



Biodiversity in the Patent System: Namibia

*A country study of genetic resources and traditional
knowledge in the patent system of relevance to
Namibia*

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Introduction

This report presents the results of analysis of patent activity for genetic resources and traditional knowledge from Namibia. The report is divided into three sections:

Section 1 provides an overview of biodiversity in Namibia based on information from the Global Biodiversity Information Facility and introduces the patent data.

Section 2 provides a general overview of patent activity for species known to occur in Namibia in the period 1976-2010. This is followed by detailed analysis of patent documents that make reference to Namibia and data based on species that are limited to distribution in Namibia.

Section 3 provides a set of short summaries for species that are a focus of patent activity. This information will also be made available online for further research through the Access and Benefit Sharing Patent Index (ABSPAT).¹

The report was prepared using large scale text mining of patent data for species names and country names. This data was then combined with taxonomic information from the Global Biodiversity Information Facility. Additional patent research was conducted using the commercial Thomson Innovation database and processed using a variety of software tools.

Patents are an important indicator of investments in research and development directed to the development of commercial products. The aim of the report is to identify potential opportunities for economic development in support of conservation by identifying existing research and development involving species from Namibia. The research did not investigate the terms and conditions under which patent applicants obtained the genetic resources and traditional knowledge disclosed in the patent document. Therefore the report does not consider the problem of biopiracy or misappropriation of genetic resources and traditional knowledge.

The research was limited to searches of patent data from the United States, the European Patent Office and the international Patent Cooperation Treaty in the period 1976-2010. As such, the research is limited to the major patent offices for this period. We do not consider patent activity prior to 1976 or after 2010 except through patent family information and citation data. As such the report provides a baseline for patent activity involving species from Namibia as a basis for further research.

Our research focused primarily on documents that make reference to Namibia and to cases where existing distribution data suggests Namibia is a likely source for the species. This imposes two limitations on the research. First, we focus on identifying species that are a focus of existing research and development. However, the report does not seek to provide the complete global patent landscape for an individual species. Second, because we focused on identifying species from a country we did not search patent data for references to regions (i.e. Africa) or sub-regions (i.e. Southern Africa) in the patent data. To address this issue we deliberately highlight cases where a species is distributed in more than one African country.

¹ ABSPAT is available at <http://www.abspat.net>

This report is one in a series of reports on patent activity for species from African countries. The following observations are based on the research for the six African country reports to date and form the main recommendations arising from the research.

Taxonomic Research:

1. There is a need to improve the availability of taxonomic information for each country. In the absence of taxonomic information it is not possible to identify genetic resources that are relevant to a particular country in patent data and any relevant opportunities for economic development. African countries could consider giving greater priority to taxonomic research and making taxonomic information available through GBIF;
2. Georeferencing of the coordinates for the locations of species is an important standard in modern biodiversity research. Georeference data can be used to identify where species have been recorded in a country and also where biodiversity research has been concentrated. In our view georeferencing is an underutilized tool for identifying where species are located as a basis for engaging with indigenous and local communities to consider potential development opportunities. We recommend greater attention to georeferencing and its use for engagement with relevant indigenous and local communities;
3. Taxonomic research does not attract investment because it appears to be remote from economic considerations. In practice taxonomic information is vital to identifying opportunities for development that is supportive of the objectives of the Convention on Biological Diversity and its Nagoya Protocol.
4. Taxonomic information is also important for the capacity of countries to monitor compliance with the Nagoya Protocol by improving baseline data on the species within a country. Advancing knowledge and understanding of biodiversity and the traditional knowledge of indigenous and local communities has an important role to play in long term monitoring under the Nagoya Protocol.

The Patent System:

1. Patent documents are frequently unclear on the precise origin or source of genetic resources and associated traditional knowledge. In addition very limited information is available on the terms and conditions of acquisition of genetic resources and traditional knowledge. This could be improved through enhanced disclosure of origin measures as advanced by the African Group and discussed in greater detail elsewhere;²
2. Species are commonly distributed in more than one country. It is important that African countries include requirements in access and benefit sharing agreements to clearly specify the source of genetic resources and associated traditional knowledge in any patent applications that may arise under the terms of an agreement. When combined with the enhanced disclosure measures noted above this would greatly improve capacity to monitor patent activity under the terms of the Nagoya Protocol;
3. One of the major issues that emerged in the research is the problem of *essential incorporation* of species into patent claims. Patent applicants frequently list very large numbers of species, or make reference to genera and families, with the purpose of incorporating all members of a genus or family into the scope of the patent claims. Typically these applications did not involve collection or use of many of the species that are listed. The aim of essential incorporation is to prevent others from using compounds, extracts or ingredients from these species in similar inventions or products. Where granted these patents are likely to have negative consequences for researchers

² Oldham, P & Burton G (2010) *Defusing Disclosure in Patent Applications*. UNEP/CBD/COP/10/INF/44

and producers in African countries seeking to develop and export similar products from these species. In our view, patent claims for components of organisms should be limited to the species from which the compound or extract was isolated by the applicants and not extend to members of the genus or entire families. Furthermore, in our view essential incorporation is anticompetitive and action should be considered to stop or severely restrict this practice.

4. In some cases patent activity may involve species that are vulnerable, endangered or CITES listed. In considering the possibilities for economic development identified in patent data it is also important to identify and assess the conservation status of the species concerned in order to support the objectives of the Convention on Biological Diversity.

Patents have frequently been viewed with suspicion within the biodiversity policy community as examples of the inequitable exploitation of resources from biodiversity rich developing countries. Our research demonstrates that patent data can also be turned to positive purposes to identify potential opportunities for economic development in Africa. We hope that this information will prove to be useful to African countries.

Namibia

Area:

824,929 sq km

Coastline:

1,572 km

Climate:

Desert; hot, dry; rainfall sparse and erratic

Geography:

Mostly high plateau; Namib Desert along coast; Kalahari Desert in east. Bushveld in the North East. Etosha Pan forms vast seasonal salt lake.



Introduction:

This report provides a preliminary analysis of patent activity for species from Namibia. The report focuses on available patent data where applicants refer to the collection of a sample of a species known to occur in Namibia. The report also examines species where, based on distribution data, Namibia is a likely source of the species. The report does not consider patent data for species distributed across several African countries or the Africa region as a whole. In our view this would significantly expand the data for Namibia. We provide two examples to illustrate this point. Furthermore, the analysis of patent documents is limited to the main patent jurisdictions between 1976-2010, notably the European Patent Office, the United States Patent Office, and the Patent Cooperation Treaty. This approach captures the most important internationally focused patents involving a species rather than patent activity worldwide (i.e. at national offices). To enhance data capture we report on the results of an expanded search of all patent office databases in the species summary section at the end of the report.

We identified a total of 19 species in the Namibia data based on the appearance of Namibia as the source or on distribution data (see below). The species include well known examples such as *Hoodias* but extend to include a number of less well known species including spiders, scorpions, fungi, bacteria, plants and a virus. We also include two examples of regional species, Baobab (*Adansonia digitata*) and Marula (*Sclerocarya birrea*) to highlight the importance of species that are distributed across multiple African countries including Namibia. We anticipate that researchers based in Namibia will be able to readily identify other species of relevance for research and development. However, our research revealed striking examples of research and development involving other organisms such as spider silk proteins and the use of venom peptides in the treatment of tumours. These examples of Namibian species with potential for research and development are not obvious. In our view, these examples provide an indicator of the promise of Namibian biodiversity for research and development across a range of technology sectors to serve a range of markets.

Biodiversity in Namibia and Patent Activity:

Data for biological diversity was obtained from the Global Biodiversity Information Facility (GBIF). GBIF is an international government-initiated resource that provides open access to the most comprehensive quantitative data on species that is presently available. All data in GBIF is submitted by participating collections who share biodiversity information.

Using this resource we have obtained biodiversity records for species which occur in Namibia. It should be noted that the usefulness of this data in determining the actual distribution of a given species in Namibia is conditional on the comprehensiveness of the data submitted by GBIF participants. We would stress that the absence of records should not be interpreted as indicating an absence of a given species, and similarly that a recorded species that only appear for one country should not be regarded as evidence of endemism. All reasonable efforts in identifying endemic species were made from alternative sources during the compilation of this report.

GBIF presently records 16,987 species with known distribution in Namibia. Of these 14,072 are accepted scientific species names. The remainder will include synonyms, homonyms and names that may become accepted scientific names in future. A total of 308,576 georeferenced records with coordinates for the species are available for Namibia. When compared with Namibia's neighbour, South Africa with 49,695 accepted species names and 10,306,146 georeferenced records, it is clear that research on Namibian species in patent data is likely to be limited by the availability of biodiversity data.

We identified a total of 112,990 documents containing species known to be distributed in Namibia in patent data from the main jurisdictions between 1976 and 2010 (the European Patent Office, United States Patent Office and Patent Cooperation Treaty). These documents were searched for references to Namibia and manually reviewed in MaxQDA data analysis and tagging software to identify documents specifying a source or origin in Namibia. We subsequently expanded the search to all patent jurisdictions worldwide in the period to 2013 and reviewed a total of 302 documents making reference to Namibia for a species originating from Namibia.

In addition, using GBIF distribution data we identified 121 patent documents containing references to species where GBIF presently records distribution only in Namibia. These documents do not mention Namibia. The idea behind this was to identify cases where a species (based on available distribution data) was likely to have come from Namibia and thus be regarded as a species of likely or potential significance for Namibia. For the sake of simplicity we call data making direct reference to the origin of a species "Origin Data". In the case of research based only on distribution we call this data 'Distribution Data'. The Distribution data documents were then selected for manual review in MAXQDA.

In reading this report it is important to emphasise that it is narrow in focus. That is, it considers patent documents where Namibia is specifically named as the source or where distribution data suggests that Namibia is a likely source. The report does not consider wider patent activity involving species distributed in several African countries or throughout the Africa Region.

Biodiversity and Distribution

Much of the data submitted to GBIF includes geographical coordinates indicating where the recorded species was located. Using this data we are able to show the physical distribution across Namibia of all GBIF recorded species with occurrence data. Plate 1 shows two maps: The left map shows plotted points, each indicating a GBIF record. The points are coloured to indicate the taxonomic kingdom of the species to which the record refers. It should be noted that this geographical information is raw data as submitted to GBIF by participating recorders. It has not been cleaned to remove any human errors when inputting to the GBIF database (an example of such an error might be where a longitudinal coordinate has been recorded as a + rather than a -). The map to the right shows major settlements and roads, it also includes the location of some protected areas such as national parks and nature reserves - places expected to be of significance for biodiversity. A larger version of the distribution map can be found in the appendix of this country summary.

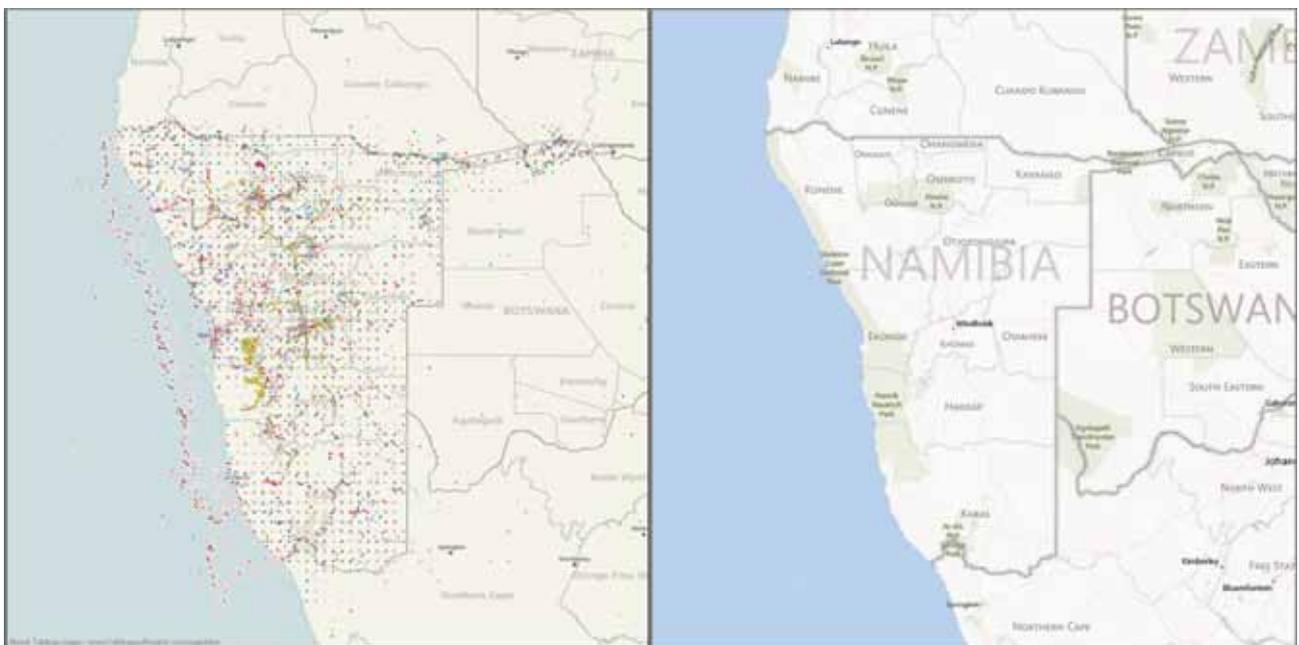


Plate 1. Distribution of GBIF records from Namibia (Left) and major settlements and roads (right) (map courtesy of Bing Maps). Each colour point represents a taxonomic kingdom for a given record.

It is very interesting to compare the two maps. The distribution map shows that records are not uniformly dispersed, but that they form large dense clusters and strings across the country. When distribution records are compared to a physical map of Namibia it can be seen that the densest clusters are close to major areas of population such as the capital Windhoek and Walvis Bay. A notable cluster in the north of the country covers the Etosha National Park, a park established primarily for its wildlife interest. Despite 18% of the country being taken up with national parks - including The Skeleton Coast and Namib Naukluft National Parks which cover most of the coastline - this is the only park area with such a density of biodiversity records. Another cluster lies in the west of the country along the east edge of the Namib Desert. The other notable feature of these mapped distribution records are the strings of data points. It can be seen that the strings follow closely the routes of major transportation routes such as main roads and rivers. This pattern of record locations is common throughout many countries and may suggest that there are practical restrictions which have prevented collection of data across a broader geographical range.

This in turn leads to the possibility that biodiversity records for Namibia are far from comprehensive in describing the fauna and flora distribution of the country. Marine records reflect the presence of the nutrient-rich Benguela Current which flows from the south and has created major fishing grounds along the coast.

An Overview of Namibian Biodiversity in the Patent System:

As of 2013 a total of 302 patent documents across all areas of invention make reference to Namibia. This provides a general overview of references to Namibia in the patent system. Only a proportion of these references will refer to a species collected in, or sourced from, Namibia. In addition, patent applications will be submitted that involve species that originate from Namibia but will not make reference to Namibia as the source of genetic resources or traditional knowledge.

Our aim in this section is to provide a brief overview of patent activity of relevance to Namibia. We focus on patent activity at the main patent offices in the period between 1976 and 2010. In the next section we examine the results of research to identify genetic resources and traditional knowledge that originate from Namibia. In approaching patent activity for genetic resources from Namibia we focus on three categories of data.

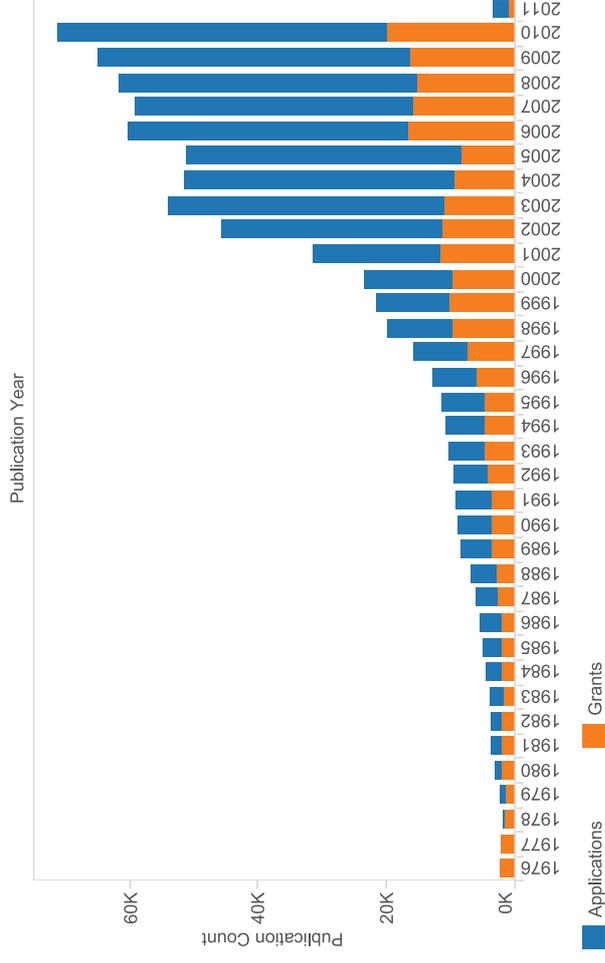
1. Species that are known to be distributed in Namibia but are also distributed elsewhere in the world. This provides an overview of global patent activity for genetic resources of relevance to Namibia.
2. Species where a direct reference is made to the collection or origin of a species from Namibia. This data is based on a review of patents that make reference to a species known to be distributed in the country and the country name.
3. Species where available distribution data suggests that a sample is likely to have originated from Namibia. This data is known as Distribution data and refers to cases where GBIF presently only records a species as occurring in Namibia and no other country. Because taxonomic information is incomplete this data provides a clue rather than proof that a species originated from Namibia.

The last two categories of data are provided in the form of summary tables describing the species and the claimed inventions involving the species. We begin our analysis with an overview of biodiversity that is known to occur in Namibia and then turn to data on species originating from Namibia in the next section.

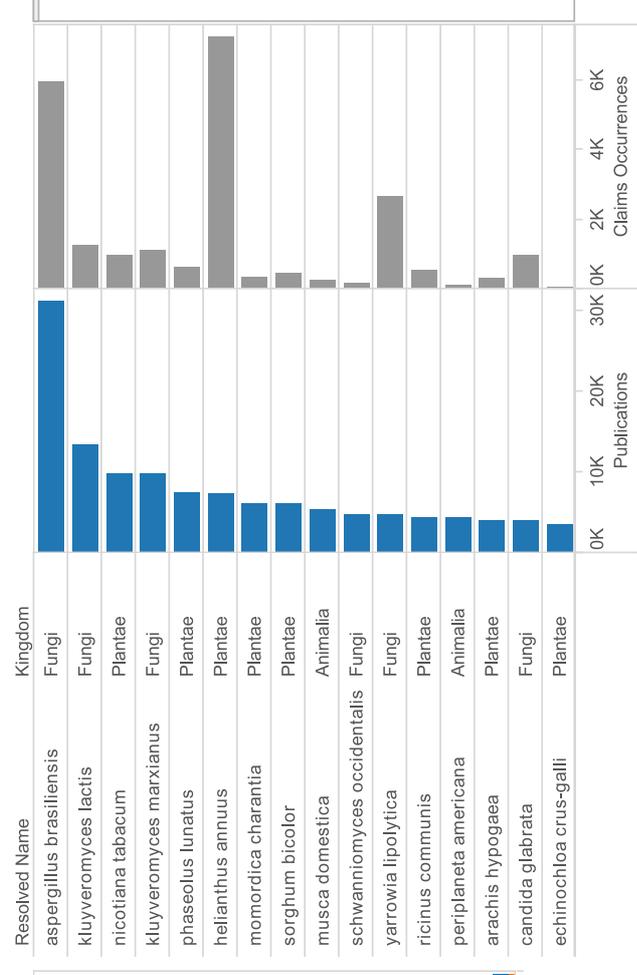
Plate 1 provides an overview of patent activity for species that are known to occur in Namibia and other countries around the world. This overview provides information on trends in applications and grants, the top species appearing in patents that are known to occur in Namibia, top applicants or assignees and technology areas.

In total we identified approximately 2,077 species in patent data from the major jurisdictions that are known to occur in Namibia. This data is relevant for Namibia because it demonstrates that researchers and companies are conducting research and development on species that are known to occur in Namibia. As Plate 1 makes clear research and development is taking place across a range of technology sectors and is targeted to a variety of markets.

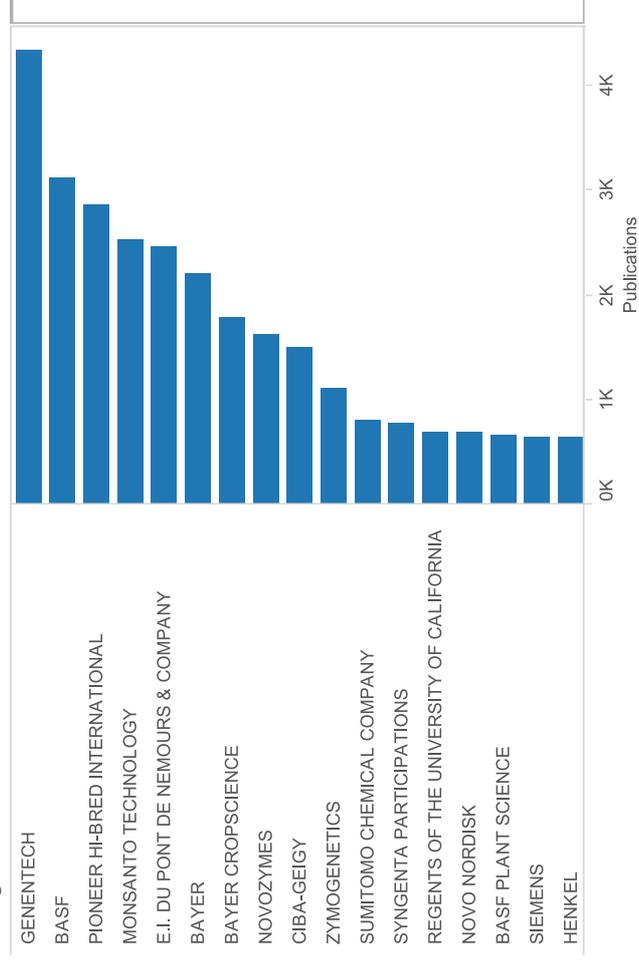
Trends



Species



Assignees



Technology Areas

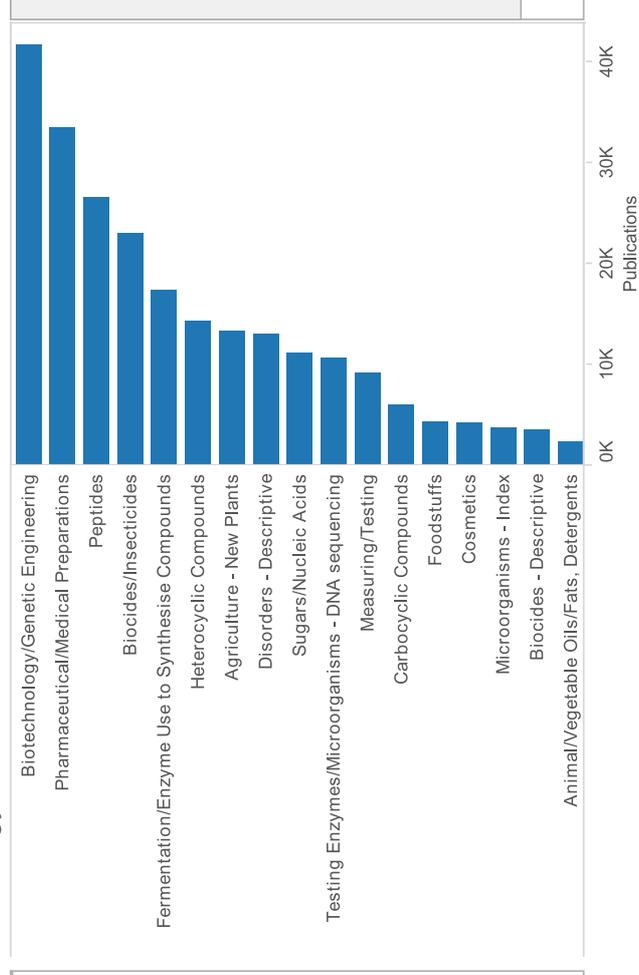


Plate 1 reveals that there is very significant research and development activity for species of relevance to Namibia. The top rankings are occupied by fungi notably *Aspergillus brasiliensis* (formerly *Aspergillus niger*) that is widely used in biotechnology applications, *Kluyveromyces lactis* is used in genetic studies, while *Kluyveromyces marxianus* is used to produce lactase enzyme and as a bonding agent in animal feed. Plants are represented by tobacco (*Nicotiana tabacum*), Lima bean (*Phaseolus lunatus*), Sunflower, (*Helianthus annuus*), Bitter melon (*Momordica charantia*) and Sorghum (*Sorghum bicolor*). In total, 681 plants that are distributed in Namibia including species such as Baobab (*Adansonia digitata*) appear in patent data.

Animals are represented by the Housefly (*Musca domestica*), the American cockroach (*Periplaneta americana*) typically for biocides/insecticides, Onion thrips (*Thrips tabaci*) and *Ceratitis capitata* (fruit fly). While members of Animalia are typically pests, as we will see in the next section, some Animalia are important in research and development (see below).

With respect to microorganisms, Archaea are represented by the extremophile *Sulfolobus solfataricus* which was first isolated in volcanic springs and is used in biotechnology. *Thermoplasma acidophilum* is also an extremophile that is a significant focus of research and development in biotechnology focusing on enzymes. *Methanosarcina barkeru* is an anaerobic methanogen significant for efforts to produce methane and *Metallosphaera sedula* which appears in patents for recovering precious metals using bioleaching. In the case of bacteria, *Sorangium cellulosum* is a source of metabolites with anti-fungal and antibacterial properties. *Myxococcus virescens* is a source of a family of antibiotics known as myxovirescins. For Chromista *Coccolithus pelagicus* is a focus of research and development for methods of producing algal products while *Calcidiscus leptoporus* is a focus of research and development for carbon sequestration.

As the details of technology sectors in Plate 1 suggests, species that occur in Namibia appear in a wide range of technology areas and suggest a strong portfolio of species with potential for research and development. In the next section we turn to the preliminary results of a review of patent documents involving species directly sourced from Namibia or where distribution data suggests Namibia is a likely country of origin.

Species Summaries

The following summary tables describe the species and patent activity involving the species. This data falls into two categories:

- a) Of Namibian origin - Patents where a named species has been identified as having been obtained from Namibia.
- b) With Namibia distribution - Patents where there is no reference to Namibia but distribution data suggests that the species may have originated from Namibia based on the existence of only a single distribution record in GBIF (Distribution).

In reading these tables note that the number of documents refers to the number of documents retained during research on the origin of species of relevance to Namibia. It does not refer to the wider patent landscape for the species consisting of the total of number of documents making reference to the species, or its components, in the global patent system.

Species may appear in patent documents in this list for a variety of reasons:

1. Because they are a focus of the invention;
2. Because they are a target of the invention (i.e. pathogens)
3. Because they are incorporated into the claims of the invention;
4. Because a reference to a species, including in very limited cases a literature reference, indicates that the species is of potential interest for economic development and merits further investigation.

This report focuses on identifying species that are of potential interest for economic development and conservation based on their appearance in patent data. The data in this summary section should not be used to draw conclusions about misappropriation or biopiracy.

African Distribution Including Namibia

| | | |
|---|--|---|
| Species name: <i>Adansonia digitata</i> | Kingdom: Plantae |  |
| Brief description of species: <i>Adansonia digitata</i> is the most widespread of the <i>Adansonia</i> species on the African continent, found in the hot, dry savannahs of sub-Saharan Africa. Cosmetic skin care products derived from Baobab trees. | | |
| Distribution: Cosmopolitan | No of documents: 233 worldwide (appears in the claims in 65 documents) | |
| US20020132021A1 US20050271595A1 WO2005012507A1 US20100021533A1 WO1998031336A1 FR2892302A1 WO2007104454A1 EP1233747B1 JP2008127281A | | |
| Detail: US20020132021A1 refers to the recover of chemical compounds from plant roots while keeping the plant alive. US20050271595A1 refers to a sanitizing hand wash. WO2005012507A1 focuses on producing a plant secondary metabolite in a suspension culture including <i>B. digitata</i> cells. US20100021533A1 provides for a nutritional supplement that reduces the risk of cardiovascular/Alzheimer's disease and diabetes. WO1998031336A1 is for a topical cosmetic and pharmaceutical for protecting skin and hair made from a baobab extract. FR2892302A1 provides a herbal agent that is a substitute for lanolin for use in soaps and antiperspirants. WO2007104454A1 is for a cosmetic/skin care treatment for preventing sunburn with an additive from baobab. EP1233747B1 by Cognis France focuses on skin treatment using Flavones/Isoflavones from plan extracts including the <i>Adansonia</i> and Citrus genus. JP2008127281A focuses on a cosmetic for skin care products including shampoos and hair conditioners. As this suggests, <i>Adansonia digitata</i> is a significant focus of research and development in the cosmetics and related fields. | | |

Of Namibian origin

| | | |
|--|--------------------|---|
| Species name: <i>Acacia catechu</i> | Kingdom: Plantae |  |
| Brief description of species: <i>Acacia catechu</i> also commonly called <i>Mimosa catechu</i> , is a deciduous, thorny tree which grows up to 15 m in height. A wood extract is used in traditional medicine. | | |
| Distribution: Cosmopolitan | No of documents: 1 | |
| WO1999045795A1 | | |
| Detail: The patent application focuses on an additive for animal feed. The patent refers to the use of extraction powder from both <i>Acacia mearnsii</i> from South Africa and <i>Acacia catechu</i> "which grows as bushes or plants in Southwest Africa (namibia)". | | |

With Namibian distribution

| | | |
|---|--------------------|---|
| Species name: <i>Bobgunnia madagascariensis</i> | Kingdom: Plantae |  |
| Brief description of species: <i>Bobgunnia madagascariensis</i> , also called the snake bean plant, is a species of legume in the Fabaceae family. | | |
| Distribution: Cosmopolitan | No of documents: 2 | |
| EP2295031A2 US20110034486A1 | | |
| Detail: EP2295031A2, US20110034486A1. These patent applications involve the use of pterocarpan as anti-cellulite agents by applicants Symrise AG. The applications claim the use of a pterocarpan compound from <i>Bobgunnia</i> for use in cosmetic or pharmaceutical preparations with anti-cellulite properties. | | |

With Namibian distribution

| | | |
|---|--------------------|--------------------|
| Species name: <i>Delitschia confertaspora</i> | Kingdom: Fungi | No Image Available |
| Brief description of species: Delitschia is a genus of fungi in the family Delitschiaceae. | | |
| Distribution: Endemic | No of documents: 1 | |
| GB2280435A | | |
| Detail: A patent application by Merck and Co for an Anti-viral agent, The antiviral agent is a compound identified in the species which "was obtained from the dung of a dassue (<i>Provavia</i> sp.) collected in Namibia" and with American Type Culture Collection numbers ATCC 74209 and ATCC 74210 under the Budapest Treaty. The compound reportedly inhibited the transcription apparatus of influenza virus required to initiate viral mRNA (messenger RNA) synthesis. | | |

With Namibian distribution

| | | |
|---|--------------------|---|
| Species name: <i>Dicoma anomala</i> | Kingdom: Plantae |  |
| Brief description of species: Morphologically diverse herb with aromatic semi-woody tubers at the base of a woody subterranean stem. A grassland species widely distributed in sub-Saharan Africa. | | |
| Distribution: Cosmopolitan | No of documents: 4 | |
| US20090304832A1 WO2006048734A1 CN101080236B CN101080236A | | |
| Detail: These applications by the South African Medical Research Council focus on the treatment of parasitic infections in humans and animals with a particular focus on Malaria (<i>Plasmodium sp.</i> , notably <i>P. falciparum</i>) based on an extract of the roots of the species. The applicants judged the invention to be sufficiently important to pursue protection in China and Brazil. | | |

With Namibian distribution

| | | |
|--|--------------------|--|
| Species name: <i>Euprosthops australis</i> | Kingdom: Animalia |  |
| Brief description of species: A type of nursery web spider, the silk from which is used to develop new medical applications. | | |
| Distribution: Cosmopolitan | No of documents: 6 | |
| EP2243792A1 US20090226969A1 US20100222553A1 WO2007078239A2 WO2008154547A2 WO2010123450A1 | | |
| Detail: EP2243792A1, WO2010123450A1 for methods for producing polymers of spider silk protein focuses on spider silk proteins and include a DNA sequence segment from this species. US20090226969A1, WO2007078239A2 for spider silk proteins refers to a spidroin protein motif from the species as the basis of the invention. US20100222553A1, WO2008154547A2 for spider silk dragline polynucleotides include amino acid motifs from the species in a comparison. | | |

With Namibian Distribution

| | | |
|---|--------------------|--------------------|
| Species name: <i>Fusarium species</i> | Kingdom: Fungi | No Image Available |
| Brief description of species: Fusarium is a large genus of filamentous fungi widely distributed in soil and in association with plants. It is found on pearl millet (<i>Pennisetum typhoideum</i>) which is grown widely across Africa and Asia. | | |
| Distribution: Endemic | No of documents: 3 | |
| WO2000036132A1 US20010014748A1 US6271402B1 | | |
| Detail: This species appears in three patent applications by Merck and Co for HIV Integrase inhibitors. The unidentified <i>Fusarium</i> strain that is the source of the compound claimed in the applications is identified as closely related (99% match of 502 base pairs) to a strain of Namibian origin based on a sequence search of Genbank. | | |

With Namibian distribution

| | | |
|---|--------------------|--------------------|
| Species name: <i>Gordonia namibiensis</i> | Kingdom: Bacteria | No Image Available |
| Brief description of species: A novel nitrile metabolising actinomycete microorganism recovered from an African sand. | | |
| Distribution: Uncertain | No of documents: 1 | |
| US20080020947A1 | | |
| Detail: The patent application focuses on novel microorganisms with oil biodegradation properties and methods for bioremediation of oil contaminated soil. <i>G. namibiensis</i> is referenced as one of the species that could be used in the biodegradation and bioremediation process. The applicants claim that the bioremediation process for contaminated soils would be economical and eco-friendly compared with other methods. | | |

Of Namibian origin

| | | |
|--|--------------------|---|
| Species name: <i>Harpagophytum procumbens</i> | Kingdom: Plantae |  |
| Brief description of species: Devil's Claw. Has many medical uses particularly anti-inflammatory and analgesic. | | |
| Distribution: Cosmopolitan | No of documents: 4 | |
| WO2007109079A2 US2010261663A1 US2007218149A1 US2006093559A1 | | |
| Detail: US2006093559A1 focuses on chewing gum compositions, that could include extracts from the species with anti-arthritic properties. Other species are also referenced in the application. US2007218149A1, WO2007109079A2 focuses on the treatment of joint or muscle pain using combinations of ingredients. The species is listed for its anti-inflammatory analgesic properties and origin in the Kalahari of Namibia and Madagascar. US2010261663A1 focuses on the treatment of pain, inflammation and arthritic conditions and includes Harpagoside as an active agent. | | |

With Namibian distribution

| | | |
|--|--------------------|---|
| Species name: <i>Hoodia currorii</i> | Kingdom: Plantae |  |
| Brief description of species: Hoodias are succulents native to southern Africa. They are stem succulents and have been widely reported as traditionally used by the San people of the Namib desert as an appetite suppressant. | | |
| Distribution: Cosmopolitan | No of documents: 7 | |
| US20070116840A1 US20080261309A1 US20080261310A1 WO2007061873A1 WO2008128847A1 WO2010067355A1 | | |
| Detail: US20070116840A1, WO2007061873A1 refer to a high potency sweetener for weight management and includes reference to an extract from a range of Hoodia species. US20080261309A1 refers to methods for in vitro multiplication (micropropagation) of Hoodia plants including this species. US20080261310A1, WO2008128847A1 refer to in vitro rooting of Hoodia plants including this species. WO2010067355A1 concerns a method of treatment of diseases using Hoodia extracts. | | |

Of Namibian origin

| | | |
|--|--------------------|---|
| Species name: <i>Hoodia juttae</i> | Kingdom: Plantae |  |
| Brief description of species: Hoodia juttae is a species of plant in the <i>Apocynaceae</i> family. It is endemic to Namibia. Its natural habitats are rocky areas and cold desert. It is threatened by habitat loss. | | |
| Distribution: Endemic | No of documents: 3 | |
| US20080261309A1 US20080261310A1 WO2008128847A1 | | |
| Detail: US20080261309A1 refers to methods for in vitro multiplication (micropropagation) of Hoodia plants including this species. US20080261310A1, WO2008128847A1 refer to in vitro rooting of Hoodia plants including this species. | | |

Of Namibian origin

| | | |
|---|--------------------|--|
| Species name: <i>Hoodia triebneri</i> | Kingdom: Plantae |  |
| Brief description of species: Hoodia triebneri is a species of plant in the <i>Apocynaceae</i> family. It is endemic to Namibia. Its natural habitat is rocky areas. | | |
| Distribution: Endemic | No of documents: 4 | |
| US20080261309A1 US20080261310A1 WO2007061873A1 WO2008128847A1 | | |
| Detail: This species is listed in patents relating to Hoodia gordonii and other members of the genus. | | |

Of Namibian origin

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|--|--------------------|---|
| Species name: <i>Hoodia gordonii</i> | Kingdom: Plantae |  |
| Brief description of species: Hoodias are succulents native to southern Africa. They are stem succulents traditionally used by the San people of the Namib desert as an appetite suppressant. | | |
| Distribution: Cosmopolitan | No of documents: 8 | |
| US2006159773A1 US2008261309A1 US20080261310A1 US2009155392A1 WO2006051334A1 WO2009079601A1 WO2008128847A1 WO2008128842A1 WO2006079056A1 | | |
| Detail: These documents are a small segment of a wider patent landscape for <i>Hoodia gordonii</i> and members of the genus. Applications typically address issues such as appetite suppression, obesity and high blood pressure (US2006159773A1, WO2006079056A1), in vitro micropropagation (US2008261309A1, WO2008128847A), combinations with other extracts such as Guarana (US2009155392A1), obesity (WO2006051334A1). The documents listed only include references to Namibia and will not reflect the wider landscape of documents that reference Southern Africa, South Africa etc. | | |

With Namibian distribution

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| Species name: <i>Monsonia drudeana</i> | Kingdom: Plantae |  |
| Brief description of species: Monsonia is a genus with upwards of 85 species. Drudeana is an unresolved name, only having been recorded in Namibia. | | |
| Distribution: Uncertain | No of documents: 1 | |
| WO2007138531A2 | | |
| Detail: The patent application is for treatment of erectile dysfunction and libido enhancement using components from members of the <i>Monsonia</i> genus including <i>M. drudeana</i> . | | |

With Namibian distribution

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|---|--------------------|---|
| Species name: <i>Parabuthus villosus</i> | Kingdom: Animalia |  |
| Brief description of species: The Black hairy thick-tailed scorpion is the largest member of it's genus, living in southern Africa and feeding on mice and lizards. | | |
| Distribution: Cosmopolitan | No of documents: 4 | |
| US20040001806A1 US20040013740A1 WO2001087346A2 WO2001088105A2 | | |
| Detail: US20040001806A1 focuses on preparing dendritic cells from spinal cord stem cells. The species appears in a list of organisms with venoms with a cytotoxic or necrotic effect for use in a particular method for loading into dendritic cells with pharmaceutical effect. US20040013740A1 forms part of the same family and further specifies use of a peptide toxin in loading pharmaceutical dendritic cells. WO2001087346A2 is a German language member of this patent family. WO2001088105A2 focuses on the production of dendritic cells from bone-marrow stem cells using toxin charged cells and is in the German language. | | |

With Namibian distribution

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|--|--------------------|--------------------|
| Species name: <i>Phoma species</i> | Kingdom: Fungi | No Image Available |
| Brief description of species: Phoma is a genus of common coelomycetous soil fungi. It contains many plant pathogenic species. | | |
| Distribution: Cosmopolitan | No of documents: 4 | |
| WO1997005270A1 US5663193A EP842291A119980520 CA2227369A119970213 | | |
| Detail: WO1997005270A1, US5663193A , EP842291A119980520, is a family of (identical) applications by Merck & Co that focus on inhibitors of Farnesyl-protein transferase for chemotherapeutic treatments and is based on a culture of the fungus "isolated from leaf litter of the desert shrub, Zygophyllum staffii, collected in Omdel, Namibia. This culture has been deposited with the American Type Culture Collection at 12301 Parklawn Drive, Rockville, MD 20852 as ATCC 74347". | | |

Of Namibian origin

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| Species name: <i>SAT1/NAM/307/98 virus</i> | Kingdom: Virales | No Available Image |
| Brief description of species: A foot and mouth virus collected from buffalo in the West Caprivi Game Reserve in Namibia | | |
| Distribution: Uncertain | No of documents: 1 | |
| US2011014232A1 | | |
| Detail: US2011014232A1. This patent application relates to chimeric food and mouth disease viruses and methods for eliciting immune virus responses using the chimeric virus. The applicant states that they used the virus from Namibia in constructing the chimeric virus. The chimeric virus is used in producing inactivated antigens for vaccines against the live viruses. | | |

African Distribution Including Namibia

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| Species name: <i>Sclerocarya birrea</i> | Kingdom: Plantae |  |
| Brief description of species: Sclerocarya birrea, the Marula, is a medium-sized dioecious tree, indigenous to the miombo woodlands of Southern Africa, the Sudano-Sahelian range of West Africa, and Madagascar. | | |
| Distribution: Cosmopolitan | No of documents: 105 (Appears in the claims of 14 documents) | |
| WO2002094299A1 WO2006097806A1 WO2008074935A2 WO2009053652A2 WO2010018047A2 WO2013079623A1 | | |
| Detail: 105 patent documents worldwide make reference to this species. 14 contain references to the species in the claims. The following are a brief sample where the species appears in the claims. WO2002094299A1 focuses on medicinal plant extracts for treating diabetic diseases. WO2006097806A1 antioxidants based on Anacardiaceae species. WO2008074935A2 for biologically active compositions for treating metabolic disorders and obesity. WO2009053652A2 for pharmaceutical or dietetic composition for inhibiting intestinal absorption of sugar in combination with <i>Nigella sativa</i> . WO2010018047A2 for cosmetic compositions comprising oil from Sumac plants. WO2013079623A1 for Vicenin 2 analogues for use as antispasmodic or prokinetic agents in a dietary supplement or drug. | | |

With Namibian distribution

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| Species name: <i>Sicarius albaspinosis</i> | Kingdom: Animalia | No Image Available |
| Brief description of species: A member of the genus of Sicarius spiders, also known as assassin spiders. They live in dry and sandy places in Southern Africa. | | |
| Distribution: Cosmopolitan | No of documents: 8 | |
| US20030175261A1 US20040001806A1 US20040013740A1 US6998389B2 WO2001043754A2 WO2001087346A2 WO2007071716A1 WO2008074872A1 | | |
| Detail: US20030175261A1, US6998389B2 focus on pharmaceutical compositions made from spider venom for treating tumours. A pharmaceutical composition consisting of a peptide toxin and enzyme from one of four Sicarius species, including <i>S. hahni</i> is claimed. WO2007071716A1 extends the earlier applications to both tumours and viral diseases including hepatitis A and is in the German language. WO2008074872A1 also extends the original application to treatment for brain tumours. This set appears to form a patent set that is being divided into separate targeted applications | | |

With Namibian distribution

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| Species name: <i>Sicarius hahni</i> | Kingdom: Animalia |  |
| Brief description of species: The six-eyed sand spider is a medium-sized spider with body measuring 8 to 15 mm and legs spanning up to 50 mm, found in deserts and other sandy places in Southern Africa. | | |
| Distribution: Cosmopolitan | No of documents: 8 | |
| US20030175261A1 US20040001806A1 US20040013740A1 US6998389B2 WO2001043754A2 WO2001087346A2 WO2007071716A1 WO2008074872A1 | | |
| Detail: This species is included in the documents for <i>Sicarius albaspinosis</i> . The remaining documents are covered under <i>Parabuthus villosus</i> . | | |

With Namibian distribution

| | | |
|---|--------------------|--------------------|
| Species name: <i>Sporormiella minimoides</i> | Kingdom: Fungi | No Image Available |
| Brief description of species: Sporormiella is a genus of fungi in the family Sporormiaceae. Species of the genus are obligately coprophilous, occurring on the dung of herbivores. An extract shows anti-fungal properties. | | |
| Distribution: Endemic | No of documents: 2 | |
| US5801172A GB2315489A | | |
| Detail: The two applications in the same patent family dating from the mid/late 1990s focus on an anti-fungal agent with broad spectrum anti-fungal activity against plant fungal pathogens. "The producing organism was isolated from giraffe dung collected in Namutoni, Namibia". The applicant (Merck) also specifies that "The compound of the present invention is a natural product produced from a strain of <i>Sporormiella minimoides</i> Ahmed & Cain (Ascomycotina, Pleosporales), MF 5867, in the culture collection of Merck & Co., Inc. , Rahway, NJ. The fungi has been deposited under the Budapest Treaty in the culture collection of the American Type Culture Collection on June 20, 1996 at 12301 Parklawn Drive, Rockville, Md. 20852 and assigned accession number ATCC 74372." | | |

