

CHAPTER 1

INTRODUCTION

Some 4 000 edible plant species have been used by man as a source of food. Over the centuries the tendency has been to concentrate on fewer and fewer of these plants. Today only about 150 plant species are widely cultivated, and a mere 20 species form most of the world's food supply (Chweya, 1989). Food security in the world today is based upon rice, wheat and maize, which between them provide approximately 60% of the worlds food (Anon., 1993). Most of the others, the largest part of the worlds storehouse of potential crops, are in danger of becoming extinct as crop plants (Chweya, 1989; Anon., 1993). There are many edible plant species in the world which have yet to be developed to their full potential.

There is increasing awareness throughout the world that additional plants should be developed into crop plants so as to avoid future problems in terms of food shortages. This need stems from the rapidly rising demand for food, particularly in developing areas, and the fact that little new land will become available for food production (Anon., 1993). On the contrary, more and more high potential agricultural land is being lost annually to urban sprawl, particularly in developing countries. Coupled with this is the fact that most of today's common crops have already been pushed close to their maximum yields. Hope for the future may well lie in a number of unexploited species of edible plant that have largely been ignored (Anon., 1993). The African continent is endowed with a rich array of both wild and domesticated food crops. This tremendous diversity of both actual and potential food sources, including vegetables, is the key to alleviating the problems of food shortages and nutritional imbalances in the rural areas which have been caused by an over dependence on a few staple crops (Anon., 1994). More and more producers in Africa are growing exotic vegetables which are poorly adapted to their conditions. According to Grubben & Almekinders (1996), these exotic crops require higher inputs of fertilizers and pesticides, and are more sensitive to environmental and other stresses.

Various studies conducted in South Africa have emphasised the role of indigenous plants in providing many of the basic needs of rural people, i.e. shelter, fuel, medicine, as dietary supplements, and as a source of income. The highest volumes of plant material are used for fuel (wood), fencing and building materials. Medicinal plants are an important element in the traditional health care system, in both rural and urban areas (Cunningham, de Jager & Hansen, 1992). In this regard it has been estimated that at least 80% of Soweto residents still consult traditional healers (Anon., 1995). Indigenous plants are also harvested and used for crafts, which has the advantage of utilising renewable resources, generating valuable income, and preserving traditional skills. Certain indigenous plants produce good quality oils which are sought after in the perfume industry (Cunningham *et al.*, 1992). Flower pickers in the Western Cape area of South Africa started a multi-million Rand industry by scouring the Cape mountains for indigenous flowers from the fynbos and selling them. This tradition is still in existence today, and these flowers are now also cultivated commercially (Coetzee & Littlejohn, 1994). The use of undomesticated food plants in regions with low agricultural potential or during periods of drought adds to food security in these areas and provide dietary supplements to the predominantly starchy staple foods (Cunningham *et al.*, 1992).

In South Africa, a country with national food self-sufficiency and food exports, malnutrition still prevails in many rural areas. This is due to a number of reasons, not the least of which are the harsh climatic conditions encountered in these areas (Allemann, van den Heever & Viljoen, 1996). It has been estimated that there are at least three million people under the age of 15 suffering from malnutrition in South Africa (FRD, 1992). Diseases in African countries are often associated with malnutrition and as a result, those who do survive these diseases often never recover completely. Malnutrition contributes to the high infant, maternal and childhood mortality rates that are found in many African countries (Sofowora, 1996).

The food base of rural people throughout Africa, especially those in marginal and semi-arid areas, has become narrower and less nutritious over the years, and this leaves the population more vulnerable to food shortages and famines (Awino, 1989). Current estimates put the annual population growth in South Africa at 2.4%. The increase in food production must

therefore be in excess of 2.4% to keep up with supplying the increasing population with food. Coupled with this is the increasing problem of urbanisation which results in the rural areas becoming depopulated while the urban areas become overpopulated, and yet the former areas must provide the food for this ever increasing population (Wehmeyer, 1986).

One way of increasing food production in arid and semi-arid regions is through the use of indigenous crops which are known to grow in these areas without substantial agronomic care. These indigenous plants may be better adapted to the often harsh climatic conditions and have few insect and disease problems in comparison to the introduced crops (Chweya, 1989; Attere, 1990; Cunningham *et al.*, 1992; Mwashayeni, 1994). Indigenous plants could be developed and used as food crops in order to broaden the food base of African countries (Chweya, 1989). The number of plant species in southern Africa exceeds 20 000, and more than 1 000 of these species are edible (Wehmeyer, 1986). In fact the National Botanical Institute of South Africa has records of more than 1 700 plants that have been referred to as being edible by the local population.

Water is a scarce commodity in South Africa. Tyson (1990) states that in general, the subtropical countries of southern Africa are prone to droughts, and that planning for the future should take cognisance of this fact. All future crop development should take this fact into account. There is a great need therefore, to develop crops from appropriate indigenous plants which are eminently suited for cultivation in the large areas of southern Africa which have low agricultural potential for conventional crops (Cunningham *et al.*, 1992). Most indigenous vegetables are, unfortunately, associated with poverty, and are therefore shunned by many, or they are considered to be inferior to the exotic species. As a result these crops have not been fully domesticated, and the management requirements remain virtually unknown (Mwashayeni, 1994). These plants should be developed to the stage that they can be cultivated as specialist crops in their own right and no longer perceived as a food only in times of famine, or to be harvested from the wild. Both scientific data and traditional knowledge suggest that plant products from indigenous plants are not inferior in taste and nutritional quality to species which are more widely known and used (Anon., 1994).

Root and tuber crops are staple foods in many areas, particularly for the poor. As foods some are popular and sought after, while others are used from necessity during winter, and yet another group is only used in times of famine. There are also those root crops which are used as a source of water, and another group which is used to provide yeasts and moulds for the making of beer (Fox & Norwood-Young, 1982). According to Kyesmu (1994) it is likely that a number of African tuber plants were formerly cultivated more widely than today, having been displaced by more successful crops, and a social stigma leading to the preference for exotic crops has emerged. Some of the lesser known root crops are now receiving attention from scientists because of their tolerance to marginal soil and climatic conditions. They are also easy to cultivate and produce stable yields even under difficult conditions (Plucknett, 1983). This is one of the major reasons for the growing interest in adapting some of these crops as possible substitutes for, or to be grown in conjunction with, commercial crops, particularly by small scale farmers under low input conditions. With the increasing interest in indigenous cuisine, and the popularity of so-called 'ethnic' restaurants in South Africa (Anderson, 1995), these crops could be developed into specialist horticultural crops in their own right to serve this growing market.

Plectranthus esculentus N.E.Br. appears to be a suitable plant for further development. It is still being used in certain areas of the country, and where planting material has been lost over time, people are keen to see it re-introduced. Production, and even botanical information about indigenous vegetation in African countries is scanty, or unavailable, implying that the potential of indigenous crops has not yet been exploited. In order to evaluate the potential of *Plectranthus esculentus* it was therefore necessary to study its nutritional quality, as well as looking into certain aspects of the botany of the plant. In this regard it was considered essential to determine the origin of the storage organs, as well as the effect of certain environmental factors on induction and growth of these organs, as these would affect both yield and potential distribution of the crop. A method of rapid propagation had to be developed in order to be able to multiply individuals showing high levels of desirable characteristics. It was important to monitor pests and diseases which occurred on the crop in the course of its growing season.

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