ENVIRONMENTAL AND ECONOMICALLY STUDY ON SOME RARE ORNAMENTAL TREES.

By

RASHA MOHAMMAD MAHMOUD ISMAIL

B.Sc.Agric.(Horticulture)

Ain shams University,(2002)

A thesis submitted in partial fulfillment

Of

The requirements for the Master degree in

Environmental Sciences

Department of Agricultural Scienece

Institute of Environmental Studies and Research

Ain Shams University

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Abstract

Environmental and Economically study on some rare Ornamental trees.

By: Rasha Mohammed Mahmoud.

The present study was carried aut at Orman Botanic garden in Giza, horticulture research institute, Ministry of Agriculture, during 2008 – 2010.

. This experiment was carried out to study the effect of different growth regulators on the propagation of cuttings and seeds of *pterygota alata* and *cordia macloedii* trees. Treating hard wood cuttings with IBA (1000-2000 ppm) or NAA (500-750 ppm) concentrations increased rooting percentage up to 47 and 67% respectively comparing with nil in the control. There were no significant differences between the two types of hormones on the number of leaves, number of roots or root length. Also treating seeds with GA_3 at (100-200 ppm) concentration increased germination percentage up to 64% comparing with nil the control. Heigh concentrations of "GA_3" increased significantly fresh weight of leaves, number of root and roots length.

Contents

Introduction

Woody trees play an important role in our life so the need of these trees is gradually increased by time. Egypt depends mostly on importing woods which costs several millions of dollors every year. Woody trees are used as shelterbelts, windbreaks, forestry plantation for sand dune fixation and erosion control. Moreover growing trees without no doubt improve the weather conditions. Trees are used for shade and beauty in avenues and streets "**Bailey and Bailey 1935**".

[1] *Cordia macloedii*. L. family: Boraginaceae. Native of plant tropical, west indies. A bushy ornamental tree with Penni-nerved, rounded arat, long petioled leaves and lax carymbose inflorescences. Composed of distant. Lemon yellow flower **"worda H. Bircher ph 1960".**

Many cordias have fragrant showy flowers and are popular in gardens although they are not especially hardy. A number of the tropical species have edible fruits knawn by awide variety of names induding clammy glue or snolly gobbles in India the fruil of local species are used avegetable, raw cooked or pickled **"D.Brandis, illustrations 1874 ".**

[2] *Pterygota alata* R.Br “sterculia *alata* sterculiaceae native india, south east Asia, Burma, Malay peninsula . Alarge beautiful, decidious tree. L cordate at base, broad, ovade entire glabrous, reacemes rusty. Tomentosa calyx companulate, divided half- way into 5-6 segments fruit with dehiscent carpels containing oblong winged seeds which are eaten roasted like chestnuts, the tree is sometimes used for avenues and wood made into matches it is very well adapted to the climate of middle Egypt and has grown to a high tree at the station of El saff where it has been raised from seed leaf stands, lopping well

grow, fast and its suitable as an avenues tree but needs a rather heavy fertiles soil **" Alfred G.Bircher and Warda Bircher with Viv Tackholm.** Flower of *pterygota alata* April." Edible nuts and seeds.

- Soures of edible gum and monnar " **Alfreed and worda**" .
- Important uses to pterygota emergent to canopy tree in distrubed every green forests up to 70m and seeds are usful and plant used medicinally in india.**Bnnett and Br.,Pl. Jav .Rar1997**.

This study aimed to get the high percentage of germination, good rooted cuttings high quality seedlings of two plants namely *cordia macloedii* and *pterygota alata* therefore four experiments, were done to study the effect of pretreatment, seeds sowing and date of seeds collection as well as the effect of some rooting hormones, to determine the best pretreatment of seeds and the treatment of cuttings to obtain better rooting and seedlings growth.

Review of literature

I – Propagation of cutting:

Roncatto, et al, (2008) stated that greenhouse studies were conducted to verify the obtainment potential of cutting propagation of passiflora edulis, *pterygota alata*, *p.giberti*, *p.nitida* and *p. setacea* rootstocks under 50% of shading and intermittent nebulization chamber conditions. The cutting were collected from adult plants and from commercial orchards. The intermediate part of the last growth branches in the growth stage and her beceous cutting with 15 cm, 3 nodes and half leaves wrer collected, the cutting wrer treated with IBA at 500, 1000, and 2000 mg/Litre concentrations and without IBA " control ", and cultirated in plastic trays with vermiculite for 60 days. The rooting percentage was better for p. Edulis. Inspring " October " with 76.7% without using IBA " control " *pterygota alata* and *p. nitida* rooted in the different seasons using 500mg IBA/ litre. P. Giberti rooted in spring, but without using IBA. The number and length of roots was higher in ocrober. The surrival rate as well as dead cutting was higher in june 2008. setace a dednot root.

Tworkoski and taked a (2007) cleared that the current year shoot cuttings were collected in October and August from three growth habits of peach " compact" pillar, and standard " and treated with one of four concentrations of indole butyric acid (0, 250 , 1250, and 2500 mg/l IBA). Rooting response was measured after 5 weeks in the green house. Little or no rooting occurred with cuttings from any growth habit that was collected in October or in August when treated with 0 and 2500 mg / l IBA . in August, the number of shoots that rooted was greater in cuttings from pillar (79 – and 45 %) than compact (13 and 3%) treated with 250 and 1250 mg/L IBA, respectively. cuttings from

standard trees had intermediate rooting of 56 and 6% at 250 and 1250 mg/L IBA, respectibvely pillar trees consistently grew more roots with greater root length per cutting than the other growth habits. It is proposed that differences in rooting response among the growth habits may be associated with differences in endogenous auxin concentration that had been found in previous stadies. Within peach and possiby other fruit tree, the capacity of shoot cuttings to develop adventitious roots can very by cultivar and successful root induction with exogenous plant, growth regulators may depend, in part, on endogenous hormone levels.

Suresh et al; (2007) found the propagation of important forest plant species, v.z. Attandia monophylla, Crataeva religiosa, crecentia cujetae, Helictres isora, toona dilatc, wrightia tinctoria was stadied at different environmental conditions. To stimulate the growth of cuttings, IBA ans NAA (auxins) were used (1000 IBA + 500 NAA). Plants cultivated under greenhous conditions showed better results than in the open field conditions. Amany then, the hormone treated plant. Grow well than the control. The results. Showed that the application of grow the regulators (IBA and NAA) resulted in the development of best root and shoot length in all the plant species when compared to the controls. The results also showed that there were significant differences in rooting percentage while comparing the plants growth treated and untreated plants species grown in the green house and open field conditions.

Reddy etal. (2006) studied the efficacy of IBA on *pelargonium graveolens* cuttings and found out the best month for rooting to obtain the maximum success treatments comprised 500, 1000, 2000 and 2500 ppm IBA prepared in lanolin paste they found that November planting

gave the highest percentage of rooting (79, 97%), closely followed by December (78.25%) Rooting percentage was lowest in August planting followed by September planting As for the highest rooting percentage seemed to coincide with the maximum temperature of 30.1 degree C and minimum temperature of 14.8 degrees C in November. The lowest rooting percentage coincided with the maximum temperature range "29.40 – 33.20" degree C and minimum temperature range "22.00 – 21.62 %" In August and September, res pectiely. IBA at 200 ppm had the highest rooting percentage (82.12%) the highest rooting percentage was recorded with 200 ppm IBA treatment in November (97 – 77%) closely followed by December. Nobember recorded the maximum number of roots (44.83) and the longest root (37.70 cm). IBA at 2000 IBA at 200 ppm recorded the highest root number (41.17), while August recorded the shortest roots (12.55cm). survival percentage was highest in November, followed by December, with 2000 ppm IBA Based on these results, geranium could be propagated through cuttings by treating with IBA at 2000 ppm in November to obtain maximum success.

Singh et al. (2006) on their studies on Fig Cv. Daulatabad cuttings treated with IBA (500, 100 and 1500 ppm) under mist condition as resulted in significatnt affect on rooting traits, i.e. days of first sprouting and number of roots per cutting by IBA treatment, compared with the other traits. IBA at 1500 ppm resulted in the best rooting response of fig in the mist chamber.

Tripathi et al. (2006) studied the effects of NAA (500 and 1000 ppm) on the rooting of stools in different apple rootstocks and crab apple (Malus baccuta) they concluded that NAA treatment increased the number of perstool but decreased both rooting percentage

and root length compared with the untreated control. They added that, all parameters decreased when the higher concentration of NAA was applied.

Bharmal etal; (2005) investigated the effect of 3 levels of IBA (1000, 2000 and 3000 ppm) and control without IBA application on chrysanthemum morifolium by quick dip method of cuttings. They conduded that a common treatment of 2 sprays of 10 ppm IBA after 30 and 60 days of transplanting was included with 200 ppm IBA treatment as aquick dip method of planting cuttings was significantly superior over the other IBA treatments and control by recording the highest number of primary roots (20, 85), survival percentage (96.57%) after 30 days of planting, primary (8.12) and secondary branching (19.68) early buttoning (79.66) early flowering (131.70), days from buttoning to flowering (51.21) and flower quality in respect to flower diameter (3.76 cm), weight of 10 flower (30.60 gm) and marke table flower yield (768.49 g/ha).

Hamooh (2005) cleared that IBA treatment up to 500 ppm significantly increased root number but had no significant effect on root length of Saudi Arabian grapevine. Rooted cuttings were planted in an open field for further evaluation. These findings may facilitate the clonal propagation of this valuable species at Al-maddina Al monworah region of Saudi Arabia.

Kazankaya etal; (2005) worked on hardwood cuttings of *Rosa canina* which werer collected in November , December, Jaunary and February and Rooted in perlite medium using 0, 1000 , 2500, 5000 or 10000 ppm IBA. They found that, highest rooting (65 – 70%) was obtained in cuttings collected in November and treated with 250 ppm

IBA, whereas, cuttings collected in February and treated with 1000 ppm IBA showed the lowest rooting (2.5%).

Nazrul (2005) studied the, Influence of IBA, water. Soaking and node number on rooting and morphological characteristics of grapevine cutting under intermittent mist which gave the highest rooting (50%) prpducing the maximum number of roots, buds shoots and leaves. Water soaking for 24 hours gave higher rooting (43.00%) than that of fresh cuttings. IBA did not improve the extent of rooting in grapevine cutting.

Pacholezak etal. (2005) conducted an experiment on several species of ornamental shrubs: stock plants were sprayed with NAA in concentrations of 50 – 1000 mg dm – 3 for 24 hours prior to cuttings harvest. Besides, commercial rooting powders were Rhizopone AA and ukorzeniacz AB, containing IBA and NAA, respectively the degree of rooting and percentage of rooting were evaluated. Root formation depented on the species tested, the auxin used and its concentration as well as on the method of hormone application. They concluded that, spraying stock plants with NAA in the range of concentration of 50 – 500 mg. Dm – 3 was the effective way auxin application in ornamental shrub propagation comparable to the traditional use of rooting powders.

Hmooh (2004) studied the effects of cutting type (basal, intermediate and terminal) and IBA concentration (1500, 3000 and 5000 ppm) on the rooting ability of hard wood cuttings of fig. He found that basal root cuttings recorded the highest root number regardless of IBA concentration. IBA concentration had non significant effects on the number of roots of the cuttings, although a reduction in the root number was observed with 5000 ppm IBA application. Root fresh and dry weights were higher in the basal cuttings.

Bly the etal (2004) concluded that terminal cuttings of *Agluonema modestum* schott ex engler treated with the basal quick dip (4920 μ m IBA + 2685 μ MNAA) produced 9.5 roots per cuttings and total root length of 386 mm, while untreated cuttings produced 6.1 roots per cuttings and total root length of 270 mm mean while, two mode cuttings of Gardenia august a L . Merrill " Radicans " *Gardenia jasminoids Ellis* " Radicans " treated with the basal quick dip produced 9.1 roots per cuttings and total root length of 311 mm, untreated and sprayed cuttings produced similar or lesser results as low as 5.2 roots per cuttings and total root length of 66 mm for untreated cuttings.

Zaky (2003) found that, spring was the best season for planting the cuttings of *phyllanthes atropurpurea*, *Hibiscus rosa* – sinensis and *tecoma stans* which gave the maximum percentage of rooting stimulated root growth and development, the tallest branches, the highest number of leaves and the highest percentage of carbohydrates in leaves. Treating the cuttings with IBA and IAA each at 400 ppm resulted in increasing the rooting percentage, root number at all of then, resulted in the best rooting percentage the longest root. The highest root number, the tallest branches and increased the leaf number fo *phyllanthus atropurpurea*. Reasults showed that IBA was more effective than IAA for rooting percentage ane root number for *Tecoma stans*. The cuttings which were taken in spring, contained the highest total indoles while those of autumn contuined the highest total phenols for phyllanthus atropurpurea.

Aminah (2003) applied, IBA dissolved in 50% ethyl alcohol (0 , 30 , 60 and 90 microg per cutting) malaccense taken from 6- month – old potred seedling. It was found that the application of IBA significantly increased the speed of rooting of roots per cuttings. At the