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Growth and improvements for *Gliricidia sepium* as a source of bioenergy

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Bioenergy can play an important role in the energy sector in Sri Lanka, since it can be obtained from sustainable grown fuel wood. This study was initiated to investigate the growth parameters and improvements in *Gliricidia sepium* (Jacq.) Walp. for mass propagation, as a plantation crop for bioenergy needs. Two experiments were carried out. Experiment 1 was initiated to study the effect of different stem maturity stages (green wood, semi hard wood and hard wood) and commercially available hormone mixtures on the rooting of *Gliricidia* cuttings. Clonex gel and Clonex powder, contained indole buteric acid (IBA) as the active ingredient in a concentration of 3 g/l and "Radipormon" contained 3% Napthylacetic acid (NAA). Experiment 2 was initiated to study the effect of different phosphate sources (Triple super phosphate (TSP), Eppawala rock phosphate (ERP), High graded ERP (HERP), ERP+"Biophos") and the length of stem cuttings on growth of *Gliricidia sepium.* "Biophos" is a commercially available, concentrated *Bacillus megatherium* culture.

Results of experiment 1 revealed that the mean number of roots at 11th week after planting was significantly higher in hard stem cuttings compared to semi hard and green stem cuttings. Application of hormones has significantly improved the number of roots in all types of stem cuttings. In hard stem cuttings both NAA and IBA gel were better, compared to IBA powder in increasing the number of roots. Root length was significantly higher in IBA treated hard wood stem cuttings compared to green wood stem cuttings at 11th week after planting. Further, root length of hard wood stems treated with IBA gel was significantly higher compared to hard wood stems treated with IBA powder. It was observed that roots emerged mainly from the lower part of the cut surface lining in green and semi hard wood cuttings, while, in hard wood cuttings roots were observed throughout the cut surface lining. Nodulation was higher in hard stem cuttings compared to semi hard and green stem cuttings and in general application of hormones increased nodulation in *Gliricidia.* However, there was no significant difference observed among hormone types, for nodulation. Results of experiment 2 revealed that shoot and root growth were higher in stem cuttings in phosphate incorporated soil. Length of stem cuttings also had an effect on both shoot and root growth of *Gliricidia sepium,* with better results associated with longer stems.

The main conclusions are that, hard wood stem cuttings can be regarded as better planting material compared to semi and green wood stem cuttings for mass propagation of *Gliricidia*. Also development of a good root system in *Gliricidia* can be achieved by application of rooting hormones, especially IBA gel to hard wood cuttings at the time of planting. Further, application of High graded Eppawala rock phosphate, at the time of planting can be recommended to promote root growth of *Gliricidia.*

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