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Compendium of medicinal plants for the ethno-therapeutic management of tuberculosis and other respiratory diseases

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Abstract

Globally, plants are used in many cultures to treat Tuberculosis (TB) and TB related symptoms including cough and other respiratory diseases. Many articles on phytotherapy of tuberculosis in various ethnomedical practices have been reported. However, many of the works reported were focused on extraction techniques and dosage, while others focused on the anti-TB assays. This treatise is a compilation of medicinal plants that have been reported for the treatment of Tuberculosis and other respiratory diseases across different ethnic groups and cultures. It was hypothesized that efficacious plant families and species are more likely to feature frequently in the prescriptions of many ethno-therapy, and they are likely to contain promising compound(s) that could become drug candidates or drug leads. Literature reports available in the last 15 years were used to analyse the frequency of use of a total of 500 plant species belonging to 129 families. The profile revealed that the family Asteraceae is the most frequently used plant species (FC = 49, and ethnobotanical index of 0.0930) for the treatment of tuberculosis across the studied ethnic and cultural groups; followed by Euphorbiaceae with FC= 32, then Rubiaceae and Rutaceae with FC of 25 and 22 respectively. The findings highlight the medicinal importance of the plant family Asteraceae in ethnomedical remedies of tuberculosis and that the genera in the family are potential sources of anti-tubercular drug candidates worthy of extensive investigation.

Keywords: indigenous knowledge, ethno-medicine, anti-tubercular activity, *Asteraceae*, *Euphorbiaceae*, *Rubiaceae*

1. Introduction

The use of plants as the source of remedies dates back to prehistory, and people of all continents have this old tradition. Plants continue to be major source of medicines, as they have been throughout human history (Van Wyl *et al.*, 1997). Herbal medicine is a major component of all indigenous people traditional medicine and is a common element in Ayurvedic homeopathic, naturopathic, traditional oriental and Native American Indian medicines. Ethnomedicine has evolved over the millennia of human existence, and has even been exhibited by wild and domestic animals who feed on selective plant leaves, bark and roots and other parts to relieve pain, supplement diet and help cure diseases.

Archeological evidence indicates that the use of medicinal plants dates at least to the Paleolithic, approximately 60,000 years ago. Written evidence of herbal remedies dates back over 5,000 years, to the Sumerians, who created lists of plants and their medical uses. In ancient Egypt, herbs are mentioned in Egyptian medica papyri, depicted in tomb illustrations, or on rare occasions found in medica jars containing trace amount of herbs (Nunn, 2002). Evidence of herbalism has also been found in the cultural practices of early civilization of Greek, Rome, and China (Hong, 2004; Ackerknecht, 1982) [17]. The earliest record of medicinal plant use in the Himalayas is found in the *Rig-Veda*. The treatise was written between 4500 BC and 1600 BC, noted to be the oldest repository of human knowledge and sixty seven (67) plants were described therein. (Malla and Shakya, 1984) [25]. In India, Ayurveda which is the cultural science of life and healing of the Hindus also described the medicinal potentials of 1200 plants. About 5000 plant species having medicinal and aromatic values have been documented in China and 1227 species in 317 genera in Nepal Himalaya (Kunwar *et al.*, 2006).

Traditional and Complementary medicine, of proven quality, safety, and efficacy, contribute to the goal of ensuring that all people have access to care. This care that is close to homes, accessible and affordable. It is culturally acceptable and trusted by large numbers of people. The affordability of most cultural traditional medicines makes them all the more attractive at a time of soaring health-care costs and nearly universal austerity. Traditional medicine also stands out as a way of coping with the relentless rise of chronic non-communicable diseases (WHO, 2013) [36].

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Regardless of reasons for seeking out traditional and complementary alternative medicine, there is little doubt that interest has grown, and will almost certainly continue to grow, around the world. In rural African and Asian communities with limited access to western health care facilities, due to their relatively high cost and concentration of functional health centers in urban areas, ethnobotanical and ethnomedical alternatives are used in the management of health problems including tuberculosis and HIV/AIDS up to the present days. Such alternatives remedies have provided leads for development of chemotherapeutic agents as practiced in western medicine (Phillipson, 2005). Medicinal plants are also important for pharmacological research and drug development, not only when plant constituent are used directly as therapeutic agents but also as starting materials for the synthesis of drugs or as models for pharmacologically active compounds). According to data released by the World Health Organization (WHO), ethnomedicine has maintained its popularity in all regions of the developing world and its use is rapidly expanding in the industrialized countries, for example, in China, traditional herbal medicine account for 30-50% of the total medicinal consumption. In Ghana, Mali, Nigeria and Zambia, the first line treatment for 60% of children with malaria is the use of herbal medicine (WHO, 2002) [37].

Plants produce and contain a variety of chemical substances that act upon the body. Herbalists use the leaves, the flowers, stems, berries and roots of plants to prevent, relive and treat illness (Wijesekera, 1991). About 25% of the prescription drugs dispensed in the United States contain at least, one active ingredients derived from plant material, some are made from plant extracts and others are synthesized to mimic a natural plant compound (Balick 1990). A number of herbal plants and their compounds have been used, and have served as models for modern medicine (Farnsworth 1984). WHO also declared that, of the 119 plant-derived pharmaceutical medicines, about 74% are used in modern medicines in a way that correlated directly with their traditional uses as plant medicines by native cultures (Shuir *et al.*, 2001).

One vital and successful approach to identification, selection and development of therapeutic agents from medicinal plants is ethnobotanical and ethnomedical survey. The approach of retrieval of information on the folk use of plants often yields more potentially useful information which has led to useful compounds than empirical approach (Carvalho *et al.*, 2000, Berlin *et al.*, 1994).

Unfortunately, plant drug discovery has not been very successful despite the historical importance (Craig *et al.*, 2004). A few of these plants have been scientifically investigated and valuable products (either in the form of herbal supplements or novel drugs in the form of isolated compounds) are currently going through clinical trials. This has been due to the fact that in ethnobotany and natural product chemistry, the modes of preparation and administration of herbal preparation are often crucial variables in determining efficacy in pharmacological evaluations (Levine, 1981; Lewis *et al.*, 1998, Albert-Schonerg *et al.*, 1997).

The traditional knowledge systems of Africa and other parts of the world have been described to be at the risk of extinction due to inadequate transmission to the next generation. The older members of communities are the custodians of these valuable knowledge and they seems unappreciated and not courted by the younger generation of their community, this scenario cut across all ethnics and cultures world-wide.

Therefore, it is worthwhile to accurately document such knowledge before it is totally lost not only to the community where it has been practiced for centuries but also to the rest of the world (Wyk *et al.*, 2009). Careful compilation of reported medicinal plants for the treatment of tuberculosis would facilitate selection of plants based on information on their families, genus and species, for exhaustive investigation into their anti-mycobacterial activity by individual natural products research groups and pharmaceutical research institutions. Several scientific investigations of medicinal plants have been initiated in many countries because of their significant contributions to health care. Efficacious plants frequently feature in the prescriptions of many cultures and they are likely to contain compounds that are drug candidates or drug leads.

It is against this background that this treatise attempts to compile and profile medicinal plants that have been implicated by the traditional practices of different cultures, ethnic groups, and diverse tribes. It is a review of publications on ethnobotanicals, ethnomedicine, and medicinal plants with anti-mycobacterial activity that have appeared in the literature data between the years 2000-2015.

2. Phytotherapeutic management of tuberculosis

Medicinal aromatic plants play a vital role in the life support of contemporary civilization by serving the purpose of maintaining good health and wellbeing of mankind. Nature has endowed the world with an enormous wealth of plant resources for the sustenance of man and all other living inhabitants of the earth. Plant species serve as a rich source of many novel biologically active compounds; although very few have been thoroughly investigated for their medicinal properties (Heinrich and Gibbons, 2001). Apart of the 30% and 40% used in today's conventional drugs, other plants are used as herbal supplement botanicals and teas (Kirby, 1996; Hostchem and Marston, 2002).

The World Health Organisation (WHO) estimates that 4 billion people or 80% of the world population presently use herbal medicine for some aspect of primary health care. Traditional healers use medicinal plants for remedy of illness such as chest pains, tuberculosis (TB), malaria, diarrheal, appetite suppressant, arthritis, asthma etc. (Cragg and Newman, 2005). Herbal remedies from these plants have contributed to the reduction of excessive mortality, morbidity, and disability brought about by diseases such as HIV/AIDS, malaria, tuberculosis, sickle cell anaemia, diabetes, mental disorder and microbial infections (Elujoba *et al.*, 2005) [11].

In rural African, Asian and European communities with limited access to western health care facilities, ethanobotanical and ethnomedical alternatives are used in the management of health problems including tuberculosis and HIV/AIDS. Such alternatives remedies have provided leads for development of chemotherapeutic agents as practiced in western medicine (Phillipson, 2005).

Globally, indigenous communities around the world use herbal medicine for the traditional treatment of TB and other respiratory ailments (Adjanohoun *et al.*, 1991; Betti, 2004 [4]; Chhabra, Mahunnah and Mshiu, 1990 [8]; John, 1985; Mann *et al.*, 2008 [8]; Disengomoka and Delaveau, 1983; Hedberg *et al.*, 1982 [16]; Jimenez-Arellanes *et al.*, 2003 [19]; York, de Wet and Van Vuuren, 2001 [38]; Soe *et al.*, 2006) [33]. This observation confirms the universal application of plants as curative agents for TB and other respiratory diseases. Worldwide, there have been several useful reviews of traditional medicinal use of plants with anti-

mycobacterial/anti-tubercular activity (Lucas *et al.*, 1951; Fitzpatrick, 1954^[12]; Watt and Breyer-Brandwijk, 1962^[34]; Bryant, 1966; Grange and Davey, 1990^[24]; Hutchings *et al.*, 1996^[18]; Cantrel *et al.*, 1998^[7]; Asres *et al.*, 2001; Cantrell *et al.*, 2001^[7]; Newton *et al.*, 2002). Reports have been published on antimycobacterial activity of many medicinal plants used in many parts of the globe to treat TB and other respiratory ailments (Watt and Breyer-Brandwijk, 1962^[34]; Hutchings *et al.*, 1996^[18]; McGaw *et al.*, 2008; Mann *et al.*, 2008^[8]; York, de Wet and Van Vuuren, 2011^[38], 2004; Gibbons, 2005; Pauli *et al.*, 2005^[32]; Okunade *et al.*, 2004)^[30]. Various assay systems and mycobacterial test organisms have been used to screen plant extracts and constituents of active plants for antimycobacterial activity. The most favourable test organism for antimycobacterial investigations is *Mycobacterium tuberculosis*, but the sophistication required for handling this highly virulent strain make this option difficult in many laboratories. Many researchers prefer to work with the rapidly growing, avirulent, saprophytic surrogate *Mycobacterium* species such as *Mycobacterium aurum*, *M. fortuitum*, and *M. smegmatis*. Reports have also been published antimycobacterial bioassay systems of screening antimycobacterial activity of plant extracts and isolates. These range from agar diffusion and dilution assays to radiorespirometry (using a BACTEC 460 instrument), and from broth macro- and micro-dilution assays to reporter gene assays (McGaw, 2008).

In the last forty years, several reports and review articles have appeared in the literature about medicinal plants with antimycobacterial activities. In some of the studies, the antimycobacterial activities of some medicinal plants were reported to have ranged from significantly active to mildly active extracts (Lucas *et al.*, 1951; Fitzpatrick, 1954^[12]; Grange and Davey, 1990^[15]; Cantrell *et al.*, 1998a^[7]; Buwa and Afolayan, 2009^[6]; Mann *et al.*, 2008)^[8]. In one review covering 20-30 years literature, Newton *et al.* (2000)^[28] reported anti-mycobacterial /anti-tubercular activity of over 350 plant species from a wide range of families and origins containing various classes of compounds. The report highlighted those promising plant species worthy of further investigation as leads for drug development. In a review of Indian medicinal plants as a source of anti-mycobacterial agents. Gautam *et al.* (2007) interestingly noted that out of 365 plant species surveyed, 255 representing 70% showed a strong positive correlation between anti-mycobacterial activity results and ethnomedical use for TB and TB-related diseases. This further provides support for scientific evaluation of plants traditionally used in other cultures to treat symptoms relating to TB. A summary of medicinal plants reported for treatment of TB and other respiratory diseases

from different cultures is presented in Table 1. This review does not cover report on the screening of the extracts and isolates from these plants, test organisms, type of bio-assay and MICs. It simply profile the plants based on their families and genus; as well as region of extraction.

3. Discussion of Results

Plants as biologic systems have inherent potential variability in their chemistry and resulting biological activity. Indigenous Knowledge (IK) is one of unique experiences applied to traditional knowledge that is transferred to younger generation and is still developed by rural indigenous communities in specific geographical areas. Ethnomedical information can be acquire from various sources such as books on medical botany and herbals; review articles (usually involving survey of medicinal plants by geographical region or ethnic culture); field work and computer data bases e.g. NAPRALERT.

Table 1 profiled medicinal plant families and species according to the source of the information and region or country where the information has been originally documented. A total of 500 plant species belonging to 129 families were encountered in the study covering published articles on ethnomedicine and ethnobotanical studies of medicinal plants for the treatment of tuberculosis in the last 15 years. Table 2 presents the analyses of the plants' profile by re-grouping the plant families according to frequency of citation (FC) and ranking of frequency of citation (RFC). The profile revealed that the family Asteraceae is the most frequently used plant family with frequency of citation (FC) of 49, followed by Euphorbiaceae with FC of 32, and then Rubiaceae and Rutaceae with FC of 25 and 22 respectively. As reported from different ethnomedical documents source, a great proportion of the plant species documented have been validated through phytochemical and pharmaceutical research; some although, not evaluated for their efficacy are used to treat TB and opportunistic diseases associated with tuberculosis in Africa and other parts of the world.

This study has provided useful scientific documentation on medicinal plants used for the treatment of tuberculosis; by providing a platform for comparative phytochemical and pharmacological analyses (in vitro, in vivo or in humans). Second phase of this studies will review the results of the anti-Tb assays and the potency of the isolated compounds from these families for further studies.

4. Acknowledgement

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Table 1: List of Reported Plants used in the Management of Tuberculosis and other Respiratory Diseases.

S/N	Family Name	Scientific Name	Region/Country	Source/Reference
1	Acanthaceae	<i>Acanthus pubescens</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
2	Acanthaceae	<i>Adhatoda vasica</i> L.	India	Gautam <i>et al.</i> , 2012
3	Acanthaceae	<i>Adhatoda vasica</i> Nees	India	Gautam <i>et al.</i> , 2007; Gupta <i>et al.</i> , 2010
4	Acanthaceae	<i>Justicia flava</i> (Vahl.)	South Africa	McGaw <i>et al.</i> , 2008
5	Adiantaceae	<i>Adiantum capillus veneris</i> L.	South Africa	McGaw <i>et al.</i> , 2008
6	Agavaceae	<i>Agave americana</i> L.	India	Gautam <i>et al.</i> , 2007
7	Agavaceae	<i>Agave</i> L. Sp.	South Africa	McGaw <i>et al.</i> , 2008
8	Aizoaceae	<i>Carpobrotus</i> L. Spp.	South Africa	McGaw <i>et al.</i> , 2008
9	Aizoaceae	<i>Galenia africana</i> L.	South Africa	McGaw <i>et al.</i> , 2008
10	Alliaceae	<i>Agapanthus africanus</i> L.	South Africa	McGaw <i>et al.</i> , 2008
11	Alliaceae	<i>Allium cepa</i> L.	India	Gupta <i>et al.</i> , 2010
12	Alliaceae	<i>Allium sativum</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011

13	Alliaceae	<i>Allium sativum</i> L.	India	Gupta <i>et al.</i> , 2010
14	Alliaceae	<i>Tulbaghia alliacea</i> L.	South Africa	McGaw <i>et al.</i> , 2008
15	Alliaceae	<i>Tulbaghia violacea</i> Harv.	South Africa	McGaw <i>et al.</i> , 2008
16	Aloaceae	<i>Aloe secundiflora</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
17	Aloaceae	<i>Aloe vera</i> L.	India	Gupta <i>et al.</i> , 2010
18	Amaranthaceae	<i>Achyranthes aspera</i> L.	India	Gautam <i>et al.</i> , 2007
19	Amaranthaceae	<i>Amaranthus spinosus</i> L.	Mexico	E/Kington <i>et al.</i> , 2009
20	Amaryllidaceae	<i>Boophana districha</i> (L.F)	South Africa	McGaw <i>et al.</i> , 2008
21	Amaryllidaceae	<i>Brunsvigia grandiflora</i> Linds.	South Africa	McGaw <i>et al.</i> , 2008
22	Amaryllidaceae	<i>Haemanthus albiflos</i> Jacq.	South Africa	McGaw <i>et al.</i> , 2008
23	Amaryllidaceae	<i>Scadoxus punierous</i> Frus & Nordal	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
24	Amaryllidaceae	<i>Scadoxus puniceus</i> L.	South Africa	McGaw <i>et al.</i> , 2008
25	Anacardiaceae	<i>Mongifera indica</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
26	Anacardiaceae	<i>Anacardium occidentale</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
27	Anacardiaceae	<i>Lannea kerstingii</i>	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
28	Anacardiaceae	<i>Ozoroa obovata</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
29	Anacardiaceae	<i>Ozoroa paniculosa</i> (Sond)	South Africa	McGaw <i>et al.</i> , 2008
30	Anacardiaceae	<i>Scirocarya birrea</i> (A. Rich) Hochst.	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
31	Anacardiaceae	<i>Spondeas</i> Sp.	Lao/Asia	E/Kington <i>et al.</i> , 2009
32	Anacardiaceae	<i>Spondias dulci</i> Parkins	Mexico	E/Kington <i>et al.</i> , 2009
33	Asteraceae	<i>Xanthium strumarium</i> L.	India	Gautam <i>et al.</i> , 2007
34	Anacardiaceae	<i>Spondias mombia</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
35	Annonaceae	<i>Annona muricata</i> L.	India	Gautam <i>et al.</i> , 2007
36	Annonaceae	<i>Annona palustris</i> L.	India	Gautam <i>et al.</i> , 2007
37	Annonaceae	<i>Annona reticulata</i> L.	Lao/Asia	E/Kington <i>et al.</i> , 2009
38	Annonaceae	<i>Polyalthia</i> Sp.	Lao/Asia	E/Kington <i>et al.</i> , 2009
39	Apiaceae	<i>Alepidea amatymbica</i> Eckl. & Zeyh.	South Africa	McGaw <i>et al.</i> , 2008
40	Apiaceae	<i>Alepidea longifolia</i> E. May	South Africa	McGaw <i>et al.</i> , 2008
41	Apiaceae	<i>Ammi visnaga</i> (L.) Lam	India	Gautam <i>et al.</i> , 2007
42	Apiaceae	<i>Angelica archangelica</i> L.	India	Gautam <i>et al.</i> , 2007
43	Apiaceae	<i>Apium graveolens</i> L.	India	Gautam <i>et al.</i> , 2007
44	Apiaceae	<i>Centella asiatica</i> (L.)	India	Gautam <i>et al.</i> , 2007
45	Apiaceae	<i>Cicuta virosa</i> L.	India	Gautam <i>et al.</i> , 2007
46	Apiaceae	<i>Foeniculum vulgare</i> Mill.	South Africa	McGaw <i>et al.</i> , 2008
47	Apiaceae	<i>Heteromorphia trifoliata</i> (Wendl.)	South Africa	McGaw <i>et al.</i> , 2008
48	Apiaceae	<i>Lichtensteinia kolbeana</i> H. Bol.	South Africa	McGaw <i>et al.</i> , 2008
49	Apiaceae	<i>Lichtensteinia unerrupta</i> (Thumb.)	South Africa	McGaw <i>et al.</i> , 2008
50	Apocynaceae	<i>Carissa edulis</i> Vahl.	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
51	Apocynaceae	<i>Catharanthus rosens</i> L.G.	India	Gautam <i>et al.</i> , 2007
52	Apocynaceae	<i>Holarrhena antidysenterica</i> (L) Wall.Syn. <i>Holarrhena pubescens</i>	India	Gautam <i>et al.</i> , 2007
53	Apocynaceae	<i>Rauwolfia caffra</i> Sond.	South Africa	McGaw <i>et al.</i> , 2008
54	Apocynaceae	<i>Tabernaemontana pallida</i> Hu.	Lao/Asia	E/Kington <i>et al.</i> , 2009
55	Araceae	<i>Acorus calamus</i> L.	India	Gautam <i>et al.</i> , 2007
56	Araceae	<i>Amorphophallus campanulatus</i> Blume ex. Deene	India	Gautam <i>et al.</i> , 2007
57	Araceae	<i>Anchomane difformis</i> (BL)	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
58	Araceae	<i>Lasia spinosa</i> (L.) Thw.	Mexico	E/Kington <i>et al.</i> , 2009
59	Araceae	<i>Pistia stratiotes</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
60	Araceae	<i>Stylochiton natalensis</i> Schott.	South Africa	McGaw <i>et al.</i> , 2008
61	Araliaceae	<i>Cussonia arborea</i> Hocst. Ex. A. Rich.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
62	Araliaceae	<i>Heteropanax fragrans</i> (Roxb.)	Mexico	E/Kington <i>et al.</i> , 2009
63	Arecaceae	<i>Areca catechu</i> L.	India	Gautam <i>et al.</i> , 2007
64	Arecaceae	<i>Caryota mitis</i> Lour.	Mexico	E/Kington <i>et al.</i> , 2009
65	Asclepiadaceae	<i>Asclepias fruticosa</i> L.	South Africa	McGaw <i>et al.</i> , 2008
66	Asclepiadaceae	<i>Calotropis gigantea</i> L. R.	India	Gautam <i>et al.</i> , 2007
67	Asclepiadaceae	<i>Ceropegia woodii</i> Schltr.	South Africa	McGaw <i>et al.</i> , 2008
68	Asclepiadaceae	<i>Myriopterion extensum</i> W. & A.	Lao/Asia	E/Kington <i>et al.</i> , 2009
69	Asclepiadaceae	<i>Secamone gerrandii</i> Harv. Ex. Benth	South Africa	McGaw <i>et al.</i> , 2008
70	Asclepiaceae	<i>Calotropis procera</i> (Ait)	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
71	Asparagaceae	<i>Prostaparagus africanus</i> (Lam.) Oberm.	South Africa	McGaw <i>et al.</i> , 2008
72	Asphodelaceae	<i>Aloe marlothi</i> a. Berger	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
73	Asphodelaceae	<i>Kniphofia laxiflora</i> Kunth.	South Africa	McGaw <i>et al.</i> , 2008
74	Asphodelaceae	<i>Kniphofia rooperic</i> (Moore) Lem.	South Africa	McGaw <i>et al.</i> , 2008
75	Asteraceae	<i>Acanthospermum</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
76	Asteraceae	<i>Achilla millefolium</i> L.	India	Gautam <i>et al.</i> , 2007
77	Asteraceae	<i>Anthemis cotula</i> L.	India	Gautam <i>et al.</i> , 2007
78	Asteraceae	<i>Arctotis auriculata</i> Jacq.	South Africa	McGaw <i>et al.</i> , 2008
79	Asteraceae	<i>Artemisia absinthium</i> L.	India	Gautam <i>et al.</i> , 2007

80	Asteraceae	<i>Artemisia afra</i> Jacq. Ex. Wild	South Africa	McGaw <i>et al.</i> , 2008
81	Asteraceae	<i>Artemisia scoparia</i> Waldst & Kit	India	Gautam <i>et al.</i> , 2007
82	Asteraceae	<i>Aster bakeranus</i>	South Africa	McGaw <i>et al.</i> , 2008
83	Asteraceae	<i>Athrixia phyllicoides</i> DC.	South Africa	McGaw <i>et al.</i> , 2008
84	Asteraceae	<i>Berkheya rhapsaotica</i> DC.	South Africa	McGaw <i>et al.</i> , 2008
85	Asteraceae	<i>Bidens pilosa</i> L.	India	Gautam <i>et al.</i> , 2007
86	Asteraceae	<i>Brachylaena discolor</i> DC	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
87	Asteraceae	<i>Brachylaena</i> spp	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
89	Asteraceae	<i>Cichorium intybus</i> L.	India	Gautam <i>et al.</i> , 2007
90	Asteraceae	<i>Cirsium arvense</i> L. Scop.	India	Gautam <i>et al.</i> , 2007
91	Asteraceae	<i>Conyza rhapsaotica</i> DC.	South Africa	McGaw <i>et al.</i> , 2008
92	Asteraceae	<i>Conyza scarbida</i> DC.	South Africa	McGaw <i>et al.</i> , 2008
93	Asteraceae	<i>Conyza ulmifolia</i> (Burn F. Kuntze)	South Africa	McGaw <i>et al.</i> , 2008
94	Asteraceae	<i>Dicoma anomala</i> Sond.	South Africa	McGaw <i>et al.</i> , 2008
95	Asteraceae	<i>Dicoma speciosa</i> DC	South Africa	McGaw <i>et al.</i> , 2008
96	Asteraceae	<i>Dicoma zeyheri</i> Sond	South Africa	McGaw <i>et al.</i> , 2008
97	Asteraceae	<i>dittrichia graveolens</i> L.	South Africa	McGaw <i>et al.</i> , 2008
98	Asteraceae	<i>Elephantopus</i> Sp.	Lao/Asia	E/Kington <i>et al.</i> , 2009
99	Asteraceae	<i>Eriocephalus africanus</i> L.	South Africa	McGaw <i>et al.</i> , 2008
100	Asteraceae	<i>Eupatorium odoratum</i> L.	India	Gautam <i>et al.</i> , 2007
101	Asteraceae	<i>Felicia erigeroides</i> DC	South Africa	McGaw <i>et al.</i> , 2008
102	Asteraceae	<i>Flourensia cernua</i>	Mexico	Molina Salinas <i>et al.</i> , 2006
103	Asteraceae	<i>Gerbera ambigua</i> (Cass) Sch. Bip	South Africa	McGaw <i>et al.</i> , 2008
104	Asteraceae	<i>Gerbera piloselloides</i> (L) Cass	South Africa	McGaw <i>et al.</i> , 2008
105	Asteraceae	<i>Helianthus annus</i> L	India	Gautam <i>et al.</i> , 2007
106	Asteraceae	<i>Helichrysum kraussi</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
107	Asteraceae	<i>Helichrysum</i> Spp. (including <i>Helichrysum Midifolium</i> (L) Less., <i>Helichrysum Odoratissimum</i> (L.) Sweat, <i>Helichrysum pilosellum</i> (LF) Less, <i>Helichrysum melanacme</i> DC, <i>Helichrysum crispum</i> (L) D. Don)	South Africa	McGaw <i>et al.</i> , 2008
108	Asteraceae	<i>Inula racemosa</i> Hook.f. Syn. <i>Inula helenium</i> L.	India	Gautam <i>et al.</i> , 2007
109	Asteraceae	<i>Leysera gnaphalodes</i> L.	South Africa	McGaw <i>et al.</i> , 2008
110	Asteraceae	<i>Nidorella anomala</i> steetz	South Africa	McGaw <i>et al.</i> , 2008
111	Asteraceae	<i>Nidorella auriculata</i> DC	South Africa	McGaw <i>et al.</i> , 2008
112	Asteraceae	<i>Osmitopsis asteriscoides</i>	South Africa	McGaw <i>et al.</i> , 2008
113	Asteraceae	<i>Senecio bupleuroides</i> DC	South Africa	McGaw <i>et al.</i> , 2008
114	Asteraceae	<i>Senecio inornatus</i> DC	South Africa	McGaw <i>et al.</i> , 2008
115	Asteraceae	<i>Senecio quinquelobus</i> (Thumb) DC	South Africa	McGaw <i>et al.</i> , 2008
116	Asteraceae	<i>Senecio serratuloides</i> DC	Kwazulu-Nata/South Africa	McGaw <i>et al.</i> , 2008; York <i>et al.</i> , 2011
117	Asteraceae	<i>Senecio speciosus</i> Will	South Africa	McGaw <i>et al.</i> , 2008
118	Asteraceae	<i>Tarconanthus camphoratus</i> L.	South Africa	McGaw <i>et al.</i> , 2008
119	Asteraceae	<i>Ursinia temilobu</i> DC	South Africa	McGaw <i>et al.</i> , 2008
120	Asteraceae	<i>Vernonia adoensis</i> Sch. Bip.	South Africa	McGaw <i>et al.</i> , 2008
121	Asteraceae	<i>Vernonia anygdaline</i>	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
122	Asteraceae	<i>Vernonia hirsuta</i> (DC) Sch. Bip.	South Africa	McGaw <i>et al.</i> , 2008
123	Asteraceae	<i>Vernonia mespilifolia</i> Less	South Africa	McGaw <i>et al.</i> , 2008
124	Balanataceae	<i>Balanites aegyptica</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
125	Balanataceae	<i>Balanites maughamii</i> Sprange	South Africa	McGaw <i>et al.</i> , 2008
126	Berberidaceae	<i>Berberiis vulgaris</i> L.	India	Gautam <i>et al.</i> , 2007
127	Bignoniaceae	<i>Haplophragma adenophyllum</i> (Wall. Ex. G. Don)	Lao/Asia	ElKington <i>et al.</i> , 2009
128	Bignoniaceae	<i>Millingtonia hortensis</i> L. F.	Lao/Asia	E/Kington <i>et al.</i> , 2009
129	Bignoniaceae	<i>Newboldia laevis</i> (P.B)	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
130	Bignoniaceae	<i>Oroxylum indicum</i> (L.) Kurz.	Lao/Asia	E/Kington <i>et al.</i> , 2009
131	Bignoniaceae	<i>Stereospermum kunthianum</i>	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
132	Bomalaceae	<i>Bombax costatum</i>	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
133	Bombacaceae	<i>Adansoniia digitata</i> L.	India	Gautam <i>et al.</i> , 2007
134	Boraginaceae	<i>Cordia boissieri</i>	Veracruz/Mexico	Jimenez - Arellanes <i>et al.</i> , 2003
135	Boraginaceae	<i>Cordia africana</i>	Kenya/Tanzania	Orodho <i>et al.</i> , 2011
136	Boraginaceae	<i>Lepidium pinnatum</i> Thumb.	South Africa	McGaw <i>et al.</i> , 2008
137	Boraginaceae	<i>Lepidum schinzii</i> Thell	South Africa	McGaw <i>et al.</i> , 2008
138	Boraginaceae	<i>Tecomaria capensis</i> (Thumb)	South Africa	McGaw <i>et al.</i> , 2008
139	Brassicaceae	<i>Brassica nigra</i> (L.) Koch.	India	Gautam <i>et al.</i> , 2007
140	Brassicaceae	<i>Brassica rapa</i> L. Emend.	India	Gautam <i>et al.</i> , 2007
141	Brassicaceae	<i>Capsella bursa-pastoris</i> L.	India	Gautam <i>et al.</i> , 2007
142	Buddlejaceae	<i>Buddleja saligna</i> L.	South Africa	McGaw <i>et al.</i> , 2008
143	Burseaceae	<i>Boswellia dalzielii</i> Hutch.	(Adamawa, Plateau)Nigeria	Kubmarwa <i>et al.</i> , 2013, Nvau <i>et al.</i> , 2011
144	Burseraceae	<i>Canarium schweinfurthii</i> Eng.	Plateau/Nigeria	Nvau <i>et al.</i> , 2011

145	Buxaceae	<i>Buxus papillosa</i> C.K.	India	Gautam <i>et al.</i> , 2007
146	Cactaceae	<i>Rhipsalis baccifera</i> (J. Mill)	South Africa	McGaw <i>et al.</i> , 2008
147	Caesalpiniaceae	<i>Bauhinia vahlii</i> Wt. & Arn.	India	Gautam <i>et al.</i> , 2007
148	Caesalpiniaceae	<i>Bauhinia variegata</i> L.	India	Gautam <i>et al.</i> , 2007
149	Caesalpiniaceae	<i>Caesalpinia digyna</i> R.	India	Gautam <i>et al.</i> , 2007
150	Caesalpiniaceae	<i>Caesalpinia pulcherrima</i> L.	India	Gautam <i>et al.</i> , 2007
151	Caesalpiniaceae	<i>Caesalpinia sappan</i> L.	India	Gautam <i>et al.</i> , 2007
152	Caesalpiniaceae	<i>Daniella Oliveri</i> (Rolfe) Hatch & Dalz.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
153	Caesalpiniaceae	<i>Detarium microcarpum</i> Guill & Perr.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
154	Caesalpiniaceae	<i>Piliostigma thonningi</i> (Schum)	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
155	Caesalpiniaceae	<i>Senna obtusifolia</i> (L.) Irwin. & B.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
156	Caesalpiniaceae	<i>Tamarindus indica</i> L.	(Adamawa, Niger)Nigeria	Abdullahi <i>et al.</i> , 2007; Kubmarwa <i>et al.</i> , 2013
157	Caesalpiniodeae	<i>Cassia mimosides</i>	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
158	Caesalpiniodeae	<i>Piliostigma thonningi</i> Schum	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
159	Caesalpinoideae	<i>Piliostigma reticulatum</i> (DC)	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
160	Canellaceae	<i>Warburgia salutaris</i> (Bertol F.)	South Africa	McGaw <i>et al.</i> , 2008
161	Canellaceae	<i>Werbugia ugandensis</i>	Kenya/Uganda/Tanzania	Orodho <i>et al.</i> , 2011
162	Cannabaceae	<i>Cannabis sativa</i> L.	India	Gautam <i>et al.</i> , 2007
163	Cannabaceae	<i>Humulus lupulus</i> L.	India	Gautam <i>et al.</i> , 2007
164	Capparaceae	<i>Capparis brassii</i> DC	(Niger) Nigeria, South Africa	Abdullahi <i>et al.</i> , 2007; McGaw <i>et al.</i> , 2008
165	Capparaceae	<i>Capparis micracantha</i> DC.	Mexico	E/Kington <i>et al.</i> , 2009
166	Capparaceae	<i>Capparis tomentosa</i> Lam.	South Africa	McGaw <i>et al.</i> , 2008
167	Capparaceae	<i>Crateva adansonii</i> DC	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
168	Caricaceae	<i>Carica Papaya</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
169	Caricaceae	<i>Carica Papaya</i> L.	India	Gautam <i>et al.</i> , 2007
170	Caryophyllaceae	<i>Krauseola mosambicina</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
171	Casuarinaceae	<i>Casuarina equisetifolia</i> L.	India	Gautam <i>et al.</i> , 2007
172	Celastraceae	<i>Cassine papillosa</i> (Hochst)	South Africa	McGaw <i>et al.</i> , 2008
173	Celastraceae	<i>Catha edulis</i> (Vahl)	South Africa	McGaw <i>et al.</i> , 2008
174	Celastraceae	<i>Euonymus atropurpureus</i>	India	Gautam <i>et al.</i> , 2007
175	Celastraceae	<i>Maytenus heterophylla</i>	South Africa	McGaw <i>et al.</i> , 2008
176	Celastraceae	<i>Maytenus senegalensis</i> (Lam)	South Africa	McGaw <i>et al.</i> , 2008
177	Celastraceae	<i>Maytenus senegalensis</i> (Lam.) Excel	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
178	Celastraceae	<i>Pterocelastrus echinatus</i> N.E.Br.	South Africa	McGaw <i>et al.</i> , 2008
179	Celastraceae	<i>Salacia chinensis</i> L.	Mexico	E/Kington <i>et al.</i> , 2009
180	Ceratophyllaceae	<i>Ceratophyllum demersum</i> L.	India	Gautam <i>et al.</i> , 2007
181	Chenopodiaceae	<i>Beta vulgaris</i> L.	India	Gautam <i>et al.</i> , 2007
182	Chenopodiaceae	<i>Chaenopodium ambrosioides</i>	Mexico	Molina Salinas <i>et al.</i> , 2006
183	Chenopodiaceae	<i>Chenopodium album</i> L.	India	Gautam <i>et al.</i> , 2007
184	Chenopodiaceae	<i>Chenopodium ambrosioides</i>	India, South Africa	Gautam <i>et al.</i> , 2007; McGaw <i>et al.</i> , 2008
185	Chenopodiaceae	<i>Chenopodium botrys</i> L.	India	Gautam <i>et al.</i> , 2007
186	Chrysobalanaceae	<i>Parinari capensis</i> Harv.	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
187	Chrysobalanaceae	<i>Parinari</i> Sp.	Mexico	E/Kington <i>et al.</i> , 2009
188	Cleomaceae	<i>Cleome viscosa</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
189	Clusiaceae	<i>Garcinia polyantha</i> Oliv.	South Africa	McGaw <i>et al.</i> , 2008
190	Combretaceae	<i>Anoeissus leiocarpus</i> (DC) Guill & Perr.	(Adamawa, Niger)Nigeria	Kubmarwa <i>et al.</i> , 2013, Abdullahi <i>et al.</i> , 2007
191	Combretaceae	<i>Combretum imberbe</i> W.	South Africa	McGaw <i>et al.</i> , 2008
192	Combretaceae	<i>Combretum kraussii</i> Hochst	South Africa	McGaw <i>et al.</i> , 2008
193	Combretaceae	<i>Combretum molle</i> R. Br. Ex. G.	Kwazulu-Nata, South Africa	McGaw <i>et al.</i> , 2008, York <i>et al.</i> , 2011
194	Combretaceae	<i>Combretum</i> Spp.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
195	Combretaceae	<i>Terminalia avicennioides</i> Guill. & Per.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
196	Combretaceae	<i>Terminalia glaucescens</i> P.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
197	Combretaceae	<i>Terminalia glaucescens</i> Planch.ex Benth.	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
198	Combretaceae	<i>Terminalia serica</i> Burch ex DC	Kwazulu-Nata, South Africa	McGaw <i>et al.</i> , 2008, York <i>et al.</i> , 2011
199	Compositae	<i>Achillea millefolium</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
200	Compositae	<i>Ageratum corimbosum</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
201	Compositae	<i>Artemisia indoviciana</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003, Molina Salinas <i>et al.</i> , 2006
202	Compositae	<i>Cirsium conspium</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
203	Compositae	<i>Gnaphalium semiam plexicaule</i>	Morelos/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
204	Convolvulaceae	<i>Impomoea aquatic</i> F.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
205	Cruciferae	<i>Garunia buchananii</i>	Kenya/Uganda/Tanzania	Orodho <i>et al.</i> , 2011
206	Cucurbitaceae	<i>Citrullus colocynthis</i> Schr.	India	Gautam <i>et al.</i> , 2007
207	Cucurbitaceae	<i>Luffa cylindrica</i> (L) M.J.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
208	Cucurbitaceae	<i>Cucumis hirsutus</i> Sond	South Africa	McGaw <i>et al.</i> , 2008

209	Cupressaceae	<i>Juniperus communis</i>	Oaxaca/Mexico	Jimenez – Arellanes <i>et al.</i> , 2003
210	Cyperaceae	<i>Cyperus articulatus</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
211	Cyperaceae	<i>Discorea abyssinica</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
212	Davalliaceae	<i>Nephrolepis exaltata</i> (L.) Schott.	Mexico	E/Kington <i>et al.</i> , 2009
213	Dioscoreaceae	<i>Dioscorea sylvatica</i> (Kimth).	South Africa	McGaw <i>et al.</i> , 2008
214	Dipsacaceae	<i>Cephalaria zeyheriana</i> Szabo	South Africa	McGaw <i>et al.</i> , 2008
215	Dracaenaceae	<i>Sansevieria hyacinthoides</i> (L) Druce	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
216	Droseraceae	<i>Drosera capensis</i> L.	South Africa	McGaw <i>et al.</i> , 2008
217	Ebenaceae	<i>Euclea crispa</i> (thumb)	South Africa	McGaw <i>et al.</i> , 2008
218	Ebenaceae	<i>Euclea natalensis</i> A. DC	South Africa	McGaw <i>et al.</i> , 2008
219	Elaeagnaceae	<i>Hippophae rhamnoides</i> L.	India	Gautam <i>et al.</i> , 2007
220	Euphorbiaceae	(Christins) Swingle	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
221	Euphorbiaceae	<i>Acalypha peduncularis</i> E. Mey. Ex.	South Africa	McGaw <i>et al.</i> , 2008
222	Euphorbiaceae	<i>Acalypha punctata</i> Meisn.	South Africa	McGaw <i>et al.</i> , 2008
223	Euphorbiaceae	<i>Acalypha indica</i> L.	India	Gupta <i>et al.</i> , 2010
224	Euphorbiaceae	<i>Alchornea cordifolia</i> Schum & Thonn. Muell.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
225	Euphorbiaceae	<i>Andrachne ovalis</i> (Sond)	South Africa	McGaw <i>et al.</i> , 2008
226	Euphorbiaceae	<i>Antidesma diandrum</i> (Roxb.)	Mexico	E/Kington <i>et al.</i> , 2009
227	Euphorbiaceae	<i>Bridelia ferruginea</i> Bth.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
228	Euphorbiaceae	<i>Bridelia cathartica</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
229	Euphorbiaceae	<i>Chaetocarpus castanocarpus</i>	Mexico	E/Kington <i>et al.</i> , 2009
230	Euphorbiaceae	<i>Chlorophora senegalensis</i> Lam.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
231	Euphorbiaceae	<i>Chrozophora tinctorica</i> Hook.	India	Gautam <i>et al.</i> , 2007
232	Euphorbiaceae	<i>Citrus aurantifolia</i> (Christins) Swingle	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
233	Euphorbiaceae	<i>Codiaeum variegatum</i> Blume.	India	Gautam <i>et al.</i> , 2007
234	Euphorbiaceae	<i>Croton dicogamus</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
235	Euphorbiaceae	<i>Croton gratissimus</i> Burch.	South Africa	McGaw <i>et al.</i> , 2008
236	Euphorbiaceae	<i>Croton pseudopulchellus</i> Pax.	South Africa	McGaw <i>et al.</i> , 2008
237	Euphorbiaceae	<i>Croton sylvaticus</i> Hochst	South Africa	McGaw <i>et al.</i> , 2008
238	Euphorbiaceae	<i>Euphobia hirta</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
239	Euphorbiaceae	<i>Euphorbia peplus</i> L.	India	Gautam <i>et al.</i> , 2007
240	Euphorbiaceae	<i>Euphorbia tirucalli</i> L.	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
241	Euphorbiaceae	<i>Mallotus philippensis</i> Muell.-Arg.	India	Gautam <i>et al.</i> , 2007
242	Euphorbiaceae	<i>Hymenocardia acida</i> Tul.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
243	Euphorbiaceae	<i>Jatropha curcas</i> L.	Mexico, (Niger) Nigeria	E/Kington <i>et al.</i> , 2009, Abdullahi <i>et al.</i> , 2007
244	Euphorbiaceae	<i>Jatropha gossypifolia</i> L.	Mexico	E/Kington <i>et al.</i> , 2009
245	Euphorbiaceae	<i>Parinari polyandra</i> Benth.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
246	Euphorbiaceae	<i>Paullina pinnata</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
247	Euphorbiaceae	<i>Riunus communis</i>	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
248	Euphorbiaceae	<i>Sarcocephalus latifolius</i> (S.M.)	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
249	Euphorbiaceae	<i>Sauropus androgynus</i> L.	Mexico	E/Kington <i>et al.</i> , 2009
250	Euphorbiaceae	<i>Zanthoxylum zanthoxyloides</i>	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
251	Fabaceae	<i>Abrus precatorius</i> L.	India	Gautam <i>et al.</i> , 2007
252	Fabaceae	<i>Acacia robusta</i> Burch	South Africa	McGaw <i>et al.</i> , 2008
253	Fabaceae	<i>Acacia sieberiana</i> DC Var. Woodii (Burt Davy) Keay & Brenan	South Africa	McGaw <i>et al.</i> , 2008
254	Fabaceae	<i>Acacia xanthophloca</i> Benth.	South Africa	McGaw <i>et al.</i> , 2008
255	Fabaceae	<i>Albizia julibrissin</i> Durazz.	India	Gautam <i>et al.</i> , 2007
256	Fabaceae	<i>Alysicarpus rugosus</i> (Wild) DC	South Africa	McGaw <i>et al.</i> , 2008
257	Fabaceae	<i>Cassia tora</i> L.	Lao/Asia	E/Kington <i>et al.</i> , 2009
258	Fabaceae	<i>Cyclopia intermedia</i> E. Mey	South Africa	McGaw <i>et al.</i> , 2008
259	Fabaceae	<i>Dalbergia</i> Sp.	Mexico	E/Kington <i>et al.</i> , 2009
260	Fabaceae	<i>Elephantorrhiza elephantina</i> (Burch.) Skeels	South Africa	McGaw <i>et al.</i> , 2008
261	Fabaceae	<i>Entada abyssinica</i>	Kenya/Uganda/Tanzania	Orodho <i>et al.</i> , 2011
262	Fabaceae	<i>Erythrina caffra</i> Thumb.	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
263	Fabaceae	<i>Faidherbia albida</i> (Del.) A. Chev.	South Africa	McGaw <i>et al.</i> , 2008
264	Fabaceae	<i>Glycyrrhiza glabra</i> L.	South Africa, India	McGaw <i>et al.</i> , 2008, Gautam <i>et al.</i> , 2007
265	Fabaceae	<i>Indigofera tenuissina</i> E. Mey.	South Africa	McGaw <i>et al.</i> , 2008
266	Fabaceae	<i>Lotus discolor</i> E. Mey.	South Africa	McGaw <i>et al.</i> , 2008
267	Fabaceae	<i>Melothria heterophylla</i> Cogn.	Mexico	E/Kington <i>et al.</i> , 2009
268	Fabaceae	<i>Tephrosia grandiflora</i> (Ait) Pers.	South Africa	McGaw <i>et al.</i> , 2008
269	Fabaceae	<i>Tephrosia macropoda</i> (E. Mey.) Harv.	South Africa	McGaw <i>et al.</i> , 2008
270	Fabaceae	<i>Vigna marima</i> (Burn.) Merr. Syn. <i>Vigna lutea</i> A. Gray	India	Gautam <i>et al.</i> , 2007
271	Fabaceae	<i>Fagus grandifolia</i> , Ehrh	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
272	Flacourtiaceae	<i>Gerrardina foliosa</i> Oliv.	South Africa	McGaw <i>et al.</i> , 2008
273	Gentianaceae	<i>Canscora decussata</i> Schult.	India	Gautam <i>et al.</i> , 2007
274	Geraniaceae	<i>Gunnera perpensa</i> L.	South Africa	McGaw <i>et al.</i> , 2008

275	Geraniaceae	<i>Pelargonium</i> Spp. (notably <i>P. Reniforme</i> Curt. and <i>P. Sidoides</i> DC)	South Africa	McGaw <i>et al.</i> , 2008
276	Graminae	<i>Agropyron repens</i>	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
277	Graminae	<i>Bambusa guada</i>	Veracruz/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
278	Hippocastanaceae	<i>Aesculus hippocastanum</i> L.	India	Gautam <i>et al.</i> , 2007
279	Hyacinthaceae	<i>Eucomis autumnalis</i> (Mill) Chitt. Subsp. <i>Clavata</i> (Bak) Reyneke	South Africa	McGaw <i>et al.</i> , 2008
280	Hypericaceae	<i>Hypericum cordifolium</i> Choisy	India	Gautam <i>et al.</i> , 2007
281	Hypericaceae	<i>Hypericum calycinum</i> L.	India	Gautam <i>et al.</i> , 2007
282	Hypericaceae	<i>Hypericum perforatum</i> L.	India	Gautam <i>et al.</i> , 2007
283	Hypoxidaceae	<i>Hypoxis</i> sp.	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
284	Iridaceae	<i>Aristea ecklonii</i> Bak.	South Africa	McGaw <i>et al.</i> , 2008
285	Iridaceae	<i>Gladiolus dalenii</i> van Geel	South Africa	McGaw <i>et al.</i> , 2008
286	Irvingalaceae	<i>Irvingia malayana</i> Oliver ex. Bennett	Mexico	E/Kington <i>et al.</i> , 2009
287	Labiatae	<i>Marrubium vulgare</i>	Mexico	Molina Salinas <i>et al.</i> , 2006
288	Labiatae	<i>Mentha spicata</i>	Mexico	Molina Salinas <i>et al.</i> , 2006
289	Lamiaceae	<i>Ballota africana</i> (L.) Benth.	South Africa	McGaw <i>et al.</i> , 2008
290	Lamiaceae	<i>Hyssopus officinalis</i> L.	India	Gautam <i>et al.</i> , 2007
291	Lamiaceae	<i>Leonotis leonurus</i> (L.) R. Br.	South Africa	McGaw <i>et al.</i> , 2008
292	Lamiaceae	<i>Mentha longifolia</i> (L.) L.	South Africa	McGaw <i>et al.</i> , 2008
293	Lamiaceae	<i>Orthosiphon labiatus</i> N.E.B	South Africa	McGaw <i>et al.</i> , 2008
294	Lamiaceae	<i>Plectranthus laxiflorus</i> B.	South Africa	McGaw <i>et al.</i> , 2008
295	Lamiaceae	<i>Plectranthus madagascaricus</i> (Pers.) Benth	South Africa	McGaw <i>et al.</i> , 2008
296	Lamiaceae	<i>Plectranthus neochilus</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
297	Lamiaceae	<i>Salvia</i> L. Spp	South Africa	McGaw <i>et al.</i> , 2008
298	Lamiaceae	<i>Tetradenia riparia</i> (Hochst.) Codd.	Kwazulu-Nata/South Africa	McGaw <i>et al.</i> , 2008, York <i>et al.</i> , 2011
299	Lamiaceae	<i>Thymus vulgaris</i> L.	South Africa	McGaw <i>et al.</i> , 2008
300	Lauraceae	<i>Litsea cucebbba</i> Pers.	Lao/Asia	E/Kington <i>et al.</i> , 2009
301	Lauraceae	<i>Cinnamomum caxphora</i> L.	India	Gautam <i>et al.</i> , 2007
302	Lauraceae	<i>Cryptocarya latifolia</i> Sond.	South Africa	McGaw <i>et al.</i> , 2008
303	Leguminosae	<i>Albizia adianthifolia</i> (Schumach) W. F. Wight.	South Africa	McGaw <i>et al.</i> , 2008
304	Leguminosae	<i>Albizia coriana</i>	Kenya/Uganda/Tanzania	Orodho <i>et al.</i> , 2011
305	Leguminosae	<i>Albizia versicola</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
306	Leguminosae	<i>Albizia zygia</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
307	Leguminosae	<i>Calliandra houstoniana</i>	Chiapas/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
308	Leguminosae	<i>Erythrina senegalensis</i>	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
309	Leguminosae	<i>Robinia pseudoaccicia</i> L.	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
310	Liliaceae	<i>Allium sativum</i> L.	India	Gautam <i>et al.</i> , 2007
320	Liliaceae	<i>Allium schoenoprasum</i> L.	India	Gautam <i>et al.</i> , 2007
321	Liliaceae	<i>Aloe vera</i> Mill.	India	Gautam <i>et al.</i> , 2007
322	Liliaceae	<i>Asparagus officinalis</i> L.	India	Gautam <i>et al.</i> , 2007
323	Liliaceae	<i>Dracaena steudneri</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
324	Loganiaceae	<i>Buddleja saligna</i> Wild.	South Africa	McGaw <i>et al.</i> , 2008
325	Loganiaceae	<i>Buddleja salviifolia</i> (L.) Lam	South Africa	McGaw <i>et al.</i> , 2008
326	Loganiaceae	<i>Strychnos mix-blanda</i> A. W. Hill	Mexico	E/Kington <i>et al.</i> , 2009
327	Lycopodiaceae	<i>Lycopodium cernuum</i> L.	Mexico	E/Kington <i>et al.</i> , 2009
328	Lythraceae	<i>Ammannia baccifera</i> L.	India	Gautam <i>et al.</i> , 2007
329	Malvaceae	<i>Althaea indwigii</i> L.	India	Gautam <i>et al.</i> , 2007
330	Malvaceae	<i>Althaea rosea</i> (L.) Cav.	India	Gautam <i>et al.</i> , 2007
331	Malvaceae	<i>Anoda cristata</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
332	Malvaceae	<i>Hibiscus esulentus</i> L. Syn. <i>Abelmoschus esulentus</i> L.	India	Gautam <i>et al.</i> , 2007
333	Malvaceae	<i>Hibiscus trionum</i> L.	India	Gautam <i>et al.</i> , 2007
334	Malvaceae	<i>Malva parviflora</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
335	Melastomaceae	<i>Melastoma decemfidum</i> Roxb.	Mexico	E/Kington <i>et al.</i> , 2009
336	Meliaceae	<i>Azadirachta indica</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
337	Meliaceae	<i>Azadirachta indica</i> A. Juss	India, Loa/Asia	Gautam <i>et al.</i> , 2007, E/Kington <i>et al.</i> , 2009
338	Meliaceae	<i>Ekebergia capensis</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
339	Meliaceae	<i>Swietenia mahogani</i> (L.) Jacq.	India	Gautam <i>et al.</i> , 2007
340	Meliaceae	<i>Ekebergia capensis</i> sparm.	South Africa	McGaw <i>et al.</i> , 2008
341	Meliaceae	<i>Sovietenia luimilis</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
342	Meliaceae	<i>Trichilia dregeana</i> Harv. & Sond.	South Africa	McGaw <i>et al.</i> , 2008
343	Meliaceae	<i>Trichilia emetica</i> Vahl.	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
344	Menispermaceae	<i>Cissampelos pareira</i> L.	India	Gautam <i>et al.</i> , 2007
345	Menispermaceae	<i>Cocculus indicus</i>	India	Gautam <i>et al.</i> , 2007
346	Mimomosaceae	<i>Acacia hockii</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
347	Mimomosaceae	<i>Dychrostachys glomerata</i>	Kenya/Tanzania	Orodho <i>et al.</i> , 2011
348	Mimosaceae	<i>Acacia senegal</i> L.	India	Gautam <i>et al.</i> , 2012

349	Mimosaceae	<i>Parkia biglobosa</i> (Jacq)	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
350	Mimosoideae	<i>Acacia tortilis</i> (Forssk) Hayne	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
351	Moraceae	<i>Artocarpus lakoocha</i> Roxb.	India	Gautam <i>et al.</i> , 2007
352	Moraceae	<i>Ficus citrifolia</i> P. Miller	India	Gautam <i>et al.</i> , 2007
353	Moraceae	<i>Ficus glomerata</i> Roxb.	Mexico	E/Kington <i>et al.</i> , 2009
354	Moraceae	<i>Ficus hispida</i> L.F.	Mexico	E/Kington <i>et al.</i> , 2009
355	Moraceae	<i>Ficus platyphylla</i> Del.	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
356	Moraceae	<i>Ficus sur</i> Forssk	South Africa	McGaw <i>et al.</i> , 2008
357	Moraceae	<i>Ficus trichopoda</i>	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
358	Moringaceae	<i>Moringa oleifera</i> Lamk	Mexico	E/Kington <i>et al.</i> , 2009
359	Myricaceae	<i>Myrica serrata</i> Lam.	South Africa	McGaw <i>et al.</i> , 2008
360	Myrothamnaceae	<i>Myrothamnus flabelliformis</i> Welw.	South Africa	McGaw <i>et al.</i> , 2008
361	Myrsinaceae	<i>Ardisia</i> Sp.	Mexico	E/Kington <i>et al.</i> , 2009
362	Myrsinaceae	<i>Rapanea melanophloeos</i> (L.) Mez.	South Africa	McGaw <i>et al.</i> , 2008
363	Myrtaceae	<i>Eucalyptus grandis</i> W. Hill	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
364	Myrtaceae	<i>Syzygium jambos</i> (L.) Alston <i>syn.</i> <i>Eugenia jambos</i> L.	India	Gautam <i>et al.</i> , 2007
365	Myrtaceae	<i>Eucalyptus</i> spp.	Kenya/Uganda/Tanzania	Orodho <i>et al.</i> , 2011
366	Myrtaceae	<i>Eugenia uniflora</i> L.	India	Gautam <i>et al.</i> , 2007
367	Myrtaceae	<i>Psidium guajava</i> L.	Kenya/Uganda/Tanzania, Kwazulu-Nata, South Africa	Orodho <i>et al.</i> , 2011, McGaw <i>et al.</i> , 2008, York <i>et al.</i> , 2011
368	Myrtaceae	<i>Syzygium cordatum</i> Hochst.	Kwazulu-Nata, South Africa	McGaw <i>et al.</i> , 2008, York <i>et al.</i> , 2011
369	Myrtaceae	<i>Syzygium gerrandi</i> (Harv.ex. Hook F.)	South Africa	McGaw <i>et al.</i> , 2008
370	Nymphaeaceae	<i>Nymphaea nouchali</i> Burm. F.	South Africa	McGaw <i>et al.</i> , 2008
371	Olacaceae	<i>Clausena antisata</i>	Ethopia	Gizachew <i>et al.</i> , 2013
372	Olacaceae	<i>Myrsine africana</i>	Ethopia	Kubmarwa <i>et al.</i> , 2013
373	Olacaceae	<i>Ocimum lamifolium</i>	Ethopia	Gizachew <i>et al.</i> , 2013
374	Olacaceae	<i>Ximenia americana</i> Linn	Adamawa/Nigeria	Kubmarwa <i>et al.</i> , 2013
375	Oleaceae	<i>Fraxinus hookeri</i> Wenz. <i>Syn.</i> <i>Frazinus excelsior</i> L.	India	Gautam <i>et al.</i> , 2007
376	Oleaceae	<i>Olea capensis</i> L.	South Africa	McGaw <i>et al.</i> , 2008
377	Palmae	<i>Chamaedora tepejilote</i>	Veracruz/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
378	Papaveraceae	<i>Fumaria officinalis</i> L.	India	Gautam <i>et al.</i> , 2007
379	Papilionaceae	<i>Erythrina abyssinica</i>	Kenya/Uganda/Tanzania	Orodho <i>et al.</i> , 2011
380	Passifloraceae	<i>Adenia gummifera</i> (Harv.) Harms	South Africa	McGaw <i>et al.</i> , 2008
381	Periprocaceae	<i>Cryptolepis sanguinolenta</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
382	Phytolaccaceae	<i>Phytolacca americana</i> L. (and <i>P. Heptandra</i> Retz. And <i>P. Octandra</i> L.)	South Africa	McGaw <i>et al.</i> , 2008
383	Pinaceae	<i>Cedrus deodara</i> (Roxb)	India	Gautam <i>et al.</i> , 2007
384	Poaceae	<i>Cymbogon marginatus</i> (Steud.) Stapf. <i>Ex.</i> <i>Burt.</i> Davy	South Africa	McGaw <i>et al.</i> , 2008
385	Poaceae	<i>Saccharum officinarum</i> L.	Lao/Asia	E/Kington <i>et al.</i> , 2009
386	Polyglaceae	<i>Polygala fruticosa</i> Berg.	South Africa	McGaw <i>et al.</i> , 2008
387	Polyglaceae	<i>Polygala myrtifolia</i> L.	South Africa	McGaw <i>et al.</i> , 2008
389	Polyglaceae	<i>Securidaca longipedunculata</i> Fresen	South Africa	McGaw <i>et al.</i> , 2008
390	Polypodiaceae	<i>Drynaria bonii</i> H. Christ.	Mexico	E/Kington <i>et al.</i> , 2009
391	Polypodiaceae	<i>Pleopeltis</i> sp	Mexico City	Jimenez - Arellanes, <i>et al.</i> , 2003
392	Polyonaceae	<i>Rumex crispus</i> L.	South Africa	McGaw <i>et al.</i> , 2008
393	Polyonaceae	<i>Rumex sagittatus</i> thunb.	South Africa	McGaw <i>et al.</i> , 2008
394	Portulanaceae	<i>Talinum caffrum</i> (thunb.) Eckl. & Zeyh.	South Africa	McGaw <i>et al.</i> , 2008
395	Proteaceae	<i>Protea repens</i> L.	South Africa	McGaw <i>et al.</i> , 2008
396	Ranunculaceae	<i>Actaea spicata</i> L. <i>Syn.</i> <i>A. accuminata</i> W.	India	Gautam <i>et al.</i> , 2007
397	Ranunculaceae	<i>Anemone Obtusisaba</i> D.D.	India	Gautam <i>et al.</i> , 2007
398	Ranunculaceae	<i>clematis brachiata</i>	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
399	Ranunculaceae	<i>Ranunculus bulbosus</i> L.	India	Gautam <i>et al.</i> , 2007
400	Ranunculaceae	<i>Ranunculus multifidus</i> Forssk.	South Africa	McGaw <i>et al.</i> , 2008
401	Rhamnaceae	<i>Colubrina officinarum</i> L.	Lao/Asia	E/Kington <i>et al.</i> , 2009
402	Rhamnaceae	<i>Ziziphus mucronata</i> willd.	South Africa	McGaw <i>et al.</i> , 2008
403	Rhamnaceae	<i>Zizipus oenoplia</i> (L.) Mill	Mexico	E/Kington <i>et al.</i> , 2009
404	Rhodomelaceae	<i>Polysiphonia virgata</i> C. Agardh	South Africa	McGaw <i>et al.</i> , 2008
405	Rosaceae	<i>Agrimonia bracteata</i> E. Mey. <i>Ex.</i> C. A. Mey.	South Africa	McGaw <i>et al.</i> , 2008
406	Rosaceae	<i>Agrimonia eupatoria</i> L.	India	Gautam <i>et al.</i> , 2007
407	Rosaceae	<i>Crataegus pubescens</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
408	Rosaceae	<i>Rosa multiflora</i> Thunb.	India	Gautam <i>et al.</i> , 2007
409	Rosaceae	<i>Prunus africana</i> (Hook F.)	South Africa	McGaw <i>et al.</i> , 2008
410	Rosaceae	<i>Rubus pinnatus</i> Willd.	South Africa	McGaw <i>et al.</i> , 2008
411	Rubiaceae	<i>Allium Sativum</i>	Oyo/Nigeria	Borokini <i>et al.</i> , 2013
412	Rubiaceae	<i>Bouvardia ternifolia</i>	Veracruz/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
413	Rubiaceae	<i>Calliandra Haematocephala</i>	Oyo/Nigeria	Borokini <i>et al.</i> , 2013

414	Rubiaceae	<i>Carica Papaya</i>	Oyo/Nigeria	Borokini <i>et al.</i> , 2013
415	Rubiaceae	<i>Citrus Sinensis</i>	Oyo/Nigeria	Borokini <i>et al.</i> , 2013
416	Rubiaceae	<i>Crossopteryx febrifuga</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
417	Rubiaceae	<i>Erythrina senegalensis</i> DC.	Kano/Nigeria	Hussain & Karatela, 1989
418	Rubiaceae	<i>Galium aparine</i> L.	India	Gautam <i>et al.</i> , 2007
419	Rubiaceae	<i>Gardenia erubescens</i> (Wild.) DC	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
420	Rubiaceae	<i>Gardenia philastrei</i> P.	Mexico	E/Kington <i>et al.</i> , 2009
421	Rubiaceae	<i>Gardenia obtusifolia</i> Roxb.	Mexico	E/Kington <i>et al.</i> , 2009
422	Rubiaceae	<i>Mitracarpus scaber</i> Zucc.	Kano/Nigeria	Hussain & Karatela, 1989
423	Rubiaceae	<i>Mitrapyna rotundifolia</i>	Lao/Asia	E/Kington <i>et al.</i> , 2009
424	Rubiaceae	<i>Morinda citrifolia</i>	India	Gautam <i>et al.</i> , 2012
425	Rubiaceae	<i>Pavetta corymbosa</i> (DC)	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
426	Rubiaceae	<i>Pavetta crassipes</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
427	Rubiaceae	<i>Pavetta owariensis</i> (PB)	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
428	Rubiaceae	<i>Pentansia prunelloides</i> Walp.	South Africa	McGaw <i>et al.</i> , 2008
429	Rubiaceae	<i>Randia cogniflora</i> Lamk.	Mexico	E/Kington <i>et al.</i> , 2009
430	Rubiaceae	<i>Rubia cordifolia</i>	Kenya/Uganda/Tanzania, South Africa	Orodho <i>et al.</i> , 2011, McGaw <i>et al.</i> , 2008
431	Rubiaceae	<i>Sesbania sesban</i> (L)	Kano/Nigeria	Hussain & Karatela, 1989
432	Rubiaceae	<i>Spermacole natalensis</i> H.	South Africa	McGaw <i>et al.</i> , 2008
433	Rubiaceae	<i>Syzygium guineense</i>	Plateau/Nigeria	Nvau <i>et al.</i> , 2011
434	Rubiaceae	<i>Vangueria infausta</i> B.	South Africa	McGaw <i>et al.</i> , 2008
435	Rutaceae	<i>Acromychia Pendunculata</i> (L.) Miq.	Mexico	E/Kington <i>et al.</i> , 2009
436	Rutaceae	<i>Aegle marmelos</i> (L.) C.	Lao/Asia, Mexico, India	E/Kington <i>et al.</i> , 2009, Gautam <i>et al.</i> , 2007
437	Rutaceae	<i>Citrus limon</i> (L.)	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
438	Rutaceae	<i>Clausena anisata</i> (wild)	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
439	Rutaceae	<i>Clausena excavata</i> Burn. F.	India	Gautam <i>et al.</i> , 2007
440	Rutaceae	<i>Coleonema album</i> (Thunb.) Barth. & Wendl.	South Africa	McGaw <i>et al.</i> , 2008
441	Rutaceae	<i>Feroniella lucida</i> Swingle	Lao/Asia	E/Kington <i>et al.</i> , 2009
442	Rutaceae	<i>Glycosmis citrifolia</i> (Willd).	Mexico	E/Kington <i>et al.</i> , 2009
443	Rutaceae	<i>Micromelum falcatum</i> L.	Lao/Asia	E/Kington <i>et al.</i> , 2009
444	Rutaceae	<i>Ruta graveolens</i> L.	South Africa	McGaw <i>et al.</i> , 2008
445	Rutaceae	<i>Teclea gerrardii</i> V.	South Africa	McGaw <i>et al.</i> , 2008
446	Rutaceae	<i>Zanthoxylum capense</i> (Thunb.) Harv.	South Africa	McGaw <i>et al.</i> , 2008
447	Rutaceae	<i>Zanthoxylum chalybeum</i>	Kenya/Uganda/Tanzania	Orodho <i>et al.</i> , 2011
448	Rutaceae	<i>Zanthoxylum davyl.</i> (Verdoorn) Waterm.	South Africa	McGaw <i>et al.</i> , 2008
449	Salicaceae	<i>Salix mucronata</i> Thunb.	South Africa	McGaw <i>et al.</i> , 2008
450	Santalaceae	<i>Thesium hystrix</i> A. W. Hill.	South Africa	McGaw <i>et al.</i> , 2008
451	Sapindaceae	<i>Dimocarpus Longan</i> Lour	Mexico	E/Kington <i>et al.</i> , 2009
452	Sapindaceae	<i>Dodonaea angustifolia</i> L. F.	South Africa	McGaw <i>et al.</i> , 2008
453	Sapindaceae	<i>Sapindus saponaria</i>	Chiapas/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
454	Sapindaceae	<i>Cardiospermum halicacabum</i> L.	South Africa	McGaw <i>et al.</i> , 2008
455	Sapotaceae	<i>Mamikara zapota</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
456	Sapotaceae	<i>Vitellaria paradoxa</i> G.F.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
457	Scrophulariaceae	<i>Schwenkia americana</i>	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
458	Scrophulariaceae	<i>Scoparia dulcis</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
459	Scrophulariaceae	<i>Striga hermonthica</i> (Del.) Benth.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
460	Serophulariaceae	<i>Antirrhinum majus</i> L.	India	Gautam <i>et al.</i> , 2007
461	Simaroubaceae	<i>Ailanthus altissima</i> (Mill.)	India	Gautam <i>et al.</i> , 2007
462	Simaroubaceae	<i>Brucea javanica</i> (L.) M.	India	Gautam <i>et al.</i> , 2007
463	Smilacaceae	<i>Smilax</i> Sp.	Mexico	E/Kington <i>et al.</i> , 2009
464	Solanaceae	<i>Capsium frutescens</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
465	Solanaceae	<i>Nicotiana tabacum</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
466	Solanaceae	<i>Physalis angulata</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
467	Solanaceae	<i>Solanum aculeastrum</i>	Uganda	Orodho <i>et al.</i> , 2011
468	Solanaceae	<i>Solanum capense</i> L.	South Africa	McGaw <i>et al.</i> , 2008
469	Solanaceae	<i>Solanum dasyphyllum</i> Schum & Thonn.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
470	Solanaceae	<i>Solanum incanum</i>	Kenya/Uganda, South Africa	Orodho <i>et al.</i> , 2011; McGaw <i>et al.</i> , 2008
471	Solanaceae	<i>Solanum lasiocarpum</i> Dunal.	Lao/Asia	E/Kington <i>et al.</i> , 2009
472	Sterculiaceae	<i>Cola acuminata</i>	Oyo/Nigeria	Adeniyi <i>et al.</i> , 2004
473	Sterculiaceae	<i>Cola milleni</i>	Oyo/Nigeria	Adeniyi <i>et al.</i> , 2004
474	Sterculiaceae	<i>Cola nitida</i>	Oyo/Nigeria	Adeniyi <i>et al.</i> , 2004
475	Sterculiaceae	<i>Dombeya rotundifolia</i> (Hochst)	South Africa	McGaw <i>et al.</i> , 2008
476	Sterculiaceae	<i>Hermania depressa</i> N. E. Br.	South Africa	McGaw <i>et al.</i> , 2008
477	Sterculiaceae	<i>Sterculia setigera</i> Del.	Bauchi/Yobe/Niger/Nigeria	Babalola <i>et al.</i> , 2012; Abdullahi <i>et al.</i> , 2007
478	Sterculiaceae	<i>Waltheria indica</i> L.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
479	Stermonaceae	<i>Stemona cochinchinensis</i> Gag.	Lao/Asia	E/Kington <i>et al.</i> , 2009
480	Thymelaeaceae	<i>Gnidia anthylloides</i> (L. F.) G.	South Africa	McGaw <i>et al.</i> , 2008
481	Thymelaeaceae	<i>Gnidia kraussiana</i> M.	South Africa	McGaw <i>et al.</i> , 2008

482	Ulmaceae	<i>Trema orientalis</i> (L) DC	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
483	Umbelliferae	<i>Foeniculum vulgare</i> Mill.	India	Gautam <i>et al.</i> , 2007
484	Verbenaceae	<i>Clerodendrum glabrum</i> E.Mey.	South Africa	McGaw <i>et al.</i> , 2008
485	Verbenaceae	<i>Clerodendrum paniculatum</i>	Lao/Asia	E/Kington <i>et al.</i> , 2009
486	Verbenaceae	<i>Lantana camara</i> L.	India	Gautam <i>et al.</i> , 2012
487	Verbenaceae	<i>Lantana hispida</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
488	Verbenaceae	<i>Lantana rugosa</i> T.	South Africa	McGaw <i>et al.</i> , 2008
489	Verbenaceae	<i>Lippia javanica</i> BF.	Kwazulu-Nata/South Africa	York <i>et al.</i> , 2011
490	Verbenaceae	<i>Lippia dulcis</i>	Oaxaca/Mexico	Jimenez - Arellanes, <i>et al.</i> , 2003
491	Verbenaceae	<i>Lippia javanica</i> (Buurm. F.) Spreng.	South Africa	McGaw <i>et al.</i> , 2008
492	Verbenaceae	<i>Vitex doniana</i> S.	(Niger, Plateau) Nigeria	Abdullahi <i>et al.</i> , 2007, Nvau <i>et al.</i> , 2011
493	Verbenaceae	<i>Vitex pedunculolaris</i>	Mexico	E/Kington <i>et al.</i> , 2009
494	Verbenaceae	<i>Vitex trifolia</i> L.	Lao/Asia	E/Kington <i>et al.</i> , 2009
495	Vitaceae	<i>Cissus quadrangularis</i>	Kenya/Uganda	Orodho <i>et al.</i> , 2011
496	Zingiberaceae	<i>Aframomum melegueta</i> K. Schum.	Niger/Nigeria	Abdullahi <i>et al.</i> , 2007
497	Zingiberaceae	<i>Alpinia galanga</i> Wild	India	Gautam <i>et al.</i> , 2007
498	Zingiberaceae	<i>Siphonochilus aethiopicus</i> (Schweinf.) B. L. Burt.	South Africa	McGaw <i>et al.</i> , 2008
499	Zingiberaceae	<i>Siphonochilus natalensis</i> (Schitr. & K. Schum.) J. M. Wood & Frank.	South Africa	McGaw <i>et al.</i> , 2008
500	Zingiberaceae	<i>Zingiber officinale</i>	Kenya/Uganda, (Niger)Nigeria	Orodho <i>et al.</i> , 2011, Abdullahi <i>et al.</i> , 2007

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