A SURVEY OF THE INDIGENOUS RELISHES OF THE VHAVENDA AND THEIR AGRICULTURAL POTENTIAL

by

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CHAPTER 1

INTRODUCTION AND OBJECTIVES

Venḓa has many kinds of indigenous relishes that play an important role in the culinary traditions of the Vhavenḓa nation. In this thesis a relish (*tshisevho* or *muroho*) refers to a mainly herbaceous plant or portion of a plant which is consumed as a side dish with the starchy staple as a traditional green vegetable. The term "indigenous" is used in a broad sense to include also naturalized alien species that have been in Venḓa for decades, and are socially regarded as indigenous to the region.

While it is necessary for the Vhavenḓa to use indigenous vegetables, they equally prefer indigenous fruits for fresh utilization and beverage. Historically, Venḓa indigenous fruits can even substitute porridge if necessary, for example with the fruits of *Englerophytum magalismontanum* (=*Bequartiodendron magalismontanum*). There are also Venḓa indigenous trees that are used for timber, wood carving, household utensils, musical instruments, medicinal purposes and especially for fire wood.

According to Vhavenḓa custom, cereal porridge has to be relished to avoid or prevent anaemia. This suggests that relishes are probably rich in important nutrients and/or minerals. However, due to urbanization and the influence of a more Western diet, many of the traditional Vhavenḓa relishes have come to be regarded as useless weeds, particularly by agriculturalists. Today many of these relishes are ignored and knowledge on the picking and preparation of the various plants for human consumption is rapidly diminishing, notably among the younger generation.

It is estimated that more than 80% of all Vhavenḓa relishes are still collected from natural stands, with many found in cultivated or abandoned lands, along road sides and in deserted animal kraals. On the other hand, at least two species of

traditional relishes (*Solanum retroflexum* and *Cucurbita maxima*) are grown as vegetable crops by the Vhavenda.

These relishes appear to require very little care as they flourish without the benefit of chemical fertilizers or sophisticated irrigation systems. Although adequate water is a necessity, they can survive on the prevailing rainfall. These plants are also fairly resistant to diseases and pests, thus suggesting a financial saving on the production costs. The importance of the relishes, which are all summer-growing, is thus that they are available even under conditions not favourable for the growth of commercial crops.

Presently, several traditional relishes are sold as cash crops in Vhavenda markets, for example *Bidens pilosa*, *Corchorus tridens*, *Amaranthus thunbergii*, *Cleome gynandra*, *Cucurbita maxima*, *Solanum retroflexum*, *Sonchus oleraceus* and a species of *Phaseolus*. They attract a lot of buyers, especially from urban areas. Yet, presently the Department of Agriculture has employed women who are offering training on the preparation of Western diets to rural communities, while some of the trainers cannot cook at least two different relishes.

Whereas relishes are presumably rich in nutrients and/or minerals, condiments are a good source of fats and oils. Traditional Vhavenda condiments include ground nuts (*Arachis hypogaea*) and marula nuts (*Sclerocarya birrea* subsp. *caffra* [=*Sclerocarya caffra*]). These are milled to produce a fine powder that is often added when cooking certain relishes (e.g. *Cucurbita maxima*) to improve flavour and taste.

Detailed information on traditional cultivated crops and the use of wild plants as supplementary foods is generally lacking for southern Africa (Liengme 1981, 1983; Arnold & Musil 1983). Although Mabogo (1990) and Quin (1959) provided valuable information on the use of plants as a source of food and beverage in the diet of the Vhavenda and the neighbouring Pedi respectively, no study has yet been conducted on the agricultural potential (nutrient status, chemistry, preference as

food, marketability, means of propagation and other uses like medicinal uses) of most of these plants, particularly the various relishes. Furthermore, details on the original traditional harvesting methods and preparation of most Vhavenda relishes have never been documented in detail.

Although no detailed research has been done on Vhavenda traditional vegetables, several studies have been conducted elsewhere in central and southern Africa. Bukenya (1994), for example, has reported on *Solanum macrocarpon*, which is used as a vegetable in Uganda. Bandeira (1994) listed 45 wild vegetable species at Inhaca Island in Mozambique while Mwanyambo (1994) listed 27 wild vegetable species in the Lower Shongwe Valley of Malawi. Maundu (1994) discussed the role of indigenous food plants in Kenya and Kabuye (1994) has highlighted the Indigenous Food Plants Programme (IFPP), which is trying to address issues around the preservation of the cultural heritage and the improvement of the nutritional base for local communities. This is done by tapping indigenous knowledge about sustainable development and the conservation of genetic resources. In the Republic of South Africa, the Agricultural Research Council (ARC) is presently running an intensive research programme on the commercialization of *Cleome gynandra* and *Amaranthus* species (Van den Heever 1995).

Relish plants not only provide food for people and domestic animals, but also pharmaceutical products and raw materials for industry. Accelerating population growth, ecological hazards and changes in market supply and demand make it necessary for scientists both to maintain a constant search for improved varieties of major crops and to diversify production by developing locally grown but underutilized crops.

The principal objectives of this study are:

- To compile an inventory of the indigenous relishes of the Vhavenda (Chapter 6).

- To record the traditional uses of the various relishes, as well as picking and treatment methods for human consumption (Chapters 5 & 6).
- To conduct nutrient analyses of selected relishes (Chapter 7).
- To comment on the potential for commercial growing of ten selected relishes, based on criteria such as taste preference, nutrient status, chemistry, propagation and marketability (Chapters 6 & 8).

CHAPTER 2

A BRIEF HISTORY OF THE VHAVENDA AND THEIR RELATIONSHIPS WITH OTHER NATIONS

The following brief discussion aims to show that the Vhavenda and surrounding nationalities have similar and related dietary traditions. Such information is useful in motivating the commercial development of Vhavenda traditional relishes, as it suggests that commercial growers will be assured of large markets for their produce.

The Vhavenda, like other nations of the world, have a beginning, a place of origin from which they migrated. They passed through many places on their way to their present day home. Although here and there a memory is preserved which throws light on the events of those early momentous days, many of the details of their wanderings and experiences have been lost in the mists of time (Nemudzivhadi 1985). Pre-colonial Vhavenda history is insufficiently documented. The little information that now exists is the legacy of an earlier, oral tradition.

The Vhavenda nation traditionally occupies the north eastern part of the Northern Province in South Africa. This area cannot be clearly demarcated geographically, however, because of the presence of other nationalities in the same area, for example the Tsonga in the east, the Pedi in the south, the Shona and Ndebele across the Limpopo River to the north and the Tswana towards the west. The Vhavenda nation comprises a number of groups, namely the Mutovhele (Ndevhele), Ndou, Ngona, Singo, Kwinda, Vhakwevho, Vhadau, Vhalaudzi and Vhalemba (Musenwa, personal communication 1995).

The relationship of the Vhavenda with other surrounding nationalities is reflected in population movements outlined below. The Vhangona migrated from central Africa eventually settling in the eastern Drakensberg (Phalaborwa). Unknown circumstances caused them to move from the eastern Drakensberg

region to the present day town of Soekmekaar where they settled in the area now known as Elim. On their journey to Elim or Mpheni, they safely passed through an area occupied by the Tsonga. The Tsonga liked the Tshivenḓa names and adopted some of them. Nowadays many Tsonga women have Tshivenḓa names like Mphephu. Some Tsonga infiltrated the Vhavenḓa in the former Republic of Venda, but they were removed under the Group Areas Act in the late 1960's (Musenwa, personal communication 1995).

The Vhavenḓa, Shona and Zimbabwean Ndebele are strongly linked. Nowadays we find many surnames that are common to all three groups, for example, the surnames "Marandela", "Kutama" and "Mudzunga". Another ancestral Vhavenḓa group moved to the present Zimbabwe. They settled in the Matopo Hills in villages called Matotsheni and Mikondeni where there are still Vhavenḓa and Kalanga people with surnames like "Dombo", "Mbire/ Mbile" and "Vhalozwi". Matopo, which was previously called Matombo, was their religious capital. They also had three military capitals called Ṅalathale, Ndilondilo and Dananombe (Musenwa, personal communication 1995). Munjeri (1992), wrote of the Vhavenḓa infussion at the Matopo Hills because Mwali (Ṅwali = supreme being) became centred in Matombo where it merged with the traditional Nyuvi-Kalanga religious duty. It is stated that the Tswana, Vhavenḓa, Nyuvi and Kalanga stayed together at the Matopo (Matombo) Hills at some stage. It is alleged that Bulawayo in Zimbabwe was named after the place called Bulawayo near the modern town of Eshowe in KwaZulu-Natal, where Mzilikazi, the son of Matshobane was born. Mzilikazi is believed to have stayed at the Matopo Hills (Munjeri 1992). According to Professor Ralushai (personal communication 1996), most residents of Francistown are traditionally Vhakalanga who were left being part of Botswana after the establishment of colonial borders.

From the above account of the Vhavenḓa and other surrounding nationalities, it can be deduced that similar dietary traditions would be likely to prevail among all these groups. This is indeed the case, particularly in so far as the kinds of relishes are concerned. For example, *Solanum retroflexum, Amaranthus*

thunbergii and *Cleome gynandra* were reported to be widely used as a relish by the Pedi (Quinn 1959) and in Zimbabwe (Tredgold 1986). This information motivates the development of the relishes since they are widely utilized, indicating a diverse market.

The theories given by Mr Museńwa (personal communication 1995) on the origin of the Vhavenda are very similar to the accounts by Ralushai & Gray (1977), Stayt (1931) and Nemudzivhadi (1985). Nemudzhivhadi's (1985) version links spatial movements of the various Vhavenda groupings to time periods, a system rejected as unreliable by anthropologists as the Vhavenda did not use a conventional calendar before European colonialism (Ralushai, personal communication 1996). Stayt (1931) contains numerous serious spelling mistakes on the Vhavenda names. A detailed account of Vhavenda customs and beliefs has also been compiled by Van Warmelo (1960). Given the nature of the information available on Vhavenda history, the existence of different versions according to different clans should be acknowledged.

CHAPTER 3

AGRICULTURAL HISTORY OF THE VHAVENDA

3.1 Introduction

The Vhavenda have practiced agriculture for many centuries. Their subsistence economy was based on soil cultivation, animal husbandry, collection of wild fruits and vegetables and game trapping. Any domestic requirements were usually satisfied through commodity exchange. Neighbours could be invited to work in exchange for drink or food, a custom called *Davha.*

3.2 Land ownership

According to the Vhavenda tradition, land belongs to the chief (*Vhamusanda*) and is administered through the headmen (*Magota*) and the petihead (*Vhakoma*) for allocation to households. When the family has been allocated a piece of land, that land can be transferred from one generation to another (i.e. through inheritence) without the leader's involvement. The chain of inheriting the land can be broken or stopped depending on changing circumstances. The chief, together with the headmen and the watchmen, can authorise the use of that particular land for any other purpose if the family has decided to stay in a different village (under another leadership) or if the land has not been ploughed for two to three seasons. The land can then be allocated to another household. Families whose land has been repossessed can be given another piece of land in another area.

3.3 Areas (lands)

The Vhavenḓa distinguish three different areas suitable for cultivation, namely *muṱanga, tshikovha* and *tsimu. Muṱanga* is characterised by the presence of water which can be used for irrigation. *Tshikovha* is a small piece of land which is commonly found in river valleys (*govhani*) and where irrigation is optional. *Tsimu* is a relatively flat, easily ploughed piece of land where production is done under dryland conditions.

3.4 Crops

Staple crops commonly grown include sorghum, maize, millet, ground nuts, pumpkin, watermelon as well as other crops which can easily be propagated from seed. The Vhavenḓa favour inter-cropping or mixed cropping. They are little concerned about inbreeding and use seed from previous years crops. Seed selection is, however, commonly practiced before planting. Only large, healthy-looking seeds are selected.

3.5 Grain stores

There are two types of traditional grain stores, namely the store used for seeds to be used for the next season's crop and the store containing the grain destined for future consumption. Seeds are stored in clay pots or calabashes which are sealed with cattle dung to prevent infestation by seed borers.

The Vhavenḓa have three different structures in which to store their harvests, viz *tshisiku, ḓulu* and *tshiṱaṱari. Tshisiku* is a hole dug in the soil, *ḓulu* is built above the soil using timber or wood and *tshiṱaṱari* is build like *ḓulu* but does not have a roof, since it is used temporarily. *Tshisiku* is subject to fungal infestation while *ḓulu* is easily infested by borers. In the northern part (Tshiungani

area) caves (*bako*) are also used as grain stores (Ralushai, personal communication 1996)

3.6 Agricultural implements

The main implement used for ploughing is called *dzembe-ḽa-mufakwa* (similar to the hand hoe). Gradually the Vhavenḓa upgraded to using hand hoes, then animal-drawn ploughs and finally power driven tractors.

3.7 Agricultural transport and containers

In the past, two main forms of transport were used: animal drawn wagons (sledges) without wheels (*tshiḽei),* and containers (*muthatha, tshirundu* and *mufaro)* which were carried on the head or shoulders depending on the bearer's sex. Females carried containers on their heads whilst males carried them on their shoulders. Containers were also carried on the backs of donkeys, usually in the form of two bags of equal weight hanging on both sides of the animal.

3.8 Division of Labour

Family members are the main source of labour. Senior men are family heads and together with boys or young men are responsible for ploughing and transportation. Women and girls are responsible for planting, weeding, harvesting and relish picking.

3.9 Pests and diseases

Historical, the pests that have threatened harvests were *phundulu* (army worm), *magerere* (leafhoppers), *nzie-tshikume* (leafhoppers), *luvhungu* (stalk-borer), *zwiṋoni* (birds), *vhuri* (witch-weed), *ṱhoho* (monkeys) and *mapfeṋe* (baboons). Rituals for the control of pests and diseases were performed and it is still a strong belief that the stalk-borer is controlled by rain.

The streak disease (caused by a virus) has been threatening the maize crop for centuries. Over time the Vhavenda have learned that they can overcome this disease by early planting.

3.10 Manure

Cattle and goat dung are used as fertilizers. Donkey dung however, is never used because it is believed to have an allelopathic effect. Fertilizer (dung) is applied before the land is tilled. Before dung is used as fertilizer it is first allowed to decompose fully. Decomposition is allowed to avoid termites and make sure that dung temperature is adequate for growth.

3.11 Chiefs and/or headmen's rituals

There is a strong belief that before people can harvest their crops, they have to take part of their harvest (*zwirangi*) to the chief or the headman. He then performs certain rituals which allow all the people in the territory to utilise whatever they have planted e.g. *Citrullus lanatus* and *Cucurbita maxima*.

CHAPTER 4

STUDY AREA, MATERIALS AND METHODS

4.1 Study area

The study area covers the region formerly known as the Republic of Venda. It is located in the Northern province, South Africa, and lies between 29°—32° E and 22°—24° S (Figure 1). The attached map is not historically correct, because it excludes the Madimbo Corridor which historically has been part of Vendaland.

The area has considerable agricultural potential. Crops currently grown in the region include maize, soya beans, grain sorghum, ground nuts and several subtropical fruits such as avocado, mango, litchi, macadamia nuts and various citrus fruits.

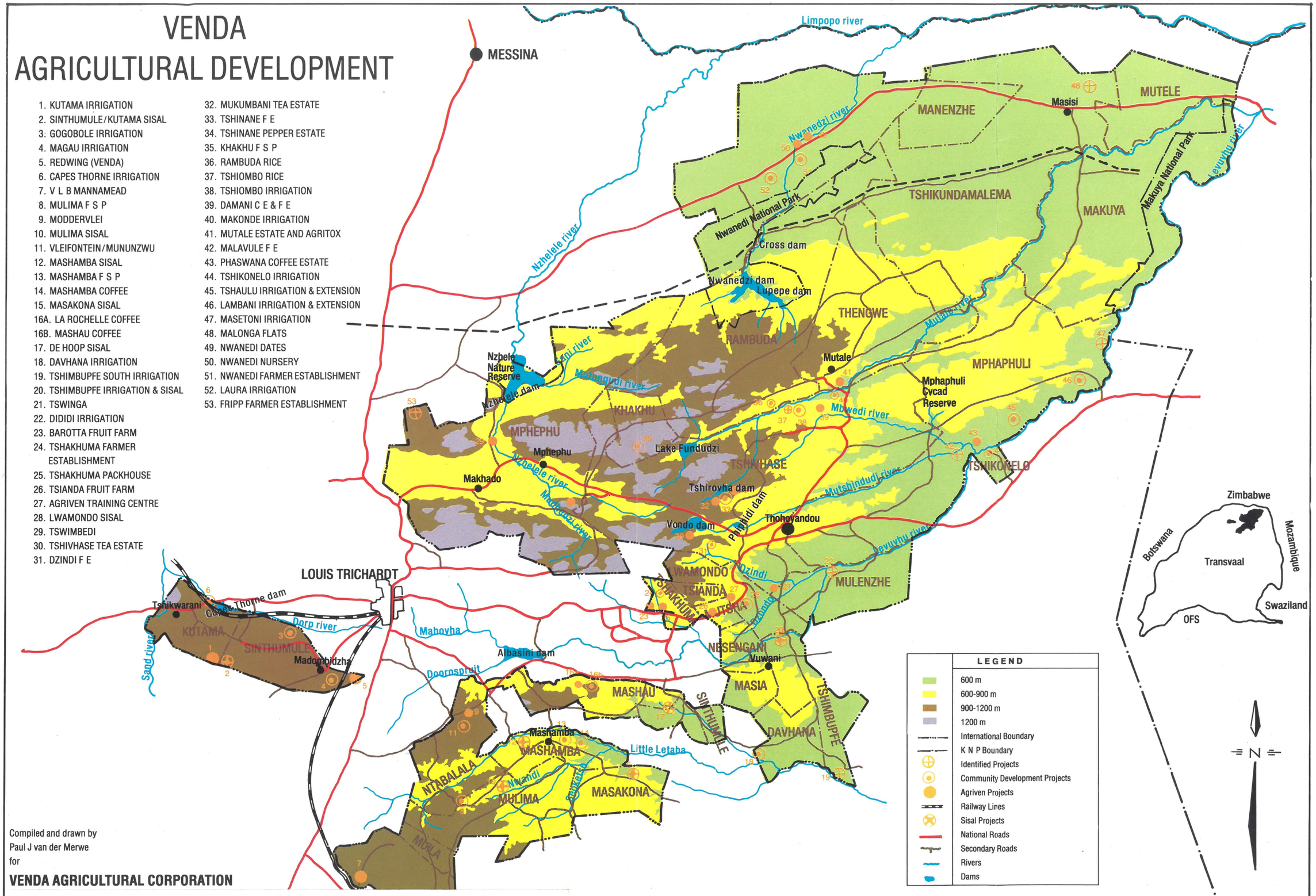
4.1.1 Climate

The study area receives summer rainfall estimated at an average of 800 mm per annum, ranging from 300 mm in the northern and eastern parts to over 2000 mm on the eastern slope of the Soutpansberg. Mean summer temperatures vary between 24°C—26°C. The highest temperature recorded is 41°C while the mean winter temperature exceeds 15°C (Weather Bureau 1986).

The area can be regarded as almost hail free since less than half a day's hail is recorded per annum. The area has a ratio of 1:7(yrs) of frost occurrences (Ehlers 1974).

VENDA
AGRICULTURAL DEVELOPMENT

1. KUTAMA IRRIGATION
2. SINTHUMULE/KUTAMA SISAL
3. GOGOBOLE IRRIGATION
4. MAGAU IRRIGATION
5. REDWING (VENDA)
6. CAPES THORNE IRRIGATION
7. V L B MANNAMEAD
8. MULIMA F S P
9. MODDERVLEI
10. MULIMA SISAL
11. VLEIFONTEIN/MUNUNZWU
12. MASHAMBA SISAL
13. MASHAMBA F S P
14. MASHAMBA COFFEE
15. MASAKONA SISAL
16A. LA ROCHELLE COFFEE
16B. MASHAU COFFEE
17. DE HOOP SISAL
18. DAVHANA IRRIGATION
19. TSHIMBUPFE SOUTH IRRIGATION
20. TSHIMBUPFE IRRIGATION & SISAL
21. TSWINGA
22. DIDIDI IRRIGATION
23. BAROTTA FRUIT FARM
24. TSHAKHUMA FARMER ESTABLISHMENT
25. TSHAKHUMA PACKHOUSE
26. TSIANDA FRUIT FARM
27. AGRIVEN TRAINING CENTRE
28. LWAMONDO SISAL
29. TSWIMBEDI
30. TSHIVHASE TEA ESTATE
31. DZINDI F E
32. MUKUMBANI TEA ESTATE
33. TSHINANE F E
34. TSHINANE PEPPER ESTATE
35. KHAKHU F S P
36. RAMBUDA RICE
37. TSHIOMBO RICE
38. TSHIOMBO IRRIGATION
39. DAMANI C E & F E
40. MAKONDE IRRIGATION
41. MUTALE ESTATE AND AGRITOX
42. MALAVULE F E
43. PHASWANA COFFEE ESTATE
44. TSHIKONELO IRRIGATION
45. TSHAULU IRRIGATION & EXTENSION
46. LAMBANI IRRIGATION & EXTENSION
47. MASETONI IRRIGATION
48. MALONGA FLATS
49. NWANEDI DATES
50. NWANEDI NURSERY
51. NWANEDI FARMER ESTABLISHMENT
52. LAURA IRRIGATION
53. FRIPP FARMER ESTABLISHMENT



Compiled and drawn by
Paul J van der Merwe
for
VENDA AGRICULTURAL CORPORATION

Figure 1. Map showing the location of the study area (former Republic of Venda).

Gerrie van Heerden JHB (011) 646-0031

4.1.2 Water resources and current use

Venda can be divided into four regions, namely middle (central), northern, western and southern regions. The whole middle region falls in the Luvuvhu catchment area. The main rivers draining this catchment are the Luvuvhu (Levubu), Mutale via Tshirovha in the northwest and the central area of Thathe-Vondo respectively, Mutshundudi in the south, Tshinane in the east, Dzindi and Dzondo in the south-east. The Nzhelele in the west is a catchment area of the Limpopo River. All these rivers have associated perennial tributaries. The rest of the regions are relatively dry and depend mainly on underground water. The Nwanedzi River, however supplies water to the Nwanedzi Nature Reserve and to farmers in the Messina Region.

Mean annual runoff is excellent and water quality is good except in the Sinthumule area where borehole water has been reported to have a high nitrate concentration. A number of dam sites exists and their economics vary from one site to another. Presently the Vondo Tshakhuma, Lupepe, Nwanedzi, Nzhelele, Mutshedzi, and Damani Dams form the basis of the regional potable water supply.

4.1.3 Soils and land capability

Soil forms are described according to Macvicar *et al.*'s (1977) soil classifications (a binomial system for South Africa).

Variation in soil character is generally attributable to geomorphology, climate and mother material. The broad soil distribution follows land form patterns (Ehlers 1974). Mountain scarps and plateaux, comprising of sandstones, are largely covered by shallow soils with low agricultural potential. The rolling sub-montane areas, comprising Waterberg lavas, is predominately occupied by deep red clay soils, where the limiting factors (stoniness, steepness of slopes, water and accessibility etc) affecting land capability are physical. These two types of soil

covers the following areas of specimens collection: Makwarela, Tshakhuma, Fondwe and Khalavha.

On the lower lying African surfaces with undulating landscapes, where rocks are not exposed, soils and landforms lend themselves to agricultural production. Soils on Waterberg lavas, as well as those on pre-weathered Basement Complex rocks are red, generally deep and well drained. The following areas where specimens were collected are classified as the lower lying African surfaces: Malavuwe and Mashamba to Solomondale (south of Mashamba).

On exposed Basement Complex rocks the soils are generally shallow and seasonally wet. The Basement Complex soils tend to be light textured in more elevated positions with heavier textured soils in the drainage lines. These soils are generally low in production potential and are present in the Makonde and Thengwe areas.

The waterlogging capacities of some of the non-stony soils may allow production of long term crops under dryland conditions, provided that rainfall exceeds potential evapotranspiration. However, stony soils and sandy shallow Basement Complex soils have a waterlogging capacity that is too low for the production of any crops that require moisture in winter or spring to initiate flowering. The geological forms described above, are common at Thohoyandou (where much of the present study was conducted) and some areas that fall within the lower lying African surfaces soil forms, like Malavuwe and Mashamba.

4.1.4 Vegetation

According to Acocks (1953), Venda is characterised by three main veldtypes, namely mountain sour veld including Afromontane forest (*Drypetes gerrardii-Olea capensis* forest), Lowveld Sour Bushveld (*Acacia sieberiana-Acacia polyacantha* woodland) and Mopane Veld (*Colophospermum mopane*).

4.2 Materials and methods

4.2.1 Relish preference

Relish preference was estimated by interviewing people in rural and urban areas of Venda. Each person was asked to complete a questionnaire (see Appendix 1). The category "Sex" was included to establish whether women are more informed about relishes than men. The general perception is that women show more interest in relishes than men. "Nationality" was included to make sure that all inteviewees were Venda by birth, while the category "Period of stay" was included on the assumption that the longer a person stays in the area the more relish knowledge he/she aquires. Interviewees were picked at random.

Relish preference studies were conducted using ten relishes that are generally available in the local markets. The main purpose of the survey was to determine the relative popularity of these ten relishes and assess taste preference among age groups. Although chosen somewhat subjectively, it is generally accepted that these are the ten most popular relishes. Results were expressed in percentages (how many times a specific relish was mentioned as the most preferred). A distinction was made between the three age groups, namely: A) young people (n = 84), age 12—15 years, mainly from Phaswana High School, B) young adults (n = 93), age 20—25 years, mainly from Tshisimani College of Education and C) older adults, age 30—65 years, mainly from Mutale Agricultural Estate as well as interviewees picked at random in various areas of Sibasa, Khalavha, Thohoyandou, Tshifudi and Tshakhuma (n = 160).

4.2.2 Moisture content determination

4.2.2.1 Introduction

Joslyn (1970) rated moisture determination as the most important and widely used analytical measurement in the processing and testing of food products. Moisture content has been used as an index of stability and a measure of yield and quantity of food solids. Food storage life, processing and packaging conditions are influenced by the partial pressure of water vapour of the atmosphere in thermal and moisture equilibrium with the food. The relationship between water content and enzyme activity was investigated and it was found that foods of relatively low moisture content are a limiting factor in amylase activity. Blain (1962) and Acker (1962) reported that the nonenzymic browning of dehydrated fruits and vegetables is drastically inhibited by a decrease in moisture content, while denaturation of proteins and oxidative rancidity increase with decrease in moisture content. The advantage is utilised by increasing storage ability by decreasing the amount of available water. This occurs during the preservation of food by drying and dehydration processes. Hamm (1960) has argued that water holding capacity is directly proportional to the taste and tenderness of the food products. Moisture content of the dried food solids must be known in determining the products status to meet the requirements of the pertinent standard of identity, quality and marketing restrictions. In developing relishes with commercial potential, their moisture content must be accurately known if they are to be marketed in the dried form.

Rockland & Stewart (1981) have described moisture determination as the most difficult exercise that food chemists are faced with, because of the difficulty of completely separating all the water from the product without causing decomposition of the product. The loss of volatile constituents from food is also another factor which must be considered. Water exists in three forms, viz, solvent, absorbed as a very thin mono-molecular or polymolecular layer on the internal and external surfaces of solid components by molecular forces or in fine

capillaries by capillary condensation, and in chemical combination. It has been found that for most dried products the moisture content required for good storage stability, agrees very closely with the amount representing the static monomolecular layer of absorbed water. This is what has led to the proposal that the minimum water content for dehydrated foods be defined in this way, where it ranges from 2—6% by weight. Drying methods for determining moisture content have been recommended by Rockland & Stewart (1981) based on the separation of water from the food solids and its measurement by resulting loss in weight or by measurement of the amount of water separated. According to these two authors, the removal of water may be accomplished by drying procedures ranging from drying in an evacuated desiccator over an absorbent to drying *in vacuo* in an oven heated to temperatures more or less 70°C. When water is the volatile component present, chemical reactions leading to changes in weight during drying occur only to a negligable extent and the removal of water is essential and complete. Extensive investigations of moisture determination by drying in which an attempt was made to develop a procedure to assure complete recovery of water present and correct errors resulting from decomposition were carried out by Nelson & Hulett (1920), as reported by Rockland & Stewart (1981). It was found that moisture is retained by biological products at least to temperatures as high as 365°C, the critical temperature of water.

4.2.2.2 Procedure (oven-dried material)

Moisture tins were placed in a forced draught oven at a temperature of 103°C for one hour. This procedure was performed twice. Oven-dried samples were milled into a fine flour (samples were dried at 50°C overnight). Dry tins were transferred to a desiccator using metal tongues. After five minutes the numbered tins were weighed using an analytical balance. Approximately two grams of flour were placed into the tins and reweighed. The tins were then placed in an oven at 50°C overnight. Thereafter the tins were removed from the oven using metal tongues and placed in a desiccator to cool for ten minutes. The dried tins were then weighed using an analytical balance. The following formula was used to determine

moisture percentage: % Moisture = (wt oven-dried flour - tin) - (wt dry flour - tin)/ wt oven-dried flour - tin X 100 (Taylor 1994a).

4.2.2.3 Procedure (fresh material)

Fresh material was collected in the morning and weighed on an analitical balance. All samples were then dried in an oven until completely dry and then re-weighed. The procedure was repeated twice for each sample. The following formula was used to determine moisture percentage: % moisture = (wt fresh material - tin) - (wt dried material - tin)/wt fresh material - tin X 100 (Taylor 1994a).

4.2.3 Protein content determination

4.2.3.1 Introduction

The protein content of a food is one of the most important measures of its nutritional value. Fennema (1985) defined proteins as molecules of great size, complexity and diversity which are a source of dietary amino acids that are used for growth and maintenance of people. These micromolecules involve many vital processes associated with all living matter. For example, in mammals, proteins function as structural components of the body. Muscles and internal organs are largely composed of proteins, the mineral components of bones are held together by collagenous proteins while skin and protective covering of the body counts for 10% of the total body proteins. There are proteins that function as biocatalysts to regulate chemical reactions within the body. These include processes like digestion, metabolism, excretion and conversion of chemical energy into mechanical work. Antibodies and modified plasma globulin protein defend against the invasion of microorganisms that cause various diseases. Due to food shortages that are likely to become acute as the population increases, lack of adequate proteins poses a serious life threat because protein requirements per kilogram of bodyweight remain constant throughout adult life. Based on the functions which proteins provide in human life, a knowledge of the composition, structure and

chemical properties of the raw materials, specifically proteins, must be available for the future use of vegetable relishes to best meet humankind's needs or to introduce new sources of food proteins.

In the case of most foods, proteins are particularly difficult to measure because of the partially insoluble nature of the food. The kjeldahl method is most commonly used to estimate the protein content of foods. The method involves determining the nitrogen content of the food and using a convention factor of 6,25 to estimate the protein content. The kjeldahl method comprises of three stages: digestion of the sample, distillation and titration. In this study a Buchi apparatus, which distils automatically, was used.

4.2.3.2 Procedure

Approximately one gram of milled (oven-dried) plant sample was weighed using an analytical balance. After recording the weight, the flour was transferred to a digestion tube. To each tube the following were added: 15 ml of concentrated sulphuric acid and one catalyst tablet. Tubes were placed in the digestion track and digestion was performed at 70% power until the contents of the tube was clear. It was then further digested at 100% power until the contents became pale green.

The tubes were then transferred to the automatic distillation apparatus. Distilled water was added to the 100 ml mark, followed by 50 ml 32% sodium hydroxide to neutralise the acid. Nitrogen, in the form of ammonia, was distilled over into the receiving flask which contained 100 ml of 4% boric acid until the flask was filled to the 250 ml mark. Titration against 0,1 M HCL was carried out. The warning point is when the solution turns blue while the end point is where the solution goes grey-brown (Taylor 1992).

4.2.4 Determination of the ash content

4.2.4.1 Introduction

According to Joslyn (1970), when food and food products are heated, water and other volatile constituents evolve as vapour and the organic constituents burned in the presence of atmospheric oxygen to yield carbon dioxide and oxides of nitrogen, while hydrogen is released as water. Sulphur and phosphorus are converted to their oxides. Mineral constituents remain in the residue as oxides, sulphates, phosphates, silicates and chlorides depending on the composition of food ignited. Ash, the material remaining after oxidative combustion of all the organic matter in the food, comprises the minerals present in that food. Ash constituents include potassium, sodium, calcium and magnesium in large quantities, aluminium, iron, copper, manganese and zinc in small quantities and arsenic, iodine, fluorine and other trace elements. Ash determination of relishes is therefore important to establish their mineral contents.

4.2.4.2 Procedure

Silica crucibles were dried in a muffle oven, allowed to cool in the muffle oven and then transferred into the desiccator using metal tongues. When the crucibles were cool, they were weighed to the nearest 0,1 mg using an analytical balance. Approximately two grams of finely milled flour of each sample was transferred to the crucibles and spread in a thin layer. The crucibles containing the samples were re-weighed and placed into a muffle oven and heated over night at 550° C, until the samples were uniformly grey. Crucibles were allowed to cool and transferred into the desiccator. They were then re-weighed.
The following calculations were made:% ash = (mass ash + crucible) - mass crucible / (mass food + crucible) - crucible X 100 (Taylor 1994b).

4.2.5 Sugar content

Sugar content was determined by adding moisture, protein and ash (minerals) contents and then subtracting the total from 100%.

4.3 Tshivenḓa plant names

As in the case of most African tribes, the Vhavenḓa have names for only those plants which have specific significance to the people. Plants which have names include those that are used as food, medicine (either for people or livestock), fire wood, timber and wood carving. The Vhavenḓa had no interest in the aesthetic qualities of plants, therefore there are no Tshivenḓa names for ornamental plants as such.

Jones & Luchsinger (1979) have discussed some of the problems associated with common or vernacular names. These include:

a) Vernacular names are not universal and usually applied only in a single language. For example, tshivenḓa is spoken by only about 1 000 000 people in southern Africa. Furthermore, the language is difficult to pronounce because of sounds not commonly found in English.

b) Vernacular names usually do not provide information indicating the generic and the family relationships of the species.

Tshivenḓa common names are derived in many different ways, for example:

- texture of the leaves. This quality may refer to either cooked or uncooked leaves. For example, *Delele* or *Mulembu* (*Corchorus tridens)* refers to plants whose leaves are slippery and/or slimy when

cooked, while *Zavha-zavha* or *Muvhazwi* (*Obetia tenax)* refers to those plants that have stinging hairs that irritate the skin when collecting.

- *Curcubita maxima* has been named *Thanga,* which means if planted together with other crops at the same time, it can be harvested earlier than other crops.

- some plants plants are named after their taste. For example, *Tshibavhe (Mormodica balsamina)*, which means a "bitter taste".

- some plants are named after a specific geographical area in which they grow. For example, *Ḓaleḓale* (*Chenopodium polyspermum*) got the name because it is found in dumping sites, even though most of the Vhavenda relishes are found in dumping sites.

- some names refers to the ability of a plant to be preserved for future use. For example, *Muṋawa* (*Phaseoulus* sp.) which means "long storage life", refering to the fact that it can be cooked, dried and stored to be used after a year.

Well known plants may have more than one common name. For example *Momordica balsamina* is known under the names *Lugu* and *Tshibavhe.* Two or more plants may also have similar vernacular name. For example, *Amaranthus hybridus* and *Amaranthus thunbergii* are both called *Vowa.*

CHAPTER 5

PICKING AND GENERAL PREPARATION OF RELISHES

5.1 Introduction

The groups that make up the Vhavenda nation (see Chapter 2) all pick and prepare relishes in a similar fasion. This chapter elaborates on the cultural practices concerning the picking and general preparation of these plants.

5.2 Picking

Vegetable or relish picking has been and still is the cultural role of the Vhavenda women and girls. It is considered equivalent to other cultural activities like weeding, ploughing, wood gathering and caring of livestock. Picking requires a knowledge of the identity of the plants as well as the parts to be picked. Such knowledge is obtained through experience by participating during picking. The uprooting of plants and the removal of branches (in the case of larger plants) is usually forbidden so as not to kill the plant and to ensure its continual growth. This is especially the case with culturally significant plants, for example relishes that have medicinal properties.

Picking is done with the fingers and only soft, tender leaves, fruits and flowers are harvested. In the case of *Cucurbita maxima*, for example, leaves, flowers and young fruits are harvested. Picking methods differ depending on the relish. In some cases special care must be taken, as certain parts of a plant may be poisonous, for example the fruits and flowers of *Cucumis zeyheri* (Mabogo 1990).

Relishes that are cooked together can be picked together and placed in the same container. Some relishes (*Cucurbita maxima* and *Bidens pilosa*, for example) are not picked together or placed in the same container as this is forbidden by Vhavenda custom. Picking is always followed by cooking on the same day, except where picked materials are to be preserved in dried form for future use. Traditionally relishes are served three times a day, at breakfast, lunch and supper, either warm or cold. It is a tradition of the Vhavenda to serve the relish and cereal porridge separately.

5.3 General preparation

Relishes are always cooked before serving. The time of cooking varies from one relish to another (see Chapter 6). This is done to make them suitable for consumption with cereal porridge. Cereal porridge is prepared from maize, millet or sorghum meal. Water or fresh milk can be used when cooking porridge. The main types of cereal porridge in Venda are *phuthu* or *munyongo, mutuku, vhutete* (*mukonde*), *munamba* and *mukapu.* Recipes for the preparation of some of these are supplied by Coetzee (1982). Salt can be added when *phuthu* or *munyongo* (braai pap) is prepared. Porridge prepared with fresh milk is known as *munamba*. Sour (*mutuku*) porridge is prepared after water and maize meal were allowed to go through fermentation process. Tartaric acid or vinegar is also used to prepare sour porridge.

Vhutete (*mukonde*) is a traditional maize meal venda porridge, the preparation and serving which require considerable skill (Coetzee 1982: 131). The cooked porridge is ladled out in layers on a flat wooden dish. It is eaten in a prescribed way. Each person sharing the communal dish peels off one of the layers of porridge with the right hand and transfers it to the left hand. With the right hand, a piece is broken off, rolled with the fingers of the same hand into a ball and dipped (*u sevha*) into a side dish, usually a relish. As with all hand-eating techniques, etiquette demands that fingers do not touch food in the side dish nor

the mouth when the morsel is popped in (Coetzee 1982).

Ingredients frequently used during relish cooking include water, salt and tomatoes. In exceptional cases one or more condiments (ground nuts for example) are added to enhance flavour. Bicarbonate of soda or ashes of *Amaranthus hybridus* are sometimes added to expedite cooking.

The name of any particular recipe is derived from the relish which is in greater proportion or of preferred taste. Relishes are either cooked alone, or in specific combinations. *Momordica balsamina*, for example, is always cooked together with other relishes because of its bitter taste. Combinations of relishes depend on personal taste, relish availability and ritual beliefs. In Venda custom for example, it is generally believed that pregnant women who eat *Corchorus tridens* are less likely to suffer pains during childbirth. Pregnant women also generally prefer traditional relishes over "western" vegetables. It is also believed that relishes retain their flavour and taste better if cooked in clay pots over an open fire. In African cooking the favourite taste are bitter and sour-musty (Coetzee 1982).

The following are examples of the common mixtures or combinations of relishes in Vhavenda cooking:

Bidens pilosa + *Solanum nigrum*
Bidens pilosa + *Cleome monophylla*
Bidens pilosa + *Sonchus oleraceus*
Cleome gynandra + *Cleome monophylla*
Corchorus tridens + *Cucurbita maxima*
Corchorus tridens + *Corchorus confusus* + *Cucurbita maxima*
Momordica balsamina + *Cucurbita maxima* + *Corchorus tridens*

CHAPTER 6

INVENTORY OF RELISHES USED BY THE VHAVENDA

6.1 Introduction

In this chapter plant families to which recorded relishes belong are listed alphabetically and their diagnostic features and economic values are highlighted [based mainly on Dyer (1975), Heywood (1978) and Zomlefer (1994)]. Species are arranged alphabetically and for each taxon information is suppled on synonyms, vernacular names, description, geographical distribution, habitat, agricultural potential and any additional notes. Agricultural potential factors are based on nutrient analysis by Quin (1959) and Fox & Norwood-Young (1982) as well as the present study, availability in the markets, chemistry and other uses. Selected relish attributes are summerized in Appendix 2. An illustration of each taxon is supplied in alphabetical order in Appendix 3.

Pending further study, taxa for which the scientific names could not be established (due to lack of fertile material) are listed under the Tshivenda names at the end of this chapter.

6.2 Family diagnostic features and economic value

Aizoaceae

Annual or perennial herbs, undershrubs or sometimes shrubs. Leaves simple, alternate, opposite or verticillate, sometimes crowed, rarely succulent. Flowers bisexual or rarely plants dioecious, solitary or in cymes; regular; stamens definite or indefinite; ovary inferior to superior. Fruit a capsule. Seeds solitary to many. A few members are used as bedding plants as they flower profusely.

Amaranthaceae

Mostly herbs or shrubs. Leaves entire, opposite or alternate; without stipules. Flowers solitary or in axillary dichasial cymes, arranged in spike-like inflorescences, usually bracteate. Seeds usually shiny. Many species are cultivated as ornamentals, few grown as vegetables or for their seed (used as grain), particularly in Central and South America where they are believed to have medicinal value.

Asteraceae (= Compositae)

Usually herbs, rarely shrubs and trees. Leaves alternate or opposite, rarely whorled, without stipules, simple, rarely compound, pinnately or palmately veined, lobed or toothed, sometimes succulent. Vegetables are found in the genera *Carthamus, Cichorium* (chicory), *Cyanara* and *Lactuca* (lettuce). Some species contain pyrethrins which are ester-based contact insecticides. Many have medicinal properties.

Capparaceae

Usually woody, sometimes herbs. Leaves simple, alternate, usually without stipules. Flowers regular or irregular. Fruits long, narrow capsules, opening by means of two valves. Vegetables include *Cleome* spp., but various members are poisonous to some extent. Some species are used medicinally and as ornamentals.

Chenopodiaceae

Typical members are herbs with deep tap roots. Leaves small, mealy-textured or with undumentum, lobed, or spiny, alternate, without stipules. Flowers inconspicuous, arranged into spike-like or cymose inflorescences. Vegetables include *Beta vulgaris* (beetroot), *Spinacia oleraceae* (spinach). Some are used as ornamentals and for dyes.

Convolvulaceae

Mostly creeping or twining herbs. Leaves simple, alternate, rarely with stipules. Flowers bisexual, regular, often with an involucre of bracts, comprising of 3—5

sepals. Seeds sometimes hairy. Some species produce edible tubers, like *Ipomoea batatas* (sweet potato), drugs and lysergic acid (used medicinally).

Cucurbitaceae

Usually perennial climbing plants, but some are annual herbs. Leaves palmately veine; tendrils usually spirally coiled. Flowers unisexual with yellowish petals. Taxa that serve as vegetables are *Citrullus* (watermelons), *Cucumis* (cucumbers), *Cucurbita* (pumpkins), Lagenaria, Momordica and *Senchium*. *Benincasa* provides ornamentals.

Malvaceae

Herbs and trees. Leaves alternate, stipulate, often with stellate hairs. Flowers bisexual, irregular. Fruit dry, capsular or schizocarpic. Seeds often covered with fine hairs. Several members of the family are used as vegetables, particularly in areas with warm climates. Some are ornamentals.

Solanaceae

Annual or perennial herbs or shrubs. Leaves entire or variously dissected, without stipules, alternate. Flowers bisexual, usually regular and composed of five sepals and five petals. Food crops are *Capsicum* (peppers), *Lycopersicon* (tomatoes) and *Solanum* (potatoes). There are also members that have medicinal properties. Many are poisonous and others are used as ornamentals.

Tiliaceae

Trees, annual or perennial herbs. Leaves alternate, usually deciduous, simple and asymmetrical, with branched hairs; stipules present, small. Bark often fibrous and mucilaginous. Flowers borne in complex cymes in leaf axils, usually bisexual, regular, small and green, yellow or white. Fruits take various forms from globose, indehiscent to spheroidal. Used as vegetables and ornamentals. Timber obtained from *Tilia* and jute from phloem fibres of *Corchorus*.

Urticaceae

Trees, shrubs or herbs, sometimes with glandular or stinging hairs. Leaves simple, entire, serrate, or lobed, alternate, sometimes opposite, pinnately to palmately veined. Flowers usually small and inconspicuous, hypogynous to epigynous. Edible green young leaves from *Urtica* spp. Fibres from *Boehmeria*.

6.3 Relishes used by the Vhavenda

The number opposite the correct scientific name represents the voucher herbarium specimen number on which the identification is based. All specimen are housed in the H.G.W.J. Schweickerdt Herbarium (PRU), Department of Botany, University of Pretoria, Pretoria. In the recipes supplied a portion refers to the volume of an ordinary tea cup. One piece of tomato refers to ½ a medium-sized tomato.

1. *Amaranthus hybridus* L. M. Singo 05

subsp. hybridus var. erythrostachys Moq.

Family: Amaranthaceae

Synonyms:

Amaranthus peniculatus sensu Cooke & Wright non L.

Vernacular names:

Tshivenda: *Vowa*

English: Cape pigweed

Afrikaans: *Misbredie*

Description:

Erect annual herb; stem ribbed, reddish tinged. Leaves simple, ovate; arranged in clusters at the tip of the branches. Flowers very tiny, green.

Geographical distribution:

Naturalised; Eastern and southern part of South Africa and Botswana. Originally from North America.

Habitat:

Found in agricultural lands as a weed, along sides of roads, in old kraals and on dumping sites.

Season:

Summer

Harvesting:

Tender leaves are harvested.

Preparation:

Refer to *Amaranthus standleyanus.*

Agricultural potential:

- Nutrient status: apparently highly nutritious (see *Amaranthus thunbergii* for nutrient analysis, also Quin 1959 and Van den Heever 1995).
- Chemistry: contains potassium oxalate (Watt & Breyer-Brandwijk 1962, Abbiw 1990).
- Preference: highly preferred.
- Marketability: highly marketable (commonly found in markets)
- Other uses: use medicinally by the Zulu (Watt & Breyer-Brandwijk 1962) and Vhavenda (Mabogo 1990). Burkill (1985)

indicated that most *Amaranthus* sp. are used for medicinal and veterinary purposes in Kenya.

Related species:

Amaranthus thunbergii and *A. standleyanus.*

Additional notes:

Amaranthaceae has an historical dietary role in Europe, America and Africa (Quin 1959 ; Abbiw 1990). Detailed information on *Amaranthus* cultivation, its potental as a forage crop and confirmation of its high fibre content are supplied by Feine *et al.* (1979). Kader-Mohideen & Rajagopal (1974) have recorded *Amaranthus* yields of 11 tons/ha while Van den Heever (1995) reported a yield of *A. tricolor* of 13.32 tons/ha and for *A. hypochondriuchus* 43.5 tons/ha. For notes on the influence of temperature on the growth of *A. hybridus* see Fawusi *et al.* (1982/83). Ore-Oluwa *et al.* (1982/83) have reported on the mineral contents of *A. caudatus*. Cheeke (1981) argued that the presence of saponins, alkaloids, phenolics and oxalate in *Amaranthus* might have negative effects on the leaf protein concentration and quality. Several *Amaranthus* species has a history of thousands of years of cultivation as vegetables or grain crops (Feine *et al.* 1979). *A. hybridus* is used as a relish in Koakoland (Malan & Owen-Smith 1974) and in Uganda (Tillantire & Goode 1975).

2. *Amaranthus standleyanus* Parodi & Nakai M. Singo 04

Family: Amaranthaceae

Synonyms:

Amaranthus vulgatissimus sensu Thell. Non Speg.

Vernacular names:

Tshivenda: *Vowa*

English: Pigweed

Afrikaans: *Misbredie*

Description:

Erect annual herb. Stems reddish. Leaves simple, ovate; margin entire, arranged in a cluster of at least eight leaves at the tip of the branches; Inflorescence with blunt spines.

Geographical distribution:

Naturalised; north and eastern regions of South Africa; Namibia and Botswana. Originally from South America.

Habitat:

Found as a weed in agricultural fields, dumping sites, unused kraals, alongside roads and in disturbed veld.

Season:

Summer

Harvesting:

Tender leaves are harvested.

Preparation:

Only fresh material is cooked, alone or combined with *Cucurbita maxima* leaves and/or flowers.

1 portion *Amaranthus standleyanus* leaves

½ portion *Cucurbita maxima* leaves and/or flowers

1 piece tomato

1 cup of water

Salt to taste

Cook ± 40 minutes. Serve with cereal porridge.

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: contains potassium oxalate (Watt & Breyer-Brandwijk 1962; Abbiw 1990).
- Preference as food: highly preferred.
- Marketability: highly marketable (commonly found in markets)
- Other uses: related species used as ingredients in snuff (Watt & Breyer-Brandwijk 1962).

Related species:

Amaranthus hybridus L.; *Amaranthus caudatus* L.

Additional notes:

Used by the Shangaan and Tswana as a relish (Watt & Breyer-Brandwijk 1962).

3. *Amaranthus viridis* L M. Singo 23

Family: Amaranthaceae

Synonyms:

Amaranthus gracilis Desf.

Vernacular names:

Tshivenda: *Vowa*

English: Pig weed

Afrikaans: *Misbredie*

Description:

Annual herb. Leaves simple, lanceolate, margin entire, spirally arranged. Flowers small, green.

Geographical distribution:

Naturalized; South Africa. Originally from Europe and Asia.

Habitat:

Disturbed areas, along road sides, agricultural land as a weed and in unused kraals.

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

See *Amaranthus standleyanus.*

Agricultural potential:

- Nutrient status: apparently highly nutritious (see *Amaranthus thunbergii).*
- Chemistry: unknown
- Preference as food: highly preferred.
- Marketability: highly marketable (common in markets).
- Other uses: unknown

Related species:

Amaranthus thunbergii, Amaranthus hybridus.

Additional notes:

Used by the Shangaan as a relish.

4. *Bidens bipinnata* L. M. Singo 19

Family: Asteraceae

Synonyms: None

Vernacular names:

Tshivenda: *Mushidzhi-donga*

English: Spanish blackjack

Afrikaans: *Spaanse knapsekêrel*

Description:

Annual herb. Leaves opposite, compound, trifoliolate; margin serrate, lobate. Flower heads with yellow rays. Seeds black, narrow and long.

Geographical distribution:

Naturalized; southern Africa; originally from Europe and Asia.

Habitat:

Undisturbed and disturbed areas, particularly rocky places and cultivated lands.

Season:

Throughout summer.

Harvesting:

Leaves are harvested.

Preparation:

For details on preparation see *Bidens pilosa.*

Agricultural potential:

- Nutrient status: apparently highly nutritious (see *Bidens pilosa* nutrient analysis).
- Chemistry: rich in volatile oils (Watt & Breyer-Brandwijk 1962).
- Preference as food: highly preferred.
- Marketability: highly marketable (common in markets).
- Other uses: used medicinally in West Africa (Watt & Breyer-Brandwijk 1962).

Related species:

Bidens pilosa L., *Bidens biternata* (Lour.) Merr. & Sherff, *Bidens formosa* (Bonato) Sch. Bip. and *Bidens steppia* (steetz) Sherff.

Additional notes:

Used as a relish by the Pedi (Quin 1959) and Shangaan. The Pedi also uses it as a piquant in sweetish pot-herbs (Fox & Norwood-Young 1982). Flowers and stems show antibiotic properties (Burkill 1985).

5. *Bidens pilosa* L. M. Singo 01

Family: Asteraceae

Synonyms:

Bidens leucantha (L.) Willd

Vernacular names :

Tshivenda: *Mushidzi*

English: Common blackjack

Afrikaans: *Gewone knapsekêrel*

Description:

Annual erect herb. Leaves compound, opposite, trifoliolate; margin serrate. Flower heads yellow, with or without white rays. Fruits narrow, elongated with three spines at the tip.

Geographical distribution:

Naturalised herb; South Africa, Namibia, Swaziland, Lesotho and Botswana. Originally from South America.

Habitat:

A weed in agricultural fields, abandoned land and along roadsides.

Season:

September—March.

Harvesting:

Tender leaves are harvested.

Preparation:

Usually mixed with *Cucurbita maxima* flowers (dried or fresh).

1 portion of *Bidens pilosa* leaves

¼ portion of *Cucurbita maxima* flowers

A piece of tomato

2 cups of water

¾ portion of condiments (finely milled ground nuts or marula nuts; optional)

1 cup of water

Salt to taste

Cook ± 1 hour. Serve with cereal porridge, preferably sour.

Agricultural potential:

- Nutrient status: apparently highly nutritious (see nutrient analysis; Quin 1959); contains vitamin C (Watt & Breyer-Brandwijk 1962).
- Chemistry: volatile oils show antibacterial activity (Watt & Breyer-Brandwijk 1962).
- Preference as food: highly preferred.
- Marketability: highly marketable (commonly available in markets).
- Other uses: medicinal uses includes young shoots which are chewed for the relief of rheumatism, juice used for sore eyes and ears, fresh leaves used as a poultice on sores or infused as remedy for colic (Tredgold 1986). Mabogo (1990) also indicated its use in traditional Vhavenda medicine.

Additional notes:

Used in Uganda (Tillantire & Goode 1975), Tanzania (Fleuret 1979) and Zimbabwe (Tredgold 1986) as a relish. Young leaves serve as spinach in Ghana (Abbiw 1990).

Related species:

Bidens bipinnata L.

6. *Chenopodium polyspermum* L. M. Singo 12

Family: Chenopodiaceae

Synonyms: None

Vernacular names:

Tshivenda: *Daledale*

English: Goosefoot

Afrikaans: None

Description:

Perennial herb. Leaves simple, entire or sometimes serrate or lobed, usually alternate. Flowers usually actinomorphic, hypogynous and bracteate.

Geographical distribution:

Naturalised; north and eastern regions of South Africa.

Habitat:

Disturbed places, mostly on dumping sites.

Season:

Throughout the year.

Harvesting:

Leaves are harvested.

Preparation:

Not known with certainty, it is an historical relish which is no longer utilized, perhaps because poeple have lost the knowledge on how to eliminate the unpleasant smell of its leaves.

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: contains hydrocyanic-acid (Watt & Breyer-Brandwijk 1962).
- Preference as food: not preferred.
- Marketability: poor (not in markets).
- Other uses: unkown

Related species:

Chenopodium album L., *Chenopodium ambrosioides* L., *Chenopodium multifdium* L., *Chenopodium giganteum* D. Don.

Additional notes:

Several related species are used as a relish (Zomlefer 1994). The species is claimed to be rich in potassium salts (Quin 1959).

7. *Citrullus lanatus* (Thunb.) Matsumura & Nakai M. Singo 03

Family: Cucurbitaceae

Synonyms:

Citrullus vulgaris Eckl. & Zeyh.
Colocynthis citrullus (L.) Kuntze
Momordica lanata Thunb.

Vernacular names:

Tshivenda: *Mutshatsha*
English: Wild watermelon
Afrikaans: *Karkoer*

Description:

Annual herbaceous creeper; stems hairy. Leaves cordate, margin entire and lobed. Flowers yellow, fugacious.

Geographical distribution:

Indigenous; South Africa; Namibia; Lesotho and Botswana; also further north in Africa.

Habitat:

An agricultural crop that is planted throughout Venda; also in disturbed sites.

Season:

Planted in summer.

Harvesting:

Tender leaves are harvested.

Preparation:

Only fresh material is cooked. It can be mixed with *Cucurbita maxima* flowers, *Corchorus tridens* or *Corchorus confusus*.

½ portion *Citrullus lanatus* leaves
4 portions *Cucurbita maxima* flowers
3 portions *Corchorus tridens* leaves
A piece of tomato
2 cups of water
Salt to taste

Cook for ± 30 minutes. Serve with cereal porridge (sour).

Agricultural potential:

- Nutrient status: apparently highly nutritious (see nutrient analysis).

- Chemistry: contains diterpenes, tetracyclin and triterpenes (Watt & Breyer-Brandwijk 1962).
- Preference as food: moderately preferred.
- Marketability: low (rarely found in markets)
- Propagation: from seeds.
- Other uses: seeds and fresh bitter melons are a drastic purgative. Leaves used to treat sores in domestic animals (Tredgold 1986).

Related species:

Citrullus colocynthis

Additional notes:

Used by the Shangaan, Pedi (Quin 1959), in Tanzania (Newman 1974), Kalahari (Tanaka 1976) and Zimbabwe (Tredgold 1986) as a relish. Related species contain hydrocyanic acid (Watt & Breyer-Brandwijk 1962). Also used in the Kalahari, Botswana and Transkei as a relish (Fox & Norwood-Young 1982).

8. *Cleome gynandra* L. M. Singo 11

Family: Capparaceae

Synonyms

Gynandropsis gynandra (L.) Briq.

Gynandropsis pentaphylla (L.) Briq.

Vernacular names:

Tshivenda: *Murudi*

English: Spider-wisp

Afrikaans: *Snotterbelletjie*

Description:

Much-branched annual herb, covered with glandular hairs; gives off a distinctive odour when crushed. Leaves palmately compound withe three leaflets; margin shallow toothed. Petals white, sometimes fading to pink.

Geographical distribution:

Indigenous; South Africa; Namibia and Botswana.

Season:

Summer

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked. It can be mixed with fresh flowers of *Cucurbita maxima.*

2 portions *Cleome gynandra* leaves

1 portion *Cucurbita maxima* flowers

A piece of tomato

2 cups of water

Salt to taste

Cook for ± 40 minutes. Serve with cereal porridge.

Agricultural potential:

- Nutrient status: apparently highly nutritious (see nutrients analysis).
- Chemistry: seeds contain volatile oils that resemble garlic and mustard oils (Watt & Breyer-Brandwijk 1962; Tredgold 1986).
- Preference as food: highly preferred.
- Marketability: highly marketable (common in markets).
- Propagation: from seeds.
- Other uses: used as a flavourant for sauces in east and west Africa; In Tanganyika an infusion of the leaf is used to ease birth and in Nyawedzi for internal disorders (Watt & Breyer-Brandwijk 1962). Leaves rubbed onto the chest to relieve pneumonia (Tredgold 1986).

Related species:

Cleome monophylla L.

Additional notes:

Used in Zambia (Scuddes 1962), Uganda (Tillantire & Goode 1975), Botswana (Grivetti 1978) and Zimbabwe (Tredgold 1986) as a relish.

9. *Cleome monophylla* L. M. Singo 07

Family: Capparaceae

Synonyms: None

Vernacular names :

Tshivenda: *Mutohotoho*

English: Spindle pod

Afrikaans: *Rusperbossie*

Description:

Slender erect annual herb, stem green and hairy. Leaves imparipinnate or simple, with sticky hairs on both surfaces; margin entire. Flowers pink. Fruit a long narrow capsule.

Geographical distribution:

Indigenous; South Africa, Namibia, Swaziland and Botswana.

Habitat:

Disturbed areas, regarded as a weed in agricultural land.

Season:

Summer

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked alone.

1 portion of *Cleome monophylla* leaves

A piece of tomato

1 cup of water

Salt to taste

Cook ± 30 minutes. Serve with cereal porridge.

Agricultural potential:

- Nutrient status: apparently highly nutritious; contains vitamin C. (Watt & Breyer-Brandwijk 1962).
- Chemistry: unknown
- Preference as food: moderate
- Marketability: low (rare in markets)
- Propagation: from seeds.
- Other uses: used as an anthelmintic in the East Indies and as an eye wash in Malawi (Watt & Breyer-Brandwijk 1962).

Related species:

Cleome spinosa Jacq., *Cleome hista* Oliv.

Additional notes:

Used in West Africa and by the Pedi as a relish (Quin 1959 and Tillantire & Goode 1975).

10. *Corchorus tridens* L. M. Singo 02

Family: Tiliaceae

Synonyms: None

Vernacular names:

Tshivenda: *Delele*

English: Wild-jute

Afrikaans: *Wildejute*

Description:

Erect annual herb. Leaves simple, oval; margin serrate. Flowers yellow. Fruits elongate, lobed, with three sticky organs at the tip.

Geographical distribution:

Naturalised; eastern and southern regions of South Africa; Namibia and Botswana. Originally from Europe and Asia.

Habitat:

Cultivated and abandoned lands and to a lesser extent on dumping sites. Considered a weed in monoculture practices.

Season:

September—March.

Harvesting:

Leaves are harvested.

Preparation:

Fresh or dried material is cooked alone or combined with *Cucurbita maxima* leaves and *Momordica balsamina* leaves or *Momordica foetida* leaves.

1 portion of *Cucurbita maxima* leaves
¼ portion of *Corchorus tridens* leaves
¼ portion of *Momordica balsamina* or *Momordica foetida* leaves
A piece of tomato
1 cup of water
Salt to taste

Cook ± 20 minutes. Serve with cereal porridge (sour or non-sour).

Agricultural potential:

- Nutrients status: highly nutritious (see nutrient analysis).
- Chemistry: contains the crystalline glucoside olitoriside (Watt

& Breyer-Brandwijk 1962).

- Preference as food: highly preferred.
- Marketability: highly marketable (common in markets).
- Propagation: from seed.
- Other uses: Mabogo (1990) reported that Vhavenda women eat it as a relish believing that it will ease the birth of a child.

Related species:

Corchorus olitorius L., *Corchorus capsularis* L., *Corchorus asplenifolius* Burch.

Additional notes:

Widely used in the Barberton area (Mpumalanga Province) and Swaziland as a relish (Fox & Norwood-Young 1982).

11. *Cucumis africanus* L.f. M. Singo 28

Family: Cucurbitaceae

Synonyms:

Cucumis hookeri Naudin

Vernacular names:

Tshivenda: *Tshinyagu*

English: Bitter apple

Afrikaans: *Bitterappel*

Description:

Annual herbaceous climber. Stems green. Leaves simple; margin scalloped, lobate. Flowers yellow; pedicel green. Fruit round, with soft spines.

Geographical distribution:

Indigenous; northern region of South Africa; Namibia; Swaziland and Botswana.

Habitat:

Forest (disturbed areas), cultivated land, abandoned kraals.

Season:

Spring—summer.

Harvesting:

Leaves are harvested.

Preparation:

Fresh or dried material is cooked. It can be mixed with *Corchorus tridens* leaves or *Corchorus confusus* leaves and *Momordica balsamina* leaves or *Momordica foetida* leaves.

1 portion of *Cucumis africanus* leaves
1 portion of *Corchorus tridens* leaves
¼ portion of *Momordica balsamina* or *Momordica foetida* leaves
A piece of tomato
2 cups of water
Salt to taste

Cook ± 20 minutes. Serve with cereal porridge (sour).

Agricultural potential:

- Nutrient status: highly nutritious (see *Cucurbita maxima* nutrient analysis).
- Chemistry: contains amorphous *cucumin* (poisonous to livestock and human beings), cucurbitacin-B (Watt & Breyer-Brandwijk 1962).
- Preference as food: highly preferred.
- Marketability: highly marketable (common in markets).
- Propagation: from seed.
- Other uses: used as purgative in southern Africa (Watt & Breyer-Brandwijk 1962, Mabogo 1990).

Related species:

Cucumis melo L., *Cucumis myriocarpus* Naud., *Cucumis zeyheri* (Sond.) C. Jeffry.

Additional notes:

Related species also contain cucumin; storage organ on the roots/tubers are a source of food for the Kalahari Bushman. The latter is also used as a remedy for stomach ailments (Watt & Breyer-Brandwijk 1962). The plant is popular as a relish in the Piet Retief District (Fox & Norwood-Young 1982) and commercially sold as a relish in east and west Africa (Abbiw 1990).

12. *Cucumis zeyheri* Sond. M. Singo 22

Family: Cucurbitaceae

Synonyms:

Cucumis africanus L.f. var. zeyheri (Sond.) Burtt Davy

Cucumis prohetarum L. subsp. zeyheri (Sond.) C. Jeffrey

Vernacular names:

Tshivenda: *Tshifhafhe*

English: Wild cucumber

Afrikaans: *Wilde komkommer*

Description:

Perennial climber; stems white. Leaves simple, alternate; margin scalloped. Flowers white, with green sepals. Fruit ellipsoid, yellow, covered with soft spines.

Geographical distribution:

Indigenous; northern and eastern regions of South Africa, Swaziland, Namibia and Botswana.

Habitat:

Alongside roads, often on fences and on forest margins.

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

For details on preparation see *Cucumis africanus*, but it must be cooked for about an hour.

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: contains cucurbitacin-B, cucumin (Watt & Breyer-Brandwijk 1962).
- Preferences as food: highly preferred.

- Marketability: highly marketable (common in markets).
- Propagation: from seeds.
- Other uses: widely used medicinally in southern Africa (Watt & Breyer-Brandwijk 1962).

Related species:

Cucumis africanus L.f, *Cucumis melo* L., *Cucumis colocynthis* Thunb. non. L.

Additional notes:

Used by the Shangaan as a relish. Fox & Norwood-Young (1982) also reported its use as a relish in Venda. Guillarmod (1966) reported the use of a *Cucurbita* sp. as a pot-herb in Lesotho.

13. *Grewia occidentalis* L. M. Singo 29

Family: Tiliaceae

Synonyms: None

Vernacular names:

Tshivenda: *Mulembu*
English: Crossberry
Afrikaans: *Kruisbessie*

Description:

Perennial shrub or small tree. Leaves simple, lanceolate, slightly cordate at the base; margin dentate. Flower peduncles slender, sepals long, greenish outside, purplish inside. Fruit a redish brown berry, somewhat fleshy, usually with 4 lobes.

Geographical distribution:

Indigenous; widespread in South Africa.

Habitat:

Forest margins and bush clumps, often on rocky places.

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

See *Corchorus tridens*

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: bark contains tannin and mucilage (Watt & Breyer-Brandwijk 1962).
- Preference as food: low
- Marketability: low (not found in market).
- Other uses: roots used medicinally by the Zulu for dressing wounds (Watt & Breyer-Brandwijk 1962). Used by the Vhavenda to hasten labour and to treat barrenness and impotency (Mabogo 1990).

Related species:

Grewia forbesii Harv. ex Mast, *Grewia flava* DC.

Additional notes: None

14. ***Hibiscus trionum*** L. M. Singo 10

Family: Malvaceae

Synonyms: None

Vernacular names:

Tshivenda: *Delele-mukhwayo*

English: Bladder weed

Afrikaans: *Terblansbossie*

Description:

Erect annual herb; stem hairy. Leaves deeply lobed, lower surface light-coloured; margin toothed. Flowers white, with dark blotches at base of petals.

Geographical distribution:

Indigenous; South Africa, Namibia, Lesotho and Swaziland.

Habitat:

Disturbed areas.

Season:

Summer

Harvesting:

Leaves are harvested.

Preparation:

See *Corchorus tridens*

Agricultural potential:

- Nutrients status: apparently highly nutritious (see nutrients analysis).
- Chemistry: seed yield oils (Watt & Breyer-Brandwijk 1962).
- Preference as food: low
- Marketability: low (not found in markets).
- Propagation: from seed.
- Other uses: used medicinally in Zimbabwe to cure roundworms (Tredgold 1986, Watt & Breyer-Brandwijk 1962)

Related species:

Hibiscus irritans R.A. Dyer.

Additional notes:

Used in Zimbabwe as a relish (Tredgold 1986). Related species cultivated as a source of food and fibre (Watt & Breyer-Brandwijk 1962).

15. *Ipomoea plebeia* R. Br. M. Singo 06

subsp. africana A. Meeuse

Family: Convolvulaceae

Synonym:

Ipomoea cynanchifolia Baker & Rendle.

Ipomoea geminiflora Welw. P.P.

Vernacular names:

Tshivenda: *Mud̂uhwi*

English: None

Afrikaans: None

Description:

Perennial climber. Leaves bi-lobed; margin entire, bi-lobed. Flowers solitary, white. Fruit small, hard, round.

Geographical distribution:

Indigenous, northern and eastern parts of South Africa, Botswana, Namibia and Swaziland.

Habitat:

Disturbed areas, mostly in cultivated land.

Season:

Throughout the year.

Harvesting:

Tender leaves are harvested.

Preparations:

Apparently no longer consumed (historical relish).

Agricultural potential:

- Nutrient status: probably low.
- Chemistry: contains muritacin-A (Watt & Breyer-Brandwijk 1962).
- Preference as food: not preferred.
- Marketability: very low (not found in markets).
- Other uses: many species of *Ipomoea* have medicinal properties (Watt & Breyer-Brandwijk 1962).

Related species:

Ipomoea purpurea (L.) Roth, *Ipomoea cairica* (L.) Sweet.

Additional notes:

Related species have lime properties when burned. The Zulu use some species as snake bite remedy (Watt & Breyer-Brandwijk 1962). Widely used by the Zulu as a relish (Fox & Norwood-Young 1982). Members of the Convolvulaceae are used as a relish in Australia, Porto Rico, Philippines, North America, India and Central Africa (Quin 1959). The Sweet potato (*I. batatas*) is widely cultivated as a vegetable and its leaves are used as a relish.

16. *Laportea peduncularis* (Wedd.) Chew M. Singo 18

Family: Urticaceae

Synonyms:

Fleurya mitis (Wedd.) N.E. Br.

Vernacular names:

Tshivenda: *Dzaluma*

English: Stinging nettle

Afrikaans: *Bosbrandnetel*

Description:

Erect annual herb. Leaves alternate simple, laceolate, margin dentate. Flowers tiny, green.

Geographical distribution:

Indigenous; northern and eastern regions of South Africa.

Habitat:

Undisturbed forest.

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

Fresh material is cooked. For details on preparation see *Corchorus tridens*.

Agricultural status:

- Nutrient status: apparently highly nutritious.
- Chemistry: unknown
- Preference as food: high preferred in certain areas.
- Marketability: very low (not found in markets).
- Propagation: from seed.
- Other uses: used medicinally for various conditions in most African countries (Watt & Breyer-Brandwijk 1962).

Related species:

Laportea alatipes N.E. Br.

Additional notes: None

17. *Limeum viscosum* (Gay.) Fenzl. M. Singo 08

*subsp. **viscosum** var. **kraussii*** Friedr.

Family: Aizoaceae

Synonyms:

Limeum natalense G. Sahellend.

Vernacular names:

Tshivenda: *Tshiṱopiṱopi*

English: None

Afrikaans: *Klosaarbossie*

Description:

Small annual herb; stems prostate, often steaky due to presence of glandular hairs. Leaves on short stalk, oval. Flowers small, in dense clusters usually opposite the leaf. Fruit green and wrinkled.

Geographical distribution:

Indigenous; northern and eastern regions of South Africa and Botswana.

Habitat:

Cultivated land and to a lesser extent in natural veld.

Season:

Summer

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked. No mixture is known.

1 portion of *Limeum viscosum* leaves

1 piece of tomato

1 cup of water

Salt to taste

Cook ± 20 minutes. Serve with cereal porridge.

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: suspected to be poisonous, but tested negatively (Watt & Breyer-Brandwijk 1962).
- Preference as food: Low
- Marketability: Low
- Other uses: unknown

Related species

Limeum sulcatum (klotzsch.) Hutch. *var. salcatum,*
pterocaypum (Gay.) Heimerl. *var. pterocarpum,*
fenestratum (Fenzl.) Heimerl. *var. fenestratum.*

Additional notes.

Related species used in traditional beer by Zimbabweans (Tredgold 1986).

18. *Momordica balsamina* L. M. Singo 09

Family: Cucurbitaceae

Synonyms:

Momordica involucrata E. Mey. ex Sond.
Momordica schinzii Cogn.

Vernacular names:

Tshivenda: *Tshibavhe; Lugu*
English: African cucumber
Afrkaans: *Laloentjie*

Description:

Perennial climber with tuberous rootstock and tendrils. Leaves variously dissected or lobeb, margin toothed. Flowers white. Fruits fleshy, orange-red. Seed conspicuous, oval.

Geographical distribution:

Indigenous; South Africa, Namibia, Swaziland, Lesotho and Botswana.

Habitat:

Homestead gardens and disturbed places.

Season:

Summer

Harvesting:

Leaves are harvested.

Preparation:

See *Momordica foetida*.

Agricultural potential:

- Nutrient status: apparently highly nutritious (see nutrient analysis).
- Chemistry: contains momordicin (Watt & Breyer-Brandwijk 1962).
- Preference as food: moderate
- Marketability: highly marketable (common in markets)
- Propagation: from seed.
- Other uses: used medicinally on humans and horses as wash for fever, purgative and yaws (Watt & Breyer-Brandwijk 1962). Used by the Vhavenda as an anti-emetic (Mabogo 1990).

Related species:

Momordica foetida, M. boivinii.

Additional notes

Used in Botswana (Story 1958) and by the Sotho and Shangaan (Fox & Norwood-Young 1982) as a relish. Abbiw (1990) listed *M. balsamina* as a species with medicinal properties.

19. *Momordica charantia* L. M. Singo 17

Family: Cucurbitaceae

Synonyms: None

Vernacular names:

Tshivenda: *Lugu*

English: None

Afrikaans: None

Description:

Perennial climber. Leaves simple, sinuate, oval; tendrils not forked. Flowers white or yellow. Fruit ellipsoid, green turning orange when ripe, covered with soft spines.

Geographical distribution:

Indigenous; north eastern parts of South Africa

Habitat:

Homestead gardens.

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked together with *Corchorus tridens* and *Cucurbita maxima* leaves.

½ portion *Momordica involcrata* or *M. balsamina* leaves
2 portions *Corchorus tridens* leaves
1 portion *Cucurbita maxima* leaves
A piece of tomato
2 cups of water
Salt to taste

Cook ± 30 minutes. Serve with cereal porridge, preferably sour.

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: roots contain momordicin (Watt & Breyer-Brandwijk 1962).
- Preference as food: moderate
- Marketability: moderate (sometimes found in markets).
- Propagation: from seed.
- Other uses: used as a sedative in west Africa, for irritable stomach problems (Watt & Breyer-Brandwijk 1962).

Related species:

Momordica balsamina, *M. boivinii*.

Additional notes:

Used by the Shangaan as a relish.

20. *Momordica foetida* Schumach. M. Singo 21

Family: Cucurbitaceae

Synonyms:

Momordica cordifolia E. Mey. ex Sond.

Vernacular names:

Tshivenda: *Nngu*

English: Bushman karo, karu

Afrikaans: None

Description:

Annual climber. Leaves alternate, cordate, stalked; margin dentate. Flowers solitary. Fruit ellipsoid, bright orange- yellow. Seed dark brown, elliptic oblong.

Geographical distribution:

Indigenous; South Africa, Namibia and Swaziland.

Habitat:

Forest

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

See *Momordica balsamina*

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: contains alkaloids (Watt & Breyer-Brandwijk 1962).
- Preference as food: very low preference.
- Marketability: not marketable (rarely in markets).
- Other uses: roots are used in Paraguay as an emetic and purgative, remedy for gout, fever, haemorrhage and epilepsy, in Tanzania used as ant repellent (poisonous); used as an eardrop to cure ear ache (Watt & Breyer-Brandwijk 1962, Fox & Norwood-Young 1982, Abbiw 1990, Mabogo 1990).

Related species:

Momordica balsamina, M. boivinii.

Additional notes:

Used by the Vhavenda and Shangaan as a relish (Fox & Norwood-Young 1982).

21. *Pouzolzia mixta* Solms. M. Singo 15

Family: Urticaceae

Synonyms:

Pouzolzia hypoleuca Wedd.

Vernacular names:

Tshivenda: *Mutȟanzwa*

English: Soapbush

Afrikaans: *Seepbos*

Description:

Deciduous shrub or small tree. Leaves stalked, egg- shaped, with long tapering tips. Flowers minute, male and female on the same plant.

Geographical distribution:

Indigenous; South Africa, Namibia, Swaziland, Lesotho and Botswana.

Habitat:

Savanna, often on rocky places.

Season:

Spring.

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked, always with *Corchorus tridens* leaves.

½ portion *Pouzolzia mixta* leaves

1 portion of *Corchorus tridens* leaves

A piece of tomato

Salt to taste.

Cook ± 20 minutes. Serve with cereal porridge (sour).

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: contains 5-hydroxytryptamine, flavonoids (Watt & Breyer-Brandwijk 1962).
- Preference as food: low.
- Marketability: Not marketable (not found in markets)
- Other uses: used medicinally by the Zulu as an enema for the relief of biliousness (Watt & Breyer-Brandwijk 1962). In Zimbabwe fibers

from the bark are used to stitch wounds, while the Shangaan use the bark as a source of fibre and the Nyasa use it for fishing nets (Tredgold 1986). Widely employed in traditional medicine (Mabogo 1990).

Related species: *Pouzolzia parasitica*

Additional notes:

Obetia tenax, a distantly related species is used by the Shangaan and Vhavenda as a relish (Fox & Norwood-Young 1982).

22. *Pouzolzia parasitica* (Forssk.) Schweinf. M. Singo 27

Family: Urticaceae

Synonyms:

Pouzolzia procridioide (Wedd.) Wedd.

Vernacular names:

Tshivenda: *Makhulu-wa-dzaluma*

English: None

Afrikaans: None

Description:

Annual herb; stems brown. Leaves simple, oval, spirally arranged; margin serrate. Flowers small and inconspicuous.

Geographical distribution:

Indigenous; South Africa.

Habitat:

Forest (disturbed areas).

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

See *Laportea peduncularis*.

Agricultural potential:

- Nutrient status: apparently highly nutritious.
- Chemistry: unknown
- Preference as food: high
- Marketability: highly marketable (common in markets).
- Other uses: unknown

Related species:

Pouzolzia mixta

Additional notes: None

23. *Solanum retroflexum* Dunal. M. Singo 14

Family: Solanaceae

Synonyms: None

Vernacular names:

Tshivenda: *Muxe*

English: None

Afrikaans: *Nastergal*

Description:

Erect annual or biennial herb. Leaves simple, alternate, margin shallowly or deeply toothed. Flowers in stalked, drooping, axillary umbels; corolla white; anthers bright yellow. Berries globose, black when ripe.

Geographical distribution:

Indigenous; South Africa, Swaziland, Lesotho and Botswana.

Habitat:

Disturbed areas, particularly as a weed in cultivated land; occasionally growing in irrigation schemes.

Season:

Throughout the year.

Harvesting:

Leaves are harvested. Ripe berries are eaten uncooked by children but always in small quantities.

Preparation:

Only fresh material is cooked, mostly alone, but it can be mixed with fresh *Cucurbita maxima* flowers.

2 portions of *Solanum retroflexum*

¼ portion *Cucurbita maxima* flowers

A piece of tomato

1½ cups of water

Salt to taste

Cook ± 60 minutes. Some people prefer to change the water at least once to reduce the bitterness of the dish. Serve with cereal porridge.

Agricultural potential:

- Nutrient status: apparently highly nutritious (see nutrient analysis).
- Chemistry: contains solasodine glucosides, solanine and solamargine (Watt & Breyer-Brandwijk 1962).
- Preference as food: highly preferred.
- Marketability: highly marketable (always in markets).
- Propagation: from seed.
- Other uses: paste of green berries said to cure ringworms whereas in Zimbabwe a decoction of soaked leaves is used to treat ulcers, black water fever and dysentery (Tredgold 1986). Abbiw (1990) reported cases of livestock poisoning.

Related species:

Solanum pseudocapsicum, Solanum nigrum.

Additional notes:

Use by the Shangaan and in Zimbabwe as a relish (Tredgold 1986).

24. *Sonchus oleraceus* L. M. Singo 13

Family: Asteraceae

Synonyms: None

Vernacular names:

Tshivenda: *Shashe*

English: Sow-thistle

Afrikaans: *Melkdissel, Sydissel*

Description:

Erect annual herb with milky latex. Leaves in a basal rosette before flowering; margin irregular toothed or lobed. Flower heads almost stalkless, yellow; involucral bracts green with membranous margin. Fruit a rough nut.

Geographical distribution:

Naturalised; South Africa, Namibia, Swaziland, Lesotho and Botswana. Originally from Europe and Asia.

Habitat:

Disturbed areas.

Season:

Throughout the year.

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked. It can be mixed with *Bidens pilosa* leaves. For details on preparation see *Bidens pilosa*.

Agricultural potential:

- Nutrient status: apparently highly nutritious (Quin 1959).
- Chemistry: contains caoutchouc (Watt & Breyer-Brandwijk 1962).
- Preference as food: highly preferred.

- Marketability: highly marketable (common in markets).
- Other uses: early Cape settlers used the plant for cleansing and healing ulcers (Watt & Breyer-Brandwijk 1962).

Related species:

Sonchus bipotini Aschers., *S. elliotianus* Hiern., *S. schwenfurthii* Oliv. & Hiern.

Additional notes:

Roots used as a vermicide, eaten either raw or boiled with banana; plants also eaten by livestock (Watt & Breyer-Brandwijk 1962); used as a relish in Transkei (Fox & Norwood-Young 1982) and in Ghana (Abbiw 1990).

25. *Mufungwi* M. Singo 16

[possibly *Ipomoea wightii* (Wall.) Choisy]

Habitat:

Forest and in undisturbed areas.

Season:

Summer

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked and it can be mixed with either of the three *Amaranthus spp.* leaves (see 1—3) or *Cucurbita maxima* flowers (fresh or dried).

1 portion of *Mufungwi* leaves

¼ portion *Amaranthus* spp. leaves

¼ portion of *Cucurbita maxima* flowers

A piece of tomato

2 cups of water.

Salt to taste

Cook ± 1 hour. Serve with cereal porridge.

26. *Nyendanyendane* M. Singo 20

Habitat:

Forest

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

See *Mufungwi*

27. *Nnyoyambudzi* M. Singo 24

Habitat:

Forest

Season:

Summer

Harvesting:

Leaves are harvested .

Preparation:

See *Bidens pilosa*.

28. *Ṭanyi* M. Singo 25

[possibly *Vernonia sp.* cf. *fastigiata* Oliv. & Hiern.]

Habitat:

Sandy soils, open woodland, undisturbed areas.

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

See *Bidens pilosa*

29. *Phulule* M. Singo 29

Habitat:

Forest, disturbed areas.

Season:

Summer—autumn.

Harvesting:

Leaves are harvested.

Preparation:

Only fresh material is cooked, alone or in mixture with *Nyendanyendane* leaves.

1 portion of *Phulule* leaves

1 portion of *Nyndanyendane* leaves

A piece of tomato

1 cup of water

Salt to taste

Cook ± an hour. Serve with cereal porridge.

CHAPTER 7

RELISH PREFERENCE AND NUTRITIONAL ANALYSIS

7.1 Introduction

Results presented in this chapter are based on those ten Vhavenda relishes which were found to be most popular among the people (see questionare in Appendix 1 and the method as explained under 4.2.2). Although selected somewhat subjectively, I am confident that these are the relishes most likely to succeed if produced commercially.

7.2 Relish preference

Taste, availability and mixtures/combination were the three most important factors for the essessment of relish preference. Women clearly showed more interest in relishes than men. For example, observations have shown that men rarely bring relishes to work with them as part of their lunch packs, whereas this is very often the case with women. Taste preference varies with age. Elderly women prefer bitter tastes, and most of their recipes are based on those bitter-tasting relishes such as *Momordica foetida*. The presence of bitter relishes in mixtures also increases the preference percentage of *Corchorus tridens* by particularly elderly women. The preference rating for selected relishes is supplied in a Table 1. As to age groups differences, the following trends were observed: Group A showed little preference for bitter-tasting relishes. Group B's preference rating falls between those of groups A and C. Group C showed a high preference for most relishes, particularly the more bitter-tasting ones such as *M. balsamina* and *M. charantia*. Group A clearly showed the least interest in general. Adults are more interested in this type of food and have shown a consistently higher preference for all the listed relishes. Young people also display poor knowledge of some of

the relishes indicated by their not knowing the identity of the plants listed in the questionaire. Group C interviewees indicated that all relishes were known to them.

Table 1 Preference rating of relishes among age groups. Percentages reflect the proportion of interviewees who gave the highest rating for a particular relish. The number of interviewees who did not know the particular relish, is supplied in brackets with the percentage figure.

Species name	Group A (n=84) %	Group B (n=93) %	Group C (n=160) %	Average (n=337) %	Order of preference
Amaranthus thunbergii	34.00 (n=2)	59.00	90.00	61.00	4
Bidens pilosa	29.76 (n=4)	36.00	56.67	40.81	6
Citrullus lanatus	0.24 (n=52)	11.20 (n=5	78.33	29.92	9
Cleome gynandra	16.67 (n=8)	81.00	100.00	65.89	3
Cleome monophylla	0.24 (n=64)	29.00 (n=7)	95.00	41.41	5
Corchorus tridens	83.33 (n=1)	89.00	81.67	84.67	1
Cucurbita maxima	51.19 (n=1)	82.00	96.67	76.62	2
Hibiscus trionum	0.00 (n=54)	9.70 (n=52)	65.00	24.90	10
Momordica balsamina	0.00 (n=52)	9.70 (n=8)	93.33	34.34	8
Momordica charantia	0.24 (n=4)	11.82	93.33	35.13	7

7.3 Nutritional analysis

Results are summarized in Table 2. Most species are relatively rich in protein, with the highest value (43.87%) recorded in *Cleome gynandra* and the lowest (20.71%) in *Momordica balsamina*.

Table 2 Nutritional analysis

Species name	Moisture content (oven-dried material) %	Moisture content (fresh material) %	Protein content %	Ash (mineral content) %	Sugar content %
Amaranthus thunbergii	6.14	36.66	29.68	59.92	4.26
Bidens pilosa	6.18	29.88	23.90	58.48	11.44
Citrullus lanatus	6.20	40.06	32.84	54.29	1.42
Cleome gynandra	6.23	32.24	43.87	47.97	0.93
Cleome monophylla	7.16	36.42	35.23	54.87	2.74
Corchorus tridens	6.25	46.90	32.54	52.38	8.83
Cucurbita maxima	6.43	41.47	30.54	63.03	0.00
Hibiscus trionum	6.98	41.96	23.76	69.26	0.00
Momordica balsamina	6.24	24.50	20.71	50.89	22.16
Momordica charantia	6.95	27.04	24.69	58.58	9.78

CHAPTER 8

DISCUSSION AND CONCLUSIONS

8.1 Discussion

In Africa south of the Sahara, recent efforts to exploit the indigenous flora commercially have focused largely on fruits rather than vegetables (e.g. Mwamba 1994, Mwabumba & Sitaubi 1994, Minae *et al.* 1994, Temu & Msanga 1994). Fruits have more economic and industrial applications than vegetables, because of the many products that can be manufactured from them, including jam and jelly (Okafor & Okolo 1974, Wilson 1987, Coates-Palgrave 1983), fruit juices, wine and beer, as well as the extraction of fats and oil from seeds (Temu & Msanga 1994).

While it is necessary to improve and commercialise the Vhavenda traditional green relishes, it is also important to take into account economic, industrial applications and other useful aspects to ensure renewable resource management and economical utilisation of resources. As the product of an intensive form of agriculture, relishes have become important as cash crops for rural and urban markets, with a great potential to improve nutrition and health. It could also raise the income of farmers and provide employment opportunities. It is clearly an industry that needs encouragement by improving biomass productivity of most of the studied indigenous relishes that have agricultural potential. Statisticians record only the trade in major commercial vegetables, but ignore traditional vegetables (including relishes) that are widely produced for home consumption. The most important fact is that relishes are consumed because they are healthy, tasty and add a variety of flavours to peoples' diets. There is also little chance of malnutrition in families that use relishes frequently. Relish utilisation can be regarded as an important economic parameter since they improve health and create employment.

Green and to lesser extent, dried relishes are sold at fresh produce markets. In Venda the biggest market for relishes is at Thohoyandou. Relishes are available daily in the market whilst they are in season. Large numbers of urban dwellers are attracted to the markets. Indigenous vegetables that are commonly found in abundance at markets are *Amaranthus thunbergii, Bidens pilosa*, *Citrullus lanatus*, *Cleome gynandra*, *Cleome monophylla*, *Corchorus tridens*, *Cucurbuta maxima*, *Hibiscus trionum*, *Momordica balsamina* and *Momordica charantia*. Their popularity shows that they have considerable market potential.

The prices of relishes were generally found to be fairly uniform, with clients paying around R2.00 per 100g for fresh relishes (1994/95 prices). Most suppliers use public transport to get to the market. For this they use monthly bus tickets which currently cost about R50.00 each. Their monthly gross income is estimated to be about R600.00. These suppliers are women from the rural areas, most of whom have school qualifications between Std 8 and 10. A very low percentage of illiterate women also supply the markets.

Some indigenous relishes are preserved for winter use. There are two processes involved in the drying. The first involves picking, cooking and drying (*tshigwada)* and the second only picking and drying (*mutshovho-tshovho).* Demand for these dried relishes is less than for the fresh products. Dried relishes are consumed as a source of roughage, except for *Corchorus tridens*. The price for the dried vegetables was found to be about R1.00 per 200g (1994/95 prices). The market for dried relishes is not as extensive as that for green relishes.

Most Vhavenda relishes belong to one of the following families: Aizoaceae, Amaranthaceae, Asteraceae, Capparaceae, Chenopodiaceae, Convolvulaceae, Cucurbitaceae, Malvaceae, Solanaceae, Tiliaceae and Urtaceae, with most members belonging to the Cucurbitaceae. It is noteworthy that the majority have been associated with medicinal properties for various

diseases. Relishes consumed as a side dish are seen as a means of taking medication; as indicated in Chapter 1, the Vhavenda believe that vegetables prevent anaemia. For example, *Bidens bipinnata* shows antibiotic action (Burkill 1985), while *Bidens pilosa* is used for the relief of rheumatism, sores on eyes and ears, even colic (Tredgold 1986). *Citrullus lanatus* has been reported to contain tetracyclin (Watt & Breyer-Brandwijk 1962) which is the drug commonly used by medical practitioners as one of the broad spectrum antibiotics. Thorough chemical screening of Vhavenda relishes might lead to the discovery of useful drugs, thus leading to the use of relishes not only as food, but also as an affordable means of home medication.

Because of a general lack of published information, it was in most cases not possible to compare the findings of the nutrient analysis conducted during the present study, with the results of other workers. However, Van den Heever (1995) reported a protein content of 26.05—30.27% for species of *Amaranthus*. This is in line with a figure of 29.68% for *A. thunbergii* established in the present study and the 26.4% reported by Quin (1959), for the same species.

Relishes studied by means of nutrient analysis (vegetable protein percentages range from 23,76—43.83%) are highly nutritious at 2.00 g. All relishes which were analysed, not forgetting relish preferences should be given priority in agricultural research. The four most popular relishes are: *Corchorus tridens*, *Cucurbita maxima*, *Cleomo gynandra* and *Amaranthus thunbergii*. Future studies on Vhavenda relishes could focus on screening them to establish their medicinal properties, toxicity, active compounds, nutrient status and biomass production. Relishes that show potential on the above factors must then be studied on means of propagation, response to chemical fertilizers and its water requirements.

This study lists 29 species that are used as relishes by the Vhavenda.

Many of these are also used for similar purposes in other parts of the world. All relishes are listed with details about their names and synonyms, distribution, agricultural potential, as well as recipes for their preparation. Of the listed relishes, seven are naturalised while 22 are indigenous.

8.2 Conclusions

- Relishes still play an important role in the culinary tradition of the Vhavenḓa.
- A total of 29 relishes were recorded as being widely utilised by the Vhavenḓa. These are listed in an inventory.
- The listed relishes belong to the following families (number of species in brackets): Aizoaceae (1), Amaranthaceae (3), Asteraceae (3), Capparaceae (2), Chenopodiaceae (1), Convolvulaceae (1), Cucurbitaceae (6), Malvaceae (1), Solanaceae (1), Tilliaceae (2), Urticaceae (3) and taxa insufficiently known (5).
- More than 85% of the listed relishes are indigenous to the region.
- More than 80% of the relishes have been reported as having medicinal properties.
- Relishes are most familiar to older people. Knowledge about relishes is clearly lacking among the youth.
- Taste preference and nutrient composition (water, protein, ash and sugar) were established for the ten most popular relishes.
- Relish preference is higher in elderly people than in young ones.
- Bitter relishes are preferred by older people, particularly women.
- Based mainly on taste preference, the ten relishes considered to be most popular among the Vhavenḓa were arranged in order of preference (=popularity). These are: *Corchorus tridens* (highest preference), *Cucurbita maxima*, *Cleome gynandra*, *Amaranthus thunbergii*, *Cleome monophylla*, *Bidens pilosa*, *Momordica charantia*, *Momordica balsamina*, *Citrullus lanatus* and *Hibiscus trionum* (lowest preference).

- Moisture content (oven-dried material) ranges from 6.14% (*Amaranthus thunbergii*) to 7.16% (*Cleome monophylla*). Moisture content for fresh material ranges from 24.50% (*Momordica balsamina*) to 46.90% (*Corchorus tridens*). Protein content ranges from 20.71% (*Momordica balsamina*) to 43.87% (*Cleome gynandra*). Ash (mineral content) ranges from 47.94% (*Cleome gynandra*) to 69.26% (*Hibiscus trionum*). Sugar content ranges from 0% (*Cucurbita maxima* and *Hibiscus trionum*) to 22.16% (*Momordica balsamina*).
- Currently, less than 34% of the listed relishes are being propagated and marketed.
- Relishes do not have very specific soil requirements and are free from pests and diseases, thus making them most suitable for commercial cultivation. Under monoculture, pests and diseases might become a serious problem.
- Relishes are cooked before serving and are usually served as a side dish with a cereal porridge. Recipes are supplied for the preparation of each of the listed relishes.
- Relishes that are utilised by the Vhavenda are similar to those of other surrounding nationalities like the Pedi, Tswana, Shangaan and various Zimbabwean tribes.
- The following relishes (those with a preference of more than 50%) show greatest promise to be developed for commercial production: *Corchorus tridens, Cucurbita maxima, Cleome gynandra* and *Amaranthus thunbergii*.

SUMMARY

Indigenous relishes play an important role in the culinary tradition of the Vhavenda. These plants are apparently rich in nutrients, but, due to urbanization and more particularly, the influence of the Western diet, most have been ignored by agriculturalists, with some species even fading into obscurity. More than 80% of all relishes are still collected from the wild. These plants generally require little care and maintenance. They thrive on the prevailing rainfall, do not require fertilizers and are very resistant to pests and diseases. Some of these relishes are now found in the market places in Venda and are very popular with consumers.

Until now no detailed survey of the relishes of the Vhavenda and their agricultural potential has been undertaken. The principal objectives of the study are to compile an inventory of the indigenous relishes of the Vhavenda; to record the traditional uses of the relishes of the Vhavenda and the ways these are collected and treated for human consumption; to rate the various relishes according to a set of criteria, based on the taste preference of the local people; to conduct nutrient analyses of selected relishes; to select those relishes most suitable for commercial growing, based on criteria such as nutrient status, chemistry, propagation, marketability and any other useful information and to make recommendations on the agricultural potential of the studied relishes.

This study lists 29 plant species that are used as relishes with notes on synonyms, vernacular names, habitat, distribution, agricultural potential and related species. Seven (7) are naturalised while twenty two (22) are indigenous. The most preferred relishes are *Bidens pilosa, Citrullus lanatus, Cleome gynandra, Cleome monophylla, Corchorus tridens and Cucurbita maxima.*

Moisture content of dried material ranges between 6.14—6.95%, protein ranges between 20.71—43.87%, ash (minerals) between 50.89—73.99% and

Recipes to prepare each of the relishes are supplied. Many relishes can be cooked fresh or dry, usually single or in combination. It was found that women like relishes more than men.

It is concluded that relishes still play an important role in the culinary tradition of the Vhavenda. Listed relishes have agricultural potential. Efforts should be made to encourage cultivation of relishes on a commercial basis and/or in food plots (mixed cropping).

OPSOMMING

Venḓa het talle inheemse blaargroentes wat as bykosse 'n belangrike rol in die kooktradisie van die Vhavenḓa speel. Alhoewel die meeste blykbaar ryk is aan voedingstowwe, word hierdie plante grootliks deur landboukundiges geignoreer. Verstedeliking en die aanvaarding van 'n westerse dieet het ook sommige in vergeletelheid laat verval. Meer is 80% van al die plant bykosse word steeds in die natuur versamel. Hierdie plante verg gewoonlik min aandag en onderhoud. Hulle is by die heersende reënval aangepas, is bestand teen peste en plae en kan sonder kunsmis floreer. Van die blaargroentes is op markte in Venḓa beskikbaar en blyk besonder gewild te wees by kopers.

Tot op hede is geen gedetaileerde opname van die blaargroentes van die Vhavenḓa en hul lanboukundige potensiaal onderneem nie. Die hoof doelstellings van hierdie ondersoek was om 'n inventaris van die bykosse van die Vhavenḓa saam te stel; om die tradisionele gebruike van hierdie groentes op te teken, asook die wyse waarop hulle versamel en voorberei word; om die onderskeie plante volgens hul voorkeur te lys, gebaseer op die smaakvoorkeur van gebruikers; om die voedinstofstatus van geselekteerde blaargroentes te bepaal; om daardie blaargroentes wat die geskikste vir kommersiële verbouing mag wees te identifiseer en aanbevelings oor hul lanboukundige potensiaal te maak.

In hierdie ondersoek word 'n lys van 29 plantspesies wat as bykosse gebruik word, verskaf. Dit word vergesel van inligting oor sinonieme, volksname, habitat, verspreiding, landboukundige potensiaal en verwante verteenwoordigers. Die gewildste blaargroentes is *Bidens pilosa*, *Citrullus lanatus*, *Cleome gynandra*, *Cleome monophylla*, *Corchorus tridens* en *Cucurbita maxima*.

Voginhoud van droë materiaal varieer van 6.14—6.95%, proteïne van 20.71—43.87%, as (minerale) van 50.89—73.99% en suikers van 0.00—11.44%.

Resepte vir die voorbereiding van die onderskeie bykosse word verskaf. Verskeie kan in die vars of gedroogte vorm gekook word, óf op hul eie, óf in kombinasie met ander soorte. Vroue toon 'n groter voorkeur vir blaargroentes as mans.

Dit is duidelik dat blaargroentes steeds 'n belangrike rol in die kookkuns van die Vhavenda speel. Talle van die aangetekende blaargroentes het besliste landboukundige potensiaal. Pogings behoort aangemoedig te word om van die blaatgroentes kommersieel te verbou, of gemeng met ander groentes te plant.

ABSTRACT

A SURVEY OF THE INDIGENOUS RELISHES OF THE VHAVENDA AND THEIR AGRICULTURAL POTENTIAL

by

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The Vhavenda use indigenous plants as a source of food, medicines, firewood and timber for building and creative work. The cereal porridge that forms a basic part of their diet is relishes with green vegetables, most of which are collected from natural stands.

As a results of various factors, many plants species traditionally used as relishes are no longer collected and knowledge about their preparation is gradually being lost. A thorough survey of the plant species used as relishes by the Vhavenda had to be undertaken. The survey would help to preserve important cultural information and could also serve as a source of information for further agricultural and pharmacological studies.

The survey collected information of 29 plant species (22 indigenous and 7 naturalised). Details about their family associations, synonyms, vernacular names, description, geographical distribution, habitat, growing season, harvesting, preparation, agricultural potential, related species and additional notes were recorded.

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CURRICULUM VITAE

NNDINGENI MOSES SINGO was born on 3 June 1967 at Khakhu in Venḓa. His primary school education was obtained at Mianzwi, Gumbu and Maṱangari community schools. His secondary education was obtained at Lunwanngwe Lower Secondary, Fheṱani Lower Secondary and Mudaswali Senior Secondary schools where he matriculated in 1985. The following year he registered at the University of Venḓa where he obtained a B.Sc. degree in 1989, majoring in Botany and Zoology. In the same year he was appointed as Laboratory Assistant in the Biology Department. Through part-time studies he obtained a B.Sc.(Hons) in Botany from the same university in 1992.

In 1990 he gained employment at Agriven (Venḓa Agricultural Corporation Ltd), a position he still holds. He has worked as Agricultural Extension Officer for Subtropical Crops, Development Officer in charge of the Farmers Support Programme and presently as an Agricultural Investigations Officer (Feasibility and Viability Studies for Agricultural Crops). During 1995, he also served in a temporary capacity as a lecturer for selected courses in the Botany Department at the University of Venḓa.

He is married to Rofhiwa Irene Singo. They have a son, Unariṋe.

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APPENDICES

APPENDIX 1

QUESTIONAIRE

APPENDIX 1

QUESTIONNAIRE

1. Sex: . . . . . .

2. Nationality: . . . . . .

3. Period of stay: . . . . . .

4. List of popular relishes in the area (please indicate preference according to the scale below; also indicate if a particular relish is not known to you):

Vowa (*Amaranthus thunbergii*): . . . . . .

Mushidzhi (*Bidens pilosa*) . . . . . .

Mutshatsha (*Citrullus lanatus*): . . . . . .

Murudi (*Cleome gynandra*): . . . . . .

Mutohotoho (*Cleome monophylla*): . . . . . .

Delele (*Corchorus tridens*): . . . . . .

Thanga/Phuri (*Cucurbita maxima*): . . . . . .

Delele-mukhwayo (*Hibiscus trionum*): . . . . . .

Tshibavhe (*Momordica balsamina*): . . . . . .

Lugu/Nngu (*Momordica charantia*): . . . . . .

5. Other relishes known by the interviewee (please supply Tshivenda names): .

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6. Please indicate which relishes are cultivated and which ones are normaly left growing in cultivated land (as weed): . . . . . .

. . . . . .

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. . . . . .

Preference rating:

* = Least preference

** = Medium preference

*** = Highest preference

APPENDIX 2

SELECTED RELISH ATTRIBUTES

Table 3 Summary of selected relish attributes.

SPECIES NAME	NUTRIENT STATUS				CHEMISTRY	PREFERENCE	MARKET-ABILITY	PROPAGATION	OTHER USES
	Moisture %	Protein %	Ash %	Sugar %					
Amaranthus hybridus	—	—	—	—	Potassium oxalate	High	High	Seed	Ingredient of snuff
Amaranthus *hunbergii	6.14	29.68	59.92	4.26	Potassium oxalate	High	High	Seed	Medicinal
Amaranthus standleyanus	—	—	—	—	Potassium oxalate	High	High	Seed	—
Amaranthus viridis	—	—	—	—	—	High	High	Seed	—
Bidens bipinnata	—	—	—	—	Rich in volatile oils	High	High	Seed	Medicinal
Bidens pilosa	6.18	23.90	58.48	11.44	Vitamin C	High	High	Seed	Medicinal
Chenopodium polyspermum	—	—	—	—	Hydrocyanic acid	Low	Low	Seed	—

Citrullus lanatus	6.20	32.84	54.29	1.42	Ditrepenes; Tetracyclin; Triterpenes	Moderate	Low	Seed	Medicinal
Cleome gynandra	6.23	43.87	47.97	0.93	Volatile oils resembling garlic and mustard oils	High	High	Seed	Medicinal
Cleome monophylla	7.16	35.23	54.87	2.74	—	Moderate	Low	Seed	Medicinal
Corchorus tridens	6.25	32.54	52.38	8.83	Crystalline; Glucosides olitoricide	High	High	Seed	Medicinal
Cucumis africanus	—	—	—	—	Amorphous cucumin	High	High	Seed	Medicinal
Cucumis zeyheri	—	—	—	—	Cucumin	High	High	Seed	Medicinal
Cucurbita maxima	6.43	30.54	63.03	0.00	Cucumin	High	High	Seed	—
Grewia occidentalis	—	—	—	—	Tannin and Mucilage	Low	Low	Seed	Medicinal
Hibiscus trionum	6.98	23.76	69.26	0.00	Seeds yield oils	Low	Low	Seed	Medicinal

Ipomoea plebia	—	—	—	—	Muritacin-A	Low	Low	Seed	Medicinal
Laportia peduncularis	—	—	—	—	—	High	Low	Cuttings	—
Limeum viscosum	—	—	—	—	Suspected to be poisonous	Low	Low	Seed	—
Momordica balsamina	6.24	20.71	50.89	22.16	Momordicin	Moderate	High	Seed	Medicinal
Momordica Charantia	6.95	24.69	58.58	9.78	Momordicin	Moderate	Moderate	Seed	Medicinal
Momordica foetida	—	—	—	—	Alkaloids	Low	Low	Seed	Medicinal
Pouzolzia mixta	—	—	—	—	Flavanoids	Low	Low	Cuttings	Medicinal
Pouzolzia parasitica	—	—	—	—	—	High	High	Cuttings	—
Solanum retroflexum	—	—	—	—	Solanine	High	High	Seed	Medicinal
Sonchus oleraceua	—	—	—	—	Vitamin-C, Caoutchouc	High	High	Seed	Medicinal
TAXA INSUFFICIENTLY KNOWN									
Mufungwi	—	—	—	—	—	Low	Low	Seed	—
Nyendanyendane	—	—	—	—	—	Low	Low	Seed	—
Nnyoyambudzi	—	—	—	—	—	Low	Low	Seed	—

Tanyi	—	—	—	—	—	Low	Low	Seed	—
Phulule	—	—	—	—	—	Low	Low	Seed	—

— = Information not available

APPENDIX 3
ILLUSTRATIONS OF TAXA

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Amaranthus hybridus L.
ssp. *hybridus var. erythrostachys* Moq.*
South Africa , Northern Transvaal 22° 30° DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone.
Full sun. Level slope. Aspect: N.
Cultivated land and dumping sites.
NOTES: Erect shrub 1 m high; flowers not clearly identified. Found wild as a weed known as VOWA MPENGO and is used as an expeditor instead of soda bicarbonate.
Frequent.
COLL.: M. Singo
NO.: 5
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 70 AMA GENSPEC.: 2299.000-00750
PRU number: 079687. Genus / Species: 2299 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Amaranthus standleyanus Parodi ex Cocas*

South Africa , Northern Transvaal 22º 30º DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone.
Full sun. Level slope. Aspect: N.
Cultivated land, dumping site along roads.
NOTES: Herb with reddish stem 0,03 m high; leaves form a cluster of eight leavesat tip of branches; inflorescences just a cluster of blunt spines. Very abundant. Eaten by goats. Wild plants - relish known as VOWA.
COLL.: M. Singo
NO.: 4
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 70 AMA GENSPEC.: 2299.000-01250
PRU number: 079686. Genus / Species: 2299 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Amaranthus viridis L.

South Africa , Northern Transvaal 22° 30' CD
Thohoyandou

Block G; stand No 207, Moses Singo.
ALT.: 000000 m
HABITAT: Open woodland. Well drained clay soil.
Ful sun. Aspect: S. Level slope.
Disturbed area.
NOTES: Annual herb, marginally entire, lanceolate and spirally arranged. Flowers green. Abundant.
Eaten by goat.
Local name: VOWA.
COLL.: M. Singo
NO.: 23
COLLECTED ON 30/03/1995 DET.: PRE

FILING: Family: 70 AMA GENSPEC.: 2299.000-01600
PRU number: 080613. Genus / Species: 2299 /
Special Collection(s): Venda
Dup's: Locality: 2230CD0100

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Bidens bipinnata L.

South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Tshakhuma; Mr. Nelwhalemi Stand.
ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Sandstone.
Full sun. Aspect: W. Moderate slope.
Disturbed land.
NOTES: Annual herb 0,5 m high. Leaves compound,
lobate and oppositely arranged.Flowers has yellow rays.
Seeds black, narrow and long. Eaten by goats. Relish for
people. Weed. Local nme: MUSHIDZIDONGA.
COLL.: M. Singo
NO.: 19
COLLECTED ON 25/03/1995 DET.: A.E. van Wyk

FILING: Family: 293 CMP GENSPEC.: 9237.000-00100
PRU number: 080609. Genus / Species: 9237 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Bidens pilosa L.

South Africa , Northern Transvaal 22º 30º DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone.
Full sun. Level slope. Aspect: N.
Cultivated land.
NOTES: Herb 0,3 m high. Small yellow flowers. Seeds long with three spines at tip end.
Local name: MUSHIDZI - it is a rellish.
Abundant.
COLL.: M. Singo
NO.: 1
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 293 CMP GENSPEC.: 9237.000-00500
PRU number: 079683. Genus / Species: 9237 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Chenopodium polyspermum L.*

South Africa , Northern Transvaal 22° 30° DC
Thohoyandou
Malavuwe
Malavuwe Community Project.
ALT.: 000000 m
HABITAT: Open shrubland. Well drained clay soil. Full sun. Gentle slope. Undisturbed land.

NOTES: Erect herb ; leaves have distinctive odour when crushed. Presently not used at all but it is a historic relish utilized during hunger times.
Rare. Local name: DALEDALE.
COLL.: M. Singo
NO.: 12
COLLECTED ON 02/02/1995 DET.: PRE

FILING: Family: 69 CHN GENSPEC.: 2223.000-01900
PRU number: 079694. Genus / Species: 2223 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0400

120

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Citrullus lanatus (Thunb.) Matsumura & Nakai

South Africa , Northern Transvaal 22° 30° DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone. Full sun. Level slope. Aspect: N.
Cultivated land.
NOTES: Creeper with yellow, poorly developed flowers; hairy stem. Pollinators - bees and butterflies. Eaten by goats. Rare. Cultivated in garden. Relish known as MUTSHATSHA
COLL.: M. Singo
NO.: 3
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 120 CUC GENSPEC.: 8598.000-00200
PRU number: 079685. Genus / Species: 8598 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

121

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Cleome gynandra L.

South Africa , Northern Transvaal 22° 30° DA
Mutale
Thengwe
Nethengwe Mafanedza - Thengwe Kraal.
ALT.: 000000 m
HABITAT: Open woodland. Well drained loam soil. Full sun.
Aspect: N. Gentle slope. Garden.

NOTES: Herb; leaves give odour when crushed; tuberous roots; long fruit. Cultivated in gardens; bees as pollinators. Utilized as relish; no herbivory, local name: MURUDI. Abundant.
COLL.: M. Singo
NO.: 11
COLLECTED ON 01/01/1995 DET.: PRE

FILING: Family: 123 CPP GENSPEC.: 3082.000-00900
PRU number: 079693. Genus / Species: 3082 /
Special Collection(s): Venda
Dup's: Locality: 2230DA0200

FLORA OF SOUTHERN AFRICA
Cleome monophylla L.

South Africa , Northern Transvaal 22° 30° DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone.
Full sun. Level slope. Aspect: N.
Cultivated land.
NOTES: Herb 0,03 m high; flowers pink-purple clustered in at tip of branches. Rare. Bees pollinators and to lesser extent flies. Weed but used as relish. Local name: MUTOHOTOHO.
COLL.: M. Singo
NO.: 7
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 123 CPP GENSPEC.: 3082.000-01600
PRU number: 079689. Genus / Species: 3082 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Corchorus tridens L.

South Africa , Northern Transvaal 22º 30º DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone.
Full sun. Level slope. Aspect: N.
Cultivated land.
NOTES: Erect herb 0,4 m high. Yellow flowers - very tiny
Stem is hard but green. Lobed seeds. Eaten by goats.
It is a very reliable relish locally called DELELE.
Very abundant.
COLL.: M. Singo
NO.: 2
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 92 TIL GENSPEC.: 4953.000-01200
PRU number: 079684. Genus / Species: 4953 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

124

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Cucumis africanus L.f.

South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Khalavha.

ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Shade. Aspect: W
Moderate slope.
Disturbed.
NOTES: Annual herb / climber 0,25 m high, simple leaves, scalloped, lobate and spirally arranged. Flowers yellow with green pedicel. Fruit big with soft spines. Rare.
Cult. in gardens. Local name: TSHINYAGU.
COLL.: M. Singo

NO.: 28
COLLECTED ON 20/04/1995 DET.: A.E. van Wyk

FILING: Family: 120 CUC GENSPEC.: 8599.000-00100
PRU number: 080616. Genus / Species: 8599 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500

125

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

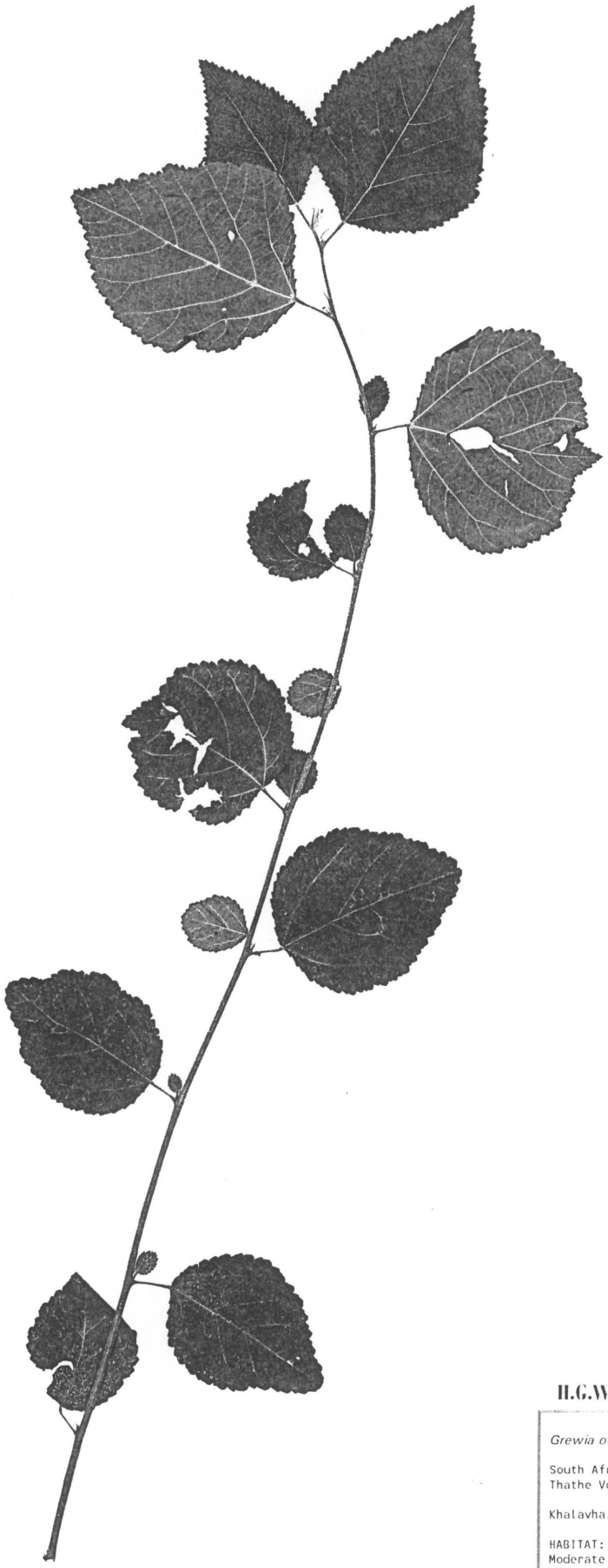
FLORA OF SOUTHERN AFRICA
Cucumis zeyheri Sond.

South africa , N. Transvaal 23° 29° BC
Between Pietersburg and Louis Trichard.

Solomonsdale.
ALT.: 000000 m
HABITAT: Open shrub land. Well drained gravel soil. Granite. Full sun. Aspect: S. Level slope. Undisturbed.
NOTES: Perennial climber, leaf margins scalloped, lobate and alternately arranged. Flowers white with green sepals. Occasional.
Local name: TSHIFHAFHE.
COLL.: M. Singo
NO.: 22
COLLECTED ON 30/03/1995 DET.: A.E. van Wyk

FILING: Family: 120 CUC GENSPEC.: 8599.000-01600
PRU number: 080612. Genus / Species: 8599 /
Special Collection(s):
Dup's: Locality: 2329BC0100

126



PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Grewia occidentalis L.

South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Khalavha.

ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Shade. Aspect: W
Moderate slope.
Disturbed.
NOTES: Annual herb 0,5 m high. Leaves dentate, ovate
and alternately arranged. Stem hard but green in colour.
Rare.
Local name: MULEMBU.
COLL.: M. Singo

NO.: 29
COLLECTED ON 20/04/1995 DET.: A.E. van Wyk

FILING: Family: 92 TIL GENSPEC.: 4966.000-01700
PRU number: 080617. Genus / Species: 4966 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500

PRU
40mm

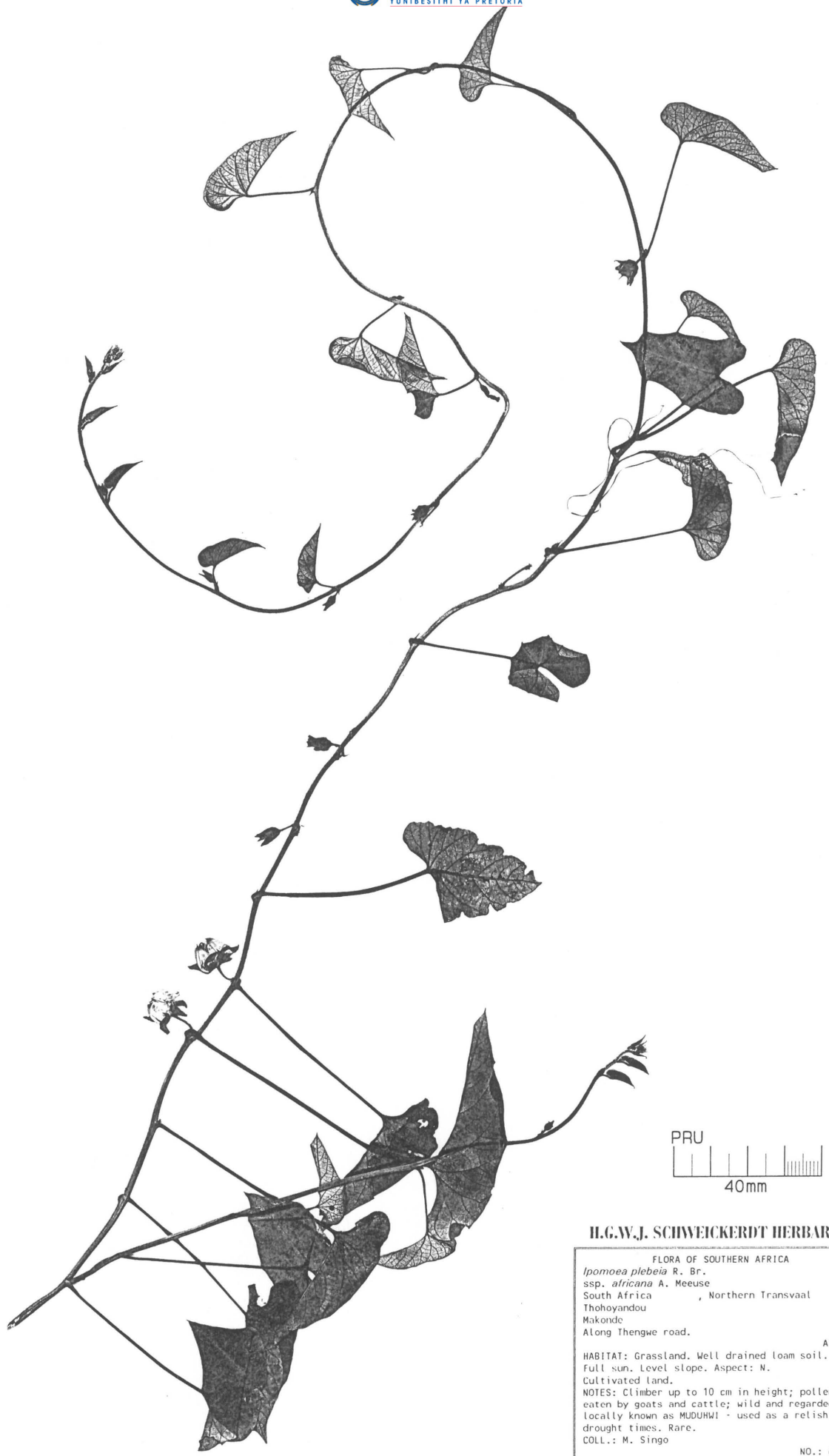
H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Hibiscus trionum L.

South Africa , Northern Transvaal 22° 30° CD
Thohoyandou

Stand no. G 207.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone. Full sun. Level slope. Aspect: N. Cultivated land.
NOTES: Shrub 0,5 m high; flowers cream and open only in the morning; stem dominated by sharp spines. Rare. Cult. in gardens through seed and utilized as relish in mixture with other species. Loc: DELELE MUKHWAYO.
COLL.: M. Singo
NO.: 10
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 95 MLV GENSPEC.: 5013.000-05300
PRU number: 079692. Genus / Species: 5013 /
Special Collection(s): Venda
Dup's: Locality: 2230CD0100



PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Ipomoea plebeia R. Br.
ssp. *africana* A. Meeuse
South Africa , Northern Transvaal 22° 30° DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone.
Full sun. Level slope. Aspect: N.
Cultivated land.
NOTES: Climber up to 10 cm in height; pollenated by bees
eaten by goats and cattle; wild and regarded as weed,
locally known as MUDUHWI - used as a relish during
drought times. Rare.
COLL.: M. Singo
NO.: 6
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 257 CNV GENSPEC.: 7003.000-04100
PRU number: 079688. Genus / Species: 7003 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Laportea peduncularis (Wedd.) Chew.
ssp. *peduncularis*
South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Tshakhuma; Christina Nevondo Stand.
ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Sandstone.
Full sun. Aspect: W. Moderate slope.
Undisturbed area.
NOTES: Annual herb with erect stem 0,5 m high.
Tiny green flowers. Leaves simple, leaflets not in pairs, dentate, asymmetrically lanceolate and spirally arranged.
Rare. Relish for people. Local: DZALUMA.
COLL.: M. Singo
NO.: 18
COLLECTED ON 25/03/1995 DET.: A.E. van Wyk

FILING: Family: 50 URT GENSPEC.: 1980.000-00400
PRU number: 080608. Genus / Species: 1980 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500

130

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Limeum viscosum (Gay) Fenzl
ssp. *viscosum var. krausii* Friedr.
South Africa , Northern Transvaal 22° 30° DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone.
Full sun. Level slope. Aspect: N.
Cultivated land.
NOTES: Climber with green flowers; leaves more or less spinally arranged. Pollinated by bees. Used as a relish.
Local name: TSHITOPITOPI.
Rare.
COLL.: M. Singo
NO.: 8
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 64 AIZ GENSPEC.: 2376.000-03200
PRU number: 079690. Genus / Species: 2376 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Momordica balsamina L.

South Africa , Northern Transvaal 22° 30' DC
Thohoyandou
Makonde
Along Thengwe road.
ALT.: 000000 m
HABITAT: Grassland. Well drained loam soil. Sandstone. Full sun. Level slope. Aspect: N.
Cultivated land.
NOTES: Climber; fruit orange-red when ripe; flowers yellow. Rare. Used as a relish but not allowed in mixture with other relishes. Local name: TSHIBAVHE.

COLL.: M. Singo
NO.: 9
COLLECTED ON 03/01/1995 DET.: PRE

FILING: Family: 120 CUC GENSPEC.: 8591.000-00100
PRU number: 079691. Genus / Species: 8591 /
Special Collection(s): Venda
Dup's: Locality: 2230DC0200

133

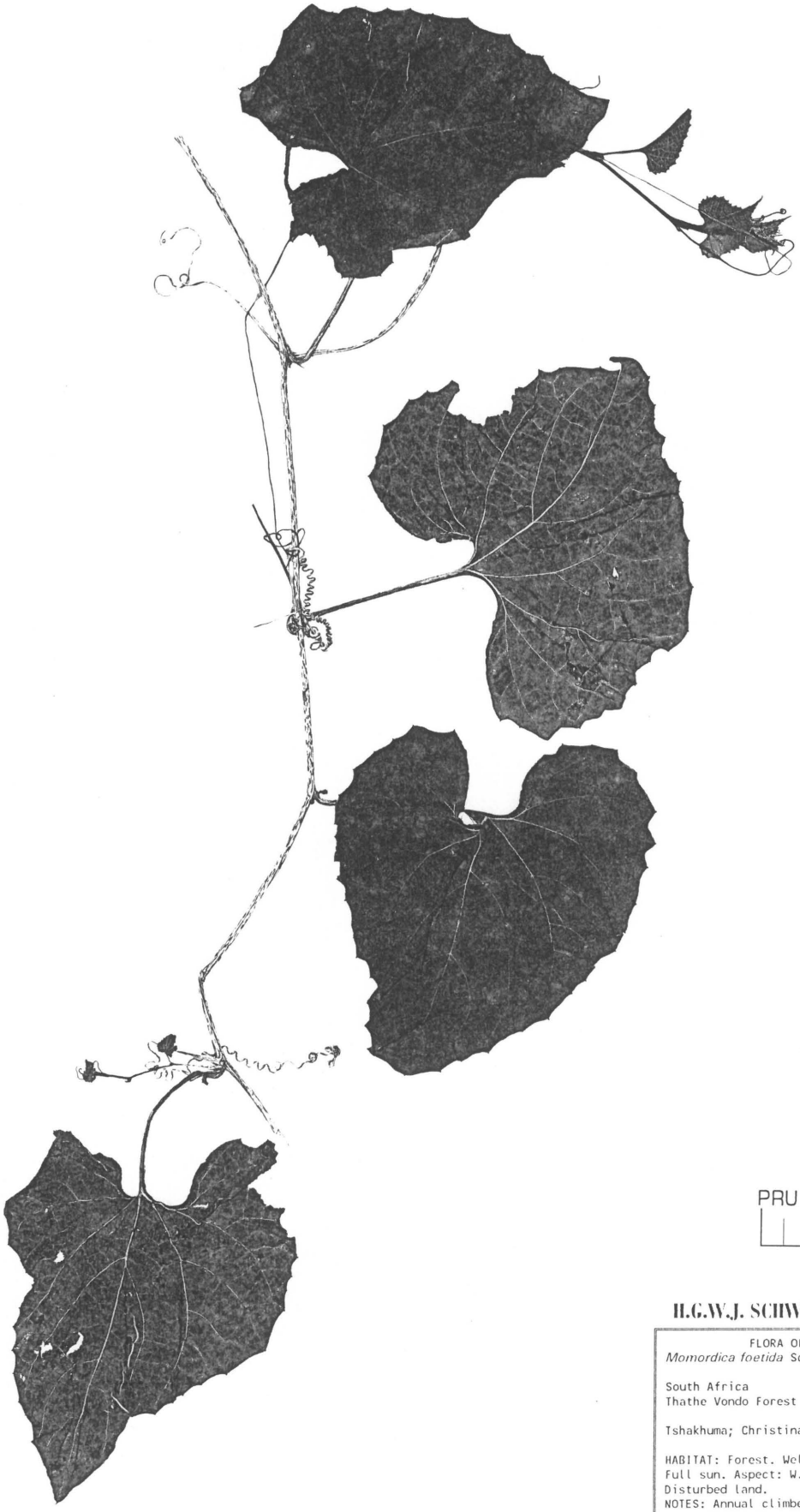
H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Momordica charantia L.

South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Tshakhuma; Christina Nevondo Stand.
ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Sandstone. Full sun. Aspect: W. Moderate slope. Undisturbed area.
NOTES: Perennial climber. Fruit ellipsoid. Flowers white or yellow. Rare. Pollinators not known. Eaten by people as a relish - cultivated on a very small scale.
Local name: LUGU.
COLL.: M. Singo
NO.: 17
COLLECTED ON 25/03/1995 DET.: PRE

FILING: Family: 120 CUC GENSPEC.: 8591.000-00300
PRU number: 080607. Genus / Species: 8591 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500



PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Momordica foetida Schumach.

South Africa , Transvaal 22º 30º CD
Thathe Vondo Forest Reserve

Tshakhuma; Christina Nevondo Stand.
ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Sandstone.
Full sun. Aspect: W. Moderate slope.
Disturbed land.
NOTES: Annual climber. Leaves stalked, dentate, cordate and alternately arranged. Rare.
Pollinators not known. Cultivated in gardens.
Local name: NNGU.
COLL.: M. Singo
NO.: 21
COLLECTED ON 25/03/1995 DET.: A.E. van Wyk

FILING: Family: 120 CUC GENSPEC.: 8591.000-00500
PRU number: 080611. Genus / Species: 8591 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500

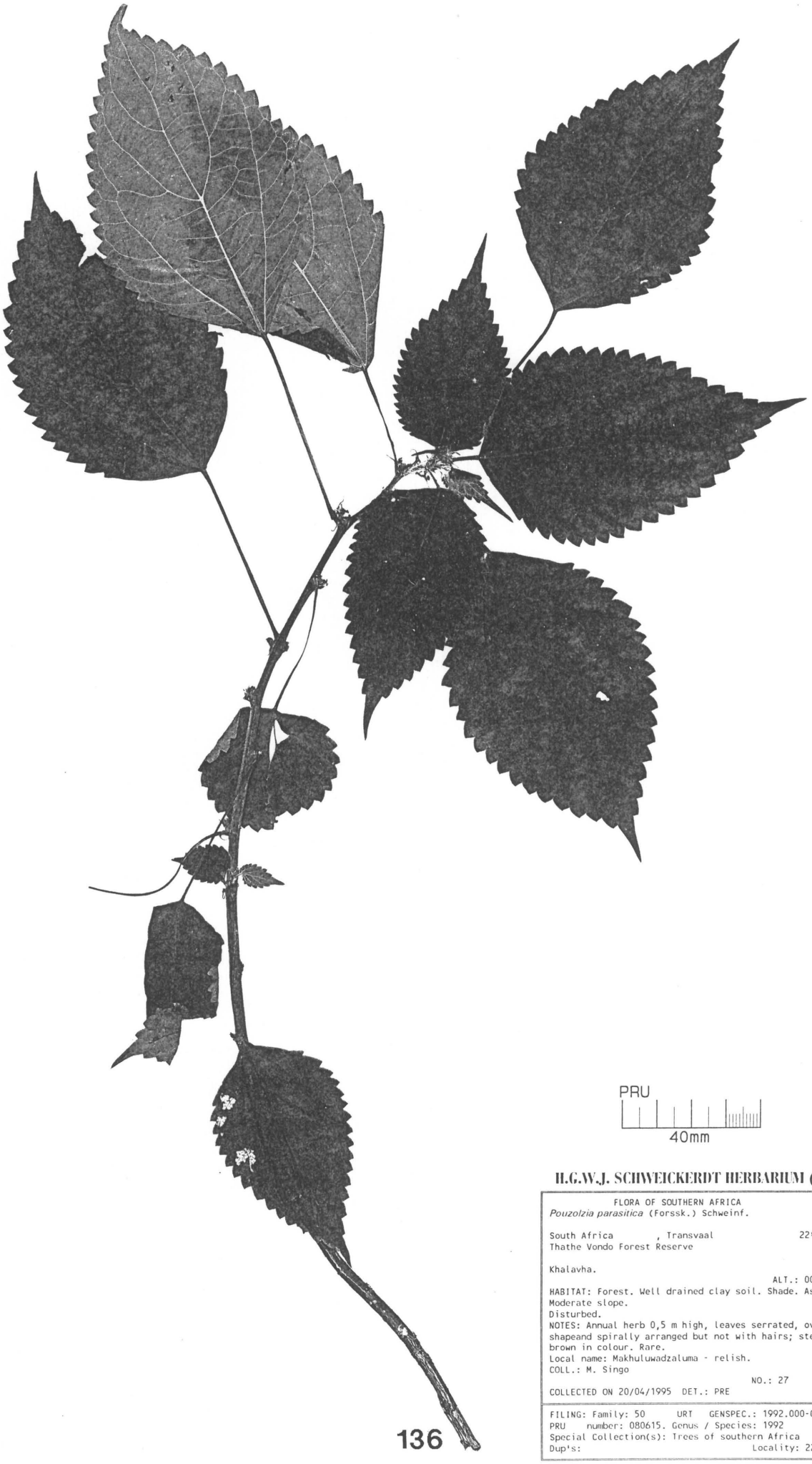
H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Pouzolzia mixta Solms.

South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Tshakhuma; Christina Nevondo Stand.
ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Sandstone.
Full sun. Aspect: W. Moderate slope.
Undisturbed.
NOTES: Perennial shrub 1,5 m high wirh erect stem.
Oval leaves white underneath, green on upper part.
Eaten by goats and cattle; Relish for people. Rare.
Local name: MUTHANZWA.
COLL.: M. Singo
NO.: 15
COLLECTED ON 25/03/1995 DET.: A.E. van Wyk

FILING: Family: 50 URT GENSPEC.: 1992.000-00100
PRU number: 080605. Genus / Species: 1992 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500



PRU
40mm

136

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Pouzolzia parasitica (Forssk.) Schweinf.

South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Khalavha.

ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Shade. Aspect: W
Moderate slope.
Disturbed.
NOTES: Annual herb 0,5 m high, leaves serrated, oval in shapeand spirally arranged but not with hairs; stem brown in colour. Rare.
Local name: Makhuluwadzaluma - relish.
COLL.: M. Singo

NO.: 27
COLLECTED ON 20/04/1995 DET.: PRE

FILING: Family: 50 URT GENSPEC.: 1992.000-00200
PRU number: 080615. Genus / Species: 1992 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500

PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Solanum retroflexum Dun.

South Africa , Northern Transvaal 22° 30° DA
Mutale
Thengwe

ALT.: 000000 m
HABITAT: Open woodland. Well drained loam soil. Sandstone. Full sun. Aspect: N. Gentle slope. Cultivated land.
NOTES: Annual erect herb 0,5 m high. Leaves imparipinnate, compound with sinuate leaf margines. Flowers yellowish. Berries black when ripe. Occasional. Eatyen by goats. Relish for people. Local nme: MUXE.
COLL.: M. Singo
NO.: 14
COLLECTED ON 25/03/1995 DET.: A.E. van Wyk

FILING: Family: 256 SOL GENSPEC.: 7407.000-05300
PRU number: 080604. Genus / Species: 7407 /
Special Collection(s): Venda
Dup's: Locality: 2230DA0200

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Sonchus oleraceus L.

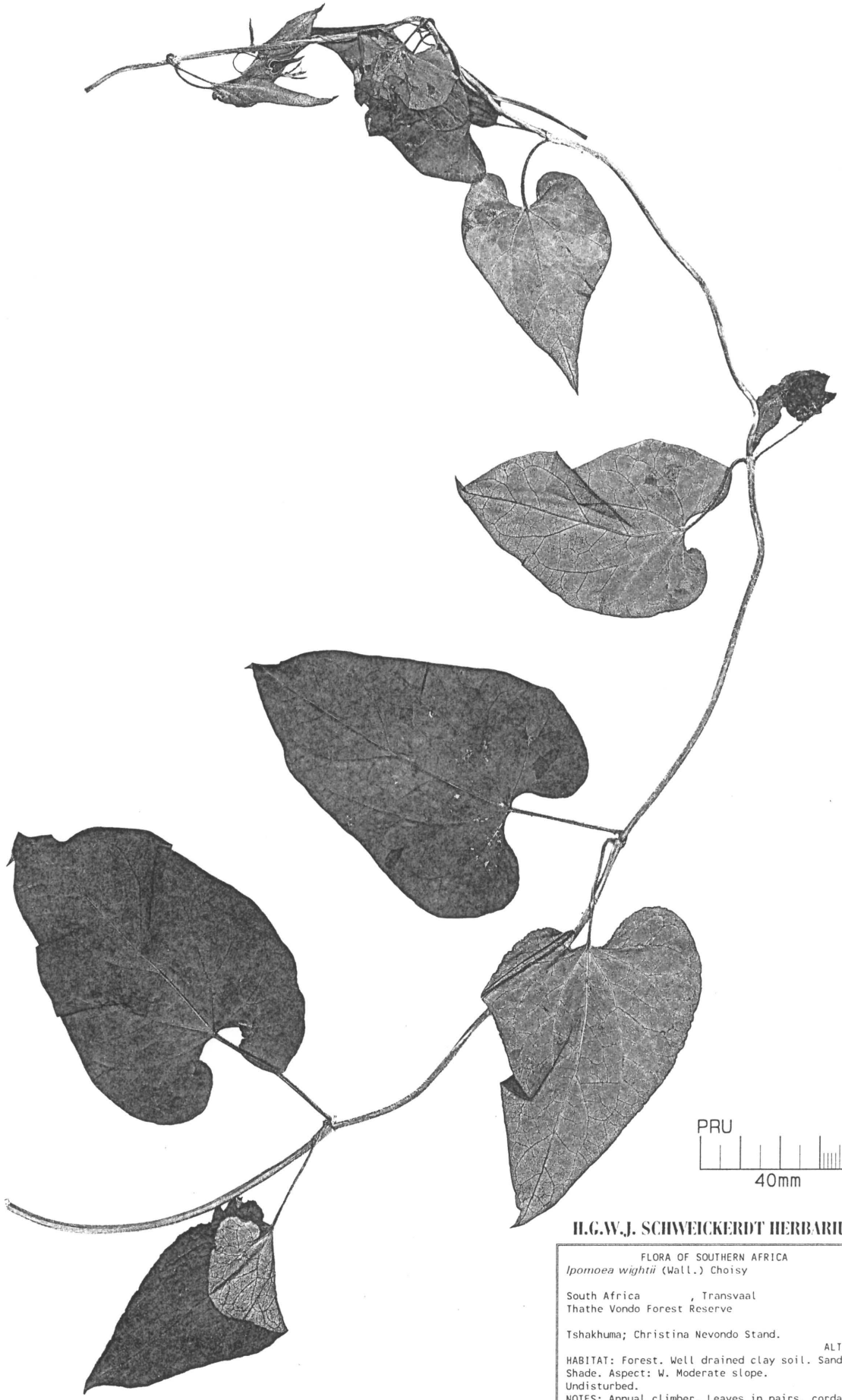
South Africa , Northern Transvaal 22° 30° CD
Thohoyandou

Makwarela. Mr. Dongola stand.
ALT.: 000000 m
HABITAT: Open shrubland. Well drained clay soil. Full sun. Gentle slope. Disturbed land.

NOTES: Herb branching from the base; leaves elongated; flowers branched. Rare. Eaten by goat.
Local name: SHASHE and is utilized as a relish.

COLL.: M. Singo
NO.: 13
COLLECTED ON 15/02/1995 DET.: PRE

FILING: Family: 293 CMP GENSPEC.: 9595.000-01000
PRU number: 079695. Genus / Species: 9595 /
Special Collection(s): Venda
Dup's: Locality: 2230CD0100



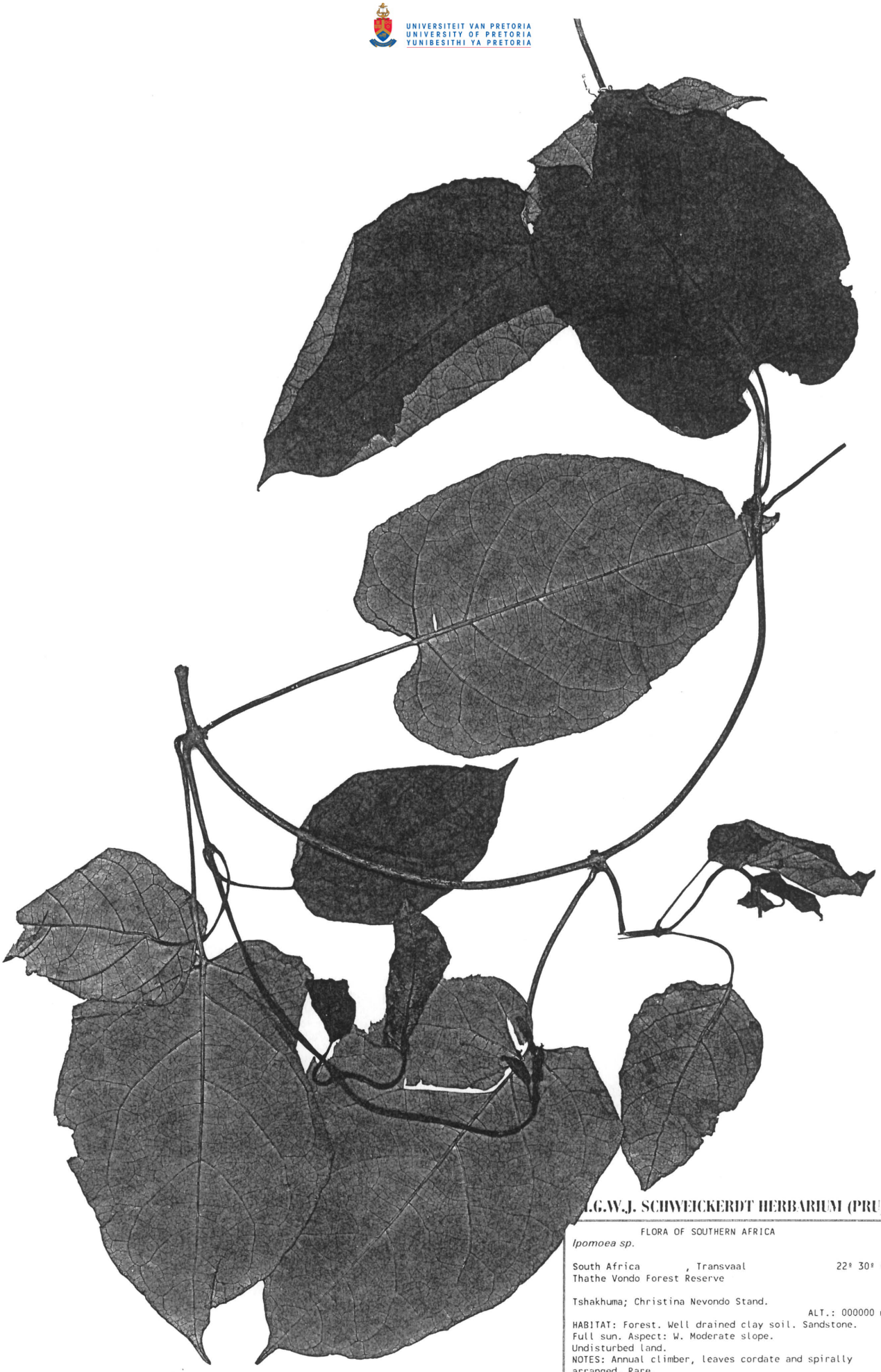
H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Ipomoea wightii (Wall.) Choisy

South Africa , Transvaal 22º 30º CD
Thathe Vondo Forest Reserve

Tshakhuma; Christina Nevondo Stand.
ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Sandstone. Shade. Aspect: W. Moderate slope. Undisturbed.
NOTES: Annual climber. Leaves in pairs, cordate,marginally entire. Rare. Eaten by goats. Eaten by people as a relish.
Local name: MUFUNGWI.
COLL.: M. Singo
NO.: 16
COLLECTED ON 25/03/1995 DET.: A.E. van Wyk

FILING: Family: 257 CNV GENSPEC.: 7003.000-05600
PRU number: 080606. Genus / Species: 7003 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500



PRU
40mm

140

.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA
Ipomoea sp.

South Africa , Transvaal 22° 30° CD
Thathe Vondo Forest Reserve

Tshakhuma; Christina Nevondo Stand.
ALT.: 000000 m
HABITAT: Forest. Well drained clay soil. Sandstone.
Full sun. Aspect: W. Moderate slope.
Undisturbed land.
NOTES: Annual climber, leaves cordate and spirally arranged. Rare.
Pollinators not known. Eaten by people as a relish.
Local name: NYENDANYENDANE.
COLL.: M. Singo
NO.: 20
COLLECTED ON 25/03/1995 DET.: A.E. van Wyk

FILING: Family: 257 CNV GENSPEC.: 7003.000-99999
PRU number: 080610. Genus / Species: 7003 /
Special Collection(s): Trees of southern Africa
Dup's: Locality: 2230CD0500

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA

South Africa , Northern Transvaal 22° 30° CD
Thohoyandou

Khalavha village.

ALT.: m
HABITAT: Forest. Well drained clay soil. Shade.
Aspect: W. Moderate slope.
Disturbed area.
NOTES: Annual herb 0,5 m high. leaves marginally entire, oval in shape and verticilate.
Rare.
Local name: NNYOYAMBUDZI.
COLL.: M. Singo
NO.: 24
COLLECTED ON 20/04/1995 DET.:

FILING: Family: GENSPEC.: 0000.000-00000
PRU number: 080767. Genus / Species: /
Special Collection(s): Venda
Dup's: Locality: 2230CD0100

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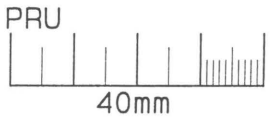

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA

Vernonia sp.

South Africa , Northern Transvaal 22° 30° CD
Thohoyandou

Dopeni; Sara Mudau stand.

ALT.: 000000 m

HABITAT: Open shrubland. Well drained sandy soil.
Full sun. Aspect: W. Level slope.
Undisturbed.
NOTES: Annual herb 0,25 m high. Leaves marginally entire oval in shape and verticillte. Rare.20% flowering, eaten by goat. cf. V. fastigiata Oliv. & Hiern
Local name: TANYI - relish.
COLL.: M. Singo

NO.: 25

COLLECTED ON 20/04/1995 DET.: PRE

FILING: Family: 293 CMP GENSPEC.: 8751.000-99999
PRU number: 080614. Genus / Species: 8751 /
Special Collection(s): Venda
Dup's: Locality: 2230CD0100

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PRU
40mm

H.G.W.J. SCHWEICKERDT HERBARIUM (PRU)

FLORA OF SOUTHERN AFRICA

South Africa , Northern Transvaal 22° 30° CD
Thohoyandou

Khalavha village.

ALT.: m

HABITAT: Forest. Well drained clay soil. Shade.
Aspect: W. Moderate slope.
Disturbed land.
NOTES: Annual climber, leaves are cordate and decussate.
Rare.
Local name: PHULULE - a relish.

COLL.: M. Singo
NO.: 26
COLLECTED ON 20/04/1995 DET.:

FILING: Family: GENSPEC.: 0000.000-00000
PRU number: 080768. Genus / Species: /
Special Collection(s): Venda
Dup's: Locality: 2230CD0100