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*Full Length Research Paper*

# Traditional vegetables of northern KwaZulu-Natal, South Africa: Has indigenous knowledge expanded the menu?

**Nontuthuko R. Ntuli[1], Alpheus M. Zobolo[1]*, Stefan J. Siebert[2] and Rufaro M. Madakadze[3]**

[1]Department of Botany, University of Zululand, Private Bag X1001, KwaDlangezwa 3886, South Africa.
[2]School of Biological Sciences, Unit for Environmental Sciences and Management, North-West University, Private Bag X6001, Potchefstroom 2520, South Africa.
[3]Alliance for a Green Revolution in Africa, P. O. Box 66773, Westlands 00800, Nairobi, Kenya.

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**A survey was conducted on traditional vegetables in three districts of northern KwaZulu-Natal, South Africa. The objective was to determine which alien and native plant species were collected from the wild or cultivated for use as leafy vegetables. The survey documented 72 vegetable species of which nearly half were alien species. The majority of the vegetables were collected from the wild (56 species) and only 16 were cultivated. Alien species were preferred more extensively than native species (2.5 times more), despite the larger variety (larger choice) of the latter (38 native versus 34 alien species). Nearly 53% of traditional vegetables of alien origin belong to well-known vegetable families that are indigenous to the study area, suggesting that there is a classification system that allows people to explore new plant sources. This makes a case that Indigenous Knowledge Systems can expand the menu by incorporating newly introduced species. However, this also suggests that alien species, which are weedy and easily obtained around the home, is displacing native species as a major food source. Our findings also suggest that wild vegetables might have been predisposed for use due to their medicinal value.**

**Key words:** Ethnobotany, food plants, homegardens, leafy vegetables, Maputaland, traditional vegetables.

## INTRODUCTION

Traditional vegetables are defined as the roots, leaves, stems, flowers and fruits of plants consumed by urbanized or rural indigenous communities through custom, habit or tradition. These vegetables include cultivated or naturally occurring plants in the wild, which can be native (indigenous species with its center of origin in that locality) or exotic (alien types) that have been in the area for a long time (introduced to the locality from elsewhere) (Shackleton et al., 2009). In many parts of the world, people consume traditional vegetables to enhance nutrient and vitamin uptake (Steyn et al., 2001), diversify the diet (Gockowski et al., 2003), provide an income (Pandey et al., 2007), buffer the impact of crop failure or drought (Jansen van Rensburg et al., 2004), and for its multi-contextually as ethno-medicine (Pieroni et al., 2002).

Even though western tradition has influenced people's food preference and pattern of consumption, traditional vegetables is common in especially resource-poor communities throughout the developing world, including southern Africa (Bhat and Rubuluza, 2002; Jansen van Rensburg et al., 2004; Modi et al., 2006; Zobolo and Mkabela, 2006; Odhav et al., 2007). In southern Africa, traditional leafy vegetables (TLV's) have been used for centuries by the Khoi-San and Bantu tribes who relied on

*Corresponding author. E-mail: azobolo@pan.uzulu.ac.za. Tel: +27 35 902 6109. Fax: +27 35 902 6491.

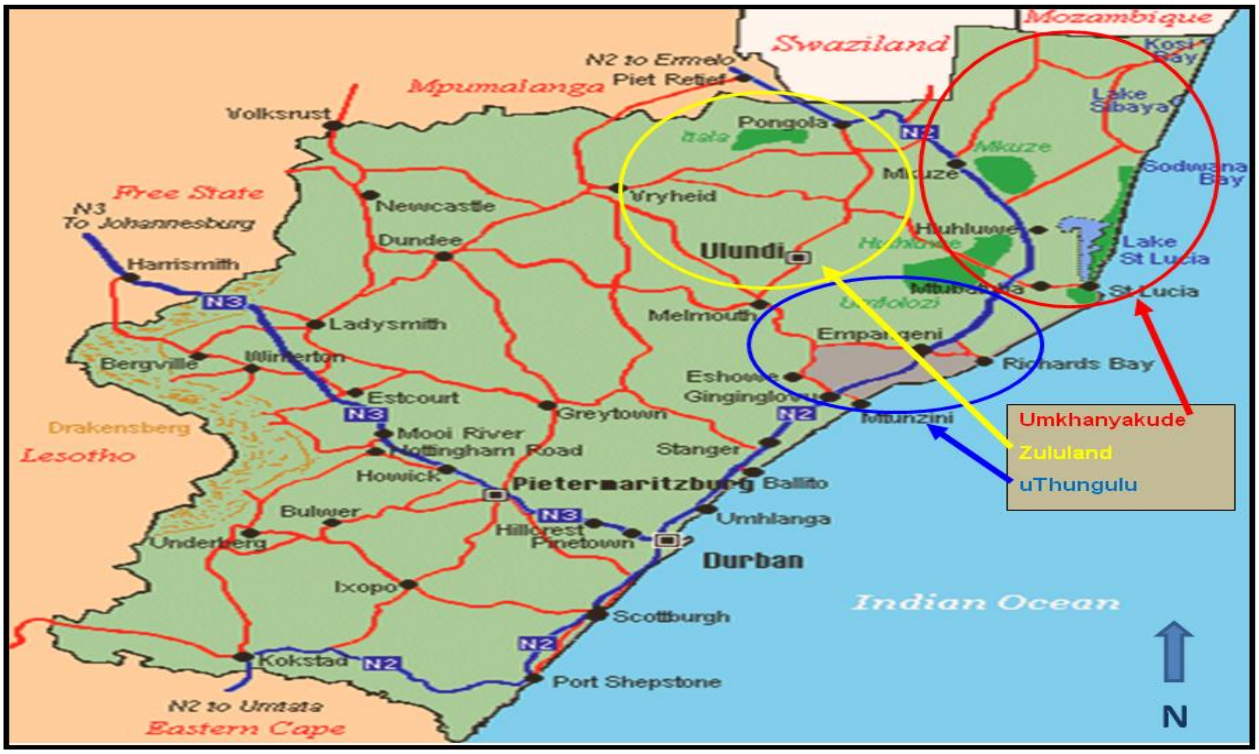


**Figure 1.** The Umkhanyakude, uThungulu and Zululand district municipalities surveyed in northern KwaZulu-Natal, South Africa.

wild plants for endurance (Fox and Norwood Young, 1982; Parsons, 1993; Bundy, 1998).

Many TLV's are weedy, pioneer species and therefore disturbed habitats associated with agricultural and agro-pastoral land promote growth of a great diversity of these species (Boutin and Jobin, 1998). For instance, weedy TLV's such as *Amaranthus hybridus*, *Momordica foetida* and *Colocasia esculenta* are collected from agricultural fields and sold at road markets by rural women in northern KwaZulu-Natal (Zobolo et al., 2008). Although a great deal of work has been done on South African traditional vegetables (Shackleton, 2003; Modi et al., 2006; Afolayan and Jimoh, 2009), there is still a lot of tradition and indigenous knowledge to be documented (Guarino, 1997).

Indigenous knowledge (IK) refers to the unique, traditional, local knowledge existing within and developed around the specific conditions, indigenous to a particular geographic area. The development of IK systems, covering all aspects of life, including management of the natural environment, has been a matter of survival to the people who generated these systems. IK is accumulative and is shared and communicated orally through culture and tradition (Tella, 2007). There is a renewed interest in IK in most developing countries due to its important role for sustainable socio-economic development (Lwoga et al., 2010). Food security in poor communities is dependent on the ability of countries to collect, preserve and to disseminate IK of traditional vegetables.

The main aim of this study was to determine whether IKS is a dynamic process, able to evaluate the usability of potential new TLV's and to incorporate these into the diet of African people. We focused our research on food sources, as the identity of food species are not kept secrets as is the case for many medicinal plants (Shackleton et al., 2002). Our hypothesis states that IKS is able to incorporate species onto the 'menu' (to expand the variety of traditional vegetables). We tested this by compiling a list and evaluating traditional vegetables in terms of the alien species that were introduced to South Africa from other countries; mostly species that were introduced to South Africa during the last 350 years (Henderson, 2006), for instance *Nasturtium officinale* in the 1650s, *Morus alba* in 1831 and *Passiflora edulis* in 1858. We also tested whether a plant's value as a food plant is linked to its medicinal value.

## MATERIALS AND METHODS

A survey of indigenous vegetables was conducted from June 2007 to December 2008 in three district municipalities of northern KwaZulu-Natal, South Africa (Figure 1), namely Umkhanyakude, uThungulu and Zululand. Umkhanyakude district (Mseleni: 27° 38' S and 32° 47' E) covers the areas with coastal sand dune forest and sand dry forests found in Maputaland on deep white sands (Pooley, 2003). It occurs in the Maputaland Centre of Plant Endemism which has many rare, unusual and endemic plant species, and also has very high species diversity (Van Wyk and Smith, 2001). The climate is subtropical (Gibbon et al., 2010), with mean annual rainfall ranging

between 707 and 721 mm (Gaugris and Van Rooyen, 2007), and a mean maximum summer temperature of 29°C, while in winter it is 17°C (Gibbon et al., 2010).

UThungulu district (Nkandla: 28° 37' S and 31° 25' E) is situated in the transition of coastal forest merging with mist-belt forest on the mainly south- and east-facing slopes of high escarpments (Pooley, 2003). It is part of the Maputaland-Pondoland-Albany biodiversity hotspots which harbors many endemic plant species (Van Wyk and Smith, 2001). The climate is subtropical with annual rainfall ranging between 1640 and 1740 mm, and mean maximum summer temperature of 32°C while in winter it is 18°C (Gibbon et al., 2010).

Zululand district (Ulundi: 28° 32' S and 31° 47' E) is characterized by granite outcrops and open grassy glades in cool, inland regions, with its vegetation ranging from mistbelt forest to bushveld (Pooley, 2003). The climate is temperate with annual rainfall ranging between 587 and 750 mm, and mean maximum summer temperature of 32°C while in winter it is 14°C (Camp, 1997; Bodenstein, 2007). The three districts have both peri-urban and deep rural areas. In each district, three remote rural villages were identified with the aid of traditional leaders. Fifty homesteads were randomly sampled per village. Hence, a total of 150 homesteads were sampled in each district, 450 in total which gave a proportion of 62.5% of the total homesteads. The homesteads sampled at uMkhanyakude district were situated around the villages of Manguzi, Ngwavuma, Mbazwana, Mseleni and Hlabisa. In uThungulu district, the villages visited were at KwaMsane, Mahlayizeni and Ongoye, and in the Zululand district, the villages were Exolo, Ewela and Nkonjeni.

Interviews and free-listings were the main data collection methods. Interviews were conducted in isiZulu, the mother tongue of the respondents. Interviewees were identified on the basis of age, varying from 40 to 70 years, as people of this age group have been shown to be the keepers of traditional knowledge about plants in northern KwaZulu-Natal (Zobolo and Mkabela, 2006). Interviewees were asked to 'Name the traditional leafy vegetables that you eat'. A complete list of traditional vegetables from the study area is given in the appendix. Interviewees were informed that a traditional vegetable is a plant of which the leaves and shoots are harvested for consumption. In other words, the plant must be an African leafy vegetable (Jansen van Rensburg et al., 2007). The consumption of the flowers, fruit, seed and corms were noted as additional uses. Four categories of origin were identified for leafy vegetables for data analysis (Lubbe et al., 2011):

1. Native; naturally occurring within the study area, not cultivated;
2. Indigenous-cultivated; indigenous to South Africa, but not occurring naturally within the study area, cultivated in gardens;
3. Naturalized; not indigenous (exotic/alien) to South Africa, but occurring naturally in the study area where it sustains self replacing populations outside of cultivation without direct intervention by people;
4. Alien-cultivated; not indigenous (exotic/alien) to South Africa and not naturalized in the study area, but cultivated in gardens.

For analytical purposes, the growth forms of the plants were categorized as woodies (trees and shrubs lumped due to the limited number of species), climbers (semi-woody and herbaceous climbers lumped due to the limited number of species), and forbs (divided into annual and perennial species due to the large variety). The growth forms were based on Pooley (1998). The plant parts used were divided into three categories, two of which were aggregates made up of smaller groups. The three use categories were leaves (green aerial parts), shoots (young shoot apices and also including corms and tubers) and fruit (also including flowers and seeds). These categories were based on Pieroni et al. (2002).

A voucher specimen was collected of each traditional vegetable mentioned in the interviews and the identity of duplicates confirmed by the KwaZulu-Natal Herbarium (NH) and University of Zululand Herbarium (ZULU). Species names follow the pattern as described by Germishuizen and Meyer (2003) and Glen (2002) and species were grouped according to plant families.

## RESULTS

### Families

Three plant families, namely the Amaranthaceae, Asteraceae and Cucurbitaceae, each contributed eight species of traditional vegetables (Table 1). These are the largest families and combined, they are richer in alien than native species, but individually this is only true for the Amaranthaceae and Asteraceae. Nine families, including the three mentioned above, contain both native and alien traditional vegetables. Together these families contain 40 species (56% of the total) (Figure 2). Another 22 families contain the remaining 32 species, belonging to eight non South African and 14 South African families. The non-South African families contribute half as many vegetable species as the South African families (Figure 2). The exclusively South Africa families are associated with specific districts. For instance the Erythroxylaceae, Menispermaceae, Icacinaceae and Sapindaceae were each represented by a single leafy vegetable in Umkh-anyakude. In all four cases these species were woody.

### Species

The survey recorded a list of 72 traditional vegetable species (Appendix), of which 34 were naturalized alien and 38 native species. This gives a very even distribution of 47% alien and 53% native species across the three study areas (Figure 3). A total of 56 (78%) species were gathered from disturbed agricultural land or the wild, while 16 (22%) were cultivated in home gardens. Among the 72 vegetables were 47 (65%) herbaceous forb species, of which 29 (62%) were weedy native or naturalized species. In total, 29 (62%) of the vegetables were used in all three districts, of which the most popular were the aliens *Amaranthus hybridus*, *Bidens pilosa* and *Cucurbita moschata*. These species are alien, but belong to families that are also indigenous to South Africa. However, when the contributions made by alien and native species is compared, then wild occurring native species contributes the most (45%) to the variety on the menu, followed by naturalized species (34%, alien species occurring naturally) (Figure 4). This is followed by alien-cultivated (15%) and indigenous-cultivated (6%) species. However, if actual consumption records of alien and native species are compared, then households generally prefer alien species (75% of total consumption) more regularly than native species (Figure 5).

Households from all three districts reported the shared use of 30 wild plant species (of 56 alien and native species). In terms of cultivated species, eight species (of

**Table 1.** Plant families that comprising both native and alien traditional vegetables.

| Family | Species | Native | Alien | Wild | Cultivated |
|---|---|---|---|---|---|
| Amaranthaceae | 8 | 2 | 6 | 8 | 0 |
| Asteraceae | 8 | 1 | 7 | 8 | 0 |
| Cucurbitaceae | 8 | 5 | 3 | 3 | 5 |
| Convolvulaceae | 4 | 3 | 1 | 3 | 1 |
| Brassicaceae | 3 | 1 | 2 | 2 | 1 |
| Fabaceae | 3 | 1 | 2 | 0 | 3 |
| Araceae | 2 | 1 | 1 | 1 | 1 |
| Solanaceae | 2 | 1 | 1 | 2 | 0 |
| Urticaceae | 2 | 1 | 1 | 2 | 0 |
| Total | 40 | 16 | 24 | 29 | 11 |

**Table 2.** Twelve alien species most often used as traditional vegetables in Umkhanyakude (Umk), Uthungulu (Uth) and Zululand (Zul).

| Species | Vernacular (Zulu, English) | Family | Orig | Umk | Uth | Zul | % |
|---|---|---|---|---|---|---|---|
| *Amaranthus hybridus* | *iMbuya enkulu*; Common Pigweed | Amaranthaceae | W | 127 | 143 | 147 | 92.7 |
| *Bidens pilosa* | *uQadolo omnyama*; Common Blackjack | Asteraceae | W | 139 | 135 | 127 | 89.1 |
| *Cucurbita moschata* | *iThanga*; Winter Squash | Cucurbitaceae | C | 133 | 139 | 123 | 87.8 |
| *Chenopodium album* | *iMbindla*; Goosefoot | Chenopodiaceae | W | 51 | 35 | 78 | 36.4 |
| *Bidens bipinnata* | *uQadolo oluhlaza*; Spanish Blackjack | Asteraceae | W | 64 | 50 | 32 | 32.4 |
| *Bidens biternata* | *uQadolo oluhlaza*; Beggar Tick | Asteraceae | W | 64 | 50 | 32 | 32.4 |
| *Cucurbita maxima* | *uMpampini*; Pumpkin | Cucurbitaceae | C | 36 | 50 | 45 | 29.1 |
| *Amaranthus spinosus* | *uHlabahlaba*; Thorny Pigweed | Amaranthaceae | W | 30 | 62 | 32 | 27.6 |
| *Sonchus oleraceus* | *iGabegabe*; Smooth Sow-thistle | Asteraceae | W | 62 | 22 | 24 | 24.0 |
| *Amaranthus retroflexus* | *iMbuya eluhlaza*; Red Rooted Pigweed | Amaranthaceae | W | 30 | 22 | 33 | 18.9 |
| *Corchorus olitorius* | *iGushe*; Tossa Jute | Tiliaceae | W | 42 | 16 | 19 | 17.1 |
| *Ipomoea batatas* | *uBhatata*; Sweet Potato | Convolvulaceae | C | 50 | 11 | 15 | 16.9 |

Orig, Origin; W, wild; C, cultivated. %, proportion of 450 households that use the vegetable.

**Table 3.** Ten native species most often used as traditional vegetables in Umkhanyakude (Umk), Uthungulu (Uth) and Zululand (Zul).

| Species | Vernacular (Zulu; English) | Family | Orig | Umk | Uth | Zul | % |
|---|---|---|---|---|---|---|---|
| *Amaranthus thunbergii* | *iMbuya encane*; Thunberg's Amaranth | Amaranthaceae | W | 85 | 33 | 46 | 36.4 |
| *Citrullus lanatus* | *iKhebe*; Common Wild Lemon | Cucurbitaceae | C | 35 | 10 | 31 | 16.9 |
| *Pyrenacantha scandens* | *umKhokhothwane* | Icacinaceae | W | 70 | 0 | 0 | 15.6 |
| *Asystasia schimperi* | *iMbobela* | Acanthaceae | W | 1 | 42 | 25 | 15.1 |
| *Momordica foetida* | *iNtshungu*; Wild Cucumber | Cucurbitaceae | W | 14 | 29 | 22 | 14.4 |
| *Zantedeschia aethiopica* | *iNtebe*; White Arum Lily | Araceae | W | 21 | 17 | 8 | 10.2 |
| *Riocreuxia torulosa* | *uFuthane*; Candle-vine | Apocynaceae | W | 44 | 0 | 1 | 10.0 |
| *Coccinia rehmannii* | *iHhawulane*; Wild Cucumber | Cucurbitaceae | W | 31 | 6 | 1 | 8.4 |
| *Lagenaria siceraria* | *AmaSelwa*; Bottle Gourd | Cucurbitaceae | C | 15 | 4 | 14 | 7.3 |
| *Momordica balsamina* | *uMkaka*; Balsam Pear | Cucurbitaceae | W | 27 | 3 | 1 | 6.9 |

Orig, Origin; W, wild; C, cultivated. %, proportion of 450 households that use the vegetable.

16) were commonly cultivated in all three districts. In both cases the shared knowledge is around 50% of the total number of traditional vegetables. The shared knowledge is further exemplified by the ten leafy vegetables used most extensively in all three districts (Tables 2 and 3). These ten species account for 60% of

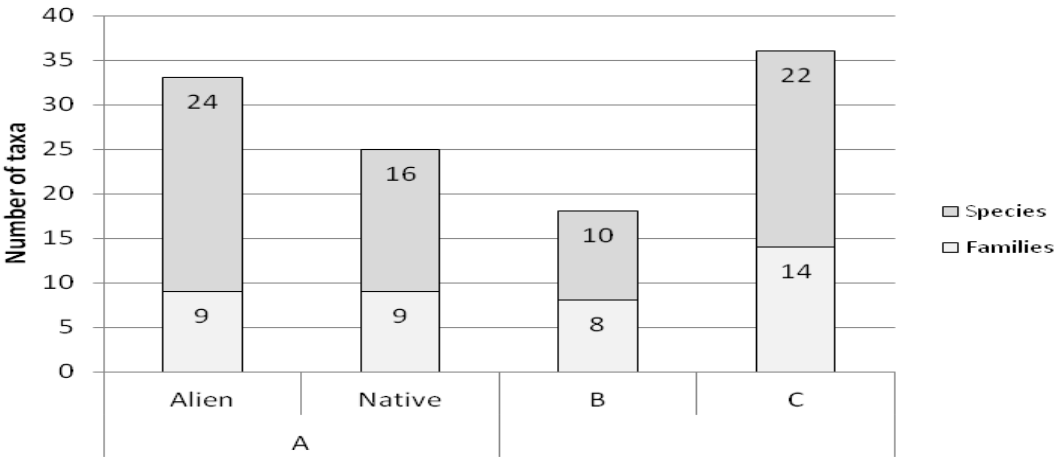


**Figure 2.** Plant families and the number of vegetable species recorded for each group: A, families that contain both alien and native species; B, alien families that contain only alien species; C, native families that contain only native species.

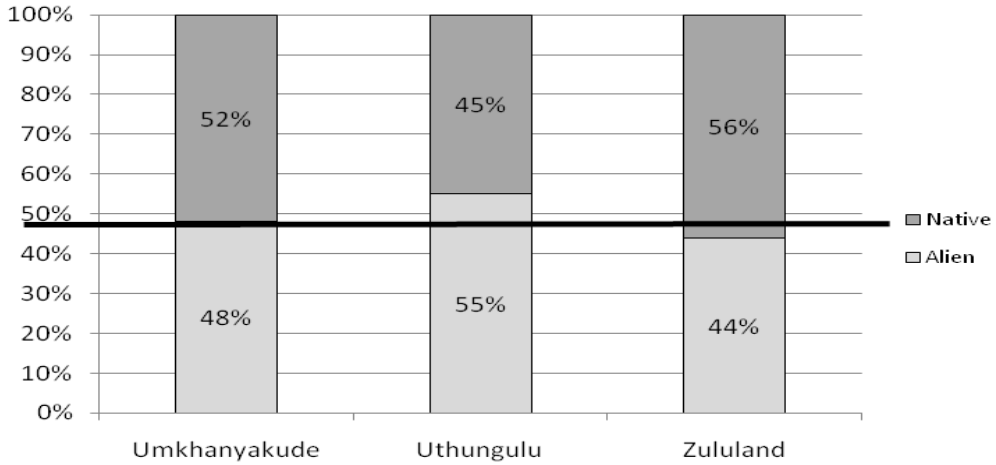


**Figure 3.** Proportion of alien and native traditional vegetables recorded from each of the districts.

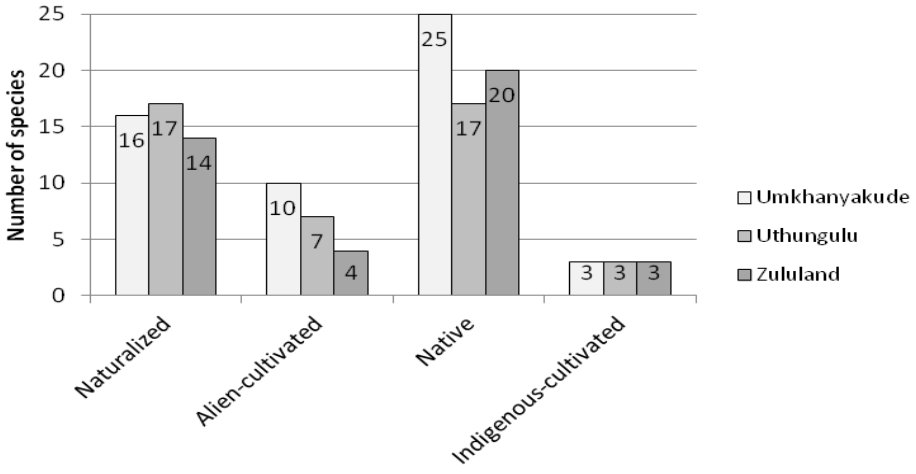


**Figure 4.** Number of species recorded from each district for each category of origin.

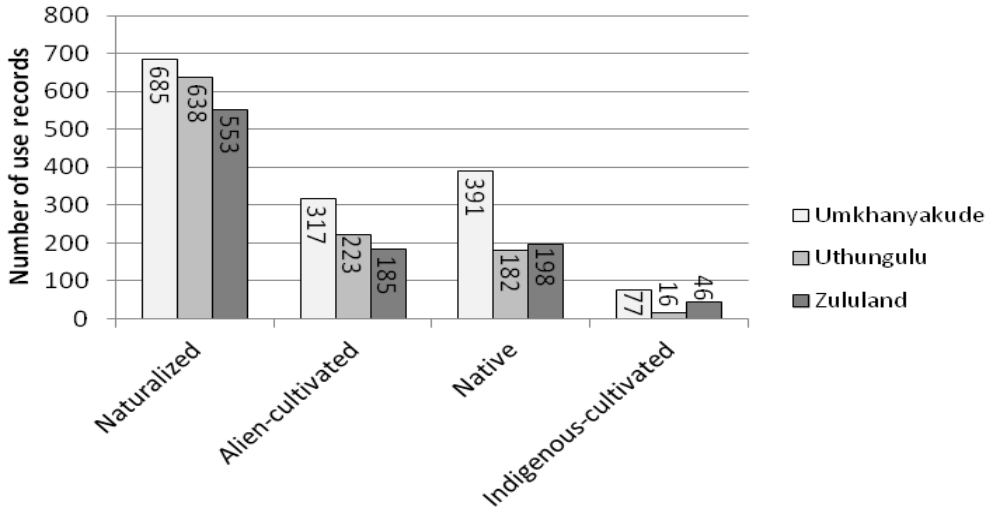


**Figure 5.** Number of use records of vegetables from each district for each category of origin.

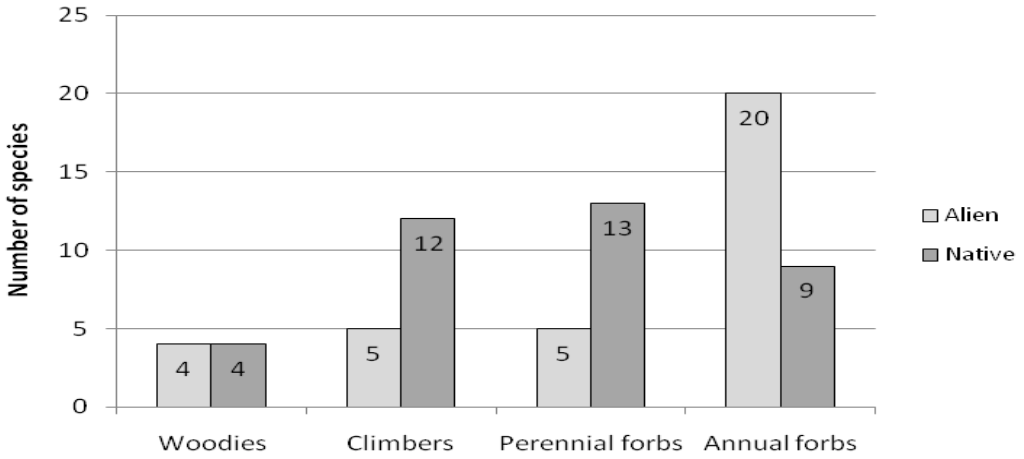


**Figure 6.** Growth forms of vegetables and the number of alien and native species in each category.

the combined household consumption of TLV's across all districts.

However, households from Umkhanyakude district do exclusively utilize 15 vegetables (ten native) that are not used in the other districts. These include the cultivated *Cucurbita pepo* (5% of households) and *Manihot esculenta* (10%), the wild harvested alien *A. hypochondriacus* (6%), and natives *Asystasia gangetica* (2%) and *Deinbollia oblongifolia* (1%). Nine vegetables (four native) were recorded only from uThungulu district and include the cultivated aliens *Arachis hypogaea* and *Vigna subterranea* (both 0.5% of households) and the wild collected alien *Hypochaeris radicata* (1%). Six vegetables (four native) were only recorded from the wild in the Zululand district, and include the alien, *Nasturtium officinale* (3% of households), and natives *Ipomoea plebeia* (4%) and *Dipcadi viride* (2%).

## Growth forms

Herbaceous forbs are favoured as vegetables (Figure 6). Only eight (11%) TLV's were woodies and 17 (24%) were semi-woody or herbaceous climbers. The remaining 47 (65%) TLV's were forbs. It is evident that when native species are harvested the households prefer climbers and perennial forbs. In contrast, when households harvest alien vegetables, then the preference lies with annual forbs (Figure 6). Half of the TLV's from the study area are annuals (36) (Figure 7). These TLV's include herbaceous climbers (7 species) and forbs (29 species). Ten of these annuals are cultivated, such as *Citrullus lanatus*, and 26 are collected from the wild, such as *Chenopodium album* (Figure 7). Many of the wild collected herbaceous vegetable species (54%) also had medicinal value (Figure 7). However, none of the

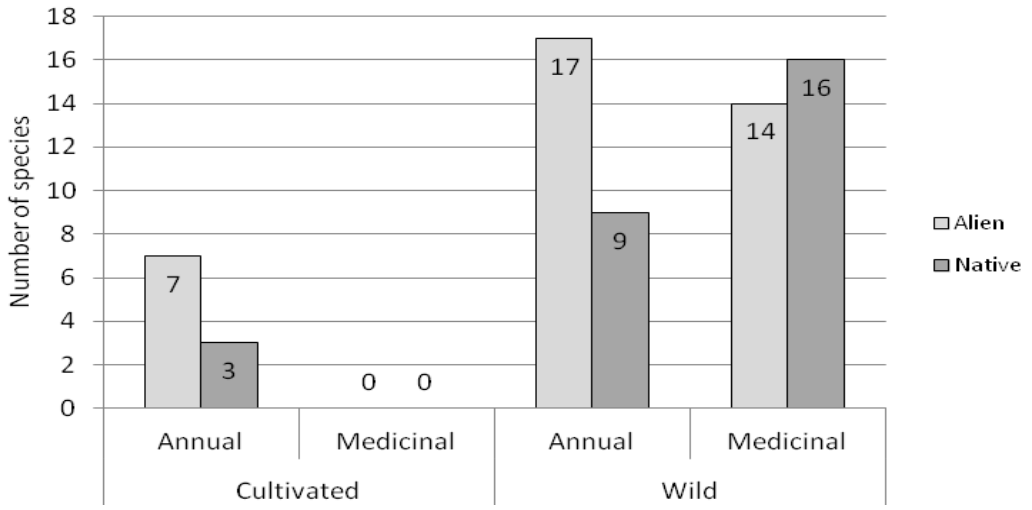


**Figure 7.** Number of annual and medicinal species which are cultivated or collected from the wild.

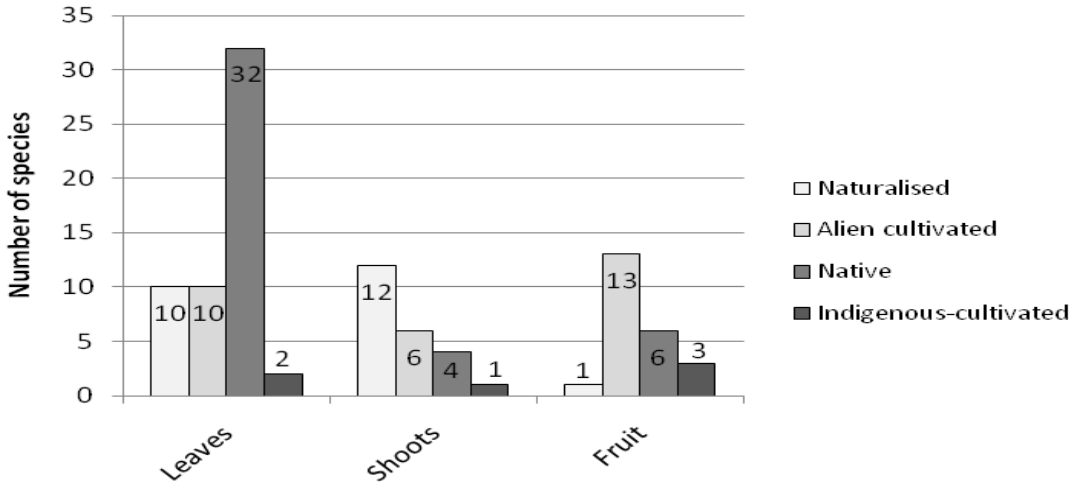


**Figure 8.** Number of species providing the plant parts used and the origin of these species. Shoots include young shoot apices, corms and tubers. Fruit include flowers and seeds.

cultivated species had any medicinal use (Figure 7). Vegetables with medicinal value were equally alien or native.

## Plant parts used

The plant parts used as vegetables ranged (in descending order) from leaves (75% of the 72 species), young shoots (30%), fruit (18%), seed (7%), flowers (6%), and tubers/corms (6%). In terms of leafy vegetables, green aerial parts (leaves) and young shoot apices are the most commonly gathered plant parts for cooking purposes. Non-cultivated native vegetables (32 species) represented the widest variety of the daily diet of leafy vegetables during the spring season and were consumed as mixtures (Figure 8). Non-cultivated naturalized aliens (12 species) were mainly harvested for their young shoot apices, also for cooking mixtures (Figure 8). Alien cultivated plants (13 species) (Figure 8) were multipurpose species cultivated specifically for their leaves and shoots, but have the added advantage of edible fruit, seed and flowers.

# DISCUSSION

## Families

The majority of the recorded leafy vegetables belong to

nine families. In these families, a much larger contribution is made by alien species, suggesting that rural households have somehow explored these groups more aggressively than other alien families. This suggests that alien species that belong to well known vegetable families have considerably expanded the vegetable diversity. This is in accordance with the findings of Maundu (1997) in Kenya, where alien species that were introduced during the pre-colonial period have been integrated into the traditions of various communities and can therefore be regarded as traditional vegetables. There seems to be limited exploitation of alien families that are not traditionally used as leafy vegetables. However, when a leafy vegetable from an alien family is incorporated, these are usually cultivated species that already have other uses for their fruit, seed or corms. In other words, these were multi-purpose plants, suggesting that 'if you can eat the fruit, you can eat the leaves'. There are many exclusively South African families that contribute considerably to the diversity of vegetables. The vege-tables of these families are often restricted to specific regions and this unavai-lability of such vegetables to households elsewhere have been ascribed to the specific climatic preferences of the native species (Vainio-Mattila, 2000). Species used as TLV's are also culture specific and often linked to the proximity of forests (Vainio-Mattila, 2000), as is the case for the sand forests of the Umkhanyakude district on the Maputaland coastal plain.

## Species

Commonly used genera of leafy vegetables in South Africa include *Amaranthus*, *Bidens*, *Chenopodium*, *Cleome* and *Momordica* (Shackleton, 2003). In the study area, the most commonly used genera were *Amaranthus* (6 species), *Ipomoea* (4), *Bidens* (3), *Commelina* (3) and *Cucurbita* (3). *Chenopodium* and *Momordica* with two species each were also used, but no records of *Cleome* were made. Traditional vegetables used by traditional communities through custom, habit or culture include a mixture of indigenous and alien species (Gockowski et al., 2003). The 56 species of TLV's collected from the wild in the study area compares favourably with surveys from South Africa, namely 36 species recorded from the Transkei (Bhat and Rubuluza, 2002) and Tanzania, namely 15 recorded from Lushoto District (Fleuret, 1979), 25 from the East Usambaras (Woodcock, 1995) and 38 species from the Mara Region (Johns et al., 1996). However, although the diversity of vegetables seems high, the ten most popular vegetables contribute towards 60% of household use. Also, the majority of these are alien, namely seven naturalized and two cultivated species. The only extensively used native species is the naturally occurring *A. thunbergii*. Based on this, we propose that the TLV diversity of the study area has become dependent on an alien flora. Hence, there has been a shift from native to alien species, probably as the weedy alien species are specially adapted to mass self generation as pioneers in the typical agro-ecosystems of the study area. Some species, such as *Colocasia esculenta* and *Zantedeschia aethiopica* are utilized as leafy vegetables despite being renowned for calcium oxalate crystals in their leaves, *Manihot esculenta* contains cyanogenic glycoside in its leaves (Van Wyk et al., 2002) and *Albertisia delagoensis* is known to be cytotoxic (De Wet et al., 2007).

Among the cultivated species, the pumpkins, *Cucurbita maxima* and *C. moschata*, are of particular interest because they were cultivated extensively by households from all three districts. The reliance of the households on these cucurbit species is ascribed to the many edible plant parts (young shoots, flowers, fruit and seed) and is regarded as multi-purpose species.

The communities of Umkhanyakude district used more wild species than those from the other two districts, probably because Umkhanyakude district lies in Maputaland, an area renowned for its biodiversity (Van Wyk and Smith, 2001), which therefore provides a wider than normal variety of species to choose from. Generally, besides the popular species harvested most often, there was a difference in TLV's collected from the wild by the different communities. Albeit a strong resemblance in cultural background, IKS and traditions have shaped and maintained the selection of species for specific communities in northern KwaZulu-Natal. It confirms that the importance, use and choice of leafy vegetables differ between communities in South Africa (Jansen van Rensburg et al., 2007).

## Medicinal

The main use of traditional leafy vegetables is to supplement diets. However, other than use as food, 42% of the TLV's surveyed for this study had medicinal value as well. The same plant organs that were used for traditional vegetables were also used for medicinal purposes. TLV's with medicinal value were not cultivated, but harvested from the wild. Hence, this supports the idea that the nutritional value of certain plants was discovered when used as a medicine (Edeoga et al., 2005), as no cultivated TLV's are used as medicine in the study area.

## Conclusion

This study has expanded the current knowledge of TLV's used by communities in South Africa. This study shows that the current resource of native plants in northern KwaZulu-Natal provides an option of 38 native species and has been expanded by the addition of 34 alien

species. IKS seems to enable people to incorporate new species onto the 'menu'. IKS is therefore a dynamic system allowing portals whereby new species can be tested for consumption.

We propose that this portal is an artificial classification system that lies within IKS and incorporates new food plants into the diet by means of comparing the characters of newly introduced species with currently used native species to judge its suitability as a vegetable. Our data support this and indicate that most of the alien species that have been incorporated into the diet belong to plant families that have been traditionally used as vegetables. Incorporation onto the menu is remarkable as communities do not have formal taxonomic education, but easily discriminate between species and recognize them as belonging to specific taxonomic groups. However, our results suggest that alien TLV's have not only expanded the menu, but have to a large degree displaced native species as the first choice, despite the many examples of suitable indigenous species. We propose that the weedy nature of the majority of the alien species allows them to occur freely around agro-ecosystems, which in turn makes them readily available for harvest and consumption.

Availability, abundance and palatability may play a major role in the selection process. This and other aspects require further investigation. For instance, the health risk associated with traditional indigenous vegetables, especially those with medicinal uses, requires further investigation to ascertain how the nutritional value of the now favoured alien species compare with that of the native species.

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**Appendix.** Traditional leafy vegetables reported by households of northern KwaZulu-Natal.

| Species | Family | Local name(s), Zulu | Voucher | Growth habit | Origin | Part(s) used |
|---|---|---|---|---|---|---|
| *Abelmoshus esculentus* (L.) Moench* | Malvaceae | *amaNdwandwa* | NRN 501 | Woody, shrub | C | Fr |
| *Albertisia delagoensis* (N.E.Br.) Forman | Menispermaceae | *uNgandingandi* | NRN 390 | Climber, semi-woody | W | Le |
| *Alternanthera sessilis* (L.) DC.* | Amaranthaceae | *iMfingwane*; *uNgudla luphongolo* | NRN 396 | Perennial forb | W | Sh |
| *Amaranthus dubius* Mart. ex Thell.* | Amaranthaceae | *iMbuya ebomvu* | NRN 406 | Annual forb | W | Sh |
| *Amaranthus hybridus* L.* | Amaranthaceae | *iSheke elikhulu*; *iMbuya*; *iMbuya enkulu / eluhlaza / ebomvu*; *umBhido*; *uGobolo*; *uGwabuzela*; *uMagwabugwabu* | NRN 459 | Annual forb | W | Sh |
| *Amaranthus hypochondriacus* L.* | Amaranthaceae | *iMbuya ebomvu* | NRN 357 | Perennial forb | W | Sh |
| *Amaranthus retroflexus* L.* | Amaranthaceae | *iMbuya eluhlaza* | NRN 497 | Annual forb | W | Sh |
| *Amaranthus spinosus* L.* | Amaranthaceae | *uHlabahlaba*; *uMabalabala*; *uPhululu*; *umQhuthu*; *uQhuthululu*; *iMbuya enameva*; *iMbuyabathwa*; *iMbuyatsheke*; *uMahlaba* | NRN 405 | Annual forb | W | Le |
| *Amaranthus thunbergii* Moq. | Amaranthaceae | *iSheke elincane*; *iMbuya encane / ecwebezelayo* | NRN 361 | Annual forb | W | Le |
| *Aneilema aequinoctiale* (P. Beauv.) Loudon | Commelinaceae | *iDangabane lesilisa* (lendoda) | NRN 325 | Perennial forb | W | Le |
| *Arachis hypogaea* L.* | Fabaceae | *amaKinati*; *amaNtongomane* | NRN 504 | Annual forb | C | Se |
| *Asystasia gangetica* (L.) T.Anderson | Acanthaceae | *iSihhobo*; *uMlomo wenyoni* | NRN 378 | Perennial forb | W | Le |
| *Asystasia schimperi* T.Anderson | Acanthaceae | *iMbobela* | NRN 455 | Annual forb | W | Le |
| *Bidens bipinnata* L.* | Asteraceae | *uQadolo oluhlaza / ontsakantsaka* | NRN 413 | Annual forb | W | Sh |
| *Bidens biternata* (Lour.) Merr. & Sherff* | Asteraceae | *uQadolo oluhlaza / ontsakantsaka* | NRN 462 | Annual forb | W | Sh |
| *Bidens pilosa L.** | Asteraceae | *uQadolo*; *uQadolo omnyama / obomvu*; *uCadolo*; *uCucuza* | NRN 400 | Annual forb | W | Sh |
| *Boerhavia diffusa L.** | Nyctaginaceae | *isiHlalakuhle*; *uNkunzana* | NRN 412 | Annual forb | W | Le |
| *Carica papaya L.** | Caricaceae | *uPhopho* | NRN 505 | Woody, tree | C | Le; fr |
| *Chenopodium album* L.* | Chenopodiaceae | *isiDwaba samaSwazi*; *iMbindla*; *iMbilikicane*; *isiKigi*; *isiKigi sesalukazi*; *uBhici*; *isiGcozi*; *uDekane*; *uGogo*; *uBhici lwesalukazi* | NRN 318 | Annual forb | W | Le |
| *Chenopodium murale* L.* | Chenopodiaceae | *iMbilikicane enkulu / ebomvu* | NRN 414 | Annual forb | W | Le |
| *Citrullus lanatus* (Thunb.) Matsum. & Nakai | Cucurbitaceae | *iKhebe*; *amaBhece*; *umHhense* | NRN 360 | Climber, herbaceous | C | Sh; fr |
| *Coccinia rehmannii* Cogn. | Cucurbitaceae | *iHhawulane*; *iNgwili*; *amaPholonjane*; *iNtshungu* | NRN 441 | Climber, semi-woody | W | Le; fr |
| *Colocasia esculenta* (L.) Schott* | Araceae | *amaDumbe*; *imiDebeza* | NRN 506 | Perennial, forb | C | Cr, le |
| *Commelina africana* L. | Commelinaceae | *iTleletlele lesifazane*; *iDangabane lesifazane* | NRN 324 | Perennial, forb | W | Le |
| *Commelina benghalensis* L. | Commelinaceae | *iDangabane*; *iDleledlele* | NRN 352 | Annual, forb | W | Le |

**Appendix.** Contd**.**

| | | | | | | |
|---|---|---|---|---|---|---|
| *Commelina erecta* L. | Commelinaceae | *iDangabane* | NRN 415 | Perennial, forb | W | Le |
| *Corchorus olitorius* L.* | Tiliaceae | *iGushe*; *uNtaba ziyadilika*; *uDekane*; *uShelela*; *uShibilika* | NRN 313 | Annual forb | W | Le |
| *Cucurbita maxima* Duchesne* | Cucurbitaceae | *uMpampini*; *uZulu*; *uGubungu* | NRN 508 | Climber, herbaceous | C | Fl; fr; Se; sh |
| *Cucurbita moschata* Duchesne ex Poir.* | Cucurbitaceae | *iThanga*; *iPhuzi* | NRN 353 | Climber, herbaceous | C | Fl; fr; Se; sh |
| *Cucurbita pepo* L.* | Cucurbitaceae | *isiPhama* | NRN 507 | Climber, herbaceous | C | Fr |
| *Deinbollia oblongifolia* (E.Mey. ex Arn.) Radlk. | Sapindaceae | *UmGontsi* | NRN 366 | Woody, tree | W | Sh |
| *Diospyros galpinii* (Hiern) De Winter | Ebenaceae | *AmaBhontsi* | NRN 374 | Woody, shrub | W | Fr, le |
| *Dipcadi marlothii* Engl. | Hyacinthaceae | *isiKhwa* | NRN 476 | Perennial, forb | W | Fl; le |
| *Dipcadi viride* (L.) Moench | Hyacinthaceae | *uNconti*; *uNcodi*, *uNgcomungcomu* | NRN 464 | Perennial, forb | W | Le |
| *Erythroxylum delagoense* Schinz | Erythroxylaceae | *umBhontsi*; *amaBhontsi* | NRN 371 | Woody, Shrub | W | Le |
| *Galinsoga ciliata* (Raf.) S.F.Blake* | Asteraceae | *uMasangweni*; *uGobuhlanya*; *isiShukelana*; *uMaMkhize*; *uMaMhlongo*; *uMasuku onoboya* | NRN 478 | Annual, forb | W | Sh |
| *Galinsoga parviflora* Cav.* | Asteraceae | *uMasangweni*; *uGobuhlanya*; *isiShukelana*; *uMaMkhize*; *uMaMhlongo*; *uMasuku* | NRN 398 | Annual, forb | W | Sh |
| *Hermbstaedtia odorata* (Burch.) T. Cooke | Amaranthaceae | *isiGamfumane* | NRN 330 | Perennial, forb | W | Sh |
| *Hypochaeris radicata* L.* | Asteraceae | *isiHlalakuhle*; *UmKopoloto* | NRN 423 | Perennial, forb | W | Le |
| *Ipomoea batatas* (L.) Lam.* | Convolvulaceae | *uBhatata*; *uNtende*; *amaTshimbu*; *amaThimbu* | NRN 358 | Climber, herbaceous | C | Le; tb |
| *Ipomoea cairica* (L.) Sweet | Convolvulaceae | *uMbophamfe* | NRN 452 | Climber, herbaceous | W | Le |
| *Ipomoea plebeia* R.Br. | Convolvulaceae | *uMkhokha*; *iSandla sonwabu*; *uNyawo lwenkukhu*; *iMbilikicane*; *uMbophamfe* | NRN 485 | Climber, herbaceous | W | Le |
| *Ipomoea wightii* (Wall.) Choisy | Convolvulaceae | *iNcumbisane*; *iMvumbisa* | NRN 393 | Climber, herbaceous | W | Le |
| *Justicia flava* (Vahl) Vahl | Acanthaceae | *iMbobela* | NRN 444 | Perennial, forb | W | Le |
| *Lagenaria siceraria* (Molina) Standl. | Cucurbitaceae | *AmaSelwa* | NRN 376 | Climber, herbaceous | C | Fr; le |
| *Limeum sulcatum* (Klotzsch) Hutch. | Limeaceae | *isiHlalakuhle*; *isiHlalakahle*; *isiHlalakamnandi*; *isiGamfumane sesilisa* | NRN 329 | Perennial, forb | W | Le |
| *Malvastrum coromandelianum* (L.) Garcke* | Malvaceae | *uVemvane*; *uVemvane olunoboya* | NRN 410 | Annual forb | W | Sh |
| *Manihot esculenta* Crantz | Euphorbiaceae | *uMdumbula*; *amaThapha*; *uKhulanaye* | NRN 364 | Woody, Shrub | C | Le; tb |
| *Momordica balsamina* L | Cucurbitaceae | *uMkaka*; *uMkakane*; *iNkakha*; *iNtshungu* | NRN 307 | Climber, semi-woody | W | Fr; le |
| *Momordica foetida* Schumach. | Cucurbitaceae | *iNtshungu*; *iNabe* | NRN 491 | Climber, semi-woody | W | Le |
| *Morus alba* L.* | Moraceae | *umJikijolo*; *uJingijolo* | NRN 377 | Woody, tree | C | Le |
| *Nasturtium officinale* R.Br.* | Brassicaceae | *uGelekula*; uWata | NRN 466 | Perennial forb | W | Sh |
| *Morus alba* L.* | Moraceae | *umJikijolo*; *uJingijolo* | NRN 377 | Woody, tree | C | Le |

**Appendix.** Contd**.**

| | | | | | | |
|---|---|---|---|---|---|---|
| *Nasturtium officinale* R.Br.* | Brassicaceae | *uGelekula*; uWata | NRN 466 | Perennial forb | W | Sh |
| *Obetia tenax* (N.E.Br.) Friis | Urticaceae | *uBabazi*; *uZi*; *iMpongozembe* | NRN 490 | Woody, tree | W | Le |
| *Ophioglossum polyphyllum* A.Braun | Ophioglossaceae | *isiNkuntshane*; *isiNdletshane* | NRN 385 | Perennial, forb | W | Le |
| *Passiflora incarnata* L.* | Passifloraceae | *amaGrayindeni*; *amaGranadila* | NRN 365 | Climber, semi-woody | C | Fr, le |
| *Pergularia daemia* (Forssk.) Chiov. | Apocynaceae | *uNquntane* | NRN 304 | Climber, semi-woody | W | Fr; le |
| *Priva meyeri* Jaub. & Spach | Verbenaceae | *iNamathela* | NRN 416 | Perennial, forb | W | Le |
| *Pyrenacantha scandens* Planch. ex Harv. | Icacinaceae | *umaKhokhothwane*; *umKhokhothwane* | NRN 302 | Climber, semi-woody | W | Le |
| *Riocreuxia torulosa* Decne. | Apocynaceae | *uFuthane*; *umFuthane*; *isiFuthane* | NRN 392 | Climber, semi-woody | W | Le |
| *Senecio madagascariensis* Poir. | Asteraceae | *umThithimbili* | NRN 486 | Annual forb | W | Sh |
| *Sisymbrium officinale* (L.) Scop.* | Brassicaceae | *imiFino yamaNdiya* | NRN 320 | Annual forb | C | Le |
| *Sisymbrium thellungii* O.E.Schulz | Brassicaceae | *isiHlalakuhle* | NRN 488 | Annual forb | W | Le |
| *Solanum americanum* Mill.* | Solanaceae | *uMsobo* | NRN 321 | Annual forb | W | Le |
| *Solanum retroflexum* Dunal | Solanaceae | *uMsobobo*; *uMsobo* | NRN 314 | Annual forb | W | Le |
| *Sonchus oleraceus* L.* | Asteraceae | *iGabegabe*; *iHlabe*; *iKlabi*; *iKlabeklabe*; *iHogwe*; *iHogo* | NRN 401 | Annual forb | W | Le |
| *Tetragonia tetragonoides* (Pall.) Kuntze | Aizoaceae | *iSipinashi semvelo* / *esenabayo* / *sentaba*; *sehlathi amaZambanyana*; *iSibhalamangongo* | NRN 332 | Annual forb | W | Le |
| *Trachyandra asperata* Kunth. | Asphodelaceae | *uNjwati* | NRN 391 | Perennial, forb | W | Fl; le |
| *Trachyandra saltii* (Baker) Oberm. | Asphodelaceae | *uDoda*; *uNjeza* | NRN 421 | Perennial, forb | W | Le |
| *Urtica urens* L.* | Urticaceae | *iMbati*; *iMbati yomhlanga* | NRN 498 | Annual forb | W | Le |
| *Vigna subterranea* (L.) Verdc.* | Fabaceae | *iziNdlubu* | NRN 509 | Annual forb | C | Se |
| *Vigna unguiculata* (L.) Walp. | Fabaceae | *iMbumba esheshayo* / *ephuzayo*; *iNyangani* | NRN 355 | Annual forb | C | Le; se |
| *Zantedeschia aethiopica* (L.) Spreng. | Araceae | *iNtebe* | NRN 493 | Perennial, forb | W | Le |

Voucher: NRN, NR Ntuli. Origin: C, cultivated; W, wild. Part(s) used: cr, corms; fl, flowers; fr, fruits; le, leaves; se, seeds; sh, shoots; tb, tuber. *, Alien species.