



“Issues and experiences from the use of databases recording genetic resources and associated traditional knowledge, and their potential for use as a defensive measure”.

WIPO Roundtable, Geneva, 27 May 2016
China Williams
Senior Policy Officer
Royal Botanic Gardens, Kew



Royal Botanic Gardens, Kew:

Non-departmental public body and
registered charity

700 staff (250 in science)

Over 1 million visitors each year

UNESCO World Heritage Site

Pagoda 1761-2

19 major collections:

Preserved plant and fungal collections
(Herbarium)

Living material (The Millennium Seed
Bank, living plant collections)

Documentary and visual reference
collections (library, art and archives,
on-line resources including databases)



Kew's Collections in Numbers

Herbarium (7.5 M) & Fungarium (1.25 M)

Living collections (+30,000 species)

Millennium Seed Bank (+30,000 species; c. 2 billion seeds)

Over 40 open access science databases

DNA and tissue bank (+42,000 accessions)

DNA C-value (+7,000 species)

Slide collections (+100,000 slides)

Library (> 750,000 volumes), archives (250,000),
 artwork (> 175,000) , paintings, prints and drawings

Hundreds of scientists visit each year

Over 60 overseas plant collecting trips per year

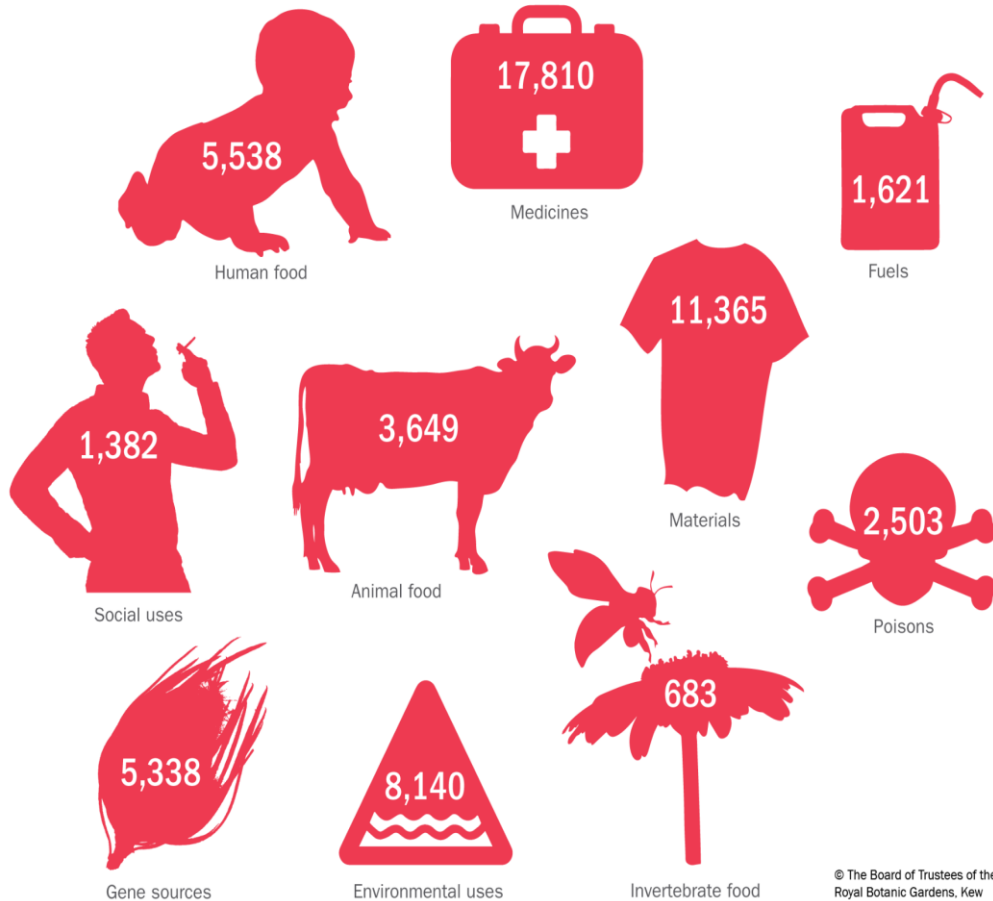
Exchange over 60,000 herbarium specimens and
 10,000 live plants and seeds each year





Kew's Economic Botany collection was founded in 1847. It contains about 90,000 plant raw materials and artefacts representing all aspects of craft and daily life worldwide, including medicines, textiles, basketry, dyes, gums and resins, foods and woods.

FIGURE 6: NUMBER OF PLANT SPECIES IN EACH USE CATEGORY



‘At least 31,128
plant species
currently have a
documented use’

Source: 2016 State of the World’s
Plant Report

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Royal Botanic Gardens, Kew

[The Plant List](#)

General

[ePIC \(electronic Plant Information Centre\)](#)

[Kew Bibliographic Databases \(KBD\)](#)

[Library Catalogue](#)

Economic Botany

[Economic Botany Bibliographic Database](#) (part of KBD)

[Economic Botany Collection](#)

[SEPASAL Database \(Survey of Economic Plants for Arid and Semi-Arid Lands\)](#)

Molecular and Genome Biology

[Plant DNA C-Values Database](#)

[DNA Bank Database](#)

Morphology

[Plant Micromorphology Bibliographic Database \(PMBD\)](#) (part of KBD)

[Inside Wood](#) (collaborative database at North Carolina State University)

[Floral Reflectance Database \(FReD\)](#) (collaborative database at Queen Mary College, University of London)

www.kew

Nomenclature, Taxonomy and Systematics

• [Herbarium Catalogue](#)

• [Flora Zambesiaca online \(eFloras\)](#)

• [Flora of West Tropical Africa](#)

• [Fungarium Catalogue IMI](#)

• [Fungarium Catalogue K\(M\)](#)

• [Index Fungorum](#)

• [IPNI \(International Plant Names Index\)](#)

• [Malpighiales Scratchpad](#)

• [Medicinal Plant Names Services Portal](#)

• [Neotropikey](#) (interactive key and data resources for Latin American plants)

• [Neotropical Plant Image Database](#)

• [Neotropical Vegetation Data](#) (interactive resource)

• [Vascular Plant Families and Genera Database](#)

• [World Checklist of Monocotyledons](#)

• [World Checklist of Rubiaceae](#)

• [World Checklist of Selected Plant Families](#)

• [World Grass Species](#) - descriptions

• [World Grass Species Synonym Database](#) (download)

Seeds

• Cactus Seed Biology Database on CD-ROM - email MSBSci@kew.org for further information

• [Millennium Seed Bank Seed List](#)

• [Seed Information Database](#)

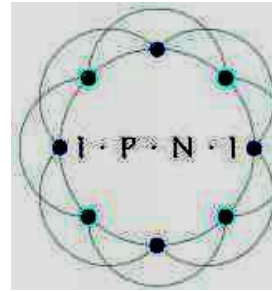
• [Reforestation in Southern Bahia](#)

• [The Millennium Seed Bank Partnership Data Warehouse](#)

Kew curates global authoritative references for:

Plant names (1 & 2) and Plant taxonomy (3 & 4)

1. International Plant Name Index (IPNI)
2. Index Fungorum
3. World Checklist
4. The Plant List



Lists all **published names**: 1.6 million

Questions it answers:

Does this name exist?

Where name published?

Well curated and up to date



Lists **plants**: synonymy, habit, geography, evidence

Question it answers:

What is current name – who says so?

What are all synonyms?

Where is the plant found?

What plants are in Cyprus?

Top quality: peer reviewed and up to date
But... only 40% complete!



First **complete lists of plants**: synonymy and taxonomy

All species and all genera for all families

Questions it answers:

What is current name – who says so?

What are all synonyms?

Static – not updated

Quality variable -known gaps and errors

Last updated in 2013 using data sets from 2012

Most widely used (3 million visits / 1.4 million users in 2015)

Kew has developed:

- A Policy on Access to Genetic Resources and Benefit Sharing
- Guidelines for Staff Working with Traditional Knowledge
- An overseas fieldwork policy that ensures legal collection of genetic resources and associated traditional knowledge
- Model agreements and clauses to ensure material and information is collected with PIC and on MAT, according to international, national and local legislation

Databases recording use *overwhelmingly* rely on:

- aTK already cited in published literature

IF TK from third party source (unpublished data) or, rarely, TK direct from knowledge holder this will ALWAYS involve a bilateral agreement covering:

- PIC (including for publically available databases)
- MAT (terms of use clear)
- source of TK recorded in all references
- terms of use, layers of access to information, publication rights if allowed (local names, germination techniques, location, high level description of use etc.)

Policy on Access to Genetic Resources and Benefit-Sharing



The Royal Botanic Gardens, Kew is a non-profit, non-departmental public body whose mission is: 'to enable better management of the Earth's environment by increasing knowledge and understanding of the plant and fungal kingdoms - the basis of life on earth'. To achieve this mission, Kew uses its collections, and the skills of its staff, in systematics, conservation, morphology, genetics, sustainable use, horticulture and education.

Kew intends to honour the letter and spirit of the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and laws relating to access and benefit-sharing, including those relating to traditional knowledge. Kew recognises the sovereign rights of States over their own biological resources and that the authority to determine access to genetic resources rests with national governments and is subject to national legislation.

Consequently, in March 2001, Kew endorsed the 'Principles on Access to Genetic Resources and Benefit-sharing'. This document was developed by a group of 28 botanical institutions from around the world, to provide a model for best practice for the acquisition, use and supply of genetic resources. Guided by these 'Principles', as well as the Bonn Guidelines on Access to Genetic Resources and Benefit Sharing, developed under the CBD, Kew has developed its current Policy on Access to Genetic Resources and Benefit-Sharing.

This policy covers:

1. Acquisition of genetic resources;
2. Use and supply of genetic resources;
3. Fair and equitable sharing of benefits arising from their use

News

Policies & Procedures

Help & Resources

Departments

Where am I? > Home > Policies & Procedures

Policies & Procedures

All Topics

Communications

A staff guide to collecting, use and data

Practical guidance on how to collect and supply genetic resources. Kew is committed to honouring the letter and spirit of these procedures.

Home > Scientific Research & Data > Legumes of the World

LEGUMES OF THE WORLD

Kew

Legumes of the World on-line (LOWD) is part of RBG Kew's commitment to advance the knowledge and understanding of the approximately 750 genera of the legume family. LOWD is based upon the 'Legumes of the World' published by RBG Kew in 2011 which is transformed here into a web offering expanded and updated information about legume genera.

Sign up to Kew time
Your email address
[Submit]

LOWD Quick Search

Scientific Research & Data

Home > Scientific Research & Data > Legumes of the World

Legume Genera (2) | Legume diversity led a joint initiative for botanical diversity on Sumbawa (2) | News according to new study, see [Legume diversity led a joint initiative for botanical diversity on Sumbawa](#)

Legume Genera (2) | Advances in Legume Systematics 15 'Towards a New Classification System for Legumes' is published | [Advances in Legume Systematics 15 'Towards a New Classification System for Legumes' is published](#)

Home > Scientific Research & Data > Legumes of the World

Vigna angularis (adzuki bean)

Uses: Many species are major pulse, vegetable, fodder and green manure crops, e.g., *V. angularis* (Willd.) Ohwi & H. Ohashi (azuki or adzuki bean) ; *V. mungo* (L.) Hepper (urd bean, black gram) ; *V. radiata* (L.) R. Wilczek (mung bean, green gram) ; *V. umbellata* (Thunb.) Ohwi & H. Ohashi (rice bean) ; *V. aconitifolia* (Jacq.) Maréchal (moth bean) ; *V. unguiculata* (L.) Walp. (cowpea, yard long bean) and *V. subterranea* (L.) Verdc. (bambara groundnut, bambara bean)

User Registration.

Title: Email Address: *

(This will be used as your account's password.)

First Name: * Username: *

Family Name: *

Organisation Name: * Organisation Type: *

Country of Residence Main project area: *

Project Details:
(max. 255 characters)

Your registration details will be used to validate access to the SEPASAL database and may be used by RBG Kew staff who wish to contact you about your project. If you agree to this, click 'Register' otherwise click 'Cancel'.

If you do not have cookies enabled on your web browser, you must enter your username and email address (as password) to login to SEPASAL."

SEPASAL - world's most comprehensive online source of information on useful 'wild' and semi-domesticated tropical and subtropical dryland plants, *with a focus on Africa*.

'useful' - plants which humans eat, use as medicine, feed to animals, make things from, use as fuel, and many other uses.

The database contains information on approximately 7,000 species.

SEPASAL 'nodes' were in operation at the National Museums of Kenya (NMK) and the National Botanical Research Institute of Namibia (NBRI).

SEPASAL uses a number of international (TDWG) standards for recording plant information, including for recording plant uses

Access to the database involves REGISTRATION

SEPASAL – Agreement with Government of Kenya

Agreement with Government of Kenya, represented by the Ministry of Environment and Natural Resources

SEPASAL database includes data *already in public domain*, currently located in paper files and publications.

This was done through a portal based in NMK, Kenya, funded by the project

(Kenyan authorities and partners) ‘shall ensure that the Plant Material and any associated ITK is collected in accordance with all applicable laws of Kenya and regulations and in particular that each and every necessary permit and or prior informed consent and or licence in connection with the collection of and/or any subsequent use of the Plant Material and any associated ITK by the Partners has been obtained’.

‘Publication or disclosure to a Third Party of confidential ITK may only take place once the written prior informed consent of the original holder(s) of that ITK has been obtained. Unauthorised Disclosure of confidential ITK is not permitted.

No primary information or data collected.



Community project nursery in Tharaka, Kenya (Photo: T. Ulian)

Project MGU* - the Useful Plants Project, aims to enhance the *ex situ* conservation of native useful plants for human wellbeing by building the capacity of local communities to successfully conserve and use these species sustainably. Since 2007 the project has been working with partners in Botswana, Kenya, Mali, Mexico, Mozambique and South Africa

Useful Plants Project – San Rafael, Mexico

Project carried out with the community of San Rafael, Coxcatlan, Puebla, Mexico - to conserve seeds of important useful plants.

Initially 117 plant species belonging to 38 families, seed banking of 98 in Seed bank in Mexico, duplicates in Kew.

Total of 80 are useful, and 17 recognised as highly important by the community.

Twenty medicinal species analysed for phytochemical studies, which corroborated the existence of plant substances that justify their use in traditional medicine in San Rafael.

Project Aim – to reinforce respectful attitude to towards conservation and sustainable use among community, to design propagation protocols for most important and threatened plants, to elaborate a programme for sustainable use and marketing of useful plants or their plant products in order to promote income generation in the communities, to promote the area by contributing to ecotourism.

Agreement with UNAM (National Autonomous University of Mexico):

‘for the avoidance of doubt, all associated traditional knowledge shall only be used as agreed by the relevant local or indigenous community and in accordance with applicable Mexican legislation and the letter and spirit of Article 8(j) of the CBD.

- TK collected in country, by knowledge holders.
- Stored on BRAHMs database – not publically available.
- Use and reference recorded.
- No permission to publish or use beyond community.



Projecto equilíbrio entre conservação e meios de subsistência na floresta Chimanimani

Interview consent form

MICAIA and The Royal Botanic Gardens, Kew have been working together for two years to support the conservation and sustainable use of plant resources in the Chimanimani forest belt. The project aims to address problems related to population growth and poverty which affect the natural environment. Our project's objectives are to:

- Identify important areas for conservation of habitats and plants
- Support the development and implementation of land use plans by community Natural Resource Committees and community rangers.
- Help promote sustainable ways to use natural resources.
- Develop ecotourism further in the area, in collaboration with communities

As part of our work we are recording information on traditional uses of plants with the aim of preserving this knowledge in a database for future generations to access. It will also be available to help deal with important challenges to people's livelihoods such as those caused by a changing climate.

The information collected by the project will not be used for commercial purposes or financial gain.

However, this information may be included in locally available educational publications, scientific publications and used in local training and education programmes.

The project recognizes all contributions made by informants. As such, their names will be mentioned in any publication, unless they wish to remain anonymous.

.....
To share my knowledge of plants and their uses, I will be supporting the project.

Name: _____ Age: _____

Community: _____

I give my permission to use the information I provide for the reasons stated above.

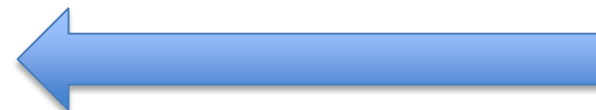
I would like to remain anonymous

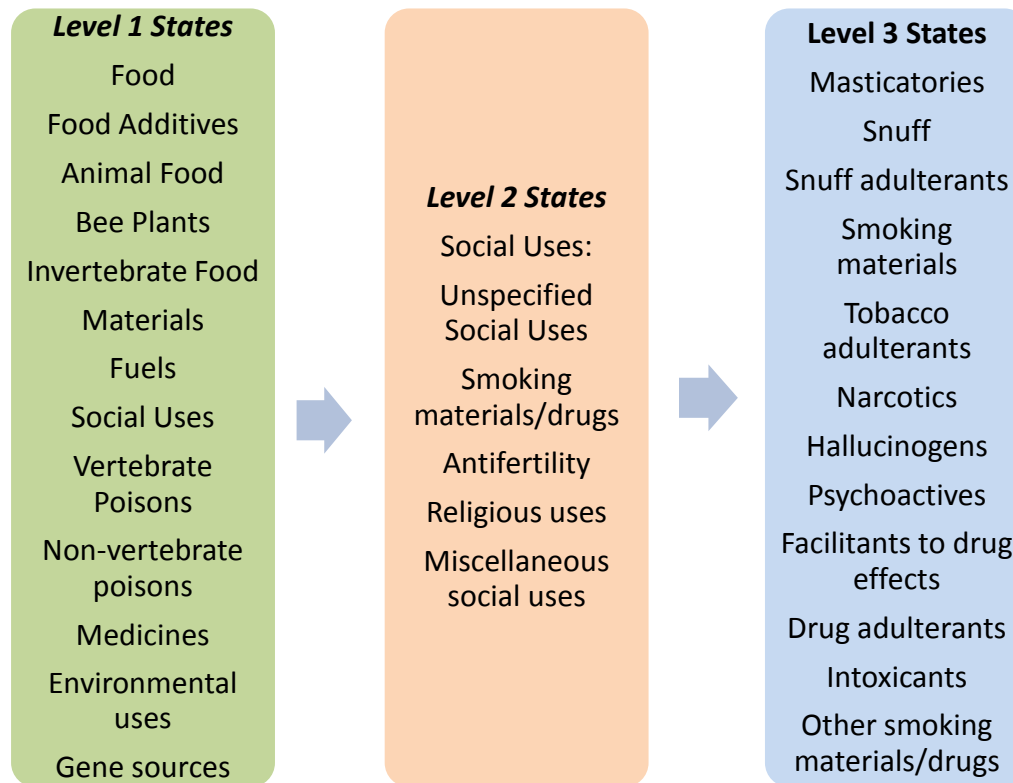
(Signature) _____

(Date) _____

Interview number:

Information not made publically available





Data collected on the uses of plants becoming increasingly important. Standardisation of terms and a unified system to describe uses are of enormous benefit to gatherers of information, especially where exchanges of data sets are involved. One such standard is: Cook, F.E.M. (1995). Economic Botany Data Collection Standard. Prepared for the International Working Group on Taxonomic Databases for Plant Sciences (TDWG). The standard provides a system whereby uses of plants (in their cultural context) can be described, using standardised descriptors and terms, and attached to taxonomic data sets. It resulted from discussions at the International Working Group on Taxonomic Databases for Plant Sciences (TDWG) between 1989 and 1992.

IT's all in the name....Medicinal Plant Names Services

Enabling effective communication in health, regulation and research

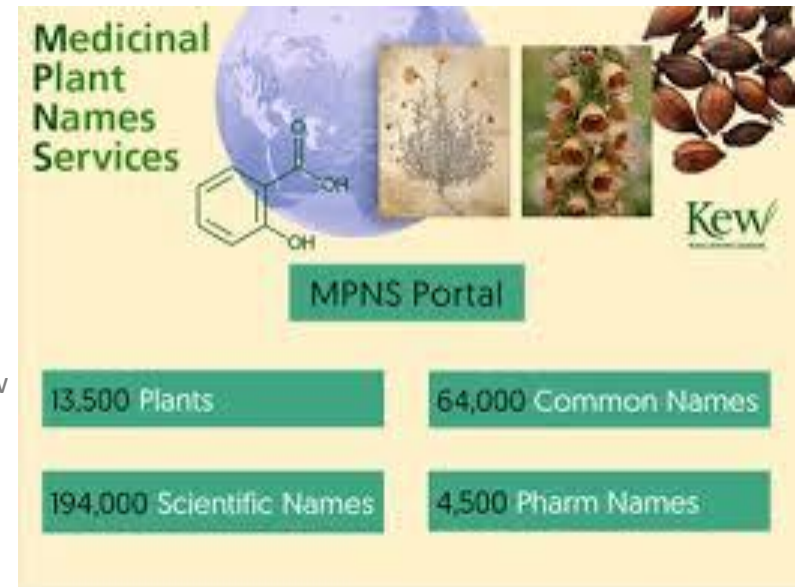
Medicinal plants are used globally and are known by different names in different communities, health traditions, generations and languages.

The same name can also be applied to different species.

Thus to find all the information published about a particular plant, and to ensure that you are sharing data about the same species, you need to know all the possible names that have been used, and any possible confusions.

The MPNS resource is built by collecting plant names from medicinal plant literature, this includes:

- pharmacopoeias
- monographs
- ethnobotanical surveys
- regional works



Medicinal Plant Names Services

Mu Xiang - widely used Chinese Herb



- ⌘ Flora of China:
 “***Aucklandia costus*** Falc.”
- ⌘ Pharmacopoeia: China and Korea:
 “***Aucklandia lappa*** Decne”
- ⌘ US Herbs of Commerce (FDA): “***Saussurea costus***
 (Falc.) Lipschitz”
- ⌘ Pharmacopoeia: Japan & Ayurvedic:
 “***Saussurea lappa*** Clarke”
- ⌘ Many more scientific synonyms

Medicinal Plant Names Services

Beta Release:

Please enter a NAME to search the MPNS resource:

[Need Help?](#)

Limit search to:

Mu Xiang All names  **GO**

16 records matched your search. These records relate to:

7 Accepted scientific names

9 Scientific names as used in medicinal plant references

9 Non-scientific names

4 Medicinal plant references

16 All records

Accepted scientific names	Records referring to name
Aucklandia costus Falc.	5
Inula helenium L.	3
Dolomiaea souliei (Franch.) C. Shih	2
Syzygium aromaticum (L.) Merr. & L.M. Perry	2
Vladimiria souliei var. cinerea Y. Ling	2
Aquilaria sinensis (Lour.) Spreng.	1
Aristolochia debilis Siebold & Zucc.	1

Mu Xiang

All names

GO

Accepted scientific name:

***Aucklandia costus* Falc., Ann. Mag. Nat. Hist. 6: 475 (1841).**

Taxonomic source: [World Checklist - unpublished](#)

Family: Asteraceae

Non-scientific names and plant parts

Scientific synonyms

Published in medicinal plant references as

Further information

Non-scientific names for this plant and parts used:

Non-scientific name:	Class of name:	Trade forms:	Plant parts:	Medicinal plant reference:
Amaya	Other	dried root	root	Siddha Pharmacopoeia India, vol. 1 (2008)
aucklandia	Other		root	Herbs of Commerce (McGuffin et al., 2000)
Aucklandiae Radix	Pharmaceutical		root	Korean Herbal Pharmacopoeia (2002)
Aucklandiae Radix	Pharmaceutical	dried root	root	Pharmacopoeia of China 2010
Changal Kustha	Other	dried root	root	Siddha Pharmacopoeia India, vol. 1 (2008)
Changal Kustha	Other	dried root	root	Ayurvedic Pharm. of India (1999-2011)
Changalva Koshtu	Other	dried root	root	Siddha Pharmacopoeia India, vol. 1 (2008)
Changalva Koshtu	Other	dried root	root	Ayurvedic Pharm. of India (1999-2011)
Common Aucklandia Root	Other	dried root	root	Pharmacopoeia of China 2005
Common Aucklandia Root	Other	dried root	root	Pharmacopoeia of China 2010
costus	Other		root	Herbs of Commerce (McGuffin et al., 2000)
costus root	Other		root, oil	Med. Pl. of the World (Wyk & Wink, 2004)
Costus Root Oil	Other	oil	root	Food Chemicals Codex (USP, 2008)
Goshtam	Other	dried root	root	Ayurvedic Pharm. of India (1999-2011)
Kath	Other	dried root	root	Siddha Pharmacopoeia India, vol. 1 (2008)
Kath	Other	dried root	root	Ayurvedic Pharm. of India (1999-2011)
Koshtham	Other	dried root	root	Ayurvedic Pharm. of India (1999-2011)
Kottam	Other	dried root	root	Siddha Pharmacopoeia India, vol. 1 (2008)
Kottam	Other	dried root	root	Ayurvedic Pharm. of India (1999-2011)
Kud	Other	dried root	root	Siddha Pharmacopoeia India, vol. 1 (2008)
Kud	Other	dried root	root	Ayurvedic Pharm. of India (1999-2011)

Mu Xiang

All names

GO

Accepted scientific name:

Aucklandia costus Falc., Ann. Mag. Nat. Hist. 6: 475 (1841).

Taxonomic source: [World Checklist - unpublished](#)

Family: Asteraceae

Non-scientific names and plant parts

Scientific synonyms

Published in medicinal plant references as

Further information

Further information:


The following online resources may contain further information about this plant. Please click on any link to search that resource. You can choose to search by the accepted name only or the accepted name plus all of its synonyms.

Search using just the accepted name:


Search using all scientific names used for this plant:

 National Center for Biotechnology Information


53 records

 National Center for Biotechnology Information

1,454 records

 GenBank — Nucleotide Alphabet of Life

 GenBank — Nucleotide Alphabet of Life

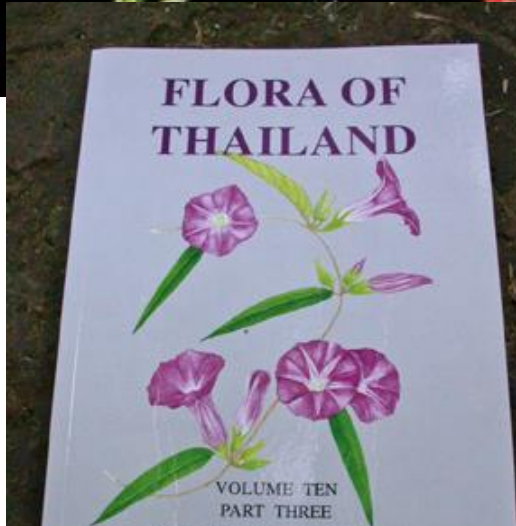
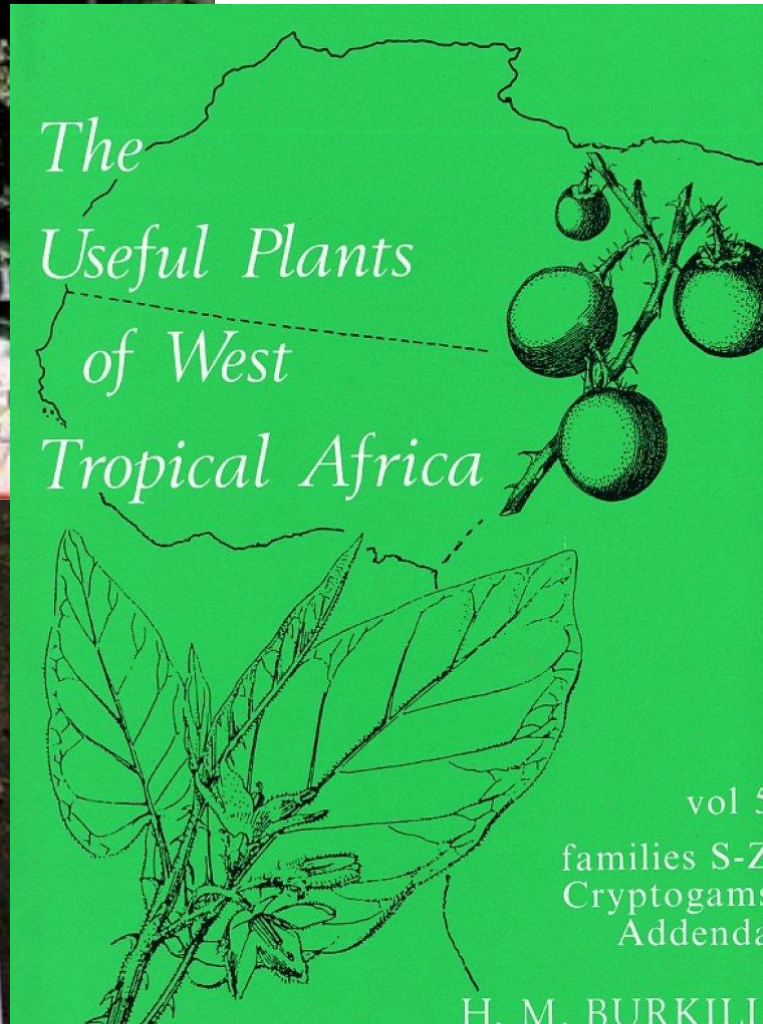
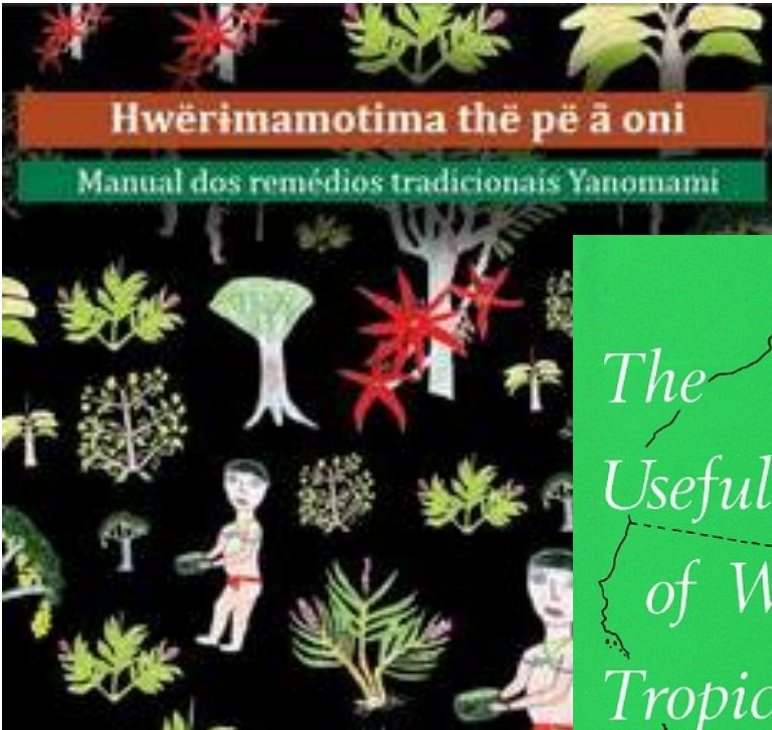
 Google Images

 Google Images

 Wikispecies

 Encyclopedia of Life

Information in published literature



Huge amount of information available in published literature (historic and recent) – how can this be accessed efficiently?



Useful Plants and Fungi Portal

A window into a wealth of information on the economic and traditional uses of plants and fungi

The Useful Plants and Fungi Portal will be an authoritative, expert-driven, online resource providing information on the economic and traditional uses of plants and fungi. It will meet the needs of user communities ranging from scientists to policymakers and the general public.

Data for the portal will be drawn from existing Kew databases, such as SEPASAL (Survey of Economic Plants for Arid and Semi-Arid Lands) and the Kew Economic Botany Collection, and from research into species important for food security, livelihoods and human health. The portal will be designed to bring together content to help guide, for example, the enhancement of the provisioning services of plants and fungi (food, fibre, fuel and water). It will be a useful resource for researchers studying the uses of plants and fungi, their relationships with human well-being, and the ecosystem services they provide. The portal will also be relevant to policy-makers, development agencies and other stakeholders working on food security and other global challenges.



Project Info

Output Leader: Tiziana Ulian

Funded by: For opportunities to fund this output and help us reach our target, please contact the [Output Leader](#)

Find Out More:

- Economic Botany Collection
- Medicinal Plant Names Services (MPNS)
- SEPASAL

Output Progress:

10%

New initiative from Kew

Online global resource for plants: the Plants of the World Online Portal (POWOP). Single point of access for authoritative information on plant species, from anywhere in the world.

The Useful Plants and Fungi Portal will be an online resource providing information on the economic and traditional uses of plants and fungi.

Data for the portal will be drawn from existing Kew databases, such as SEPASAL (Survey of Economic Plants for Arid and Semi-Arid Lands) and the Kew Economic Botany Collection, and from research into species important for food security, livelihoods and human health.

- Databases usually created for a particular reason or project
- Information on use not collected systematically
- Information on use often not databased or available online
- Use information is spread across many databases – how to bring information together?
- Many project databases have no permission to make public, or subject to different terms of PIC in bilateral agreements
- Use information is *fragmented*, and there is *no single entry point* to this information

Important for searches to be consistent – names, use etc.

- Uses need to have been systematically collected
- Permissions for access need to be clear
- Kew's expertise in taxonomy and naming could be useful in ensuring systematic and accurate searches
- Increase dialogue with new database initiatives – e.g. Useful Plants and Fungal Portal

I am very grateful to the following people at RBG, Kew for help with the preparation of this talk:

Alex Hudson (Useful Plants Project)

Professor Monique Simmonds

Bob Allkin (MPNS)

Mark Nesbitt (Economic Botany)

Pete Gasson

References

All Kew's publically available databases can be accessed here: www.kew.org/kew-science/people-and-data/resources-and-databases

Kew's ABS policy can be seen here: www.cbd.int/abs/submissions/icnp-3/EU-Kew-letter.pdf

Cook, F.E.M. (1995). Economic Botany Data Collection Standard. Prepared for the International Working Group on Taxonomic Databases for Plant Sciences (TDWG). Kew: Royal Botanic Gardens, Kew, 1995. x + 146 pp. £15. ISBN 0947643710.

The 2016 State of the World's Plants report can be accessed here:

<https://stateoftheworldsplants.com/>