

C
580
DEA

**DEVELOPMENT OF PROPAGATION TECHNIQUES AND
AGRONOMIC PRACTICES OF TWO MEDICINAL PLANTS**
Asparagus racemosus Willd. and *Cyperus rotundus* L.

A THESIS PRESENTED BY

KAMBURAWELA KANKANAMGE SANDYA KAMANI DE ALWIS

to the Board of Study in Plant Science
POSTGRADUATE INSTITUTE OF SCIENCE

*in partial fulfillment of the requirement
for the award of the degree of*

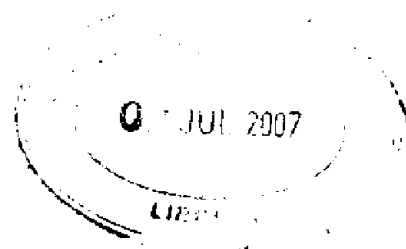
MASTER OF PHILOSOPHY

of the

**UNIVERSITY OF PERADENIYA
SRI LANKA**

2005

607467



**DEVELOPMENT OF PROPAGATION TECHNIQUES AND
AGRONOMIC PRACTICES OF TWO MEDICINAL PLANTS**
Asparagus racemosus Willd. and *Cyperus rotundus* L.

K. K. S. K. De Alwis
Department of Botany
University of Peradeniya
Sri Lanka

Asparagus racemosus Willd. and *Cyperus rotundus* L. are widely used in Ayurvedic medicine, however, scientific information on their propagation techniques and agronomic practices are scarce. The present study was therefore focused on the development of simple, rapid and cost effective propagation techniques and the initial establishment methods of these two species.

The mature seeds of *A. racemosus* treated over night with 500 ppm gibberalic acid followed by piercing the seed coat with a fine needle gave only 70 % germination. Propagules comprising parts of the shoot in the primary growth stage, tuber and condensed stem grown in a coir and sand medium gave 94% success. The best growth performance of *A. racemosus* after 15 months of growth in terms of fresh shoot weight (20 ± 1.5 g), fresh root weight (137 ± 8 g), dry shoot weight (7.8 ± 0.5 g), harvest index of shoot (56 %) and biological yield (34 ± 2 g) was observed when grown in the media comprising soil: sand: manure mixed in 1:2:1 ratio. Exposure to average shade gave the highest fresh shoot weight (41.3 ± 2 g). Fresh root weight, shoot dry weight, root dry weight and biological yield of plants grown for 12 months under full sun light and the average shade were significantly higher than those parameters obtained under high shade.

Percentage sprouting of *C. rotundus* (95%), and total biomass and mean number of leaves per plant were the highest when plants were raised from propagules comprising the full tuber without parts of the mother plant treated with rooting hormone IBA (3000 mg/l). Mean plant height (27 ± 1.4 cm) and average leaf length (14 ± 0.73 cm) were highest in the plants raised from the same propagule type grown in coir and sand medium, but the number of buds per

plant were the highest (1.7 ± 0.2) when the propagules were grown in water. The best growth performance in terms of harvest index (88 %) was observed when plants were grown in the medium comprising one part each of soil, sand and farmyard manure. Plants grown under full sun ensured the highest harvest index (53%), biological yield (25 ± 1.5 g) and tuber weight (13.5 ± 0.7 g) 360 days after planting. Plants grown in containers and harvested 255 days after the initial establishment gave the best tuber yield.

The thesis concludes with a synthesis of research findings.