	- square centimeter
et al.	- and others
Fig.	- Figure
i.e.	- that is
mg/g	- milligram per gram
mm	- milli meter
PGR	- plant growth retardant
ppm	- parts per million
RH	- Relative Humidity
Rs	- rupees
T	- treatment
viz.,	- namely

Dedicated to my Beloved Parents

Introduction

1. INTRODUCTION

During the past few years, we have witnessed a significant change in our urban housing system.Most of the scenic beauty of nature has been replaced by densely populated areas that sprawl for miles from urban centers. More and more people now living in multi storied flats or apartments, with little or no open space available for gardening primarily depend on potted plants for a touch of green. Interior plants are an ideal way to create attractive and restful settings while enhancing our sense of well-being. In addition, growing houseplants can be a satisfying hobby and can help purify the air in our homes.Indoor plants can reduce airborne microbes and dust in the ambient air. By having plants indoor a considerable amount of reduction (35.43 %) in air borne microbes was found (Alex *et al.* 2010). Plant filled rooms have 50 to 60 per cent less airborne microbes than similar rooms without plants (Wolverton and Wolverton, 1996).

Foliage plants form an interesting group of ornamentals generally grown for their attractive foliage and can be retained for their beauty for longer periods in an interior environment. The awareness of using these plants indoors and in shady garden corners is increasing day by day. These are mainly grown inside and outside residential houses, bungalows, showrooms, hotels, restaurants, public institutional buildings, offices, etc. There is a great demand for foliage plants for both domestic market as well as export market.

The Netherlands is the greatest producer (547 hectares of green house) of foliage plants with 64 per cent of export(Bhattacharjee, 2006). In India, major foliage plant production centres are located around Bangalore, Calcutta, Delhi, Pune, Trivandrum and few cities of Andhra Pradesh. Kerala, already a biodiversity hub, can lead the country by evaluating.and introducing many foliage plants which it possesses in enormous numbers.

Although rapid vigorous growth of foliage plants is encouraged to attain a salable size, once this size is attained, further growth may decrease the attractive appearance of the plant causing a reduction in sales value. Whether in permanently installed planters or in individual moveable containers, plants should

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be attractive and decorative and should create moods and organize the space in a way that is compatible with the surrounding decor. When plants are placed in the home or office, their continued growth may cause them to appear unsightly. Often this growth will appear unattractive because of long thin vines and/or chlorotic leaves possibly caused by improper levels of fertilization, water and light.

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). Plant growth retardants are applied to horticultural crops to reduce unwanted longitudinal shoot growth without lowering plant productivity. Plant growth retardants (PGRs) are chemicals that are designed to affect plant growth and/or development. Most of the PGRs used in the greenhouse or nursery are used to regulate shoot growth of containerized crops by inhibiting the production of gibberellins-the primary planthormones responsible for cell elongation.

Controlling plant height in foliage plants by growth retardants make them sturdy and attractive. They are also 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).Other effects of chemical growth retardants are the production of stockier plants with thicker stems that produce higher survival rates during shipping plus the aesthetic benefit of greener foliage (Dole and Wilkins, 2004). The foliage and interiorscape plant industries would benefit from plant growth regulators programme that would reduce or eliminate the need to replace or prune plants (Pennisi, 2006).

Use of growth retardants in production of tropical ornamental foliage plants is not a routine practice; however, interest in potential benefits is increasing as growers look for ways to improve their products (Henny *et al.*, 1994). With this background, the present study "Canopy management in foliage plants for interiorscaping" was undertaken to determine the effect of application of growth retardants on plant canopy and subsequent interior performance of selected foliage

Review of Literature

2. REVIEW OF LITERATURE

Foliage plants form an interesting group of ornamentals usually grown as pot plants or ornamentals for centuries. This group of plants is generally grown for their attractive foliage and can be retained for their beauty for long periods in an interior environment. A large number of foliage plants are available for interior decoration.

Foliage plants are one such container grown plant that can benefit from the use of plant growth regulators to control plant size (height and spread). Foliage plants tend to be lush and bold in size making them sometimes appear disproportionate with the container during production. Interiorscape displays of foliage plants demand tidy plants that do not appear leggy and overgrown. Since foliage plants are often produced under heavy shade and in close proximity, controlling plant height by means of retardant application would make plants sturdier and more attractive.

2.1 Origin and importance of growth retardants in plant growth and development

Plant growth retardants (PGRs) are synthetic compounds used to retard the shoot length of plants in a desired way without changing developmental patterns or evoke phytotoxic effects (Cathey, 1964; Frank and Donnan, 1975; Aswath *et al.*, 1994; Rademacher, 2000). Nicotinium derivatives were the first growth retardants reported by Mitchell *et al.*, in 1949 (Cathey, 1964). These growth retardants reduced stem elongation of bean plants without gall formation or other formative changes. Many other compounds have subsequently been detected, some of which have been introduced into agronomic or horticultural practices (Rademacher, 2000).

Prior to the use of plant growth retardants (PGRs), plants were water and nutrient stressed to reduce height, which resulted in a poor appearance of flowers and foliage. Today PGRs are applied to control and reduce height. This has been achieved not only by reducing cell elongation, but also by lowering the rate of cell division and regulating the plant height physiologically (Rademacher, 2000). In general, PGRs produce plants with shorter internodes but do not affect the number of leaves formed. Most plant growth retardants inhibit the formation of growth-active gibberellins (GAs) and can thus be used to reduce unwanted shoot elongation (Cathey, 1964; Nickell, 1978; Rademacher, 2000; Latimer, 2001; Singh, 2004; Mansuroglu *et al.*, 2009). The resulting stems are thicker and leaves may be a deeper green as a result of higher concentrations of chlorophyll in smaller cells. Treated plants finish with an increased marketable appearance (Nelson, 1998).

Extensive research has been directed to the use of growth retardants in controlling height of fruit trees and flowering ornamental plants such as poinsettia and chrysanthemum. The plant growth retardants in ornamental horticulture are utilized commercially to produce compact, sturdy potted and bedding plants. This practice reduces the cost for pruning and allows obtaining a better ratio between vegetative growth and flower production, besides reducing the space in the greenhouse required for flower production thereby improving market quality (Nickell, 1978; and Rademacher, 2000).

Growth retardants have been applied to ornamentals as foliar spray, soil drench, injecting into woody ornamentals or in sub irrigation water (Halevy, 1986; Million *et al.*, 1999). Recently pinching, pre-plant bulb soaks and liner dip techniques have been effectively used in ornamental horticulture (Gibson *et al.*, 2005; Krug and Whipker, 2004; Blanchard and Runkle 2007).

Growth retardants are also used to enhance the green colour of the foliage, strengthen the flower stems, stimulate flowering and promote resistance against environmental stresses (Cathey, 1964). Growth retardants have also been noticed to increase the stress tolerance of plants during shipping, handling and retail marketing thereby improving the shelf life, an important aspect in marketing practices (Latimer, 2001).

Growth retardants control excessive vegetative growth that helps to adjust a perennial plant species to an annual cycle of cultivation and costs for trimming hedges, trees and moving turf grasses may also be reduced by the application of growth retardants (Rademacher, 2000).

Until recently, however, the use of growth retardants on foliage plants had received relatively little interest from researchers.

Paclobutrazol, ancymidol, B-nine and chlormequat effectively control height of many florist crops (Barrett and Bartuska, 1981; Barrette, 1982; McDaniel, 1983; Menhennett and Hanks, 1983 and Wilfret, 1981). These growth regulating chemicals usually affect gibberellins which are responsible for shoot elongation, thus these anti-gibberellin compounds are commonly used to control height. For the highest efficacy, growth retardants require application prior to or during the rapid growth phase to reduce internode elongation (Dole and Wilkins, 2004). The effects of stem elongation cannot be reversed; however, the application of growth retardants can slow the process.

Plant growth retardants could be used for height control. However, the optimal rate of application and sensitivity of plants to each retardant may vary greatly from one species to another. Application of these retardants requires great caution to eliminate the possibility of crop loss or prolonged production time. (Wang and Blessington, 1990).

2.2 Effect of ancimidol on plant growth and development

A-Rest™ (ancymidol), a pyrimidine analog, is used primarily to retard stem elongation ofannuals and perennials grown in containers (Basra, 2000). Ancimidol retard plant height by inhibiting gibberellic acid biosynthesis (Rademacher, 1991) which is responsible for stem growth and shoot elongation. Ancymidol has been reported to effectively reduce the rate of stem elongation of several species of ornamental plants including both monocots and dicots (Furuta *et al.,* 1972). Ancymidol effectively controls the height of, and is labeled for, numerous annual and perennial plants, and can be applied as a spray or drench depending on the crop (Nelson, 1998).

Furuta *et al.*, (1972) in Caladium observed a reduction in petiole length by application of ancymidol compared to control.Ancymidol @ 15 ppm significantly reduced the lateral spread of foliage, increased the proportion of the total stem length bearing dead leaves in Mid-Century Hybrid lily (Dicks and Rees, 1973).

Henley and Poole (1974) stated that ancymidol was most effective in reducing elongation of *Brassaia actinophylla, Gynura sarmentosa, Syngonium podophyllum* and *Pilea* sps by 1.08 cm, 3.88 cm, 1.76 cm and 2.24 cm compared to the similar plant species kept untreated (4.24 cm, 10.52 cm, 2.24 cm and 2.68 cm).

Cathey (1975) studied the effect of growth retardants applied as foliar sprays or soil drenches to potted plants of 88 species including 25 species of trees. He concluded that ancymidol retarded the growth of many species including four species of Acer, *Betula papyrifera, Tilia cordata* and *Ulmus* spp. The height of the plants was drastically reduced, with and numbers of nodes.

Frank and Donnan (1975) concluded that the optimum foliar application rate based on plant height for Dracaena 'Babydoll/Alternanthera (66 %), Schefflera (93%), and Pothos (79%) was 0.625 mg/sq ft. The optimum rate for Philodendron (72%), green Nepthytis (88%), aluminum plant (55%), and Wandering Jew (74%) was 1.25 mg/sq ft; while for purple passion (70%), blue bell (43%), and variegated Nepthytis (93%), it was 2.5 mg/sq ft. compared to control (100%) respectively.

Lopes and Weiler (1977b) observed that ancymidol effectively reduced total plant height of*Dicentraspectabilis* by up to 58 % compared to control. In *Clerodendrum,* ancymidol @ 50 ppm reduced leaf area by 3 cm^2 compared to control respectively under indoor conditions with an increase in the indoor life (Kruger, 1979).

In *Ficus benjamina* L., plant spread (23 cm) was reduced significantly with ancimidol spray at 132 ppm concentration, respectively, compared to untreated plants (27 cm) and there was no increase in leaf drop after limited observation of plants placed in interior environments after treatment with the growth retardant ancymidol (Barrett and Nell, 1983).

Bailey and Miller (1988) reported that growth retardant ancimidol treatment (50ppm) reduced the leaf area of Easter lilies (*Lilium longiflorum* Thunb. 'Nellie White') by 29.4 cm^2 compared to the control (37.2 cm^2).

Cramer and Bridgen (1998) reported that sprays of 33 and 66 ppm of ancymidol reduced internodal length of potted *Mussaenda 'Queen sirikit'* by28.8 and 21.3 cm compared to the control (30 cm). A significant reduction in plant height was stated by Kim *et al.* (1999) in Bleeding Heart *(Dicentra spectabilis)* by 59.6and 46.2 cm compared to control (60.7cm) with the spray application of 50 and 100 ppm of ancymidol under indoor environment 14 days after flowering.

Bartel and Starman (2000) reported that ancymidol at both rates i.e., 66 and 132 ppm caused stunting and made the plants more compact in *Asteriscus maritimus* 'Compact Gold Coin'. Reduction in petiole length by application of ancimidol might be the reason for reduced plant spread; however, it was not effective on *Angelonia angustifolia* 'Blue Pacific', and *Heliotropium aborescens* 'Fragrant Delight'.

2.3 Effect of paclobutrazol on plant growth and development

Controlling undesirable foliage plant growth indoors to retain aesthetic appeal is a major challenge for the interiorscape industry. Bonzi™ (paclobutrazol), of the triazole group, is a more recent height retardant. Compared to other PGRs, triazoles are effective at relatively low doses and are non-phytotoxic (Basra, 2000). Paclobutrazol retard plant height by inhibiting gibberellic acid biosynthesis (Rademacher, 1991) which is responsible for stem growth and shoot elongation.

Paclobutrazol, a gibberellin biosynthesis inhibitor, successfully inhibited growth of flowering plants (Cox and Keever, 1988; McDaniel, 1983), foliage plants (Cox and Whittington, 1988; Hagiladi and Watad, 1992; LeCain *et al.*, 1986; Wang and Blessington, 1990) and woody ornamentals (Hamada *et al.*, 1990; Wilkinson and Richards, 1988) under commercial production and interiorscape conditions. However, results of treatment and sensitivity vary for individual species (LeCain *et al.*, 1986 and Wang and Blessington, 1990).

Barrett and Nell (1983) reported that elongation of *Ficus benjamina* L. treated with paclobutrazol sprays at 500 and 2000 ppm concentrations were 12 cm and 7 cm, respectively, compared to untreated plants (27 cm). He stated that less height increase in treated plants was due to reductions in internode elongation.

Hickman (1986) observed that application of paclobutrazol with concentrations of 62.5 ppm and 125 ppm effectively reduced overall height of greenhouse grown 12 week old Grape ivy (47.3 cm and 44.4 cm), German violet (30.8 cm and 28.5 cm) and Miniature rose (38 cm and 41.2 cm) compared to the control (54.6 cm, 32.7 cm and 42 cm).

Banko and Stefani (1988) found that foliar spray at 0.15-0.45 mg/plant of paclobutrazol in *Begonia semperflorens* cvs. Olympia, Scarletta and Vodka reduced plant height significantly.He also stated that foliar spray of paclobutrazol at 0.025-0.075 mg/plant reduced leaf breadth of *Catharanthus roseus* cv. little Bright Eye compared to control.

Henny (1990) conducted an extensive screening with paclobutrazol on foliage plants and categorized plant growth regulator response as slight, moderate and high for sprays and drenches. He discovered little response to paclobutrazol sprays at concentrations of 5 to 100 mg.L-1 on *Ficus elastica*.

Hampton (1991) in white clover *(Trifolium repens* L.) observed a significant decrease in petiole length which in turn reduced overall canopy spread and therefore make the plant more compact and attractive.

Hagiladi and Watad (1992) stated that in *Cordyline terminalis* 'Prince Albert' paclobutrazol as a foliar spray effectively reduced plant height by increasing concentrations (8, 40 and 200 ppm) 4 months after application. Application of paclobutrazol at 200 ppm gave desirable compact marketable product. He also observed a less pronounced response in *Cordyline terminalis* in case of petiole length and diameter with the 1000 ppm spray treatment of paclobutrazol.

Paclobutrazol (5 ppm, 0.01 mg a.i. per plant) treated *Begonia* x *tuberhybrida* 'Musical Orange' plants were 65% (29 cm) shorter than the control (10 cm) plants 13 weeks after growth regulator application (Karlsson *et al.*, 1992).

Healy and Klick (1993) while working on *Alstroemeria* concluded that PP333 (Bonzi) at 10-20 ppm was the most effective in achieving the desired results in reducing the leaf area.

Cramer and Bridgen (1998) reported that spray applications of paclobutrazol at 25 and 50 ppm concentrations reduced plant growth (32.2 cm and 28.8 cm) compared to control (34 cm) in *potted Mussaenda 'Queen sirikit'* grown under indoor environment.

Foliar spray of paclobutrazol @ 96 ppm concentration reduced growth of Achillea x cv. Coronation Gold (0.61 cm) compared to control (0.65 cm). Similarly foliar spray of paclobutrazol at 0-150 mg/l reduced growth and enhanced marketability in *Coreopsis verticillata* cv. Moonbeam (Kessler and Keever, 1999).

Kim *et al.* (1999) reported that sprays of 50 and 100 ppm of paclobutrazol reduced plant growth of *Bleeding Heart (Dicentra spectabilis)* by43.3 cmand 26.8 cm compared to control (60.7cm) 14 days after flowering.

Karaguzel and Ortacesme (2002) reported that internode lengths of *Bougainvillea glabra*Choisy 'Sanderiana' treated with a foliar spray of paclobutrazol could reach the internode lengths of control plants in only 120 days. The prolonged effect may indicate that *Pachira aquatica* is more sensitive to paclobutrazol than *Bougainvillea glabra* because plant species differences in paclobutrazol sensitivity have been widely documented (Wang and Blessington, 1990).

Warner and Erwin (2003) reported that foliar spray applications of paclobutrazol @ 20 ppm and 40 ppm have inhibited stem elongation of *Hibiscus* *coccineus, H. radiates* and *H. trionum.* In *Pachira aquatica,* the foliar applications of paclobutrazol (50 and 150 ppm) reduced internode length thereby resulting in plants with reduced canopy height and width and more compact growth form. Plants with the compact growth form did not grow substantially, dropped fewer leaflets, and thus maintained their aesthetic appearance after placement indoors for 6 months (Li *et al.,* 2009).

Chaney (2004) stated that unique structure of paclobutrazol that allows it to bind to an iron atom in the enzymes essential for the production of gibberellins also has the capacity to bind to enzymes. Morphological modifications of leaves induced by treatment with paclobutrazol such as smaller stomatal pores, thicker leaves would have also resulted in the production of low leaf area. When gibberellin biosysnthesis is blocked, cell division still occurs, but the new cells do not elongate, which results in shoots with the same numbers of leaves and internodes compressed into a shorter length.

Moraes *et al.* (2005) reported that all the paclobutrazol treatments (15, 30, 45, 60 and 75 ppm) reduced plant height of ornamental tomato (*Lycopersicon esculentum*), by at least 15% compared to the non-treated plants in one experiment. Here it was found that plant height was 20% shorter as paclobutrazol concentration increased up to 30 mg ai·L-1 for foliar application. He also found that as the paclobutrazol concentration increased from 0 to 32 mg ai·L^{-1}, leaf area decreased linearly by 12 cm^2, from 62 to 50 cm^2 in ornamental Tomato. In another experiment, ornamental pepper plants sprayed with only one application of paclobutrazol at concentrations of 60 and 90 ppm were 20% and 30% shorter than untreated plants, respectively. In *Capsicum chinense* cv. Pitanga, the spray application of paclobutrazol at 0-150 mg/l reduced plant height signidicantly compared to control (Grossi *et al.*, 2005).

Pepin (2012) reported that in *Buddleia davidii* the paclobutrazol treatment resulted in reduced leaf length (43.8 mm) compared to the control (48.3 mm).

Mansuroglu *et al.* (2009) observed that the mean highest plant height of *Consolida orientalis* was recorded as 85.7 cm for control plants compared to the plants treated with 500 ppm paclobutrazol whose height was decreased to 39.8 cm with a reduction rate of 215.3%. Taking the results of this study as a whole, he concluded that *C. orientalis* is sensitive to spray application of paclobutrazol. This chemical can easily be used to produce sturdy plants with reduced excessive plant growth in *C. orientalis.*

Bekheta *et al.* (2008) reported that foliar spray of paclobutrazol at 100 mg/l reduced the plant height of *Gerbera jamesonii.* Wei-hui and Li-feia (2008) reported that foliar spray of paclobutrazol at 3000 ppm concentration resulted in production of dwarf plants with decrease in the petiole length and petiole girth in *Altemanthera versicolor* compared to control, which could be attributed to the reduced gibberilic acid which is responsible for cell elongation.

Meijon *et al.* (2009) reported that single foliar spray of paclobutrazol at 190 ppm reduced growth and improved compactness in *Azalea japonica.* Wazir (2011) experimented with the spray application of paclobutrazol @ 50 ppm concentration on pot grown *Alstroemeria* cultivars viz., Selection No-14 and Riana. He concluded that there was a subsequent reduction of overall height in the 1st flush & 2nd flush i.e., 52.48 cm & 45.15 cm in cultivar Selection No-14 and 61.05 cm & 50.15 cm in cultivar Raina compared to control i.e., 78.42 cm & 67.67 cm in Selection No-14 and 61.05 cm & 50.15 cm in Raina.

Asgarian *et al.* (2013) reported that paclobutrazol decreased significantly the main stem height of Zinnia by 33.4 cm, 32.5 cm and 30.5 cm with increase in concentration i.e., 10 ppm, 20 ppm and 30 ppm than the plants which are kept under control (40.8 cm). Results of the above study imply that paclobutrazol, the growth retardant, mainly affected the vegetative growth of Zinnia plant. Thus it could have good potential as growth retardant in Zinnia.

2.4 Effect of B-nine on plant growth and development

B-Nine SP™ (daminozide) considers one of the most systematic growth retardants, so it has various effects in plants (Basra, 1994). Alar is an effective height retardant labeled for use in azalea, pot chrysanthemum, gardenia, hydrangea and many bedding and foliage plants. Azalea treated with daminozide promoted early and more extensive flower-bud set and retarded vegetative shoot development. Daminozide is the most commonly used PGR in the floriculture industry. In general, it is not phytotoxic and has a short-term effect that seldom results in over stunting of treated plants (Latimer *et al.*, 2001).

B-Nine reduced growth without any harmful effects. Plants (*Philodendron oxycardium*, *Scindapsus aureus* and *Syngonium podophyllum* 'Emerald Gem) treated twice with B-Nine grew less than one half the control. Plants treated with B-Nine, although generally shorter than control plants, had as many or almost as many nodes indicating shortened internodes. B-Nine reduced growth approximately 50% with no distortion or discoloration of the plants (Poole, 1970).

Blomme and Dambre (1982) reported that B-Nine @ 0-3 gl-1 when applied to ten month-old plants of *Alstroemeria* resulted in reduction of stalk length by 19-23 cm. Spray treatments of B-Nine (Alar) were effective in controlling plant height in *Alstroemeria* (Healy and Klick, 1993).

Banko and Stefani (1988) found that daminozide spray (5.0 g L-1) reduced internode length and plant height of 'Yellow Marvel' *Z. elegans*. Anderson and Hartley (1990) reported that twin foliar spray of B-nine at 5000 mg/l reduced the growth in *Godetia whitneyi*. Khimani *et al.* (1994) reported that foliar spray of B-nine at 500-1500 mg/l reduced the growth in *Gaillardia pulchella* cv. Picta Fouger.

Cramer and Bridgen (1998) found that sprays of 2500 and 5000 ppm of paclobutrazol reduced plant growth of potted *Mussaenda 'Queen sirikit'* 10.9 and 12.2 cm compared to control (34 cm).

Karlovic *et al.* (2004) found that the foliar spray of B-nine at 2000-4000 mg/l reduced stem length and internode length of *Chrysanthemum morifolium* var. Revert. Pateli *et al.* (2004) reported that foliar spray of B-nine at 1000-4000 mg/l restricted growth of main shoot of *Epidendrum radicans.*

An experiment was conducted by Pinto *et al.* (2005) in 'Lilliput' *Zinnia elegans* to evaluate the number of leaves affected by retardants application. And he concluded that number of leaves was not affected by paclobutrazol and B-nine application. Number of leaves of *Z. elegans* is related to plant's node number (usually, a maximum of two leaves develop at each node). Therefore, when retardants suppress internode elongation without changing the node number, no effect is observed in the number of leaves. He also found that the reduction in leaf area of *Zinnia elegans*was also affected by the B-nine concentration. The area was inversely proportional to B-nine concentration. It has been noted that the reduction of leaf area by $17cm^2$, $14cm^2$ and $12cm^2$ was observed in treated plants with concentrations of 1250 ppm, 2500 ppm and 5000 ppm and caused some change in leaf structure compared to the non-treated ones i.e., 18 cm^2.

Pinto *et al.* (2005) also predicted minimum internode length of 4.40 cm for 3.24 g L-1 of daminozide and minimum main stem height of 35.78 cm for 3.35 g L-1 of daminozide in the cultivar 'Yellow Marvel' *Z. elegans.* Daminozide sprays also presented similar results on 'Lilliput', but at lower concentrations (2.5 and 3.75 g L^{-1}).

Kim *et al.* (1999) reported that sprays of 1500 and 3000 ppm of B-nine reduced plant growth of *Bleeding Heart (Dicentra spectabilis)* 50.1and 36.5 cm compared to control (60.7cm) 14 days after flowering. Foliar spray of B-nine at 650 ppm reduced growth of Achillea x cv. Coronation Gold compared to control (Kessler and Keever, 1999).

Warner and Erwin (2003) found that diaminozide applied at 2500 ppm and 5000 ppm reduced *Hibiscus radiates* stem elongation compared to control 28 days after application.

In *Chrysanthemum morifolium,* El-Sheibany *et al.* (2007) reported that foliar spray of B-nine at 250-1500 mg/l reduced stem length, plant spread and internode length significantly there by improving its quality and market value. Similarly, he treated a local cultivar of *Chrysanthemum morifolium* with growth retardant alar as a foliar spray at 1250 ppm, 2000 ppm and 5000 ppm concentrations. The results revealed that application of retardant B-nine at all concentrations, compared to control resulted a significant reduction of shoot length and internodal length which was inversely of proportional to B-nine concentration. In addition to B-nine effect, it has been found that the reduction in the stem length increased as the time of growing increased from 2 week to 8 weeks.

Kahar (2008) reported that foliar application of B-nine at 0-5000 mg/l in *Chrysanthemum morifolium* cv. Reagan Sunny resulted in suppression of growth. Kofidis *et al.* (2008) reported that coriander plants treated with daminozide were up to 25% shorter than the controls i.e., growth retardant induced reduction of stem internode length, leading to shorter plants.

Bhat (2010) reported that B-nine application @ 500 ppm, 1000 ppm and 1500 ppm was not effective in decreasing the plant height (42.17 cm, 43 cm and 42.17 cm) compared to control (40.21 cm) in *Erysimum marshallii.*

Hashemabadi (2012) experimented on *Calendula officinalis* L., with daminozide @ 4500ppm concentration and found that the treated plants showed a reduced plant height of 34.17 cm compared to the control (35.92 cm).

2.5 Effect of cycocel on plant growth and development

Studies on several ornamental plants revealed that the maximum concentration of cycocel for reduction of plant height is 1500 mg/L (Cathey, 1975; Schwartz *et al.,* 1985; Hedayat, 2001; Joyce *et al.*, 2004).

In *Vitis vinifera L.,* CCC 1000 ppm reduced the petiole length (5 cm) significantly compared to the control (7.5 cm) (Coombe, 1967). Mittal (1967) in Dahlia found a decrease in plant spread and an increase in compactness due to application of cycocel. Cycocel act as a growth retardant thereby inhibiting biochemical processes resulting in less spreading of plants (Sharifuzzaman *et al.*, 2011).

Bose *et al.* (1968) observed that cycocel application reduced the height of *Hibiscus syriacus* L. (rose-of-sharon), *H.mutabilis* (cotton rose) and *H.sabdariffa* L .(roselle). Shanks (1972) reported that foliar application of cycocel @ 1000ppm reduced petiole length of cultivars *Hibicus rosa sinensis* 'Brilliantisima' and 'Kona' by 0.93 cm relative to control.

In prairie grass (*Bromus wildenowii* Kunth), cycocel significantly delayed senescence of leaf tissue, which may have assisted in the retention of more seeds per spikelet (Hampton *et al.* 1989b). Zalewska (1989) found that application of cycocel at twin or triple foliar spray at 125% or 250% reduced the growth of *Chrysanthemum* cvs. Paloma, Poramek and Promyk. Cycocel reduces elongation by interfering with the biosynthetic steps directly before ent – kaurene, a precursor in gibberrilin biosynthesis pathway (Rademacher, 1991).

Studies of Karlsson *et al.* (1992) on *Begonia* × *Tuberhybrida* showed that the cycocel (500 mg/L) resulted in 23% shorter plants than the control plants 15 weeks after transplanting. Henny *et al.* (1994) reported that cycocel @1000ppm applied on *Barleria cristata* (Phillipine white) has resulted in shorter plants compared to untreated plants and plants were more compact and having darker foliage.

Khimani *et al.* (1994) reported that foliar spray of cycocel at 500-1500 mg/l reduced the leaf area in *Gaillardia pulchella* cv. Picta Fouger grown under indoor conditions.

Kim *et al.* (1999) reported that sprays of 1000 and 2000 ppm of cycocel reduced plant growth of *Bleeding Heart (Dicentra spectabilis)* by 58.1and 59.6 cm compared to control (60.7cm) 14 days after flowering. This growth retardant, also, reduced plant height in *Euphorbia* and *Bougeinvillia* (Shekari *et al.*, 2004) and *Rosa* (Saffari *et al.*, 2004).

The application of cycocel has been shown to reduce the plant height in a number of plant species such as *Epidendrum radicans, Encelia farinosa, Zinnia elegans, Chrysanthemum, Poinsettia* (Pateli *et al.*, 2004; El-Mokadem and Hadia, 2008; Pinto *et al.*, 2005; Lodeta *et al.*, 2010).

Bruner *et al.* (2001) experimented to observe the effect of cycocel @ 1500 ppm in suppressing shoot length of *Lonicera* x *heckrottii* 'Goldflame' honeysuckle at the beginning of 2 weeks after treatment (WAT). And he revealed that shoot length had decreased linearly by 8–24% (2 WAT), 7–24% (4 WAT), 7–20% (6 WAT), 5–19% (10 WAT) and 5–20% (14 WAT) respectively.

Smith *et al.* (2002) found in *Euphorbia pulcherrima* that the average weekly change in height of the average weekly change in height of the cycocel 0.025% group was 0.57 cm. The final height of the cycocel 0.025% was 30.88 cm. The average weekly change in height of the cycocel 0.050% group was 0.23 cm. The final height of the cycocel 0.050% group was 28.97 cm, whereas the weekly change in the height of control group was 1.53 cm and the final height of the control group was 37.60 cm. By the above results he confirmed that there was a considerable reduction in the height of selected plant species compared to control.

Warner and Erwin (2003) reported that cycocel inhibited stem elongation of *Hibiscus coccinius, Hibiscus radiatus* and *Hibiscustrionum* with 2000ppm application reducing stem length by 87%, 42%, and 52% respectively compared to untreated plants, 28 days after application.

Karlovic *et al.* (2004) reported that foliar spray of cycocel at 1000-3000 mg/l reduced stem length and internode length of *Chrysanthemum morifolium* var. Revert. Pateli *et al.* (2004) reported that foliar spray of cycocel at 2000-4000 mg/l restricted growth of main shoot of *Epidendrum radicans.* Saffari *et al.* (2004) sprayed *Rosa damascena* with cycocel and observed that 3,000 mg L-1 cycocel decreased stem length (5 cm) and leaf length (0.92 cm) relative to control.

An experiment was conducted by Lee *et al.* (2004) in potted Hibiscus to evaluate the effect of cycocel, paclobutrazol, ancimidol and B-nine on petiole length and diameter. And they concluded that the selected plant species did not show any noticeable differences width and petiole length of leaf.

Azzaz *et al.* (2007) reported that cycocel at 1000, 2000 and 3000 ppm application rates in *Calendula officinalis* L. decreased the plant height by 33.33 cm, 33.37 cm and 31.00 cm compared to control (39.33 cm) in the first season and in the second season by 38.67cm, 34.30 cm and 28.93 cm compared to the control (40.24 cm) indicating the efficiency of growth retardant cycocel in control of plant growth.

Hojjati *et al.* (2009) stated that increased application rates did not positively impact plant development when compared to the lower rates used in the study conducted on *Zinnia* with spray application of cycocel @ 1000 and 2000 mg/L concentrations.

Bhat *et al.* (2011) reported that the *Erysimum marshallii* (Henfr.) which received foliar application of cycocel at 1000 and 1500 mg L^{-1} concentrations showed a sequential decrease in plant height (36.17 cm, 32.17 cm and 40.21 cm) with increase in cycocel concentration. He also reported that the reduced leaf area was the characteristic feature of plants of *Erysimum marshallii* sprayed with cycocel. Leaf length and leaf area registered a decreasing trend with the increase in the concentration of cycocel. The plants which received a foliar spray of 1500 ppm cycocel concentration showed the minimum value for leaf length, leaf breadth and leaf area per plant i.e., 8cm, 7.3cm and 69.33cm^2 compared to control (9 cm, 7.9 cm and 74.37cm^2).

Gholampour *et al.* (2012) observed that the growth of *Brassica oleracea* cultivar 'Kamome White' and 'Nagoya Red' decreased with increasing theconcentration of cycocel. Foliar sprays of cycocel controlled plant height of bothcultivars under indoor conditions. The least record of plant height was obtained by application of 1500mg/L cycocel via spraying method in cultivar 'Kamome White' after 60 and 90days by 9.94 and 11.59 cm, respectively.

2.6 Effect of growth retardants on plant quality

Growth retardants, such as CCC, paclobutrazol and ancimidol are successfully used to obtain higher quality yield and control of quality and quantity characters in many plant species (Hayashi et al., 2001; Karlovic et al., 2004). The growth retardants delay the onset of various hydrolases concerned with senescence viz., proteases, RNase etc and also reduce lipid peroxidation in both light and dark and resulting in delayed senescence. Due to delay in senescence photosynthetic activity of a given leaf continues for a longer period. Further, leaves are also retained for a longer duration (Kumar and Purohit, 1998). They also found that leaves of plants treated with paclobutrazol are deep green in colour due to enhanced synthesis of chlorophyll.

Growth retardants also enhance stress tolerance, green color of the foliar and indoor life (Latimer, 2001). Most foliage plants originated in the tropical and subtropical regions where they grow under tree canopies on shaded forest floors or live in trees as epiphytes (Henny and Chen, 2003). A distinct characteristic of many foliage plants is their ability to tolerate low light levels. Foliage plants have been predominately cultivated in shaded greenhouses. Finished plants can be directly placed in interiorscapes if produced under an appropriate light intensity or they must be acclimatized during the final production process (Conover and Poole, 1984; Chen *et al.*, 2001). Acclimatization is a seriate process of adapting the plants to interior conditions. Light acclimatization improves the plant interior performance by lowering the light compensation point, thus reducing leaf abscission and maintaining the aesthetic values during interiorscape (Chen *et al.*, 2005a; Fonteno and McWilliams, 1978; Reyes *et al.*, 1996; Yeh and Wang, 2000).

Production of plants under reduced light levels, however, may modify some morphological traits such as increasing internode length, which may affect the plant's aesthetic appearance, especially of some woody ornamental plants like *Ficus* and *Schefflera* (Kubatsch *et al.*, 2006). To reduce rapid internode elongation and improve appearance under a low light level, plant growth retardants have been used as a foliar spray or soil drench (Davis, 1987).

Frank & Donnan (1975) reported that ancymidol at rates of 0.625 to 2.5 mg/sq ft provided significant increases in market value over the control plants. The effect of ancymidol on the intensification of foliage color was noted on several plants. Ancymidol at 0.625 mg/sq ft provided premium plants for *Schefflera, Pothos*, and *Dracaena 'Babydoll.* The 1.25 mg/sq ft rate provided premium plants for *Alternanthera*, Wandering Jew, and Philodendron, while 2.5 mg/sq ft was required to provide premium plants with green *Nepthytis,* purple passion, and blue bell. No phytotoxicity was noted on any of the plants tested at any rate. The response on aluminum plant was not as great and showed up as intensification of the green color. Some color inhibition was noted on dracaena babydoll at higher rates.

Decrease in leaf senescence and increase in leaf longevity by both paclobutrazol and ancymidol was previously observed in 'Nellie White' Easter lily (*Lilium longiflorum* Thunb.) (Jiao *et al.,* 1986).

Paclobutrazol-treated plants as a result of either increasing chlorophyll biosynthesis and/or reduction of leaf expansion are accompanied by normal rates of chlorophyll biosynthesis (Davis *et al.*, 1988).

Wang *et al.* (1998) reported that spray application of cycocel @ 1000 ppm is done reduced stem elongation of *H. moscheutus* L. (common rose mallow) 'Disco Belle Mixed' to make it commercially acceptable crop. No disease or insect problems were observed after placement indoors for four months.

Kim *et al.* (1999) reported that deep green leaves were obtained with the 3000 mg L–1 daminozide sprays and the paclobutrazol sprays (50 and 100 mg L–1) in Bleeding Heart (*Dicentra spectabilis*). Stefanski (2008) reported that foliar spray of paclobutrazol at 20 to 40 mg. L-1 produced plants within wholesale standards with the highest quality for *Xanthosoma violaceum.*

Youssef and Abd El-Aal (2013) found that the spray application of paclobutrazol @ 150 ppm in *Tabernaemontana coronaria* Stapf plant resulted in more chlorophyll content (0.2874mg/g) compared to the control (0.2421 mg/g). The plants treated with paclobutrazol had leaves with a rich green color suggesting high chlorophyll content. The possible explanations for this response were given by Chaney (2004). One is that the leaves of both treated and untreated plants contain 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. In addition, the amount of chlorophyll is increased because of an increase in the production of phytyl, an essential part of the chlorophyll molecule produced via the same terpenoid pathway as gibberellins. Paclobutrazol treatment, which blocks the production of gibberellins, results in a shunting of the intermediate compounds from gibberellin synthesis to the production of even more phytyl. An analogy might be an accident blocking the flow of traffic on a major highway causing drivers to divert to alternate routes.

2.7 Effect of growth retardants on plant anatomical characters

As it is known fact that plant growth regulators are applied to control and reduce height. This has been achieved not only by reducing cell elongation, but also by lowering the rate of cell division and regulating the plant height physiologically (Rademacher, 2000).

Most plant growth retardants inhibit the formation of growth-active gibberellins (GAs) and can thus be used to reduce unwanted shoot elongation. They reduce internodal length by inhibiting the production of gibberellin and increasing the number of palisade cells per unit area of leaf. The plants become more aesthetically pleasing with compact form and deeper green colour and are more resistant to breaking during transportation (Cathey, 1964; Nickell, 1978; Rademacher, 2000; Latimer, 2001; Singh, 2004; Mansuroglu *et al.*, 2009).

Paclobutrazol treatment increased the number of cells per unit area in the palisade of the leaf (6.58) compared to control (6.18) in *Amorphophallus campanulatus* (Gopi *et al.*, 2008).

Materials and Methods

3. MATERIALS AND METHODS

The investigation entitled "Canopy management in foliage plants for interiorscaping" was conducted at the Department of Pomology and Floriculture, College of Horticulture, Vellanikkara , Thrissur during 2013-14. The materials used and the methodology adopted for the investigation are presented in this chapter.

3.1. Location

Geographically the area is situated at a latitude of $10^{o}31$`N and longitude of $76^{o}13$`E. The area lies 22-25m above the mean sea level.

3.2. Climate

The climate is humid tropical. The weather parameters recorded during the period of study are presented.

3.3. Evaluation of foliage plant species in shade house

3.3.1. Materials

Six species of foliage plants, representing a wide spectrum of morphological variability were selected for the study. Two species were selected from each of the groups viz., upright type, climbing type and tree like type. List of plant species selected with their common names and family are given in table 1 and plate 2.

3.3.2. Growing systems

The selected foliage plant species were evaluated after application of growth retardants in a shade house with 50% shade (plate 1) and later placed in the interior under medium light intensity (800-2000 Lux).

3.3.3. Planting and general management

Planting was done in pots of 15 cm diameter. Soil, sand and organic matter in 1:1:1 proportion was used as the standard potting medium. Three month old uniform sized plants were selected for the study. Uniform management practices were adopted for all the species. Plants selected for the study are presented in the table 1 and plate 2.

Table 1. List of plants selected for study

S. No.	Scientific name	Common name	Family	Type of growth
1.	*Dieffenbachia amoena*	Dumb cane	Araceae	Upright type
2.	*Dracaena sanderiana*	Ribbon plant	Dracaenaceae	
3.	*Syngonium podophyllum* Syn: *Nephthytis triphylla*	Arrowhead vine	Araceae	Climbing type
4.	*Scindapsus aureus*	Golden pothos	Araceae	
5.	*Ficus benjamina*	Weeping fig, Benjamin bush, weeping willow	Moraceae	Tree like
6.	*Schefflera arboricola* Syn: *Brassaia, Heptopleurum*	Hawaiian elf/Dwarf Schefflera	Araliaceae	

Plate 1. View of experimental plot inside the shade house

3.3.4. Plant growth retardants used in the experiment

Growth retarding chemicals viz., ancymidol (A-rest), paclobutrazol (Bonzi), B-nine (Alar) and cycocel (CCC) with two concentrations each, were used in the experiment. There were totally nine treatments and the plants were sprayed with growth retardants in two schedules of application at 3 months and 6 monthsand the treatment without application of growth retardant was taken as control. The details of the experiment and observations recorded on morphological traits and other characters for 3 months after application are furnished below.

3.3.5. Treatment details

T_1 – Ancimidol @ 500ppm

T_2 – Ancimidol @ 1000ppm

T_3 - Paclobutrazol @ 50ppm

T_4 - Paclobutrazol @ 100ppm

T_5 – B-nine @ 1000ppm

T_6 - B-nine @ 2000ppm

T_7 - Cycocel @ 1000ppm

T_8 –Cycocel @ 2000ppm

T_9-Control

Plate 2:List of plants selected for study

Dieffenbachia amoena

Dracaena sanderiana

Syngonium podophyllum

Scindapsus aureus

Ficus benjamina

Schefflera arboricola

3.3.6. Design of the experiment

For experiment conducted in shade house structure a completely randomised block design with three replications and each with five plants was laid out.

3.3.7. Preparation of growth retardant solutions

3.3.7.1. Ancymidol

Ancymidol solution was prepared by dissolving the required quantities as per the treatment concentrations in small quantity of methyl alcohol and making up the volumes to one litre by adding distilled water.

3.3.7.2. Paclobutrazol

Paclobutrazol solution was prepared by dissolving the required quantities of chemical in small quantity of methyl alcohol and volume was made upto one litre with distilled water.

3.3.7.3. B-nine

B-nine solution was prepared by dissolving the required quantities as per the treatment concentrations in small quantity of distilled water and making up the volumes to one litre by adding distilled water.

3.3.7.4. Cycocel

Cycocel solution was prepared by dissolving the required quantities of chemical in small quantity of ethyl alcohol and volume was made up to one litre with distilled water.

3.3.8. Observations

Biometric observations were recorded for all the selected species. The parameters recorded during the course of the experiment under shade house conditions are the following:

3.3.8.1. Quantitative characters

3.3.8.1.1. Plant height

The height of the plant was measured from collar region to the tip of the youngest mature leaf at weekly intervals and expressed in centimetres.

3.3.8.1.2. Plant spread

The spread of the plant in East West and North South directions were measured and recorded in centimetres.

3.3.8.1.3. Length of leaves

The length of the leaf from the basal lobe to the tip was measured and expressed in centimetres.

3.3.8.1.4. Breadth of leaves

Maximum leaf width at the centre of the leaf was measured and expressed in centimetres.

3.3.8.1.5. Leaf area

Dot method (Bleasdale, 1977) was used to measure the leaf area and the same was expressed in square centimetres.

3.3.8.1.6. Number of leaves

The total number of leaves present on the plant at the time of each observation was counted and recorded.

3.3.8.1.7. Internodal length

The length between two successive nodes was measured and expressed in centimetres.

3.3.8.1.8. Leaf producing interval

Time interval (days) between the emergence of two successive leaves was counted and recorded.

3.3.8.1.9. Petiole length

The length of the petiole from the point of its emergence to the base of the leaf lamina was measured and recorded in centimetres.

3.3.8.1.10. Petiole girth

The circumference of the middle portion of the petiole was measured and expressed in centimetres as the petiole girth.

3.3.8.1.11. Longevity of leaves

Longevity was measured in days from the day the leaf is fully unfurled to the day the leaf became unfit (as indicated by drying, wilting, twisting, drooping, yellowing, blackening, etc.).

3.3.8.2. Qualitative characters

Leaf characters, which directly contributed towards their use as cut foliage, were observed.

3.3.8.2.1. Texture of leaves are described as smooth, verrucose, leathery, coarse

3.3.8.2.2. Shape of leaves are described as linear, saggitate, ovate, obovate

3.3.8.2.3. Bending/drooping of leaves

3.3.8.2.4. Pigmentation-colour changes during maturity

3.3.8.2.5. Plant quality rating

The foliage plant species were rated according to their fullness, growth, tolerance capacity (suitability to indoor conditions) and visual appearance *viz.*, colour and pigmentation, texture, shape and pattern during the growth period. The grades ranged from 1-10 for each character.

Other qualitative characters like appearance, colour and fading were also observed and recorded.

3.3.8.3. Other characters

Other general characters of the plants, such as, branching habit,scorching of leaves,yellowing of leaves, bending /drooping of leaves and incidence of pests and diseases were also recorded.

3.3.8.4. Chemical evaluation

Chlorophyll content

The top most fully opened leaves were selected from five different random plants for chlorophyll estimation. For analysis, 0.2 gm of finely cut sample was taken in a beaker and 10 ml

DMSO (Dimethyl Sulphoxide) solution was added. This kept in dark place overnight and the next day, made up to 25 ml in a flask after filtering on the next day. The chlorophyll content was estimated colorimetrically (Yoshida *et al.*, 1972) in a spectronic- 20 spectrophotometer at two wave lengths i.e. 663 and 645 nm. Using the equation given below, chlorophyll a, chlorophyll b and total chlorophyll contents were computed at 6 months after treatment.

Chlorophyll a = 12.7x OD @ 663nm-'2.69.\OD@ 645nm x V/Wx1000

Chlorophyll b = 22.9x OD @ 645nm- 4.63\OD@ 663am x V/Wx1000

Total chlorophyll = 8.02x OD @ 663nm + 20.2xOD@ 645nm x V/Wx1000

Where, OD - Optical Density, V - Volume made up, W- Weight of sample

3.3.8.5. Anatomical studies

Leaf anatomical studies with the aid of free hand section and observed under the light microscope with an eye piece lens (12.5 x) and an objective of low power lens (10 x). The sections were stained with saffranin (1 %) (the saffranin was prepared by dissolving 1gm saffranin powder in 100 ml of distilled water and filtered) and mounted in 50 % glycerine. All of them were photographed. (Elumalai *et al.*, 2014).

3.3.8.6. Weather parameters

Daily readings of temperature, relative humidity and light intensity were recorded at 0900, 1200 and 1500 hrs.

3.4. Evaluation under indoor conditions

The plants after application of second dose of growth retardants placed in the interior under medium light intensity (800-2000 Lux) and observations were recorded on the interior performance. All the observations were repeated under indoor conditions.

3.5. Statistical analysis

Statistical analysis of the data collected was done by adopting MSTAT-C software (Mirshekari*et al.*, 2012). Multiple range tests were performed wherever necessary.

Results

4. RESULTS

Results obtained from the experiment 'Canopy management in foliage plants for interior landscaping' using six different species viz., *Dieffenbachia amoena, Dracaena sanderiana, Syngonium podophyllum, Scindapsus aureus, Ficus benjamina* and *Schefflera arboricola* are presented in this chapter.

Uniform three month old plants were selected, kept under greenhouse and the growth regulators viz., ancymidol, paclobutrazol, B-Nine and cycocel each at two concentrations were applied at two intervals, three months and six months after planting. The effect of growth retardants on different characters of plant species were evaluated and compared with control.

4.1. Evaluation under shade house conditions

4.1.1. Plant characters

Plant characters like height, spread, number of leaves, leaf area, internodal length, leaf producing interval etc. were observed at monthly intervals for six months.

4.1.1.1. Quantitative characters

4.1.1.1.1. Plant height (cm)

The data pertaining to the plant height are presented in tables 2a - 2f, Fig 2 and Fig 3, plates 3 and 4.

In *Dieffenbachia amoena*; at three months after application, a significant difference was observed among the treatments. Plant height was the lowest in T_7 (CCC 1000ppm)(38.94 cm) and the highest plant height was observed in T_9 (control) (58.61 cm) followed by T_5 (B-Nine 1000 ppm)(57.60 cm) and T_6 (B-nine 2000 ppm) (56.63 cm). Three months after second schedule application, the lowest plant height was observed in T_7 (CCC 1000 ppm)(42.59 cm). The highest plant height was observed in T_9 (control) (69.46 cm)followed by T_5 (B-Nine 1000 ppm)(68.40 cm) and T_6 (B-nine 2000 ppm) (67.43cm) (Table 2a, Fig 1a and plate 3a).

In *Dracaena sanderiana* at three months after first application, a significant difference was observed between the treatments. The plants treated with T_7 (CCC 1000ppm) showed the lowest plant height (31.15 cm) and the highest plant height was observed in T_3 (paclobutrazol 50 ppm)(49.35 cm). Three months after second application, plants treated with T_7 (CCC 1000ppm) showed the lowest plant height (32.64 cm) and the highest plant height was observed in T_9 (control)(61.22 cm)(Table 2b, Fig 1b and plate 3b).

In *Syngonium podophyllum,* three months after first application, significant difference was observed between the treatments. The lowest plant height (131.15 cm) was observed in the plants treated with T_3 (paclobutrazol 50ppm). The highest plant height was observed in T_9 (control) (148.83 cm) followed by T_5 (B-Nine 1000 ppm) (147.83 cm) and T_6 (B-Nine 2000 ppm) (146.83 cm). Three months after second application, the lowest plant height was observed in T_4 (paclobutrazol 100 ppm) (225.50 cm) and the highest plant height was observed in T_9 (control) (260.29 cm) followed by T_5 (B-Nine 1000 ppm) (259.29 cm) and T_6 (B-Nine 2000 ppm) (258.29 cm). (Table 2c and Fig 1c).

In *Scindapsus aureus,* three monthsafter first application, significant difference was observed between the treatments. The plants treated with T_4 (paclobutrazol 100ppm) had shown the lowest plant height (119.83 cm). The highest plant height was observed in T_9 (control) (145.44 cm) followed by T_5 (B-Nine 1000 ppm)(144.44 cm) and T_6 (B-Nine 2000 ppm) (143.44 cm). Three months after second application, the lowest plant height was observed in T_2(ancymidol 1000 ppm) (206.02 cm) and the highest plant height was observed in T_9 (control) (261.65 cm) followed by T_5 (B-Nine 1000 ppm)(260.65 cm) and T_6 (B-Nine 2000 ppm) (259.65 cm)(Table 2d and Fig 2a).

In *Ficus benjamina* at three months after first application, plants treated with T_4 (paclobutrazol 100ppm) had shown the lowest plant height (30.17cm). The plant height was the highest in T_9 (control) (59.28 cm) followed by T_5 (B-Nine 1000 ppm)(58.28 cm) and T_6 (B-Nine 2000 ppm) (57.28 cm). Similar results were observed at three months after second application (Table 2e, Fig 2b and plate 4a).

In *Schefflera arboricola* at three months after application, significant difference was observed between the treatments. The plants treated with T_4 (paclobutrazol 100ppm) were observed with lowest plant height (31.06cm). The highest plant height was observed in T_9 (control) (38.94 cm). Similar results were observed at three months after second application (Table 2f, Fig 2c and plate 4b).

4.1.1.1.2. Plant spread (cm)

This parameter was not taken into consideration for the plant species *Syngonium podophyllum* and *Scindapsus aureus,* as these plants are climbing type.

The observations on the plant spread are presented in tables 3a - 3d.

In *Dieffenbachia amoena,* up to three months after application, no significant differences were observed among the treatments. At three months after second application, the plants treated with T_8 (CCC 2000ppm) was observed with the lowest plant spread (48.54 cm). The highest plant spread was observed in T_9(control)(62.51 cm) followed by T_5 (B-Nine 1000 ppm) and T_6 (B-Nine 2000 ppm) (61.51 cm and 60.51 cm) (Table 3a).

In *Dracaena sanderiana* at three months after first application, the lowest plant spread was observed in T_7 (CCC 1000 ppm) (24.91 cm) and the highest plant spread was observed in T_3 (paclobutrazol 50 ppm) (27.58 cm) followed by T_9 (control) (27.24 cm). At three months after second application, the plants treated with T_7 (CCC 1000 ppm) was observed with the lowest plant spread (26.17 cm). The highest plant spread was observed in T_9 (control)(29.93 cm)followed by T_3 (paclobutrazol 50 ppm) (29.79 cm)(Table 3b).

In *Ficus benjamina*, no significant difference was observed among the treatments at three months after application. At three months after second application, the lowest plant spread was observed in the plants treated with T_2 (ancymidol 1000ppm) (32.51 cm) followed by T_1 (ancymidol 500ppm) (32.86 cm) and the highest plant spread was observed in T_8 (cycocel 2000 ppm) (38.27 cm) (Table 3c).

In *Schefflera arboricola*, at three months after application, significant difference was observed between the treatments. The lowest plant spread was observed in the plants treated with T_5 (B-Nine 1000 ppm) (34.56 cm) and the highest plant spread was observed in T_8 (37.93 cm). Similar results were observed at three months after second application (Table 3d).

Table 2a. Effect of application of growth retardants on plant height in *Dieffenbachia amoena*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	44.10^{b}	46.27^{bc}	48.32^{bcd}	50.25^{bc}	52.12^{bc}	53.85^{c}	55.49^{c}
T_2	41.60^{b}	43.75^{bc}	45.78^{bc}	47.69^{bc}	49.54^{bc}	51.25^{bc}	52.87^{bc}
T_3	45.49^{b}	48.20^{bc}	50.79^{cd}	53.26^{cd}	55.67^{cd}	57.94^{c}	60.12^{c}
T_4	44.66^{b}	47.17^{bc}	49.56^{bcd}	51.83^{cd}	54.04^{c}	56.11^{c}	58.09^{c}
T_5	45.82^{b}	49.80^{c}	53.80^{d}	57.60^{d}	61.30^{d}	64.90^{d}	68.40^{d}
T_6	44.80^{b}	48.83^{c}	52.83^{d}	56.63^{d}	60.32^{d}	63.92^{d}	67.43^{d}
T_7	34.38^{a}	36.02^{a}	37.54^{a}	38.94^{a}	40.28^{a}	41.48^{a}	42.59^{a}
T_8	39.54^{ab}	41.11^{ab}	42.56^{ab}	43.89^{ab}	45.16^{ab}	46.29^{ab}	47.30^{ab}
T_9	46.85^{b}	50.89^{c}	54.81^{d}	58.61^{d}	62.35^{d}	65.95^{d}	69.46^{d}

***Figures with even alphabets form one homogenous group**

Table 2b. Effect of application of growth retardants on plant height in *Dracaena sanderiana*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	34.05^{ab}	36.23^{ab}	38.30^{ab}	40.25^{ab}	42.11^{ab}	43.93^{b}	45.71^{bc}
T_2	41.66^{b}	43.17^{b}	44.57^{b}	45.85^{b}	47.04^{b}	48.19^{bc}	49.26^{bcd}
T_3	38.77^{ab}	42.41^{b}	45.94^{b}	49.35^{b}	52.67^{b}	55.95^{c}	59.15^{de}
T_4	38.61^{ab}	41.78^{b}	44.84^{b}	47.78^{b}	50.63^{b}	53.44^{bc}	56.17^{cde}
T_5	32.94^{ab}	37.73^{ab}	42.41^{b}	46.97^{b}	51.44^{b}	55.87^{c}	60.22^{e}
T_6	31.94^{ab}	36.73^{ab}	41.41^{b}	45.97^{b}	50.44^{b}	54.87^{c}	59.22^{e}
T_7	28.88^{a}	29.75^{a}	30.51^{a}	31.15^{a}	31.70^{a}	32.21^{a}	32.64^{a}
T_8	43.60^{b}	44.01^{b}	44.31^{b}	44.49^{b}	44.58^{b}	44.63^{b}	44.64^{b}
T_9	33.94^{ab}	38.73^{ab}	43.41^{b}	47.97^{b}	52.44^{b}	56.87^{c}	61.22^{e}

***Figures with even alphabets form one homogenous group**

Table 2c. Effect of application of growth retardants on plant height in *Syngonium podophyllum*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	31.35^{a}	67.68^{ab}	103.77^{a}	139.56^{c}	174.97^{b}	210.12^{b}	245.02^{c}
T_2	31.40^{a}	66.73^{a}	101.82^{a}	136.61^{abc}	171.02^{b}	205.17^{b}	239.07^{b}
T_3	31.94^{a}	65.27^{a}	98.36^{a}	131.15^{a}	163.56^{a}	195.71^{a}	227.61^{a}
T_4	35.83^{a}	68.16^{ab}	100.25^{a}	132.04^{ab}	163.45^{a}	194.60^{a}	225.50^{a}
T_5	33.62^{a}	71.95^{b}	110.04^{a}	147.83^{d}	185.24^{c}	222.39^{c}	259.29^{d}
T_6	32.62^{a}	70.95^{b}	109.04^{a}	146.83^{d}	184.24^{c}	221.39^{c}	258.29^{d}
T_7	32.38^{a}	67.71^{ab}	102.80^{a}	137.59^{bc}	172.00^{b}	206.15^{b}	240.05^{bc}
T_8	31.30^{a}	64.93^{a}	98.32^{a}	131.41^{a}	164.12^{a}	196.57^{a}	228.77^{a}
T_9	34.62^{a}	72.95^{b}	111.04^{a}	148.83^{d}	186.24^{c}	223.39^{c}	260.29^{d}

***Figures with even alphabets form one homogenous group**

Table 2d. Effect of application of growth retardants on plant height in *Scindapsus aureus*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T$_1$	44.13^{b}	73.23^{bc}	101.93^{abc}	130.44^{ab}	158.64^{a}	186.44^{a}	213.95^{a}
T$_2$	40.40^{ab}	68.80^{abc}	96.80^{abc}	124.61^{a}	152.11^{a}	179.21^{a}	206.02^{a}
T$_3$	45.30^{b}	78.07^{c}	110.44^{c}	142.62^{bc}	174.49^{b}	205.96^{b}	237.14^{b}
T$_4$	32.31^{ab}	63.08^{ab}	93.45^{ab}	123.63^{a}	153.50^{a}	182.97^{a}	212.15^{a}
T$_5$	25.43^{a}	65.43^{abc}	105.03^{bc}	144.44^{c}	183.54^{b}	222.24^{c}	260.65^{c}
T$_6$	24.43^{a}	64.43^{abc}	104.03^{bc}	143.44^{c}	182.54^{b}	221.24^{c}	259.65^{c}
T$_7$	34.03^{ab}	69.03^{abc}	103.63^{bc}	138.04^{bc}	172.14^{b}	205.84^{b}	239.25^{b}
T$_8$	27.76^{a}	58.78^{a}	89.40^{a}	119.83^{a}	149.95^{a}	179.67^{a}	209.10^{a}
T$_9$	26.43^{a}	66.43^{abc}	106.03^{bc}	145.44^{c}	184.54^{b}	223.24^{c}	261.65^{c}

***Figures with even alphabets form one homogenous group**

Table 2e. Effect of application of growth retardants on plant height in *Ficus benjamina*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T$_1$	24.52^{abc}	31.02^{c}	37.39^{c}	44.65^{d}	51.81^{d}	58.90^{d}	65.87^{d}
T$_2$	24.83^{bc}	29.93^{bc}	34.90^{bc}	40.76^{cd}	46.52^{c}	52.21^{c}	57.78^{c}
T$_3$	20.95^{ab}	25.45^{ab}	29.82^{ab}	35.08^{ab}	40.24^{b}	45.30^{b}	50.30^{b}
T$_4$	19.64^{ab}	22.94^{ab}	26.11^{a}	30.17^{a}	34.13^{a}	38.02^{a}	41.79^{a}
T$_5$	26.75^{c}	37.05^{d}	47.22^{d}	58.28^{e}	69.24^{e}	80.13^{e}	90.90^{e}
T$_6$	25.75^{c}	36.05^{d}	46.22^{d}	57.28^{e}	68.24^{e}	79.13^{e}	89.90^{e}
T$_7$	20.67^{ab}	28.47^{bc}	36.14^{c}	44.70^{d}	53.16^{d}	61.55^{d}	69.82^{d}
T$_8$	19.20^{a}	24.90^{ab}	30.47^{ab}	36.93^{bc}	43.29^{bc}	49.58^{bc}	55.75^{c}
T$_9$	27.75^{c}	38.05^{d}	48.22^{d}	59.28^{e}	70.24^{e}	81.13^{e}	91.90^{e}

***Figures with even alphabets form one homogenous group**

Table 2f. Effect of application of growth retardants on plant height in *Schefflera arboricola*

Treatments	3rd month	4th month	5th month	6th Month	7th month	8th month	9th month
T$_1$	30.72^{abc}	31.98^{ab}	33.15^{ab}	34.18^{ab}	35.12^{ab}	35.97^{ab}	36.69^{ab}
T$_2$	33.40^{c}	34.61^{b}	35.73^{b}	36.71^{bc}	37.59^{b}	38.39^{b}	39.06^{bc}
T$_3$	33.30^{c}	34.84^{b}	36.29^{b}	37.60^{bc}	38.81^{bc}	39.94^{b}	40.94^{bc}
T$_4$	27.06^{a}	28.50^{a}	29.85^{a}	31.06^{a}	32.17^{a}	33.20^{a}	34.10^{a}
T$_5$	28.12^{abc}	31.50^{ab}	34.79^{b}	37.94^{c}	40.99^{c}	43.96^{c}	46.80^{d}
T$_6$	27.12^{abc}	30.50^{ab}	33.79^{b}	36.94^{c}	39.99^{c}	42.96^{c}	45.80^{d}
T$_7$	28.79^{ab}	30.72^{ab}	32.57^{ab}	34.28^{ab}	35.89^{ab}	37.42^{b}	38.82^{bc}
T$_8$	31.98^{bc}	33.77^{b}	35.47^{b}	37.03^{bc}	38.49^{bc}	39.87^{b}	41.12^{c}
T$_9$	29.12^{abc}	32.50^{ab}	35.79^{b}	38.94^{c}	41.99^{c}	44.96^{c}	47.80^{d}

***Figures with even alphabets form one homogenous group**

Fig 1a. Effect of application of growth retardants on plant height in *Dieffenbachia amoena*

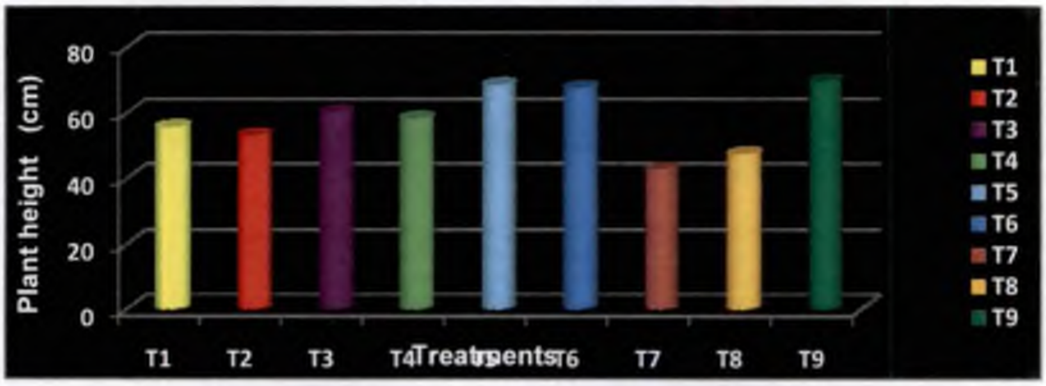


Fig 1b. Effect of application of growth retardants on plant height in *Dracaena sanderiana*

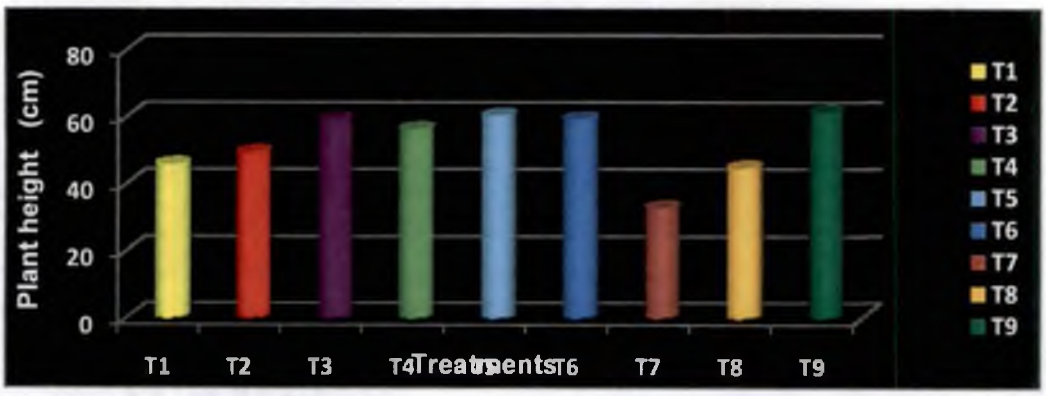


Fig 1c. Effect of application of growth retardants on plant height in *Syngonium podophyllum*

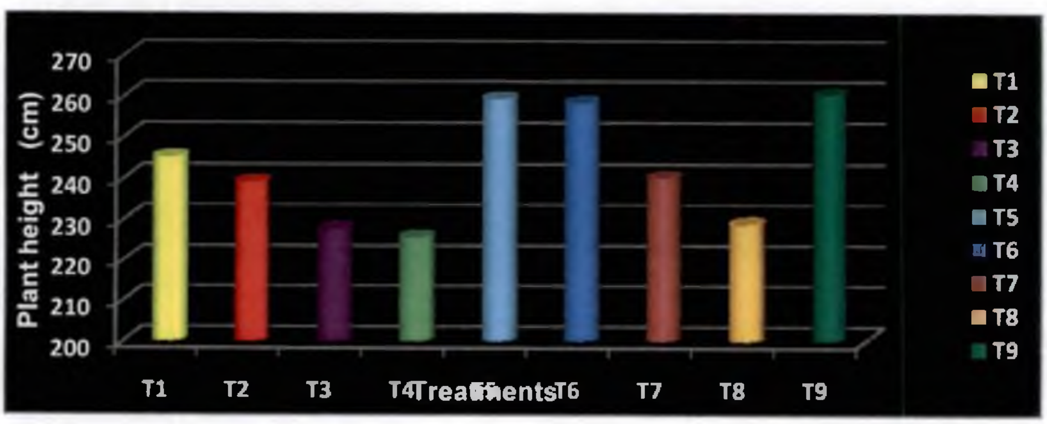


Fig 2a. Effect of application of growth retardants on plant height in *Scindapsus aureus*

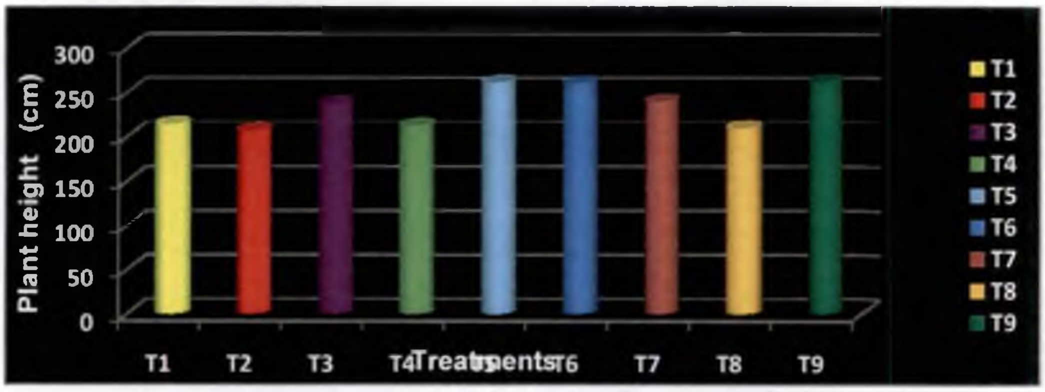


Fig 2b. Effect of application of growth retardants on plant height in *Ficus benjamina*

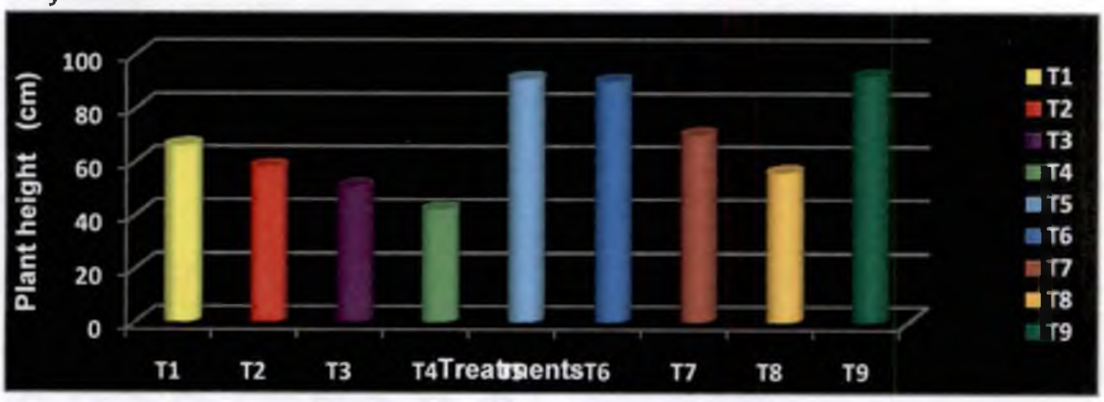


Fig 2c. Effect of application of growth retardants on plant height in *Schefflera arboricola*

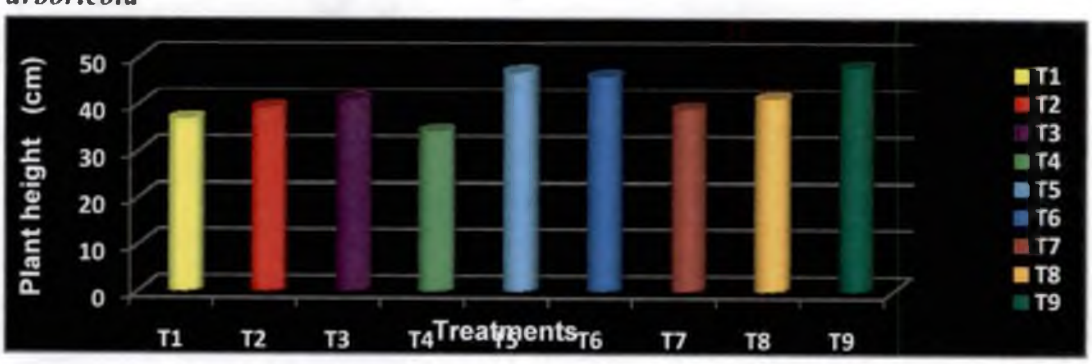


Plate 3a: Effect of application of growth retardants on plant height in *Dieffenbachia amoena*

Plate 3b: Effect of application of growth retardants on plant height in *Dracaena sanderiana*

Plate 4a: Effect of application of growth retardants on plant height in *Ficus benjamina*

Plate 4b: Effect of application of growth retardants on plant height in *Schefflera arboricola*

Table 3a. Effect of application of growth retardants on plant spread in *Dieffenbachia amoena*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	40.78[a]	42.59[a]	43.63[a]	45.93[a]	47.46[a]	48.47[ab]	49.23[a]
T_2	45.66[a]	50.52[a]	51.53[a]	53.25[a]	54.36[a]	55.09[ab]	55.74[ab]
T_3	42.66[a]	45.61[a]	45.83[a]	49.05[a]	51.35[a]	52.82[ab]	54.20[ab]
T_4	44.87[a]	46.22[a]	47.87[a]	49.25[a]	50.48[a]	51.75[ab]	53.46[ab]
T_5	42.75[a]	46.82[a]	50.29[a]	51.73[a]	56.11[a]	58.95[b]	61.51[b]
T_6	41.75[a]	45.82[a]	49.29[a]	50.73[a]	55.11[a]	57.95[b]	60.51[b]
T_7	45.28[a]	46.97[a]	47.98[a]	49.35[a]	49.95[a]	50.88[ab]	51.67[a]
T_8	45.05[a]	46.54[a]	47.15[a]	47.51[a]	47.98[a]	48.44[a]	48.54[a]
T_9	43.75[a]	47.82[a]	51.29[a]	52.73[a]	57.11[a]	59.95[b]	62.51[b]

***Figures with even alphabets form one homogenous group**

Table 3b. Effect of application of growth retardants on plant spread in *Dracaena sanderiana*

Treatments	3rd month	4th month	5th month	6th Month	7th month	8th month	9th month
T_1	24.78[a]	25.54[a]	26.27[ab]	26.95[a]	27.59[bcd]	28.21[bc]	28.79[bc]
T_2	24.22[a]	24.77[a]	25.31[ab]	25.80[a]	26.26[ab]	26.72[ab]	27.12[ab]
T_3	24.99[a]	25.90[a]	26.77[b]	27.58[b]	28.36[d]	29.10[c]	29.79[c]
T_4	24.64[a]	25.40[a]	26.14[ab]	26.82[ab]	27.47[bcd]	28.09[bc]	28.67[bc]
T_5	22.36[a]	24.18[a]	25.25[ab]	26.24[b]	27.18[cd]	28.09[c]	28.93[c]
T_6	21.36[a]	23.18[a]	24.25[ab]	25.24[b]	26.18[cd]	27.09[c]	27.93[c]
T_7	23.56[a]	24.20[a]	24.45[a]	24.91[a]	25.35[a]	25.78[a]	26.17[a]
T_8	25.07[a]	25.43[a]	25.78[ab]	26.09[ab]	26.38[bc]	26.66[ab]	26.90[a]
T_9	23.36[a]	25.18[a]	26.25[ab]	27.24[b]	28.18[cd]	29.09[c]	29.93[c]

***Figures with even alphabets form one homogenous group**

Table 3c. Effect of application of growth retardants on plant spread in *Ficus benjamina*

Treatments	3rd month	4th month	5th month	6th Month	7th month	8th month	9th month
T_1	30.17[a]	30.77[a]	31.11[a]	31.31[a]	31.62[a]	31.94[a]	32.86[a]
T_2	31.36[a]	31.73[a]	32.05[a]	32.31[a]	32.43[ab]	32.45[a]	32.51[a]
T_3	31.61[a]	32.34[a]	33.66[a]	34.10[a]	35.28[ab]	36.08[ab]	36.81[ab]
T_4	32.39[a]	33.37[a]	34.12[a]	34.85[a]	35.56[ab]	36.99[b]	37.83[b]
T_5	27.56[a]	28.98[a]	30.36[a]	31.37[a]	32.59[ab]	33.35[ab]	34.46[ab]
T_6	26.56[a]	27.98[a]	29.36[a]	30.37[a]	31.59[ab]	32.35[ab]	33.46[ab]
T_7	29.55[a]	33.08[a]	34.87[a]	35.16[a]	36.18[ab]	36.91[b]	37.87[b]
T_8	32.70[a]	33.82[a]	34.87[a]	35.66[a]	36.59[b]	37.38[b]	38.27[b]
T_9	28.56[a]	29.98[a]	31.36[a]	32.37[a]	33.59[ab]	34.35[ab]	35.46[ab]

***Figures with even alphabets form one homogenous group**

Table 3d. Effect of application of growth retardants on plant spread in *Schefflera arboricola*

Treatments	3rd month	4th month	5th month	6th Month	7th month	8th month	9th month
T_1	34.60[a]	34.90[a]	35.26[a]	35.60[a]	35.90[a]	36.26[a]	36.62[a]
T_2	36.47[ab]	36.84[ab]	37.18[ab]	37.48[ab]	37.84[ab]	38.18[ab]	38.48[ab]
T_3	36.01[ab]	36.45[ab]	36.75[ab]	37.02[ab]	37.45[ab]	37.85[ab]	38.02[ab]
T_4	35.55[ab]	35.85[ab]	36.05[ab]	36.56[ab]	36.85[ab]	37.05[ab]	37.58[ab]
T_5	33.54[b]	33.85[ab]	34.05[ab]	34.56[ab]	34.85[ab]	35.05[ab]	35.57[a]
T_6	34.54[b]	35.85[ab]	34.05[ab]	35.56[a]	35.85[ab]	35.05[ab]	36.57[ab]
T_7	35.55[ab]	35.85[ab]	35.05[ab]	36.56[ab]	36.85[ab]	36.05[ab]	37.58[ab]
T_8	36.92[b]	37.23[b]	37.67[b]	37.93[b]	38.23[b]	38.63[b]	38.93[b]
T_9	35.54[b]	35.85[ab]	35.05[ab]	36.56[ab]	36.85[ab]	36.05[ab]	37.57[ab]

***Figures with even alphabets form one homogenous group**

4.1.1.1.3. Length and breadth of leaves (cm)

When the foliage plants are concerned for interior plantscaping, the leaf characters are needed to be studied completely, so as to recommend them for particular conditions. Length and breadth of leaves are the important parameters to be considered while evaluating a foliage plant. In the present study, they were measured at monthly intervals.

4.1.1.1.3.1. Leaf length (cm)

The observations on the leaf length are presented in tables 4a - 4f.

In *Dracaena sanderiana, Scindapsus aureus,*and *Schefflera arboricola* there was no significant variation observed in leaf length before and after the treatment and between the treatments under the greenhouse condition for total six months duration (Tables 4b, 4d and 4f).

In *Dieffenbachia amoena,* three months after application, significant difference was observed between the treatments. The plants treated with T_7 (CCC 1000ppm) was observed with the lowest leaf length (24.14 cm). The highest leaf length was observed in T_4 (paclobutrazol 100 ppm) (29.11 cm) followed by T_3 (paclobutrazol 50 ppm) (29.00 cm). Similar results were observed at three months after second application (Table 4a).

In *Syngonium podophyllum,* there was no significant variation at three months after application. At three months after second application, significant difference was observed between the treatments. The plants treated with T_3 (paclobutrazol 50ppm) (9.20 cm) followed by T_8 (CCC 2000ppm) (9.34 cm) and T_1 (ancymidol 500 ppm) (9.38 cm). The highest leaf length was observed in T_9(control) (11.21 cm) followed by T_6(B-Nine 2000 ppm) (11.01cm) (Table 4b).

In *Ficus benjamina,* at three months after application, significant difference was observed between the treatments. The lowest leaf length was observed in the plants treated with T_4 (paclobutrazol 100ppm)(4.48 cm). The highest leaf length was observed in T_9 (control) (5.24 cm). Three months after second application, similar results were observed (Table 4e).

4.1.1.1.3.2. Leaf breadth (cm)

The observations on the leaf breadth are presented in tables 5a - 5f.

In *Dieffenbachia amoena,* significant difference was observed between the treatments.At three months after application, plants treated with T_7 (CCC 1000ppm) had shown the lowest leaf breadth (9.36cm) and the highest leaf breadth was observed in T_3 (paclobutrazol 50 ppm) (12.08 cm). Three months after second application, similar results were observed (Table 5a).

In *Dracaena sanderiana,* significant difference was observed among the treatments only after second schedule of application. The lowest leaf breadth was observed in T_4(paclobutrazol 100 ppm) (2.68 cm) and the highest leaf breadth was noticed in T_9 (control) (3.46 cm) (Table 5b).

In *Syngonium podophyllum, Scindapsus aureus*and *Ficus benjamina*there was no significant variation observed in leaf breadth before and after the treatment of growth retardants and between the treatments (Tables 5c, 5d and 5e).

In *Schefflera arboricola,* three months after first application, the lowest leaf breadth was observed in T_1(ancymidol 500 ppm) (11.28 cm) and T_6(B-Nine 2000 ppm) (11.28 cm) and the highest leaf breadth was observed in T_3(paclobutrazol 50 ppm) (12.56 cm), T_5 (B-Nine 1000 ppm) (12.56 cm) and T_7 (CCC 1000 ppm)(12.56 cm). Similar results were observed at three months after second application.

4.1.1.1.4. Leaf area (cm^2)

The observations on the leaf area are presented in tables 6a - 6f.

In *Dieffenbachia amoena,* significant difference was observed between the treatments. At three months after first application the plants treated with T_7 (CCC 1000ppm) was observed with the lowest leaf area (183.78cm^2) and the highest leaf area was observed in T_3 (paclobutrazol 50 ppm) (291.71 cm^2). Similar results were observed three months after second application. (Table 6a).

In *Dracaena sandariana* the growth retardant application even after the two schedules of application, did not show any effect on leaf area (Tables 6b).

In *Syngonium podophyllum,* no significant difference was observed in the leaf area three months after first application. At three months after second application, plants treated with T_3 (paclobutrazol 50 ppm) showed the lowest leaf area (49.06 cm^2) and the highest leaf area was observed in T_9 (control) (66.62 cm^2) followed by T_5 (B-Nine 1000 ppm) (65.62 cm^2) and T_6 (B-Nine 2000 ppm) (64.62 cm^2). (Table 6c).

In *Scindapsus aureus,* after the first schedule of application, plants treated with T_4 (paclobutrazol 100 ppm) showed lowest leaf area (44.59 cm^2) and the highest leaf area was observed in T_9 (control) (50.32 cm^2). Similar results were observed after second schedule of application (Table 6d).

In *Ficus benjamina,* no significant difference was observed after first schedule of application. After the second schedule of growth retardant application, the lowest leaf area was observed in T_4 (paclobutrazol 100 ppm) (10.89 cm^2) and the highest leaf area was observed in T_9(control) (13.88 cm^2) (Table 6e).

In *Schefflera arboricola,* at three months after first application, significant difference was observed between the treatments. The plants treated with T_1

(ancymidol 500ppm) showed the lowest leaf area (105.83 cm^2) and the highest leaf area (134.40 cm^2) was observed in T_8 (CCC 2000 ppm). At three months after second application, similar results were observed (Table 6f).

4.1.1.1.5. Number of leaves

The observations on the number of leaves are presented in tables 7a - 7f.

The number of leaves was not affected by the application of growth retardants.

4.1.1.1.6. Internodal length (cm)

The observations on the plant height are presented in tables 8a - 8f and Fig 4 and 5

Internodal length is also an important character to be considered because it determines compactness and appearance of the plant. Similar to the other parameters the internodal length of plant was determined to evaluate the effect of growth retardants in lowering the internodal length of the selected plant species.

In *Dieffenbachia amoena,* a significant variation was not noticed upto two months after application. At three months after application, plants treated with T_2 (ancymidol 1000ppm) showed the lowest internodal length (1.61cm) followed by T_7 (CCC 1000ppm) (1.64cm) . The highest internodal length was observed in T_9 (control) (2.34cm) followed by T_5 (B-Nine 1000 ppm) (2.33 cm) and T_6 (B-Nine 2000 ppm) (2.32 cm). At three months after second application, similar results were obtained.

In *Dracaena sanderiana,* there was no significant difference observed at three months after application. At three months after second application, plants treated with T_7 (CCC 1000ppm) showed lowest internodal length (2.39cm)followed by T_8 (CCC 2000 ppm) (2.51 cm) and the highest internodal length was observed in T_9 (control)

(3.58cm) followed by T_5 (B-Nine 1000 ppm)(3.57 cm) and T_6 (B-Nine 2000 ppm) (3.56 cm) and (Table 8b and Fig 3b).

In *Syngonium podophyllum,* at three months after first application, significant difference was observed between the treatments. The plants treated with T_4 (paclobutrazol 100ppm) showed the lowest internodal length (2.51cm) and the highest internodal length was observed in T_1 (ancymidol 500ppm) (3.59 cm) followed by T_9 (control) (3.36 cm) and T_5 (B-Nine 1000 ppm) (3.35 cm).At three months after second application T_4 (paclobutrazol 100 ppm) showed the lowest internodal length (2.86 cm) and the highest internodal length was observed in T_9 (control) (4.43 cm) followed by T_5 (B-Nine 1000 ppm) (4.42 cm) and T_6 (B-Nine 2000 ppm) (4.41 cm). (Table 8c and Fig 3c).

In *Scindapsus aureus,* at three months after first application, no significant difference was observed between the treatments. At three months after second application, plants treated with T_4 (paclobutazol 100ppm) was observed with the lowest internodal length (3.81cm) followed by T_3 (paclobutrazol 50 ppm) (3.96 cm) and the highest internodal length was in T_7 (CCC 1000 ppm) (5.73 cm) followed by T_9 (control) (5.66cm) and T_5 (B-Nine 1000 ppm) (5.65 cm).(Table 8d and Fig 4a).

In *Ficus benjamina,* significant variation was observed at three months after first application. Plants treated with T_8 (CCC 2000ppm) showed the lowest internodal length (2.09cm) followed by T_3 (paclobutrazol 50 ppm) (2.16 cm) and T_4(paclobutrazol 100 ppm) (2.18 cm). The highest internodal length was observed in T_7 (CCC 1000 ppm) (2.61 cm) followed by T_9 (control) (2.52 cm), T_5 (B-Nine 1000 ppm) (2.51 cm) and T_6 (B-Nine 2000 ppm) (2.50 cm). After second application, the lowest internodal length was observed in T_4 (paclobutrazol 100 ppm) (2.30 cm) followed by T_3 (paclobutrazol 50 ppm) (2.37 cm) and the highest internodal length was observed in T_9 (control) (3.24 cm) followed by T_5 (B-Nine 1000 ppm) (3.23 cm) and T_6 (B-Nine 2000 ppm) (3.22 cm). (Table 8e and Fig 4b).

In *Schefflera arboricola,* at three months after first application, significant difference was observed between the treatments. The plants treated with T_2 (ancymidol 1000ppm) were observed with the lowest internodal length (1.47cm). followed by T_3 (paclobutrazol 50 ppm) (1.56 cm) and T_1 (ancymidol 500 ppm) (1.57 cm). The highest internodal length was observed in T_9 (control) (2.37 cm) followed by T_5 (B-Nine 1000 ppm) (2.36 cm) and T_6 (B-Nine 2000 ppm) (2.35 cm). Three months after second application, the lowest internodal length was observed in T_2 (ancymidol 1000 ppm) (1.67 cm) followed by T_1 (ancymidol 500 ppm) (1.86 cm) and the highest internodal length was observed in T_9 (control) (3.20 cm) followed by T_5 (B-Nine 1000 ppm (3.19 cm) and T_6 (B-Nine 2000 ppm) (3.18 cm). (Table 8f and Fig 4c).

Table 4a. Effect of application of growth retardants on leaf length in *Dieffenbachia amoena*

Treatments	3rd month	4th month	5th month	6th month	7th Month	8th Month	9th month
T_1	27.06^{bc}	27.25^{bc}	27.45^{bc}	27.65^{bc}	27.85^{bc}	28.05^{bc}	28.24^{bc}
T_2	24.84^{ab}	25.02^{ab}	25.20^{ab}	25.38^{ab}	25.55^{ab}	25.73^{ab}	25.91^{ab}
T_3	28.20^{c}	28.46^{c}	28.73^{c}	29.00^{c}	29.27^{c}	29.54^{c}	29.80^{c}
T_4	28.40^{c}	28.64^{c}	28.88^{c}	29.11^{c}	29.35^{c}	29.59^{c}	29.83^{c}
T_5	24.89^{abc}	25.26^{abc}	25.63^{abc}	26.00^{bc}	26.36^{bc}	26.73^{bc}	27.10^{bc}
T_6	23.89^{abc}	24.26^{abc}	24.63^{abc}	25.00^{bc}	25.36^{bc}	25.73^{bc}	26.10^{bc}
T_7	23.66^{a}	23.82^{a}	23.98^{a}	24.14^{a}	24.31^{a}	24.47^{a}	24.63^{a}
T_8	27.16^{bc}	27.29^{bc}	27.42^{bc}	27.55^{bc}	27.67^{bc}	27.80^{bc}	27.93^{bc}
T_9	25.89^{abc}	26.26^{abc}	26.63^{abc}	27.00^{bc}	27.36^{bc}	27.73^{bc}	28.10^{bc}

***Figures with even alphabets form one homogenous group**

Table 4b. Effect of application of growth retardants on leaf length in *Dracaena sanderiana*

Treatments	3rd month	4th month	5th Month	6th month	7th month	8th month	9th month
T_1	12.27^{a}	12.41^{a}	12.55^{a}	12.69^{a}	12.82^{a}	12.95^{a}	13.08^{a}
T_2	12.16^{a}	12.29^{a}	12.42^{a}	12.55^{a}	12.68^{a}	12.80^{a}	12.92^{a}
T_3	12.17^{a}	12.33^{a}	12.48^{a}	12.64^{a}	12.79^{a}	12.94^{a}	13.08^{a}
T_4	12.57^{a}	12.72^{a}	12.87^{a}	13.02^{a}	13.16^{a}	13.30^{a}	13.44^{a}
T_5	11.11^{a}	11.30^{a}	11.48^{a}	11.67^{a}	11.85^{a}	12.02^{a}	12.20^{a}
T_6	10.11^{a}	10.30^{a}	10.48^{a}	10.67^{a}	10.85^{a}	11.02^{a}	11.20^{a}
T_7	11.55^{a}	11.68^{a}	11.81^{a}	11.94^{a}	12.06^{a}	12.18^{a}	12.30^{a}
T_8	12.18^{a}	12.31^{a}	12.44^{a}	12.56^{a}	12.69^{a}	12.81^{a}	12.92^{a}
T_9	12.11^{a}	12.30^{a}	12.48^{a}	12.67^{a}	12.85^{a}	13.02^{a}	13.20^{a}

***Figures with even alphabets form one homogenous group**

Table 4c. Effect of application of growth retardants on leaf length in *Syngonium podophyllum*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	7.85^{a}	8.11^{a}	8.37^{a}	8.62^{a}	8.88^{a}	9.13^{a}	9.38^{a}
T_2	8.55^{a}	8.78^{a}	9.01^{a}	9.23^{a}	9.46^{ab}	9.68^{ab}	9.90^{ab}
T_3	8.27^{a}	8.43^{a}	8.59^{a}	8.74^{a}	8.90^{a}	9.05^{a}	9.20^{a}
T_4	9.16^{a}	9.31^{a}	9.45^{a}	9.59^{a}	9.74^{ab}	9.87^{ab}	10.01^{ab}
T_5	8.00^{a}	8.40^{a}	8.84^{a}	9.18^{a}	9.53^{b}	9.87^{c}	10.21^{b}
T_6	8.14^{a}	9.29^{a}	9.74^{a}	10.00^{a}	10.53^{b}	10.67^{c}	11.01^{b}
T_7	8.38^{a}	8.59^{a}	8.80^{a}	9.01^{a}	9.21^{ab}	9.41^{ab}	9.61^{a}
T_8	8.23^{a}	8.42^{a}	8.60^{a}	8.79^{a}	8.98^{ab}	9.16^{a}	9.34^{a}
T_9	9.14^{a}	9.49^{a}	9.84^{a}	10.18^{a}	10.53^{b}	10.87^{c}	11.21^{b}

***Figures with even alphabets form one homogenous group**

Table 4d. Effect of application of growth retardants on leaf length in *Scindapsus aureus*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th Month	9th month
T_1	9.13^a	9.29^a	9.43^a	9.58^a	9.72^a	9.87^a	10.01^a
T_2	8.94^a	9.08^a	9.21^a	9.34^a	9.47^a	9.60^a	9.72^a
T_3	8.98^a	9.11^a	9.23^a	9.35^a	9.46^a	9.57^a	9.68^a
T_4	9.06^a	9.18^a	9.29^a	9.39^a	9.50^a	9.60^a	9.70^a
T_5	8.37^a	8.60^a	8.82^a	9.04^a	9.25^a	9.46^a	9.67^a
T_6	8.07^a	8.40^a	8.62^a	8.88^a	9.00^a	9.26^a	9.47^a
T_7	8.93^a	9.11^a	9.28^a	9.44^a	9.61^a	9.77^a	9.93^a
T_8	8.71^a	8.88^a	9.04^a	9.20^a	9.35^a	9.51^a	9.66^a
T_9	9.37^a	9.60^a	9.82^a	10.04^a	10.25^a	10.46^a	10.67^a

***Figures with even alphabets form one homogenous group**

Table 4e. Effect of application of growth retardants on leaf length in *Ficus benjamina*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	4.92^b	4.98^b	5.04^{bc}	5.09^{bc}	5.14^{bc}	5.19^{bc}	5.24^{bc}
T_2	4.63^{ab}	4.69^{ab}	4.74^{ab}	4.78^{ab}	4.83^{ab}	4.87^{ab}	4.91^{ab}
T_3	4.85^b	4.90^b	4.94^{bc}	4.98^{bc}	5.01^{bc}	5.04^{bc}	5.07^{bc}
T_4	4.37^a	4.41^a	4.45^a	4.48^a	4.50^a	4.53^a	4.55^a
T_5	4.96^b	5.04^b	5.11^{bc}	5.18^{bc}	5.24^c	5.30^c	5.37^c
T_6	4.85^b	4.90^b	4.94^{bc}	4.98^{bc}	5.01^{bc}	5.04^{bc}	5.07^{bc}
T_7	4.96^b	5.04^b	5.11^{bc}	5.18^{bc}	5.24^c	5.30^c	5.37^c
T_8	4.77^b	4.84^b	4.91^{bc}	4.98^{bc}	5.04^{bc}	5.10^{bc}	5.15^{bc}
T_9	4.99^b	5.08^b	5.16^c	5.24^c	5.32^c	5.39^c	5.46^c

***Figures with even alphabets form one homogenous group**

Table 4f. Effect of application of growth retardants on leaf length in *Schefflera arboricola*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th Month	9th month
T_1	11.34^{ab}	11.56^a	11.78^a	11.99^a	12.19^a	12.40^a	12.60^a
T_2	11.85^{ab}	12.05^a	12.25^a	12.45^a	12.64^a	12.82^a	13.01^a
T_3	11.58^{ab}	11.84^a	12.10^a	12.35^a	12.59^a	12.83^a	13.07^a
T_4	12.09^b	12.33^a	12.57^a	12.80^a	13.02^a	13.24^a	13.46^a
T_5	11.58^{ab}	11.84^a	12.10^a	12.35^a	12.59^a	12.83^a	13.07^a
T_6	11.34^{ab}	11.56^a	11.78^a	11.99^a	12.19^a	12.40^a	12.60^a
T_7	10.97^a	11.26^a	11.55^a	11.82^a	12.10^a	12.37^a	12.64^a
T_8	11.96^{ab}	12.24^a	12.53^a	12.80^a	13.07^a	13.33^a	13.60^a
T_9	11.54^{ab}	11.90^a	12.25^a	12.60^a	12.95^a	13.29^a	13.63^a

***Figures with even alphabets form one homogenous group**

Table 5a. Effect of application of growth retardants on leaf breadth in *Dieffenbachia amoena*

Treatments	rd month	th month	5th month	6th month	7th month	8th month	9th month
T_1	11.06^{b}	11.20^{b}	11.35^{bc}	11.49^{bc}	11.63^{bc}	11.76^{bc}	11.90^{bc}
T_2	10.17^{ab}	10.31^{ab}	10.44^{abc}	10.57^{abc}	10.70^{abc}	10.83^{abc}	10.95^{abc}
T_3	11.53^{b}	11.71^{b}	11.90^{c}	12.08^{c}	12.26^{c}	12.44^{c}	12.62^{c}
T_4	11.14^{b}	11.30^{b}	11.47^{bc}	11.63^{bc}	11.79^{bc}	11.95^{bc}	12.11^{bc}
T_5	10.60^{ab}	10.90^{b}	11.10^{bc}	11.33^{bc}	11.60^{bc}	11.80^{bc}	12.03^{bc}
T_6	10.63^{ab}	10.86^{b}	11.13^{bc}	11.30^{bc}	11.55^{bc}	11.82^{bc}	12.00^{bc}
T_7	8.99^{a}	9.120^{a}	9.24^{a}	9.36^{a}	9.48^{a}	9.59^{a}	9.70^{a}
T_8	9.76^{ab}	9.87^{ab}	9.97^{ab}	10.08^{ab}	10.18^{ab}	10.27^{ab}	10.37^{ab}
T_9	10.69^{ab}	10.92^{b}	11.16^{bc}	11.39^{bc}	11.61^{bc}	11.84^{bc}	12.06^{bc}

***Figures with even alphabets form one homogenous group**

Table 5b. Effect of application of growth retardants on leaf breadth in *Dracaena sanderiana*

Treatments	3rd month	4th Month	5th month	6th month	7th month	8th month	9th month
T_1	2.98^{a}	3.02^{a}	3.04^{a}	3.07^{a}	3.09^{a}	3.12^{a}	3.14^{ab}
T_2	2.98^{a}	3.01^{a}	3.04^{a}	3.06^{a}	3.08^{a}	3.11^{a}	3.13^{ab}
T_3	3.22^{a}	3.26^{a}	3.30^{a}	3.33^{a}	3.37^{a}	3.41^{a}	3.43^{b}
T_4	2.51^{a}	2.54^{a}	2.57^{a}	2.60^{a}	2.63^{a}	2.66^{a}	2.68^{a}
T_5	2.80^{a}	3.00^{a}	3.12^{a}	3.25^{a}	3.32^{a}	3.32^{a}	3.45^{b}
T_6	2.70^{a}	3.10^{a}	3.13^{a}	3.24^{a}	3.31^{a}	3.38^{a}	3.44^{b}
T_7	3.11^{a}	3.13^{a}	3.16^{a}	3.18^{a}	3.20^{a}	3.22^{a}	3.24^{ab}
T_8	3.12^{a}	3.14^{a}	3.16^{a}	3.19^{a}	3.20^{a}	3.22^{a}	3.24^{ab}
T_9	3.05^{a}	3.12^{a}	3.19^{a}	3.26^{a}	3.33^{a}	3.39^{a}	3.46^{b}

***Figures with even alphabets form one homogenous group**

Table 5c. Effect of application of growth retardants on leaf breadth in *Syngonium podophyllum*

Treatments	3rd month	4th Month	5th month	6th month	7th month	8th month	9th month
T_1	6.02^{a}	6.21^{a}	6.40^{a}	6.58^{a}	6.77^{a}	6.95^{a}	7.13^{a}
T_2	6.25^{a}	6.42^{a}	6.58^{a}	6.75^{a}	6.91^{a}	7.07^{a}	7.23^{a}
T_3	6.13^{a}	6.26^{a}	6.39^{a}	6.51^{a}	6.64^{a}	6.76^{a}	6.88^{a}
T_4	6.97^{a}	7.09^{a}	7.22^{a}	7.34^{a}	7.45^{a}	7.57^{a}	7.69^{a}
T_5	6.50^{a}	6.73^{a}	6.95^{a}	7.18^{a}	7.40^{a}	7.63^{a}	7.85^{a}
T_6	6.49^{a}	6.72^{a}	6.94^{a}	7.17^{a}	7.39^{a}	7.62^{a}	7.84^{a}
T_7	6.42^{a}	6.57^{a}	6.72^{a}	6.87^{a}	7.02^{a}	7.16^{a}	7.30^{a}
T_8	6.19^{a}	6.34^{a}	6.48^{a}	6.61^{a}	6.75^{a}	6.89^{a}	7.02^{a}
T_9	6.51^{a}	6.74^{a}	6.96^{a}	7.19^{a}	7.41^{a}	7.64^{a}	7.86^{a}

***Figures with even alphabets form one homogenous group**

Table 5d. Effect of application of growth retardants on leaf breadth in *Scindapsus aureus*

Treatments	3rd month	4th Month	5th Month	6th month	7th month	8th month	9th Month
T_1	6.32[a]	6.46[a]	6.61[a]	6.74[a]	6.88[a]	7.01[a]	7.15[a]
T_2	6.39[a]	6.54[a]	6.67[a]	6.81[a]	6.94[a]	7.07[a]	7.19[a]
T_3	6.59[a]	6.71[a]	6.82[a]	6.93[a]	7.04[a]	7.14[a]	7.24[a]
T_4	6.26[a]	6.37[a]	6.48[a]	6.58[a]	6.68[a]	6.78[a]	6.88[a]
T_5	6.23[a]	6.44[a]	6.64[a]	6.84[a]	7.04[a]	7.24[a]	7.43[a]
T_6	6.24[a]	6.45[a]	6.65[a]	6.85[a]	7.05[a]	7.25[a]	7.44[a]
T_7	6.57[a]	6.74[a]	6.90[a]	7.06[a]	7.21[a]	7.36[a]	7.52[a]
T_8	6.56[a]	6.71[a]	6.86[a]	7.00[a]	7.14[a]	7.27[a]	7.41[a]
T_9	6.22[a]	6.43[a]	6.63[a]	6.83[a]	7.03[a]	7.23[a]	7.42[a]

*Figures with even alphabets form one homogenous group

Table 5e. Effect of application of growth retardants on leaf breadth in *Ficus benjamina*

Treatments	3rd Month	4th Month	5th Month	6th month	7th month	8th month	9th Month
T_1	2.73[a]	2.77[a]	2.80[a]	2.83[a]	2.86[a]	2.89[a]	2.91[a]
T_2	2.56[a]	2.59[a]	2.63[a]	2.66[a]	2.68[a]	2.71[a]	2.73[a]
T_3	2.76[a]	2.79[a]	2.82[a]	2.85[a]	2.87[a]	2.90[a]	2.92[a]
T_4	2.83[a]	2.86[a]	2.89[a]	2.92[a]	2.94[a]	2.96[a]	2.98[a]
T_5	2.76[a]	2.79[a]	2.82[a]	2.85[a]	2.87[a]	2.90[a]	2.92[a]
T_6	2.75[a]	2.78[a]	2.81[a]	2.84[a]	2.86[a]	2.89[a]	2.91[a]
T_7	2.76[a]	2.79[a]	2.82[a]	2.85[a]	2.87[a]	2.90[a]	2.92[a]
T_8	2.56[a]	2.59[a]	2.63[a]	2.66[a]	2.68[a]	2.71[a]	2.73[a]
T_9	2.79[a]	2.85[a]	2.90[a]	2.95[a]	3.00[a]	3.05[a]	3.09[a]

*Figures with even alphabets form one homogenous group

Table 5f. Effect of application of growth retardants on leaf breadth in *Schefflera arboricola*

Treatments	3rd Month	4th Month	5th Month	6th month	7th month	8th month	9th Month
T_1	10.69[a]	10.89[a]	11.09[a]	11.28[a]	11.47[a]	11.65[a]	11.84[a]
T_2	11.45[ab]	11.63[ab]	11.81[ab]	11.99[ab]	12.16[ab]	12.34[ab]	12.50[ab]
T_3	11.87[ab]	12.11[ab]	12.33[ab]	12.56[ab]	12.78[ab]	13.01[ab]	13.22[ab]
T_4	11.29[ab]	11.51[ab]	11.73[ab]	11.94[ab]	12.15[ab]	12.35[ab]	12.56[ab]
T_5	11.87[ab]	12.11[ab]	12.33[ab]	12.56[ab]	12.78[ab]	13.01[ab]	13.22[ab]
T_6	10.69[a]	10.89[a]	11.09[a]	11.28[a]	11.47[a]	11.65[a]	11.84[a]
T_7	11.87[ab]	12.11[ab]	12.33[ab]	12.56[ab]	12.78[ab]	13.01[ab]	13.22[ab]
T_8	11.38[ab]	11.66[ab]	11.92[ab]	12.19[ab]	12.45[ab]	12.71[ab]	12.97[ab]
T_9	11.01[ab]	11.35[ab]	11.69[ab]	12.02[ab]	12.36[ab]	12.69[ab]	13.02[ab]

*Figures with even alphabets form one homogenous group

Table 6a. Effect of application of growth retardants on leaf area in *Dieffenbachia amoena*

Treatments	3rd Month	4th Month	5th month	6th month	7th month	8th month	9th month
T_1	249.70^{bc}	255.82^{bc}	262.33^{bc}	268.14^{bc}	274.26^{bc}	280.38^{bc}	286.50^{bc}
T_2	205.21^{ab}	210.40^{ab}	213.31^{ab}	220.85^{ab}	226.03^{ab}	231.20^{ab}	236.38^{ab}
T_3	266.34^{c}	274.73^{c}	287.21^{c}	291.71^{c}	300.22^{c}	308.76^{c}	317.35^{c}
T_4	258.06^{c}	265.80^{bc}	270.62^{c}	280.76^{c}	288.23^{c}	295.71^{c}	303.22^{c}
T_5	223.56^{bc}	233.61^{bc}	249.84^{bc}	254.16^{bc}	264.56^{bc}	275.08^{bc}	285.71^{bc}
T_6	222.56^{bc}	232.61^{bc}	248.84^{bc}	253.16^{bc}	263.56^{bc}	274.08^{bc}	284.71^{bc}
T_7	170.60^{a}	174.98^{a}	169.07^{a}	183.78^{a}	188.14^{a}	192.48^{c}	196.81^{a}
T_8	218.59^{bc}	222.73^{bc}	229.57^{ab}	231.01^{ab}	235.07^{ab}	239.10^{ab}	243.10^{ab}
T_9	224.56^{bc}	234.61^{bc}	250.84^{bc}	255.16^{bc}	265.56^{bc}	276.08^{bc}	286.71^{bc}

*Figures with even alphabets form one homogenous group

Table 6b. Effect of application of growth retardants on leaf area in *Dracaena sanderiana*

Treatments	3rd Month	4th Month	5th month	6th month	7th month	8th month	9th month
T_1	25.31^{a}	26.11^{a}	26.87^{a}	27.62^{a}	28.34^{a}	29.05^{a}	30.40^{a}
T_2	26.02^{a}	26.76^{a}	27.48^{a}	28.17^{a}	28.84^{a}	29.49^{a}	30.47^{a}
T_3	27.58^{a}	28.59^{a}	29.57^{a}	30.54^{a}	31.48^{a}	32.41^{a}	32.66^{a}
T_4	22.27^{a}	23.08^{a}	23.87^{a}	24.64^{a}	25.39^{a}	26.12^{a}	26.51^{a}
T_5	25.34^{a}	26.80^{a}	28.25^{a}	29.70^{a}	31.14^{a}	31.91^{a}	34.02^{a}
T_6	24.34^{a}	25.80^{a}	27.25^{a}	28.70^{a}	30.14^{a}	30.91^{a}	33.02^{a}
T_7	25.75^{a}	26.46^{a}	27.14^{a}	27.81^{a}	28.45^{a}	29.08^{a}	30.35^{a}
T_8	27.12^{a}	27.82^{a}	28.50^{a}	29.15^{a}	29.77^{a}	30.37^{a}	30.96^{a}
T_9	26.34^{a}	27.80^{a}	29.25^{a}	30.70^{a}	32.14^{a}	32.91^{a}	35.02^{a}

*Figures with even alphabets form one homogenous group

Table 6c. Effect of application of growth retardants on leaf area in *Syngonium podophyllum*

Treatments	3rd Month	4th Month	5th month	6th month	7th month	8th month	9th month
T_1	32.64^{a}	35.75^{a}	38.93^{a}	42.17^{a}	45.49^{ab}	48.87^{a}	52.30^{ab}
T_2	34.42^{a}	37.32^{a}	40.30^{a}	43.31^{a}	46.36^{a}	49.46^{a}	52.58^{ab}
T_3	36.42^{a}	38.50^{a}	40.59^{a}	46.70^{a}	44.81^{ab}	46.94^{a}	49.06^{a}
T_4	41.45^{a}	43.62^{a}	49.47^{a}	47.98^{a}	50.17^{ab}	52.36^{a}	54.53^{ab}
T_5	36.97^{a}	41.44^{a}	45.69^{a}	50.75^{a}	55.59^{b}	60.56^{a}	65.62^{b}
T_6	35.97^{a}	40.44^{a}	44.69^{a}	49.75^{a}	54.59^{b}	59.56^{a}	64.62^{b}
T_7	37.22^{a}	39.88^{a}	42.25^{a}	45.31^{a}	48.08^{ab}	50.88^{a}	53.69^{ab}
T_8	36.31^{a}	38.69^{a}	37.75^{a}	43.51^{a}	45.96^{ab}	48.43^{a}	50.90^{ab}
T_9	37.97^{a}	42.44^{a}	46.69^{a}	51.75^{a}	56.59^{b}	61.56^{a}	66.62^{b}

*Figures with even alphabets form one homogenous group

Table 6d. Effect of application of growth retardants on leaf area in *Scindapsus aureus*

Treatments	3^{rd} Month	4^{th} Month	5^{th} month	6^{th} month	7^{th} month	8^{th} month	9^{th} month
T_1	38.07^a	40.43^a	42.74^a	45.03^a	47.12^a	49.62^a	51.92^{ab}
T_2	39.00^a	41.20^a	43.33^a	45.45^a	47.56^a	49.67^a	51.78^{ab}
T_3	40.06^a	41.97^a	43.81^a	45.61^a	47.40^a	49.18^a	50.96^{ab}
T_4	37.47^a	41.24^a	42.93^a	44.59^a	46.23^a	47.87^a	49.49^a
T_5	39.02^a	42.45^a	45.87^a	49.32^b	52.83^b	56.38^a	59.98^c
T_6	38.02^a	41.45^a	44.87^a	48.32^b	51.83^b	55.38^a	58.98^c
T_7	39.30^a	41.98^a	44.62^a	47.25^{ab}	49.89^{ab}	52.56^a	55.24^b
T_8	39.35^a	41.46^a	44.52^a	46.57^{ab}	48.96^{ab}	51.36^a	53.77^{ab}
T_9	40.02^a	43.45^a	46.87^a	50.32^b	53.83^b	57.38^a	60.98^c

***Figures with even alphabets form one homogenous group**

Table 6e. Effect of application of growth retardants on leaf area in *Ficus benjamina*

Treatments	3^{rd} Month	4^{th} Month	5^{th} month	6^{th} month	7^{th} month	8^{th} month	9^{th} month
T_1	10.42^a	10.78^a	11.11^a	11.09^a	11.72^a	12.00^a	12.27^{ab}
T_2	9.58^a	9.88^a	10.17^a	10.11^a	10.68^a	10.92^a	11.14^{ab}
T_3	10.43^a	10.72^a	11.32^a	11.89^a	11.45^a	11.66^a	11.85^{ab}
T_4	9.68^a	9.94^a	9.83^a	10.10^a	10.56^a	10.73^a	10.89^a
T_5	10.86^a	10.97^a	11.73^a	12.80^a	12.52^a	12.89^a	13.25^{ab}
T_6	10.43^a	10.72^a	11.32^a	11.89^a	11.45^a	11.66^a	11.85^{ab}
T_7	10.86^a	10.97^a	11.73^a	12.80^a	12.52^a	12.89^a	13.25^{ab}
T_8	9.77^a	10.84^a	10.55^a	10.90^a	11.24^a	11.57^a	11.88^{ab}
T_9	10.93^a	11.46^a	11.97^a	12.13^a	12.95^a	13.42^a	13.88^b

***Figures with even alphabets form one homogenous group**

Table 6f. Effect of application of growth retardants on leaf area in *Schefflera arboricola*

Treatments	3^{rd} Month	4^{th} Month	5^{th} month	6^{th} month	7^{th} month	8^{th} month	9^{th} month
T_1	91.88^a	96.51^a	101.20^a	105.83^a	110.46^a	115.11^a	119.76^a
T_2	103.84^{ab}	108.36^{ab}	112.92^{ab}	117.40^{ab}	121.87^{ab}	126.34^{ab}	130.80^{ab}
T_3	105.92^{ab}	111.72^{ab}	117.61^{ab}	123.46^{ab}	129.33^{ab}	135.25^{ab}	141.20^{abc}
T_4	101.48^{ab}	106.85^{ab}	112.28^{ab}	117.67^{ab}	123.07^{ab}	128.50^{ab}	133.94^{abc}
T_5	105.92^{ab}	111.72^{ab}	117.61^{ab}	123.46^{ab}	129.33^{ab}	135.25^{ab}	141.20^{abc}
T_6	92.46^{ab}	100.46^{ab}	102.67^{ab}	110.97^{ab}	120.43^{ab}	130.05^{ab}	140.80^{bc}
T_7	92.80^a	99.14^a	105.59^a	112.05^a	118.58^a	125.19^{ab}	131.86^{abc}
T_8	114.29^b	120.93^b	127.67^b	134.40^b	141.17^b	148.02^b	154.91^c
T_9	95.46^{ab}	103.46^{ab}	111.67^{ab}	119.97^{ab}	128.43^{ab}	137.05^{ab}	145.80^{bc}

***Figures with even alphabets form one homogenous group**

Table 7a. Effect of application of growth retardants on number of leaves in *Dieffenbachia amoena*

Treatments	3rd month	4th month	5th Month	6th month	7th Month	8th month	9th Month
T_1	4.20^{b}	5.31^{a}	6.55^{a}	7.88^{a}	9.11^{b}	10.44^{b}	11.44^{c}
T_2	3.77^{ab}	4.99^{a}	6.44^{a}	7.77^{a}	8.77^{ab}	9.77^{ab}	10.66^{bc}
T_3	3.76^{ab}	5.11^{a}	6.44^{a}	7.44^{a}	8.22^{ab}	9.33^{ab}	10.00^{abc}
T_4	3.66^{ab}	4.77^{a}	5.88^{a}	6.77^{a}	7.55^{a}	8.22^{a}	8.88^{a}
T_5	4.21^{b}	5.43^{a}	6.32^{a}	7.21^{a}	7.99^{ab}	8.76^{ab}	9.65^{ab}
T_6	4.20^{b}	5.42^{a}	6.31^{a}	7.20^{a}	7.98^{ab}	8.75^{ab}	9.64^{ab}
T_7	3.00^{a}	5.33^{a}	6.33^{a}	7.11^{a}	8.11^{ab}	9.11^{ab}	10.00^{abc}
T_8	3.43^{ab}	5.22^{a}	5.99^{a}	6.88^{a}	7.66^{ab}	8.66^{ab}	9.22^{ab}
T_9	4.22^{b}	5.44^{a}	6.33^{a}	7.22^{a}	8.00^{ab}	8.77^{ab}	9.66^{ab}

Table 7b. Effect of application of growth retardants on number of leaves in *Dracaena sanderiana*

Treatments	3rd month	4th month	5th Month	6th month	7th Month	8th month	9th Month
T_1	15.44^{a}	16.88^{a}	19.22^{b}	20.77^{a}	21.99^{a}	22.88^{a}	23.33^{a}
T_2	14.99^{a}	17.22^{a}	11.77^{a}	21.22^{a}	22.55^{a}	23.55^{a}	24.22^{a}
T_3	13.33^{a}	15.33^{a}	17.88^{ab}	18.33^{a}	20.66^{a}	21.77^{a}	23.32^{a}
T_4	12.77^{a}	13.77^{a}	17.22^{ab}	17.77^{a}	19.77^{a}	20.88^{a}	21.88^{a}
T_5	15.32^{a}	16.76^{a}	20.65^{b}	21.43^{a}	22.76^{a}	23.54^{a}	24.43^{a}
T_6	15.31^{a}	16.75^{a}	20.64^{b}	21.42^{a}	22.75^{a}	23.53^{a}	24.42^{a}
T_7	15.33^{a}	17.66^{a}	19.99^{b}	20.88^{a}	22.77^{a}	23.66^{a}	24.77^{a}
T_8	15.66^{a}	17.99^{a}	19.55^{b}	21.11^{a}	22.11^{a}	23.11^{a}	23.88^{a}
T_9	15.33^{a}	16.77^{a}	20.66^{b}	21.44^{a}	22.77^{a}	23.55^{a}	24.44^{a}

Table 7c. Effect of application of growth retardants on number of leaves in *Syngonium podophyllum*

Treatments	3rd month	4th month	5th Month	6th month	7th Month	8th month	9th Month
T_1	26.21^{a}	28.88^{a}	32.55^{a}	35.21^{a}	46.88^{ab}	51.55^{ab}	59.21^{ab}
T_2	26.33^{a}	28.33^{a}	30.33^{a}	33.33^{a}	42.33^{a}	46.33^{a}	55.33^{ab}
T_3	25.44^{a}	31.77^{a}	36.77^{a}	40.77^{a}	53.77^{b}	58.77^{b}	68.77^{b}
T_4	24.66^{a}	28.33^{a}	29.33^{a}	32.33^{a}	43.33^{a}	47.33^{ab}	53.33^{a}
T_5	23.21^{a}	26.11^{a}	29.01^{a}	32.90^{a}	42.80^{a}	47.70^{ab}	54.61^{a}
T_6	23.20^{a}	26.10^{a}	29.00^{a}	32.89^{a}	42.79^{a}	47.69^{ab}	54.60^{a}
T_7	25.66^{a}	27.59^{a}	31.53^{a}	37.13^{a}	47.06^{ab}	50.99^{ab}	57.83^{ab}
T_8	22.77^{a}	26.24^{a}	30.71^{a}	35.17^{a}	46.64^{ab}	52.11^{ab}	57.57^{ab}
T_9	23.22^{a}	26.12^{a}	29.02^{a}	32.91^{a}	42.81^{a}	47.71^{ab}	54.62^{a}

Table 7d. Effect of application of growth retardants on number of leaves in *Scindapsus aureus*

Treatments	3rd month	4th month	5th month	6th month	7th Month	8th month	9th month
T_1	27.77^{abc}	38.88^{a}	52.99^{a}	66.61^{a}	78.91^{a}	90.03^{a}	102.83^{a}
T_2	31.10^{bc}	40.11^{a}	51.11^{a}	63.11^{a}	73.41^{a}	82.41^{a}	93.21^{a}
T_3	30.66^{bc}	41.33^{a}	52.99^{a}	64.66^{a}	77.33^{a}	87.99^{a}	100.76^{a}
T_4	31.66^{c}	41.99^{a}	55.33^{a}	68.66^{a}	83.19^{a}	93.53^{a}	104.96^{a}
T_5	26.42^{ab}	37.42^{a}	50.92^{a}	64.42^{a}	78.62^{a}	89.62^{a}	102.62^{a}
T_6	26.41^{ab}	37.41^{a}	50.91^{a}	64.41^{a}	78.61^{a}	89.61^{a}	102.61^{a}
T_7	25.33^{a}	36.99^{a}	50.66^{a}	65.53^{a}	80.19^{a}	91.86^{a}	106.53^{a}
T_8	23.44^{a}	38.77^{a}	57.11^{a}	73.44^{a}	89.77^{a}	105.11^{a}	121.44^{a}
T_9	26.43^{ab}	37.43^{a}	50.93^{a}	64.43^{a}	78.63^{a}	89.63^{a}	102.63^{a}

Table 7e. Effect of application of growth retardants on number of leaves in *Ficus benjamina*

Treatments	3rd month	4th month	5th month	6th month	7th Month	8th month	9th month
T_1	44.00^{abc}	72.00^{ab}	100.00^{bc}	121.00^{b}	141.00^{b}	165.00^{b}	185.00^{b}
T_2	47.99^{c}	75.00^{b}	105.00^{c}	132.00^{c}	157.00^{c}	185.00^{c}	210.00^{d}
T_3	45.77^{bc}	69.33^{ab}	93.33^{a}	112.33^{a}	130.33^{a}	150.33^{a}	168.33^{a}
T_4	40.11^{a}	66.11^{a}	95.11^{ab}	116.11^{bc}	136.11^{bc}	163.11^{b}	183.11^{b}
T_5	41.87^{ab}	72.43^{ab}	101.43^{c}	128.43^{c}	153.43^{c}	179.43^{c}	204.43^{cd}
T_6	41.86^{ab}	72.42^{ab}	101.42^{c}	128.42^{c}	153.42^{c}	179.42^{c}	204.42^{cd}
T_7	41.88^{ab}	70.99^{ab}	104.99^{c}	132.92^{c}	157.99^{c}	184.99^{c}	209.99^{d}
T_8	44.32^{abc}	74.55^{b}	105.55^{c}	131.55^{a}	154.5^{a}	178.55^{c}	201.55^{c}
T_9	41.88^{ab}	72.44^{ab}	101.44^{c}	128.44^{c}	153.44^{c}	179.44^{c}	204.44^{cd}

Table 7f. Effect of application of growth retardants on number of leaves in *Schefflera arboricola*

Treatments	3rd month	4th month	5th month	6th month	7th Month	8th month	9th month
T_1	16.44^{ab}	16.77^{ab}	18.66^{ab}	19.77^{ab}	20.99^{ab}	21.99^{ab}	22.66^{a}
T_2	15.44^{a}	16.44^{a}	18.55^{ab}	19.22^{a}	20.55^{ab}	21.33^{ab}	22.44^{a}
T_3	18.99^{b}	19.88^{c}	21.66^{c}	22.55^{b}	23.33^{b}	23.88^{b}	24.77^{a}
T_4	14.99^{a}	16.11^{a}	17.77^{a}	18.66^{a}	19.44^{a}	20.77^{a}	21.99^{a}
T_5	17.65^{ab}	19.32^{bc}	21.00^{bc}	22.65^{b}	23.45^{b}	23.87^{b}	24.87^{a}
T_6	17.64^{ab}	19.31^{bc}	21.00^{bc}	22.64^{b}	23.43^{b}	23.86^{b}	24.86^{a}
T_7	15.99^{ab}	17.33^{abc}	19.33^{abc}	20.66^{ab}	21.77^{ab}	22.65^{ab}	23.77^{a}
T_8	16.88^{ab}	18.22^{abc}	20.00^{abc}	21.55^{ab}	22.33^{ab}	23.21^{ab}	23.77^{a}
T_9	17.66^{ab}	19.33^{bc}	21.00^{bc}	22.66^{b}	23.44^{b}	23.88^{b}	24.88^{a}

Table 8a. Effect of application of growth retardants on internodal length in *Dieffenbachia amoena*

Treatments	3rd month	4th month	5th month	6th month	7th Month	8th month	9th month
T$_1$	1.64^{a}	1.73^{a}	1.79^{a}	1.84^{ab}	1.88^{ab}	1.91^{ab}	1.92^{a}
T$_2$	1.47^{a}	1.54^{a}	1.58^{a}	1.61^{a}	1.63^{a}	1.64^{a}	1.66^{a}
T$_3$	1.75^{a}	1.93^{a}	2.08^{a}	2.22^{ab}	2.34^{bc}	2.46^{bc}	2.57^{bc}
T$_4$	1.72^{a}	1.85^{a}	1.94^{a}	2.03^{ab}	2.11^{abc}	2.18^{ab}	2.24^{ab}
T$_5$	1.50^{a}	1.80^{a}	2.07^{a}	2.33^{b}	2.57^{c}	2.81^{b}	3.04^{c}
T$_6$	1.49^{a}	1.79^{a}	2.06^{a}	2.32^{b}	2.56^{c}	2.80^{b}	3.03^{c}
T$_7$	1.56^{a}	1.61^{a}	1.63^{a}	1.64^{a}	1.65^{a}	1.66^{a}	1.67^{a}
T$_8$	1.65^{a}	1.67^{a}	1.69^{a}	1.76^{ab}	1.77^{ab}	1.77^{a}	1.81^{a}
T$_9$	1.51^{a}	1.81^{a}	2.08^{a}	2.34^{b}	2.58^{c}	2.82^{b}	3.05^{c}

Table 8b. Effect of application of growth retardants on internodal length in *Dracaena sanderiana*

Treatments	3rd month	4th month	5th month	6th month	7th Month	8th month	9th month
T$_1$	2.02^{a}	2.23^{a}	2.41^{a}	2.57^{a}	2.73^{ab}	2.88^{ab}	3.02^{abc}
T$_2$	2.10^{a}	2.26^{a}	2.38^{a}	2.50^{a}	2.61^{ab}	2.71^{ab}	2.80^{abc}
T$_3$	2.07^{a}	2.31^{a}	2.52^{a}	2.72^{a}	2.91^{ab}	3.08^{ab}	3.25^{bc}
T$_4$	2.18^{a}	2.40^{a}	2.59^{a}	2.77^{a}	2.94^{ab}	3.09^{ab}	3.24^{bc}
T$_5$	1.97^{a}	2.28^{a}	2.55^{a}	2.82^{a}	3.08^{b}	3.33^{b}	3.57^{c}
T$_6$	1.96^{a}	2.27^{a}	2.54^{a}	2.81^{a}	3.07^{b}	3.32^{b}	3.56^{c}
T$_7$	1.87^{a}	2.00^{a}	2.10^{a}	2.19^{a}	2.27^{a}	2.33^{a}	2.39^{a}
T$_8$	2.17^{a}	2.27^{a}	2.34^{a}	2.39^{a}	2.44^{ab}	2.48^{a}	2.51^{ab}
T$_9$	1.98^{a}	2.29^{a}	2.56^{a}	2.83^{a}	3.09^{b}	3.34^{b}	3.58^{c}

8c. Effect of application of growth retardants on internodal length in *Syngonium podophyllum*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T$_1$	2.78^{a}	3.028^{b}	3.31^{b}	3.59^{b}	3.85^{b}	4.11^{c}	4.36^{c}
T$_2$	2.52^{a}	2.72^{ab}	2.96^{ab}	3.20^{ab}	3.43^{b}	3.64^{bc}	3.85^{bc}
T$_3$	2.42^{a}	2.57^{ab}	2.76^{ab}	2.95^{ab}	3.12^{ab}	3.29^{ab}	3.45^{ab}
T$_4$	2.13^{a}	2.23^{a}	2.37^{a}	2.51^{a}	2.64^{a}	2.75^{a}	2.86^{a}
T$_5$	2.25^{a}	2.59^{ab}	2.98^{ab}	3.35^{b}	3.72^{b}	4.08^{c}	4.42^{c}
T$_6$	2.24^{a}	2.58^{ab}	2.97^{ab}	3.34^{b}	3.71^{b}	4.07^{c}	4.41^{c}
T$_7$	2.38^{a}	2.58^{ab}	2.83^{ab}	3.07^{ab}	3.29^{ab}	3.51^{bc}	3.72^{bc}
T$_8$	2.31^{a}	2.49^{ab}	2.71^{ab}	2.93^{ab}	3.14^{ab}	3.33^{ab}	3.52^{ab}
T$_9$	2.26^{a}	2.60^{ab}	2.99^{ab}	3.36^{b}	3.73^{b}	4.09^{c}	4.43^{c}

Table 8d. Effect of application of growth retardants on internodal length in *Scindapsus aureus*

Treatments	3rd month	4th month	5th Month	6th month	7th Month	8th month	9th Month
T_1	2.76^a	3.09^a	3.40^a	3.69^a	3.99^{ab}	4.27^{ab}	4.55^{ab}
T_2	3.22^a	3.45^a	3.65^a	3.85^a	4.04^{ab}	4.23^{ab}	4.41^{ab}
T_3	3.43^a	3.55^a	3.64^a	3.73^a	3.81^{ab}	3.89^a	3.96^a
T_4	3.64^a	3.70^a	3.73^a	3.76^a	3.78^a	3.80^a	3.81^a
T_5	3.20^a	3.64^a	4.05^a	4.46^a	4.86^{ab}	5.26^b	5.65^{cd}
T_6	3.19^a	3.63^a	4.04^a	4.45^a	4.85^{ab}	5.25^b	5.64^{cd}
T_7	3.46^a	3.87^a	4.26^a	4.63^a	5.01^b	5.37^b	5.73^d
T_8	3.52^a	3.88^a	4.21^a	4.54^a	4.86^{ab}	5.18^b	5.49^{bcd}
T_9	3.21^a	3.65^a	4.06^a	4.47^a	4.87^{ab}	5.27^b	5.66^{cd}

Table 8e. Effect of application of growth retardants on internodal length in *Ficus benjamina*

Treatments	3rd month	4th month	5th Month	6th month	7th month	8th month	9th Month
T_1	1.95^a	2.12^a	2.25^a	2.38^{ab}	2.50^{ab}	2.61^{abc}	2.71^{ab}
T_2	1.94^a	2.09^a	2.20^a	2.31^{ab}	2.41^{ab}	2.50^{ab}	2.58^a
T_3	1.85^a	1.98^a	2.07^a	2.16^{ab}	2.24^a	2.31^a	2.37^a
T_4	1.96^a	2.06^a	2.13^a	2.18^{ab}	2.23^a	2.27^a	2.30^a
T_5	1.69^a	2.00^a	2.26^a	2.51^{ab}	2.76^b	3.00^d	3.23^c
T_6	1.68^a	1.99^a	2.25^a	2.50^{ab}	2.75^b	2.99^d	3.22^c
T_7	1.99^a	2.22^a	2.42^a	2.61^b	2.78^b	2.95^{bc}	3.11^{bc}
T_8	1.57^a	1.77^a	1.93^a	2.09^a	2.24^a	2.38^a	2.51^a
T_9	1.70^a	2.01^a	2.27^a	2.52^{ab}	2.77^b	3.01^d	3.24^c

Table 8f. Effect of application of growth retardants on internodal length in *Schefflera arboricola*

Treatments	3rd month	4th month	5th Month	6th month	7th month	8th month	9th Month
T_1	1.51^a	1.67^{abc}	1.46^a	1.57^{ab}	1.68^a	1.78^a	1.86^a
T_2	1.49^a	1.62^{ab}	1.38^a	1.47^a	1.55^a	1.61^a	1.67^a
T_3	1.34^a	1.55^a	1.39^a	1.56^{ab}	1.71^a	1.86^a	2.00^a
T_4	1.57^a	1.75^{abc}	1.56^a	1.70^{ab}	1.83^{ab}	1.94^a	2.05^a
T_5	1.75^a	2.09^c	2.06^b	2.36^c	2.65^d	2.92^c	3.19^c
T_6	1.74^a	2.08^c	2.05^b	2.35^c	2.64^d	2.91^c	3.18^c
T_7	1.77^a	2.07^{bc}	2.00^b	2.26^b	2.51^{cd}	2.74^{bc}	2.97^{bc}
T_8	1.58^a	1.85^{abc}	1.75^{ab}	1.97^{bc}	2.19^{bc}	2.40^b	2.59^b
T_9	1.76^a	2.10^c	2.07^b	2.37^c	2.66^d	2.93^c	3.20^c

Fig 3a. Effect of application of growth retardants on internodal length in *Dieffenbachia amoena*

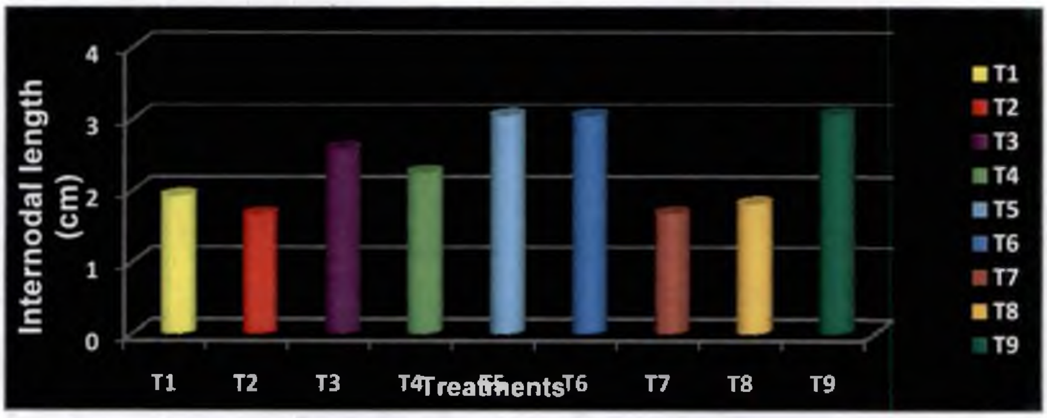


Fig 3b. Effect of application of growth retardants on internodal length in *Dracaena sandariana*

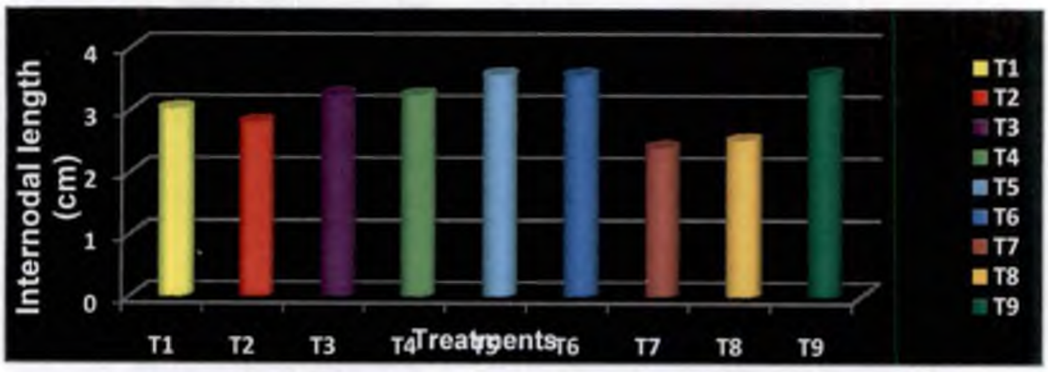


Fig 3c. Effect of application of growth retardants on internodal length in *Syngonium podophyllum*

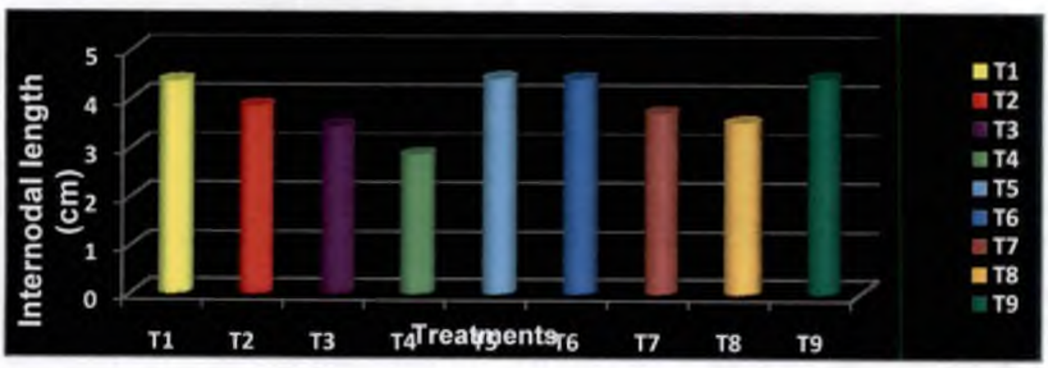


Fig 4a. Effect of application of growth retardants on internodal length in *Scindapsusaureus*

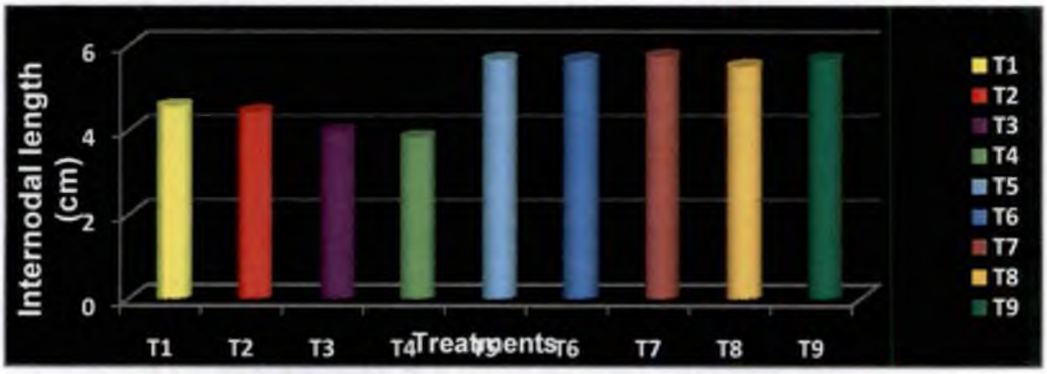


Fig 4b. Effect of application of growth retardants on internodal length in*Ficus benjamina*

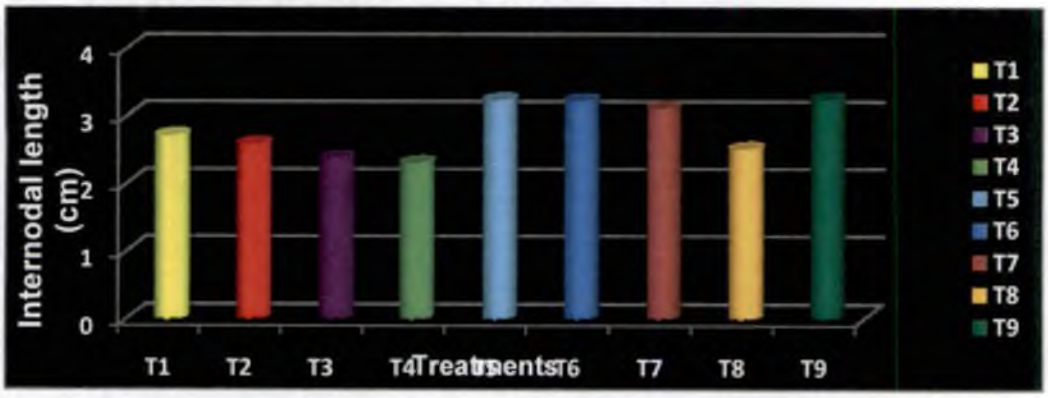
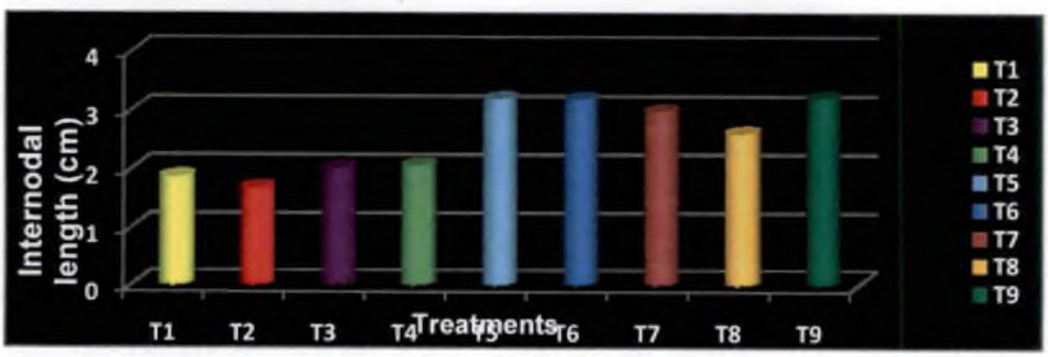


Fig 4c. Effect of application of growth retardants on internodal length in*Schefflera arboricola*



4.1.1.1.7. Leaf producing interval (days)

The observations on the leaf producing interval are presented in table 9.

Leaf producing interval was significantly different among the treatments in the foliage plants selected for the study. Among the different treatments, the longer interval in the leaf production was observed in the plants treated with T_1 (ancymidol 500 ppm) in *Dieffenbachia amoena* (29.93 days) and in *Ficus benjamina*(16.63 days), T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum* (14.00 days) and in *Scindapsus aureus* (12.10 days), T_4 (paclobutrazol 100 ppm) in *Dracaena sanderiana* (29.93 days) and in*Schefflera arboricola*(29.20 days).

The leaf production at shorter intervals was observed in the plants treated with T_4 (paclobutrazol 100 ppm) in *Scindapsus aureus*(10.06 days) and *Ficus benjamina* (10.06 days), T_7 (CCC 1000 ppm) in *Dracaena sanderiana*(18.93 days) and in *Syngonium podophyllum* (12.63 days) and T_8 (CCC 2000 ppm) in *Dieffenbachia amoena*(21.10 days)and *Schefflera arboricola* (18.90 days) respectively.

4.1.1.1.8. Length and girth of petiole (cm)

As like any other characters, length and girth of petiole are also equally important as they support the leaves. The petiole length and girth were measured monthly.

4.1.1.1.8.1. Petiole length (cm)

The observations on the petiole length are presented in tables 10a - 10f.

In *Dieffenbachia amoena,* there was no significant variation observed after first application. At three months after second application, T_8 (CCC 2000 ppm) showed lowest petiole length (13.69 cm) and the highest petiole length was observed in T_9 (control)(16.88 cm) followed by T_5 (B-Nine 1000 ppm) (16.87 cm) and T_6 (B-Nine 2000 ppm) (16.86 cm) (Table 10a).

In *Dracaena sanderiana,* at three months after first application, T_7 (CCC 1000 ppm) showed the lowest petiole length (4.21 cm)and the highest petiole length was observed in T_3 (paclobutrazol 50 ppm) (5.61 cm). After second schedule of application, T_7 (CCC 1000 ppm) showed the lowest petiole length (4.85 cm) and the highest petiole length was observed in T_9 (control) (6.96 cm) followed by T5 (B-Nine 1000 ppm) (6.95 cm) and T_6 (B-Nine 2000 ppm) (6.94 cm).(Table 10b).

In *Syngonium podophyllum,* there was no significant difference observed among the treatments after first application. At three months after second application, significant difference was observed between the treatments. The plants treated with T_3 (paclobutrazol 50ppm) showed the lowest petiole length (19.70cm) followed by T_4 (paclobutrazol 100ppm) (20.04cm). The highest petiole length was observed in T_9 (control) (23.32 cm) followed by T_5 (B-Nine 1000 ppm) (23.31 cm) and T_6 (B-Nine 2000 ppm) (23.30 cm). (Table 10c).

In *Scindapsus aureus,* there was no significant variation observed for the first 3 months after the treatment. Three months after second application, significant variation was observed between the treatments. The plants treated with T_3 (paclobutrazol 50ppm) had shown the lowest petiole length (6.35cm) and the highest petiole length was observed in T_9(control) (7.81 cm) followed by T_5 (B-Nine 1000 ppm) (7.80 cm) and T_6 (B-Nine 2000 ppm) (7.79 cm) (Table 10d).

In *Ficus benjamina,* there was no significant difference observed after first application. At three months after second application, the lowest petiole length was observed in T_1(ancymidol 500 ppm) (0.92 cm) followed by T_2 (ancymidol 1000 ppm) (0.93 cm) and the highest petiole length was observed in T_8(CCC 2000 ppm) (1.20 cm) followed by T_7 (CCC 1000 ppm) (1.18 cm) (Table 10 e).

In *Schefflera arboricola,* there was no significant difference observed after first application. At three months after second application, the lowest petiole length was observed in T_1(ancymidol 500 ppm) (9.11 cm) and the highest petiole length was observed in T_9 (control) (10.71 cm) followed by T_5 (B-Nine 1000 ppm) (10.70 cm) and T_6(B-Nine 2000 ppm) (10.69 cm). (Table 10f).

4.1.1.1.8.2. Petiole girth (cm)

The observations on the petiole girth are presented in tables 11a - 11f.

The growth retardants treatment did not show any positive impact in increasing the petiole girth compared to the control (T_9) in all the plants except *Scindapsus aureus* selected for the study.

In *Scindapsus aureus,* at three months after first application, the lowest petiole girth was observed in T_4 (paclobutrazol 100 ppm) (0.83 cm) and the highest petiole girth was observed in T_9(control) (1.33 cm) followed by T_5 (B-Nine 1000 ppm) (1.32 cm) and T_6 (B-Nine 2000 ppm) (1.31 cm). Similar results were observed three months after second application. (Table 11d).

Table 9. Effect of application of growth retardants on leaf producing interval (Days)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	29.93^{f}	27.90^{e}	12.80^{ab}	10.56^{b}	16.63^{f}	20.93^{e}
T_2	27.90^{d}	19.20^{b}	13.20^{c}	11.20^{c}	14.86^{d}	19.93^{c}
T_3	25.86^{c}	19.93^{c}	14.00^{d}	12.10^{d}	12.30^{b}	19.43^{b}
T_4	29.90^{f}	29.93^{f}	12.83^{ab}	10.06^{a}	10.06^{a}	29.20^{f}
T_5	28.80^{e}	26.83^{d}	13.30^{c}	11.00^{c}	14.90^{d}	20.18^{d}
T_6	28.78^{e}	26.81^{d}	13.29^{c}	11.01^{c}	14.92^{d}	20.15^{d}
T_7	25.33^{b}	18.93^{a}	12.63^{a}	10.23^{a}	15.20^{e}	19.50^{b}
T_8	21.10^{a}	19.13^{ab}	12.86^{b}	11.26^{c}	14.63^{c}	18.90^{a}
T_9	28.83^{e}	26.90^{d}	13.33^{c}	11.06^{c}	14.96^{d}	20.20^{d}

***Figures with even alphabets form one homogenous group**

Table 10a. Effect of application of growth retardants on petiole length in *Dieffenbachia amoena*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	12.11^{a}	12.45^{a}	12.77^{a}	13.09^{a}	13.40^{a}	13.68^{ab}	13.93^{a}
T_2	13.71^{a}	14.01^{a}	14.28^{a}	14.55^{a}	14.81^{a}	15.04^{ab}	15.24^{ab}
T_3	12.54^{a}	12.98^{a}	13.40^{a}	13.82^{a}	14.23^{a}	14.61^{ab}	14.96^{ab}
T_4	12.81^{a}	13.17^{a}	13.51^{a}	13.85^{a}	14.18^{a}	14.48^{ab}	14.75^{ab}
T_5	12.77^{a}	13.49^{a}	14.20^{a}	14.89^{a}	15.58^{a}	16.24^{b}	16.87^{ab}
T_6	12.76^{a}	13.48^{a}	14.19^{a}	14.88^{a}	15.57^{a}	16.23^{b}	16.86^{ab}
T_7	13.02^{a}	13.29^{a}	13.55^{a}	13.79^{a}	14.03^{a}	14.24^{ab}	14.42^{ab}
T_8	13.07^{a}	13.21^{a}	13.33^{a}	13.45^{a}	13.56^{a}	13.64^{a}	13.69^{a}
T_9	12.78^{a}	13.50^{a}	14.21^{a}	14.90^{a}	15.59^{a}	16.25^{b}	16.88^{ab}

***Figures with even alphabets form one homogenous group**

Table 10b. Effect of application of growth retardants on petiole length in *Dracaena sanderiana*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	4.14^{a}	4.52^{a}	4.90^{ab}	5.26^{b}	5.62^{bcd}	5.96^{bc}	6.29^{bc}
T_2	3.87^{a}	4.14^{a}	4.41^{ab}	4.66^{ab}	4.90^{ab}	5.14^{ab}	5.36^{ab}
T_3	4.24^{a}	4.71^{a}	5.17^{b}	5.61^{b}	6.04^{d}	6.47^{b}	6.88^{c}
T_4	4.07^{a}	4.45^{a}	4.83^{ab}	5.19^{ab}	5.55^{bcd}	5.89^{bc}	6.22^{bc}
T_5	3.78^{a}	4.33^{a}	4.88^{ab}	5.41^{b}	5.94^{cd}	6.45^{b}	6.95^{c}
T_6	3.77^{a}	4.32^{a}	4.87^{ab}	5.40^{b}	5.93^{cd}	6.44^{b}	6.94^{c}
T_7	3.48^{a}	3.73^{a}	3.98^{a}	4.21^{a}	4.43^{a}	4.65^{a}	4.85^{a}
T_8	4.29^{a}	4.47^{a}	4.65^{ab}	4.81^{ab}	4.96^{abc}	5.11^{ab}	5.24^{a}
T_9	3.79^{a}	4.34^{a}	4.89^{ab}	5.42^{b}	5.95^{cd}	6.46^{b}	6.96^{c}

***Figures with even alphabets form one homogenous group**

Table 10c. Effect of application of growth retardants on petiole length in *Syngonium podophyllum*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	19.32^{a}	19.77^{a}	20.12^{a}	20.44^{a}	20.74^{ab}	21.04^{ab}	21.34^{ab}
T_2	19.30^{a}	19.62^{a}	19.84^{a}	20.03^{a}	20.21^{ab}	20.38^{ab}	20.54^{a}
T_3	19.00^{a}	19.23^{a}	19.36^{a}	19.46^{a}	19.55^{a}	19.63^{a}	19.70^{a}
T_4	19.52^{a}	19.72^{a}	19.82^{a}	19.89^{a}	19.94^{ab}	19.99^{a}	20.04^{a}
T_5	20.39^{a}	21.00^{a}	21.50^{a}	21.96^{a}	22.42^{b}	22.87^{b}	23.31^{b}
T_6	20.38^{a}	21.00^{a}	21.49^{a}	21.95^{a}	22.41^{b}	22.86^{b}	23.30^{b}
T_7	19.38^{a}	19.70^{a}	19.92^{a}	20.11^{a}	20.29^{ab}	20.46^{ab}	20.62^{a}
T_8	21.14^{a}	21.37^{a}	21.50^{a}	21.60^{a}	21.68^{ab}	21.76^{ab}	21.84^{ab}
T_9	20.40^{a}	21.00^{a}	21.51^{a}	21.97^{a}	22.43^{b}	22.88^{b}	23.32^{b}

***Figures with even alphabets form one homogenous group**

Table 10d. Effect of application of growth retardants on petiole length in *Scindapsus aureus*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	6.92^{a}	7.12^{a}	7.27^{a}	7.41^{a}	7.54^{b}	7.66^{b}	7.76^{b}
T_2	7.03^{a}	7.20^{a}	7.32^{a}	7.43^{a}	7.53^{b}	7.62^{b}	7.70^{b}
T_3	5.75^{a}	5.91^{a}	6.02^{a}	6.12^{a}	6.21^{a}	6.29^{a}	6.35^{a}
T_4	6.28^{a}	6.42^{a}	6.53^{a}	6.61^{a}	6.68^{ab}	6.74^{ab}	6.79^{ab}
T_5	6.50^{a}	6.79^{a}	6.90^{a}	7.14^{a}	7.37^{ab}	7.59^{b}	7.80^{b}
T_6	6.49^{a}	6.78^{a}	6.89^{a}	7.13^{a}	7.36^{ab}	7.58^{b}	7.79^{b}
T_7	6.24^{a}	6.45^{a}	6.56^{a}	6.71^{a}	6.85^{ab}	6.98^{ab}	7.10^{ab}
T_8	6.56^{a}	6.74^{a}	6.85^{a}	6.97^{a}	7.08^{ab}	7.18^{ab}	7.27^{ab}
T_9	6.51^{a}	6.80^{a}	6.91^{a}	7.15^{a}	7.38^{ab}	7.60^{b}	7.81^{b}

*Figures with even alphabets form one homogenous group

Table 10e. Effect of application of growth retardants on petiole length in *Ficus benjamina*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	0.84^{a}	0.86^{a}	0.87^{a}	0.88^{a}	0.89^{a}	0.90^{a}	0.92^{a}
T_2	0.88^{a}	0.90^{a}	0.91^{a}	0.92^{a}	0.92^{ab}	0.93^{a}	0.93^{a}
T_3	0.90^{a}	0.94^{a}	0.98^{a}	1.02^{a}	1.05^{ab}	1.09^{ab}	1.12^{b}
T_4	0.93^{a}	0.96^{a}	1.00^{a}	1.04^{a}	1.07^{ab}	1.10^{ab}	1.13^{b}
T_5	0.76^{a}	0.84^{a}	0.87^{a}	0.91^{a}	0.97^{ab}	1.00^{ab}	1.05^{ab}
T_6	0.75^{a}	0.85^{a}	0.86^{a}	0.90^{a}	0.96^{ab}	9.99^{ab}	1.04^{ab}
T_7	0.90^{a}	0.95^{a}	1.00^{a}	1.05^{a}	1.10^{ab}	1.13^{b}	1.18^{b}
T_8	0.94^{a}	0.99^{a}	1.03^{a}	1.08^{a}	1.12^{b}	1.15^{b}	1.20^{b}
T_9	0.77^{a}	0.83^{a}	0.88^{a}	0.92^{a}	0.98^{ab}	1.01^{ab}	1.06^{ab}

*Figures with even alphabets form one homogenous group

Table 10f. Effect of application of growth retardants on petiole length in *Schefflera arboricola*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	8.34^{a}	8.49^{a}	8.63^{a}	8.77^{a}	8.89^{a}	9.01^{a}	9.11^{a}
T_2	9.74^{a}	9.84^{a}	9.93^{a}	10.02^{a}	10.09^{a}	10.15^{a}	10.21^{ab}
T_3	8.92^{a}	9.10^{a}	9.27^{a}	9.43^{a}	9.59^{a}	9.73^{a}	9.86^{ab}
T_4	8.80^{a}	8.94^{a}	9.06^{a}	9.17^{a}	9.27^{a}	9.371^{a}	9.45^{ab}
T_5	8.73^{a}	9.08^{a}	9.42^{a}	9.76^{a}	10.08^{a}	10.40^{a}	10.70^{b}
T_6	8.72^{a}	9.07^{a}	9.41^{a}	9.75^{a}	10.07^{a}	10.39^{a}	10.69^{b}
T_7	9.02^{a}	9.29^{a}	9.55^{a}	9.80^{a}	10.05^{a}	10.28^{a}	10.50^{ab}
T_8	9.46^{a}	9.64^{a}	9.82^{a}	9.98^{a}	10.13^{a}	10.27^{a}	10.41^{ab}
T_9	8.74^{a}	9.09^{a}	9.43^{a}	9.77^{a}	10.09^{a}	10.41^{a}	10.71^{b}

*Figures with even alphabets form one homogenous group

Table 11a. Effect of application of growth retardants on petiole girth in *Dieffenbachia amoena*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	2.60^{a}	2.63^{a}	2.66^{a}	2.76^{a}	2.80^{a}	2.86^{a}	2.86^{a}
T_2	2.80^{a}	2.83^{a}	2.86^{a}	2.86^{a}	2.90^{a}	2.90^{a}	2.93^{a}
T_3	2.60^{a}	2.60^{a}	2.56^{a}	2.63^{a}	2.70^{a}	2.80^{a}	2.80^{a}
T_4	2.83^{a}	2.86^{a}	2.86^{a}	2.90^{a}	2.93^{a}	2.93^{a}	2.96^{a}
T_5	2.75^{a}	2.79^{a}	2.85^{a}	2.85^{a}	2.89^{a}	2.90^{a}	2.99^{a}
T_6	2.74^{a}	2.78^{a}	2.84^{a}	2.84^{a}	2.88^{a}	2.90^{a}	2.98^{a}
T_7	2.93^{a}	2.93^{a}	2.96^{a}	3.00^{a}	3.06^{a}	3.10^{a}	3.10^{a}
T_8	2.93^{a}	2.96^{a}	3.00^{a}	3.03^{a}	3.03^{a}	3.03^{a}	3.03^{a}
T_9	2.76^{a}	2.80^{a}	2.86^{a}	2.86^{a}	2.90^{a}	2.90^{a}	3.00^{a}

***Figures with even alphabets form one homogenous group**

Table 11b. Effect of application of growth retardants on petiole girth in *Dracaena sanderiana*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	1.16^{a}	1.20^{a}	1.20^{a}	1.23^{a}	1.23^{a}	1.26^{a}	1.33^{a}
T_2	1.20^{a}	1.23^{a}	1.26^{a}	1.26^{a}	1.26^{a}	1.30^{a}	1.30^{a}
T_3	1.06^{a}	1.10^{a}	1.13^{a}	1.16^{a}	1.20^{a}	1.23^{a}	1.26^{a}
T_4	1.33^{a}	1.36^{a}	1.40^{a}	1.40^{a}	1.40^{a}	1.43^{a}	1.43^{a}
T_5	1.35^{a}	1.35^{a}	1.39^{a}	1.45^{a}	1.52^{a}	1.54^{a}	1.59^{a}
T_6	1.34^{a}	1.34^{a}	1.38^{a}	1.44^{a}	1.51^{a}	1.53^{a}	1.58^{a}
T_7	1.20^{a}	1.26^{a}	1.26^{a}	1.33^{a}	1.36^{a}	1.40^{a}	1.40^{a}
T_8	0.83^{a}	0.86^{a}	0.86^{a}	0.86^{a}	0.86^{a}	0.86^{a}	0.93^{a}
T_9	1.36^{a}	1.36^{a}	1.40^{a}	1.46^{a}	1.53^{a}	1.56^{a}	1.60^{a}

***Figures with even alphabets form one homogenous group**

Table 11c. Effect of application of growth retardants on petiole girth in *Syngonium podophyllum*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	0.80^{a}	0.83^{ab}	0.86^{a}	0.90^{ab}	0.93^{ab}	0.96^{a}	1.00^{a}
T_2	0.80^{a}	0.86^{ab}	0.90^{a}	0.93^{ab}	0.93^{ab}	0.96^{a}	0.96^{a}
T_3	0.96^{a}	0.96^{ab}	0.96^{a}	1.00^{ab}	1.00^{ab}	1.00^{a}	1.00^{a}
T_4	0.86^{a}	0.86^{ab}	0.86^{a}	0.86^{a}	0.86^{a}	0.90^{a}	0.90^{a}
T_5	0.99^{a}	1.02^{b}	1.05^{a}	1.05^{b}	1.05^{b}	1.04^{ab}	1.06^{a}
T_6	0.98^{a}	1.01^{b}	1.04^{a}	1.04^{b}	1.04^{b}	1.03^{ab}	1.06^{a}
T_7	0.80^{a}	0.80^{a}	0.86^{a}	0.86^{a}	0.90^{ab}	0.93^{a}	0.96^{a}
T_8	0.86^{a}	0.90^{bc}	0.90^{a}	0.93^{ab}	0.93^{ab}	0.93^{a}	0.93^{a}
T_9	1.00^{a}	1.03^{b}	1.06^{a}	1.06^{b}	1.06^{b}	1.06^{ab}	1.06^{a}

***Figures with even alphabets form one homogenous group**

Table 11d. Effect of application of growth retardants on petiole girth in *Scindapsus aureus*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	0.86^{a}	0.93^{ab}	0.96^{ab}	0.96^{ab}	0.96^{ab}	0.96^{ab}	0.96^{a}
T_2	0.93^{ab}	0.96^{ab}	1.03^{abc}	1.06^{abc}	1.06^{abc}	1.06^{abc}	1.10^{ab}
T_3	0.86^{a}	0.90^{ab}	0.96^{ab}	0.96^{ab}	0.96^{ab}	0.96^{ab}	1.00^{ab}
T_4	0.73^{a}	0.73^{a}	0.80^{a}	0.83^{a}	0.86^{a}	0.86^{a}	0.93^{a}
T_5	1.32^{c}	1.32^{c}	1.32^{d}	1.32^{d}	1.35^{d}	1.35^{d}	1.35^{c}
T_6	1.31^{c}	1.31^{c}	1.31^{d}	1.31^{d}	1.34^{d}	1.34^{d}	1.34^{c}
T_7	1.20^{c}	1.23^{c}	1.26^{cd}	1.26^{cd}	1.30^{cd}	1.30^{cd}	1.33^{c}
T_8	1.13^{bc}	1.16^{bc}	1.20^{bcd}	1.20^{bcd}	1.20^{cd}	1.20^{bcd}	1.20^{bc}
T_9	1.33^{c}	1.33^{c}	1.33^{d}	1.33^{d}	1.36^{d}	1.36^{d}	1.36^{c}

***Figures with even alphabets form one homogenous group**

Table 11e. Effect of application of growth retardants on petiole girth in *Ficus benjamina*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	0.30^{a}	0.30^{a}	0.30^{a}	0.33^{a}	0.36^{ab}	0.36^{ab}	0.36^{a}
T_2	0.23^{a}	0.26^{a}	0.26^{a}	0.26^{a}	0.26^{ab}	0.30^{ab}	0.36^{a}
T_3	0.40^{a}	0.40^{a}	0.43^{a}	0.43^{a}	0.43^{b}	0.43^{b}	0.43^{a}
T_4	0.30^{a}	0.33^{a}	0.33^{a}	0.33^{a}	0.33^{ab}	0.36^{ab}	0.36^{a}
T_5	0.29^{a}	0.29^{a}	0.29^{a}	0.32^{a}	0.35^{ab}	0.35^{ab}	0.35^{a}
T_6	0.28^{a}	0.28^{a}	0.28^{a}	0.31^{a}	0.34^{ab}	0.34^{ab}	0.34^{a}
T_7	0.23^{a}	0.23^{a}	0.26^{a}	0.26^{a}	0.26^{a}	0.26^{a}	0.30^{a}
T_8	0.36^{a}	0.40^{a}	0.43^{a}	0.43^{a}	0.43^{b}	0.43^{b}	0.43^{a}
T_9	0.30^{a}	0.30^{a}	0.30^{a}	0.33^{a}	0.36^{ab}	0.36^{ab}	0.36^{a}

***Figures with even alphabets form one homogenous group**

Table 11f. Effect of application of growth retardants on petiole girth in *Schefflera arboricola*

Treatments	3rd month	4th month	5th month	6th month	7th month	8th month	9th month
T_1	0.53^{a}	0.56^{a}	0.56^{a}	0.56^{a}	0.56^{a}	0.56^{a}	0.60^{a}
T_2	0.50^{a}	0.50^{a}	0.50^{a}	0.53^{a}	0.56^{a}	0.60^{a}	0.63^{a}
T_3	0.60^{a}	0.60^{a}	0.60^{a}	0.60^{a}	0.60^{a}	0.63^{a}	0.63^{a}
T_4	0.53^{a}	0.53^{a}	0.53^{a}	0.56^{a}	0.56^{a}	0.60^{a}	0.60^{a}
T_5	0.42^{a}	0.45^{a}	0.45^{a}	0.49^{a}	0.52^{a}	0.52^{a}	0.59^{a}
T_6	0.41^{a}	0.44^{a}	0.44^{a}	0.48^{a}	0.51^{a}	0.51^{a}	0.58^{a}
T_7	0.53^{a}	0.53^{a}	0.53^{a}	0.53^{a}	0.53^{a}	0.53^{a}	0.56^{a}
T_8	0.56^{a}	0.56^{a}	0.56^{a}	0.56^{a}	0.60^{a}	0.63^{a}	0.63^{a}
T_9	0.43^{a}	0.46^{a}	0.46^{a}	0.50^{a}	0.53^{a}	0.53^{a}	0.60^{a}

***Figures with even alphabets form one homogenous group**

4.1.1.1.9. Leaf longevity (days)

The observations on the leaf longevity are presented in table 12.

There was a significant difference between the foliage plants in keeping the leaves intact for more number of days.

In *Dieffenbachia amoena,* the highest leaf longevity was observed in T_8(CCC 2000 ppm) (133.00 days) followed by T_7 (CCC 1000 ppm) (130.00 days) and the lowest leaf longevity was observed in T_5 (B-Nine 1000 ppm) (111.33 days) and in T_6(B-Nine 2000 ppm) (112.33 days). In *Dracaena sanderiana,* the highest leaf longevity was observed in T_8(CCC 2000 ppm) (240.66 days) followed by T_7 (CCC 1000 ppm) (240.00 days) and the lowest leaf longevity was observed in T_2 (ancymidol 1000 ppm) (230.33 days) and T_4 (paclobutrazol 100 ppm) (230.33 days).

In *Syngonium podophyllum,* the highest leaf longevity was observed in T_3 (paclobutrazol 50 ppm) (78.00 days) followed by T_4 (paclobutrazol 100 ppm) (76.00 days) and the lowest leaf longevity was observed in T_6(B-Nine 2000 ppm) (62.00 days) and T_9(control) (62.00 days). In *Scindapsus aureus,* the highest leaf longevity was observed in T_1(ancymidol 500 ppm) (186.33 days) followed by T_2 (ancymidol 1000 ppm) (185.33 days) and the lowest leaf longevity was observed in T_6 (B-Nine 2000 ppm) (172.33 days) followed by T_9 (control) (173.33 days).

In *Ficus benjamina,* the highest leaf longevity was observed in T_4(paclobutrazol 100 ppm) (74.20 days) followed by T_3(paclobutrazol 50 ppm) (73.33 days) and the lowest leaf longevity was observed in T_9(control) (69.93 days) followed by T_1 (ancymidol 500 ppm) (70.00 days). In *Schefflera arboricola,* the highest leaf longevity was observed in T_1 (ancymidol 500 ppm) (162.33 days) followed by T_4 (paclobutrazol 100 ppm) (162.00 days) and the lowest leaf longevity was observed in T_8 (CCC 2000 ppm) (154.00 days) followed by T_5 (B-Nine 1000 ppm) (154.20 days) and T_6(B-Nine 2000 ppm) (154.33 days).

4.1.1.2. Qualitative characters

Leaf characters like texture, shape, margin, tip, base, type, pigmentation, venation and arrangement were observed. The observations are presented in table 13.

4.1.1.3. Others

Branching habit, pests and diseases, other symptoms like bending, drooping etc. were observed with regard to the greenhouse. The observations are presented in table 14.Under greenhouse conditions, no serious pest and disease problems were observed.

4.1.1.4. Plant quality rating

4.1.1.4.1. Plant quality rating based on growth and fullness

The observations on the plant quality rating are presented in table 15 a, Fig 5a -6c and Fig 6a -7c.

The highest plant quality rating (9.3) based on growth and fullness was observed in the plants treated with T_1 (ancymidol 500 ppm) and T_2 (ancymidol 1000 ppm) in *Scindapsus aureus*, T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum*, T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum, Scindapsus aureus, Ficus benjamina*and *Schefflera arboricola*, T_7 (CCC 1000 ppm) in *Dieffenbachia amoena*, and *Dracaena sanderiana*, T_8 (CCC 2000 ppm) in *Syngonium podophyllum* and*Scindapsus aureus* followed by a rating of (9.1) was observed in the plants treated with T_1(ancymidol 500 ppm) in *Schefflera arboricola* and T_8(CCC 2000 ppm) in *Dieffenbachia amoena.*

The lowest plant quality rating (5.5) was recorded in the plants treated T_5(B-Nine 1000 ppm), T_6(B-Nine 2000 ppm) and T_9(control) in *Dracaena sanderiana* and *Ficus benjamina* followed by a rating of (6.0) in T_1 (ancymidol 500 ppm) in *Ficus benjamina*, T_3 (paclobutrazol 50 ppm) in *Dracaena sanderiana*, T_5(B-Nine 1000 ppm) and T_6(B-Nine 2000 ppm) in *Dieffenbachia amoena*and *Syngonium podophyllum*and inT_9(control) in *Dieffenbachia amoena*and *Schefflera arboricola.*

4.1.1.4.2. Plant quality rating based on color and pigmentation

The observations on the plant quality rating are presented in table 15 b, Fig 7a -8c and Fig 8a -9c.

Based on pigmentation, the highest plant quality rating (9.1) was recorded in the plants treated with T_4 (paclobutrazol @ 100ppm) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.*

The lowest plant quality rating (6.7) was observed in T_9 (control) in all the plants selected for the study.

4.1.1.5. Chlorophyll content

The observations on the chlorophyll a, chlorophyll b and total chlorophyll content are presented in table 16a - 16c.

The chlorophyll a content was the highest in the plants treated with T_4 (paclobutrazol 100ppm) in *Dieffenbachia amoena* and *Ficus benjamina* (0.5932 mg/g and 1.2107 mg/g) (Table 16a).

The chlorophyll b content was the highest in the plants treated with T_4 (paclobutrazol 100ppm) in *Dracaena sanderiana* and *Scindapsus aureus* (0.4062 mg/g and 0.2311 mg/g) (Table 16b).

The total chlorophyll content was the highest in the plants treated with the treatment T_4 (paclobutrazol 100ppm) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina* (0.7788 mg/g, 1.6111 mg/g, 0.9790mg/g and 1.5912 mg/g) (Table 16c and Fig 6).

In all the plants selected for the study, the plants under T_9 (control) had shown lowest chlorophyll a & b and total chlorophyll contents compared to the treated plants (table 16a - 16c, Fig 9a -10c and Fig 10a - 11c).

4.1.1.6. Anatomical studies

The observations on the leaf anatomical studies are presented in table 17, plates 5 and 6.

With regard to the anatomical studies, the plants treated with T_4 (paclobutrazol 100 ppm) were observed with the highest number of palisade cells per unit length (0.35 mm) (8, 11, 13 and 28) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.*

The lowest number of palisade cells per unit length (0.35 mm) (7, 10, 12, and 27) as observed in T_9 (control) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.* The number of palisade cells per unit length in the remaining treatments, other than T_4 (paclobutrazol 100 ppm) was equal compared to T_9 (control) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.* In *Syngonium podophyllum* and *Schefflera arboricola,* there was no significant difference observed between the treatments i.e., the growth retardant application didnot affect the number of palisade cells per unit length.

4.1.1.7. Atmospheric conditions

Temperatures, relative humidity and light intensity that prevailed in the greenhouse were observed and are presented in Appendix 1.

Table 12. Effect of application of growth retardants on leaf longevity (Days)

Treatments	*Dieffenbachia Amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Scheffle ra arboricola*
T_1	113.00^{b}	232.00^{ab}	64.00^{b}	186.33^{c}	70.00^{ab}	162.33^{c}
T_2	120.66^{d}	230.33^{a}	71.33^{c}	185.33^{c}	71.00^{ab}	157.33^{bc}
T_3	112.66^{a}	232.33^{b}	78.00^{d}	180.33^{bc}	73.33^{bcd}	158.33^{bc}
T_4	113.00^{b}	230.33^{a}	76.00^{d}	183.33^{c}	74.20^{cd}	162.00^{c}
T_5	111.33^{b}	231.33^{b}	63.00^{b}	176.33^{b}	71.20^{ab}	154.20^{ab}
T_6	112.33^{b}	234.33^{b}	62.00^{b}	172.33^{b}	70.20^{ab}	154.33^{ab}
T_7	130.00^{e}	240.00^{d}	64.00^{b}	180.33^{bc}	71.33^{ab}	157.33^{bc}
T_8	133.00^{e}	240.66^{d}	67.00^{c}	180.00^{bc}	71.44^{ab}	154.00^{ab}
T_9	115.33^{b}	233.33^{b}	62.00^{b}	173.33^{b}	69.93^{b}	154.45^{ab}

*Figures with even alphabets form one homogenous group

Table 13. Qualitative leaf characters of foliage plants selected for the study

Plant species	Texture	Shape	Bending and drooping of leaves	Pigmentation
Dieffenbachia amoena	Coarse	Ovate	Nil	Deep green and marked with cream white bands and blotches along veins
Dracaena sandariana	Medium	Narrow	Nil	Deep green somewhat milky & with broad marginal bands of white
Syngonium podophyllum	Medium	Sagitate	Bends if not staked	Green
Scindapsus aureus	Medium	Ovate	Bends if not staked	Dark green with yellow variegation
Ficus benjamina	Fine	Ovate	Nil	Deep green
Schefflera arboricola	Medium	Obovate	Nil	Glossy green

Table 14. Other leaf characters of foliage plants selected for the study

Plant species	Branching habit	Scorching or yellowing	Bending and drooping of leaves	Pest and diseases
Dieffenbachia amoena	Single stem/trunk	Nil	Nil	Nil
Dracaena sandariana	Single stem	Nil	Nil	Nil
Syngonium podophyllum	Produce adventitious roots in nodes	Nil	Bends if not staked	Nil
Scindapsus aureus	Produce adventitious roots in nodes	Nil	Bends if not staked	Nil
Ficus benjamina	Yes	Nil	Nil	Nil
Schefflera arboricola	Yes	Nil	Nil	Nil

Table 15a. **Plant quality rating of foliage plants based on growth and fullness by visual scoring***

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	7.0^{bc}	8.0^{b}	7.0^{bc}	9.3^{a}	6.0^{d}	9.1^{a}
T_2	8.0^{b}	8.0^{b}	8.0^{b}	9.3^{a}	7.0^{bc}	8.0^{b}
T_3	7.0^{bc}	6.0^{b}	9.3^{a}	8.0^{b}	8.0^{b}	8.0^{b}
T_4	7.0^{bc}	7.0^{bc}	9.3^{a}	9.3^{a}	9.3^{a}	9.3^{a}
T_5	6.0^{d}	5.5^{d}	6.0^{d}	7.0^{bc}	5.5^{d}	7.0^{bc}
T_6	6.0^{d}	5.5^{d}	6.0^{d}	7.0^{bc}	5.5^{d}	7.0^{bc}
T_7	9.3^{a}	9.3^{a}	8.0^{b}	8.0^{b}	6.5^{d}	8.0^{b}
T_8	9.1^{a}	8.0^{b}	9.3^{a}	9.3^{a}	7.0^{bc}	7.0^{bc}
T_9	6.0^{d}	5.5^{d}	7.0^{bc}	7.0^{c}	5.5^{d}	6.0^{d}

***Score. 1-10, 10 being the highest and 1 being the lowest**

Fig 5a. Plant quality rating of foliage plants based on growth and fullness in *Dieffenbachia amoena*

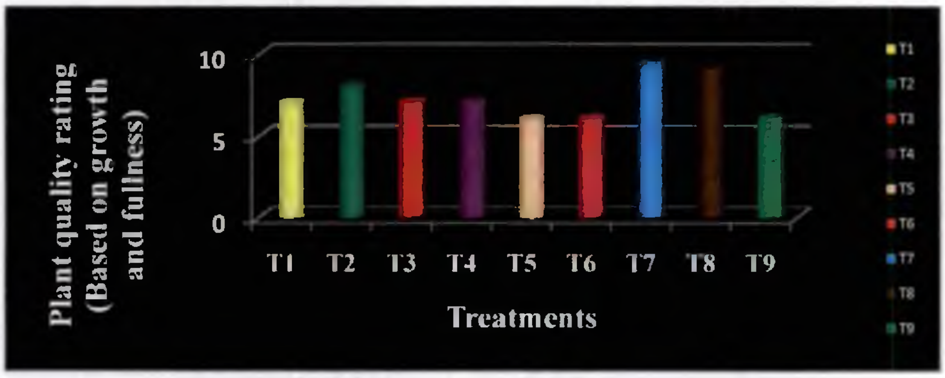


Fig 5b. Plant quality rating of foliage plants based on growth and fullness in *Dracaena sandariana*

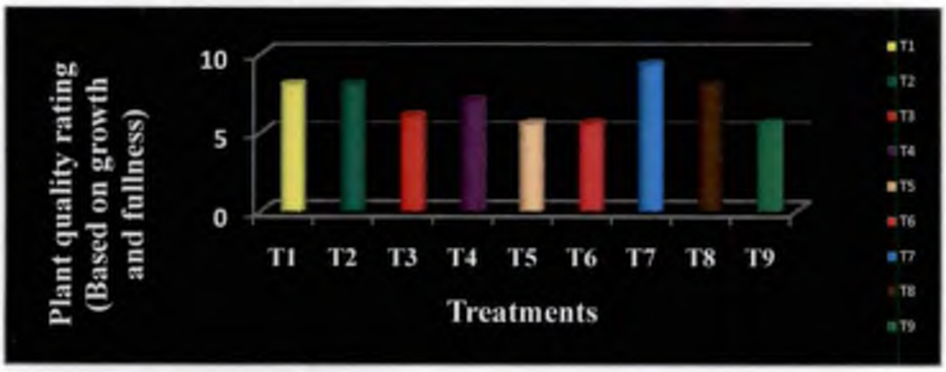


Fig 5c. Plant quality rating of foliage plants based on growth and fullness in *Syngonium podophyllum*

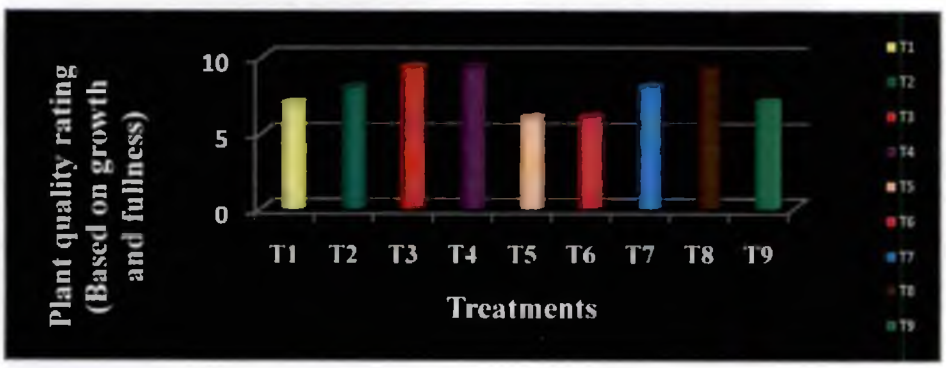


Fig 6a. Plant quality rating of foliage plants based on growth and fullnessin *Scindapsus aureus*

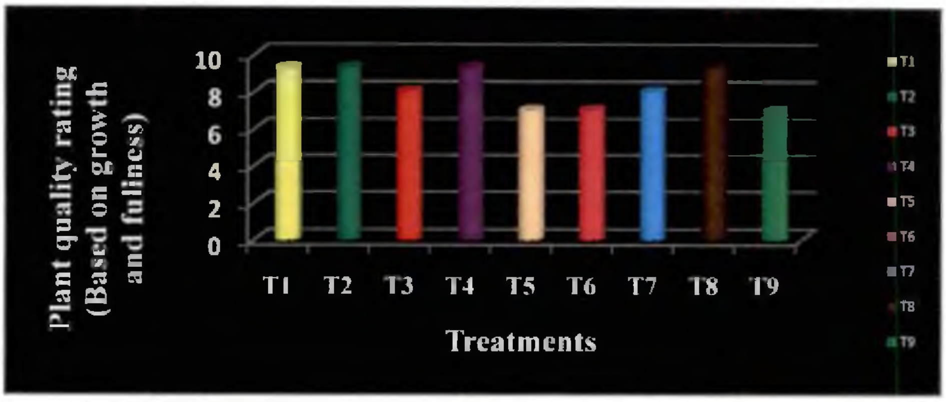


Fig 6b.Plant quality rating of foliage plants based on growth and fullnessin *Ficus benjamina*

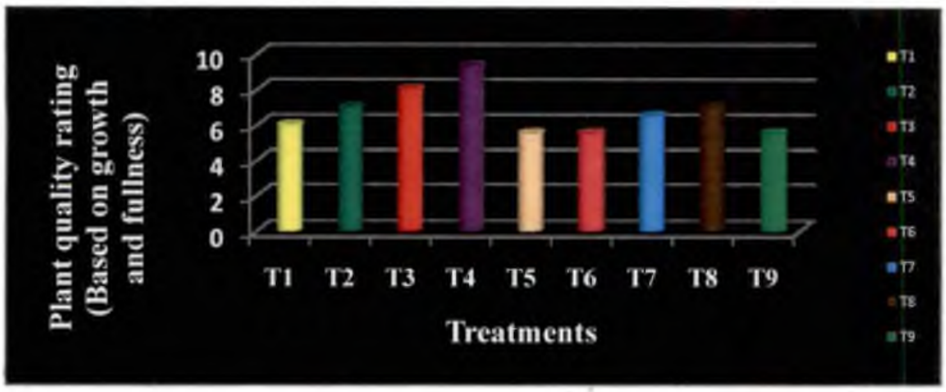


Fig 6c.Plant quality rating of foliage plants based on growth and fullness in *Schefflera arboricola*

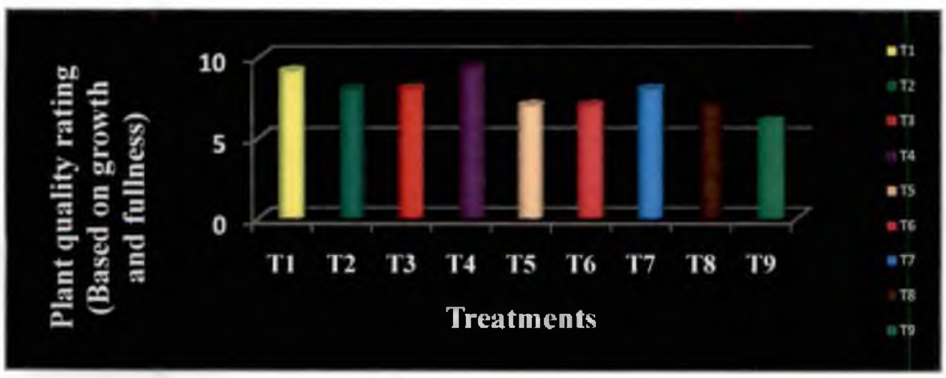


Fig 7a. Plant quality rating of foliage plants based on pigmentation in *Dieffenbachia amoena*

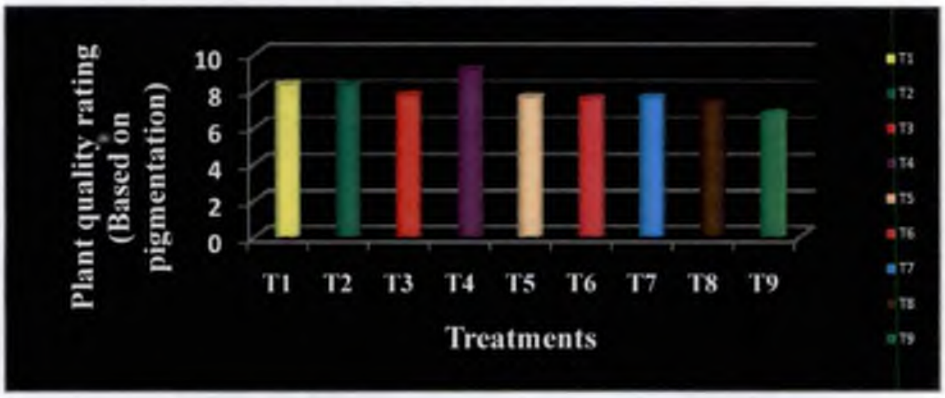


Fig 7b.Plant quality rating of foliage plants based on pigmentation in *Dracaena sandariana*

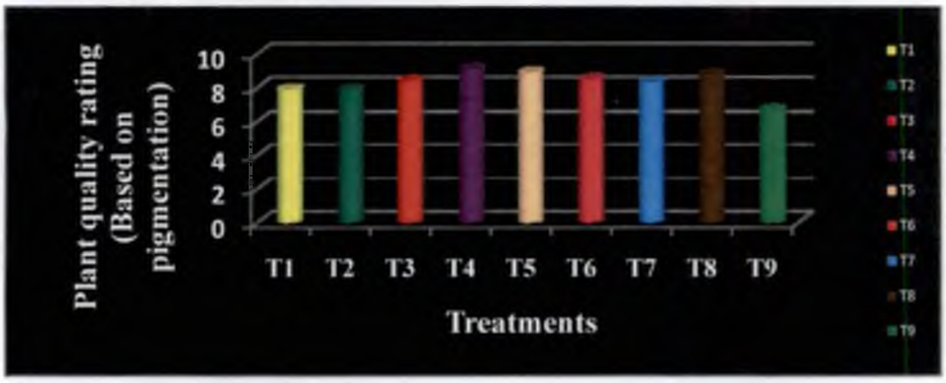


Fig 7c. Plant quality rating of foliage plants based on pigmentation in *Syngonium podophyllum*

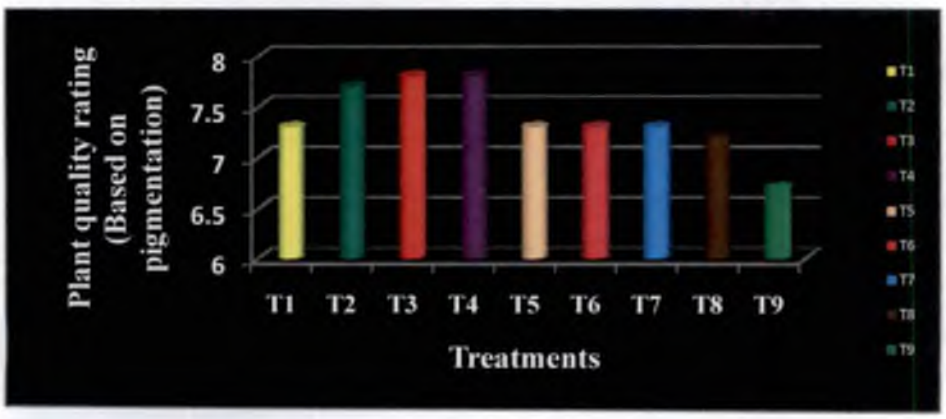


Fig 8a. Plant quality rating of foliage plants based on pigmentation in *Scindapsus aureus*

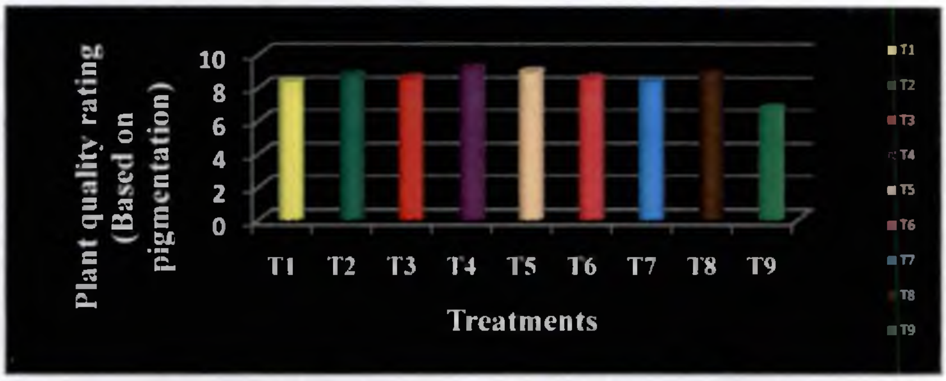


Fig 8b. Plant quality rating of foliage plants based on pigmentation in *Ficus benjamina*

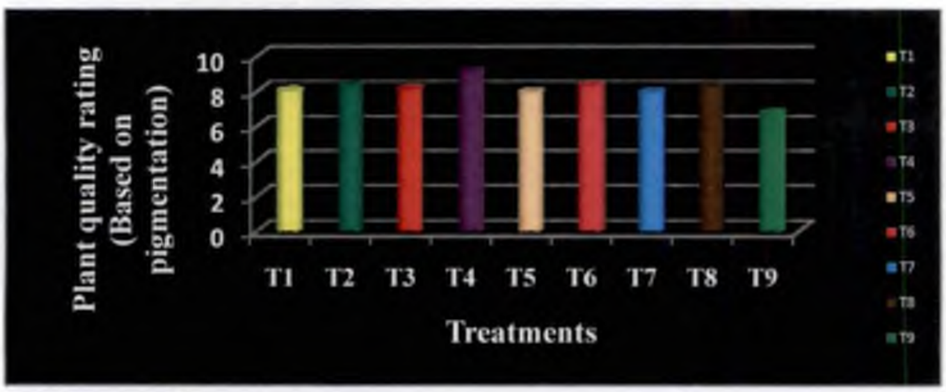


Fig 8c. Plant quality rating of foliage plants based on pigmentation in *Schefflera arboricola*

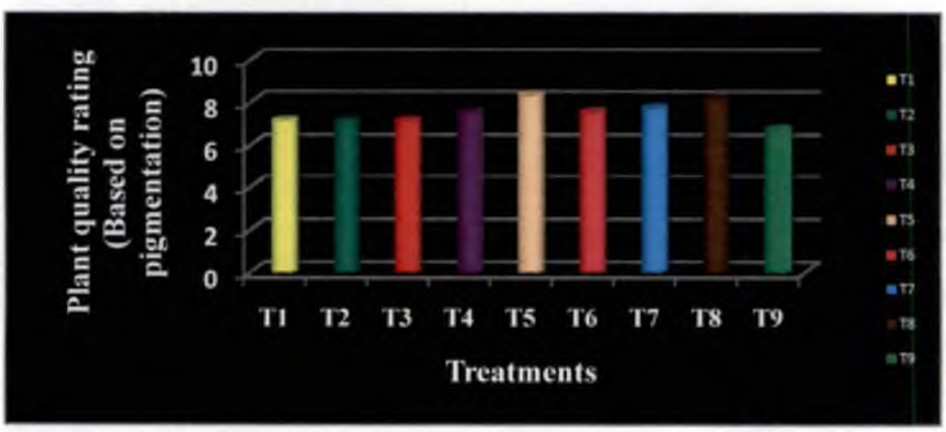


Table 16a. Effect of application of growth retardants on chlorophyll a content (mg/g)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	0.5173^{bc}	1.2104^{b}	0.7941^{b}	0.7185^{bc}	0.9317^{b}	0.6834^{ab}
T_2	0.5174^{bc}	1.2101^{b}	0.8886^{b}	0.7354^{bc}	1.1524^{bc}	0.7168^{ab}
T_3	0.4141^{ab}	0.9355^{a}	0.8069^{b}	0.6684^{b}	0.9371^{b}	0.6934^{ab}
T_4	0.5932^{c}	1.2104^{b}	0.9225^{b}	0.7513^{bc}	1.2107^{c}	0.7788^{abc}
T_5	0.4141^{ab}	0.9035^{a}	0.7998^{b}	0.7582^{bc}	0.9518^{b}	0.9505^{bc}
T_6	0.3359^{a}	0.9305^{a}	0.7884^{b}	0.6584^{b}	1.1344^{bc}	0.7697^{abc}
T_7	0.4131^{ab}	1.1004^{b}	0.7919^{b}	0.7120^{bc}	0.9117^{b}	0.6234^{ab}
T_8	0.4211^{ab}	1.1104^{b}	0.7915^{b}	0.7523^{bc}	1.1224^{bc}	0.7068^{ab}
T_9	0.3781^{a}	0.5358^{a}	0.5038^{a}	0.4243^{a}	0.5289^{a}	0.4781^{a}

***Figures with even alphabets form one homogenous group**

Table 16b. Effect of application of growth retardants on chlorophyll b content (mg/g)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	0.1833^{ab}	0.1855^{b}	0.2246^{a}	0.1608^{ab}	0.1954^{ab}	0.2266^{ab}
T_2	0.1830^{ab}	0.1851^{b}	0.2568^{a}	0.1766^{b}	0.3479^{ab}	0.2446^{ab}
T_3	0.1138^{b}	0.2533^{b}	0.2538^{a}	0.2001^{bc}	0.3177^{ab}	0.2366^{ab}
T_4	0.1883^{ab}	0.4062^{c}	0.2609^{a}	0.2311^{c}	0.3860^{b}	0.3160^{b}
T_5	0.1138^{b}	0.2023^{b}	0.2408^{a}	0.1893^{bc}	0.1811^{ab}	0.2251^{ab}
T_6	0.1232^{a}	0.2513^{b}	0.2340^{a}	0.1901^{bc}	0.3243^{ab}	0.2079^{ab}
T_7	0.1128^{b}	0.1355^{b}	0.2229^{a}	0.1620^{ab}	0.1950^{ab}	0.2166^{ab}
T_8	0.1136^{b}	0.1005^{b}	0.2412^{a}	0.1823^{bc}	0.3470^{ab}	0.2046^{ab}
T_9	0.1224^{a}	0.0904^{a}	0.2035^{a}	0.1174^{a}	0.1624^{a}	0.1736^{a}

***Figures with even alphabets form one homogenous group**

Table 16c. Effect of application of growth retardants on total chlorophyll content (mg/g)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	0.6980^{bc}	0.7562^{ab}	1.0152^{ab}	0.8762^{bc}	1.1231^{b}	0.9070^{ab}
T_2	0.6981^{bc}	0.7561^{ab}	1.1414^{b}	0.9088^{bc}	1.4951^{bc}	0.9581^{ab}
T_3	0.5261^{ab}	0.9855^{b}	1.0570^{b}	0.8755^{b}	1.2506^{bc}	0.9170^{ab}
T_4	0.7788^{c}	1.6111^{c}	1.1793^{b}	0.9790^{c}	1.5912^{c}	1.0913^{abc}
T_5	0.5261^{ab}	0.9675^{b}	1.0370^{ab}	0.9442^{bc}	1.1320^{b}	1.1714^{bc}
T_6	0.4676^{a}	0.9655^{b}	1.0189^{ab}	0.8455^{b}	1.4536^{bc}	0.9742^{ab}
T_7	0.5231^{ab}	0.7502^{ab}	1.0111^{ab}	0.8719^{bc}	1.1230^{b}	0.9170^{ab}
T_8	0.5240^{ab}	0.7342^{ab}	1.0370^{ab}	0.9410^{bc}	1.4950^{bc}	0.9181^{ab}
T_9	0.4988^{a}	0.6240^{a}	0.7050^{a}	0.5398^{a}	0.6889^{a}	0.6462^{a}

Fig 9a. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Dieffenbachia amoena*

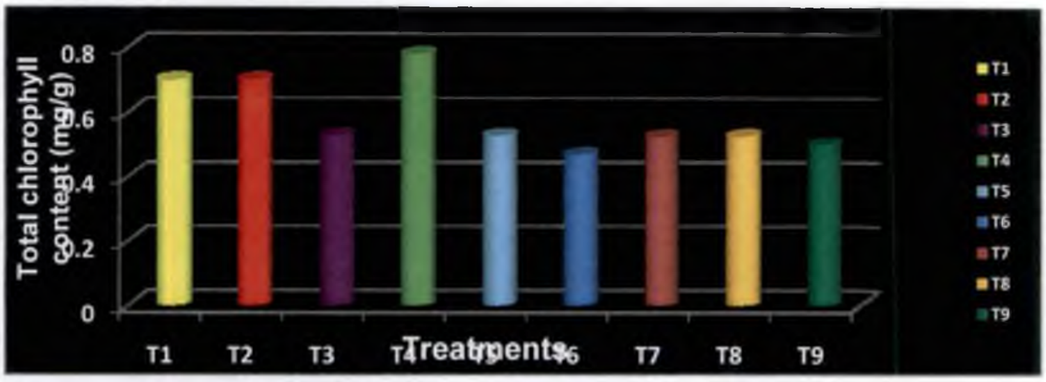


Fig 9b. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Dracaena sandariana*

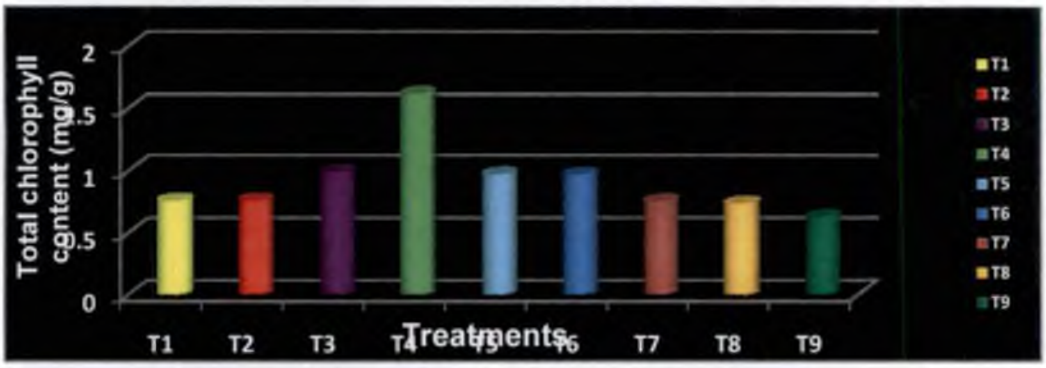


Fig 9c. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Syngonium podophyllum*

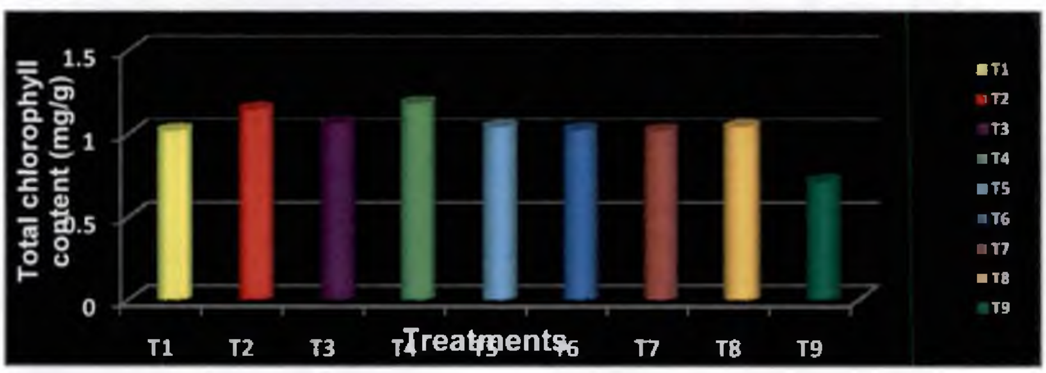


Fig 10a. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Scindapsus aureus*

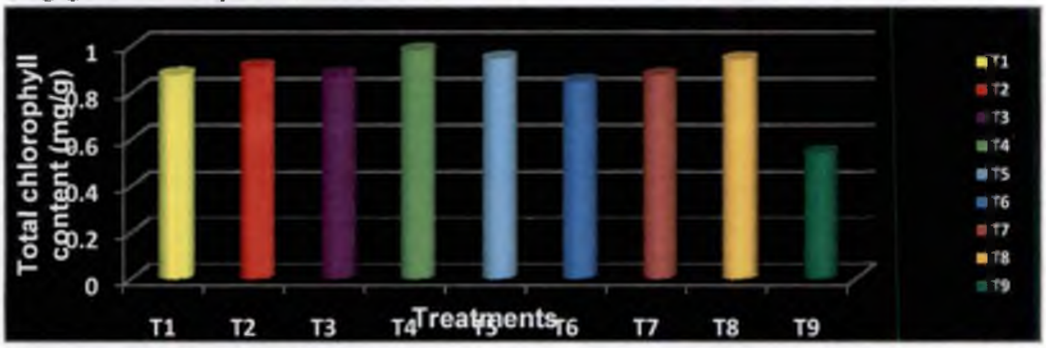


Fig 10b. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Ficus benjamina*

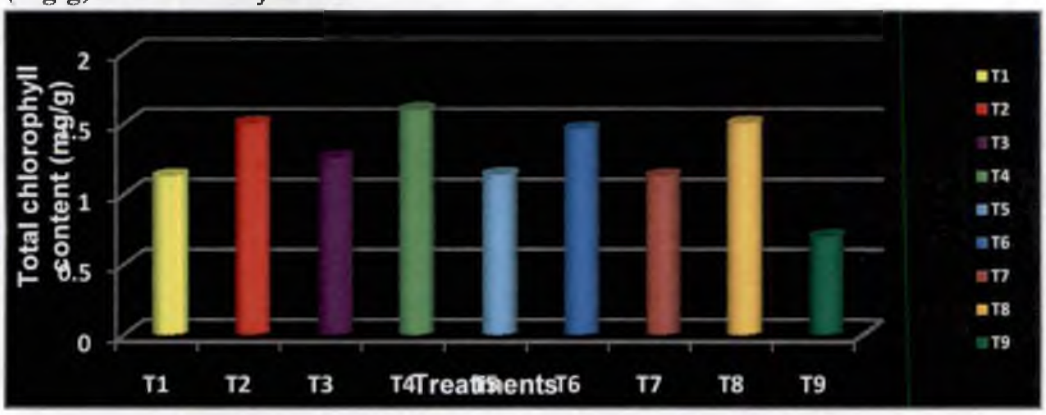


Fig 10c. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Schefflera arboricola*

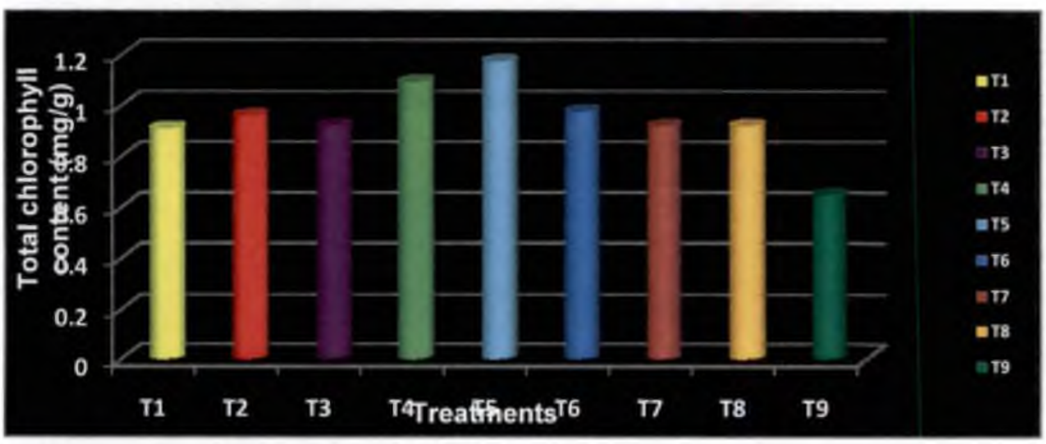
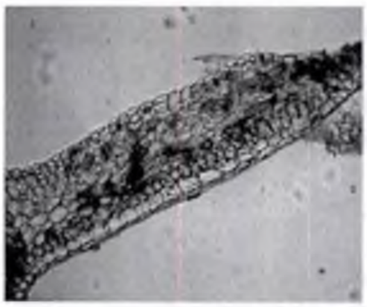


Table 17. Effect of application of growth retardants on leaf anatomy (Number of palisade cells per unit length- 0.35mm)

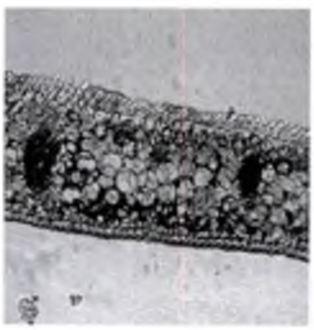
Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	7.0	10	15	12	27	27
T_2	7.0	10	15	12	27	27
T_3	7.0	10	15	12	27	27
T_4	8.0	11	15	13	28	27
T_5	7.0	10	15	12	27	27
T_6	7.0	10	15	12	27	27
T_7	7.0	10	15	12	27	27
T_8	7.0	10	15	12	27	27
T_9	7.0	10	15	12	27	27

Plate 5: Effect of application of growth retardants on leaf anatomy (Number of palisade cells per unit length- 0.35mm) in*Dieffenbachia amoena* and *Dracaena sanderiana*

Paclobutrazol 100 ppm (T_4)

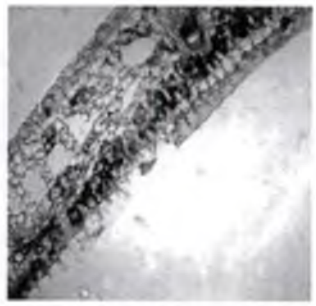


Dieffenbachia amoena

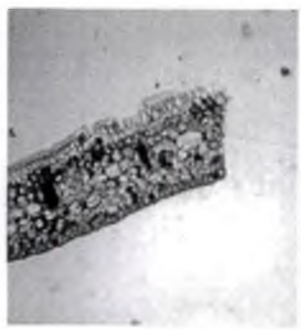


Dracaena sanderiana

Control (T_9)



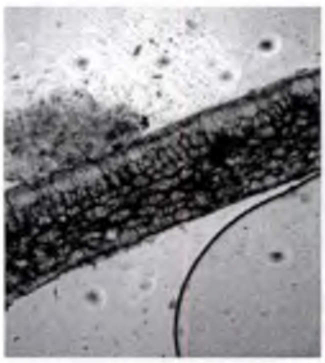
Dieffenbachia amoena



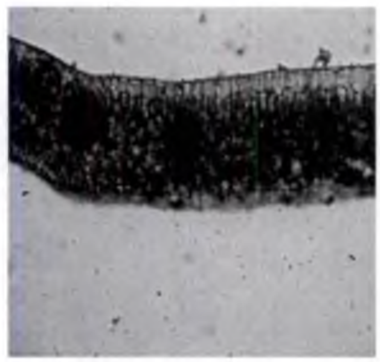
Dracaena sanderiana

Plate 6.Effect of application of growth retardants on leaf anatomy (Number of palisade cells per unit length- 0.35mm) in *Scindapsus aureus* and *Ficus benjamina*

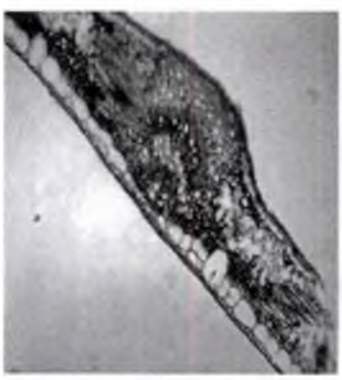
Paclobutrazol 100 ppm (T_4) | **Control (T_9)**



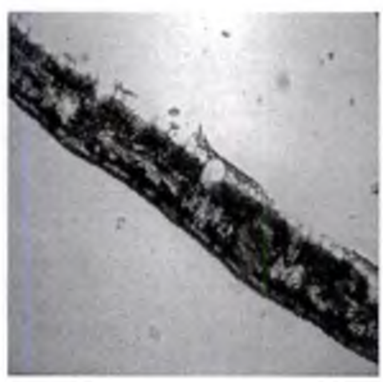
Scindapsus aureus



Scindapsus aureus



Ficus benjamina



Ficus benjamina

4.2. Evaluation under indoor conditions

The plants were placed in the interior under medium light intensity (800-2000 Lux) and observations were observed on the interior performance.

4.2.1. Plant characters

4.2.1.1. Quantitative characters

4.2.1.1.1. Plant height

The observations on the plant height are presented in table 18a and 18b, Fig 11 and 12 and plates 7 and 8.

In *Dieffenbachia amoena,* significant variation was observed between the treatments. Plants treated with T_7 (CCC 1000ppm) recorded lowest plant height (44.81cm). The highest plant height was observed in T_9 (control) (76.48 cm) (Table 18a, Fig 11a and plate 7a).

In *Dracaena sanderiana,* significant variation was observed between the treatments. Plants treated withT_7 (CCC 1000ppm) was observed with the lowest plant height (33.50 cm) and the highest plant height was observed in T_9 (control)(69.92 cm). (Table 18a, Fig 11b and plate 7b).

In *Syngonium podophyllum,* significant variation was observed between the treatments. Plants treated with T_4 (paclobutrazol 100ppm) was observed with the lowest plant height (287.30 cm) followed by T_3 (paclobutrazol 50ppm) (291.41 cm) and the highest plant height was observed in T_9 (control) (334.09 cm)followed by T_5 (B-Nine 1000 ppm) (330.09 cm) and T_6 (B-Nine 2000 ppm) (329.09 cm) (Table 18a and Fig 11c).

In *Scindapsus aureus,* significant variation was observed between the treatments. Plants treated with T_2 (ancymidol 1000ppm) showed the lowest plant height (259.64 cm) and the highest plant height was observed in T_9 (control) (338.47 cm) followed byT_6 (B-Nine 2000 ppm)(331.47 cm) and T_5 (B-Nine 1000 ppm) (330.47 cm) (Table 18b and Fig 12a).

In *Ficus benjamina,* significant variation was observed between the treatments. The plants treated with T_4 (paclobutrazol 100ppm) showed the lowest plant height (47.03 cm). The highest plant height was observed inT_9 (control) (107.64 cm) (Table 18b, Fig 12b and plate 8a).

In *Schefflera arboricola,* significant variation was observed between the treatments. The plants treated with T_4 (paclobutrazol 100ppm) was observed with the lowest plant height (34.86 cm). The highest plant height was observed in T_9 (control)(51.47 cm)(Table 18b, Fig 12c and plate 8b).

4.2.1.1.2. Plant spread

This parameter was not taken into consideration for the plant species *Syngonium podophyllum* and *Scindapsus aureus,* as these plants are climbing type.

The observations on the plant spread are presented in table 19.

In *Dieffenbachia amoena,*significant difference was observed between the treatments. Plants treated with T_8 (CCC 2000 ppm) showed the lowest plant spread (49.57 cm) and the highest plant spread was observed in T_9 (control) (66.66 cm) followed by T_5 (B-Nine 1000 ppm) (63.66 cm) and T_6 (B-Nine 2000 ppm) (62.66 cm).(Table 19).

In *Dracaena sanderiana,* significant difference was observed between the treatments. Plants treated with T_7 (CCC 1000 ppm) showed the lowest plant spread (26.94 cm). The highest plant spread was observed in T_9 (control) (31. 58 cm) followed by T_3 (paclobutrazol 50 ppm) (31.16 cm) (Table 19).

In *Ficus benjamina,* plants treated with T_2 (ancymidol 1000ppm) showed the lowest plant spread (32.54 cm)and the highest plant spread was observed in T_8 (CCC 2000 ppm) (39.53 cm) and T_7 (CCC 1000 ppm) (39.19 cm) (Table 19).

In *Schefflera arboricola,* plants treated with T_5 (B-Nine 1000 ppm) (36.43 cm) showed the lowest spread and the highest plant spread was observed in T_8 (CCC 2000 ppm) (39.72 cm) followed by T_3 (paclobutrazol 50 ppm) (38.83 cm) and T_7 (CCC 1000 ppm) (38.48 cm)(Table 19).

4.2.1.1.3. Length and breadth of leaves (cm)

When the foliage plants are concerned for interior plantscaping, the leaf characters are needed to be studied completely, so as to recommend them for particular conditions. Length and breadth of leaves are the important parameters to be considered while evaluating a foliage plant. In the present study, they were measured and the results are tabulated.

4.2.1.1.3.1. Leaf length

The observations on the leaf length are presented in table 20a and 20b.

In *Dieffenbachia amoena,* the plants treated with T_7 (CCC 1000ppm) showed lowest leaf length (24.95 cm). The highest leaf length was observed in T_3 (paclobutrazol 50 ppm) (30.34 cm) followed by T_4 (paclobutrazol 100 ppm) (30.30 cm) (Table 20a).

In *Syngonium podophyllum,* the lowest leaf length was observed in T_3(paclobutrazol 50 ppm) (9.50 cm) followed by T_8(CCC 2000 ppm) (9.70 cm) and T_1(ancymidol 500 ppm) (9.88 cm) and the highest leaf length was observed in T_9 (control) (11.89 cm) followed by T_6 (B-Nine 2000 ppm) (11.83 cm) and T_5(B-Nine 1000 ppm) (11.80 cm). (Table 20a).

In *Ficus benjamina,* plants treated with T_4 (paclobutrazol 100 ppm) showed the lowest leaf length (4.60 cm). The highest leaf length was observed in T_9 (control) (5.61 cm) (Table 20b).

The leaf length was not affected by the application of growth retardants in the *Dracaena sanderiana, Scindapsus aureus*and *Schefflera arboricola* (Tables 20a and 20b)

4.2.1.1.3.2. Leaf breadth

The observations on the leaf breadth are presented in table 21a and 21b.

In *Dieffenbachia amoena,* plants treated with T_7 (CCC 1000ppm) had shown the lowest leaf breadth (9.93 cm) and the highest leaf breadth was observed in T_3 (paclobutrazol 50 ppm) (12.97 cm) (Table 21a).

In *Dracaena sanderiana,* plants treated with T_4 (paclobutrazol 100ppm) had shown the lowest leaf breadth (2.74 cm) and the highest leaf breadth was observed in T_9 (control) (3.58 cm) followed by T_5 (B-Nine 1000 ppm) (3.53 cm) and T_3 (paclobutrazol 50 ppm) (3.50 cm)(Table 21a).

In *Schefflera arboricola,* the lowest leaf breadth was observed in T_1(ancymidol 500 ppm) (12.20 cm) and the highest leaf breadth was observed in T_8(CCC 2000 ppm) (14.34 cm) followed by T_9(control) (13.67 cm) (Table 21b).

The leaf breadth was not affected by application of growth retardants in *Syngonium podophyllum, Scindapsus aureus* and*Ficus benjamina* (Tables 21a and 21b)

4.2.1.1.4. Leaf area

The observations on the leaf area are presented in table 22a and 22b.

In *Dieffenbachia amoena,* significant variation was observed between treatments. The plants treated withT_7 (CCC 1000ppm) showed the lowest leaf area (205.59 cm^2) and the highest leaf area was observed in T_3 (paclobutrazol 50 ppm) (331.81 cm^2) followed by T_4 (paclbutrazol 100 ppm) (319.12 cm^2).(Table 22a).

There was no significant variation among the treatments in *Dracaena sanderiana* (Table22a).

In *Syngonium podophyllum*, significant variation was observed between treatments. Plants treated with T_3 (paclobutrazol 50ppm) showed the lowest leaf area (53.41 cm^2) and the highest leaf area was observed in T_9 (control) (77.20 cm^2) followed by T_5 (B-Nine 1000 ppm) (76.20 cm^2) and T_6 (B-Nine 2000 ppm) (75.20 cm^2) (Table 22a).

In *Scindapsus aureus*, the lowest leaf area was observed in T_4(paclobutrazol 100 ppm) (52.78 cm^2) and the highest leaf area was observed in T_9(control) (68.43 cm^2) followed by T_5(B-Nine 1000 ppm) (67.43 cm^2) and T_6 (B-Nine 2000 ppm) (66.43 cm^2). (Table 22b).

In *Ficus benjamina*, the lowest leaf area was observed in T_4(paclobutrazol 100 ppm) (11.21 cm^2) and the highest leaf area was observed in T_9 (control) (14.82 cm^2) (Table 22b).

In *Schefflera arboricola*, significant variation was observed between treatments. Theplants treated with T_1 (ancymidol 500ppm) were observed with the lowest leaf area (129.28 cm^2) and the highest leaf area was observed in T_8 (CCC 2000 ppm) (169.06 cm^2) followed by T_9 (control) (163.99 cm^2)(Table 22b).

Table 18a. Effect of application of growth retardants on plant height (cm)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	57.13^{c}	58.77^{c}	47.49^{bc}	49.27^{bc}	279.92^{c}	314.82^{c}
T_2	54.49^{bc}	56.11^{bc}	50.33^{bcd}	51.40^{bcd}	272.97^{b}	306.87^{b}
T_3	62.30^{c}	64.48^{c}	62.35^{de}	65.55^{de}	259.51^{a}	291.41^{a}
T_4	60.07^{c}	62.05^{c}	58.90^{cde}	61.63^{cde}	256.40^{a}	287.30^{a}
T_5	69.97^{cd}	72.48^{cd}	62.57^{e}	66.92^{e}	293.19^{d}	330.09^{d}
T_6	68.97^{cd}	71.48^{cd}	63.57^{e}	65.92^{e}	290.19^{d}	329.09^{d}
T_7	43.70^{a}	44.81^{a}	33.07^{a}	33.50^{a}	273.95^{c}	307.85^{c}
T_8	48.37^{ab}	49.41^{ab}	44.65^{cde}	44.66^{cde}	260.97^{bc}	293.17^{bc}
T_9	72.97^{cd}	76.48^{cd}	65.57^{e}	69.92^{e}	297.19^{d}	334.09^{d}

Table 18b. Effect of application of growth retardants on plant height (cm)

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	241.46^{a}	268.97^{a}	72.84^{d}	75.81^{d}	37.41^{ab}	37.23^{ab}
T_2	232.83^{a}	259.64^{a}	63.35^{c}	65.32^{c}	39.73^{bc}	39.45^{bc}
T_3	268.32^{b}	299.50^{b}	55.27^{b}	57.24^{b}	41.94^{bc}	41.85^{bc}
T_4	241.33^{a}	270.51^{a}	45.56^{a}	47.03^{a}	35.00^{a}	34.86^{a}
T_5	290.06^{c}	330.47^{c}	98.67^{e}	100.64^{e}	48.64^{d}	50.47^{d}
T_6	292.06^{c}	331.47^{c}	97.67^{e}	99.64^{e}	47.64^{d}	47.47^{d}
T_7	272.66^{b}	306.07^{b}	78.09^{d}	82.06^{d}	40.22^{bc}	40.33^{bc}
T_8	238.53^{b}	267.96^{b}	61.92^{d}	64.19^{d}	42.37^{c}	42.42^{c}
T_9	300.06^{c}	338.47^{c}	102.67^{e}	107.64^{e}	50.64^{d}	51.47^{d}

***Figures with even alphabets form one homogenous group**

Fig 11a. Effect of application of growth retardants on plant height in *Dieffenbachia amoena* under indoor conditions

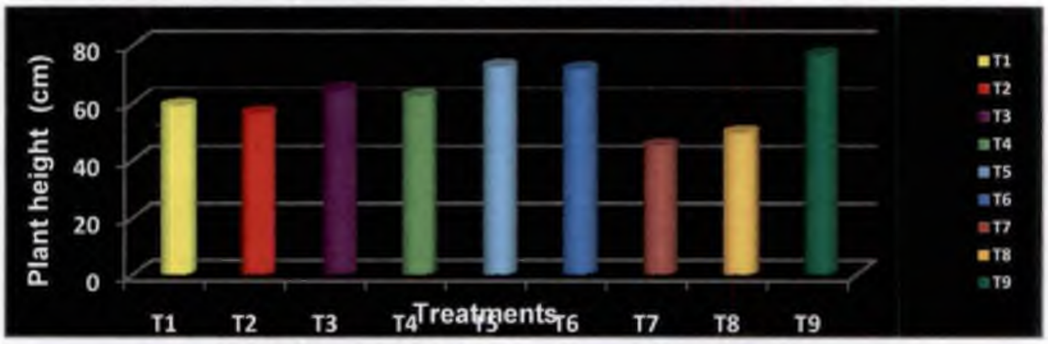


Fig 11b. Effect of application of growth retardants on plant height in *Dracaena sanderiana* under indoor conditions

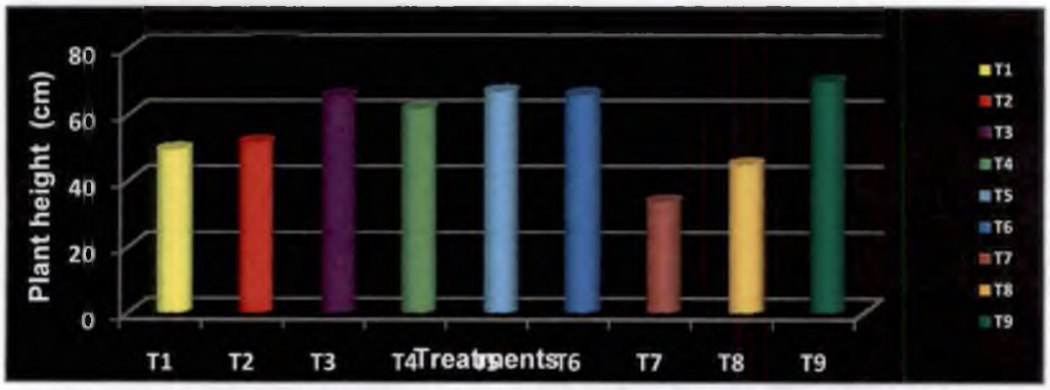


Fig 11c. Effect of application of growth retardants on plant height in *Syngonium podophyllum* under indoor conditions

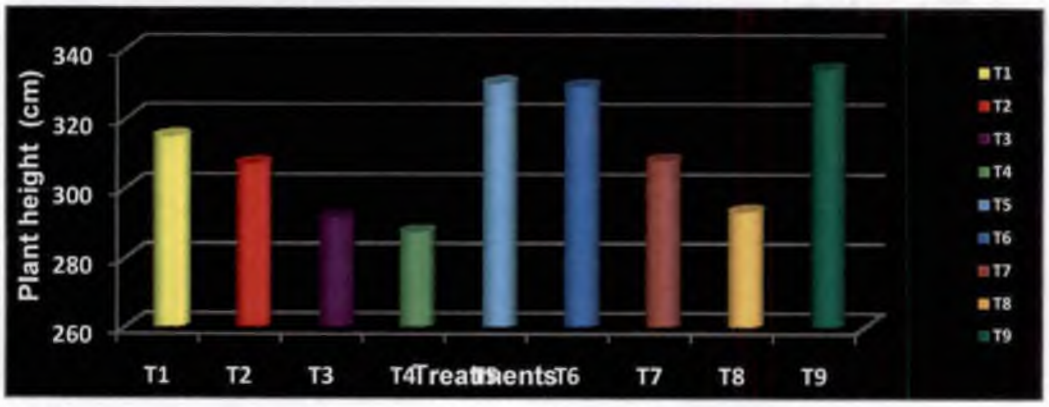


Fig 12a. Effect of application of growth retardants on plant height in *Scindapsus aureus* under indoor conditions

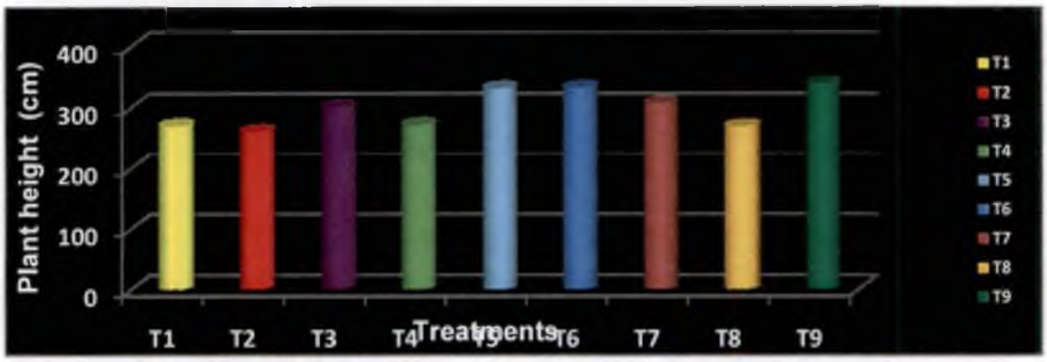


Fig 12b.Effect of application of growth retardants on plant height in *Ficus benjamina* under indoor condit

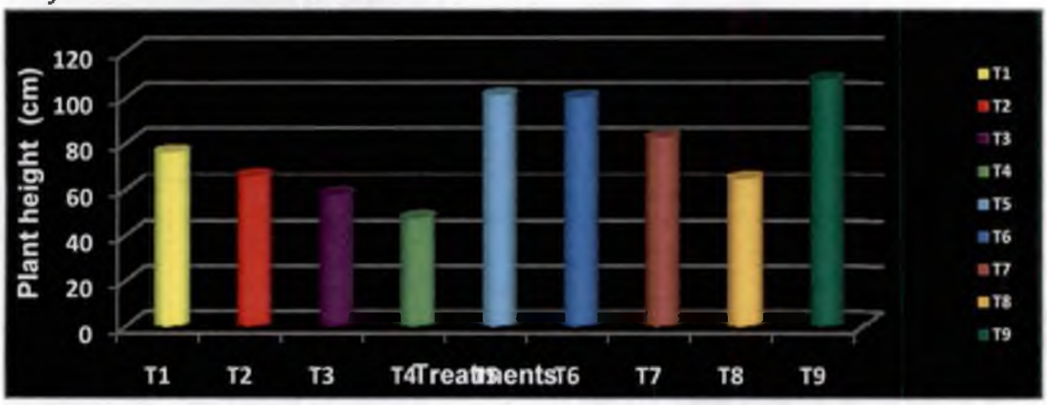


Fig 12c. Effect of application of growth retardants on plant height in *Schefflera arboricola* under indoor conditions

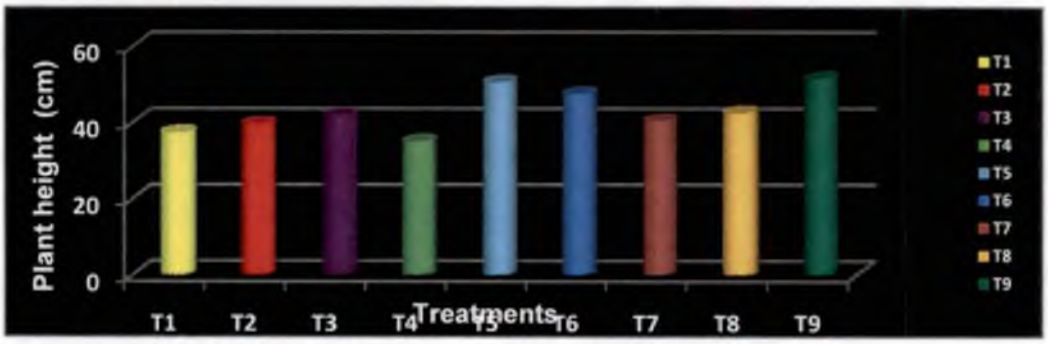


Plate 7a: Effect of application of growth retardants on plant height in *Dieffenbachia amoena* under indoor conditions

Plate 7b: Effect of application of growth retardants on plant height in*Dracaena sanderiana*under indoor conditions

Plate 8a: Effect of application of growth retardants on plant height in *Ficus benjamina* under indoor conditions

Plate 8b: Effect of application of growth retardants on plant height in *Schefflera arboricola* under indoor conditions

19. Effect of application of growth retardants on plant spread (cm)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	51.06[a]	52.12[a]	29.37[bc]	29.93[bc]	33.68[a]	34.10[a]	37.00[a]	37.42[a]
T_2	56.50[ab]	56.73[ab]	27.53[ab]	27.94[ab]	32.51[a]	32.54[a]	38.82[ab]	37.14[ab]
T_3	55.99[ab]	57.14[ab]	30.48[c]	31.16[c]	37.33[ab]	37.61[ab]	38.47[ab]	38.83[ab]
T_4	53.72[ab]	56.05[ab]	29.25[bc]	29.82[bc]	38.60[b]	38.99[b]	38.00[ab]	38.46[ab]
T_5	62.55[b]	63.66[b]	28.76[c]	30.58[c]	34.52[ab]	36.05[ab]	35.98[ab]	36.43[ab]
T_6	61.55[b]	62.66[b]	27.76[c]	28.58[c]	35.52[ab]	35.05[ab]	36.98[ab]	37.40[ab]
T_7	52.74[a]	53.35[a]	26.55[a]	26.94[a]	38.73[b]	39.19[b]	37.96[ab]	38.48[ab]
T_8	49.22[a]	49.57[a]	27.15[a]	27.40[a]	39.10[b]	39.53[b]	39.36[b]	39.72[b]
T_9	64.55[b]	66.66[b]	30.76[c]	31.58[c]	36.52[ab]	37.05[ab]	37.92[ab]	38.38[ab]

***Figures with even alphabets form one homogenous group**

Table 20a. Effect of application of growth retardants on leaf length (cm)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	28.44[bc]	28.64[bc]	13.21[a]	13.33[a]	9.63[a]	9.88[a]
T_2	26.09[ab]	26.27[ab]	13.04[a]	13.16[a]	10.12[ab]	10.34[ab]
T_3	30.07[c]	30.34[c]	13.23[a]	13.37[a]	9.35[a]	9.50[a]
T_4	30.07[c]	30.30[c]	13.57[a]	13.71[a]	10.15[ab]	10.28[ab]
T_5	28.40[bc]	27.84[bc]	13.35[a]	13.50[a]	11.50[b]	11.80[b]
T_6	27.47[bc]	27.70[bc]	13.30[a]	13.51[a]	11.51[b]	11.83[b]
T_7	24.79[a]	24.95[a]	12.42[a]	12.54[a]	9.81[a]	10.01[a]
T_8	28.06[bc]	28.19[bc]	13.04[a]	13.16[a]	9.52[a]	9.70[a]
T_9	28.47[bc]	28.84[bc]	13.37[a]	13.55[a]	11.55[b]	11.89[b]

Table 20b. Effect of application of growth retardants on leaf length (cm)

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	10.15[a]	10.29[a]	5.29[bc]	5.39[bc]	12.80[a]	13.00[a]
T_2	9.85[a]	9.97[a]	4.95[ab]	5.00[ab]	13.19[a]	13.38[a]
T_3	9.79[a]	9.90[a]	5.11[bc]	5.14[bc]	13.31[a]	13.55[a]
T_4	9.80[a]	9.90[a]	4.58[a]	4.60[a]	13.68[a]	13.90[a]
T_5	10.80[a]	11.03[a]	5.43[c]	5.49[c]	13.31[a]	13.55[a]
T_6	10.82[a]	11.05[a]	5.11[bc]	5.14[bc]	12.80[a]	13.00[a]
T_7	10.09[a]	10.25[a]	5.43[c]	5.49[c]	12.91[a]	13.18[a]
T_8	9.81[a]	9.96[a]	5.21[bc]	5.27[bc]	13.86[a]	14.13[a]
T_9	10.88[a]	11.09[a]	5.54[c]	5.61[c]	13.97[a]	14.30[a]

***Figures with even alphabets form one homogenous group**

Table 21a. Effect of application of growth retardants on leaf breadth (cm)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	12.03[bc]	12.17[bc]	3.16[ab]	3.18[ab]	7.31[a]	7.49[a]
T_2	11.08[abc]	11.20[abc]	3.15[ab]	3.17[ab]	7.39[a]	7.55[a]
T_3	12.79[c]	12.97[c]	3.47[b]	3.50[b]	7.00[a]	7.12[a]
T_4	12.26[bc]	12.42[bc]	2.71[a]	2.74[a]	7.80[a]	7.91[a]
T_5	12.20[bc]	12.50[bc]	3.50[b]	3.53[b]	8.02[a]	8.28[a]
T_6	12.23[bc]	12.45[bc]	3.48[b]	3.49[b]	8.03[a]	8.26[a]
T_7	9.82[a]	9.93[a]	3.25[ab]	3.27[ab]	7.45[a]	7.59[a]
T_8	10.47[ab]	10.56[ab]	3.25[ab]	3.27[ab]	7.15[a]	7.28[a]
T_9	12.29[bc]	12.51[bc]	3.52[b]	3.58[b]	8.08[a]	8.30[a]

Table 21b. Effect of application of growth retardants on leaf breadth (cm)

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	7.28[a]	7.41[a]	2.93[a]	2.96[a]	12.02[a]	12.20[a]
T_2	7.32[a]	7.45[a]	2.75[a]	2.77[a]	12.67[ab]	12.84[ab]
T_3	7.35[a]	7.45[a]	2.94[a]	2.96[a]	13.44[ab]	13.65[ab]
T_4	6.98[a]	7.07[a]	3.00[a]	3.02[a]	12.76[ab]	12.96[ab]
T_5	7.60[a]	7.80[a]	3.10[a]	3.16[a]	13.30[ab]	13.65[ab]
T_6	7.58[a]	7.83[a]	3.15[a]	3.18[a]	13.32[ab]	13.62[ab]
T_7	7.67[a]	7.82[a]	3.12[a]	3.15[a]	13.23[ab]	13.48[ab]
T_8	7.54[a]	7.68[a]	2.97[a]	3.00[a]	14.10[b]	14.34[b]
T_9	7.62[a]	7.81[a]	3.13[a]	3.18[a]	13.34[ab]	13.67[ab]

*Figures with even alphabets form one homogenous group

Table 22a. Effect of application of growth retardants on leaf area (cm^2)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	292.67^{bc}	294.57^{bc}	31.10^{a}	31.80^{a}	55.82^{ab}	59.43^{ab}
T_2	241.59^{ab}	246.52^{ab}	31.11^{a}	31.75^{a}	55.78^{ab}	59.04^{ab}
T_3	326.03^{c}	331.81^{c}	33.59^{a}	34.53^{a}	51.22^{a}	53.41^{a}
T_4	310.80^{c}	319.12^{c}	27.23^{a}	27.96^{a}	56.73^{ab}	58.97^{ab}
T_5	296.51^{bc}	307.47^{bc}	35.49^{a}	36.97^{a}	70.84^{b}	76.20^{b}
T_6	295.51^{bc}	306.47^{bc}	34.49^{a}	35.97^{a}	69.84^{b}	75.20^{b}
T_7	194.85^{a}	205.59^{a}	30.96^{a}	31.58^{a}	56.55^{ab}	59.48^{ab}
T_8	252.13^{ab}	251.18^{ab}	31.55^{a}	32.14^{a}	53.42^{ab}	55.99^{ab}
T_9	297.51^{bc}	308.47^{bc}	36.49^{a}	37.97^{a}	71.84^{b}	77.20^{b}

Table 22b. Effect of application of growth retardants on leaf area (cm^2)

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	54.27^{ab}	56.64^{ab}	12.54^{ab}	12.76^{ab}	124.48^{a}	129.28^{a}
T_2	53.93^{ab}	56.10^{ab}	11.36^{ab}	11.59^{ab}	135.32^{ab}	139.90^{ab}
T_3	52.76^{ab}	54.57^{ab}	12.04^{ab}	12.23^{ab}	147.25^{abc}	153.40^{abc}
T_4	51.12^{a}	52.78^{a}	11.05^{a}	11.21^{a}	139.47^{abc}	145.09^{abc}
T_5	63.33^{c}	67.43^{c}	13.34^{b}	13.82^{b}	153.78^{bc}	162.99^{bc}
T_6	62.33^{c}	66.43^{c}	12.34^{b}	12.82^{b}	152.78^{bc}	161.99^{bc}
T_7	57.96^{b}	60.74^{b}	13.62^{ab}	13.99^{ab}	138.67^{ab}c	145.62^{abc}
T_8	56.23^{ab}	58.72^{ab}	12.19^{ab}	12.51^{ab}	161.92^{c}	169.06^{c}
T_9	64.33^{c}	68.43^{c}	14.34^{b}	14.82^{b}	154.78^{bc}	163.99^{bc}

*Figures with even alphabets form one homogenous group

4.2.1.1.5. Number of leaves

The observations on the number of leaves are presented in table 23a and 23b.

Number of leaves was not affected by the application of growth retardant.

4.2.1.1.6. Internodal length

The observations on the internodal length are presented in table 24a and 24b and Fig 13a, 13b, 13c, 14a, 14b and 14c.

In *Dieffenbachia amoena,* significant difference was observed between the treatments. The plants treated withT_2 (ancymidol 1000ppm) were observed with the lowest internodal length (1.68 cm) followed by T_7 (CCC 1000 ppm) (1.69 cm) and the plants treated with T_9 (control) (3.51 cm) were observed with highest internodal length followed by T_5(B-Nine 1000 ppm) (3.50 cm) and T_6 (B-Nine 2000 ppm) (3.49 cm)(Table 24 and Fig 13a).

In *Dracaena sanderiana,* significant difference was observed between the treatments. The plants treated with T_7 (CCC 1000ppm) showed the lowest internodal length (2.51cm) followed by T_8 (CCC 2000 ppm) (2.57 cm). The highest internodal length was observed in T_9 (control) (4.06cm) followed by T_5 (B-Nine 1000 ppm) (4.00 cm) and T_6 (B-Nine 2000 ppm) (3.95 cm)(Table 24a and Fig 13b).

In *Syngonium podophyllum,* significant difference was observed between the treatments.The plants treated with T_4 (paclobutrazol 100ppm) was observed with the lowest internodal length (3.07 cm) and the highest internodal length was observed in T_9 (control) (5.13 cm) followed by T_5 (B-Nine 1000 ppm) (5.12 cm) and T_6 (B-Nine 2000 ppm) (5.11 cm)(Table 24a and Fig 13c).

In *Scindapsus aureus*, significant difference was observed between the treatments.Plants treated with T_4 (paclobutrazol 100 ppm) was observed with the lowest internodal length (3.83cm) followed by T_3 (paclobutrazol 50 ppm) (4.10 cm) and the highest internodal length was observed in T_7 (CCC 1000 ppm) (6.45 cm) and T_9 (control) (6.44 cm) (Table 24b and Fig 14a).

In *Ficus benjamina,* significant difference was observed between the treatments. The plants treated withT_4 (paclobutrazol 100ppm) showed lowest internodal length (2.32cm) followed by T_3 (paclobutrazol 50 ppm) (2.43 cm) and the highest internodal length was observed in T_9 (control) (3.56 cm) followed by T_5 (B-Nine 1000 ppm) (3.52 cm) and T_6 (B-Nine 2000 ppm) (3.51 cm) (Table 24b and Fig 14b).

In *Schefflera arboricola,* significant difference was observed between the treatments. Plants treated with T_2 (ancymidol 1000 ppm) was observed with lowest internodal length (1.80 cm) followed by T_1 (ancymidol 500 ppm) (2.05 cm)and the highest internodal length was observed in T_9 (control) (3.57 cm) followed by T_6 (B-Nine 2000 ppm) (3.56 cm) and T_5 (B-Nine 1000 ppm).(3.55 cm) (Table 24b and Fig 14c).

4.2.1.1.7. Leaf producing interval (days)

The observations on the leaf producing interval are presented in table 25.

Leaf producing interval was significantly different among the treatments in the plants selected for the study.

In *Dieffenbachia amoena,* the longer leaf producing interval was observed in the plants treated with T_4(paclobutrazol 100 ppm) (29.93 days) followed by T_1(ancymidol 500 ppm) (29.90 days) and the shorter leaf producing interval was observed in T_8 (CCC 2000 ppm) (21.13 days). In *Dracaena sanderiana,*longer leaf producing interval was observed in T_4 (paclobutrazol 100 ppm) (29.90 days) and shorter leaf producing interval was in T_7 (CCC 1000 ppm) (18.90 days) followed by T_8(CCC 2000 ppm (19.10 days) and T_2 (ancymidol 1000 ppm) (19.23 days).

In *Syngonium podophyllum*, the longer leaf producing interval was observed in T_3(paclobutrazol 50 ppm) (14.03 days) and shorter leaf producing interval was observed in T_7 (CCC 1000 ppm) (12.60 days) followed by T_4 (paclobutrazol 100 ppm) (12.80 days) and T_8 (CCC 2000 ppm) (12.82 days). In *Scindapsus aureus*, the longer leaf producing interval was observed in T_3 (paclobutrazol 50 ppm) (12.07 days) and the shorter leaf producing interval was observed in T_4 (paclobutrazol 100 ppm) (10.01 days) followed by T_7(CCC 1000 ppm) (10.20 days).

In *Ficus benjamina*, the longer leaf producing interval was observed in T_1(ancymidol 500 ppm) (16.62 days) and the shorter leaf producing interval was observed in T_4 (paclobutrazol 100 ppm) (10.03 days). In *Schefflera arboricola*, the longer leaf producing interval was observed in T_4(paclobutrazol 100 ppm) (29.20 days) and the shorter leaf producing interval was observed in T_8 (CCC 2000 ppm) (18.92 days).

Table 23a. Effect of application of growth retardants on number of leaves

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	12.44[c]	13.44[c]	24.55[a]	25.43[a]	69.55[ab]	78.55[ab]
T_2	11.66[bc]	12.66[bc]	25.32[a]	26.10[a]	64.33[ab]	73.33[ab]
T_3	10.99[abc]	11.88[abc]	23.77[a]	24.77[a]	78.77[b]	88.77[b]
T_4	9.55[a]	10.22[a]	22.88[a]	23.88[a]	57.33[a]	62.33[a]
T_5	10.33[ab]	11.55[ab]	25.10[a]	25.44[a]	61.33[a]	69.33[a]
T_6	10.33[ab]	11.77[ab]	25.44[a]	25.88[a]	61.01[a]	69.33[a]
T_7	10.99[abc]	11.99[abc]	25.44[a]	26.21[a]	68.99[ab]	77.99[ab]
T_8	9.77[ab]	10.33[ab]	25.10[a]	26.10[a]	63.30[ab]	68.90[ab]
T_9	10.55[ab]	11.77[ab]	25.21[a]	25.88[a]	61.91[a]	69.01[a]

Table 23b. Effect of application of growth retardants on number of leaves

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	119.42[a]	134.12[a]	205.00[b]	215.00[b]	23.77[a]	24.21[a]
T_2	104.00[a]	114.80[a]	235.00[d]	248.00[d]	23.21[a]	23.44[a]
T_3	102.19[a]	109.29[a]	186.33[a]	195.33[a]	25.88[a]	26.22[a]
T_4	109.73[a]	117.83[a]	203.11[b]	213.11[b]	23.10[a]	23.66[a]
T_5	115.63[a]	128.63[a]	225.44[cd]	240.44[cd]	25.87[a]	26.20[a]
T_6	114.63[a]	129.63[a]	223.44[cd]	238.44[cd]	25.47[a]	26.00[a]
T_7	123.86[a]	139.86[a]	234.99[d]	247.99[d]	24.66[a]	25.33[a]
T_8	143.10[a]	162.10[a]	224.55[c]	235.55[c]	24.44[a]	24.77[a]
T_9	117.63[a]	131.63[a]	229.44[cd]	242.44[cd]	25.77[a]	26.20[a]

***Figures with even alphabets form one homogenous group**

Table 24a. Effect of application of growth retardants on internodal length (cm)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	1.95[a]	1.98[a]	3.16[abc]	3.30[abc]	4.60[c]	4.85[c]
T_2	1.67[a]	1.68[a]	2.89[abc]	2.98[abc]	4.06[bc]	4.26[bc]
T_3	2.68[bc]	2.79[bc]	3.42[bc]	3.59[bc]	3.60[ab]	3.76[ab]
T_4	2.30[ab]	2.36[ab]	3.39[bc]	3.54[bc]	2.97[a]	3.07[a]
T_5	3.27[c]	3.50[c]	3.80[c]	4.00[c]	4.77[c]	5.12[c]
T_6	3.26[c]	3.49[c]	3.78[c]	3.95[c]	4.76[c]	5.11[c]
T_7	1.68[a]	1.69[a]	2.45[a]	2.51[a]	3.92[bc]	4.13[bc]
T_8	1.85[a]	1.89[a]	2.54[ab]	2.57[ab]	3.71[ab]	3.89[ab]
T_9	3.28[c]	3.51[c]	3.82[c]	4.06[c]	4.78[c]	5.13[c]

Table 24b. Effect of application of growth retardants on internodal length (cm)

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	4.83[ab]	5.11[ab]	2.81[ab]	2.84[ab]	1.95[a]	2.05[a]
T_2	4.59[ab]	4.77[ab]	2.66[a]	2.66[a]	1.73[a]	1.80[a]
T_3	4.03[a]	4.10[a]	2.43[a]	2.43[a]	2.14[a]	2.28[a]
T_4	3.82[a]	3.83[a]	2.33[a]	2.32[a]	2.16[a]	2.27[a]
T_5	6.00[cd]	6.40[cd]	3.43[c]	3.52[c]	3.43[c]	3.55[c]
T_6	6.01[cd]	6.38[cd]	3.45[c]	3.51[c]	3.44[c]	3.56[c]
T_7	6.09[d]	6.45[cd]	3.28[bc]	3.33[bc]	3.20[bc]	3.43[bc]
T_8	5.80[bcd]	6.11[cd]	2.64[a]	2.68[a]	2.79[b]	2.99[b]
T_9	6.05[cd]	6.44[cd]	3.47[c]	3.56[c]	3.47[c]	3.57[c]

***Figures with even alphabets form one homogenous group**

Fig 13a. Effect of application of growth retardants on internodal length in *Dieffenbachia amoena* under indoor conditions

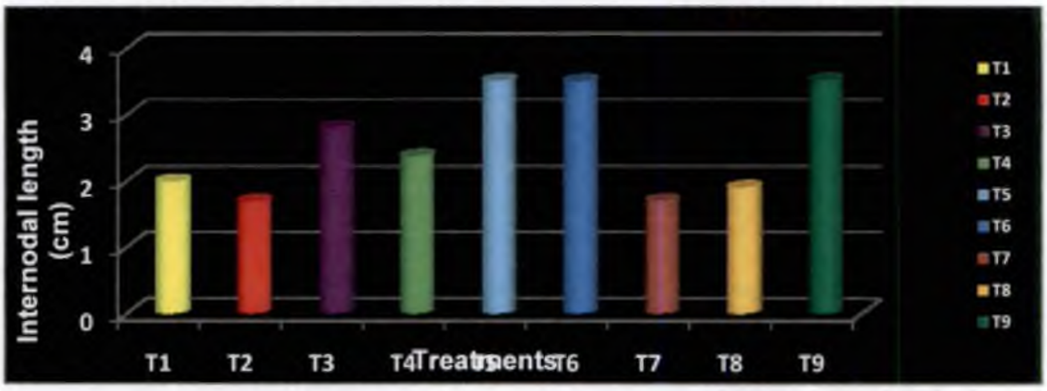


Fig 13b. Effect of application of growth retardants on internodal length in *Dracaena sanderiana* under indoor conditions

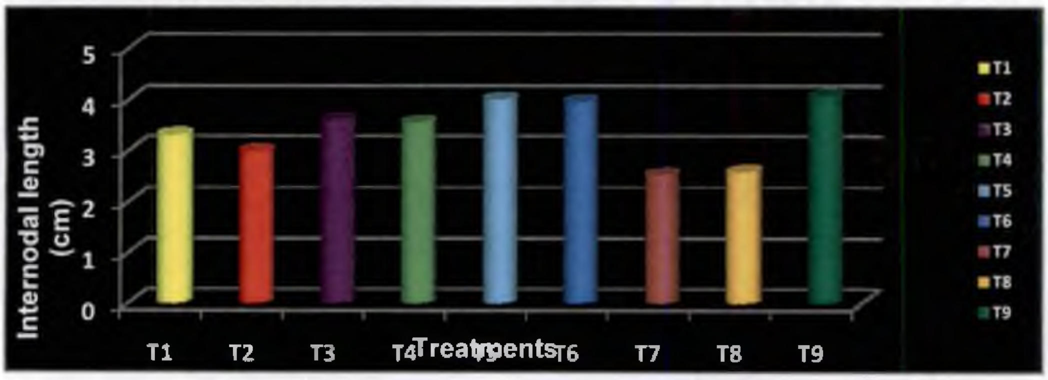


Fig 13c. Effect of application of growth retardants on internodal length in *Syngonium podophyllum*under indoor conditions

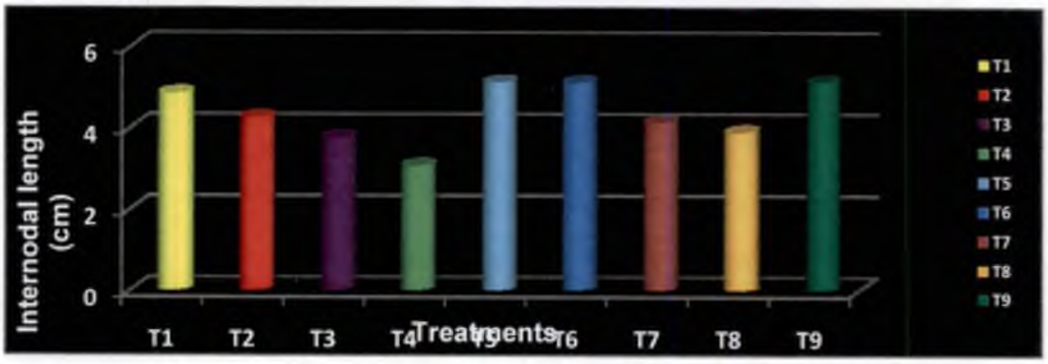


Fig 14a. Effect of application of growth retardants on internodal length in *Scindapsus aureus* under indoor conditions

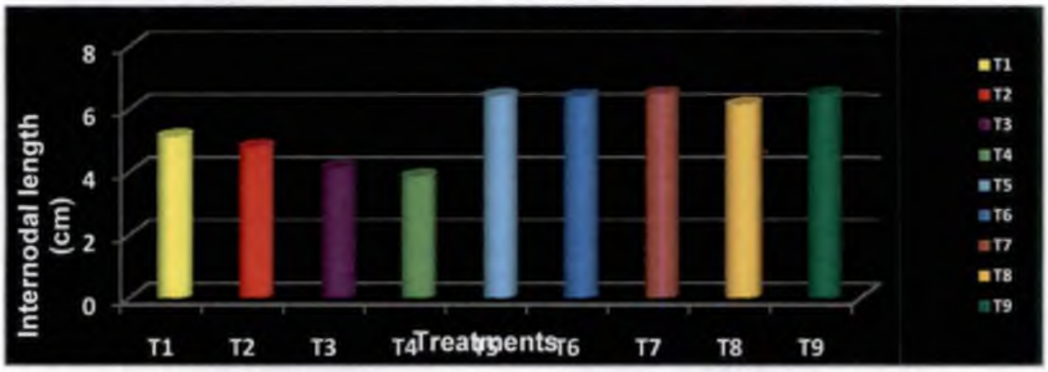


Fig 14b. Effect of application of growth retardants on internodal length in *Ficus benjamina* under indoor conditions

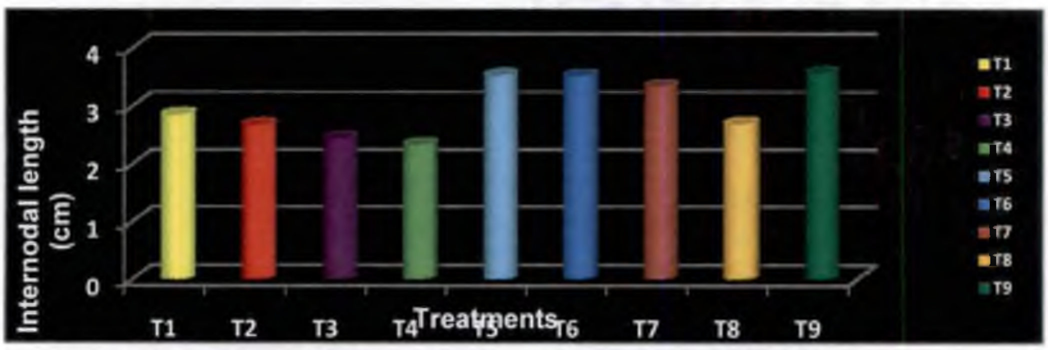


Fig 14c. Effect of application of growth retardants on internodal length in *Schefflera arboricola* under indoor conditions

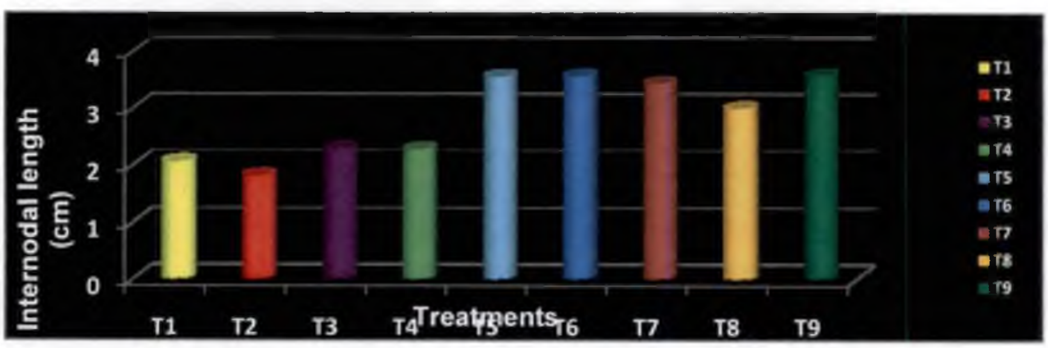


Table 25. Effect of application of growth retardants on leaf producing interval (Days)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	29.90^{f}	27.93^{e}	12.83^{ab}	10.53^{b}	16.62^{f}	20.90^{e}
T_2	27.93^{d}	19.23^{b}	13.23^{c}	11.18^{c}	14.84^{d}	19.90^{c}
T_3	25.83^{c}	19.90^{c}	14.03^{d}	12.07^{d}	12.32^{b}	19.40^{b}
T_4	29.93^{f}	29.90^{f}	12.80^{ab}	10.01^{a}	10.03^{a}	29.20^{f}
T_5	28.83^{e}	26.80^{d}	13.33^{c}	11.03^{c}	14.92^{d}	20.13^{d}
T_6	28.75^{e}	26.80^{d}	13.23^{c}	11.00^{c}	14.90^{d}	20.16^{d}
T_7	25.30^{b}	18.90^{a}	12.60^{a}	10.20^{a}	15.22^{e}	19.52^{b}
T_8	21.13^{a}	19.10^{ab}	12.82^{b}	11.23^{c}	14.61^{c}	18.92^{a}
T_9	28.80^{e}	26.93^{d}	13.30^{c}	11.02^{c}	14.92^{d}	20.22^{d}

***Figures with even alphabets form one homogenous group**

4.2.1.1.8. Length and girth of petiole (cm)

As like any other characters, length and girth of petiole are also equally important as they support the leaves. The petiole length and girth were measured monthly.

4.2.1.1.8.1. Petiole length

The observations on the petiole length are presented in tables 26a and 26b.

In *Dieffenbachia amoena,*significant variation was noticed between the treatments. The lowest petiole length was observed in T_8 (CCC 2000 ppm) (13.79 cm) and the highest petiole length was observed in T_9 (control) (18.14 cm) followed by T_6 (B-Nine 2000 ppm) (18.04 cm) and T_5 (B-Nine 1000 ppm) (18.00 cm).(Table 26a).

In *Dracaena sanderiana,* significant variation was noticed between the treatments. Plants treated with T_7 (CCC 1000ppm) showed the lowest petiole length (5.26 cm) followed by T_8 (CCC 2000 ppm) (5.51 cm). The highest petiole length was observed in T_9 (control) (7.97 cm) followed by T_6 (B-Nine 2000 ppm) (7.93 cm) and T_5 (B-Nine 1000 ppm) (7.92 cm) (Table 26a).

In *Syngonium podophyllum,* significant variation was observed between the treatments. The lowest petiole length was observed in T_3 (paclobutrazol 50 ppm) (19.85 cm) followed by T_4 (Paclobutrazol 100 ppm) (20.12 cm) and the highest petiole length was observed in T_9 (control) (24.21 cm) followed by T_5 (B-Nine 1000 ppm) (24.20 cm) and T_6 (B-Nine 2000 ppm) (24.18 cm) (Table 26a).

In *Scindapsus aureus,* significant variation was noticed between the treatments. The plants treated with T_3 (paclobutrazol 50ppm) had shown the lowest petiole length (6.49cm) followed by T_4 (paclobutrazol 100 ppm)(6.88 cm) and the highest petiole length was observed in T_9 (control) (8.22 cm) followed by T_5 (B-Nine 1000 ppm) (8.20 cm) and T_6 (B-Nine 2000 ppm)(8.12 cm) (Table 26b).

In *Ficus benjamina*, the lowest petiole length was observed in T_1(ancymidol 500 ppm) (0.92 cm) and T_2 (ancymidol 1000 ppm) (0.92 cm) and the highest petiole length was observed in T_7(CCC 1000 ppm) (1.24 cm) and T_8(CCC 2000 ppm) (1.24 cm). (Table 26b).

In *Schefflera arboricola,* the lowest petiole length was observed in T_1(ancymidol 500 ppm) (9.21 cm) followed by T_4(paclobutrazol 100 ppm) (9.53 cm). The highest petiole length was observed in T_5(B-Nine 1000 ppm) (11.11 cm) and T_9 (control) (11.11 cm) followed by T_6(B-Nine 2000 ppm) (11.07 cm) (Table 26b)

4.2.1.1.8.2. Petiole girth

The observations on the petiole girth are presented in tables 27a and 27b.

The growth retardants treatment did not show any positive impact in increasing the petiole girth in all the plants selected for the study except in *Scindapsus aureus*.

In *Scindapsus aureus*, the lowest petiole girth was observed in T_4 (paclobutrazol 100 ppm) (1.00 cm) followed by T_1 (ancymidol 500 ppm) (1.03 cm) and T_3 (paclobutrazol 50 pm) (1.06 cm) and the highest petiole girth was observed in T_9 (control) (1.43 cm) followed by T_5(B-Nine 1000 ppm) (1.40 cm), T_6(B-Nine 2000 ppm) (1.40 cm) and T_7 (CCC 1000 ppm) (1.40 cm). (Table 27b).

4.2.1.2. Qualitative characters

Leaf characters like texture, shape, margin, tip, base, type, pigmentation, venation and arrangement were observed. The observations on the qualitative characters are presented in table 28.

4.2.1.3. Others

Branching habit, pests and diseases, other symptoms like bending, drooping etc were observed with regard to the greenhouse and presented in table 29.

Under indoor conditions, no serious pest and disease problems were observed.

4.2.1.4. Indoor life of foliage plants (Days)

Indoor life of foliage plants was determined by counting the number of days the plants were kept under indoor conditions without any symptoms/signs of damage and there was a significant difference between the plant species and treatments.

The observations on indoor life are presented in table 30.

In *Dieffenbachia amoena,* the highest indoor life was observed in T_7 (CCC 1000ppm) (62 days) followed by T_8 (CCC 2000 ppm) (61 days) and the lowest indoor life was observed in T_4 (paclobutrazol 100 ppm) (50 days) and T_5 (B-Nine 1000 ppm) (50 days) followed by T_1 (ancymidol 500 ppm) (51 days), T_3 (paclobutrazol 50 ppm) (51 days) and T_9 (control) (51 days). In *Dracaena sanderiana*, the highest indoor life was observed in T_2 (ancymidol 1000 ppm) (57 days) and T_7 (CCC 1000 ppm) (57 days) and the lowest indoor life was observed in T_4 (paclobutrazol 100ppm) (49 days) and T_6 (B-Nine 2000 ppm) (49 days).

In *Syngonium podophyllum,* the highest indoor life was observed in T_4(paclobutrazol 100 ppm) (62 days) followed by T_3(paclobutrazol 50 ppm) (61 days) and the shortest indoor life was observed in T_1(ancymidol 500 ppm) (50 days) and T_7 (CCC 1000 ppm) (50 days) followed by T_9(control) (51 days). In *Scindapsus aureus,* the highest indoor life was observed in T_2(ancymidol 1000 ppm) (62 days) followed by T_1(ancymidol 500 ppm) (61 days) and the lowest indoor life was observed in T_5(B-Nine 1000 ppm) (50 days) and T_9 (control) (50 days).

In *Ficus benjamina,* the highest indoor life was observed in T_4(paclobutrazol 100 ppm) (62 days) and the lowest indoor life was observed in T_2(ancymidol 1000 ppm) (50 days), T_6(B-Nine 2000 ppm) (50 days), T_7(CCC 1000 ppm) (50 days) and T_9(control) (50 days). In *Schefflera arboricola,* the highest indoor life was observed in T_1(ancymidol 500 ppm) (62 days) and T_4(paclobutrazol 100 ppm) (62 days) and the lowest indoor life was observed in T_5(B-Nine 1000 ppm) (51 days) and T_8(CCC 2000 ppm) (51 days).

4.2.1.5. Major symptoms/signs of damage

The observations are presented in table 31.

The plants showed different symptoms/signs of damage when kept under indoor conditions for long period. Symptoms were observed at every part of the plant from leaf tip to main stalk. It ranged from yellowing, wilting, leaf drop, leaf drying, tip browning, bending and so on which were listed in Table with respect to each species.

4.2.1.6. Plant quality rating

4.2.1.6.1. Plant quality rating based on growth and fullness

The observations are presented in table 32a, Fig 15a -15c and 16a -16c.

Under indoor conditions, the highest plant quality rating (9.3) based on growth and full ness was observed in the plants treated with T_1 (ancymidol 500 ppm) and T_2 (ancymidol 1000 ppm) in *Scindapsus aureus,* T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum,* T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum, Scindapsus aureus, Ficus benjamina*and *Schefflera arboricola,* T_7 (CCC 1000 ppm) in *Dieffenbachia amoena,* and *Dracaena sanderiana,* T_8 (CCC 2000 ppm) in *Syngonium podophyllum* and*Scindapsus aureus* followed by a rating of (9.1) was observed in the plants treated with T_1 (ancymidol 500 ppm) in *Schefflera arboricola* and T_8 (CCC 2000 ppm) in *Dieffenbachia amoena.*

The lowest plant quality rating (5.5) was recorded in the plants treated T_5 (B-Nine 1000 ppm), T_6 (B-Nine 2000 ppm) and T_9 (control) in *Dracaena sanderiana* and *Ficus benjamina* followed by a rating of (6.0) in T_1 (ancymidol 500 ppm) in *Ficus benjamina*, T_3 (paclobutrazol 50 ppm) in *Dracaena sanderiana*, T_5(B-Nine 1000 ppm) and T_6 (B-Nine 2000 ppm) in *Dieffenbachia amoena* and *Syngonium podophyllum* and inT_9 (control) in *Dieffenbachia amoena* and *Schefflera arboricola.*

4.2.1.6.2. Plant quality rating based on colour and pigmentation

The observations on the plant height are presented in table 32b, Fig 17a -17c and 18a -18c.

Based on pigmentation, the highest plant quality rating (9.1) was recorded in the plants treated with T_4 (paclobutrazol @ 100ppm) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.*

The lowest plant quality rating (6.7) was observed in T_9 (control) in all the plants selected for the study.

4.2.1.7. Chlorophyll content

The observations on the chlorophyll a, chlorophyll b and total chlorophyll content are presented in table 33a - 33c, Fig 19a -19c and 20a -20c.

The chlorophyll a content was the highest in the plants treated with T_4 (paclobutrazol 100ppm) in *Dieffenbachia amoena* and *Ficus benjamina* (0.5929 mg/g and 1.2103 mg/g) (Table 33a)

The chlorophyll b content was the highest in the plants treated with T_4 (paclobutrazol 100ppm) in *Dracaena sanderiana* and *Scindapsus aureus* (0.4059 mg/g and 0.2308 mg/g) (Table 33b).

The total chlorophyll content was the highest in the plants treated with the treatment T_4 (paclobutrazol 100 ppm) in *Dieffenbachia amoena, Dracaena* *sanderiana, Scindapsus aureus* and *Ficus benjamina* (0.7785 mg/g, 1.6108 mg/g, 0.9760mg/g and 1.5909 mg/g) (Table 33c and Fig 11).

In all the plants selected for the study, T9 (control) had shown lowest chlorophyll a & b and total chlorophyll contents compared to the treated plants (table 33a, 33b and 33c).

Table 26a. Effect of application of growth retardants on petiole length (cm)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	14.18^{a}	14.43^{a}	6.63^{bc}	6.96^{bc}	21.63^{ab}	21.92^{ab}
T_2	15.44^{ab}	15.64^{ab}	5.58^{ab}	5.81^{ab}	20.70^{a}	20.87^{a}
T_3	15.31^{ab}	15.66^{ab}	7.29^{c}	7.71^{c}	19.77^{a}	19.85^{a}
T_4	15.02^{ab}	15.29^{ab}	6.56^{bc}	6.89^{bc}	20.08^{a}	20.12^{a}
T_5	17.43^{ab}	18.00^{ab}	7.43^{c}	7.92^{c}	23.73^{b}	24.20^{b}
T_6	17.42^{ab}	18.04^{ab}	7.44^{c}	7.93^{c}	23.71^{b}	24.18^{b}
T_7	14.60^{ab}	14.78^{ab}	5.05^{a}	5.26^{a}	20.78^{a}	20.95^{a}
T_8	13.74^{a}	13.79^{a}	5.37^{a}	5.51^{a}	21.91^{ab}	21.98^{ab}
T_9	17.51^{ab}	18.14^{ab}	7.47^{c}	7.97^{c}	23.76^{b}	24.21^{b}

Table 26b. Effect of application of growth retardants on petiole length (cm)

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	7.87^{b}	7.98^{b}	0.93^{a}	0.92^{a}	9.21^{a}	9.21^{a}
T_2	7.77^{b}	7.85^{b}	0.93^{a}	0.92^{a}	10.26^{ab}	10.23^{ab}
T_3	6.42^{a}	6.49^{a}	1.16^{b}	1.17^{b}	10.00^{ab}	10.00^{ab}
T_4	6.84^{ab}	6.88^{ab}	1.17^{b}	1.17^{b}	9.53^{ab}	9.53^{ab}
T_5	8.00^{b}	8.20^{b}	1.10^{ab}	1.12^{ab}	11.00^{b}	11.11^{b}
T_6	7.95^{b}	8.12^{b}	1.09^{ab}	1.12^{ab}	10.98^{b}	11.07^{b}
T_7	7.21^{ab}	7.33^{ab}	1.22^{b}	1.24^{b}	10.73^{ab}	10.79^{ab}
T_8	7.36^{ab}	7.44^{ab}	1.24^{b}	1.24^{b}	10.54^{ab}	10.55^{ab}
T_9	8.02^{b}	8.22^{b}	1.11^{ab}	1.12^{ab}	11.01^{b}	11.11^{b}

*Figures with even alphabets form one homogenous group

Table 27a. Effect of application of growth retardants on petiole girth (cm)

Treatments	*Dieffenbachia amoena*		*Dracaena sanderiana*		*Syngonium podophyllum*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	2.90[a]	2.93[a]	1.36[a]	1.33[a]	1.03[a]	1.06[a]
T_2	2.96[a]	3.00[a]	1.33[a]	1.36[a]	1.00[a]	1.03[a]
T_3	2.86[a]	2.90[a]	1.30[a]	1.33[a]	1.03[a]	1.06[a]
T_4	3.00[a]	3.03[a]	1.46[a]	1.50[a]	0.93[a]	0.96[a]
T_5	3.03[a]	3.05[a]	1.62[a]	1.65[a]	1.09[a]	1.12[a]
T_6	3.02[a]	3.06[a]	1.61[a]	1.64[a]	1.08[a]	1.11[a]
T_7	3.13[a]	3.16[a]	1.58[a]	1.61[a]	1.00[a]	1.03[a]
T_8	3.06[a]	3.10[a]	0.96[a]	1.00[a]	0.96[a]	1.00[a]
T_9	3.03[a]	3.06[a]	1.63[a]	1.66[a]	1.10[a]	1.13[a]

Table 27b. Effect of application of growth retardants on petiole girth (cm)

Treatments	*Scindapsus aureus*		*Ficus benjamina*		*Schefflera arboricola*	
	1st month	2nd month	1st month	2nd month	1st month	2nd month
T_1	1.00[a]	1.03[a]	0.40[a]	0.43[a]	0.63[a]	0.66[a]
T_2	1.13[ab]	1.16[ab]	0.40[a]	0.43[a]	0.66[a]	0.70[a]
T_3	1.03[ab]	1.06[ab]	0.46[a]	0.50[a]	0.66[a]	0.70[a]
T_4	0.96[a]	1.00[a]	0.40[a]	0.43[a]	0.63[a]	0.66[a]
T_5	1.38[c]	1.40[c]	0.41[a]	0.44[a]	0.62[a]	0.65[a]
T_6	1.37[c]	1.40[c]	0.41[a]	0.43[a]	0.61[a]	0.64[a]
T_7	1.36[c]	1.40[c]	0.33[a]	0.36[a]	0.56[a]	0.60[a]
T_8	1.23[bc]	1.26[bc]	0.46[a]	0.50[a]	0.70[a]	0.73[a]
T_9	1.40[c]	1.43[c]	0.40[a]	0.43[a]	0.63[a]	0.66[a]

Table 28. Qualitative leaf characters of foliage plants selected for the study under indoor conditions

Plant species	Texture	Shape	Bending and drooping of leaves	Pigmentation
Dieffenbachia amoena	Coarse	Ovate	Nil	Deep green and marked with cream white bands and blotches along veins
Dracaena sandariana	Medium	Narrow	Nil	Deep green somewhat milky & with broad marginal bands of white
Syngonium podophyllum	Medium	Sagitate	Bends if not staked	Green
Scindapsus aureus	Medium	Ovate	Bends if not staked	Dark green with yellow variegation
Ficus benjamina	Fine	Ovate	Nil	Deep green
Schefflera arboricola	Medium	Obovate	Nil	Glossy green

Table 29. Other characters of foliage plants selected for the study under indoor conditions

Plant species	Branching habit	Bending and drooping of leaves	Pest and diseases
Dieffenbachia amoena	Single stem/trunk	Nil	Nil
Dracaena sandariana	Single stem	Nil	Nil
Syngonium podophyllum	Produce adventitious roots in nodes	Bends if not staked	Nil
Scindapsus aureus	Produce adventitious roots in nodes	Bends if not staked	Nil
Ficus benjamina	Yes	Nil	Nil
Schefflera arboricola	Yes	Nil	Nil

Table 30. Effect of application of growth retardants on indoor life (Days)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	51^{b}	56^{ab}	50^{b}	61^{a}	51^{b}	62^{a}
T_2	58^{ab}	57^{a}	56^{ab}	62^{a}	50^{b}	57^{ab}
T_3	51^{b}	51^{b}	61^{a}	55^{ab}	58^{ab}	58^{ab}
T_4	50^{b}	49^{b}	62^{a}	60^{a}	62^{a}	62^{a}
T_5	50^{b}	50^{b}	53^{b}	50^{b}	51^{b}	51^{b}
T_6	52^{b}	49^{b}	52^{b}	51^{b}	50^{b}	52^{b}
T_7	62^{a}	57^{a}	50^{b}	56^{ab}	50^{b}	57^{ab}
T_8	61^{a}	50^{b}	56^{ab}	56^{ab}	51^{b}	51^{b}
T_9	51^{b}	50^{b}	51^{b}	50^{b}	50^{b}	52^{b}

***Figures with even alphabets form one homogenous group**

Table 31. Major symptoms/signs of damage under indoor conditions

S.No.	Plant species	Symptoms of damage
1	*Dieffenbachia amoena*	Leaf tip become brown
2	*Dracaena sandariana*	Leaf tip become brown
3	*Syngonium podophyllum*	Bending
4	*Scindapsus aureus*	Leaf tip and margin brown
5	*Ficus benjamina*	Leaf tip become brown
6	*Schefflera arboricola*	Leaves droop, drying, wilting

Table 32a. Plant quality rating of foliage plants based on growth and fullness by visual scoring*(under indoor conditions)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	7.0^{bc}	8.0^{b}	9.3^{a}	7.0^{bc}	6.0^{d}	9.1^{a}
T_2	8.0^{b}	8.0^{b}	9.3^{a}	8.0^{b}	7.0^{bc}	8.0^{b}
T_3	7.0^{bc}	6.0^{b}	8.0^{b}	9.3^{a}	8.0^{b}	8.0^{b}
T_4	7.0^{bc}	7.0^{bc}	9.3^{a}	9.3^{a}	9.3^{a}	9.3^{a}
T_5	6.0^{d}	5.5^{d}	7.0^{bc}	6.0^{d}	5.5^{d}	7.0^{bc}
T_6	6.0^{d}	5.5^{d}	7.0^{bc}	6.0^{d}	5.5^{d}	7.0^{bc}
T_7	9.3^{a}	9.3^{a}	8.0^{b}	8.0^{b}	6.5^{d}	8.0^{b}
T_8	9.1^{a}	8.0^{b}	9.3^{a}	9.3^{a}	7.0^{bc}	7.0^{bc}
T_9	6.0^{d}	5.5^{d}	7.0^{c}	7.0^{bc}	5.5^{d}	6.0^{d}

***Score. 1-10, 10 being the highest and 1 being the lowest**

Fig 15a. Plant quality rating of foliage plants based on growth and fullness (under indoor conditions) in *Dieffenbachia amoena*

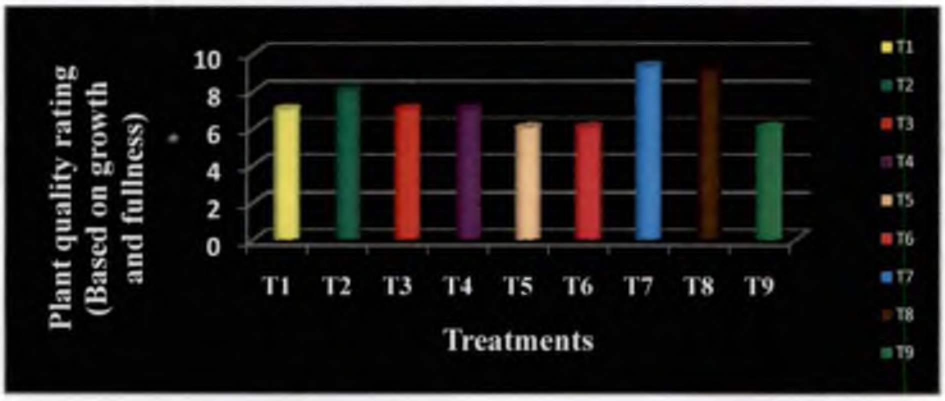


Fig 15b. Plant quality rating of foliage plants based on growth and fullness (under indoor conditions) in *Dracaena sandariana*

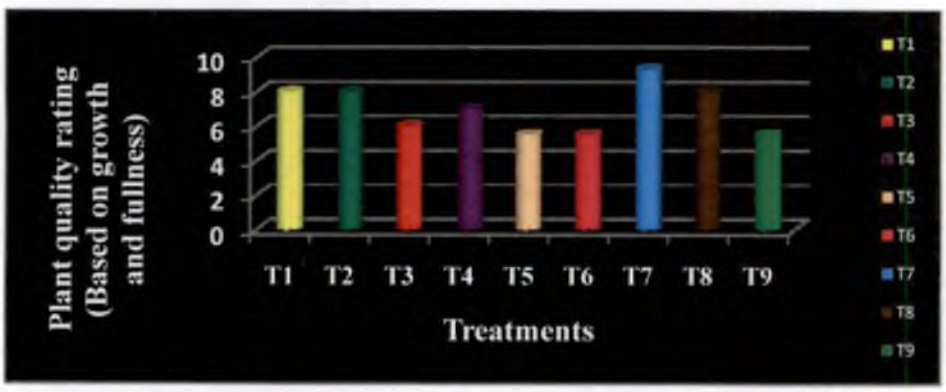


Fig 15c. Plant quality rating of foliage plants based on growth and fullness (under indoor conditions)in *Syngonium podophyllum*

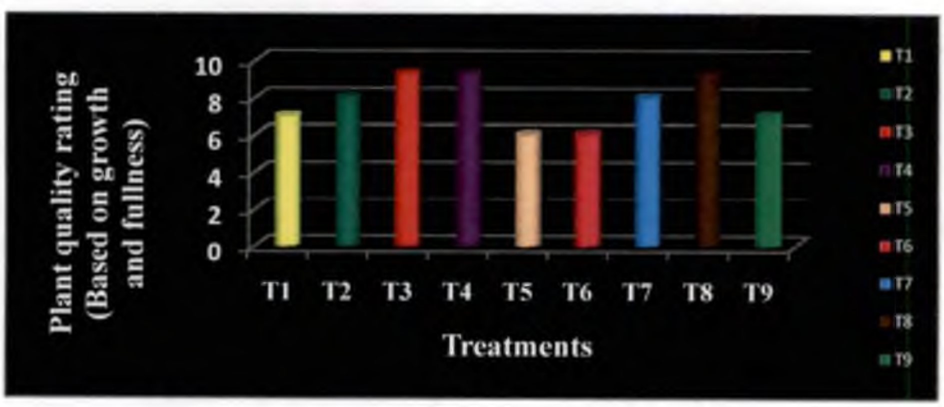


Fig 16a. Plant quality rating of foliage plants based on growth and fullness(under indoor conditions) in *Scindapsus aureus*

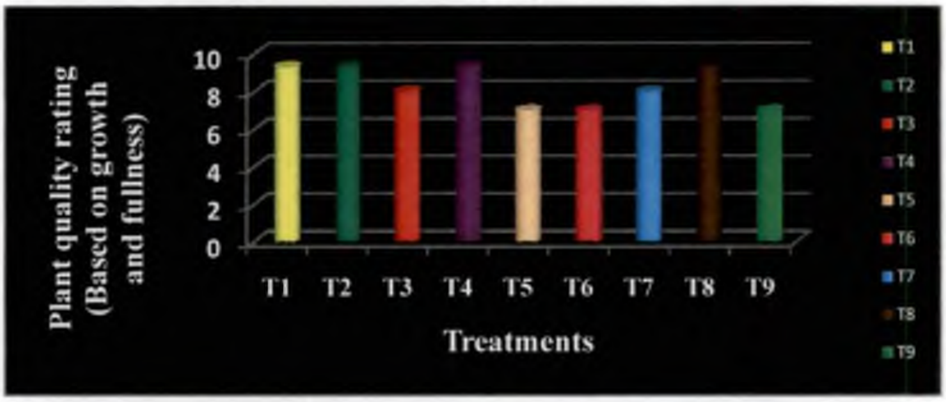


Fig 16b.Plant quality rating of foliage plants based on growth and fullness(under indoor conditions) in *Ficus benjamina*

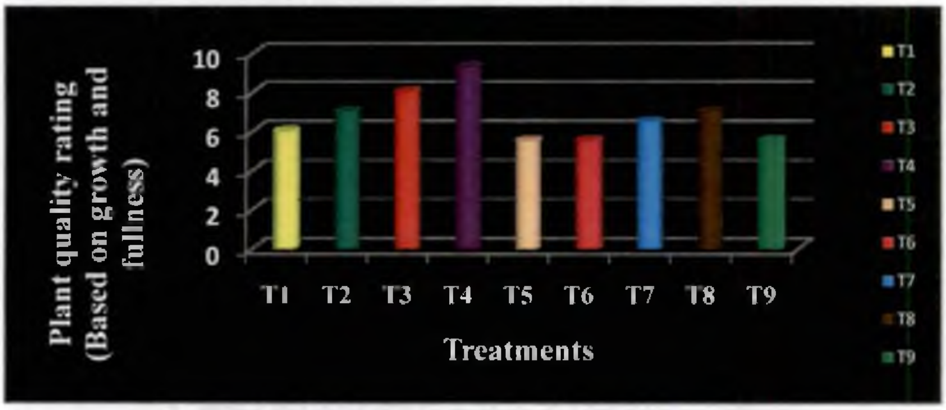


Fig 16c.Plant quality rating of foliage plants based on growth and fullness (under indoor conditions) in *Schefflera arboricola*

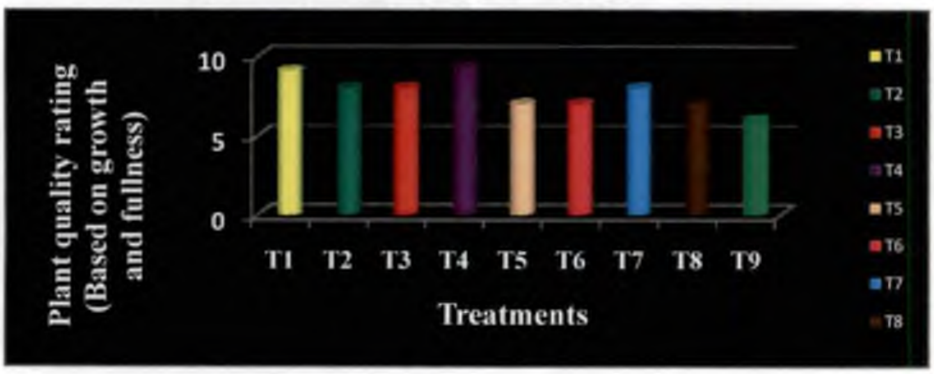


Table 32b. **Plant quality rating of foliage plants based on pigmentation by visual scoring* (under indoor conditions)**

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	8.3^{b}	7.9^{bc}	8.3^{b}	7.3^{bc}	8.0^{b}	7.1^{bc}
T_2	8.3^{b}	7.9^{bc}	8.7^{ab}	7.7^{bc}	8.3^{b}	7.1^{bc}
T_3	7.7^{bc}	8.4^{bc}	8.5^{b}	7.8^{bc}	8.1^{b}	7.1^{bc}
T_4	9.1^{a}	9.1^{a}	9.1^{a}	7.8^{bc}	9.1^{a}	7.5^{bc}
T_5	7.6^{bc}	8.9^{ab}	8.9^{ab}	7.3^{bc}	7.9^{bc}	8.3^{b}
T_6	7.5^{bc}	8.5^{b}	8.5^{b}	7.3^{bc}	8.3^{b}	7.5^{bc}
T_7	7.6^{bc}	8.3^{b}	8.3^{b}	7.3^{bc}	7.9^{bc}	7.7^{bc}
T_8	7.4^{bc}	8.8^{ab}	8.9^{ab}	7.2^{bc}	8.2^{b}	8.1^{b}
T_9	6.7^{c}	6.7^{c}	6.7^{c}	6.7^{c}	6.7^{c}	6.7^{c}

***Score. 1-10, 10 being the highest and 1 being the lowest**

Fig17a. Plant quality rating of foliage plants based on pigmentation (under indoor conditions) in *Dieffenbachia amoena*

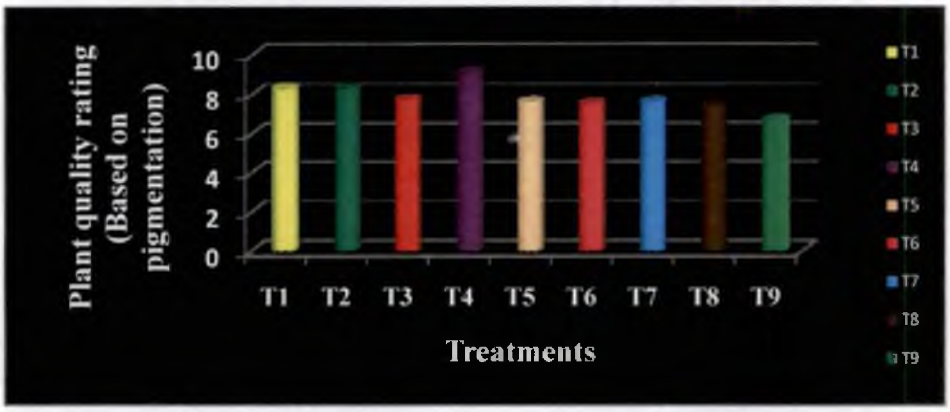


Fig 17b.Plant quality rating of foliage plants based on pigmentation (under indoor conditions) in *Dracaena sandariana*

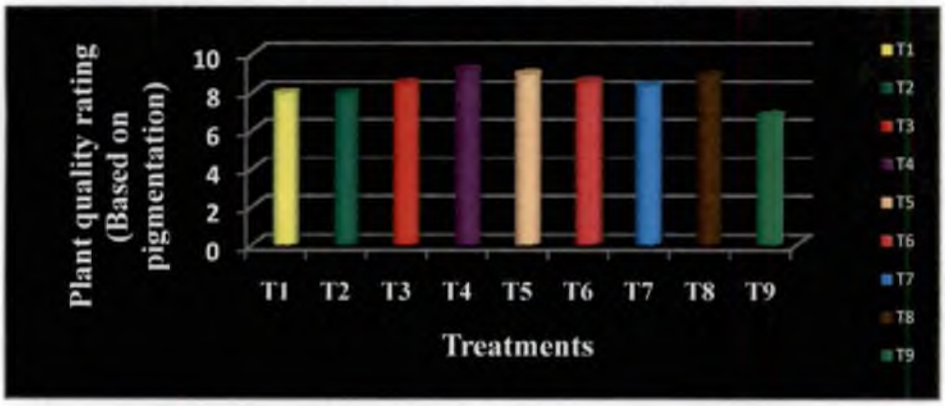


Fig 17c. Plant quality rating of foliage plants based on pigmentation (under indoor conditions) in *Syngonium podophyllum*

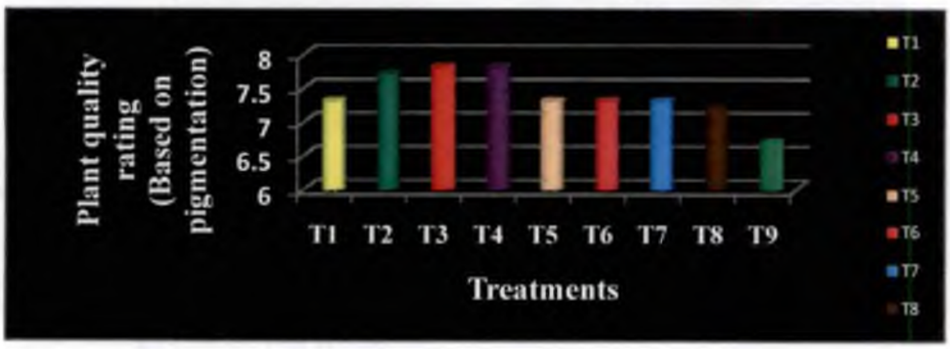


Fig 18a. Plant quality rating of foliage plants based on pigmentation (under indoor conditions) in *Syndapsus aureus*

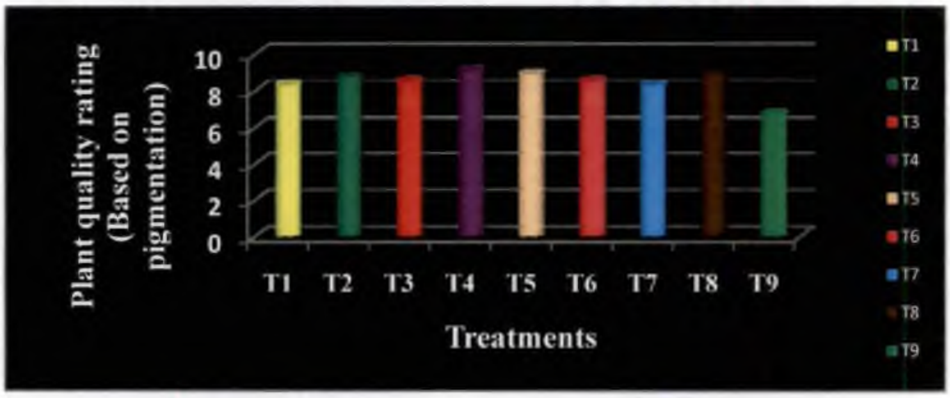


Fig 18b. Plant quality rating of foliage plants based on pigmentation (under indoor conditions) in *Ficus benjamina*

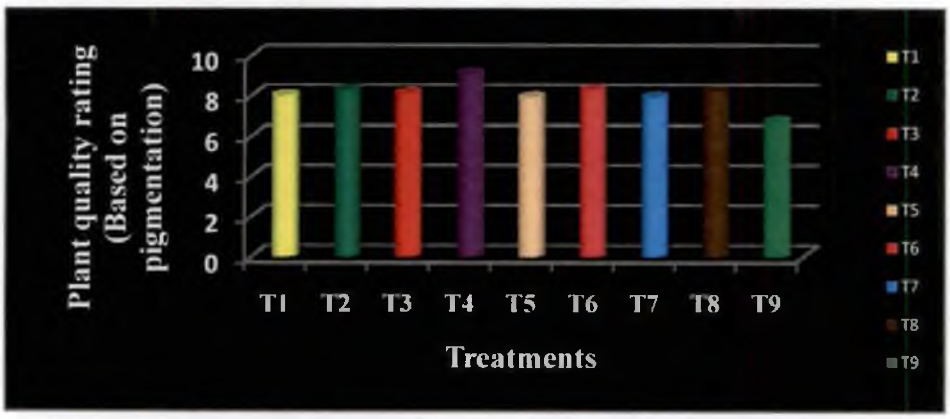


Fig 18c. Plant quality rating of foliage plants based on pigmentation (under indoor conditions) in *Schefflera arboricola*

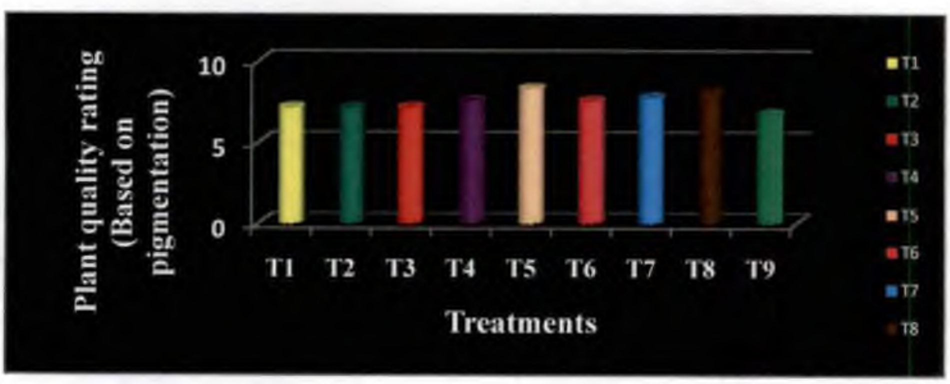


Table 33a. Effect of application of growth retardants on chlorophyll a content (mg/g)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	0.5170^{bc}	1.2100^{b}	0.7911^{b}	0.7155^{bc}	0.9313^{b}	0.6831^{ab}
T_2	0.5170^{bc}	1.2100^{b}	0.8856^{b}	0.7324^{bc}	1.1521^{bc}	0.7165^{ab}
T_3	0.4140^{ab}	0.9350^{b}	0.8029^{b}	0.6654^{b}	0.9368^{b}	0.6931^{ab}
T_4	0.5929^{c}	1.2101^{b}	0.9221^{b}	0.7500^{bc}	1.2103^{c}	0.7783^{abc}
T_5	0.4140^{ab}	0.7550^{bc}	0.7968^{b}	0.7552^{bc}	0.9515^{b}	0.9501^{bc}
T_6	0.4350^{ab}	0.6550^{b}	0.7854^{b}	0.6554^{b}	1.1341^{bc}	0.7694^{abc}
T_7	0.4130^{ab}	0.7110^{bc}	0.7916^{b}	0.7118^{bc}	0.9114^{b}	0.6231^{ab}
T_8	0.4210^{ab}	0.7510^{bc}	0.7912^{b}	0.7519^{bc}	1.1221^{bc}	0.7065^{ab}
T_9	0.3773^{a}	0.5355^{a}	0.5035^{a}	0.4213^{a}	0.5286^{a}	0.4778^{a}

Table 33b. Effect of application of growth retardants on chlorophyll b content (mg/g)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	0.1830^{ab}	0.1850^{b}	0.2243^{a}	0.1605^{ab}	0.1951^{ab}	0.2263^{ab}
T_2	0.1830^{ab}	0.1850^{b}	0.2565^{a}	0.1736^{b}	0.3476^{ab}	0.2443^{ab}
T_3	0.1130^{b}	0.2530^{b}	0.2535^{a}	0.2000^{bc}	0.3174^{ab}	0.2363^{ab}
T_4	0.1880^{ab}	0.4059^{c}	0.2606^{a}	0.2308^{c}	0.3857^{b}	0.3157^{b}
T_5	0.1130^{b}	0.1860^{bc}	0.2406^{a}	0.1863^{bc}	0.1807^{ab}	0.2248^{ab}
T_6	0.1120^{b}	0.1900^{bc}	0.2337^{a}	0.1900^{bc}	0.3240^{ab}	0.2076^{ab}
T_7	0.1120^{b}	0.1610^{ab}	0.2226^{a}	0.1617^{ab}	0.1947^{ab}	0.2163^{ab}
T_8	0.1130^{b}	0.1810^{bc}	0.2409^{a}	0.1819^{bc}	0.3467^{ab}	0.2043^{ab}
T_9	0.1221^{a}	0.0900^{a}	0.2032^{a}	0.1171^{a}	0.1621^{a}	0.1733^{a}

Table 33c. Effect of application of growth retardants on total chlorophyll content (mg/g)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	0.6980^{bc}	0.7560^{ab}	1.0148^{ab}	0.8732^{bc}	1.1228^{b}	0.9030^{ab}
T_2	0.6980^{bc}	0.7560^{ab}	1.1411^{b}	0.9058^{bc}	1.4949^{bc}	0.9551^{ab}
T_3	0.5260^{ab}	0.9850^{b}	1.0567^{b}	0.8725^{b}	1.2503^{bc}	0.9130^{ab}
T_4	0.7785^{c}	1.6108^{c}	1.1790^{b}	0.9760^{c}	1.5909^{c}	1.0910^{abc}
T_5	0.5260^{ab}	0.9410^{bc}	1.0367^{ab}	0.9412^{bc}	1.1317^{b}	1.1711^{bc}
T_6	0.5670^{ab}	0.8420^{b}	1.0186^{ab}	0.8425^{b}	1.4533^{bc}	0.9738^{ab}
T_7	0.5230^{ab}	0.8710^{bc}	1.0107^{ab}	0.8715^{bc}	1.1227^{b}	0.9167^{ab}
T_8	0.5240^{ab}	0.9400^{bc}	1.0367^{ab}	0.9406^{bc}	1.4946^{bc}	0.9178^{ab}
T_9	0.4985^{a}	0.6237^{a}	0.7047^{a}	0.5368^{a}	0.6886^{a}	0.6458^{a}

***Figures with even alphabets form one homogenous group**

Fig 19a. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Dieffenbachia amoena*

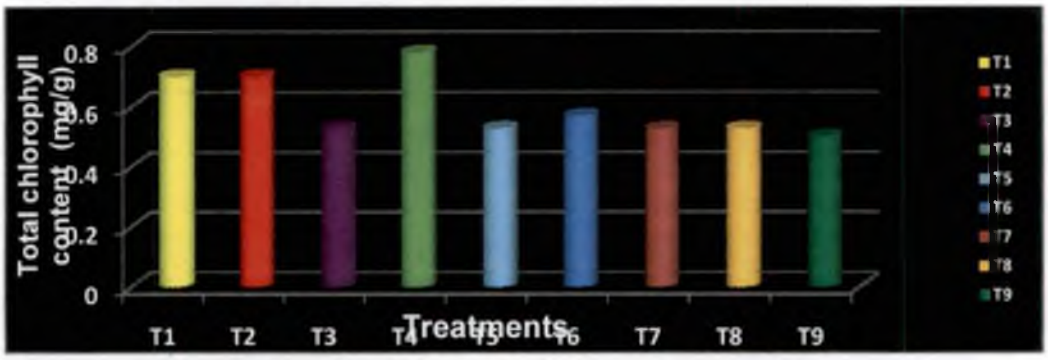


Fig 19b. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Dracaena sandariana*

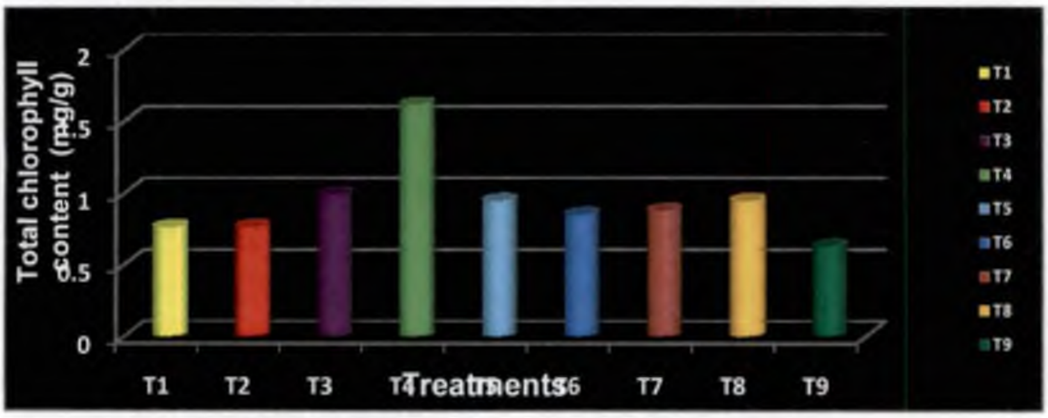


Fig 19c. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Syngonium podophyllum*

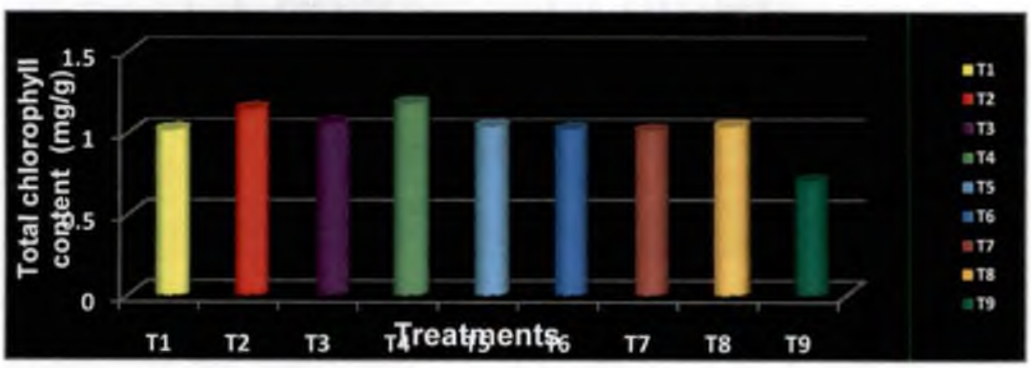


Fig 20a. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Scindapsus aureus*

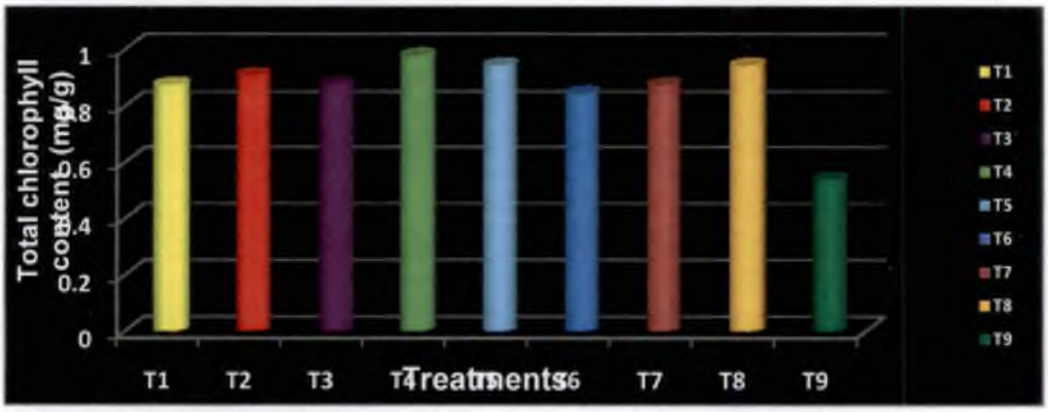


Fig 20b.Effect of application of growth retardants on total chlorophyll content (mg/g) in *Ficus benjamina*

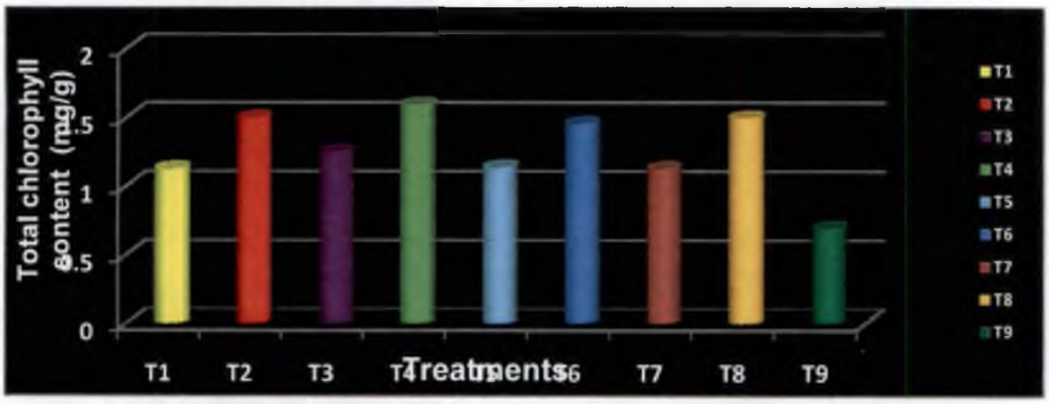
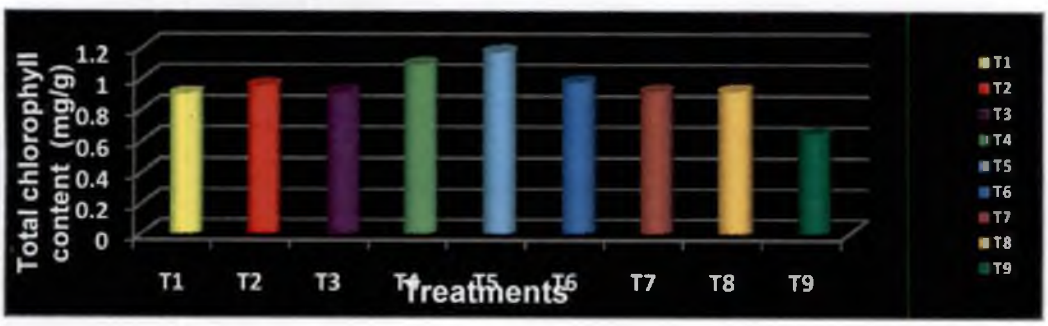


Fig 20c. Effect of application of growth retardants on total chlorophyll content (mg/g) in *Schefflera arboricola*



4.2.1.8. Anatomical studies

The observations on the leaf anatomical studies are presented in table 34.

With regard to the anatomical studies, the plants treated with T_4 (paclobutrazol 100 ppm) were observed with the highest number of palisade cells per unit length (0.35 mm) (8, 11, 13 and 28) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.*

The lowest number of palisade cells per unit length (0.35 mm) (7, 10, 12 and 27) was observed in T_9 (control) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.* The number of palisade cells per unit length in the remaining treatments, other than T_4 (paclobutrazol 100 ppm) was equal compared to T_9 (control) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.* In *Syngonium podophyllum* and *Schefflera arboricola,* there was no significant difference observed between the treatments i.e., the growth retardant application didnot affect the number of palisade cells per unit length.

4.2.1.9. Cost of application of growth retardants

Among the growth retardants applied, the highest cost incurred per plant was for the chemical ancymidol 1000 ppm (Rs. 26) and ancymidol 500 ppm (Rs. 13) followed by cycocel 2000 ppm (Rs. 8) and cycocel 1000 ppm (Rs. 4). The lowest cost per plant was for the chemical paclobutrazol 50ppm (0.60 paise) (table 35).

4.2.1.10. Atmospheric conditions

The temperature, relative humidity and light intensity that prevailed in the indoor conditions were observed and are presented in Appendix 1.

Table 34. Effect of application of growth retardants on leaf anatomy (Number of palisade cells per unit length – 0.35mm)

Treatments	*Dieffenbachia amoena*	*Dracaena sanderiana*	*Syngonium podophyllum*	*Scindapsus aureus*	*Ficus benjamina*	*Schefflera arboricola*
T_1	7.0	10	15	12	27	27
T_2	7.0	10	15	12	27	27
T_3	7.0	10	15	12	27	27
T_4	8.0	11	15	13	28	27
T_5	7.0	10	15	12	27	27
T_6	7.0	10	15	12	27	27
T_7	7.0	10	15	12	27	27
T_8	7.0	10	15	12	27	27
T_9	7.0	10	15	12	27	27

Table 35.Cost of application of growth retardants

Treatments	Growth retardant and concentration	Total cost (Rs/plant)
T_1	Ancymidol – 500 ppm	13.00
T_2	Ancymidol – 1000 ppm	26.00
T_3	Paclobutrazol – 50 ppm	00.60
T_4	Paclobutrazol – 100 ppm	01.20
T_5	B-Nine – 1000 ppm	01.00
T_6	B-Nine – 2000 ppm	02.00
T_7	Cycocel – 1000 ppm	04.00
T_8	Cycocel – 2000 ppm	08.00
T_9	Control	00.00

Table36: Effect of treatments on quantitative and qualitative characters in *Dieffenbachia amoena* is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	55.49^{c}	52.87^{bc}	60.12^{c}	58.09^{c}	68.40^{d}	67.43^{d}	42.59^{a}	47.30^{ab}	69.46^{d}
2	Plant spread (cm)	49.23^{a}	55.74^{ab}	54.20^{ab}	53.46^{ab}	61.51^{b}	60.51^{b}	51.67^{a}	48.54^{a}	62.51^{b}
3	Leaf length (cm)	28.24^{bc}	25.91^{ab}	29.80^{c}	29.83^{c}	27.10^{bc}	26.10^{bc}	24.63^{a}	27.93^{bc}	28.10^{bc}
4	Leaf breadth (cm)	11.90^{bc}	10.95^{abc}	12.62^{c}	12.11^{bc}	12.03^{bc}	12.00^{bc}	9.70^{a}	10.37^{ab}	12.06^{bc}
5	Leaf area (cm^2)	286.50^{bc}	236.38^{ab}	317.35^{c}	303.22^{c}	285.71^{bc}	284.71^{bc}	196.81^{a}	243.10^{ab}	286.71^{bc}
6	Number of leaves	11.44^{c}	10.66^{bc}	10.00^{abc}	8.88^{a}	9.65^{ab}	9.64^{ab}	10.00^{abc}	9.22^{ab}	9.66^{ab}
7	Internodal length (cm)	1.92^{a}	1.66^{a}	2.57^{bc}	2.24^{ab}	3.04^{c}	3.03^{c}	1.67^{a}	1.81^{a}	3.05^{c}
8	Leaf producing interval (days)	29.93^{f}	27.90^{d}	25.86^{c}	29.90^{f}	28.80^{e}	28.78^{e}	25.33^{b}	21.10^{a}	28.83^{e}
9	Petiole length (cm)	13.93^{a}	15.24^{ab}	14.96^{ab}	14.75^{ab}	16.87^{ab}	16.86^{ab}	14.42^{ab}	13.69^{a}	16.88^{ab}
10	Petiole girth (cm)	2.86^{a}	2.93^{a}	2.80^{a}	2.96^{a}	2.99^{a}	2.98^{a}	3.10^{a}	3.03^{a}	3.00^{a}
11	Leaf longevity (days)	113.00^{b}	120.66^{d}	112.66^{a}	113.00^{b}	111.33^{b}	112.33^{b}	130.00^{e}	133.00^{e}	115.33^{b}
12	Plant quality rating based on growth and fullness	7^{bc}	8^{b}	7^{bc}	7^{bc}	6^{d}	6^{d}	9.3^{a}	9.1^{a}	6^{d}
13	Pigmentation	8.3^{b}	8.3^{b}	7.7^{bc}	9.1^{a}	7.6^{bc}	7.5^{bc}	7.6^{bc}	7.4^{bc}	6.7^{c}
14	Chlorophyll content (mg/g)	0.6980^{bc}	0.6981^{bc}	0.5261^{ab}	0.7788^{c}	0.5261^{ab}	0.4676^{a}	0.5231^{ab}	0.5240^{ab}	0.4988^{a}
15	No. of palisade cells per unit length (0.35mm)	7	7	7	8	7	7	7	7	7

***Figures with even alphabets form one homogenous group**

Table 37: Effect of treatments on quantitative and qualitative characters in *Dracaena sanderiana* is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	45.71^{bc}	49.26^{bcd}	59.15^{de}	56.17^{cde}	60.22^{e}	59.22^{e}	32.64^{a}	44.64^{b}	61.22^{e}
2	Plant spread (cm)	28.79^{bc}	27.12^{ab}	29.79^{c}	28.67^{bc}	28.93^{c}	27.93^{c}	26.17^{a}	26.90^{a}	29.93^{c}
3	Leaf length (cm)	13.08^{a}	12.92^{a}	13.08^{a}	13.44^{a}	12.20^{a}	11.20^{a}	12.30^{a}	12.92^{a}	13.20^{a}
4	Leaf breadth (cm)	3.14^{ab}	3.13^{ab}	3.43^{b}	2.68^{a}	3.45^{b}	3.44^{b}	3.24^{ab}	3.24^{ab}	3.46^{b}
5	Leaf area (cm^2)	30.40^{a}	30.47^{a}	32.66^{a}	26.51^{a}	34.02^{a}	33.02^{a}	30.35^{a}	30.96^{a}	35.02^{a}
6	Number of leaves	23.33^{a}	24.22^{a}	23.32^{a}	21.88^{a}	24.43^{a}	24.42^{a}	24.77^{a}	23.88^{a}	24.44^{a}
7	Internodal length (cm)	3.02^{abc}	2.80^{abc}	3.25^{bc}	3.24^{bc}	3.57^{c}	3.56^{c}	2.39^{a}	2.51^{ab}	3.58^{c}
8	Leaf producing interval (days)	27.90^{e}	19.20^{b}	19.93^{c}	29.93^{f}	26.83^{d}	26.81^{d}	18.93^{a}	19.13^{ab}	26.90^{d}
9	Petiole length (cm)	6.29^{bc}	5.36^{ab}	6.88^{c}	6.22^{bc}	6.95^{c}	6.94^{c}	4.85^{a}	5.24^{a}	6.96^{c}
10	Petiole girth (cm)	1.33^{a}	1.30^{a}	1.26^{a}	1.43^{a}	1.59^{a}	1.58^{a}	1.40^{a}	0.93^{a}	1.60^{a}
11	Leaf longevity (days)	232.00^{ab}	230.33^{a}	232.33^{b}	230.33^{a}	231.33^{b}	234.33^{b}	240.00^{d}	240.66^{d}	233.33^{b}
12	Plant quality rating based on growth and fullness	8.0^{b}	8.0^{b}	6.0^{b}	7.0^{bc}	5.5^{d}	5.5^{d}	9.3^{a}	8.0^{b}	5.5^{d}
13	Pigmentation	7.9^{bc}	7.9^{bc}	8.4^{bc}	9.1^{a}	8.9^{ab}	8.5^{b}	8.3^{b}	8.8^{ab}	6.7^{c}
14	Chlorophyll content (mg/g)	0.7562^{ab}	0.7561^{ab}	0.9855^{b}	1.6111^{c}	0.9675^{b}	0.9655^{b}	0.7502^{ab}	0.7342^{ab}	0.6240^{a}
15	No. of palisade cells per unit length (0.35mm)	10	10	10	11	10	10	10	10	10

***Figures with even alphabets form one homogenous group**

Table 38: Effect of treatments on quantitative and qualitative characters in *Syngonium podophyllum* is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	245.02^{c}	239.07^{b}	227.61^{a}	225.50^{a}	259.29^{d}	258.29^{d}	240.05^{bc}	228.77^{a}	260.29^{d}
2	Plant spread (cm)									
3	Leaf length, (cm)	9.38^{a}	9.90^{ab}	9.20^{a}	10.01^{ab}	10.21^{b}	11.01^{b}	9.61^{a}	9.34^{a}	11.21^{b}
4	Leaf breadth (cm)	7.13^{a}	7.23^{a}	6.88^{a}	7.69^{a}	7.85^{a}	7.84^{a}	7.30^{a}	7.02^{a}	7.86^{a}
5	Leaf area (cm^2)	52.30^{ab}	52.58^{ab}	49.06^{a}	54.53^{ab}	65.62^{b}	64.62^{b}	53.69^{ab}	50.90^{ab}	66.62^{b}
6	Number of leaves	59.21^{ab}	55.33^{ab}	68.77^{b}	53.33^{a}	54.61^{a}	54.60^{a}	57.83^{ab}	57.57^{ab}	54.62^{a}
7	Internodal length (cm)	4.36^{c}	3.85^{bc}	3.45^{ab}	2.86^{a}	4.42^{c}	4.41^{c}	3.72^{bc}	3.52^{ab}	4.43^{c}
8	Leaf producing interval (days)	12.80^{ab}	13.20^{c}	14.00^{d}	12.83^{ab}	13.30^{c}	13.29^{c}	12.63^{a}	12.86^{b}	13.33^{c}
9	Petiole length (cm)	21.34^{ab}	20.54^{a}	19.70^{a}	20.04^{a}	23.31^{b}	23.30^{b}	20.62^{a}	21.84^{ab}	23.32^{b}
10	Petiole girth (cm)	1.00^{a}	0.96^{a}	1.00^{a}	0.90^{a}	1.06^{a}	1.06^{a}	0.96^{a}	0.93^{a}	1.06^{a}
11	Leaf longevity (days)	64.00^{b}	71.33^{c}	78.00^{d}	76.00^{d}	63.00^{b}	62.00^{b}	64.00^{b}	67.00^{c}	62.00^{b}
12	Plant quality rating based on growth and fullness	7.0^{bc}	8.0^{b}	9.3^{a}	9.3^{a}	6.0^{d}	6.0^{d}	8.0^{b}	9.3^{a}	7.0^{bc}
13	Pigmentation	7.3^{bc}	7.7^{bc}	7.8^{bc}	7.8^{bc}	7.3^{bc}	7.3^{bc}	7.3^{bc}	7.2^{bc}	6.7^{c}
14	Chlorophyll content (mg/g)	1.0152^{ab}	1.1414^{b}	1.0570^{b}	1.1793^{b}	1.0370^{ab}	1.0189^{ab}	1.0111^{ab}	1.0370^{ab}	0.7050^{a}
15	No. of palisade cells per unit length (0.35mm)	15	15	15	15	15	15	15	15	15

***Figures with even alphabets form one homogenous group**

Table 39: Effect of treatments on quantitative and qualitative characters in *Scindapsus aureus* is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	213.95[a]	206.02[a]	237.14[b]	212.15[a]	260.65[c]	259.65[c]	239.25[b]	209.10[a]	261.65[c]
2	Plant spread (cm)									
3	Leaf length (cm)	10.01[a]	9.72[a]	9.68[a]	9.70[a]	9.67[a]	9.47[a]	9.93[a]	9.66[a]	10.67[a]
4	Leaf breadth (cm)	7.15[a]	7.19[a]	7.24[a]	6.88[a]	7.43[a]	7.44[a]	7.52[a]	7.41[a]	7.42[a]
5	Leaf area (cm^2)	51.92[ab]	51.78[ab]	50.96[ab]	49.49[a]	59.98[c]	58.98[c]	55.24[b]	53.77[ab]	60.98[c]
6	Number of leaves	102.83[a]	93.21[a]	100.76[a]	104.96[a]	102.62[a]	102.61[a]	106.53[a]	121.44[a]	102.63[a]
7	Internodal length (cm)	4.55[ab]	4.41[ab]	3.96[a]	3.81[a]	5.65[cd]	5.64[cd]	5.73[d]	5.49[bcd]	5.66[cd]
8	Leaf producing interval (days)	10.56[b]	11.20[c]	12.10[d]	10.06[a]	11.00[c]	11.01[c]	10.23[a]	11.26[c]	11.06[c]
9	Petiole length (cm)	7.76[b]	7.70[b]	6.35[a]	6.79[ab]	7.80[b]	7.79[b]	7.10[ab]	7.27[ab]	7.81[b]
10	Petiole girth (cm)	0.96[a]	1.10[ab]	1.00[ab]	0.93[a]	1.35[c]	1.34[c]	1.33[c]	1.20[bc]	1.36[c]
11	Leaf longevity (days)	186.33[c]	185.33[c]	180.33[bc]	183.33[c]	176.33[b]	172.33[b]	180.33[bc]	180.00[bc]	173.33[b]
12	Plant quality rating based on growth and fullness	9.3[a]	9.3[a]	8.0[b]	9.3[a]	7.0[bc]	7.0[bc]	8.0[b]	9.3[a]	7.0[bc]
13	Pigmentation	8.3[b]	8.7[ab]	8.5[b]	9.1[a]	8.9[ab]	8.5[b]	8.3[b]	8.9[ab]	6.7[c]
14	Chlorophyll content (mg/g)	0.8762[bc]	0.9088[bc]	0.8755[b]	0.9790[c]	0.9442[bc]	0.8455[b]	0.8719[bc]	0.9410[bc]	0.5398[a]
15	No. of palisade cells per unit length (0.35mm)	12	12	12	13	12	12	12	12	12

***Figures with even alphabets form one homogenous group**

Table 40: Effect of treatments on quantitative and qualitative characters in *Ficus benjamina* is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	65.87^{d}	57.78^{c}	50.30^{b}	41.79^{a}	90.90^{e}	89.90^{e}	69.82^{d}	55.75^{c}	91.90^{e}
2	Plant spread (cm)	32.86^{a}	32.51^{a}	36.81^{ab}	37.83^{b}	34.46^{ab}	33.46^{ab}	37.87^{b}	38.27^{b}	35.46^{ab}
3	Leaf length (cm)	5.24^{bc}	4.91^{ab}	5.07^{bc}	4.55^{a}	5.37^{c}	5.07^{bc}	5.37^{c}	5.15^{bc}	5.46^{c}
4	Leaf breadth (cm)	2.91^{a}	2.73^{a}	2.92^{a}	2.98^{a}	2.92^{a}	2.91^{a}	2.92^{a}	2.73^{a}	3.09^{a}
5	Leaf area (cm^2)	12.27^{ab}	11.14^{ab}	11.85^{ab}	10.89^{a}	13.25^{ab}	11.85^{ab}	13.25^{ab}	11.88^{ab}	13.88^{b}
6	Number of leaves	185.00^{b}	210.00^{d}	168.33^{a}	183.11^{b}	204.43^{cd}	204.42^{cd}	209.99^{d}	201.55^{c}	204.44^{cd}
7	Internodal length (cm)	2.71^{ab}	2.58^{a}	2.37^{a}	2.30^{a}	3.23^{c}	3.22^{c}	3.11^{bc}	2.51^{a}	3.24^{c}
8	Leaf producing interval (days)	16.63^{f}	14.86^{d}	12.30^{b}	10.06^{a}	14.90^{d}	14.92^{d}	15.20^{e}	14.63^{c}	14.96^{d}
9	Petiole length (cm)	0.92^{a}	0.93^{a}	1.12^{b}	1.13^{b}	1.05^{ab}	1.04^{ab}	1.18^{b}	1.20^{b}	1.06^{ab}
10	Petiole girth (cm)	0.36^{a}	0.36^{a}	0.43^{a}	0.36^{a}	0.35^{a}	0.34^{a}	0.30^{a}	0.43^{a}	0.36^{a}
11	Leaf longevity (days)	70.00^{ab}	71.00^{ab}	73.33^{bcd}	74.20^{cd}	71.20^{ab}	70.20^{ab}	71.33^{ab}	71.44^{ab}	69.93^{b}
12	Plant quality rating based on growth and fullness	6.0^{d}	7.0^{bc}	8.0^{b}	9.3^{a}	5.5^{d}	5.5^{d}	6.5^{d}	7.0^{bc}	5.5^{d}
13	Pigmentation	8.0^{b}	8.3^{b}	8.1^{b}	9.1^{a}	7.9^{bc}	8.3^{b}	7.9^{bc}	8.2^{b}	6.7^{c}
14	Chlorophyll content (mg/g)	1.1231^{b}	1.4951^{bc}	1.2506^{bc}	1.5912^{c}	1.1320^{b}	1.4536^{bc}	1.1230^{b}	1.4950^{bc}	0.6889^{a}
15	No. of palisade cells per unit length (0.35mm)	27	27	27	28	27	27	27	27	27

***Figures with even alphabets form one homogenous group**

Table 41: Effect of treatments on quantitative and qualitative characters in *Scheffiera arboricola* is summarizedbelow:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	36.69^{ab}	39.06^{bc}	40.94^{bc}	34.10^{a}	46.80^{d}	45.80^{d}	38.82^{bc}	41.12^{c}	47.80^{d}
2	Plant spread (cm)	36.62^{a}	38.48^{ab}	38.02^{ab}	37.58^{ab}	35.57^{ab}	36.57^{ab}	37.58^{ab}	38.93^{b}	37.57^{ab}
3	Leaf length (cm)	12.60^{a}	13.01^{a}	13.07^{a}	13.46^{a}	13.07^{a}	12.60^{a}	12.64^{a}	13.60^{a}	13.63^{a}
4	Leaf breadth (cm)	11.84^{a}	12.50^{ab}	13.22^{ab}	12.56^{ab}	13.22^{ab}	12.50^{ab}	13.22^{ab}	12.97^{ab}	13.02^{ab}
5	Leaf area (cm^2)	119.76^{a}	130.80^{ab}	141.20^{abc}	133.94^{abc}	141.20^{abc}	140.80^{bc}	131.86^{abc}	154.91^{c}	145.80^{bc}
6	Number of leaves	22.66^{a}	22.44^{a}	24.77^{a}	21.99^{a}	24.87^{a}	24.86^{a}	23.77^{a}	23.77^{a}	24.88^{a}
7	Internodal length (cm)	1.86^{a}	1.67^{a}	2.00^{a}	2.05^{a}	3.19^{c}	3.18^{c}	2.97^{bc}	2.59^{b}	3.20^{c}
8	Leaf producing interval (days)	20.93^{e}	19.93^{c}	19.43^{b}	29.20^{f}	20.18^{d}	20.15^{d}	19.50^{b}	18.90^{a}	20.20^{d}
9	Petiole length (cm)	9.11^{a}	10.21^{ab}	9.86^{ab}	9.45^{ab}	10.70^{b}	10.69^{b}	10.50^{ab}	10.41^{ab}	10.71^{b}
10	Petiole girth (cm)	0.60^{a}	0.63^{a}	0.63^{a}	0.60^{a}	0.59^{a}	0.58^{a}	0.56^{a}	0.63^{a}	0.60^{a}
11	Leaf longevity (days)	162.33^{c}	157.33^{bc}	158.33^{bc}	162.00^{c}	154.20^{ab}	154.33^{ab}	157.33^{bc}	154.00^{ab}	154.45^{ab}
12	Plant quality rating based on growth and fullness	9.1^{a}	8.0^{b}	8.0^{b}	9.3^{a}	7.0^{bc}	7.0^{bc}	8.0^{b}	7.0^{bc}	6.0^{d}
13	Pigmentation	7.1^{bc}	7.1^{bc}	7.1^{bc}	7.5^{bc}	8.3^{b}	7.5^{bc}	7.7^{bc}	8.1^{b}	6.7^{c}
14	Chlorophyll content (mg/g)	0.9070^{ab}	0.9581^{ab}	0.9170^{ab}	1.0913^{abc}	1.1714^{bc}	0.9742^{ab}	0.9170^{ab}	0.9181^{ab}	0.6462^{a}
15	No. of palisade cells per unit length (0.35mm)	27	27	27	27	27	27	27	27	27

***Figures with even alphabets form one homogenous group**

Table 42: Effect of treatments on quantitative and qualitative characters in *Dieffenbachia amoena* (under indoor conditions)is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	58.77^{c}	56.11^{bc}	64.48^{c}	62.05^{c}	72.48^{cd}	71.48^{cd}	44.81^{a}	49.41^{ab}	76.48^{cd}
2	Plant spread (cm)	52.12^{a}	56.73^{ab}	57.14^{ab}	56.05^{ab}	63.66^{b}	62.66^{b}	53.35^{a}	49.57^{a}	66.66^{b}
3	Leaf length (cm)	28.64^{bc}	26.27^{ab}	30.34^{c}	30.30^{c}	27.84^{bc}	27.70^{bc}	24.95^{a}	28.19^{bc}	28.84^{bc}
4	Leaf breadth (cm)	12.17^{bc}	11.20^{abc}	12.97^{c}	12.42^{bc}	12.50^{bc}	12.45^{bc}	9.93^{a}	10.56^{ab}	12.51^{bc}
5	Leaf area (cm^2)	294.57^{bc}	246.52^{ab}	331.81^{c}	319.12^{c}	307.47^{bc}	306.47^{bc}	205.59^{a}	251.18^{ab}	308.47^{bc}
6	Number of leaves	13.44^{c}	12.66^{bc}	11.88^{abc}	10.22^{a}	11.55^{ab}	11.77^{ab}	11.99^{abc}	10.33^{ab}	11.77^{ab}
7	Internodal length (cm)	1.98^{a}	1.68^{a}	2.79^{bc}	2.36^{ab}	3.50^{c}	3.49^{c}	1.69^{a}	1.89^{a}	3.51^{c}
8	Leaf producing interval (days)	29.90^{f}	27.93^{d}	25.83^{c}	29.93^{f}	28.83^{e}	28.75^{e}	25.30^{b}	21.13^{a}	28.80^{e}
9	Petiole length (cm)	14.43^{a}	15.64^{ab}	15.66^{ab}	15.29^{ab}	18.00^{ab}	18.04^{ab}	14.78^{ab}	13.79^{a}	18.14^{ab}
10	Petiole girth (cm)	2.93^{a}	3.00^{a}	2.90^{a}	3.03^{a}	3.05^{a}	3.06^{a}	3.16^{a}	3.10^{a}	3.06^{a}
11	Indoor life (days)	51^{b}	58^{ab}	51^{b}	50^{b}	50^{b}	52^{b}	62^{a}	61^{a}	51^{b}
12	Plant quality rating based on growth and fullness	7^{bc}	8^{b}	7^{bc}	7^{bc}	6^{d}	6^{d}	9.3^{a}	9.1^{a}	6^{d}
13	Pigmentation	8.3^{b}	8.3^{b}	7.7^{bc}	9.1^{a}	7.6^{bc}	7.5^{bc}	7.6^{bc}	7.4^{bc}	6.7^{c}
14	Chlorophyll content (mg/g)	0.6980^{bc}	0.6980^{bc}	0.5260^{ab}	0.7785^{c}	0.5260^{ab}	0.5670^{ab}	0.5230^{ab}	0.5240^{ab}	0.4985^{a}
15	No. of palisade cells per unit length (0.35mm)	7	7	7	8	7	7	7	7	7

***Figures with even alphabets form one homogenous group**

Table 43: Effect of treatments on quantitative and qualitative characters in *Dracaena sanderiana* (under indoor conditions)is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	49.27^{bc}	51.40^{bcd}	65.55^{de}	61.63^{cde}	66.92^{e}	65.92^{e}	33.50^{a}	44.66^{cde}	69.92^{e}
2	Plant spread (cm)	29.93^{bc}	27.94^{ab}	31.16^{c}	29.82^{bc}	30.58^{c}	28.58^{c}	26.94^{a}	27.40^{a}	31.58^{c}
3	Leaf length (cm)	13.33^{a}	13.16^{a}	13.37^{a}	13.71^{a}	13.50^{a}	13.51^{a}	12.54^{a}	13.16^{a}	13.55^{a}
4	Leaf breadth (cm)	3.18^{ab}	3.17^{ab}	3.50^{b}	2.74^{a}	3.53^{b}	3.49^{b}	3.27^{ab}	3.27^{ab}	3.58^{b}
5	Leaf area (cm^2)	31.80^{a}	31.75^{a}	34.53^{a}	27.96^{a}	36.97^{a}	35.97^{a}	31.58^{a}	32.14^{a}	37.97^{a}
6	Number of leaves	25.43^{a}	26.10^{a}	24.77^{a}	23.88^{a}	25.44^{a}	25.88^{a}	26.21^{a}	26.10^{a}	25.88^{a}
7	Internodal length (cm)	3.30^{abc}	2.98^{abc}	3.59^{bc}	3.54^{bc}	4.00^{c}	3.95^{c}	2.51^{a}	2.57^{ab}	4.06^{c}
8	Leaf producing interval (days)	27.93^{e}	19.23^{b}	19.90^{c}	29.90^{f}	26.80^{d}	26.80^{d}	18.90^{a}	19.10^{ab}	26.93^{d}
9	Petiole length (cm)	6.96^{bc}	5.81^{ab}	7.71^{c}	6.89^{bc}	7.92^{c}	7.93^{c}	5.26^{a}	5.51^{a}	7.97^{c}
10	Petiole girth (cm)	1.33^{a}	1.36^{a}	1.33^{a}	1.50^{a}	1.65^{a}	1.64^{a}	1.61^{a}	1.00^{a}	1.66^{a}
11	Indoor life (days)	56^{ab}	56^{ab}	51^{b}	49^{b}	50^{b}	49^{b}	57^{a}	50^{b}	50^{b}
12	Plant quality rating based on growth and fullness	8.0^{b}	8.0^{b}	6.0^{b}	7.0^{bc}	5.5^{d}	5.5^{d}	9.3^{a}	8.0^{b}	5.5^{d}
13	Pigmentation	7.9^{bc}	7.9^{bc}	8.4^{bc}	9.1^{a}	8.9^{ab}	8.5^{b}	8.3^{b}	8.8^{ab}	6.7^{c}
14	Chlorophyll content (mg/g)	0.7560^{ab}	0.7560^{ab}	0.9850^{b}	1.6108^{c}	0.9410^{bc}	0.8420^{b}	0.8710^{bc}	0.9400^{bc}	0.6237^{a}
15	No. of palisade cells per unit length (0.35mm)	10	10	10	11	10	10	10	10	10

***Figures with even alphabets form one homogenous group**

Table 44: Effect of treatments on quantitative and qualitative characters in *Syngonium podophyllum* (under indoor conditions)is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	314.82^{c}	306.87^{b}	291.41^{a}	287.30^{a}	330.09^{d}	329.09^{d}	307.85^{c}	293.17^{bc}	334.09^{d}
2	Plant spread (cm)									
3	Leaf length (cm)	9.88^{a}	10.34^{ab}	9.50^{a}	10.28^{ab}	11.80^{b}	11.83^{b}	10.01^{a}	9.70^{a}	11.89^{b}
4	Leaf breadth (cm)	7.49^{a}	7.55^{a}	7.12^{a}	7.91^{a}	8.28^{a}	8.26^{a}	7.59^{a}	7.28^{a}	8.30^{a}
5	Leaf area (cm^2)	59.43^{ab}	59.04^{ab}	53.41^{a}	58.97^{ab}	76.20^{b}	75.20^{b}	59.48^{ab}	55.99^{ab}	77.20^{b}
6	Number of leaves	78.55^{ab}	73.33^{ab}	88.77^{b}	62.33^{a}	69.33^{a}	69.33^{a}	77.99^{ab}	68.90^{ab}	69.01^{a}
7	Internodal length (cm)	4.85^{c}	4.26^{bc}	3.76^{ab}	3.07^{a}	5.12^{c}	5.11^{c}	4.13^{bc}	3.89^{ab}	5.13^{c}
8	Leaf producing interval (days)	12.83^{ab}	13.23^{c}	14.03^{d}	12.80^{ab}	13.33^{c}	13.23^{c}	12.60^{a}	12.82^{b}	13.30^{c}
9	Petiole length (cm)	21.92^{ab}	20.87^{a}	19.85^{a}	20.12^{a}	24.20^{b}	24.18^{b}	20.95^{a}	21.98^{ab}	24.21^{b}
10	Petiole girth (cm)	1.06^{a}	1.03^{a}	1.06^{a}	0.96^{a}	1.12^{a}	1.11^{a}	1.03^{a}	1.00^{a}	1.13^{a}
11	Indoor life (days)	50^{b}	56^{ab}	61^{a}	62^{a}	53^{b}	52^{b}	50^{b}	56^{ab}	51^{b}
12	Plant quality rating based on growth and fullness	7.0^{bc}	8.0^{b}	9.3^{a}	9.3^{a}	6.0^{d}	6.0^{d}	8.0^{b}	9.3^{a}	7.0^{bc}
13	Pigmentation	7.3^{bc}	7.7^{bc}	7.8^{bc}	7.8^{bc}	7.3^{bc}	7.3^{bc}	7.3^{bc}	7.2^{bc}	6.7^{c}
14	Chlorophyll content (mg/g)	1.0148^{ab}	1.1411^{b}	1.0567^{b}	1.1790^{b}	1.0367^{ab}	1.0186^{ab}	1.0107^{ab}	1.0367^{ab}	0.7047^{a}
15	No. of palisade cells per unit length (0.35mm)	15	15	15	15	15	15	15	15	15

***Figures with even alphabets form one homogenous group**

Table 45: Effect of treatments on quantitative and qualitative characters in *Scindapsus aureus* (under indoor conditions)is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	268.97^{a}	259.64^{a}	299.50^{b}	270.51^{a}	330.47^{c}	331.47^{c}	306.07^{b}	267.96^{b}	338.47^{c}
2	Plant spread (cm)									
3	Leaf length (cm)	10.29^{a}	9.97^{a}	9.90^{a}	9.90^{a}	11.03^{a}	11.05^{a}	10.25^{a}	9.96^{a}	11.09^{a}
4	Leaf breadth (cm)	7.41^{a}	7.45^{a}	7.45^{a}	7.07^{a}	7.80^{a}	7.83^{a}	7.82^{a}	7.68^{a}	7.81^{a}
5	Leaf area (cm^2)	56.64^{ab}	56.10^{ab}	54.57^{ab}	52.78^{a}	67.43^{c}	66.43^{c}	60.74^{b}	58.72^{ab}	68.43^{c}
6	Number of leaves	134.12^{a}	114.80^{a}	109.29^{a}	117.83^{a}	128.63^{a}	129.63^{a}	139.86^{a}	162.10^{a}	131.63^{a}
7	Internodal length (cm)	5.11^{ab}	4.77^{ab}	4.10^{a}	3.83^{a}	6.40^{cd}	6.38^{cd}	6.45^{cd}	6.11^{cd}	6.44^{cd}
8	Leaf producing interval (days)	10.53^{b}	11.18^{c}	12.07^{d}	10.01^{a}	11.03^{c}	11.00^{c}	10.20^{a}	11.23^{c}	11.02^{c}
9	Petiole length (cm)	7.98^{b}	7.85^{b}	6.49^{a}	6.88^{ab}	8.20^{b}	8.12^{b}	7.33^{ab}	7.44^{ab}	8.22^{b}
10	Petiole girth (cm)	1.03^{a}	1.16^{ab}	1.06^{ab}	1.00^{a}	1.40^{c}	1.40^{c}	1.40^{c}	1.26^{bc}	1.43^{c}
11	Indoor life (days)	57^{ab}	62^{a}	55^{ab}	60^{a}	50^{b}	51^{b}	56^{ab}	56^{ab}	50^{b}
12	Plant quality rating based on growth and fullness	9.3^{a}	9.3^{a}	8.0^{b}	9.3^{a}	7.0^{bc}	7.0^{bc}	8.0^{b}	9.3^{a}	7.0^{bc}
13	Pigmentation	8.3^{b}	8.7^{ab}	8.5^{b}	9.1^{a}	8.9^{ab}	8.5^{b}	8.3^{b}	8.9^{ab}	6.7^{c}
14	Chlorophyll content (mg/g)	0.8732^{bc}	0.9058^{bc}	0.8725^{b}	0.9760^{c}	0.9412^{bc}	0.8425^{b}	0.8715^{bc}	0.9406^{bc}	0.5368^{a}
15	No. of palisade cells per unit length (0.35mm)	12	12	12	13	12	12	12	12	12

***Figures with even alphabets form one homogenous group**

Table 46: Effect of treatments on quantitative and qualitative characters in *Ficus benjamina* (under indoor conditions)is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	75.81^{d}	65.32^{c}	57.24^{b}	47.03^{a}	100.64^{e}	99.64^{e}	82.06^{d}	64.19^{d}	107.64^{e}
2	Plant spread (cm)	34.10^{a}	32.54^{a}	37.61^{ab}	38.99^{b}	36.05^{ab}	35.05^{ab}	39.19^{b}	39.53^{b}	37.05^{ab}
3	Leaf length (cm)	5.39^{bc}	5.00^{ab}	5.14^{bc}	4.60^{a}	5.49^{c}	5.14^{bc}	5.49^{c}	5.27^{bc}	5.61^{c}
4	Leaf breadth (cm)	2.96^{a}	2.77^{a}	2.96^{a}	3.02^{a}	3.16^{a}	3.18^{a}	3.15^{a}	3.00^{a}	3.18^{a}
5	Leaf area (cm^2)	12.76^{ab}	11.59^{ab}	12.23^{ab}	11.21^{a}	13.82^{b}	12.82^{b}	13.99^{ab}	12.51^{ab}	14.82^{b}
6	Number of leaves	215.00^{b}	248.00^{d}	195.33^{a}	213.11^{b}	240.44^{cd}	238.44^{cd}	247.99^{d}	235.55^{c}	242.44^{cd}
7	Internodal length (cm)	2.84^{ab}	2.66^{a}	2.43^{a}	2.32^{a}	3.52^{c}	3.51^{c}	3.33^{bc}	2.68^{a}	3.56^{c}
8	Leaf producing interval (days)	16.62^{f}	14.84^{d}	12.32^{b}	10.03^{a}	14.92^{d}	14.90^{d}	15.22^{e}	14.61^{c}	14.92^{d}
9	Petiole length (cm)	0.92^{a}	0.92^{a}	1.17^{b}	1.17^{b}	1.12^{ab}	1.12^{ab}	1.24^{b}	1.24^{b}	1.12^{ab}
10	Petiole girth (cm)	0.43^{a}	0.43^{a}	0.50^{a}	0.43^{a}	0.44^{a}	0.43^{a}	0.36^{a}	0.50^{a}	0.43^{a}
11	Indoor life (days)	51^{b}	50^{b}	58^{ab}	62^{a}	51^{b}	50^{b}	50^{b}	51^{b}	50^{b}
12	Plant quality rating based on growth and fullness	6.0^{d}	7.0^{bc}	8.0^{b}	9.3^{a}	5.5^{d}	5.5^{d}	6.5^{d}	7.0^{bc}	5.5^{d}
13	Pigmentation	8.0^{b}	8.3^{b}	8.1^{b}	9.1^{a}	7.9^{bc}	8.3^{b}	7.9^{bc}	8.2^{b}	6.7^{c}
14	Chlorophyll content (mg/g)	1.1228^{b}	1.4949^{bc}	1.2503^{bc}	1.5909^{c}	1.1317^{b}	1.4533^{bc}	1.1227^{b}	1.4946^{bc}	0.6886^{a}
15	No. of palisade cells per unit length (0.35mm)	27	27	27	28	27	27	27	27	27

***Figures with even alphabets form one homogenous group**

Table 47: Effect of treatments on quantitative and qualitative characters in *Schefflera arboricola* (under indoor conditions)is summarized below:

S. No.	Plant characters	Treatments								
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9 (control)
1	Plant height (cm)	37.23^{ab}	39.45^{bc}	41.85^{bc}	34.86^{a}	50.47^{d}	47.47^{d}	40.33^{bc}	42.42^{c}	51.47^{d}
2	Plant spread (cm)	37.42^{a}	37.14^{ab}	38.83^{ab}	38.46^{ab}	36.43^{ab}	37.40^{ab}	38.48^{ab}	39.72^{b}	38.38^{ab}
3	Leaf length (cm)	13.00^{a}	13.38^{a}	13.55^{a}	13.90^{a}	13.55^{a}	13.00^{a}	13.18^{a}	14.13^{a}	14.30^{a}
4	Leaf breadth (cm)	12.20^{a}	12.84^{ab}	13.65^{ab}	12.96^{ab}	13.65^{ab}	13.62^{ab}	13.48^{ab}	14.34^{b}	13.67^{ab}
5	Leaf area (cm^2)	129.28^{a}	139.90^{ab}	153.40^{abc}	145.09^{abc}	162.99^{bc}	161.99^{bc}	145.62^{abc}	169.06^{c}	163.99^{bc}
6	Number of leaves	24.21^{a}	23.44^{a}	26.22^{a}	23.66^{a}	26.20^{a}	26.00^{a}	25.33^{a}	24.77^{a}	26.20^{a}
7	Internodal length (cm)	2.05^{a}	1.80^{a}	2.28^{a}	2.27^{a}	3.55^{c}	3.56^{c}	3.43^{bc}	2.99^{b}	3.57^{c}
8	Leaf producing interval (days)	20.90^{e}	19.90^{c}	19.40^{b}	29.20^{f}	20.13^{d}	20.16^{d}	19.52^{b}	18.92^{a}	20.22^{d}
9	Petiole length (cm)	9.21^{a}	10.23^{ab}	10.00^{ab}	9.53^{ab}	11.11^{b}	11.07^{b}	10.79^{ab}	10.55^{ab}	11.11^{b}
10	Petiole girth (cm)	0.66^{a}	0.70^{a}	0.70^{a}	0.66^{a}	0.65^{a}	0.64^{a}	0.60^{a}	0.73^{a}	0.66^{a}
11	Indoor life (days)	62^{a}	57^{ab}	58^{ab}	62^{a}	51^{b}	52^{b}	57^{ab}	51^{b}	52^{b}
12	Plant quality rating based on growth and fullness	9.1^{a}	8.0^{b}	8.0^{b}	9.3^{a}	7.0^{bc}	7.0^{bc}	8.0^{b}	7.0^{bc}	6.0^{d}
13	Pigmentation	7.1^{bc}	7.1^{bc}	7.1^{bc}	7.5^{bc}	8.3^{b}	7.5^{bc}	7.7^{bc}	8.1^{b}	6.7^{c}
14	Chlorophyll content (mg/g)	0.9030^{ab}	0.9551^{ab}	0.9130^{ab}	1.0910^{abc}	1.1711^{bc}	0.9738^{ab}	0.9167^{ab}	0.9178^{ab}	0.6458^{a}
15	No. of palisade cells per unit length (0.35mm)	27	27	27	27	27	27	27	27	27

***Figures with even alphabets form one homogenous group**

Discussion

5. DISCUSSION

Results of the investigation on "Canopy management in foliage plants for interiorscaping" carried out at the Department of Pomology and Floriculture, College of Horticulture, Vellanikkara during the period from August 2013 – February 2014 are discussed in this chapter.

The main objective of the study was to determine the effect of application of growth retardants on plant canopy and subsequent interior performance of selected foliage plants. Different quantitative and qualitative characters of six plant species viz., *Dieffenbachia amoena, Dracaena sanderiana, Syngonium podophyllum, Scindapsus aureus, Ficus benjamina* and *Schefflera arboricola* were observed in shade house and under indoor conditions after application of growth retardants.

5.1 Evaluation under shadehouse

5.1.1 Quantitative characters

Foliage plants form an interesting group of ornamentals usually grown as pot plants or ornamentals for centuries. This group of plants is generally grown for their attractive foliage and can be retained for their beauty for long periods in an interior environment. Aesthetic appearance of the plant is the most important consideration in interior plantscaping.

Interiorscape display of foliage plants demand tidy plants that do not appear leggy and overgrown. Since foliage plants are often produced under heavy shade and in close proximity, controlling plant height by means of retardant application would make plants sturdier and more attractive. These growth regulating chemicals usually affect gibberellins which are responsible for shoot elongation, thus these anti-gibberellin compounds are commonly used to control height (Dole and Wilkins, 2004).

Among the qualitative characters, the plant height was effectively reduced by T_7(CCC 1000 ppm) in *Dieffenbachia amoena*(42.59 cm) and in *Dracaena sanderiana* (32.64 cm) compared to the control (69.46 cm and 61.22 cm). Cycocel reduces elongation by interfering with the biosynthetic steps directly before ent – kaurene, a precursor in gibberrilin biosynthesis pathway (Rademacher, 1991). The results are in confirmation with the findings of Henny *et al.* (1994) in *Barleria cristata* (Phillipine white), where the application of CCC 1000 ppm had resulted in shorter plants compared to untreated plants.

The treatment T_4(paclobutrazol 100 ppm) effectively reduced plant height in *Syngonium podophyllum*(225.50 cm), in *Ficus benjamina* (41.79 cm), in *Schefflera arboricola* (34.10 cm) compared to control (260.29 cm, 91.90 cm and 47.80 cm). Bonzi™ (paclobutrazol), of the triazole group, is a more recent height retardant. Compared to other PGRs, triazoles are effective at relatively low doses and are non-phytotoxic (Basra, 2000). Paclobutrazol retard plant height by inhibiting gibberellic acid biosynthesis (Rademacher, 1991) which is responsible for stem growth and shoot elongation. Barrett and Nell (1983) reported that elongation of *Ficus benjamina* L. treated with paclobutrazol sprays at 500 and 2000 ppm concentrations were 12 cm and 7 cm, respectively, compared to untreated plants (27 cm).

In *Scindapsus aureus*, the plant height was effectively reduced by T_2(ancymidol 1000 ppm) (206.02 cm) compared to the control (261.65 cm). A-Rest™ (ancymidol), a pyrimidine analog, is used primarily to retard stem elongation of annuals and perennials grown in containers (Basra, 2000). Ancimidol retard plant height by inhibiting gibberellic acid biosynthesis (Rademacher, 1991) which is responsible for stem growth and shoot elongation. The results are in confirmation with the findings of Henley and Poole (1974) who stated that ancymidol was most effective in reducing elongation of *Brassaia actinophylla*, *Gynura sarmentosa*, *Syngonium podophyllum* and *Pilea* sps by 1.08 cm, 3.88 cm, 1.76 cm and 2.24 cm compared to the similar plant species kept untreated (4.24 cm, 10.52 cm, 2.24 cm and 2.68 cm).

Plant spread was effectively reduced by T_8 (CCC 2000 ppm) in *Dieffenbachia amoena*(48.54 cm) compared to control (62.51 cm). In *Dracaena sanderiana,* T_7(CCC 1000 ppm) reduced plant spread effectively (26.17 cm) compared to the control (29.93 cm). Mittal (1967) in Dahlia found a decrease in plant spread and an increase in compactness due to application of cycocel. Cycocel act as a growth retardant thereby inhibiting biochemical processes resulting in less spreading of plants (Sharifuzzaman *et al.*, 2011).

In *Syngonium podophyllum,* the lowest leaf length was in T_3 (paclobutrazol 50 ppm) (9.20 cm) and the highest was in T_9(control) (11.21 cm). In *Ficus benjamina,* the lowest leaf length was in T_4(paclobutrazol 100 ppm) (4.55 cm) and the highest was in T_9(control) (5.46 cm). These results are in confirmation with the findings of Pepin (2006) in *Buddleia davidii*where the paclobutrazol treatment resulted in reduced leaf length (43.8 mm) compared to the control (48.3 mm).

In *Dracaena sanderiana,* the lowest leaf breadth was in T_4(paclobutrazol 100 ppm) (2.68 cm) and the highest was in T_9(control) (3.46 cm). These results are in confirmation with the findings of Banko and Stefani (1988). He stated that foliar spray of paclobutrazol at 0.025-0.075 mg/plant reduced leaf breadth of *Catharanthus roseus* cv. little Bright Eye compared to control.

In *Syngonium podophyllum,* the lowest leaf area was in T_3(paclobutrazol 50 ppm) (49.06 cm^2) and the highest was in T_9(control) (66.62 cm^2). In *Scindapsus aureus,* the lowest leaf area was in T_4(paclobutrazol 100 ppm) (49.49 cm^2) and the highest was in T_9(control) (60.98 cm^2). In *Ficus benjamina,* the lowest leaf area was in T_4(paclobutrazol 100 ppm) (10.89 cm^2) and the highest was in T_9(control) (13.88 cm^2. Moraes *et al.* (2005) reported that as the paclobutrazol concentration increased from 0 to 32 mg ai·L^{-1}, leaf area decreased linearly by 12 cm^2, from 62 to 50 cm^2 in ornamental Tomato.

In *Dieffenbachia amoena,* the internodal length was effectively reduced by T_2(ancymidol 1000 ppm) (1.66 cm) and the highest was in T_9(control) (3.05 cm). In *Schefflera arboricola,* the lowest internodal length was in T_2(ancymidol 1000 ppm) (1.67 cm) and the highest was in T_9(control) (3.20 cm). Cramer and Bridgen (1998) reported that sprays of 33 and 66 ppm of ancymidol reduced internodal length of potted *Mussaenda 'Queen sirikit'* by28.8 and 21.3 cm compared to the control (30 cm).

In *Syngonium podophyllum,* the lowest internodal length was observed in T_4(paclobutrazol 100 ppm) (2.86 cm) and the highest was in T_9(control) (4.43 cm). In *Ficus benjamina,* the lowest internodal length was observed in T_4(paclobutrazol 100 ppm) (2.30 cm) and the highest was in T_9(control) (3.24 cm). The results are in confirmation with the findings of Karaguzel and Ortacesme (2002) in *Bougainvillea glabra*Choisy 'Sanderiana'.

In *Dracaena sanderiana,* the lowest internodal length was observed in T_7 (CCC 1000 ppm) (2.39 cm) and the highest was in T_9 (control) (3.58 cm). The results are in line with the findings of Karlovic *et al.* (2004) in*Chrysanthemum morifolium* var. Revert.

The petiole length was effectively reduced by T_8(CCC 2000 ppm) in *Dieffenbachia amoena* (13.69 cm) compared to the control (16.88 cm). In *Dracaena sanderiana,* the lowest petiole length was observed in T_7(CCC 1000 ppm) (4.85 cm) compared to the control (6.96 cm). In *Vitis vinifera L.,* CCC 1000 ppm reduced the petiole length (5 cm) significantly compared to the control (7.5 cm) (Coombe, 1967).

In *Syngonium podophyllum,* the lowest petiole length was observed in T_3(paclobutrazol 50 ppm) (19.70 cm) compared to control (23.32 cm). In *Scindapsus aureus,* the lowest petiole length was observed in T_3(paclobutrazol 50 ppm) (6.35 cm) compared to the control (7.81 cm). The results are in confirmation with the findings of Wei-hui and Li-feia (2008) who reported that foliar spray of paclobutrazol at 3000 ppm concentration resulted in production of dwarf plants with decrease in the petiole length in *Altemanthera versicolor* compared to control, which could be attributed to the reduced gibberilic acid which is responsible for cell elongation.

In *Schefflera arboricola,* the lowest petiole length was observed in T_1(ancymidol 500 ppm) (9.11 cm) compared to the control (10.71 cm). Furuta *et al.,* (1972) in Caladium observed a reduction in petiole length by application of ancymidol compared to control.

In *Scindapsus aureus,* the petiole girth was effectively reduced by T_4(paclobutrazol 100 ppm) (0.93 cm) compared to the control (1.36 cm). The results are in confirmation with the findings of Wei-hui and Li-feia (2008) in *Altemanthera versicolor.*

In *Syngonium podophyllum,* the highest leaf longevity was observed in T_3(paclobutrazol 50 ppm) (78 days) and the lowest leaf longevity (62 days) was observed in T_6(B-Nine 2000 ppm) and T_9(control). In *Ficus benjamina,* the highest leaf longevity was in T_4(paclobutrazol 100 ppm) (74.20 days) and the lowest was in T_9(control) (69.93 days). The results are in line with the findings of Jiao *et al.* (1986) who stated that decrease in leaf senescence and increase in leaf longevity by both paclobutrazol was previously observed in 'Nellie White' Easter lily (*Lilium longiflorum* Thunb.).

5.1.2 Qualitative characters

The highest plant quality rating (9.3) based on growth and full ness was observed in the plants treated with T_1 (ancymidol 500 ppm) and T_2 (ancymidol 1000 ppm) in *Scindapsus aureus,* T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum,* T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum, Scindapsus aureus, Ficus benjamina*and *Schefflera arboricola,* T_7 (CCC 1000 ppm) in *Dieffenbachia amoena,* and *Dracaena sanderiana,* T_8 (CCC 2000 ppm) in *Syngonium podophyllum* and*Scindapsus aureus.* Growth retardants, such as CCC, paclobutrazol and ancimidol are successfully used to obtain higher quality yield and control of quality and quantity characters in many plant species (Hayashi et al., 2001; Karlovic et al., 2004).

Based on pigmentation, the highest plant quality rating (9.1) was recorded in the plants treated with T_4 (paclobutrazol @ 100 ppm) in *Dieffenbachia amoena*, *Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.* Most plant growth retardants inhibit the formation of growth-active gibberellins (GAs) and can thus be used to reduce unwanted shoot elongation (Cathey, 1964; Nickell, 1978; Rademacher, 2000; Latimer, 2001; Singh, 2004; Mansuroglu *et al.*, 2009). The resulting stems are thicker and leaves may be a deeper green as a result of higher concentrations of chlorophyll in smaller cells. Treated plants finish with an increased marketable appearance (Nelson, 1998).

5.2 Chlorophyll content

The treatment T_4 (paclobutrazol @ 100 ppm) was effective in increasing the chlorophyll a content in *Dieffenbachia amoena* and *Ficus benjamina* (0.5932 mg/g and 1.2107 mg/g), chlorophyll b content in *Dracaena sanderiana* and *Scindapsus aureus* (0.4062 mg/g and 0.2311 mg/g) and total chlorophyll content in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina* (0.7788 mg/g, 1.6111 mg/g, 0.9790 mg/g and 1.5912 mg/g). These results are in agreement with the findings of Youssef and Abd El-Aal (2013) where the spray application of paclobutrazol @ 150 ppm in *Tabernaemontana coronaria* Stapf plant resulted in more chlorophyll content (0.2874mg/g) compared to the control (0.2421 mg/g). The plants treated with paclobutrazol had leaves with a rich green color suggesting high chlorophyll content. The possible explanations for this response were given by Chaney (2004). One is that the leaves of both treated and untreated plants contain 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. In addition, the amount of chlorophyll is increased because of an increase in the production of phytyl, an essential part of the chlorophyll molecule produced via the same terpenoid pathway as gibberellins. Paclobutrazol treatment, which blocks the production of gibberellins, results in a shunting of the intermediate compounds from gibberellin synthesis to the production of even more phytyl. An analogy might be an accident blocking the flow of traffic on a major highway causing drivers to divert to alternate routes.

5.3 Anatomical studies

With regard to the anatomical studies, T_4 (paclobutrazol 100 ppm) has increased the number of palisade cells per unit length (0.35 mm) (8, 11, 13 and 28) compared to the rest of the treatments in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina*. The reason behind is paclobutrazol suppressed the cell wall thickening, decreased inter-cellular space and resulted in more number of cells per unit length compared to control. Paclobutrazol treatment increased the number of cells per unit area in the palisade of the leaf (6.58) compared to control (6.18) in *Amorphophallus campanulatus* (Gopi *et al.*, 2008).

5.4 Evaluation under indoor conditions

A distinct characteristic of many foliage plants is their ability to tolerate low light levels. Foliage plants have been predominately cultivated in shaded greenhouses. Finished plants can be directly placed in interiorscapes if produced under an appropriate light intensity or they must be acclimatized during the final production process (Conover and Poole, 1984; Chen *et al.*, 2001).

Acclimatization is a seriate process of adapting the plants to interior conditions. Light acclimatization improves the plant interior performance by lowering the light compensation point, thus reducing leaf abscission and maintaining the aesthetic values during interiorscape (Chen *et al.*, 2005a; Fonteno and McWilliams, 1978; Reyes *et al.*, 1996; Yeh and Wang, 2000).

Production of plants under reduced light levels, however, may modify some morphological traits such as increasing internode length, which may affect the plant's aesthetic appearance, especially of some woody ornamental plants like *Ficus* and *Schefflera* (Kubatsch *et al.*, 2006). To reduce rapid internode elongation and improve appearance under a low light level, plant growth retardants have been used as a foliar spray or soil drench (Davis, 1987).

Under indoor conditions, observations were recorded on the interior performance. All the observations were repeated under indoor conditions. The results were same as under shade house conditions in all the parameters observed (both qualitative and quantitative characters).The effect of growth retardants retained even after shifting to the indoor environment. Chlorophyll content was increased thereby improving the appearance. Quality rating was also high in the plants treated with growth retardants. It improved the indoor life of foliage plants.

In *Scindapsus aureus,* the highest indoor life was observed in T_2(ancymidol 1000 ppm) (62 days) and the lowest indoor life was observed in T_5(B-Nine 1000 ppm) (50 days) and T_9 (control) (50 days). These results are in confirmation with the findings of Barrett and Nell (1983).

In *Ficus benjamina,* the highest indoor life was observed in T_4(paclobutrazol 100 ppm) (62 days) and the lowest indoor life was observed in T_2(ancymidol 1000 ppm) (50 days), T_6(B-Nine 2000 ppm) (50 days), T_7(CCC 1000 ppm) (50 days) and T_9(control) (50 days). These results are in confirmation with the findings of Li *et al.* (2009), where the foliar application of paclobutrazol (50 and 150 ppm) reduced internode length of *Pachira aquatica* thereby resulting in plants with reduced canopy height and width and more compact growth form. Plants with the compact growth form did not grow substantially, dropped fewer leaflets, and thus maintained their aesthetic appearance after placement indoors for 6 months.

In the present study, paclobutrazol 100 ppm was proven to be effective in retarding growth of selected foliage plants followed by CCC 1000 ppm, paclobutrazol

50 ppm and ancymidol 1000 ppm. As the cost of application of paclobutrazol is less, it can be used as an effective growth retardant for the improvement of quality of foliage plants. Though the cost of application of cycocel per plant is more, there will be an increase in the quality of foliage plants which in turn fetches good price in the market.

The study reveals a differential response of the selected species towards the growth retardant treatments. The response varies with the species and growth retardants used. Hence specific studies with respect to the growth retardants and plant species will be required. Further the effect of growth retardants on branching and comparison of growth retardants effect with pruning on various species could be studied.

Summary

6. SUMMARY

The investigations were carried out with an objective to determine the effect of application of growth retardants on plant canopy and subsequent interior performance of selected foliage plants. The experiment was conducted in the Department of Pomology and Floriculture, College of Horticulture for a period of 6 months under shade house from August 2013 to January 2014 and then shifted to indoor conditions for further evaluation. The result of the experiment is summarized below.

1. Among the different growth retardants, plant height was reduced to the maximum extent by T_7(CCC 1000 ppm) in *Dieffenbachia amoena*(42.59 cm) and *Dracaena sanderiana* (32.64 cm) compared to control (69.46 cm and 61.22cm). The treatment T_4(paclobutrazol 100 ppm) reduced plant height in *Syngonium podophyllum* (225.50 cm), *Ficus benjamina*(41.79 cm) and *Schefflera arboricola* (34.10cm) compared to control (260.29 cm, 91.90 cm and 47.80 cm). In *Scindapsus aureus,* T_2(ancymidol 1000 ppm) reduced the plant height to the maximum (206.02 cm) compared to the control (261.65 cm).

2. Plant spread was effectively reduced by T_8 (CCC 2000 ppm) in *Dieffenbachia amoena*(48.54 cm) compared to control (62.51 cm). In *Dracaena sanderiana,* T_7(CCC 1000 ppm) reduced plant spread effectively (26.17 cm) compared to the control (29.93 cm). In *Ficus benjamina,* the highest plant spread was observed in T_2(ancymidol 1000 ppm) (32.51 cm) and the lowest was in T_8(CCC 2000 ppm) (38.27 cm). In *Schefflera arboricola,* the highest plant spread was observed in T_5(B-Nine 1000 ppm) (35.57 cm) and the lowest was in T_8(CCC 2000 ppm) (38.93 cm).

3. Among the different growth retardants, T_7(CCC 1000 ppm) effectively reduced the leaf length (24.63 cm) in *Dieffenbachia amoena* and the highest leaf length was in the plants treated with T_4(paclobutrazol 100 ppm) (29.83

cm). In *Syngonium podophyllum,* the lowest leaf length was in T_3 (paclobutrazol 50 ppm) (9.20 cm) and the highest was in T_9(control) (11.21 cm). In *Ficus benjamina,* the lowest leaf length was in T_4(paclobutrazol 100 ppm) (4.55 cm) and the highest was in T_9(control) (5.46 cm).

4. In *Dieffenbachia amoena,* the lowest leaf breadth was observed in T_7(CCC 1000ppm) (9.70 cm) and the highest leaf breadth was in T_3(paclobutrazol 50 ppm) (12.62 cm). In *Dracaena sanderiana,* the lowest leaf breadth was in T_4(paclobutrazol 100 ppm) (2.68 cm) and the highest was in T_9(control) (3.46 cm). In *Schefflera arboricola,* the lowest leaf breadth was in T_1(ancymidol 500 ppm) (11.84 cm) and the highest was in T_3(paclobutrazol 50 ppm) (13.22 cm).

5. In *Dieffenbachia amoena,* the lowest leaf area was in T_7 (CCC 1000 ppm) (196.81 cm^2) and the highest was in T_3(paclobutrazol 50 ppm) (317.35 cm^2). In *Syngonium podophyllum,* the lowest leaf area was in T_3(paclobutrazol 50 ppm) (49.06 cm^2) and the highest was in T_9(control) (66.62 cm^2). In *Scindapsus aureus,* the lowest leaf area was in T_4(paclobutrazol 100 ppm) (49.49 cm^2) and the highest was in T_9(control) (60.98 cm^2). In *Ficus benjamina,* the lowest leaf area was in T_4(paclobutrazol 100 ppm) (10.89 cm^2) and the highest was in T_9(control) (13.88 cm^2). In *Schefflera arboricola,* the lowest leaf area was in T_1(ancymidol 500 ppm) (119.76 cm^2) and the highest was in T_8(CCC 2000 ppm) (154.91 cm^2).

6. Among all the growth retardants, in *Dieffenbachia amoena,* the internodal length was effectively reduced by T_2(ancymidol 1000 ppm) (1.66 cm) and the highest was in T_9(control) (3.05 cm). In *Dracaena sanderiana,* the lowest internodal length was observed in T_7(CCC 1000 ppm) (2.39 cm) and the highest was in T_9(control) (3.58 cm).

7. In *Syngonium podophyllum,* the lowest internodal length was observed in T_4(paclobutrazol 100 ppm) (2.86 cm) and the highest was in T_9(control) (4.43 cm). In *Scindapsus aureus,* the lowest internodal length was observed in T_4(paclobutrazol 100 ppm) (3.81 cm) and the highest was in T_7(CCC 1000 ppm) (5.73 cm).

8. In *Ficus benjamina,* the lowest internodal length was observed in T_4(paclobutrazol 100 ppm) (2.30 cm) and the highest was in T_9(control) (3.24 cm). In *Schefflera arboricola,* the lowest internodal length was in T_2(ancymidol 1000 ppm) (1.67 cm) and the highest was in T_9(control) (3.20 cm).

9. The petiole length was effectively reduced by T_8(CCC 2000 ppm) in *Dieffenbachia amoena* (13.69 cm) compared to the control (16.88 cm). In *Dracaena sanderiana,* the lowest petiole length was observed in T_7(CCC 1000 ppm) (4.85 cm) compared to the control (6.96 cm).

10. In *Syngonium podophyllum,* the lowest petiole length was observed in T_3(paclobutrazol 50 ppm) (19.70 cm) compared to control (23.32 cm). In *Scindapsus aureus,* the lowest petiole length was observed in T_3(paclobutrazol 50 ppm) (6.35 cm) compared to the control (7.81 cm).

11. In *Ficus benjamina,* the lowest petiole length was observed in T_1(0.92 cm) and the highest was in T_8(CCC 2000 ppm) (1.20cm). In *Schefflera arboricola,* the lowest petiole length was observed in T_1(ancymidol 500 ppm) (9.11 cm) compared to the control (10.71 cm).

12. In *Scindapsus aureus,* the petiole girth was effectively reduced by T_4(paclobutrazol 100 ppm) (0.93 cm) compared to the control (1.36 cm).

13. Leaf producing interval was significantly different among the treatments in the foliage plants selected for the study. Among the different treatments, the

longer interval in the leaf production was observed in the plants treated with T_1 (ancymidol 500 ppm) in *Dieffenbachia amoena* (29.93 days) and in *Ficus benjamina*(16.63 days), T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum* (14.00 days) and in *Scindapsus aureus* (12.10 days), T_4 (paclobutrazol 100 ppm) in *Dracaena sanderiana* (29.93 days) and in *Schefflera arboricola*(29.20 days).

14. The leaf production at shorter intervals was observed in the plants treated with T_4 (paclobutrazol 100 ppm) in *Scindapsus aureus*(10.06 days) and *Ficus benjamina* (10.06 days), T_7 (CCC 1000 ppm) in *Dracaena sanderiana*(18.93 days) and in *Syngonium podophyllum* (12.63 days) and T_8 (CCC 2000 ppm) in *Dieffenbachia amoena*(21.10 days)and *Schefflera arboricola* (18.90 days) respectively.
15. In *Dieffenbachia amoena,* the highest leaf longevity was observed in T_8(CCC 2000 ppm) (133 days) and the lowest leaf longevity was in T_5(B-Nine 1000 ppm) (111.33 days). In *Dracaena sanderiana,* the highest leaf longevity was observed in T_8(CCC 2000 ppm) (240.66 days) and the lowest (230.33 days) was in T_2(ancymidol 1000 ppm) and T_4(paclobutrazol 100 ppm).
16. In *Syngonium podophyllum,* the highest leaf longevity was observed in T_3(paclobutrazol 50 ppm) (78 days) and the lowest leaf longevity (62 days) was observed in T_6(B-Nine 2000 ppm) and T_9(control). In *Scindapsus aureus,* the highest leaf longevity was observed in T_1(ancymidol 500 ppm) (186.33 days) and the lowest was in T_6(B-Nine 2000 ppm) (172.33 days).
17. In *Ficus benjamina,* the highest leaf longevity was in T_4(paclobutrazol 100 ppm) (74.20 days) and the lowest was in T_9(control) (69.93 days). In *Schefflera arboricola,* the highest leaf longevity was observed in T_1(ancymidol 500 ppm) (162.33 days) and the lowest was in T_8(CCC 2000 ppm) (154 days).

18. The highest plant quality rating (9.3) based on growth and full ness was observed in the plants treated with T_1 (ancymidol 500 ppm) and T_2 (ancymidol 1000 ppm) in *Scindapsus aureus*, T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum*, T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum, Scindapsus aureus, Ficus benjamina*and *Schefflera arboricola*, T_7 (CCC 1000 ppm) in *Dieffenbachia amoena,* and *Dracaena sanderiana,* T_8 (CCC 2000 ppm) in *Syngonium podophyllum* and*Scindapsus aureus.* The lowest plant quality rating (5.5) was recorded in the plants treated T_5(B-Nine 1000 ppm), T_6(B-Nine 2000 ppm) and T_9(control) in *Dracaena sanderiana* and *Ficus benjamina.*

19. Based on pigmentation, the highest plant quality rating (9.1) was recorded in the plants treated with T_4 (paclobutrazol @ 100ppm) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.*The lowest plant quality rating (6.7) was observed in T_9 (control) in all the plants selected for the study.

20. The total chlorophyll content was the highest in the plants treated with the treatment T_4 (paclobutrazol 100ppm) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina* (0.7788 mg/g, 1.6111 mg/g, 0.9790mg/g and 1.5912 mg/g).

21. With regard to the anatomical studies, the plants treated with T_4 (paclobutrazol 100 ppm) were observed with the highest number of palisade cells per unit length (0.35 mm) (8, 11, 13 and 28) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina*. The lowest number of palisade cells per unit length (0.35 mm) (7, 10, 12, and 27) as observed in T_9 (control) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.*

22. The number of leaves was not affected by growth retardant application.

23. Under indoor conditions, the plant height was effectively reduced by T_7(CCC 1000 ppm) in *Dieffenbachia amoena*(44.81 cm) compared to the control (76.48 cm). In *Dracaena sanderiana,*the lowest plant height was observed in T_7(CCC 1000 ppm) (33.50 cm) compared to the control (69.92 cm). In *Syngonium podophyllum,* the lowest plant height was in T_4(paclobutrazol 100 ppm) (287.30 cm) compared to the control (334.09 cm). In *Scindapsus aureus,* the lowest plant height was observed in T_2(ancymidol 1000 ppm) (259.64 cm) compared to control (338.47 cm). In *Ficus benjamina,* the lowest plant height was observed in T_4(paclobutrazol 100 ppm) (47.03 cm) and the highest was in T_9(control) (107.64 cm). In *Schefflera arboricola,* the lowest plant height was observed in T_4(paclobutrazol 100 ppm) (34.86 cm) and the highest was in T_9(control) (51.47 cm).

24. The plant spread was effectively reduced by T_8(CCC 2000 ppm) in *Dieffenbachia amoena* (49.57 cm) compared to the control (66.66 cm). In *Dracaena sanderiana,*the T_7(CCC 1000 ppm) effectively reduced plant spread (26.94 cm) compared to the control (31.58 cm). In *Ficus benjamina,* the T_2(ancymidol 1000 ppm) (32.54 cm) effectively reduced plant spread and the highest plant spread was observed in T_8(CCC 2000 ppm) (39.53 cm). In *Schefflera arboricola,* the lowest plant spread was observed in T_5 (B-Nine 1000 ppm) (36.43 cm) and the highest was observed in T_8(CCC 2000 ppm) (39.72 cm).

25. Among the different treatments, in *Dieffenbachia amoena,* the lowest leaf length was observed in T_7(CCC 1000 ppm) (24.95 cm) and the highest leaf length was in T_3(paclobutrazol 50 ppm) (30.34 cm). In *Syngonium podophyllum,*the lowest leaf length was observed in T_3(paclobutrazol 50 ppm) (9.50 cm) and the highest was in T_9(control) (11.89 cm). In *Ficus benjamina,* the lowest leaf length was observed in T_4(paclobutrazol 100 ppm) (4.60 cm) and the highest was inT_9(control) (5.61 cm).

26. In *Dieffenbachia amoena,* the lowest leaf breadth was observed in T_7(9.93 cm) and the highest was in T_3(paclobutrazol 50 ppm) (12.97 cm). In *Dracaena sanderiana,*the lowest leaf breadth was observed in T_4(paclobutrazol 100 ppm) (2.74 cm) and the highest was in T_9(control) (3.58 cm). In *Schefflera arboricola,* the lowest leaf breadth was observed in T_1(ancymidol 500 ppm) (12.20 cm) and the highest leaf breadth was in T_8(CCC 2000 ppm) (14.34 cm).

27. In *Dieffenbachia amoena,* the lowest leaf area was observed in T_7(CCC 1000 ppm) (205.59 cm^2) and the highest was in T_3(paclobutrazol 50 ppm) (331.81 cm^2). In *Syngonium podophyllum,* the lowest leaf area was observed in T_3(paclobutrazol 50 ppm) (53.41 cm^2) and the highest was in T_9(control) (77.20 cm^2). In *Scindapsus aureus,* the lowest leaf area was observed in T_4(paclobutrazol 100 ppm) (52.78 cm^2) and the highest was in T_9(control) (68.43 cm^2). In *Ficus benjamina,* the lowest leaf area was in T_4(paclobutrazol 100 ppm) (11.21 cm^2) and the highest was in T_9(control) (14.82 cm^2). In *Schefflera arboricola,* the lowest leaf area was observed in T_1(ancymidol 500 ppm) (129.28 cm^2) and the highest leaf area was in T_8(CCC 2000 ppm) (169.06 cm^2).

28. Among the different treatments, the internodal length was effectively reduced by T_2(ancymidol 1000 ppm) in *Dieffenbachia amoena*(1.68 cm) and the highest internodal length was in T_9(control) (3.51 cm). In *Dracaena sanderiana,* the lowest internodal length was in T_7 (CCC 1000 ppm) (2.51 cm) and the highest was in T_9(control) (4.06 cm). In *Syngonium podophyllum,* the lowest internodal length was observed in T_4(paclobutrazol 100 ppm) (3.07 cm) and the highest was in T_9(control) (5.13 cm). In *Scindapsus aureus,* the lowest internodal length was observed in T_4(paclobutrazol 100 ppm) (3.83 cm) and the highest was in T_7(CCC 1000 ppm) (6.45 cm). In *Ficus benjamina,* the lowest internodal length was observed in T_4(paclobutrazol 100

ppm) (2.32 cm) and the highest was in T_9(control) (3.56 cm). In *Schefflera arboricola,* the lowest internodal length was in T_2(ancymidol 1000 ppm) (1.80 cm) and the highest was in T_9(control) (3.57 cm).

29. In case of leaf producing interval, in *Dieffenbachia amoena,* the longer leaf producing interval was observed in the plants treated with T_4 (paclobutrazol 100 ppm) (29.93 days) and the shorter leaf producing interval was observed in T_8 (CCC 2000 ppm) (21.13 days). In *Dracaena sanderiana,* longer leaf producing interval was observed in T_4 (paclobutrazol 100 ppm) (29.90 days) and shorter leaf producing interval was in T_7 (CCC 1000 ppm) (18.90 days).

30. In *Syngonium podophyllum*, the longer leaf producing interval was observed in T_3 (paclobutrazol 50 ppm) (14.03 days) and shorter leaf producing interval was observed in T_7 (CCC 1000 ppm) (12.60 days). In *Scindapsus aureus,* the longer leaf producing interval was observed in T_3 (paclobutrazol 50 ppm) (12.07 days) and the shorter leaf producing interval was observed in T_4 (paclobutrazol 100 ppm) (10.01 days).

31. In *Ficus benjamina,* the longer leaf producing interval was observed in T_1 (ancymidol 500 ppm) (16.62 days) and the shorter leaf producing interval was observed in T_4 (paclobutrazol 100 ppm) (10.03 days). In *Schefflera arboricola,* the longer leaf producing interval was observed in T_4 (paclobutrazol 100 ppm) (29.20 days) and the shorter leaf producing interval was observed in T_8 (CCC 2000 ppm) (18.92 days).

32. In *Dieffenbachia amoena,* the lowest petiole length was observed in T_8 (CCC 2000 ppm) (13.79 cm) and the highest petiole length was observed in T_9 (control) (18.14 cm).In *Dracaena sanderiana,* plants treated with T_7 (CCC 1000ppm) showed the lowest petiole length (5.26 cm) and the highest petiole length was observed in T_9 (control) (7.97 cm).

33. In *Syngonium podophyllum,* the lowest petiole length was observed in T_3 (paclobutrazol 50 ppm) (19.85 cm) and the highest petiole length was observed in T_9 (control) (24.21 cm).In *Scindapsus aureus,* the plants treated with T_3 (paclobutrazol 50ppm) had shown the lowest petiole length (6.49cm) and the highest petiole length was observed in T_9 (control) (8.22 cm).

34. In *Ficus benjamina,* the lowest petiole length was observed in T_1 (ancymidol 500 ppm) (0.92 cm) and T_2 (ancymidol 1000 ppm) (0.92 cm) and the highest petiole length was observed in T_7 (CCC 1000 ppm) (1.24 cm) and T_8 (CCC 2000 ppm) (1.24 cm). In *Schefflera arboricola,* the lowest petiole length was observed in T_1(ancymidol 500 ppm) (9.21 cm) and the highest petiole length was observed in T_5(B-Nine 1000 ppm) (11.11 cm) and T_9 (control) (11.11 cm).

35. In *Scindapsus aureus,* the lowest petiole girth was observed in T_4 (paclobutrazol 100 ppm) (1.00 cm) and the highest petiole girth was observed in T_9 (control) (1.43 cm).

36. In *Dieffenbachia amoena,* the highest indoor life was observed in T_7 (CCC 1000ppm) (62 days) and the lowest indoor life was observed in T_4 (paclobutrazol 100 ppm) (50 days) and T_5 (B-Nine 1000 ppm) (50 days). In *Dracaena sanderiana*, the highest indoor life was observed in T_2 (ancymidol 1000 ppm) (57 days) and T_7 (CCC 1000 ppm) (57 days) and the lowest indoor life was observed in T_4 (paclobutrazol 100ppm) (49 days) and T_6 (B-Nine 2000 ppm) (49 days).

37. In *Syngonium podophyllum,* the highest indoor life was observed in T_4(paclobutrazol 100 ppm) (62 days) and the shortest indoor life was observed in T_1(ancymidol 500 ppm) (50 days) and T_7 (CCC 1000 ppm) (50 days). In *Scindapsus aureus,* the highest indoor life was observed in

T_2(ancymidol 1000 ppm) (62 days) and the lowest indoor life was observed in T_5(B-Nine 1000 ppm) (50 days) and T_9 (control) (50 days).

38. In *Ficus benjamina,* the highest indoor life was observed in T_4(paclobutrazol 100 ppm) (62 days) and the lowest indoor life was observed in T_2(ancymidol 1000 ppm) (50 days), T_6(B-Nine 2000 ppm) (50 days), T_7(CCC 1000 ppm) (50 days) and T_9(control) (50 days). In *Schefflera arboricola,* the highest indoor life was observed in T_1(ancymidol 500 ppm) (62 days) and T_4(paclobutrazol 100 ppm) (62 days) and the lowest indoor life was observed in T_5(B-Nine 1000 ppm) (51 days) and T_8(CCC 2000 ppm) (51 days).

39. The highest plant quality rating (9.3) based on growth and full ness was observed in the plants treated with T_1 (ancymidol 500 ppm) and T_2 (ancymidol 1000 ppm) in *Scindapsus aureus,* T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum,* T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum, Scindapsus aureus, Ficus benjamina*and *Schefflera arboricola,* T_7 (CCC 1000 ppm) in *Dieffenbachia amoena,* and *Dracaena sanderiana,* T_8 (CCC 2000 ppm) in *Syngonium podophyllum* and*Scindapsus aureus.* The lowest plant quality rating (5.5) was recorded in the plants treated T_5(B-Nine 1000 ppm), T_6(B-Nine 2000 ppm) and T_9(control) in *Dracaena sanderiana* and *Ficus benjamina.*

40. Based on pigmentation, the highest plant quality rating (9.1) was recorded in the plants treated with T_4 (paclobutrazol @ 100ppm) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina.*The lowest plant quality rating (6.7) was observed in T_9 (control) in all the plants selected for the study.

41. The total chlorophyll content was the highest in the plants treated with the treatment T_4 (paclobutrazol 100 ppm) in *Dieffenbachia amoena, Dracaena*

sanderiana, Scindapsus aureus and *Ficus benjamina* (0.7785 mg/g, 1.6108 mg/g, 0.9760mg/g and 1.5909 mg/g).

42. With regard to the anatomical studies, under indoor conditions, the plants treated with T_4 (paclobutrazol 100 ppm) were observed with the highest number of palisade cells per unit length (0.35 mm) (8, 11, 13 and 28) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina*. The lowest number of palisade cells per unit length (0.35 mm) (7, 10, 12, and 27) as observed in T_9 (control) in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina*.

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Appendix

APPENDIX – 1

Weather data of the shade house

Months (Aug 2013 to Jan 2014)	1st week			2nd week			3rd Week			4th Week		
	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)
1	28.30	77.60	6214.30	27.80	75.83	6123.12	30.30	76.73	6321.23	26.70	77.20	6027.83
2	26.83	79.23	5470.22	26.70	78.32	5370.23	27.30	79.12	5481.33	27.98	78.31	5299.82
3	26.72	73.13	6387.33	25.80	72.83	6388.31	26.99	72.99	6299.33	26.21	73.32	6312.88
4	28.82	70.32	9998.93	27.81	71.32	9982.33	27.20	71.82	9981.72	27.36	71.93	9970.43
5	27.23	60.12	9990.75	26.31	61.33	9981.70	26.72	60.32	9970.82	27.36	60.53	9980.23
6	26.32	57.32	9490.32	26.76	56.83	9491.32	27.22	56.92	9482.31	27.31	57.12	9430.33

Weather data of the indoor experiment site

Months (Aug 2013 to Jan 2014)	1st week			2nd week			3rd Week			4th Week		
	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)	Temp. (^{0}C)	Rel. Humidity (%)	Light (lux)
1	25.20	90.73	1045.33	25.12	90.63	1043.35	25.32	91.02	1041.22	25.88	90.82	1045.22
2	26.20	90.43	1065.15	26.22	90.23	1073.24	25.99	90.42	1075.45	25.43	90.13	1074.23

CANOPY MANAGEMENT IN FOLIAGE PLANTS FOR INTERIORSCAPING

By

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ABSTRACT OF THE THESIS
Submitted in partial fulfilment of the requirement for the degree of

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ABSTRACT

The study on "Canopy management in foliage plants for interiorscaping" was conducted during 2013-2014 in the Department of Pomology and Floriculture, College of Horticulture, Vellanikkara. The main objective of the study is to determine the effect of application of growth retardants on plant canopy and subsequent interior performance of selected foliage plants.

Six species of foliage plants viz., *Dieffenbachia amoena* and *Dracaena sanderiana* (Upright type), *Syngonium podophyllum* and *Scindapsus aureus* (Climbing type), *Ficus benjamina* and *Schefflera arboricola* (Tree like) were selected for the study. The selected foliage plants were kept under greenhouse with 50% shade. Growth retarding chemicals viz., ancymidol, paclobutrazol, B-nine and cycocel with two concentrations each, were applied at three months and six months after planting. Observations on quantitative and qualitative characters were recorded. Chlorophyll content estimation and anatomical studies were conducted using standard procedures. The plants were shifted under indoor conditions with 800 – 2000 lux light intensity and observations were recorded as earlier.

Among the quantitative characters, the plant height was lowest in T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum* and tree like plants and in T_7 (cycocel 1000 ppm) in upright plants and T_2 (ancymidol 1000 ppm) in *Scindapsus aureus* with the highest in control. The lowest plant spread was due to T_7 (cycocel 1000 ppm) in *Dracaena sanderiana* and T_8 (cycocel 2000 ppm) in *Dieffenbachia amoena* with the highest in control. The lowest leaf length was observed in T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum* and T_4 (paclobutrazol 100 ppm) in *Ficus benjamina* compared to control. The T_4 (paclobutrazol 100 ppm) had shown lowest leaf breadth in *Dracaena sanderiana* with a significant difference from rest of the treatments. The lowest leaf area was observed in T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum* and T_4 (paclobutrazol 100 ppm) in *Scindapsus aureus* and *Ficus benjamina* compared to control.

The lowest internodal length was observed in T_2 (ancymidol 1000 ppm) in *Dieffenbachia amoena* and *Schefflera arboricola,* T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum* and *Ficus benjamina* and T_7 (CCC 1000 ppm) in *Dracaena sanderiana.* The

lowest petiole length was observed in T_1 (ancymidol 500 ppm) in *Schefflera arboricola,* T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum* and *Scindapsus aureus,* T_7 (CCC 1000 ppm) in *Dracaena sanderiana* and T_8 (CCC 2000 ppm) in *Dieffenbachia amoena* compared to control. The lowest petiole girth was observed in T_4 (paclobutrazol 100 ppm) in *Scindapsus aureus compared to control.*The highest leaf longevity was observed in T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum* and T_4 (paclobutrazol 100 ppm) in *Ficus benjamina.* The number of leaves and leaf producing interval were not influenced by the treatment application.

The plants were rated based on visual appearance. The highest plant quality rating based on growth and full ness was observed in T_1 (ancymidol 500 ppm) and T_2 (ancymidol 1000 ppm) in *Scindapsus aureus,* T_3 (paclobutrazol 50 ppm) in *Syngonium podophyllum,* T_4 (paclobutrazol 100 ppm) in *Syngonium podophyllum, Scindapsus aureus, Ficus benjamina* and *Schefflera arboricola,* T_7 (CCC 1000 ppm) in *Dieffenbachia amoena,* and *Dracaena sanderiana,* T_8 (CCC 2000 ppm) in *Syngonium podophyllum* and *Scindapsus aureus* compared to the rest of the treatments. The treatment T_4 (paclobutrazol 100 ppm) has shown highest plant quality rating based on pigmentation, chlorophyll content and higher number of palisade cells per unit length in *Dieffenbachia amoena, Dracaena sanderiana, Scindapsus aureus* and *Ficus benjamina* compared to the rest of treatments.

When the plants were shifted to the indoor conditions similar results were obtained. Indoor life was highest in T_2 (ancymidol 1000 ppm) in *Scindapsus aureus* and T_4 (paclobutrazol 100 ppm) in *Ficus benjamina* compared to the control. By the application of growth retardants the foliage plants could be made more compact which their quality as indoor plants. Chlorophyll content was increased thereby improving the appearance. Quality rating was also high in the plants treated with growth retardants. It improves the indoor life of foliage plants.

Paclobutrazol 100 ppm was proven to be effective in retarding growth of selected foliage plants followed by CCC 1000 ppm, paclobutrazol 50 ppm and ancymidol 1000 ppm. As the cost of application of paclobutrazol is less, it can be used as an effective growth retardant for the improvement of quality of foliage plants. Though the cost of application of cycocel per plant is more, there will be an increase in the quality of foliage plants which in turn fetches good price in the market.