

044***In vitro* multiplication of *Withnia somnifera* auxiliary buds for mass propagation**

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Withnia somnifera of family Solanaceae commonly known as Amukkara or Ashwaganda is an important medicinal perennial herb with long tapering roots. The roots are widely used in ayurvedic medicine and prescribed for hiccup, female disorders, cough and rheumatism. Wild and cultivated forms are available and cultivated plants differ in morphological and therapeutical action from wild ones. The annual requirement of 42347 kg is imported from India spending Rs. 2, 840, 449 (IUCN, 2005). Development of a method for *in vitro* mass production of this valuable species would substantially reduce the import cost and generate employment opportunities. This study was conducted to develop an *in vitro* protocol for mass production of *W. somnifera*.

In vitro grown seedlings of *W. somnifera* were used to excise single nodal cuttings and cultured on MS (Murashige & Skoog, 1962) medium. The effect of NAA (0.01, 0.2 mg/l) in combination with BAP (0.5, 1.0, 1.5 mg/l) on shoot proliferation was tested in solid and liquid MS media containing two levels of sucrose (3% and 4%). Proliferation (number of plantlets produced) was observed at weekly intervals.

Highest shoot proliferation rate (1:20) was observed in solid MS medium containing 3% sucrose and 1.5mg/l BAP after two months. In solid MS medium with 4% sucrose and 1.0 mg/l BAP 1:10 shoot proliferation rate was observed after two months. During the same time period 1:15 shoot proliferation rate was observed in solid MS medium with 3% sucrose, 0.5 mg/l BAP and 0.2 mg/l NAA, where 1:12 proliferation rate was observed when BAP concentration increased up to 1.0 mg/l. Solid MS media both with 3% and 4% sucrose levels and 0.5 mg/l BAP showed some proliferated shoots while other solid cultures were not proliferated. However cultures containing NAA in addition to BAP enhance rooting of proliferated shoots before transferring the separated shoots to rooting media. The explants in liquid MS medium with 4% sucrose and 1.0 mg/l BAP, proliferation initiated in one week and gave 1:40 shoot multiplication rate after two months. Rest of the liquid cultures with different BAP and NAA combinations were not proliferated within the same time duration.

Finally it can be concluded that highest shoot proliferation of *W. somnifera* through single nodal cuttings can be obtained on liquid MS medium with 4% sucrose and 1.0 mg/l BAP.

045**Development of new cultivation technology for straw mushroom (*Volvariella volvacea*) using locally available raw materials**A S Nissanka¹, P Rajapakshe² and R H M K Ratnayake¹¹Department of Horticulture and Landscape Gardening, Wayamba University of Sri Lanka, Sri Lanka²Regional Agricultural Research and Development Centre, Gonawila, Sri Lanka

Paddy straw mushroom (*Volvariella volvacea*) is an edible mushroom variety which can be cultivated under tropical and sub tropical conditions. In Sri Lanka, though the majority of farmers grow oyster mushroom they are willing to undertake other mushroom types, including straw mushroom and milky mushroom. Straw mushroom cultivation is highly rewarding because of the favourable climatic conditions in Sri Lanka and the abundant availability of raw materials. The existing outdoor method for straw mushroom cultivation introduced by the Department of Agriculture (DOA) gives low or/and irregular yield. As the optimum environmental conditions are crucial in straw mushroom production, an indoor cultivation method using a polythene house was tested with the existing outdoor method. Cotton waste and paddy straw were used as the growing media in both outdoor and indoor conditions under four treatments viz. paddy straw compost in polythene house (T1), cotton waste compost in polythene house (T2), paddy straw in outdoor environment (T3) and cotton waste in outdoor environment (T4), arranged in a Completely Randomized Design with three replicates. The results revealed that,

the indoor cultivation method with cotton waste compost substrate (T1) gave significantly higher values for average yield (6901.18 kg/ha) and average marketable yield (6489 kg/ha) compared to other treatments. Outdoor culture in straw substrate (T3) resulted lowest values for the same yield parameters (567.13 kg/ha, 516.31 kg/ha, respectively). Indoor cultivation method with paddy straw compost and cotton waste compost both resulted higher yields when compared to the outdoor culture. As paddy straw is freely available in Sri Lanka, combining of paddy straw compost and cotton waste compost as the substrate for straw mushroom culture under indoor conditions would be more profitable.

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Evaluation of *Luffa (Luffa acutangula (L.) Roxb)* varieties under low country intermediate zone of Sri Lanka

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Luffa (Luffa acutangula) is a popular low country vegetable in Sri Lanka and it is one of the most highly utilized vegetable species in the farming systems of dry and intermediate zones. The existing *Luffa* varieties in Sri Lanka, recommended by the Department of Agriculture, and the introduced hybrids are vulnerable to pests and diseases and the cost for pest control mainly accounts for the higher production cost of *Luffa*. Makandura Selection (MK) is a *Luffa* variety selected from farmer fields and it shows tolerance to fruit fly (*Bactrocera cucurbitae* (Coquillett)), which is the most serious pest causing high level of economic losses. Therefore, an experiment was conducted at the Regional Agricultural Research and Development Centre, Makandura, to evaluate the performance of Makandura Selection along with the two Department of Agriculture recommended *Luffa* varieties, Asiri and LA 33. The experiment was laid out in a randomized complete block design with four replicates. Evaluation was done based on reproductive, yield and fruit quality parameters. Though the variety LA 33 recorded the significantly highest yield (9.08 t/ha), the higher fruit length (35.02 cm), higher fruit weight (280.5 g) and high fruit firmness (4.38 kg) were not desirable in the context of consumer preference. The variety Asiri recorded a significantly lower yield (7.05 t ha⁻¹) and the lowest fruit firmness (3.89 kg) which are not preferred by the farmers. The variety Makandura Selection showed moderate yields (8.98 t ha⁻¹) and better performance in fruit quality attributes such as lower fruit length (21.7 cm), lower fruit weight (207.2 g) and moderate firmness (4.25 kg). Therefore, the fruit fly tolerant ability, along with these positive fruit characteristics makes Makandura Selection a suitable variety to introduce to the *Luffa* growers in Sri Lanka after further testing.

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Exploring natural resources for sustainable management of ecosystems: future challenges for control and management of *Xyleborus fornicatus* eichh. (Coleoptera: Scolytidae), the shot-hole borer of tea in Sri Lanka

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In view of the highly diverse genetic base of the seedling tea plants, though cultivated as a monocrop, along with shade trees and surrounding forests, provided a reasonably stable ecosystem then. With the introduction of high yielding vegetatively propagated tea during 1950's, a significant change in the distribution and population densities of pests has been taken place. Shot-hole borer is one such pest and since then it has become the most serious and damaging pest of tea in Sri Lanka. Control has been a difficult task as a result of its' wide distribution from near sea level up to 1500m amsl and the concealed habit virtually protected from parasites and predators. Biological control using entomopathogenic fungus, *Beauveria bassiana* Vuillemin (Balsomo) is being viewed as an environmentally friendly alternative to chemical control in the light of growing concern on the usage