

**Evaluation of *Plectranthus esculentus* N.E.Br.
as a potential vegetable crop**

by

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PhD: Agronomy

in the Faculty of Natural and Agricultural Science

(Department of Plant Production and Soil Science)

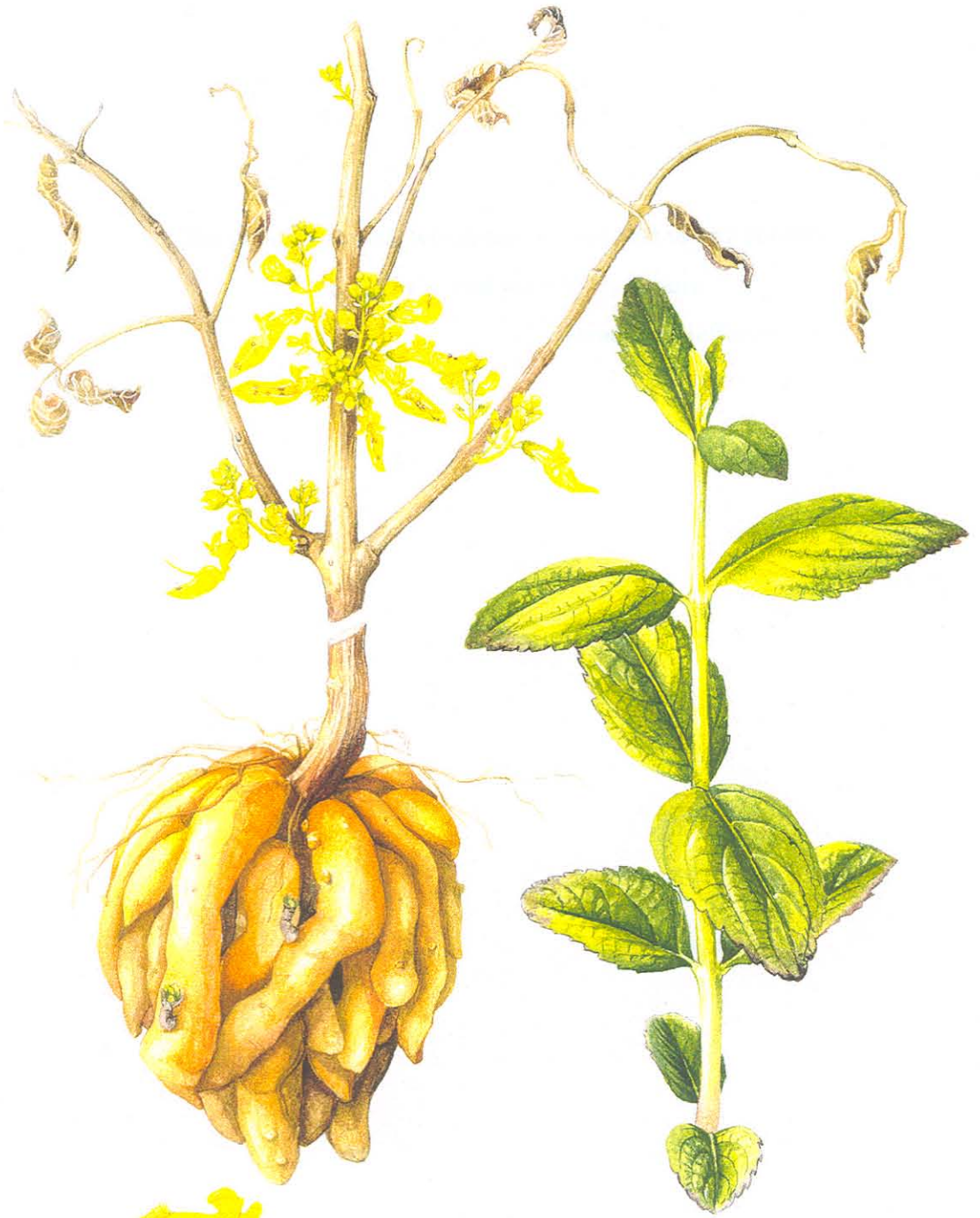
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The greatest service which can be rendered to any country
is to add a useful plant to its culture

Thomas F. Jefferson

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ABSTRACT

Evaluation of *Plectranthus esculentus* N.E.Br. as a potential vegetable crop

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Department of Plant Production and Soil Science

Plectranthus esculentus (Lamiaceae) is an endemic African plant that produces edible underground storage organs that have been used as food by indigenous peoples for many years. An evaluation programme was conducted to determine the potential of this species as a possible commercial crop.

Morphological and anatomical studies confirmed that the edible underground storage organs are true stem tubers. A technique for micro-propagation of the local species was developed in order to be able to provide uniform genetic material for research purposes, as well as being able to rapidly multiply disease free material of promising selections.

Cuttings were investigated as an alternative to plants in tuber induction studies, and tuberisation on cuttings reflected that on intact plants, with the induced state being best characterised by swelling of the bases of underground shoots. Single-node cuttings originating from the lower half of the stem and containing two intact leaves were the best type of cutting to use. A scale of tuber development on cuttings with increasing exposure to inductive conditions was developed. Tuber mass was increased by increasing leaf area on cuttings.

The major environmental factor affecting tuber induction was photoperiod, with a minor

role being played by temperature. The critical photoperiod for tuber induction was between 12 and 13 hours, and exposure to a 10 hour photoperiod for four days was sufficient for tuber initiation. Low night temperatures did not induce tuber formation despite exposure periods as long as 21 days, although plant growth was reduced by night temperatures below 18°C.

Pests and diseases rarely proved serious, with the exception of root-knot nematode and *Fusarium* wilt. Other pests identified were whitefly, red spider and fungus gnat, while charcoal rot (*Macrophomina phaseolina*) was the only additional disease noted.

Chemical analyses revealed that the tubers are a good source of carbohydrates, and also provide significant amounts of protein, vitamin A, Ca, Fe and other minerals to the diet. The protein contains all eight essential amino acids, seven of them in greater concentrations than the FAO reference protein. From a nutritional point of view this species is more valuable than comparable exotic species.