Biodiversity in the Patent System: Cameroon

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

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Introduction

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

Section 1 provides an overview of biodiversity in Cameroon 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 Cameroon in the period 1976-2010. This is followed by detailed analysis of patent documents that make reference to Cameroon and data based on species that are limited to distribution in Cameroon.

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 Cameroon. 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 Cameroon as a basis for further research.

Our research focused primarily on documents that make reference to Cameroon and to cases where existing distribution data suggests Cameroon 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.

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[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.

Cameroon

Area:
475,440 sq km
Coastline:
402km
Climate:
Varies with terrain, from tropical along coast to semi-arid and hot in north
Geography:
Cameroon exhibits all the major climates and vegetation of the African continent: mountains, desert, rain forest, savanna grassland, and ocean coastland. The low South Cameroon Plateau rising from the coastal plain is dominated by tropical rain forest.From the forested southern plateau the land rises northward to the grassy Adamaoua highlands. The northern savanna plain extends from the edge of the Adamaoua to Lake Chad.

Biodiversity in Cameroon 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 of species across time and space presently available. All data is submitted by participants who share biodiversity information.

Using this resource we have obtained biodiversity records for species which occur in Cameroon. It should be noted that the usefulness of this data in determining the actual distribution of a given species is conditional to the comprehensiveness of the data submitted by GBIF participants. Therefore 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 appears from 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 15,988 species names for Cameroon.Of the 15,988 recorded species, 13,933 are accepted scientific names for the species with the remainder being synonyms, homonyms or names that have not yet been scientifically accepted. In addition GBIF records 206,385 georeferenced coordinates for the occurrences of these species in Cameroon. Accurate georeferencing of species collection records is an important standard in biodiversity related research.

We identified a total of 135,776 documents containing species known to be distributed in Cameroon. Of these, 184 made some form of reference to Cameroon. These documents were manually reviewed in MaxQDA software to identify documents specifying a source or origin in Cameroon.

The 184 documents that made a specific reference to Cameroon contained 2,425 species. These documents were manually reviewed in MaxQDA data analysis software and through this process we were able to identify species where it was definitively stated that they had been collected, sampled or otherwise obtained from Cameroon.

In addition, using GBIF distribution data we identified 21 species where GBIF presently records distribution only in Cameroon. These species appeared in 97 patent documents where Cameroon was not explicitly mentioned. The idea behind this was to identify cases where a species (based on available distribution data) was likely to have come from Cameroon and thus be regarded as a species of likely or potential significance for Cameroon. For the sake of simplicity we call this data 'Distribution 1'. These documents were then selected for further review.

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 Cameroon of all GBIF recorded species. Plate 1 shows two maps: The left map shows plotted points, each indicating a GBIF record. The points are coloured to indicate the kingdom to which the species belongs. 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 statutory conservation sites 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.

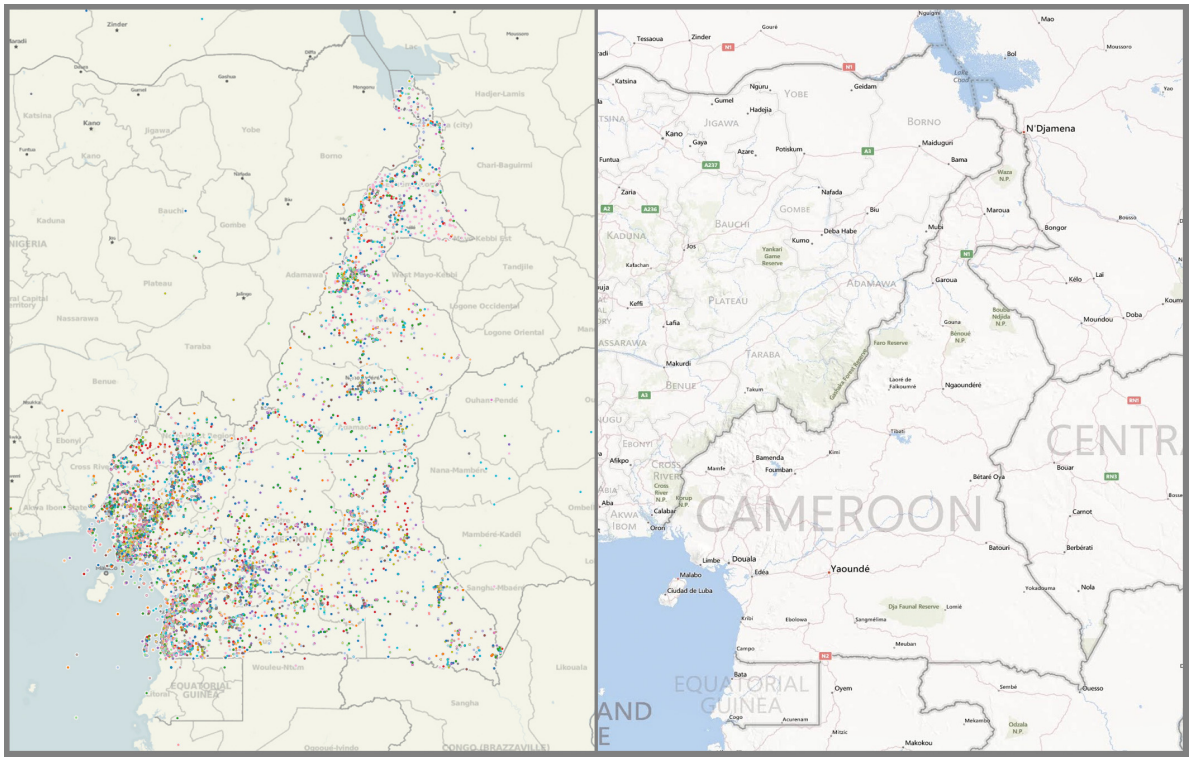


Plate1. Distribution of GBIF records from Cameroon (Left) and major settlements and roads (right) (map courtesy of Bing Maps). Each point represents a species record data point.

It is very interesting to compare the two maps. The distribution map shows that records are not uniformly dispersed across the country, but they form large dense clusters, particularly in the south and west but also in other areas of the country. Another feature of these mapped distribution records are the strings of data points which cross the country. When compared with the right-hand map it can be seen that the clusters coincide with large

human settlements such as Yaoundé and Douala and other areas of high population density. It can also be seen that the strings of data points follow closely the routes of major roads. This pattern of record locations suggest that there are practical restrictions which have prevented collection of data across a broader geographical range. This in turn leads to the likelihood that biodiversity records for Cameroon are far from comprehensive in describing the fauna and flora of the country. Interestingly there do not appear to be any record 'hotspots' in statutory conservation sites.

GBIF presently records 15,988 species known to be present in Cameroon. This list is dominated by plants and animals which account for over 15,000, as can be seen in Table 1. Given their importance to all forms of life the number of recorded fungi is surprisingly low at 450 species. Microbial life accounts for less than 50 records.

Table 1: Showing the number of species in Cameroon by kingdom using GBIF data.

Using global data it is possible to examine the wider distribution of Cameroonian species.

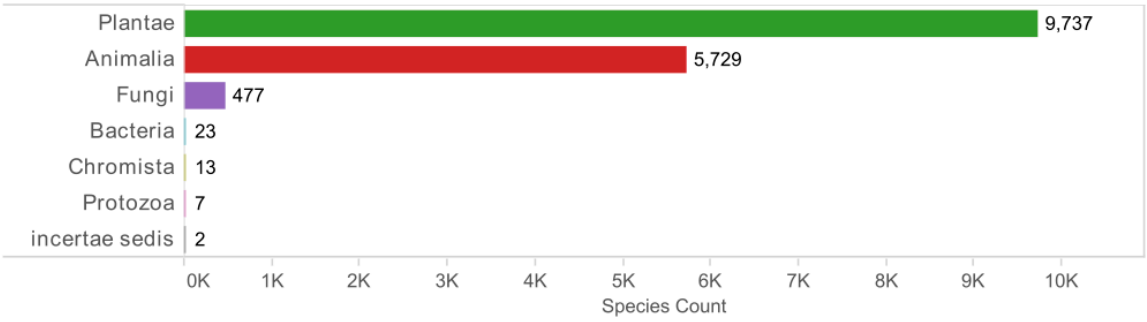


Plate 2 shows where records exist across the globe for such species. Species which are found in two or more countries are referred to as being 'cosmopolitan'. Each pie represents the number of occurrences of cosmopolitan species which are found in Cameroon and is segmented by kingdom. It can be seen that a small number of species have a very wide planetary distribution (it should be noted that some of these records may originate from research institutions or collections and therefore do not represent native or naturalised distribution). It can also be seen that many species are pan-sub-Sahara African in range, particularly across tropical and equatorial countries.

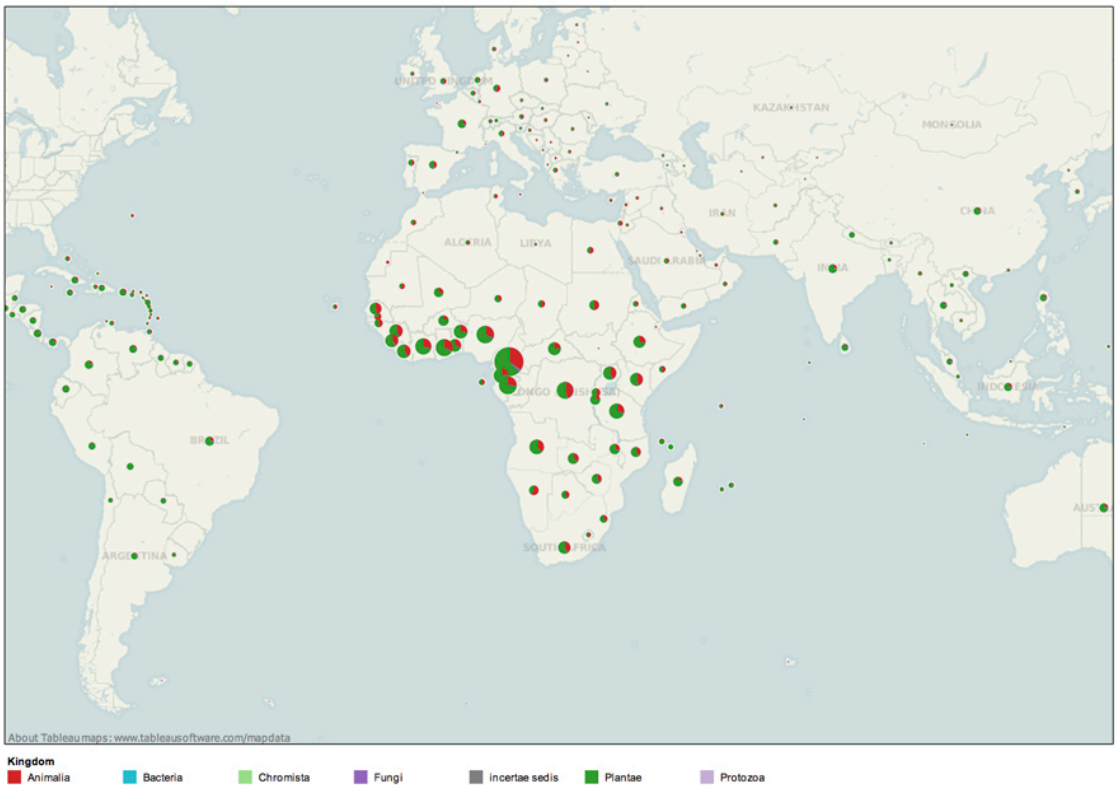


Plate 2: Global distribution of Cameroonian species shown by the number of species in GBIF.

Cameroon in the Patent System

This section discusses patent activity involving species distributed in Cameroon and collected or sourced from Cameroon. The discussion focuses on three types of data.

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

Biodiversity in Cameroon in the Global Patent System:

In common with other countries, Cameroon shares a significant proportion of its known biodiversity with other countries in Africa and around the world. Plate 3 provides an overview of trends in patent activity for species that occur in Cameroon and elsewhere around the world and provides information on trends in applications and grants (A), the top species appearing in patents known to occur in Cameroon (B), top applicants (C) and technology areas (D).

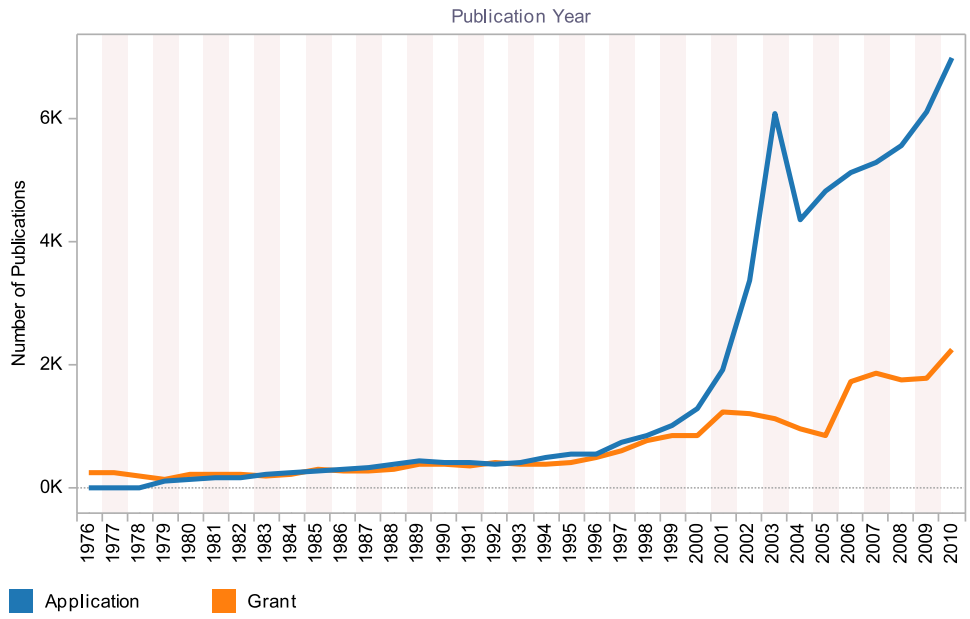
This data is of relevance to Cameroon because it demonstrates that other researchers and companies are conducting research and development on species that are known to occur in Cameroon. These range from common agricultural species (such as the potato - *Solanum tuberosum*) to organisms such as *Xenopus levis* (the African clawed frog), the fungus *Fusarium oxysporum* or the Bitter Melon *Momordica charantia.*

In total we identified approximately 1,592 species in patent data that are known to occur in Cameroon. What is important about this data is that indicates that these species are a focus of research and development across a range of different sectors as revealed in Plate 3, Figure D. This reveals that species of relevance to Cameroon are a focus of research and development in genetic engineering, pharmaceuticals, biocides, new agricultural plants, cosmetics, foodstuffs and detergents. These research and development activities encompass organisms across the spectrum from plants to animals, bacteria and viruses. In some cases the organisms are a target of activity, such as pathogens or agricultural pests, while in others they are a focus for the development of medicines, foodstuffs, cosmetics or research tools in biotechnology.

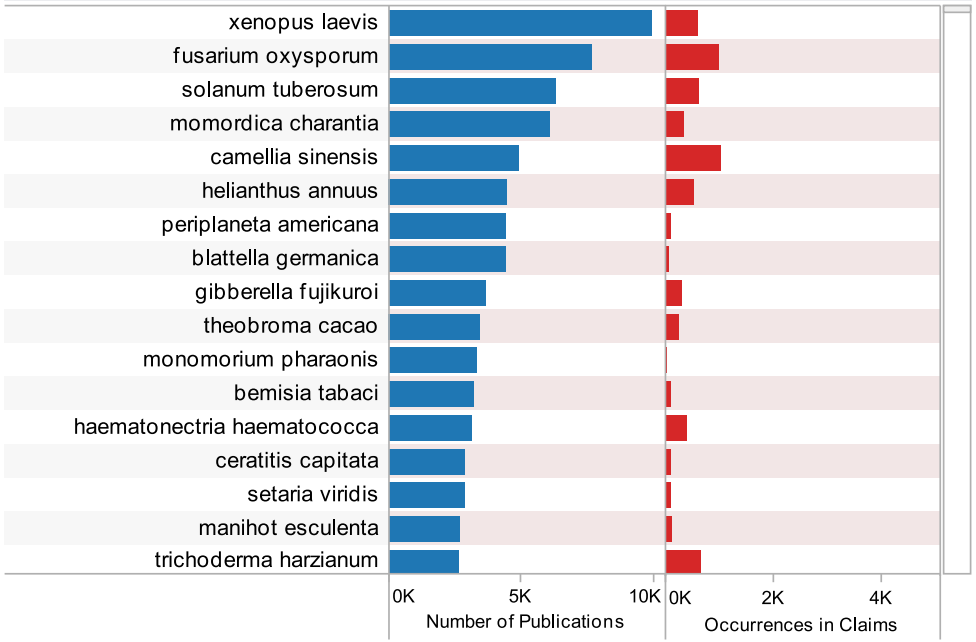
Species from Cameroon in patent data:

In total we identified 22 species of organism that were directly sourced from or are likely to originate from Cameroon based on distribution data. Plate 4 displays the top species for Cameroon that appear in patent data. A summary is provided for each species in the next section and will be made available online to allow for exploration of each case.

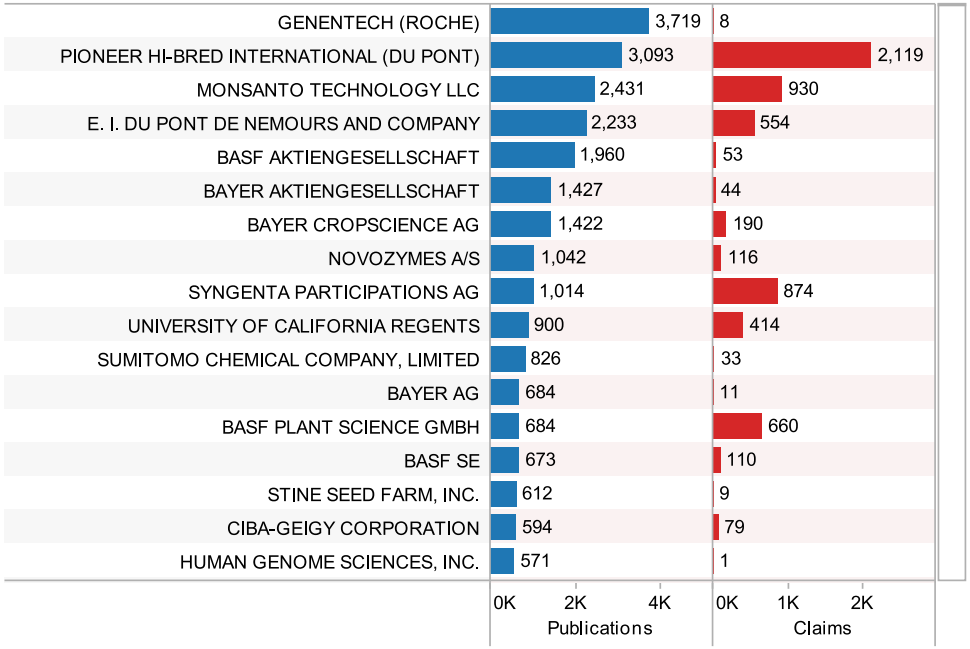
A.


Publication Year
Number of Publications
6K
4K
2K
0K
1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Application
Grant

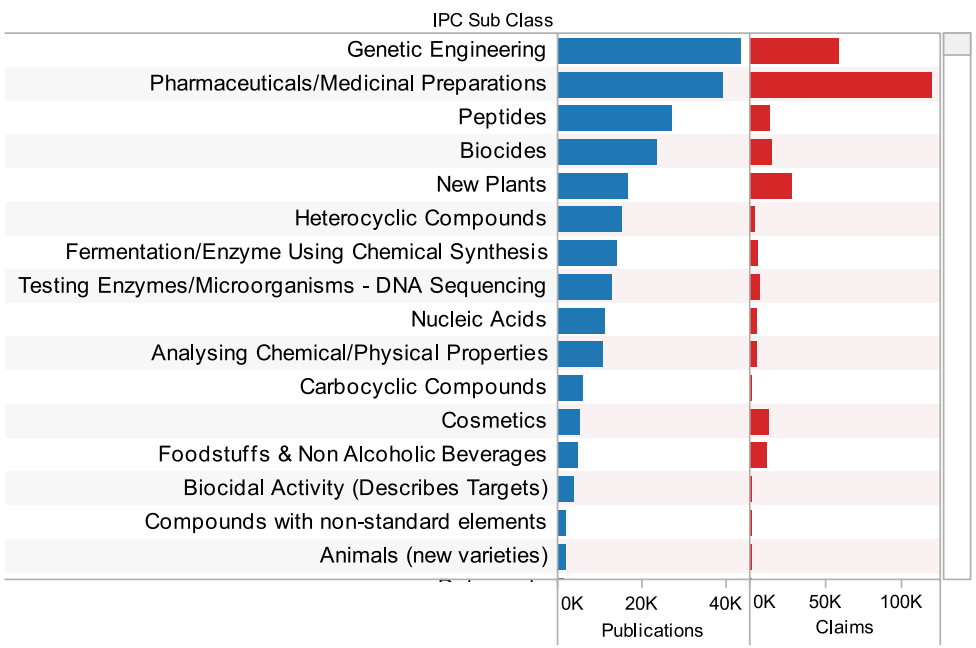
B.

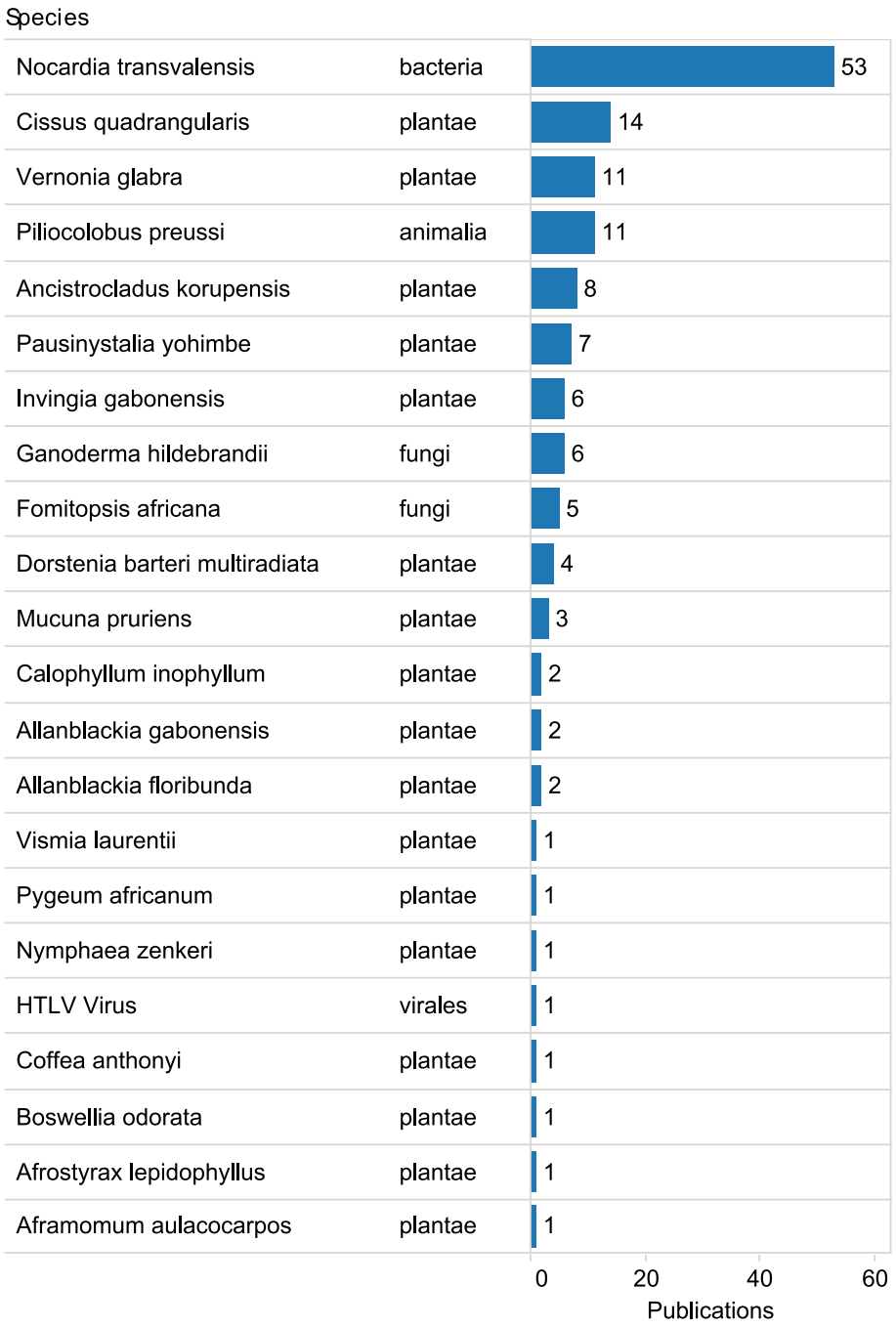

xenopus laevis
fusarium oxysporum
solanum tuberosum
momordica charantia
camellia sinensis
helianthus annuus
periplaneta americana
blattella germanica
gibberella fujikuroi
theobroma cacao
monomorium pharaonis
bemisia tabaci
haematonectria haematococca
ceratitis capitata
setaria viridis
manihot esculenta
trichoderma harzianum
0K 5K 10K
Number of Publications
0K 2K 4K
Occurrences in Claims

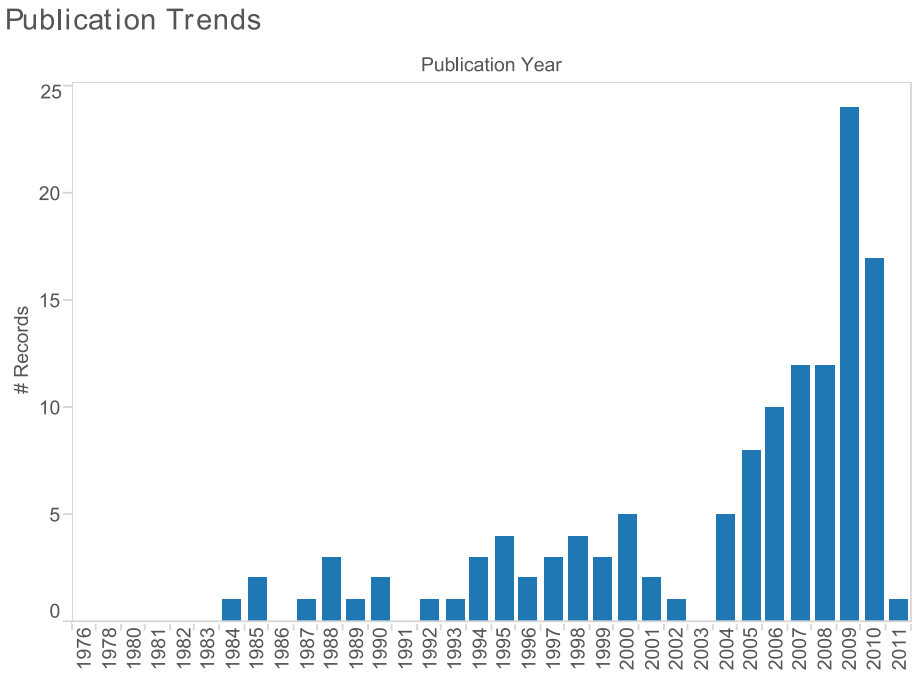
C.


GENENTECH (ROCHE) 3,719 8
PIONEER HI-BRED INTERNATIONAL (DU PONT) 3,093 2,119
MONSANTO TECHNOLOGY LLC 2,431 930
E. I. DU PONT DE NEMOURS AND COMPANY 2,233 554
BASF AKTIENGESELLSCHAFT 1,960 53
BAYER AKTIENGESELLSCHAFT 1,427 44
BAYER CROPSCIENCE AG 1,422 190
NOVOZYMES A/S 1,042 116
SYNGENTA PARTICIPATIONS AG 1,014 874
UNIVERSITY OF CALIFORNIA REGENTS 900 414
SUMITOMO CHEMICAL COMPANY, LIMITED 826 33
BAYER AG 684 11
BASF PLANT SCIENCE GMBH 684 660
BASF SE 673 110
STINE SEED FARM, INC. 612 9
CIBA-GEIGY CORPORATION 594 79
HUMAN GENOME SCIENCES, INC. 571 1
0K 2K 4K
Publications
0K 1K 2K
Claims

D.


IPC Sub Class
Genetic Engineering
Pharmaceuticals/Medicinal Preparations
Peptides
Biocides
New Plants
Heterocyclic Compounds
Fermentation/Enzyme Using Chemical Synthesis
Testing Enzymes/Microorganisms - DNA Sequencing
Nucleic Acids
Analysing Chemical/Physical Properties
Carbocyclic Compounds
Cosmetics
Foodstuffs & Non Alcoholic Beverages
Biocidal Activity (Describes Targets)
Compounds with non-standard elements
Animals (new varieties)
0K 20K 40K
Publications
0K 50K 100K
Claims


Species
Nocardia transvalensis bacteria 53
Cissus quadrangularis plantae 14
Vernonia glabra plantae 11
Piliocolobus preussi animalia 11
Ancistrocladus korupensis plantae 8
Pausinystalia yohimbe plantae 7
Invingia gabonensis plantae 6
Ganoderma hildebrandii fungi 6
Fomitopsis africana fungi 5
Dorstenia barteri multiradiata plantae 4
Mucuna pruriens plantae 3
Calophyllum inophyllum plantae 2
Allanblackia gabonensis plantae 2
Allanblackia floribunda plantae 2
Vismia laurentii plantae 1
Pygeum africanum plantae 1
Nymphaea zenkeri plantae 1
HTLV Virus virales 1
Coffea anthonyi plantae 1
Boswellia odorata plantae 1
Afrostyrax lepidophyllus plantae 1
Aframomum aulacocarpos plantae 1
0 20 40 60
Publications


Publication Trends
Publication Year
Records
0 5 10 15 20 25
1976 1978 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

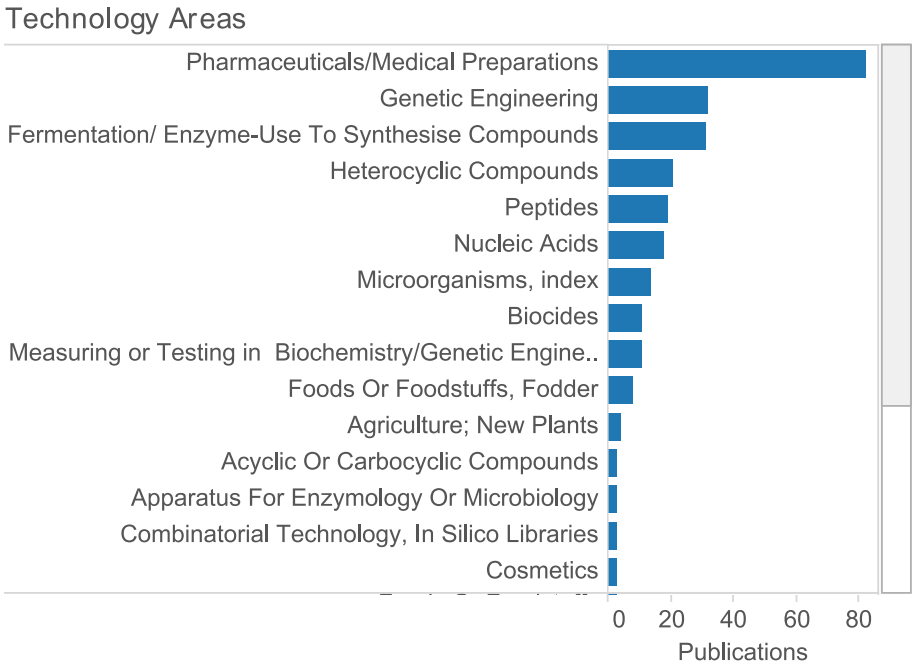

Technology Areas
Pharmaceuticals/Medical Preparations
Genetic Engineering
Fermentation/ Enzyme-Use To Synthesise Compounds
Heterocyclic Compounds
Peptides
Nucleic Acids
Microorganisms, index
Biocides
Measuring or Testing in Biochemistry/Genetic Engine..
Foods Or Foodstuffs, Fodder
Agriculture; New Plants
Acyclic Or Carbocyclic Compounds
Apparatus For Enzymology Or Microbiology
Combinatorial Technology, In Silico Libraries
Cosmetics
0 20 40 60 80
Publications

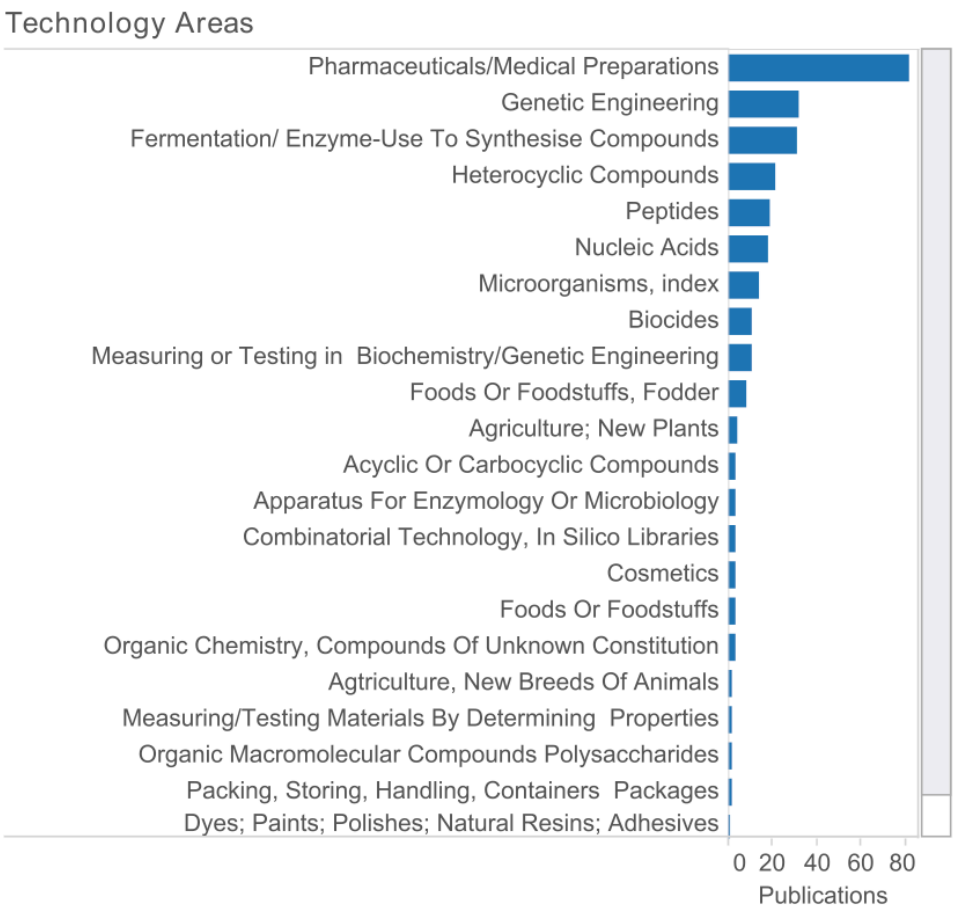
Plate 4 reveals that the top species include plants, bacteria, animals and in one case a virus. While the overall numbers of species identified in patents as originating from Cameroon may appear low they are a significant indicator of interest in research and development in species from Cameroon. Recent trends in patent activity also suggest that interest is increasing although overall numbers of publications remain low.

Plate 4 immediately makes apparent that patent activity measured on the number of patent publications is dominated by *Nocardia transvalensis.* This is a bacteria that is a cause, in rare cases, of actinomycotic mycetoma resulting in abscesses on the skin and elsewhere in the body. Within the patent data this species is associated with activity for antibiotics, immunoadjuvants for use in vaccines, and agriculture. In contrast the plant *Cissus quadrilangus* is a focus of patent activity for appetite suppression and weight loss in activity by Gateway Health Alliance and Medex Sci Ltd.

Technology Areas:

Table 2 provides a brief summary of the technology areas involved in patent activity for Cameroon and is followed by a more detailed break down of activity.

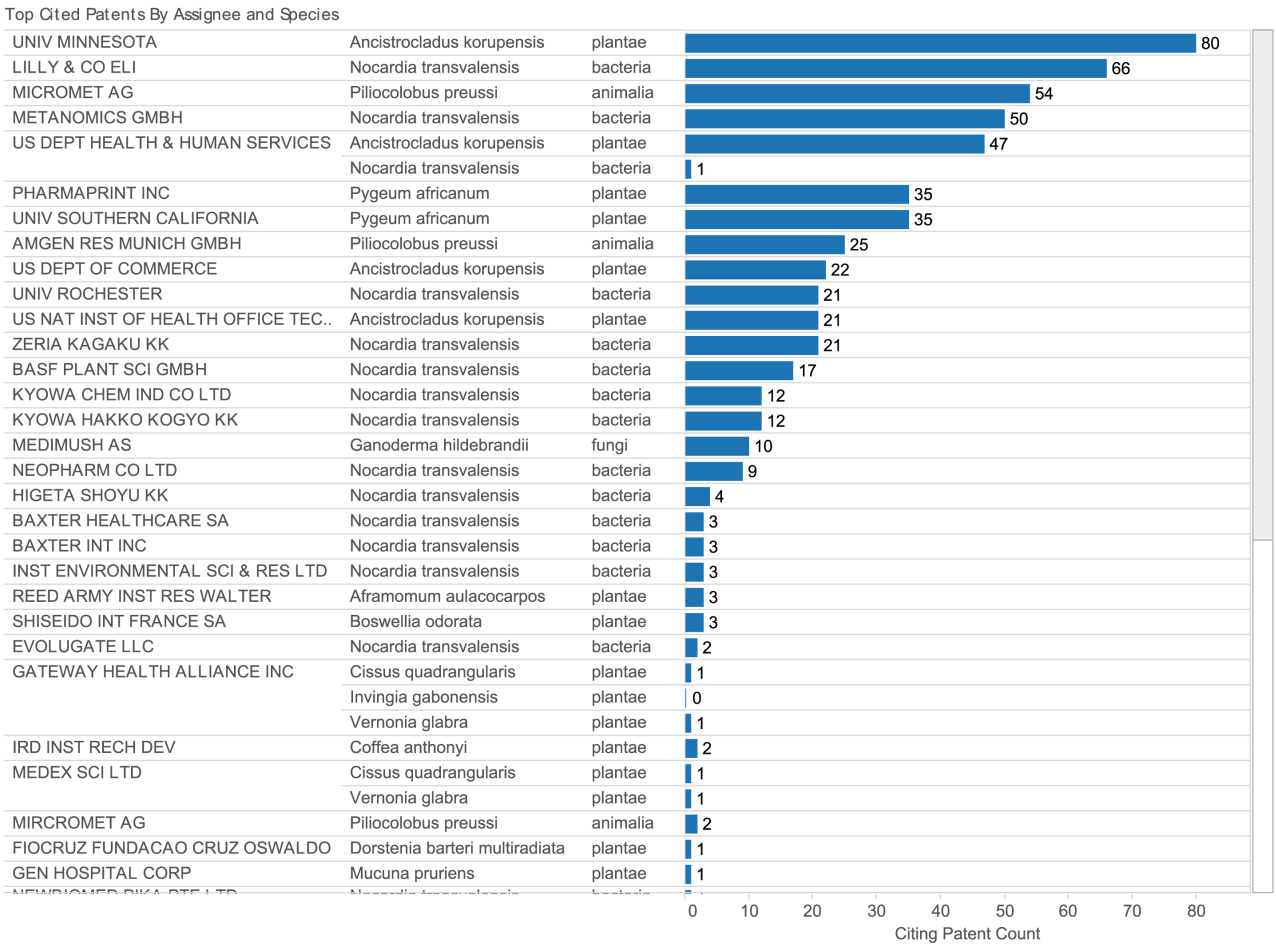
Table 2: Technology Areas



This list therefore reveals that a species may appear in patent data for a variety of reasons across a range of different sectors and technologies. In some cases, such as *Nocardia transvalensis* and rare or neglected diseases a species may be of potential relevance to health care systems in countries such as Cameroon or elsewhere in Africa. This becomes evident when we focus on measuring the importance of patents in the patent system.

Table 3 ranks the patents involving species from Cameroon on the number of times that they have been cited by other patent applicants. This is an important measure of the value of patents because a more important patent will be cited more often by other patent applicants. Table 3 reveals that the top ranking patents for Cameroon are held by the University of Minnesota of a plant known as *Ancistrocladus korupensis. A. korupensis* is a liana species named after Korup national park that became a focus of patent activity in the mid-1990s for potential protection against HIV1 and HIV2 (WO1996015111A1 andsee below). Other important plant species include *Pygeum africanum* (also known as *Prunus africanum*) with bark that is used in medical treatments, including for malaria and prostate disease. Finally, the plant *Pausinystalia yohimbe* (formerly *Corynanthe johimbe*) has not attracted a high level of citations but is a focus of patent activity for treating male impotence and treating central nervous system disorders.

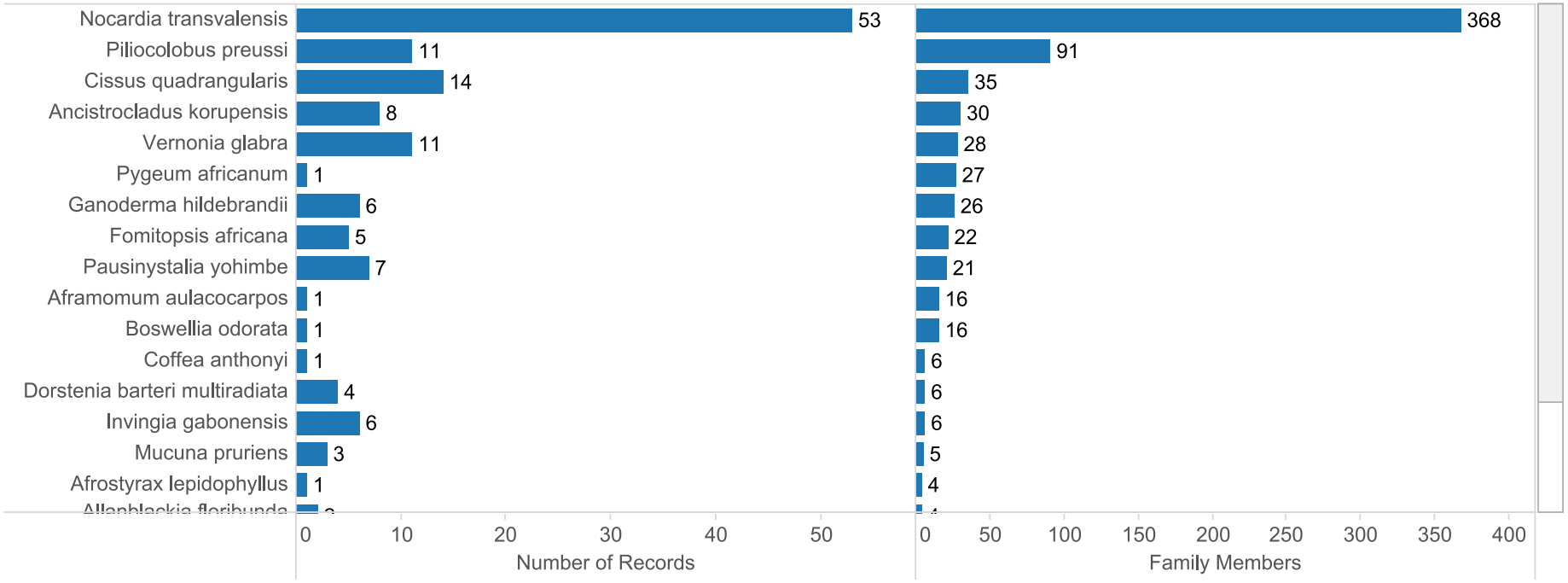
Table 3: Top Cited Patents by Assignee and Species

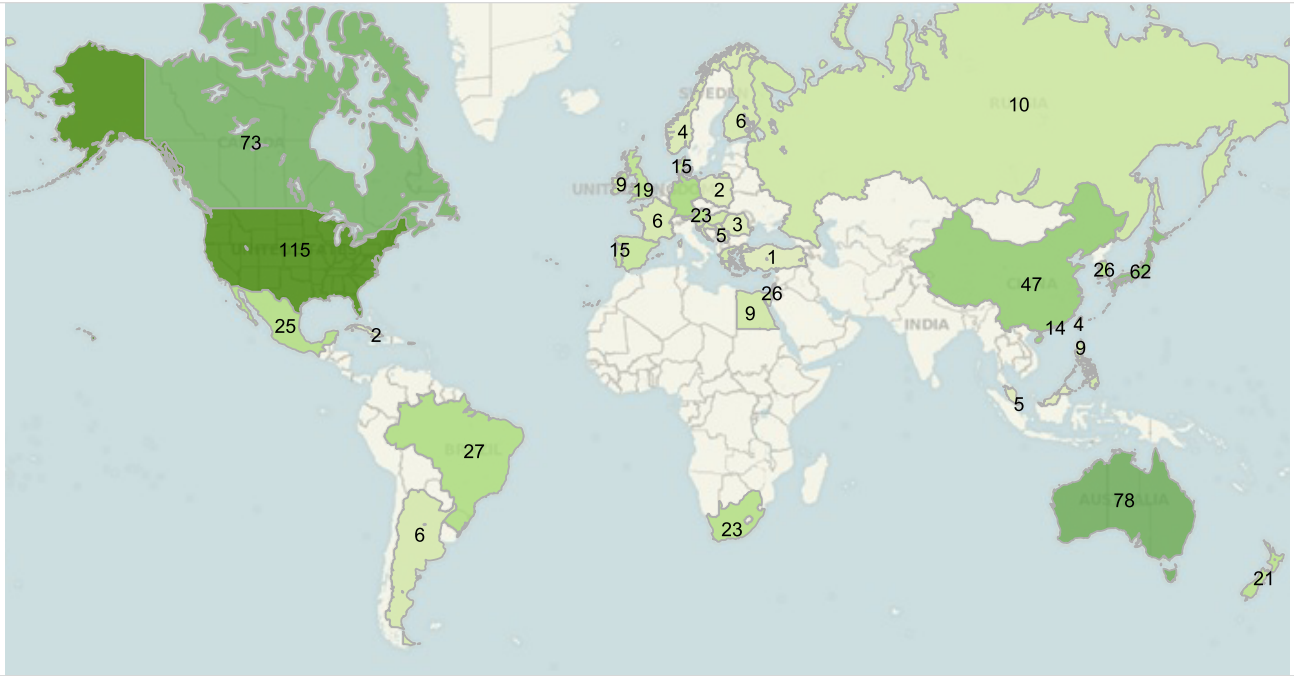


A second measure of the potential importance of patents is provided by patent family data. A patent family is simply a set of patent documents that link back to an original parent filing (known as a “priority” filing). These patent documents can be filed anywhere in the world and can be tracked using unique identifiers known as INPADOC numbers that link back to the parent document. In contrast with patent citations that provide an indicator of the impact of a patent on others in the patent system, the size of a patent family reveals how important a patent is to applicants. The reason for this is that they must pay each time they file a patent application that is linked to the parent. Plate 5 ranks patent family data by species and shows the global map for the distribution of patent documents linked to the species.

This data is useful because it provides an overview of global activity involving a species of interest from Cameroon. It is immediately apparent that this closely matches the rankings based on citation counts. However, other species such as *Aframomum aulacocarpos* which was a focus of patent activity for antiparasitic compounds by the Walter Reed Army Institute in the year 2000 also become more prominent. In this case follow on patent applications were recorded in Australia, Austria, Brazil, Canada, Germany, Israel, Mexico, Turkey and the United States. As this makes clear, family data allows patents involving a species from a particular country to be tracked around the world.

This data is also important for understanding markets and the implications of patent activity for Cameroon. In total we identified follow on patent activity for species involving


Nocardia transvalensis 53 368
Piliocolobus preussi 11 91
Cissus quadrangularis 14 35
Ancistrocladus korupensis 8 30
Vernonia glabra 11 28
Pygeum africanum 1 27
Ganoderma hildebrandii 6 26
Fomitopsis africana 5 22
Pausinystalia yohimbe 7 21
Aframomum aulacocarpos 1 16
Boswellia odorata 1 16
Coffea anthonyi 1 6
Dorstenia barteri multiradiata 4 6
Invingia gabonensis 6 6
Mucuna pruriens 3 5
Afrostyrax lepidophyllus 1 4
0 10 20 30 40 50
Number of Records
0 50 100 150 200 250 300 350 400
Family Members


73
115
25
2
27
6
4
6
15
9
19
2
6
23
3
5
15
1
26
9
10
47
26
62
14
4
9
5
INDIA
78
23
21

Cameroon in 42 countries (including the European Patent Office and the international Patent Cooperation Treaty). As can be seen from the map, demand for patent protection is focused outside of Africa with two important exceptions. In the case of South Africa follow on applications were observed for Nocardia transvalensis, Vernonia glabra, Cissus quadrangularis and Afrostyrax lepidophyllus. In the case of Egypt a follow on filing was also observed linked to Nocardia transvalensis.

The practical implication of this data is that it becomes possible to identify markets where patent protection is being sought that are perceived to be important for applicants. In cases where a patent has been granted and remains in force, this could potentially constitute a barrier to entry for African producers where the scope of the patent encompassed the product. However, in other cases this data also helps to expose potential markets, including internal markets in Africa where patent protection is unlikely to be a barrier to sales. We would note that testing markets for patents for freedom to operate in a particular market requires specialist analysis and legal advice to provide legal certainty. However, patent family data has a useful role to play in understanding the position of a potential product from biodiversity in wider markets.

Finally, in considering patent data it is also important to consider patent applicants in light of potential partnerships or future collaborations. Table 3 has highlighted the main applicants involved in patent activity for species relating to Cameroon. In some cases these include government organisations or public research organisations and museums such as the National History Museum in France with respect to *Allanblackia floribunda*, *Allanblackia gabonensis*, *Calophyllum inophyllum* and *Vismia laurentii* (see documents: EP2108645A1, WO2008155393A1, WO2009124909A1) or research on cross species transfers of viruses and genomics linked to the bushmeat trade in the case of the US Government department of health and human services Centers for Disease Control (see document US2010317034A1). As such, patent data can provide insights into cases of potential misappropriation but it can also provide insights into potential opportunities for economic development and research collaborations.

Species Summaries

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

a) Of Cameroonian origin - Patents where a named species has been identified as having been obtained from Cameroon.
b) With Cameroonian distribution - Patents where there is no reference to Cameroon but distribution data suggests that the species may have originated from Cameroon (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 Cameroon. It does not refer to the wider patent landscape for the species consisting of the total 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 incorporated into the claims of the invention;
3. Because they are a target of the invention (i.e. pathogens or pests)
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.

Of Cameroonian origin

Species name: *Aframomum aulacocarpos*	Kingdom: Plantae	
Brief description of species: Member of the ginger family. Plant produces anti-parasitic compounds.		
Distribution: Cosmopolitan	No of documents: 1	
WO2000024411A2		

Of Cameroonian origin

Species name: *Afrostyrax lepidophyllus*	Kingdom: Plantae	
Brief description of species: A species of plant in the Huaceae family found in Cameroon, Gabon and Ghana. Also known as the country onion. Bark extract of has shown pesticidal activity against nematodes and arthropods, including insecticide-resistant strains of lice and blowflies.		
Distribution: Cosmopolitan	No of documents: 1	
WO1995010187A1		

Of Cameroonian origin

Species name: *Allanblackia floribunda*	Kingdom: Plantae	
Brief description of species: A common understory tree across western Africa. Used as a food source, for oil and in cosmetics.		
Distribution: Cosmopolitan	No of documents: 2	
WO2009124909A1 EP2108645A1		

Of Cameroonian origin

Species name: *Allanblackia gabonensis*	Kingdom: Plantae	
Brief description of species: Allanblackia gabonensis is a species of flowering plant in the Clusiaceae family. It is found in Cameroon and Gabon. Its natural habitat is subtropical or tropical moist lowland forests.		
Distribution: Cosmopolitan	No of documents: 2	
WO2009124909A1 EP2108645A1		

Of Cameroonian origin

Species name: *Ancistrocladus korupensis* *Ancistrocladus novum*	Kingdom: Plantae	
Brief description of species: Recently discovered liana species which is being researched for its anti-HIV potential.		
Distribution: Endemic	No of documents: 8	
WO1996015111A1 WO1995021826A1 WO1994024108A1 WO1992018125A1 US5543523A US5409938A US5654432A US5455251A		

With Cameroonian distribution

Species name: *Boswellia odorata*	Kingdom: Plantae	
Brief description of species: Pharmaceuticals. Tree bark and resins used in traditional medicines. One of a the species from which frankincense is derived.		
Distribution: Uncertain	No of documents: 1	
WO2004082643A2		

Of Cameroonian origin

Species name: *Calophyllum inophyllum*	Kingdom: Plantae	
Brief description of species: Native to east Africa, much of Asia and Australia. Seeds produce oil that can be used as bio-fuel. Used in cosmetics and for traditional boat building.		
Distribution: Cosmopolitan	No of documents: 2	
WO2009124909A1 EP2108645A1		

With Cameroonian distribution

Species name: *Corynanthe johimbe*	Kingdom: Plantae	
Brief description of species: Now renamed Pausinystalia yohimbe, a tree that grows across west Africa, esp Cameroon, Gabon & Zaire. The pharmaceutical industry uses yohimbe extracts to manufacture aphrodisiacs and medicines to treat impotence.		
Distribution: Cosmopolitan	No of documents: 7	
EP1086695A1 US6086884A US2005159419A1 US2009165167A1 WO2000067765A1 WO2004103283A2 WO2007031556A2		

Of Cameroonian origin

Species name: *Cissus quadrangularis*	Kingdom: Plantae	
Brief description of species: Succulent vine that is used in medicine and as a dietary supplement. Found across Asia and Africa and exported to the Americas.		
Distribution: Cosmopolitan	No of documents: 14	
WO2009035987A1 US2010113375A1 US2010113374A1 US2009324758A1 US2009076129A1 US2007202204A1 US2007202196A1 US2007190185A1 US2007048392A1 US7736675B2 US7718200B2 US7695742B2 US175859B1 EP1212070B1		

With Cameroonian distribution

Species name: *Coffea anthonyi*	Kingdom: Plantae	
Brief description of species: New species of coffee, discovered in Cameroon and DRC in 2008. Species mentioned in long list of all coffee species.		
Distribution: Cosmopolitan	No of documents: 1	
WO2009125017A2		

With Cameroonian distribution

Species name: *Dorstenia barteri multiradiata*	Kingdom: Plantae	
Brief description of species: A perennial herb, semi-woody, erect to 80 cm; of the forest in S Nigeria, W Cameroon and Fernando Po. The plant is lactiferous. Plant used for extraction of alkaloids and other derivatives.		
Distribution: Cosmopolitan	No of documents: 4	
US5290553A US6998394B2 US2002103386A1 US2005101519A1		

Of Cameroonian origin

Species name: *Enanthia chlorantha*	Kingdom: Plantae	
Brief description of species: A yellowwood from Liberia, Ivory Coast, and Cameroon, produces a sulfurous yellow dye; the wood also is used locally to make unpainted furniture and veneers.		
Distribution: Cosmopolitan	No of documents: 2	
US2009269395A1 WO2007029187A2		

With Cameroonian distribution

Species name: *Fomitopsis africana*	Kingdom: Fungi	
Brief description of species: Pharmaceutical uses. Fungi used for antiviral derivatives.		
Distribution: Uncertain	No of documents: 5	
US2005238655A1 US2005276815A1 US2006171958A1 US2009130138A1 US2011008384A1		

With Cameroonian distribution

Species name: *Ganoderma hildebrandii*	Kingdom: Fungi	No Images Available.
Brief description of species: Ganoderma is an important genus of the Polyporales in the tropics. Fungi used to produce anti-cancer agents.		
Distribution: Cosmopolitan	No of documents: 6	
US2009005340A1 US2009143280A1 US2010086647A1 WO2006119774A1 WO2006133707A2 WO2006133708A1		

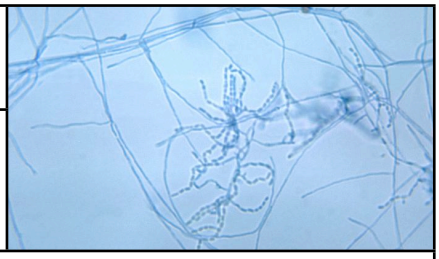
Of Cameroonian origin

Species name: *Invingia gabonensis*	Kingdom: Plantae	
Brief description of species: Irvingia gabonensis is a species of African trees in the genus Irvingia, sometimes known by the common names wild mango, African mango, bush mango, dika or ogbono. Food plant and some pharmaceutical use. Used in agriculture as a shade plant.		
Distribution: Cosmopolitan	No of documents: 6	
US2009227514A1 US2009226553A1 US2009214684A1 US2007065523A1 US2006263450A1 US7537790B2		

Of Cameroonian origin

Species name: *Mucuna pruriens*	Kingdom: Plantae	
Brief description of species: Mucuna pruriens is a tropical legume known as velvet bean or cowitch and by other common names, found in Africa, India and the Caribbean. Various medicinal uses including for Parkinson's Disease.		
Distribution: Cosmopolitan	No of documents: 3	
WO2008086069A1 WO200101576A1 US2008213252A1		

With Cameroonian distribution

Species name: *Nocardia transvalensis*	Kingdom: Bacteria	
Brief description of species: Nocardia transvalensis, a rare Nocardia species, recognized as a cause of actinomycotic mycetoma.		
Distribution: Cosmopolitan	No of documents: 53	
EP0112184A2 EP0241285A2 EP0265071A1 EP0398588A1 EP0808843A2 EP0825258A1 EP0855402A1 EP1481688A1 EP1953235A2 EP1970074A1 EP2080769A2 EP2096177A2 EP2199304A1 US4495179A US4558009A US4746511A US4764510A US4870021A US4956374A US5239064A US5312738A US5843437A US5922582A US5965407A US6004995A US6090610A US6153419A US7320881B2 US7722857B2 US7811764B2 US2005106155A1 US2005277136A1 US2006137042A1 US2007010700A1 US2007059693A1 US2008020947A1 US2009047670A1 US2009137418A1 US2009175902A1 US2009274763A1 US2009311334A1 US2010279354A1 WO1998044153A1 WO2004061127A2 WO2004063036A1 WO2005014828A2 WO2005085478A2 WO2006069610A2 WO2007087815A2 WO2008034648A1 WO2008070039A2 WO2009061783A2 WO2010127182A1		

With Cameroonian distribution

Species name: *Nymphaea zenkeri*	Kingdom: Plantae	
Brief description of species: Grown across east Africa. Aquatic plant popular in aquaria.		
Distribution: Cosmopolitan	No of documents: 1	
US2006030489A1		

With Cameroonian distribution

Species name: *Piliocolobus preussi*	Kingdom: Animalia	
Brief description of species: Preuss's red colobus monkey, lives in Cameroon and Nigeria. Mentioned in patent in species long list. Possibly used to research cross species reactions to antibodies. Critically endangered.		
Distribution: Endemic/Cosmopolitan	No of documents: 11	
US2009252683A1 US2010150918A1 US2010183615A1 WO2007042261A2 WO2008119565A2 WO2008119566A2 WO2008119567A2 WO2010037835A2 WO2010037836A2 WO2010037837A2 WO2010037838A2		

Of Cameroonian origin

Species name: *Pygeum africanum*	Kingdom: Plantae	
Brief description of species: A synonym for Prunus africana. Bark is used for a variety of medical treatments including malaria and prostate disease. Grows across central sub-Saharan Africa and Madagascar.		
Distribution: Cosmopolitan	No of documents: 1	
WO1997039355A1		

Of Cameroonian origin

Species name: *Primate HTLV Virus*	Kingdom: Virales	
Brief description of species: HTLV studied in humans and primates from Cameroon		
Distribution: Uncertain	No of documents: 1	
US2010317034A1		

Of Cameroonian origin

Species name: *Vernonia glabra*	Kingdom: Plantae	
Brief description of species: Herbaceous plant which grows throughout large regions of Africa. Leaf extract has anti-microbial and anti-fungal properties.		
Distribution: Cosmopolitan	No of documents: 11	
WO200101576A1 US2009324758A1 US2007202204A1 US2007202196A1 US2007190185A1 US2007048392A1 US7736675B2 US7718200B2 US7695742B2 US7175859B1 EP1212070B1		

With Cameroonian distribution

Species name: *Vismia laurentii*	Kingdom: Plantae	
Brief description of species: Unresolved name. Pharmaceuticals Found in African forests in general and more specifically in Senegal, Liberia, Ghana, Nigeria, Côte d'Ivoire, Sierra Leone and in Cameroon. Extraction of compounds for use as an anti coocidial		
Distribution: Cosmopolitan	No of documents: 1	
WO2008155393A1		

Appendix 1.
Distribution map of GBIF records in Cameroon coloured by kingdom.