PHYSIOLOGICAL STUDIES ON THE PROPAGATION OF SOME ORNAMENTAL PLANTS

By

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B. Sc. Agric. Sc. (Horticulture), Ain Shams University, 2002

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ABSTRACT

Nermen Mahdy Taha El-Sayed Badawy: Physiological Studies on the Propagation of Some Ornamental Plants. Unpublished M. Sc. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2010.

This experiment was carried out to study the effect dipping of different concentrations of plant growth regulators with 4-indole-3-butyric acid (IBA) solution alone at (0, 2000, 3000 and 4000 ppm) or combined with Co-factor substances Cobalt Sulphate ($Co\ So_4$) solution and three different media treatments (peat moss, peat moss + sand and peat moss + perlite) on rooting some ornamental plants cuttings. (*Bougainvillea peruviana* var. Mary palmer and statice *Ficus binnendijkii* cv. Amstel queen) were investigated during the two successive seasons for both experiment of (2007/2008, 2008/2009). Two experiments laid out a complete randomized block design. Generally, the treatments with IBA alone at any concentration or with $Co\ So_4$ gave increases in the rooting percentage, number, length, fresh and dry weights of roots and leaves, as well as, total indoles per cutting. The treatments of IBA alone or combined with $Co\ So_4$ improved the vegetative and root growth, in all measurments investigated, in both seasons.

Data showed that the best treatment for first experiment on (*Bougainvillea peruviana* var. mary palmer) plant : in the rooting percentage, with IBA at 3000 ppm plus $Co\ So_4$ at 20 ppm treatment which gave (34.45 and 40.00 %); in addation, the peat moss medium only was better media which gave (25.01 and 30.00 %), compared with the other treatments, in the 1^{st} and 2^{nd} seasons, respectively. Also, for the roots length, the peat moss medium were presented best results of (14.99 and 16.43 cm), for the first and second seasons, in respect

order. Then, in the fresh weight of roots, the peat moss medium was better medium which produced (2.80 and 2.72 g), in the 1st and 2nd seasons, resprctively. On different, for the dry weight of roots, the highest value was obtained from 3000 ppm IBA + 20 ppm Co So_4 treatment which gave (2.32 and 1.76 g), for the first and second seasons, in respect order. While, in the fresh weight of leaves, the best medium was peat moss alone which resulted (5.09 and 6.48 g), in the 1st and 2nd seasons, respectively. So, for the total indoles, the all data was compared with pre-planting treatment by result (0.71 and 0.60 mg / 100 g dw), for the first and second seasons, in respect order.

Meanwhile, the increases from treatments in second experiment on (*Ficus binnendijkii* cv. amstel queen) plant were follow as : in the roots number, IBA at concentration of 3000 ppm with peat moss + perlite medium treatment gave the highest number of roots (25.75) in the 1st season and (25.58) in the 2nd season, respectively. As well as, for the fresh weight of leaves, the peat moss + perlite medium gave highest value (1.50) for the first season and (2.48) for the second season, in respect order. Likewise, in the total indoles, 4000 ppm IBA + 20 ppm Co So_4 with peat moss medium treatment increased the total indoles in the rooting cutting in the two seasons (1st and 2nd) with value of (4.07) and (5.74) mg / 100 g dw, compared with pre-planting treatment by value (1.58 and 0.54 mg / 100 g dw), in the first and second seasons, respectively.

Notably, the data appeared that some of differents between two seasons (first and second) together, in some of treatments and parameters, for both experiments and plants.

Key words : *Bougainvillea peruviana, Ficus binnendijkii,* Growth regulators, IBA, Co-factor substances Cobalt Sulphate (Co So_4), Different media.

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INTRODUCTION

Ornamental plants are considered to be economically important on the worldwide level. The local importance of these plants increased recently as an unconventional source of national income to Egypt.

Egypt is endowed by a lot of proportional advantages such as low wages, abundance of water supply, rich land and good weather compared to other countries.

The experimental plants for this study were selected to represent the two major branches of perennial plants (i.e. climbers and shrubs) that could suit the new fashion and trend of expansion in cultivation in the newly reclaimed desert lands in arid and semi-arid zones of Egypt.

Bougainvillea, a genus of 18 species of lianas, shrubs, often climbers, and small trees with simple alternate, petioled, entire : fls. small and inconspicuous leaves, the margin 5-6 lobed, stamens 7-8 on unequal eapillary, filaments, ovary stipitate and I to several, small, tubular flowers that are subtended by and are inclosed with very gaudy large colourful and showy magenta-purple or red bracts that constitute the decorative value of the plants. Several species and numerous cultivars are grown under glass as tender ornamentals particularly around the Mediterranean, and as arbor plants South. *Distr*. Tropical and subtropical South America. *Fam*. Nyctaginaceae. *Class* D. Two more or less scandent species are chiefly known. Less than a dozen recognized species.

Bougainvillea peruviana var. Mary Palmer, is an evergreen climber belonging to the family Nyctaginaceae. It is very popular nowadays in desert landscaping particularly in seaside touristic villages. *Bougainvillea* popularity andsignificance are attributed to its durability and resistance to adverse conditions and to its wide-range

coloured bracts (white on pink or rose in var. Mary Palmer) which remain for a rather long period of the year. Commercial propagation is carried out by semi-hardwood stem cuttings. Cuttings produce a poor number of adventitious roots unless some other treatments is applied to stimulate root production.

Ficus, (the classical and ancient Latin name for the edible fig). A genus of about 3800 species of deciduous and evergreen shrubs, trees, and often climbers, with milky juice, with simple or palmately lobed leaves and minute unsexual flowers that are borne within a fleshy, flask-shaped receptacle (the fig). Pollination is carried out by small specialized wasps that lay their eggs in the fig. Most species contain latex and some grow as large epiphytes that slowly overwhelm and strangle their hosts. These plants are the source of a large number of natural products ranging from edible fruits and medicines through timber and fibers to latex for rubber, and they are also of some religious importance. *Distr*. Cosmopolitan in tropical and subtropical regions, especially Asia. *Fam*. Fagaceae or Moraceae. *Class* D.

Ficus, the fig, the India rubber plant, the banyan tree and the creeping fig of conservatory walls belong to this vast and natural genus, which has over 600 species scattered through the warmer regions of the world. *Ficus* has no near ally of garden value. In the common fig are deeply lobed, but in most of the other species they are entire or else the margin is wavy or has a few teeth or an occasional small lobe, and are nearly always alternate. The most important ornamental plant in the genus is the India rubber plant (*F. elastica*), which ranks amongst the most popular foliage plants for home use indoors.

A common joint aspect in the chosen plant species is that they are propagated by cuttings. In almost all cases these cuttings encounter some kind of difficulty, one way or another, in their rooting.

As increase of such chosen plant species depends on cuttings, which is the most widely practicised method of propagation worldwide, it was thought as a good idea in this study to try to improve the chances of explant cuttings by influencing their rooting ability and/or capacity. To reach that aim several methods applied to the cuttings themselves (viz. wounding, dipping in IBA and dipping in Co So_4) and also treatments different media (viz. peat moss, sand and perlite).

REVIEW OF LITERATURE

1- *Bougainvillea peruviana* var. Mary Palmer :

Bhattacharjee and Balakrishna (1983), found that propagation of bougainvillea from stem cuttings in effect of growth regulators, rooting media, noticed that with the cv. Usha, used (1) leafless cuttings, (2) basal, middle or apical cuttings, or (3) 10, 15 or 20 cm long, cuttings were treated with IBA at 4000 p.p.m. or at 2000 – 6000 p.p.m. In rooting (80%) were best with IBA at 4000 and 6000 p.p.m. In the 15 cm long cuttings gave 100% rooting and in apical cuttings gave 100% rooting. In a trial on the effect of rotting media, with all cuttings treated with IBA at 4000 p.p.m., rooting in sand was (100%).

Awad, et al, (1988), a study on auxin affecting on the rooting and consequently the growth of *Bougainvillea glabra* L. whereas used cuttings 20 cm long, were dipped in 0, 3000 or 6000 p.p.m. IBA and immediately planted in peatmoss. The highest auxin concentration resulted in the highest rooting percentage and number of roots/cutting.

Joshi, et al (1989), showed that in studies on rooting of cuttings in some Bougainvillea varieties as influenced by plant growth regulators whereas used hardwood cuttings 15-22 cm long of 5 cultivars were treated with IBA at 4000 or 6000 p.p.m. The average percentage of rooted cuttings was highest IBA at 6000 p.p.m. (52.89). There were no significant differences between cultivars in rooting percentage. Average rooting in the control was (43.15%).

Baraskar, et al (1990), when rooting in difficult-to-root Bougainvillea cultivars used twenty-five cm long hardwood cuttings of Bougainvillea cultivars (Mary Palmer and Mahara), the treated cuttings were dipped in 2500 p.p.m. IBA + 2500 p.p.m. ferulic acid produced the best rooting response in both cultivars. This treatment