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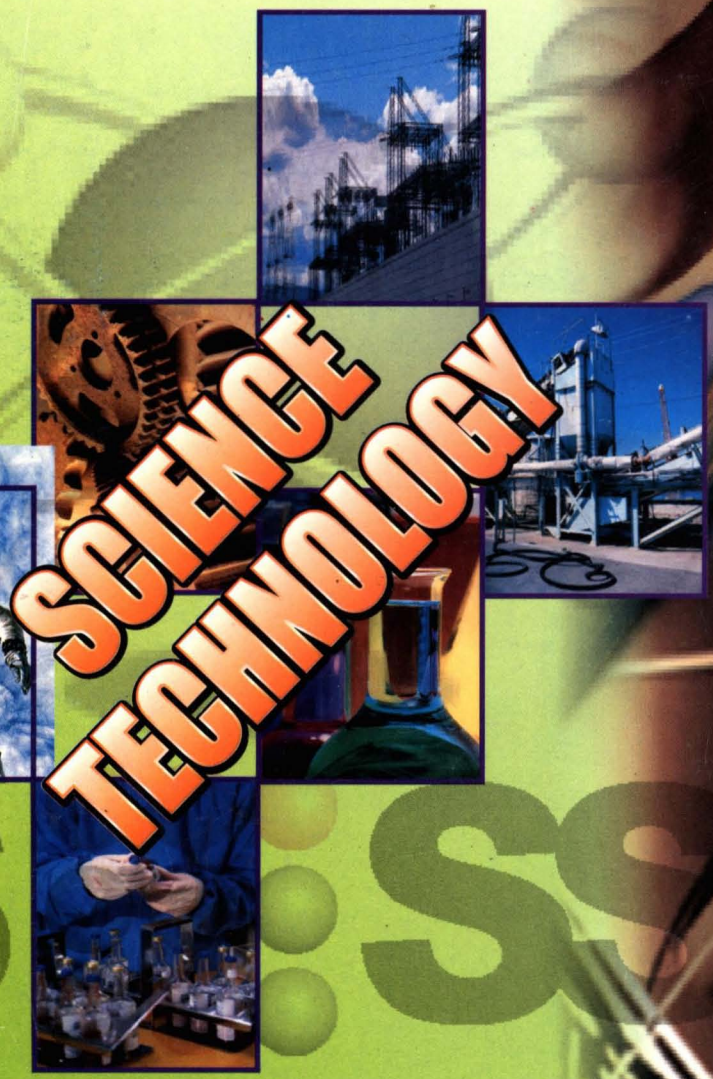

NATIONAL SEMINAR ON SCIENCE TECHNOLOGY & SOCIAL SCIENCES 2006

30-31 May 2006

Swiss Garden Resort & Spa

Kuantan, Pahang

Preliminary Trial on Rooting Ability of *Telosma cordata* (Burm. F.) Merr. (Asclepiadaceae) Stem Cuttings

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ABSTRACT

Rooting ability of Telosma cordata or Bunga Tongkin had been investigated. Sixty (60) healthy stem cuttings of about 20 cm each were used in this study. Half of the cuttings were treated with commercial hormone, Jumbofeed® Rooting Rowder S.P. which contains IBA and NAA hormone plus chelated trace elements. These cuttings were planted in media of (a) 100% peatgrow (organic potting soil), (b) mixture of peatgrow and sand (1:1), and (c) mixture of peatgrow, soil and sand (3:2:1). The results two weeks after planting showed that many roots formation was obtain with stem cuttings without hormone treatments in all types of the media and the highest rooting ability observed in the medium contains the mixture of peatgrow and sand (1:1) with the average of root length is 6.49 ± 1.03 cm. This study showed that commercial rooting powder used is not significantly induced rooting of stem cuttings of T. cordata. ANOVA analysis (α = 0.05) showed there was much difference observed on rooting of stem cuttings with hormone compared to stem cuttings without hormone in all media. In conclusion, the influence of rooting powder on root formation was far less compared to media used. Optimum water and oxygen balance provide by the mixture of peatgrow and sand (1:1) is important for root formation of T. cordata.

Keywords: *Telosma cordata, stem cuttings, hormone, media.*

Introduction

In the Family Asclepiadaceae, *Telosma cordata* (Burm F.) Merr. or Bunga Tongkin is a small woody plant and also a climber (Figure 1). This species synonym to *Pergularia odoratissima* and was originated from India and China. There are ten (10) species native to Southern Asia and *T. cordata* is one which has very fragrant flowers (Khelikuzzaman 2000). Due to its characteristics scent of this flower, *T. cordata* are suitable grown in garden as pot plants, hedges or outdoor landscape.

Aromatic plants quite famous nowadays and some of them already used to extract essential oil, such as *Cananga odorata* (kenanga), *Jasminum officinalis* (melur), *Rosa sp.* (bunga ros) and *Pelargonium graveolens* (jerimin). *T. cordata*, a nocturnal fragrance plant is said has great potential in landscaping and also can be used to extract an essential oil or perfume. Study by Arai et al. (1993) showed that there are a total of 43 compounds in flowers of *T. cordata* Merrill growing in Hawaii. Instead of its fragrant, *T. cordata* shoots and flower buds are also edible for their medicinal values (Saidin 2000). They are used in cooking and medicine to treat conjunctivitis (Thohirah & Wong 2000; Li Ping-tao et al. 2005). Anyway, not many people recognized *T. cordata* as valuable and aesthetic plants. This plant is difficult to find in our nurseries and need to be propagated and re-introduced into nursery industry.

Although the most common form of plant reproduction is from the seed, *T. cordata* do not produce fertile seeds (Sarina et al. 2004). Asexual reproduction of this plant is used to ensure that new plants produce are identical to the parents. The most common types of asexual reproduction for *T. cordata* are identified, that are layering and cuttings. Propagated *T. cordata* by tip layering usually involved the shoot tip, which is inserted in a holes three or four inches deep and covered with soil. The tip grows downward first, then bends sharply and grows upward. Roots form at the node, and the recurved tip becomes a new plant. The tip layer can be removed and planted at another place. This conventional method is easy but cannot produce many new plants at a time period. Many planters prefer propagate using hardwood cutting. Anyhow, stems of *T. cordata* easy infected by fluid feeder, *Saissetia oleae* (Olivier) (scales insect) (Muzamil et al. 2004). Only healthy, insect-free cutting should be selected.

Fig. 1: *T. cordata*, a small woody plant and as a climber.

Stem cuttings of *T. cordata* can produce many new plants in the shortest time. But selection of the correct rooting medium is important to get optimum rooting at selected stem cutting. Therefore, an experiment was carried out to determine the rooting ability of *T. cordata* stem cuttings with or without commercial rooting powder treatments using three different media.

Materials and Methods

Fresh and healthy, insect-free *T. cordata* stems obtained from DIS Research Plot, UiTM Pahang were used to study the rooting ability of *T. cordata* stem cuttings. Sixty (60) stem cuttings used in this experiment. Stem cutting of about 20 cm each (or about six inches long) with three to four leaves retained at the terminal end are selected. Cut the stem at forty-five-degree below the node. Keep the cut end moist until it is rooted. Half of the cuttings were treated with commercial hormone, *Jumbofeed® Rooting Powder S.P.* (Figure 2) which contains IBA and NAA hormone plus chelated trace elements. For stem cuttings treated with rooting hormone, moisten end of cutting and dip in powder. Shakes of excess powder and plant cutting to approximately half it's depth in a selected medium. Stem cuttings are inserted into a rooting medium. The medium needs to be moist but not saturate with water before inserting cuttings.

Stem cuttings were planted in three types of media: (a) 100% peatgrow (organic potting soil), (b) mixture of peatgrow and sand (1:1), and (c) mixture of peatgrow, soil and sand (3:2:1). *T. cordata* stem cuttings are grown in Biology Laboratory as pot plants for two weeks. They were placed in bright but indirect light near the window. Medium kept evenly moist while cuttings are rooting and forming new shoots.

After two weeks, stem cuttings were taken from the media to test for their rooting ability. The number of roots develops on stem cutting and the length of root was then recorded for each treatment. Data were analyzed by using the SPSS 12.0 with single way ANOVA.

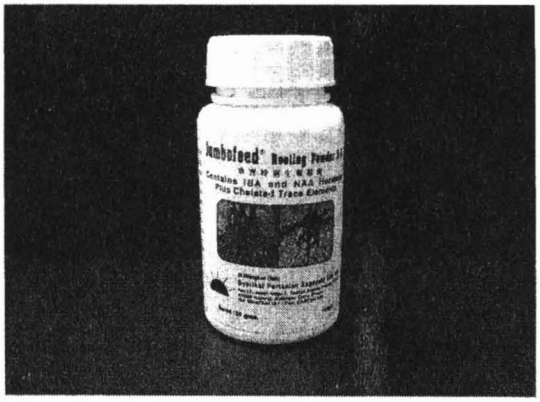
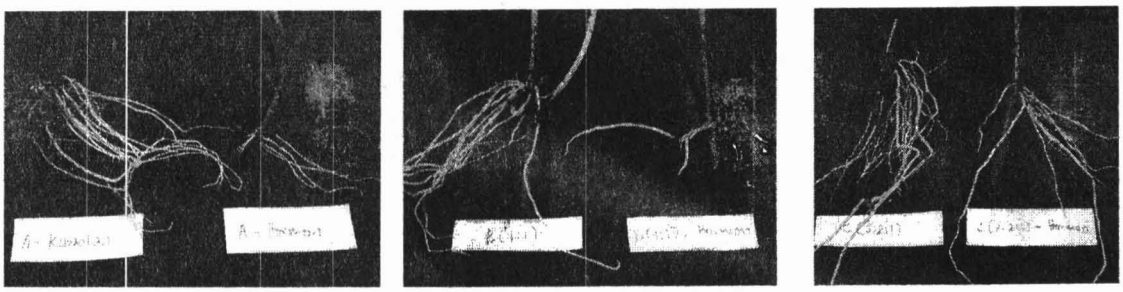


Fig. 2: Commercial rooting powder contains auxins hormone.

Results and Discussion

Figure 3(a), (b) and (c) shows the rooted of *T. cordata* stem cuttings. This result indicates that the rooting study was successfully done with or without hormone in all types of media. It suggests that *T. cordata* was quite easy to propagate through stem cuttings. The propagation of plants by means of stem cuttings succeed if the development of adventitious roots not influenced by any biotic or abiotic factors as suggested by Esau (1977). Adventitious root are widely distributed in all vascular plants and are formed in many locations on the plant. In the case of *T. cordata*, this study observed that adventitious roots occurs at nodes in association with axillary shoots and may also be independent of axillary buds, and seldom develop on internodes.



(a) (b) (c)

Fig. 3: The rooted stem cuttings of *Telosma cordata* inserted into media contain: (a) 100% peatgrow, (b) the mixture of peatgrow and sand (1:1), and (c) the mixture of peatgrow, soil and sand (3:2:1).

ANOVA analysis ($\alpha = 0.05$) for the root length indicates that there is a significant difference between controlled and treatments given. Average of root length from stem cuttings without hormone treatments are (6.34 ± 0.82)cm in 100% peatgrow (control), (6.49 ± 1.03)cm in the mixture of peatgrow and sand (1:1) and (4.89 ± 0.68)cm in the mixture of peatgrow, soil and sand (3:2:1). Meantime, average of root length from stem cuttings with hormone treatments are (1.98 ± 0.60)cm in 100% peatgrow, (0.52 ± 0.33)cm in the mixture of peatgrow and sand (1:1) and (1.82 ± 0.80)cm in the mixture of peatgrow, soil and sand (3:2:1). So, the highest rooting observed for stem cuttings without hormone which are inserted into the mixture of peatgrow and sand (1:1). Optimum water and oxygen balance provide by this medium is important for root formation of *T. cordata*. In general, the rooting medium for stem cuttings should be sterile, low in fertility, drain well enough to provide oxygen, and retain enough moisture to prevent water stress.

In terms of hormone, commercial rooting powder usually used to induce root formation of stem cuttings. The phenomenon of adventitious root formation has been widely explored in connection with research on growth substances. In cuttings that are naturally able to regenerate roots, applied auxins increase the number of developing adventitious roots (Esau 1977; Parker 2004). Anyhow, this study showed that commercial rooting powder used is not significantly induced rooting of stem cuttings of *T. cordata*. ANOVA analysis with $\alpha = 0.05$ showed there was much difference observed on rooting of stem cuttings with hormone compared to stem cuttings without hormone in all media. In conclusion, the influence of rooting powder on root formation was far less compared to media used.

For future studies, micropropagation under aseptic condition using different parts of plants such as shoot tips, and even single pollen grains, can be try to increase the number of new plants. *T. cordata* has great potential because it emits a strong fragrance, edible with medicinal values and can be used to extract an essential oil or perfume. Suitable methods of propagation or micropropagation are very important and should be improve to ensure the survival of *T. cordata*.

Conclusion

Study on rooting ability of *T. cordata* cuttings shows that commercial hormone used does not significantly induced root formation compared to media. The correct rooting medium for *T. cordata* is the mixture of peatgrow and sand (1:1) with the average of root length from stem cuttings without hormone treatment is 6.49 ± 1.03 cm. This medium is important to get optimum rooting in the shortest time. The present result indicates that stem cuttings were the promising ex-plant for propagation and regeneration of *T. cordata*.

Acknowledgements

The study on *T. cordata* was carried out in Research Plot, DIS and Biology Laboratory, UiTM Pahang. We would like to express our gratitude to the Campus Director, UiTM Pahang for his support in this project. We also thank Mr. Kaharuddin Osman @ Omar and Mr. Mohd. Narawi Hassan for their assistance. Financial support from Institute of Research, Development and Commercialization (IRDC), UiTM Shah Alam (Project No. 0110000030028) was greatly appreciated.

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