

## The UVIMA Project

### *Uchambuzi wa Viumbe kwa Maendeleo* Taxonomy for Development in East Africa

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UVIMA Tools and Products Consultancy  
***Draft Report***

**REPORT #:1**

**REPORTING PERIOD: 7<sup>th</sup> May to 29<sup>th</sup> May 2009**

**Report Prepared by: Esther Kioko, Mordecai Ogada and Staline Kibet**

<b>Country:</b>	KENYA
<b>Countries Covered by Project:</b>	KENYA
<b>Consultancy Team Members:</b>	ESTHER KIOKO MORDECAI OGADA STALINE KIBET

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## List of Acronyms and Abbreviations

AFFP	African Fruit fly Programme
BIOTA	Biodiversity Transect Analysis
CBD	Convention on Biological Diversity
CBO	Community Based Organisation
FAO	Food and Agriculture Organization of the United Nations
FONA	Friends of National Arboretum
FTEA	Flora of Tropical East Africa
GISP	Global Invasive Species Programme
ICIPE	International Centre for Insect Physiology and Ecology
ISSG	Invasive Species Specialist Group
IUCN/EARO	World Conservation Union-East Africa Regional Office
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KARI	Kenya Agricultural Research Institute
KU	Kenyatta University
KEFRI	Kenya Forestry Research Institute
KEMFRI	Kenya Marine and Fisheries Research Institute
KEPHIS	Kenya Plants Health Inspectorate Service
NEMA	National Environmental Authority
NGO	Non Governmental Organizations
NMK	National Museums of Kenya
PROTA	Plants Resources for Tropical Africa
SACDEP	Sustainable Agriculture and Community Development Programme
SANBI	South Africa National Biodiversity Institute
SEPASAL	Survey of Economic Plants for Arid and Semi-Arid Lands
TAWG	Taxonomic Working Group
TOR	Terms of Reference
UON	University of Nairobi

## 1. Executive Summary

The global economy has fostered rapid globalization and trade liberalization, universal environment change, and chemical and physical alterations of the ecosystems. A recognized side effect of these factors is the inadvertent introduction of invasive alien species (IAS), food insecurity due to pest outbreaks and loss of pollinators. Just on IAS, opinions are unanimous that they are the second most important threat factor to nature after habitat destruction. The impact of these invasion includes: (1) loss and reduced efficiency of agricultural production; (2) trade impact that that have major implications which outweighs direct production loses; (3) food security and nutrition impact by directly reducing domestic supply or restricting international trade especially for developing countries; (4) human, animal and environment health impact through invasive food-borne diseases with severe health and socio-economic impact, extinction of local species and irreparable changes to habitat and ecosystems biodiversity; and (5) financial cost impact that includes cost of inspection, monitoring, prevention and control or eradication. However, despite the several global mechanisms that are already in place to address the problem of invasive, pest and pollinator species, the extent to problems continues to worsen suggest that management measures in many countries

are far from adequate. The adoption of best-practice management of invasives, pests and conservation of pollinators is dependent on correct species identifications.

This consultancy was undertaken to assess existing taxonomic tools and products for invasive, pest and pollinator species in Kenya. Using interviews, questionnaires, literature review, and visits to various key institutions; it was possible to outline the tools and products that are with the end users. The findings indicate that there are challenges that need urgent mitigation measures as relates to the taxonomic tools and products in relation to alien invasives, pests and pollinators in Kenya. These include the low levels of information available, the formats the available information is stored in, its accessibility and dissemination. The key recommendation to Uvima is that emphasis should be on improving the suitability of some of the existing taxonomic tools and products to suit the needs of the end users as well as improving the capacity of taxonomists.

### 1.1 Key project achievements during the reporting period

Fill-in this table with what you consider to be the most important consultancy achievements in the reporting period.

#	Key Consultancy Achievements
	<insert a short summary of not more than 30 words for each achievement>
1	We have identified key resources/ tools that can be applied to advance the science of taxonomy in Kenya/ East Africa.
2.	We have identified the ways in which these resources can be improved to enhance their usefulness to the target groups.
3.	The consultancy has resulted in a successful network of resource persons and collaborations even in the absence of wider institutional linkages
4.	The existing taxonomic tools and products in various institutions have been documented, their means of dissemination and suitability assessed.
5.	The key weakness of existing tools and products identified have been identified and recommendations made on where Uvima could find a niche to contribute to improve taxonomy in Kenya.

### 2.1 Tools/methodologies used in the review

The following methods were used in data collection and review;

1. Questionnaires
2. Interviews (both face to face and by telephone)
3. Literature review
4. Participation in relevant meetings (e.g. International Biodiversity day) where invasive alien species was the theme of the event.
5. Reference to online resources

## 2. 2.1 Existing Tools and products

(Institutional and personal documented) in each case. Please fill-in the following table: The information should cover the whole country

<b>CATEGORY Of existing tools and products</b>	<b>What the tool or product /facility is</b>	<b>Where it is developed</b>	<b>Where it is maintained</b>	<b>Why developed</b>	<b>Target audience</b>	<b>How - approach/method/ design/platform</b>
IAS	Identification manuals with Species specific keys for invasive species such as stemborers, fruit flies	Icipe	icipe	To assist in identification	Researchers and extension workers	Collaborative initiatives with institutions in the south and the north eg the African Fruit Fly program.
	Flora of tropical East Africa Identification keys	Royal Botanic Gardens	UK	Facilitate plants species identification and collection in Eastern Africa	Researchers, students, conservation managers	
	Herbarium Specimens	NMK	NMK	For records, for research and education	Researchers, students	Field collection and mounting in paper files.

	Digitised Images	NMK	NMK, ALUKA	To facilitate data sharing and avoid damage to life specimen	Researchers and students	Stored in online & offline databases. Largely targets type specimens
	Africa Invaded: The growing danger of invasive alien species book	CABI	GISP	Promote understanding among general public and policy makers on impacts of invasives alien species and what needs to be done to eradicate of minimise negative effects	Farmers, policy makers, students	
	Arboretums	NMK, Universities (UON, JKUAT, Egerton,	NMK, Universities, Local councils,	Depository of national heritage, education	Researchers, students, general public, forensic	

		<i>Botanical gardens</i>	FONA,	al & research	experts	
	Online database	IUCN –Species Survival Commission	ISSG	Research, awareness creation and data sharing	Policy makers, researchers, students, resource managers, farmers etc	Database updated by experts from all over the world
	Online database	SEPASAL	Royal Botanic Gardens, NMK	Repatriate information from the North to South	Students, researchers, development agencies, resource managers etc	Partnership project
	Accurate species identification	NMK, Universities	NMK, Universities, TAWG	Inventories of biodiversity in the country, to be able to share out information with other institutions /individuals	Farmers, researchers, policy makers, forensic experts, industries	Databases, mounted specimens, digital images
	Species distribution	NMK,	NMK,	Promote conservati	Researchers, industries,	Student research projects,

				on, bio prospecting,	conservation managers	biodiversity surveys
Pests						
	Reference collections	Field collected specimens	NMK, UoN, KARI, icipe	For reference/national collection	Researchers, technicians, students	<ul style="list-style-type: none"> <li>Project based, routine collections, expeditions</li> </ul>
Pollinators						
	Picture Posters	Within institutions	NMK, icipe	Awareness	Researchers, students, general public	Project based

Existing tools and products could also include:

1. Collections
2. Information
  - (i) Databases and literature
3. Specialists (NB.Experts are also end users)

**Information about species**

- a. Libraries of major taxonomic institution
- b. Databases. databases could about information sources e.g. of funders of taxonomic projects, etc

**Tools and facilities**

- a. Tailor-made software for members

**End users of taxonomic tools or target audience**

- a. Conservation and resource managers
- b. Environment protection agencies
- c. Also will focus according to man and biosphere
- d. List all others encountered during the consultancy

## 2. 2.2 Existing Tools and products

Category	Stakeholder	Desired tools
IIAS	Farmers	Posters, free clinic by taxonomist, audio and visual
	Researchers	Updated Identification keys, online resources, books, databases, bar-coding & molecular technique
	Students	Identification keys, online resources, databases, books
	Environmental protection agencies	Distribution maps, checklists,
	Conservation and resource managers	Identification keys, online resources, checklists
	Quarantine specialists/Forensic experts	Checklists, pamphlets, pictorial
Pests	Farmers	Trained parataxonomists

	Researchers	Interactive identification keys, Lucid keys, molecular identification tools, updates on pest id. status
	Students	"
	Agriculture/Extension Officers	"
Pollinators	Agriculture/Extension Officers	Identification keys, online resources, databases, books, distribution maps, checklists, pictorial illustrations
	Researchers, Students	Specialised pollinators collections for reference
	Environmental protection agencies	"
	Conservation and resource managers	"

### 3. Target users (Stakeholder Analysis)

(Stakeholder matrix) in each case spell out the name of the stakeholder, the taxonomic tools and products produced to enhance food security, ecosystem services, trade, agricultural productivity and ultimately human well being, environmental integrity and sustainability. Please fill-in the following table: Make sure the information give covers the whole country. Address

<b>Name of Strategic Stakeholder Institution</b> (Govt institutions, Statutory agencies, Research institutions, Teaching and Training, International Organisations, National NGOs, Private companies, Community based organizations, etc)	<b>Roles</b> Of the stakeholder	<b>Mandates</b> Of the stakeholder	<b>Tools and or Products produced</b> (e.g. Species lists, Identification tools, Ecological information, Educational information, Species distributional information, etc)	<b>Status</b> Of the tools & products	<b>ISSUES</b> Description of problems encountered; Issues that need to be addressed; Decisions / Actions that can be taken
NMK	Research	Protect national heritage	Species list, collection specimens, databases, distribution info etc	Regularly updated	Lack of funds, lack of infrastructure (space, equipment, transport etc)
KARI	Research	Promote sustainable agric	Educational info, species lists, databases	Regularly updated	Same as above
KEPHIS	Policy/research	Regulate agricultural inputs & produce	Educational info, posters		
KEFRI	Research	Forestry research & Development	Educational info, distribution information	Recent and well illustrated	Largely donor driven as projects
Oils Africa	Private company	Promote sustainable utilization of wild collected plants	Identification keys, distribution information	Recent and undergoing review	Most keys are old and need updates, previous keys used limiting parameters such as flowers which maybe absent at some time

NEMA	Policy guideline	Formulation and enforcement of environmental policy	Educational information, checklists		Lack of experts, Need to link up data from NMK, KEFRI, etc universities with NEMA using appropriate technology
FORMAT/Sacred Africa	Policy/advocacy	Mobilization of farmers, extension services, networking	Educational Information	Regularly updated	Limited coverage
ISukha CBO	Community mobilization/conservation	Conservation and community empowerment through promotion of sustainable development	Species list, educational information		Limited awareness on invasives
Icipe	Insect science for development	Research, capacity building, reference collection	Identification manuals, identification keys, insect collection,	Fair	Dissemination limited, formats not suitable to some of the would be users
University of Nairobi	Academic	Builds capacity through teaching graduates and undergraduates	Reference collections, literature such as thesis	Fair	Cataloging of collections not yet done, information in libraries not easily accessible to all users
Egerton University	Academic	Builds capacity through teaching	Reference collections, literature such as thesis	The collections are not regularly updated	Cataloging of collections not yet done, information in libraries not easily accessible to

		graduates and undergraduates			all users
Kenyatta University	Academic	Builds capacity through teaching graduates and undergraduates	Reference collections, literature such as thesis	Inadequate in content and organization	Cataloging of collections not yet done, irregular collection of field specimens. Information in libraries not easily accessible to all users
Ministry of Fisheries	Resource Management	Ensure sustainable and profitable exploitation of fisheries	Records of exports, Fish landing data, annual reports	Inadequate scientific collection and analysis of data.	Data not generally available to the public. Data in its current form cannot advise management of the resource.
Kenya Marine and Fisheries Research Institute	Research and Development	Advising the management of fisheries and development of Aquaculture	Research Facilities, Fish specimen Collections, Scientific Literature	Publications are current and specimen collections are well-managed	Scientific literature is highly technical, while Research Facilities and Fish specimen Collections are for internal use only

#### 4. Dissemination for existing products and tools

CATEGORY	Name	Successes	Failures	Challenges
	List all means of disseminating tools & products			

	you have come across in your country			
IAS	Books	Useful to extension workers and trainers of trainers. Subject matter is well covered	Limited circulation	Expensive venture and therefore access is limited to few persons
	Publications	Information given are reviewed by other experts in the subject matter and therefore well researched.	Limited circulation	Access limited to persons with internet or library facilities. Most farmers have no access. Not common to get materials translated to local languages
	Databases	Lots of information is consolidated in one place. Easy to store and retrieve for use	Limited access	Not online mainly in our local institutions. No policy on data sharing. Regular updates not common
	Posters	Wider circulation, brief to the point, easily understandable, can be done in many different languages, fairly cheap, long lasting if placed indoors	Some posters handed out to farmers ends up in dustbin as waste	
	Media (Electronic and print)	Wide coverage and available in more than one language	Some information given are not based on hard facts	Provide media with accurate information in simple form

	CBD online resource tools on invasive	Worldwide coverage and accessible for free. Well researched	Only useful to those with access to internet	May not to targeting specific Kenyan on invasive alien species
	Invasion of <i>Prosopis juliflora</i> and local livelihoods. A case study of Lake Baringo, ICRAF Publications	Information given are reviewed by other experts in the subject matter and therefore well researched.	Limited circulation	Access limited to persons with internet or library facilities. Most farmers have no access. Not common to get materials translated to local languages
	GISP database	Data well research and up to date	Limited awareness on its existence	Consolidate all existing information in the country in one stop shop
	Biofuels and invasive species – Workshop proceedings	Provide food for thought in terms of ways to manage invasive through use as bio fuels	Limited distribution	Coordination of disjointed efforts to control or eradicate invasives
Pests	Hard copies of Identification keys	Useful to specialists in certain groups	Some were developed ages ago and have not been updated	Access limited to a few individuals/institutions
	Identification manuals	Gives good details on the targets eg the stemborer and fruit fly ones given in the ref.	Limited distribution	To reach wider audience, need to have the information online
	Computer based information	A lot of information available on the many websites on pests	Computers not yet available to all stakeholders	All would be beneficiaries not yet accessing the information

Pollinators	Pictorial pamphlets	Specific with details and pictures of a given species	Circulation may be limited to a few individuals/institutions	Lack of adequate information on most of the species
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## 5. Recommendation of new tools & products

CATEGORY	Name List all new tools & products you have come across elsewhere good for your country not listed above	What for potential applications	Where Where best to develop it	Target Group/stakeholder	Recommendation how to disseminate
AIS	Pamphlets	Dissemination/identification	Jointly between Ministries of Agriculture, environment and research institutions	Farmers/extension workers/NGOs	Organise an free entry exhibitions in rural towns /farmers associations/networks/farmer field schools/field days/beach management unit field days
	Audio-visual guides	Dissemination	Research institution with help from communication experts	Farmers	Organise a field-day or exhibitions in rural areas/local radio stations
	Audio-visual guides	Dissemination	Research institution with help from communication experts	Farmers	Organise a field-day or exhibitions in rural areas/local radio stations

	Plant clinics	Education & Dissemination	Research institutions jointly with media houses and communication experts	Farmers, extension workers	Field day, farmer field schools, agricultural shows, exhibitions
	Schools building walls	Dissemination & Education	Rural schools	Children, teachers and parents	Illustration and messages drawn on school building with messages needed to be passed
	Calendars with necessary information	Dissemination	Research institutions and communication experts	General public	Print calendars' with photos of invasive species and other information that need to be passed across appended to it.
Pests	Illustrated formats	Identifications and recognition of the pests	Museums, agriculture research institutions	Researchers, extensionists, students and farmers	Websites, information networks, posters, media
Pollinators	Identification manuals illustrated for specific groups	Awareness creation, identification	Museums, Universities, Research institutions	Researchers, extensionists, students, farmers	Posters, websites, manuals., farmer field days
	Pollinator gardens	Awareness creation, identification, Dissemination Education	Farmers, Museums, agriculture research institutions	General public, Researchers, extensionists, students, farmers	Organised tours, posters, brochures.

## 6. Suitability of all tools & products

CATEGORY	Name of the tool or product produced	Target audience	Suitability	Why? If unsuitable	Mitigation measures
IAS	Specimen collection	Researchers/students	Can refer back if necessary. However can easily get damaged by students	Accessing specimen is difficult, can easily get damaged, cataloguing problematic	Improve on cataloguing/digitise collection
	ISSG database on invasive species	Researchers/students/development agencies/resource managers/policy makers	Yes		
	FTEA identification keys	Researchers/students/resource managers	Yes/no	Some characters used are not easily isolated in field, language used not easy for non taxonomists	Revise identification keys to user friendly type. Involved non botanists in its review
	Books	Researchers/students/resource managers/farmers	Yes/no	Reach limited audience, not always in language understood by some targets (e.g. farmers)	Keys information may be summarised in pamphlets/posters in simple language or even in local dialect
	Pamphlets	Extensions workers,	Yes		Kept simple and

UVIMA- The BioNET-EAFRINET Project, Country Consultancy Report

		farmers, NGOs			attractive
	Audio-visual guides	Farmers/extension workers	Yes		
	Plants clinics	Farmers/general public	Yes		
	Calendars	General public	Yes		
	Media	General public	Yes		
Pests	Picture posters	Farmers/extension workers	Yes	Language problem	Translate for key pest species
	Taxonomic publications	Researchers/student, Agriculture/Extension officers	Yes/No	Limited funding for taxonomic research	Fund some taxonomic projects
	Molecular identification tools	Researchers, students, Agriculture, Quarantine officers	Yes/No	Limited facilities	Funding for centres to have molecular labs and expertise
	Illustrated interactive keys, lucid keys	Researchers/student, Agriculture/Extension officers	Yes/No	Limited availability of information to make quality keys	Need for more research on taxonomy of key pests
Pollinators	Pamphlets and posters	Farmers/extension workers	Yes	Numbers available limited	Make available quality materials with pictorial illustrations of key pollinators

## 7. Infrastructure for tools and products

Current and potential infrastructure for developing these tools and products to identify the Niche for the UVIMA project (is the infrastructure such as software and imaging technologies robust enough or does UVIMA need to build on, enhance or otherwise, if so what information / training / software etc is need?) documented. (These may include Collections and Databases, Hardware, Software, Technologies, Communication resources, Secondary e.g. keys, literature, publications and tertiary, Expertise, Programmes, Projects and partnerships etc for each thematic area)

CATEGORY	Current &/Potential infrastructure for developing these tools and products	Gaps	Future plans
IAS	Publications	Communication strategy (Even the little info that exist does not reach the target at the right time in the right format)	Use communication experts to deliver research findings instead of using current dissemination strategy
	Collections	Little collections on invasive alien species in NMK herbarium	Support specific collection of all invasive species in the country
	Databases, BRAHMS	Offline and the information given is on general species. May need to create invasive species portal	Should be available online and updated regularly
	Institutions already involved in developing identification tools eg icipe on fruitflies and stemborers with networks outside Africa	Harvesting information, storing it and sharing it out efficiently. Advocacy and awareness	UVIMA could strengthen communication of existing initiatives
Pests	Institutions in place such as KARI, UoN, NMK with collections of key pests	Cataloging not fully done and accessibility limited	UVIMA could build on the infrastructure such as software and imaging technology to help

			digitize the collections
Pollinators			
	Funded projects such the Global Pollination Project in place.	Awareness on pollinators low	UVIMA needs to invest in simple publications on the pollinators.

### 8. Existing communication strategies and dissemination channels for tools & products

CATEGORY	Name	Institution	CONTACTS
	List all strategies and channels you have come across in your country)	List the all institutions in your country where these are located	Give contact details of the Institution and focal person
IAS	Networks (SCGIS)	African Conservation Centre	Ms Lucy Waruinge
	Networks - ISSG	IUCN -EARO	Dr. Geoffrey Howard
	Partnerships (ALUKA, Indexing Kenya)	NMK	Dr. Siro Masinde, P.O. Box 40658 Nairobi
	Partnerships - GISP	CABI Nairobi	
	Collaborations (FAO on Prosopis with KEFRI)	KEFRI	Mr. Simon Choge,
	Others		
Pests	Networks African Fruit Fly Programme (AFFP)	Icipe, KEPHIS	Dr. Sunday Ekese Icipe, P. O. Box 30772-00100Nairobi

			Email:sekesi@icipe.org
	Partnerships in thrips research	KARI, icipe	Dr. Monicah Waiganjo National Horticultural Research Centre, Thika, P. O. Box 220-01000 THIKA.Email:monicahwaiganjo@y ahoo.com
	Collaborations		
	Others Consortium for the Barcode of Life	KEMRI, KARI,Icipe, NMK, Smithsonian Institute	Dr. Daniel Masiga Icipe, P. O. Box 30772- 00100Nairobi Email:dmasiga@icipe.org
Pollinators	Networks African Pollinator Initiative	NMK, UoN, KARI, JKUAT, NEMA, ABL,	Dr. H. Oyieke, National Museums of Kenya, P. O. Box 40658,00100, Nairobi. Email:hoyieke@museums.or.ke
	Partnerships		
	Collaborations BIOTA project		
	Others Commercial Insects Programme	icipe	Prof. S. K. Raina, Programme Leader, icipe, P. O. Box 30772- 00100 Nairobi. Email:sraina@icipe.org

## 9. Defining specific challenges, constraints, key gaps and opportunities for UVIMA

#	Issue/Category	specific challenges	constraints	key gaps	opportunities	Proposed Solution
	IAS	Obsolete policy guidelines	Lack of data to support policy formulation	Build data for use in facilitating updating existing policy	Media hype on Mathenge and striga weed can be an entry point	Promote advocacy for a comprehensive policy review on IAS, promote more data collection
		Absence of comprehensive checklist of IAS	Inadequate expertise, limited funds	Train taxonomists and parataxonomists	Take advantage of recognition of taxonomy as important in biodiversity conservation as capture in CBD articles	Capacity building
		Lack of effective identification keys	Inadequate expertise, most keys are not user-friendly	Develop easy to use identification keys	Baseline	Capacity building
		Poor capacity of scientists	Inadequate infrastructure (modern equipment, space etc)	Provision of hardware and software	Marine optic fibre cables is currently underway will make access to data easy. Zero rated customs on hardware	Purchase appropriate hardware and software
		Poor networking and data sharing among scientists and research institutions	Absence of necessary infrastructure	Provision of needed infrastructure	Establishment of Kenbif, built on JRS project	Strengthened existing networks

			such as WAN, compatible databases, enabling policy	e, appropriate technology (hardware & software)		
	Pest	Collections not well organized	Catalogues with gaps, space not sufficient	Provision of the required tools and expertise to fully database the collections	Pockets of collections in different institutions	Initiate upgrading of collections already in place
	Pollinators	Awareness of pollinators, their role very scarce	Inadequate literature/information on pollinators	Lack of simple pictorial posters on pollinators	Use of the current food insecurity to highlight role of pollinators in seed and food production	Advocacy and enhancement of pollinator awareness

## 10. Checklist of persons in the country with knowledge in Taxonomy including (Pollinators, Pests and IAS)

Please provide updated list of Taxonomists in your thematic area (list the UVIMA members and specialists first): Prepare this in an Excel file as well.

Name	Title	Courier Address	Zip coce	Phone-Desk	Phone-Mobile	Email1	Email2
Emily Wabuye	Dr.	NMK		3742131 ext 2205	0722803047	ewabuyele@museums.or.ke	ewabuyele@yahoo.com
Agnes Lusweti	Ms.	NMK		3742131		alusweti@museums.or.ke	
Geoffrey Mwachala	Dr	NMK		3742131		gmwachala@museums.or.ke	
Itambo Malombe	Dr	NMK		3742131		bmalombe@museums.or.ke	
Francis Gachathi	Mr.	KEFRI			0720400263		
Staline Kibet	Mr.	NMK		3742131 ext 2202	0720785532	Skibet1@yahoo.com	
Elizabeth Omino	Dr.	PROTA					
Joyce Jefwa	Dr.	NMK		3742131 ext			
David Okebiro	Mr.	NMK		3742131 ext			
Paul Kirika	Mr.	NMK		3742131 ext			
Paul Musili	Mr.	NMK		3742131 ext			
Kimeu	Mr.	NMK					

Peris Kamau	Mr	NMK		3742131 ext 2205			
Simon Mathenge	Mr.	Private			0722437959		
Grace Ngugi	Ms	NMK		3742131 ext			
Geoffrey Mungai	Mr.	Private					
Ahmed Adan	Mr.	NMK		3742131 ext 2205			
Maria Dodds	Ms	Private					
Quentin Luke	Mr	NMK					
Ann Roberson	Ms	Private					
Newton	Prof.	KU					
Mutiso	Mr.	UoN					
Musembi	Mr.	UoN					
Ojung	Mr.	UoN					
Fabian Haas	Dr	Icipe, Kasarani, Off Thika Road, Nairobi				fhaas@icipe.org	
Esther Kioko	Dr.	Icipe, Kasarani, Off Thika Road, Nairobi				ekioko@icipe.org	<a href="mailto:Esther_kioko@yahoo.com">Esther_kioko@yahoo.com</a>
Monicah	Dr.	National		254-	254733595182	<a href="mailto:monicahwaiganjo@yahoo.com">monicahwaiganjo@yahoo.com</a>	

Waiganjo		Horticulture Research Center, Thika		020255038			
Charles Warui	Dr	National Museums of Kenya		2547	254720764784	cwarui@museums.or.ke	<a href="mailto:cwarui@yahoo.com">cwarui@yahoo.com</a>
Michael Mungai	Mr	National Museums of Kenya				<a href="mailto:mmungai@museums.or.ke">mmungai@museums.or.ke</a>	
Mary Gikungu	Dr	National Museums of Kenya			254020-3742131		
Dorothy Nyingi	Dr	National Museums of Kenya		020-3742131	0722-812985	<a href="mailto:dnyingi@museums.or.ke">dnyingi@museums.or.ke</a>	
William Ojwang	Dr	Kenya Marine and Fisheries Research Institute		057-2021461	0720-206495	<a href="mailto:W_ojwang@yahoo.com">W_ojwang@yahoo.com</a>	

### 11. Related Projects

Please report on the status of projects whose objectives are more less similar to UVIMA Project in your country along the lines of your thematic area using the table below

Project Name	Implementing institution	Country	Source of funding	Status (project beginning, mid-term, ending)	Focal person	Contact details
Global invasive species programme	CABI, IUCN, SANBI & The Nature Conservancy	Ke			Dr. Sara Simons	CABI Nairobi
Striga weed project	FORMAT, Others	Ke			Mr. Paul Woomeer	Village Market
Below Ground Biodiversity	UON, NMK, UNEP	Ke	GEF			
Species Survival commission	IUCN	Ke				
Conservation of pollinators through ecosystem Approach and Sustainable Agriculture	NMK, SACDEP	Ke			Mr. Mutura	
Prosopis project	KEFRI	Ke	FAO			
Conservation and Management of Pollinators for sustainable agriculture, through an ecosystem approach	National Museums of Kenya	Ke	GEF through FAO	Beginning	Dr. Helida Oyieke	P.O. Box 40658 00100 Nairobi
Prosopis Upsurge in Kenya	Kenya Forestry Research Institute	Ke	NUFFIC and Kenya Forestry Research Institute Sandwich PhD	Mild term	Mr. Gabriel Muturi	KEFRI

**ANNEXES**

**Annex 1: Reference electronic and printed materials**

Type	Title	Author(s)/Editor(s)	Publisher	Symbol	Publication Date	Where to get it and / or contact person
Book	Africa Invaded, The growing danger of invasive alien species	Sue Mathews and Kobie Brand	Global invasive species programme		2004	CABI, Nairobi
<i>UVIMA- The BioNET-EAFRINET Project, Country Consultancy Report</i>						
Workshop Proceedings	Biofuels and invasive species	John Mauremootoo	IUCN			IUCN –Nairobi Office
Book	Invasion of Prosopis juliflora and Locals Livelihoods: Case study of Lake Baringo area Kenya	Esther Mwangi Brent Swallow	ICRAF		2005	ICRAF Nairobi' Dr. Brent Swallow
Online database	Prosopis juliflora	ICRAF			Continuous	
Online database	Identifying Prosopis guide					<a href="http://www.gardenorganic.org.uk/pdfs/international_programme/IdentifyingProsopisGuide.pdf">http://www.gardenorganic.org.uk/pdfs/international_programme/IdentifyingProsopisGuide.pdf</a>
Online database	Invasive species in Kenya	ISSG	ISSG		continuous	<a href="http://www.issg.org/database/species/search">http://www.issg.org/database/species/search</a>
Online resource	Invasive species database	GISP	GISP		continuous	<a href="http://www.gisp.org/">http://www.gisp.org/</a>
Online Resource	Invasive species can cause serious ecological, environmental and health impact	Peter Warutere, Beldina Auma	World Bank		2007	
Workshop proceedings	Identification of risks and management of invasive alien species using IPPC framework	IPPC Secretariat	FAO		2005	
Online resource	Invasive tools	CBD secretariat	CBD			<a href="http://www.cbd.int/invasive/tools.shtml">http://www.cbd.int/invasive/tools.shtml</a>
PhD Project	Prosopis upsurge in Kenya	Gabriel Muturi			2002-2011	<a href="http://www.fem.wur.nl/UK/Research/Theme+1/muturi/">http://www.fem.wur.nl/UK/Research/Theme+1/muturi/</a>
Thesis	Status and potential of stingless bees (Apidae:Meliponinae) for forest conservation and income generation: A case study of Kakamega forest.	Joseph K. Macharia	-	-	2008	Jomo Kenyatta University of Agriculture and Technology
Manual	The scale insects of the tropical South pacific region Part 1The armoured scales (Diaspididae)	Williams D. J. and Watson G. W.	CAB International	ISBN: 0851986080	1988	NMK
Manual	IIE Guides to Insects of Importance to man 2. Thysanoptera	Palmer J. M., Mound L. A. and Heaume G. J.	CAB International	ISBN: 085198634X	1989	British Library, NMK
Manual	Terebratia (Insecta: Thysanoptera) Fauna of New Zealand. Number 1	Mound L. A. and A. K. Walker		ISBN: 047706687-9	1982	NMK
Book	Agricultural Insects of East Africa	R. H. Pelley	East African High commission		1959	
Book	Agricultural Insect pests of the tropics and their control	Dennis Hill	Cambridge University Press	ISBN: 0521202612	1975,1983	NMK, icipe

**Annex 2 List of persons met**

Name	Title	Institution	Courier Address	Zip code	Phone-Mobile/desk	Email1	Email2/website
Charles Warui	Dr	NMK	P. O. Box 40658-00100, Nairobi, Kenya		2543742131-4, or 254720764784	<a href="mailto:cwarui@yahoo.com">cwarui@yahoo.com</a>	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Musombi Kibberenge	Mr.	NMK	P. O. Box 40658-00100, Nairobi, Kenya		2543742131-4 ext. 2254	<a href="mailto:kmusombi@museums.or.ke">kmusombi@museums.or.ke</a>	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Monicah Waiganjo	Dr	KARI	P. O. Box 220-01000, Thika.		254020255038 or 254733595182	<a href="mailto:monicahwaiganjo@yahoo.com">monicahwaiganjo@yahoo.com</a>	
Samira Mohamed	Dr	icipe	Icipe, Kasarani P. O. Box 107-00621, Village Market, Nairobi		254208632000	<a href="mailto:sfaris@icipe.org">sfaris@icipe.org</a>	<a href="http://www.icipe.org">www.icipe.org</a>
Chabi Olaye	Dr	icipe	Icipe, Kasarani P. O. Box 107-00621, Village Market, Nairobi		254208632000	<a href="mailto:achabi@icipe.org">achabi@icipe.org</a>	<a href="http://www.icipe.org">www.icipe.org</a>
Sunday Ekesi	Dr	icipe	Icipe, Kasarani P. O. Box 107-00621, Village		Icipe, Kasarani P. O. Box 107-00621, Village Market, Nairobi	<a href="mailto:sekesi@icipe.org">sekesi@icipe.org</a>	<a href="http://www.icipe.org">www.icipe.org</a>

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			Market, Nairobi				
Fabian Haas	Dr	icipe	Icipe, Kasarani P. O. Box 107-00621, Village Market, Nairobi		254208632000	fhaas@icipe.org	www.icipe.org
Elliud Muli	Dr	icipe	Icipe, Kasarani P. O. Box 107-00621, Village Market, Nairobi		254298632000 ext.2153	emuli@icipe.org	www.icipe.org
Subramania n Sevgan	Dr	icipe	Icipe, Kasarani P. O. Box 30772, 00100 Nairobi		254298632000 ext.2159; 254722329927	ssubramania@icipe.org	www.icipe.org
Ian Gordon	Dr	icipe	Icipe, Kasarani P. O. Box P. O. Box 30772, 00100 Nairobi, Nairobi		254208632000	igordon@icipe.org	www.icipe.org
Gideon Nyamasyo	Dr	UoN			254 (0)722874591	<a href="mailto:gnyamasyo@uonbi.ac.ke">gnyamasyo@uonbi.ac.ke</a>	
Anne Bruntse Nganga	Ms	BioVision	Icipe, Kasarani P. O. Box 107-00621, Village Market,		254(0)72382214 5 254(0)73691821 1	<a href="mailto:a.bruntse@biovision.ch">a.bruntse@biovision.ch</a>	<a href="http://www.biovision.ch">www.biovision.ch</a>

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			Nairobi				
Patrick Malonza	Dr	National Museums of Kenya	P.O. Box 40658 00100 Nairobi		020-3742131	<a href="mailto:pmalonza@museums.or.ke">pmalonza@museums.or.ke</a>	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Edward Njagi	Mr	National Museums of Kenya	P.O. Box 40658 00100 Nairobi		020-3742131	<a href="mailto:enjagi@museums.or.ke">enjagi@museums.or.ke</a>	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Bernard Agwanda	Mr	National Museums of Kenya	P.O. Box 40658 00100 Nairobi		0722-280955,020-3742131	<a href="mailto:ben_risky@yahoo.co.uk">ben_risky@yahoo.co.uk</a>	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Philista Malaki	Ms	National Museums of Kenya	P.O. Box 40658 00100 Nairobi		020-3742131	<a href="mailto:pmalaki@museums.or.ke">pmalaki@museums.or.ke</a>	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Dorcas Lusweti	Mrs	Ministry of Fisheries	P.O. Box 40658 00100 Nairobi		020-3743579	<a href="mailto:dlusweti@yahoo.co.uk">dlusweti@yahoo.co.uk</a>	
Penninah Aloo-Obudho	Prof	Kenyatta University	KU		020-810901	<a href="mailto:Aloopenina@yahoo.com">Aloopenina@yahoo.com</a>	
Peris Kariuki	Ms	NMK	P.O. Box 40658 00100 Nairobi		0722615259	<a href="mailto:pkariuki@museums.or.ke">pkariuki@museums.or.ke</a>	<a href="mailto:pmweru@yahoo.com">pmweru@yahoo.com</a> <a href="http://www.museums.or.ke">www.museums.or.ke</a>
Itambo Malombe	Dr	NMK	NMK P.O. Box 40658 00100 Nairobi		0734327254	<a href="mailto:bmalombe@museums.or.ke">bmalombe@museums.or.ke</a>	
Francis Gachathi	Mr.	KEFRI					
Elizabeth Omino	Dr.	PROTA				<a href="mailto:e.omino@cgiar.org">e.omino@cgiar.org</a>	
John Kimeu	Mr.	NMK	P.O.Box 45166 00100		0736982620	<a href="mailto:jkmbaluka@yahoo.com">jkmbaluka@yahoo.com</a>	

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			Nairobi				
Simon Mathenge	Mr.	Private			0722437959		
Maria Dodds	Ms	Private					
Quentin Luke	Mr	NMK	P.O. Box 45166 00100 Nairobi				
Joseph Chirchir	Mr	NMK	P.O. Box 40658 00100 Nairobi		0720811404	Jchacha2001@yahoo.com	
Taita Terer	Mr	NMK	P.O. Box 40658 00100 Nairobi		0720581995	taaita@yahoo.com	
Esther Kioko	Dr.	Icipe, Kasarani, Off Thika Road, Nairobi	Icipe, Kasarani P. O. Box 30772, 00100 Nairobi		254298632000 ext.2054	ekioko@icipe.org	<a href="mailto:esther_kioko@yahoo.com">esther_kioko@yahoo.com</a>
Michael Mungai	Mr	National Museums of Kenya	NMK, P.O. Box 40658 00100 Nairobi		25420-3742131	<a href="mailto:mmungai@museums.or.ke">mmungai@museums.or.ke</a>	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Mary Gikungu	Dr	National Museums of Kenya	NMK, P.O. Box 40658 00100 Nairobi		25420-3742131	mgikungu@museums.or.ke	<a href="http://www.museums.or.ke">www.museums.or.ke</a>
Dorothy Nyingi	Dr	National Museums of Kenya	NMK, P.O. Box 40658 00100 Nairobi		0722-812985, 020-3742131	<a href="mailto:dnyingi@museums.or.ke">dnyingi@museums.or.ke</a>	
William Ojwang	Dr	Kenya Marine and	057-2021461		0720-206495	<a href="mailto:W_ojwang@yahoo.com">W_ojwang@yahoo.com</a>	

### Annex 3. List of hard copy documents enclosed.

- Biological control of maize pests in sub-saharan Africa, icipe
- Pest update: blue gum chalcid, a pest of Eucalyptus in Kenya, KEFRI
- The African fruit fly programme, a fruitfull future for Africa, icipe

### Annex 4. (a) Key species in the various categories (for more info. See references in annex 1)

No	Species name	Common name	Taxa Group	Category/Comments	Country		
					Ke	Tz	Ug
1	Bactrocera invadens	African invader fly	Insect	AIS			
2.	Chilo partellus	Stemborer	..	AIS			
3.	Prostephanus truncatus	Larger Grain Borer	„	AIS			
4.	Procambarus Clarkii	Louisiana crayfish	Crustacea	AIS			
5.	Myocastor coypus	Coypu	Mammalia	AIS			
6.	Lates niloticus	Nile perch	Fish	AIS			
7.	Cyprinus carpio	Common carp	Fish	AIS			
8.	Onchorynchus mykiss	Rainbow trout	Fish	AIS			
9.	Micropterus salmoides	Largemouth bass	Fish	AIS			
10.	Corvus splendens	Indian crow	Birds	AIS			
11.	Passer domesticus	House sparrow	Birds	AIS			
12.	Hemidactylus frenatus	Pacific house gecko	Reptilia	AIS			
13.	Prosopis spp	Mathenge	Plants	AIS			
14.	Acacia melanoxylon		Plants	AIS			
15.	Acacia mearnsii	Wattle tree	Plants	AIS			
16.	Bryophyllum spp.	Mother of millions	Plants	AIS			
17.	Solanum mauritanium		Plants	AIS			
18.	Ipomoea kituensis		Plants	AIS			
19.	Opuntia sp	Cactus	Plants	AIS			
20.	Lantana camara	Lantana	Plants	AIS			
21.	<a href="#">Eichhornia crassipes</a>	Water Hyacinth	Plants	AIS			
22	Leptocybe invasa	Blue gum chalcid	„	AIS			

23	Heliothis helicopaper	Boll worm	„	Pest			
24	Papilio demodocus	Citrus dog	„	Pest			
25	Chilo orichalcociliellus	stemborer	„	Pest			
26	Aphis sp.	Aphids	„	pest			
27	Achroia grisella	Lesser wax moth	„	pest			
28	Galleria mellonella	Greater wax moth	„	pest			
28	Agromyza sp.	Leaf miners	„	Pest			
29	Ceratitis sp.	Fruit flies	„	Pest			
30	Eldana saccharina	Stemborer	„	Pest			
31	Busseola fusca	Stemborer	„	Pest			
32	Sesamia calamistis	stenborer	„	Pest			
33	Tetranychus sp.	Mites	Acarina	Pest			
34	Eriophyes sp.	Mites	Acarina	Pest			
35	Apis mellifera	Honey bee	Insect	Pollinator			
36	Meliponula bocandei	Stingless bee	Insect	Pollinator			
37	Meliponula lendliana	Stingless bee	Insect	Pollinator			
38	Meliponula ferruginea	Stingless bee	Insect	Pollinator			
39	P. hildebrandti	Stingless bee	Insect	Pollinator			
40	Hypotrigona gribodoi	Stingless bee	Insect	Pollinator			

## Annex 4. (b) Invasive species in Kenya

Alien Species found in Kenya (From internet)

### 1. [Acacia melanoxylon](#) (tree)

*Acacia melanoxylon* is native in eastern Australia. This tree grows fast and tall, up to 45m height. It has a wide ecological tolerance, occurring over an extensive range of soils and climatic conditions, but develops better in colder climates. Control of its invasion of natural vegetation, commercial timber plantations and farmland incurs considerable costs, but its timber value and nursing of natural forest succession provides a positive contribution.

**Common Names:** acacia à bois noir, acacia de madera negra, acacia rouge, acácia-preta, algarrobo, aroma salvaje, Australian blackwood, Australiese swarthout, blackwood, blackwood acacia, Tasmanian blackwood

**Synonyms:** *Racosperma melanoxylon* (R.Br.) C.Martius

### 2. [Bidens pilosa](#) (herb)

*Bidens pilosa* is a cosmopolitan, annual herb which originates from tropical and Central America. Its hardiness, explosive reproductive potential, and ability to thrive in almost any environment have enabled it to establish throughout the world. Generally introduced unintentionally through agriculture or sometimes intentionally for ornamental purposes, *B. pilosa* is a major crop weed, threat to native fauna, and a physical nuisance.

**Common Names:** abissawa, acetillo, adzrskpi, agberi-oku , akesan, alonga, alongoi , amonoablanfè, amor seco, anansee mpaane, anasipagné, arponcito, aseduro, asta de cabra, batimadramadramatakaro, beggar's tick , bident hérissé, bident poilu, bidente pilosa, black fellows, black jack, broom stick, broom stuff, cache de cabra, cadillo, carrapicho-deagulha, cobbler's peg, dada, dadayem, devil's needles, diaani, diandu, dinenkui, dwirantwi, dzani pipi, eyinata, fisi'uli, gonoretti, gyinantwi, hairy beggar ticks, herbe d'aiguille, herbe villegague, hierba amarilla , iréné, iuna, kamik tuarongo, kandane, kete kete, ki, ki nehe, ki pipili, kichoma mguu, kichoma nguo, kiradale, klakuo, kofetoga, kofetonga, kokosa, ko-sendagusa, kukwe kwo, kurofidie, lebason, légué, manamendigo, masquia, matua kamate, mazote, mbatikalawau , mbatimandramandra, nana, nangua, nanguadian, nehe, nguad, niani, nidul-lif, niroa, papunga chipaca, passoklo, pega-prga, perca, pétéoré, picão-preto, pilipili, piquants noirs, piripiri, piripiri, piripiri kerekere, piripiri niroa, pisau-pisau, puriket, rosilla, sanyi, sanyina, sirvulaca, sornet, sosolé, Spanish needle, tabason, tagiaani , tebasson, tombo-maga, zagaï zagagbé, zagoi ini, zebeyuzébogue, zegbei zegbagwè, zikilli wissi, Zweizhan

**Synonyms:** *Bidens leucantha* (L.) Willd., *Bidens leucantha* Willd. var. *sundaica* (Blume) Hassk., *Bidens odorata*, *Bidens sunaica* (Blume), *Coreopsis leucantha* L.

3. [Cactoblastis cactorum](#) (insect) 

*Cactoblastis cactorum* is a moth that preys specifically on cacti species. It has been introduced in various locations around the globe to provide biological control of invasive cacti species and has proved itself successful in Australia and some Caribbean islands. However, from the Caribbean it spread into Florida and has attacked non-target cacti species. It is feared that it will cause large scale losses of native cacti diversity in North America and possibly have a large economic, social and ecological impact in *Opuntia* rich areas of southwestern USA and Mexico.

**Common Names:** Cactus moth, prickly pear moth

**Synonyms:** *Zophodia cactorum* Berg

4. [Corvus splendens](#) (bird)

The house crow (*Corvus splendens*) has established itself in at least 25 countries. It proliferates in human settlements and disturbed habitats and is especially suited to coastal settlements. It can even penetrate harsh desert environments once man has become established there. The house crow causes problems across a range of areas, including crop and livestock sustainability and poses a risk to native avifauna. It also carries a range of human pathogens but a link with human disease is yet to be established.

**Common Names:** bæjakråka, Ceylon crow, Colombo crow, corbeau familier, cornacchia grigia indiana, corneille de l'Inde, corneja India, corvo delle case, cuervo casero, domaca vrana, gagak rumah, Glanzkrähe , gralha-indiana, grey-necked crow, Hauskrähe, hint kargasi, huiskraai, huiskraai, huskrage, huskråka, huskråke, iegarasu, Ie-garasu, Indian crow, Indian house crow, Indian house-crow, Indijine varna, intianvaris, Kunguru Bara-Hindi, maniyan kakai, nalla kakka, òuevares, préachán binne, town crow, vrána domáci, vrana lesklá, vrána lesklá, wrona orientalna

5. [Ctenopharyngodon idella](#) (fish)

Grass carp (*Ctenopharyngodon idella*) is a large cyprinid introduced worldwide as a biological control of aquatic vegetation as well as a food fish. It is a voracious feeder which is incredibly efficient at removing aquatic weeds. However they can completely eliminate vegetation from water systems, resulting in widespread ecological effects. Grass carp are also known to compete with native fish, carry parasites such as Asian tapeworm (*Bothriocephalus opsarichthydis*), and induce other harmful effects to introduced waters.

**Common Names:** amur, amur bialy, amur biely, amur i bardhe, amurkarpfen, beli amur, belyi amur, bílý amur, byal amur, Cá Châm Treng, carpa China, carpa do limo , carpa erbivora, carpa herbivora, carpe de roseau, carpe herbivore, Chinese carp, Chinese graskarper, chortofagos kyprinos, crap-de-iarba, gardd carp, græskarpe, graskarp, gråskarp, gråskarp, graskarpe, graskarpen, graskarper, graskarpfen, grass carp, hullu,

hullugende, kap makan rumput, kap rumput, Pla Chao Hea, Pla Chao Heu, Pla Van Heu, ruohokarppi, silver orfe, sôgyo, tongsan, trey srokchen, waan ue, white amur

**Synonyms:** *Ctenopharyngodon idella* (Valenciennes, 1844), *Ctenopharyngodon idellus* (Valenciennes, 1844), *Ctenopharyngodon laticeps* (Valenciennes, 1844), *Leuciscus idella* (Valenciennes in Cuvier and Valenciennes, 1844), *Leuciscus idella* (Valenciennes, 1844), *Leuciscus idellus* (Valenciennes, 1844), *Leuciscus tschiliensis* (Valenciennes, 1844), *Pristiodon siemionovii* (Valenciennes, 1844), *Sarcocheilichthys teretiusculus* (Valenciennes, 1844)

6. [Cyprinus carpio](#) (fish) 

*The common carp (Cyprinus carpio) has been introduced as a food and ornamental fish into temperate freshwaters throughout the world. It is considered a pest because of its abundance and its tendency to reduce water clarity and destroy and uproot the aquatic vegetation used as habitat by a variety of species.*

**Common Names:** carp, carpa, carpat, carpe, carpe, carpe commune, carpeau, carpo, cerpyn, ciortan, ciortanica, ciortocrap, ciuciulean, common carp, crap, crapcean, cyprinos, escarpo, Europäischer Karpfen, European carp, German carp, grass carp, grivadi, ikan mas, kapoor-e-maamoli, kapor, kapr obecny, karp, karp, karp, karp, karp, karp dziki a. sazan, karpa, karpar, karpe, Karpe, karpen, karper, karpfen, karpion, karppi, kerpaille, koi, koi carp, korop, krap, krap, krap, krap, krap, krap dziki a. sazan, karpa, karpar, karpe, Karpe, karpen, karper, karpfen, karpion, olocari, pa nai, pba ni, pla nai, ponty, punjabe gad, rata pethiya, saran, Saran, sarmão, sazan, sazan baligi, scale carp, sharan, skælkarpe, soneri masha, spejlkarpe, sulari, suloi, tikure, trey carp samahn, trey kap, ulucari, weißfische, wild carp, wildkarpfen

**Synonyms:** *Carpio carpio gibbosus* (Kessler, 1856), *Carpio flavipinna* Valenciennes, 1842, *Carpio vulgaris* Rapp, 1854, *Cyprinus acuminatus* Heckel & Kner, 1858, *Cyprinus acuminatus* Richardson, 1846, *Cyprinus angulatus* Heckel, 1843, *Cyprinus atrovirens* Richardson, 1846, *Cyprinus bithynicus* Richardson, 1857, *Cyprinus carpio anatolicus* Hanka, 1924, *Cyprinus carpio aralensis* Spiczakow, 1935, *Cyprinus carpio brevicirri* Misik, 1958, *Cyprinus carpio elongatus* Walecki, 1863, *Cyprinus carpio fluviatilis* Pravdin, 1945, *Cyprinus carpio longicirri* Misik, 1958, *Cyprinus carpio monstrosus* Walecki, 1863, *Cyprinus carpio oblongus* Antipa, 1909, *Cyprinus chinensis* Basilewsky, 1855, *Cyprinus conirostris* Temminck & Schlegel, 1846, *Cyprinus festetitsii* Bonaparte, 1845, *Cyprinus flamm* Richardson, 1846, *Cyprinus fossicola* Richardson, 1846, *Cyprinus haematopterus* Temminck & Schlegel, 1846, *Cyprinus melanotus* Temminck & Schlegel, 1846, *Cyprinus nordmannii* Valenciennes, 1842, *Cyprinus sculponeatus* Richardson, 1846, *Cyprinus thermalis* Heckel, 1843, *Cyprinus tossicole* Elera, 1895, *Cyprinus vittatus* Valenciennes, 1842

7. [Dalbergia sissoo](#) (tree)

*Dalbergia sissoo is a perennial tree that is economically important for its value in forestry, agroforestry, and horticulture. It provides timber, fuelwood, fodder, has medicinal value, used extensively as an ornamental tree as well as for shading, erosion control, and soil fertility. Native to the Indian sub-continent it is a member of the legume family and can fix nitrogen from the atmosphere through bacteria nodules on its root system. It has been introduced in various countries throughout the world, but has known to be invasive in Australia and in Florida (U.S.).*

**Common Names:** aguru, Bombay blackwood, dalbergia, du-khaek, du-khaek, ébénier juane, gette, Himalaya raintree, India teakwood, Indian dalbergia, Indian rosewood, nukku kattai, ostindisches Rosenholz, pradu-khaek, pradu-khaek, shinshapa, shisham, shishu, shisu, sisam, sisham, sissai, sissau, sisso, sisso, sissoo, sissoo, sissoo, sissu, sisu, sisu, sisuitti, skuva, sonoswaseso, tali, yette

**Synonyms:** *Amerimnon sissoo* (Kuntze), *Dalbergia pseudo-sissoo* (Miq.)

8. [Eichhornia crassipes](#) (aquatic plant) 

*Originally from South America, Eichhornia crassipes is one of the worst aquatic weeds in the world. Its beautiful, large purple and violet flowers make it a popular ornamental plant for ponds. It is now found in more than 50 countries on five continents. Water hyacinth is a very fast growing plant, with populations known to double in as little as 12 days. Infestations of this weed block waterways, limiting boat traffic,*

swimming and fishing. Water hyacinth also prevents sunlight and oxygen from reaching the water column and submerged plants. Its shading and crowding of native aquatic plants dramatically reduces biological diversity in aquatic ecosystems.

**Common Names:** aguapé, bekabe kairanga, bung el ralm, bung el ralm, floating water hyacinth, jacinthe d'eau, jacinto de agua, jacinto-aquatico, jal khumbe, jal kumbhi, lechuguilla, lila de agua, lirio acuatico, mbekambekairanga, riri vai, wasserhyazinthe, water hyacinth, water orchid, wota haisin

**Synonyms:** *Eichhornia speciosa* Kunth, *Heteranthera formosa*, *Piaropus crassipes* (Mart.) Raf., *Piaropus mesomelas*, *Pontederia crassipes* Mart. (basonym)

9. [Gambusia affinis](#) (fish)   **See eradication or other absence information**

*Gambusia affinis* is a small fish native to the fresh waters of the eastern and southern United States. It has become a pest in many waterways around the world following initial introductions early last century as a biological control of mosquito. In general, it is considered to be no more effective than native predators of mosquitoes. The highly predatory mosquito fish eats the eggs of economically desirable fish and preys on and endangers rare indigenous fish and invertebrate species. Mosquito fish are difficult to eliminate once established, so the best way to reduce their effects is to control their further spread. One of the main avenues of spread is continued, intentional release by mosquito-control agencies. *G. affinis* is closely related to the eastern mosquitofish (*G. holbrooki*), which was formerly classed as a sub-species. Their appearance, behaviour and impacts are almost identical, and they can therefore be treated the same when it comes to management techniques. Records of *G. affinis* in Australia actually refer to *G. holbrooki*.

**Common Names:** Barkaleci, Dai to ue, Gambusia, Gambusie, Gambusino, Gambuzia, Gambuzia pospolita, Gambuzija, guayacon mosquito, Isdang canal, Kadayashi, Koboldkärpfling, Kounouopsaro, Live-bearing tooth-carp, Mosquito fish, Obyknovennaya gambuziya, pez mosquito, San hang ue, Silberkärpfling, tes, Texaskärpfling, Topminnow, western mosquitofish, Western mosquitofish

**Synonyms:** *Fundulus inurus* (Jordan & Gilbert, 1882), *Gambusia affinis affinis* (Baird & Girard, 1853), *Gambusia affinis* (Baird & Girard, 1853), *Gambusia gracilis* Girard, 1859, *Gambusia humilis* Günther, 1866, *Gambusia patruelis* (Baird & Girard, 1853), *Haplochilus melanops* Cope, 1870, *Heterandria affinis* Baird & Girard, 1853, *Heterandria patruelis* Baird & Girard, 1853, *Zygonectes brachypterus* Cope, 1880, *Zygonectes gracilis* (Girard, 1859), *Zygonectes inurus* Jordan & Gilbert, 1882, *Zygonectes patruelis* (Baird & Girard, 1853)

10. [Lantana camara](#) (shrub)  

*Lantana camara* is a significant weed of which there are some 650 varieties in over 60 countries or island groups. It is established and expanding in many regions of the world, often as a result of clearing of forest for timber or agriculture. It impacts severely on agriculture as well as on natural ecosystems. Daniel Gluesenkamp Habitat Protection and Restoration Audubon Canyon Ranch 13935 Sonoma Highway Glen Ellen, CA 95442 *Lantana camara* is a significant weed of which there are some 650 varieties in over 60 countries or island groups. It is established and expanding in many regions of the world, often as a result of clearing of forest for timber or agriculture. It impacts severely on agriculture as well as on natural ecosystems. The plants can grow individually in clumps or as dense thickets, crowding out more desirable species. In disturbed native forests it can become the dominant understorey species, disrupting succession and decreasing biodiversity. At some sites, infestations have been so persistent that they have completely stalled the regeneration of rainforest for three decades. Its allelopathic qualities can reduce vigour of nearby plant species and reduce productivity in orchards. *Lantana camara* has been the focus of biological control attempts for a century, yet still poses major problems in many regions. plants can grow individually in clumps or as dense thickets, crowding out more desirable species. In disturbed native forests it can become the dominant understorey species, disrupting succession and decreasing biodiversity. At some sites, infestations have been so persistent that they have completely stalled the regeneration of rainforest for three decades. Its allelopathic qualities can reduce vigour of nearby plant species and reduce productivity in orchards. It has been the focus of biological control attempts for a century, yet still poses major problems in many regions. "

**Common Names:** ach man, angel lips, ayam, big sage, blacksage, bunga tayi, cambara de espinto, cuasquito, flowered sage, lantana, lantana wildtype, largeleaf lantana, latora moa, pha-ka-krong, prickly lantana, shrub verbean, supirroza, Wandelroeschen, white sage, wild sage  
**Synonyms:** *Camara vulgaris*, *Lantana scabrida*

11. [\*Leucaena leucocephala\*](#) (tree) 

*Leucaena leucocephala* is a 'conflict tree' being widely promoted for tropical forage production and reforestation, whilst at the same time it is spreading naturally and is widely reported as a weed. This thornless tree can form dense monospecific thickets and is difficult to eradicate once established. It renders extensive areas unusable and inaccessible and threatens native plants.

**Common Names:** acacia palida, aroma blanca, balori, bo chet, cassis, false koa, faux mimosa, faux-acacia, fua pepe, ganitnityuwan tangantan, graines de lin, guaje, guaslim, guaxin, huaxin, horse/wild tamarind, huaxin, ipil-ipil, jumbie bean, kan thin, kanthum thect, koa haole, koa-haole, kra thin, kratin, lamtoro, lead tree, leucaena, Leucaena, liliak, lino criollo, lopa samoa, lusina, nito, pepe, rohbohtin, schemu, siale mohemohe, subabul, tamarindo silvestre, tangantangan, tangan-tangan, te kaitetua, telentund, tuhngantuhngan, uaxim, vaivai, vaivai dina, vaivai ni vavalangi, wild mimosa, wild tamarind, zarcilla

**Synonyms:** *Acacia leucocephala* (Lamark) Link 1822, *Leucaena glabrata* Rose 1897, *Leucaena glauca* (L.) Benth. 1842, *Mimosa leucocephala* Lamark 1783

12. [\*Macfadyena unguis-cati\*](#) (vine, climber) 

*Macfadyena unguis-cati* is a perennial, climbing liana found primarily in tropical forests. It is native to the Central and South Americas and the West Indies, but currently is represented on every continent except Antarctica. It is an invasive species in much of its range and is said to be "one of the most destructive exotic vines". *Macfadyena unguis-cati* effects all layers of infected forest ecosystems by rapidly spreading both vertically and horizontally across everything with which it makes contact, overwhelming both the understorey plants and the canopy trees. *Macfadyena unguis-cati* species becomes established quickly and is difficult to eliminate due to its rapid growth, extensive root system, and prolific seed production. Methods of manual, chemical, and biological control for *Macfadyena unguis-cati* are available.

**Common Names:** bejuco de gato, cat-claw creeper, catclaw-trumpet, catclawvine, cat's claw climber, cat's claw creeper, cat's claw vine, cat's-claw, claw vine, funnel-creeper, griffe à chatte, kateklouranker, liane patate, macfadyena, patte d'oiseau, paz y justicia, riffe chatte, uña de gato, yellow trumpet vine

**Synonyms:** *Batocytia unguis-cati* (L.) Mart. ex Britt., *Bignonia tweedieana* Lindl., *Bignonia unguis-cati* L., *Doxantha unguis-cati* (L.) Miers

13. [\*Micropterus salmoides\*](#) (fish) 

*Micropterus salmoides* (bass) has been widely introduced throughout the world due to its appeal as a sport fish and for its tasty flesh. In some places introduced *Micropterus salmoides* have affected populations of small native fish through predation, sometimes resulting in their decline or extinction. Its diet includes fish, crayfish, amphibians and insects.

**Common Names:** achigã, achigan, achigan à grande bouche, American black bass, bas dehanbozorg, bas wielkogeby, bass, bass wielkgebowy, biban cu gura mare, black bass, bolsherotnyi amerikanskii tscherny okun, bol'sheroty chernyi okun', buraku basu, fekete sügér, forelbaars, forellenbarsch, green bass, green trout, großmäuliger Schwarzbarsch, huro, isobassi, khorshid Mahi Baleh Kuchak, lakseabbor, largemouth bass, largemouth black bass, lobina negra, lobina-truche, northern largemouth bass, okounek pstruhový, okuchibasú, Öringsaborre, Ørredaborre, ostracka, ostracka lososovitá, perca americana, perche d'Amérique, perche noire, perche truite, persico trota, stormundet black bass, stormundet ørredaborre, tam suy lo ue, zwarte baars

**Synonyms:** *Aplites salmoides* (Lacepède, 1802), *Grystes megastoma* Garlick, 1857, *Huro nigricans* Cuvier, 1828, *Huro salmoides* (Lacepède, 1802), *Labrus salmoides* Lacepède, 1802, *Micropterus salmoides* (Lacepède, 1802), *Perca nigricans* (Cuvier, 1828)

14. [\*Mimosa pigra\*](#) (shrub) 

*Mimosa pigra* is invasive, especially in parts of South East Asia and Australia. It reproduces via buoyant seed pods that can be spread long distances in flood waters. *Mimosa pigra* has the potential to spread through natural grassland floodplain ecosystems and pastures, converting them into unproductive scrubland which are only able to sustain lower levels of biodiversity. In Thailand *Mimosa pigra* blocks irrigation systems that supply rice fields, reducing crop yield and harming farming livelihoods. In Vietnam it has invaded unique ecosystems in protected areas, threatening the biodiversity of seasonally inundated grasslands.

**Common Names:** bashful plant, catclaw, catclaw mimosa, chi yop, columbi-da-lagoa, eomridera, espino, giant sensitive plant, giant sensitive tree, giant trembling plant, juquiri, juquiri grand, kembang gajah, mai yah raap yak, maiyarap ton, malicia-de-boi, mimosa, mimosa, mimose, putri malu, semalu gajah, sensitiva, trinh nu nhon, una de gato, xao ho

**Synonyms:** *Mimosa pellita*

15. [Myiopsitta monachus](#) (bird)

*Myiopsitta monachus* (monk parakeets) are popular in the pet trade business. Their distinction as the only nest-building parrot has allowed them to adapt to cold climates and urban areas, thus increasing their range when intentionally or unintentionally released. In Argentina, where *Myiopsitta monachus* are native, they are reported to cause one billion dollars worth of crop damage annually. They have, as yet, not significantly harmed any other invaded region.

**Common Names:** burátpapagáj, catita com?n, caturra-da-argentina, convue veuve, cotorra argentina, grey-breasted parakeet, grey-headed parakeet, matto grasso, mniszka, Mönchssittich, monk parakeet, monniksparikiet, munkkiaratti, munkparakit, papo branco, parrochetto monaco, perruche-souris, quaker conure, quaker parakeet, quaker parrot

**Synonyms:** *Psittacus monachus* (Boddaert, 1783)

16. [Myocastor coypus](#) (mammal)

*Myocastor coypus* (coypu) is a large semi-aquatic rodent which originated from South America. However, due to escapes and releases from fur farms there are now large feral populations in North America, Europe and Asia. Their burrows penetrate and damage river banks, dykes and irrigation facilities. *Myocastor coypus*' feeding methods lead to the destruction of large areas of reed swamp. Habitat loss caused by coypus impacts plant, insect, bird and fish species.

**Common Names:** Biberratte, coipù, coypu, nutria, ragondin, ratão-do-banhado, Sumpfbiber

17. [Oncorhynchus mykiss](#) (fish)  

*Oncorhynchus mykiss* (rainbow trout) are one of the most widely introduced fish species in the world. Native to western North America, from Alaska to the Baja Peninsula, *Oncorhynchus mykiss* have been introduced to numerous countries for sport and commercial aquaculture. *Oncorhynchus mykiss* is highly valued as a sportfish, with regular stocking occurring in many locations where wild populations cannot support the pressure from anglers. Concerns have been raised about the effects of introduced trout in some areas, as they may affect native fish and invertebrates through predation and competition.

**Common Names:** Alabalik, Alabalik türü, Amerikaniki Pestrofa, Aure, Baiser, Baja California rainbow trout, Brown trout, Coast angel trout, Coast rainbow trout, Coast range trout, Dagova pastarva, Forel rajduzhna, Forelle, Hardhead, Kamchatka steelhead, Kamchatka trout, Kamloops, Kamloops trout, Kirjolohi, K'wsech, Lord-fish, Masu, Nijimasu, Orret, Pastrva, Pestropha, pstrag teczowy, Pstrag teczowy, Pstruh duhový, Pstruh dúhový, rainbow trout, Rainbow trout, Redband, redband trout, Regenbogenforelle, Regenbogenforelle, Regenboogforel, Regnbåge, Regnbågslax, Regnbogasilungur, Regnbueørred, Regnbueørret, Salmon trout, Salmones del Pacífico, Silver trout, Stahlkopfforelle, Stålhovedørred, Steelhead, steelhead trout, Steelhead trout, Summer salmon, Sxew'k'em, Trofta ylberi, Trofte ylberi, Trota, Trota iridea, Trucha, trucha arco iris, Trucha arco iris, Trucha arcoiris, truite arc-en-ciel, Truta, Truta-arco-iris, Urriöi

**Synonyms:** *Fario gairdneri* (Richardson, 1836), *Onchorrhynchus mykiss* (Walbaum, 1792), *Oncorhynchus kamloops* (Jordan, 1892), *Oncorhynchus mykiss nelsoni* (Evermann, 1908), *Parasalmo mykiss* (Walbaum, 1792), *Salmo gairdneri irideus* (Gibbons, 1855), *Salmo*

*gairdneri shasta* (Jordan, 1894), *Salmo gairdneri* (Richardson, 1836), *Salmo gairdnerii gairdnerii* (Richardson, 1836), *Salmo gairdnerii irideus* (Gibbons, 1855), *Salmo gairdnerii* (Richardson, 1836), *Salmo gilberti* (Jordan, 1894), *Salmo iridea* (Gibbons, 1855), *Salmo irideus argentatus* (Bajkov, 1927), *Salmo irideus* (Gibbons, 1855), *Salmo kamloops whitehousei* (Dymond, 1931), *Salmo kamloops* (Jordan, 1892), *Salmo masoni* (Suckley, 1860), *Salmo mykiss* (Walbaum, 1792), *Salmo mykiss* (Walbaum, 1792), *Salmo nelsoni* (Evermann, 1908), *Salmo purpuratus* (Pallas, 1814), *Salmo rivularis kamloops* (Jordan, 1892), *Salmo rivularis* (Ayres, 1855), *Salmo stellatus* (Girard, 1856), *Salmo truncatus* (Suckley, 1859)

18. [Oreochromis mossambicus](#) (fish) 

*Oreochromis mossambicus* (Mozambique tilapia) has spread worldwide through introductions for aquaculture. Established populations of *Oreochromis mossambicus* in the wild are as a result of intentional release or escapes from fish farms. *Oreochromis mossambicus* is omnivorous and feeds on almost anything, from algae to insects.

**Common Names:** blou kurper, common tilapia, fai chau chak ue, Java tilapia, kawasuzume, kurper bream, malea, mojarra, mosambik-maulbrüter, Mozambikskaya tilapiya, Mozambique cichlid, Mozambique mouth-breeder, Mozambique mouthbrooder, Mozambique tilapia, mphende, mujair, nkobue, tilapia, tilapia del Mozambique, tilapia du Mozambique, tilapia mossambica, tilapia mozámbrica, trey tilapia khmao, weißkehlbarsch, wu-kuo yu

**Synonyms:** *Chromis dumerilii* Steindachner, 1864, *Chromis natalensis* Weber, 1897, *Chromis vorax* Pfeffer, 1893, *Sarotherodon mossambicus* (Peters, 1852), *Tilapia arnoldi* Gilchrist & Thompson, 1917, *Tilapia mossambica* (Peters, 1852)

19. [Orthezia insignis](#) (insect) **Interim profile, incomplete information**

The scale insect *Orthezia insignis* damages the host plant by feeding on its phloem and excreting nutrients which promote the growth of sooty mold. Biocontrol using the coccinellid predator *Hyperaspis pantherina* has proven to be successful in controlling the scale insect on Saint Helena (in the South Atlantic Ocean).

**Common Names:** chinche harinosa del croto, cochinilla blanca menor de los citricos, Croton bug, escama blanca del croto, Gewaechshaus-Roehrenschildlaus, glasshouse Orthezia, greenhouse Orthezia, jacaranda bug, Kew bug, Lantana blight, Lantana bug, marsupial coccid, Maui blight, Orthezia scale

20. [Pennisetum clandestinum](#) (grass) 

*Pennisetum clandestinum* is a creeping, mat-forming grass that originates from tropical eastern Africa. It gets its common name, kikuyu grass, from the fact that it is native to the area in which the Kikuyu tribe live. *Pennisetum clandestinum* is an aggressive invader of pasture, crops and natural areas. It spreads via an extensive network of rhizomes and stolons, and smothers all other vegetation. It is difficult to control manually, but the use of herbicides can yield good results.

**Common Names:** capim-quicuo, kikuyo, kikuyu grass, kikuyu pul, kikuyu tana, kikuyugras, pasto africano, West African pennisetum, xi fei lang wei cao

**Synonyms:** *Pennisetum inclusum* Pilg., *Pennisetum longstylum* Hochst., *Pennisetum longstylum* var. *clandestinum* (Hochst. ex Chiov.) Leeke

21. [Pheidole megacephala](#) (insect) 

*Pheidole megacephala* is one of the world's worst invasive ant species. Believed to be native to southern Africa, it is now found throughout the temperate and tropical zones of the world. It is a serious threat to biodiversity through the displacement of native invertebrate fauna and is a pest of agriculture as it harvests seeds and harbours phytophagous insects that reduce crop productivity. *Pheidole megacephala* are also known to chew on irrigation and telephone cabling as well as electrical wires.

**Common Names:** big-headed ant, brown house-ant, coastal brown-ant, Grosskopfameise, lion ant

**Synonyms:** *Atta testacea* Smith 1858, *Formica edax* Forskal 1775, *Formica megacephala* Fabricius 1793, *Myrmica suspiciosa* Smith 1859, *Myrmica trinodis* Losana 1834, *Oecophthora pernicioso* Gerstaecker 1859, *Oecophthora pusilla* Heer 1852

22. [Physalis peruviana](#) (shrub)

**Interim profile, incomplete information**

*Physalis peruviana* originates from the tropics and is cultivated in its native lands. It poses an indirect threat to agriculture when imported as it may harbour introduced plant pests.

**Common Names:** aguaymanto, alquequenje, alquequenje amarillo, alquequenje , bate-testa , botebote yadra, camapú , Cape gooseberry, capuli, capulí , coqueret du Peru, erva-noiva-do-peru , goldenberry , gooseberry tomato, gooseberry-tomato, goundou-goundou, groselha-do-Peru, groselha-do-Peru, ground cherry, ishmagol, jangalii mevaa, Kapstachelbeere, kospeli, ku‘usi, manini, manini fua lalahi, maulangua, mbotembote yandra, oatamo, pa‘ina, Peruvian cherry, Peruvian ground-cherry, physalis , poha, rasabarii, te baraki, te bin, thol thakkali, tomatinho-de-capucho, topotopo, tukiyandra, tupera, tupere, uvilla , watamo, winebusupén

23. [Poecilia reticulata](#) (fish)  

*Poecilia reticulata* is a small benthopelagic fish native to Brazil, Guyana, Venezuela and the Caribbean Islands. It is a popular aquarium species and is also commonly used in genetics research. In the past *Poecilia reticulata* was widely introduced for mosquito control but there have been rare to non-existing measurable effects on mosquito populations. It can occupy a wide range of aquatic habitats and is a threat to native cyprinids and killifishes. It is a carrier of exotic parasites and is believed to play a role in the decline of several threatened and endangered species.



**Common Names:** guppie , guppil , guppy, hung dzoek ue, ikan seribu, lareza tripikaloshe, lebistes, lepistes, Mexicano, miljoenvis, miljoonakala, million fish, millionenfisch, millions, poisson million, queue de voile, rainbow fish, sarapintado, Sardinita, Wilder Riesenguppy, zivorodka duhová

**Synonyms:** *Acanthophaecelus guppil* (Günther, 1866), *Acanthophaecelus reticulatus* (Peters, 1859), *Girardinus guppil* Günther, 1866, *Girardinus reticulatus* (Peters, 1859), *Haridichthys reticulatus* (Peters, 1859), *Heterandria guppyi* (Günther, 1866), *Lebistes poecilioides* De Filippi, 1861, *Lebistes poecilioides* De Filippi, 1861, *Lebistes reticulatus* (Peters, 1859), *Poecilia reticulatus* Peters, 1859, *Poecilioides reticulatus* (Peters, 1859)

24. [Procambarus clarkii](#) (crustacean)

*Procambarus clarkii* is a hardy warm water freshwater crayfish that is typically found in marshes, rivers, slow flowing water, reservoirs, irrigation systems, and rice fields. It may become a keystone species, affecting many components of the ecosystem inhabits and altering the nature of native plant and animal communities. It is an aggressive competitor with native crayfish, and its burrowing behaviour may cause significant agricultural problems. Management strategies include prohibiting the transport of live crayfish, restocking habitats with native crayfish, and improving public education about the risks alien crayfish pose to the environment. Encouraging farming of native species as well as research into managing, economically productive harvests of native crayfish has the potential to reduce the numbers of alien crayfish imported and farmed.

**Common Names:** Louisiana crayfish, red swamp crayfish

25. [Prosopis spp.](#) (tree, shrub)  

Members of the genus *Prosopis* spp., which are commonly known as mesquite or algarrobo, include at least 44 defined species and many hybrids. This leads to problems with identification. For this reason, information about different species in the *Prosopis* genus is presented in this genus-level profile. Native to the Americas, *Prosopis* species are fast growing, nitrogen fixing and very salt and drought tolerant shrubs or trees. Most are thorny, although thornless types are known. Animals eat the pods and may spread seeds widely. Trees develop a shrubby growth form if cut or grazed. The four main species that have presented problems as weeds world-wide are *P. glandulosa* and *P. velutina* in more subtropical regions and *P. juliflora* and *P. pallida* in the truly tropical zone.

**Common Names:** acacia de Catarina, aguijote negro, algaroba, algarobeira, algarobeira, algarroba, algarroba, algarrobo, algarrobo, algarrobo americano, algarrobo del Brasil, algarrobo forragero, anchipia guaiva, angrezi bavaliya , aroma, aroma americana, aromo, arómo, baron,

bayahon, bayahon, bayahonda, bayahonda blanca, bayahonde, bayahonde, bayahonde française, bayarone, bayawonn, bayawonn française, belari jari, bohahunda, cambrón, campeche, caóbano gateado, carbón, carobier, cashaw, cashew, catzimec, chachaca, chambron, cojí wawalú, cuida, cují, cují amarillo, cují negro, cují yague, cují yaque, cujicarora, dakkar toubab, espinheiro, espino negro, espino real, espino ruco, eterai, gando baval, gaudi maaka, ghaf, guarango, guatapaná, huarango, indjoe, indju, kiawe, kuigi, lebi, maíz criollo, manca-caballo, mareño, mastuerzos, mathenge, mesquite, mesquite, mesquite, mesquite, mesquit-tree, Mexican thorn, mezquite, mezquite, mugun kawa, nacascol, nacasol, palo de campeche, plumo de oro, qui, screwbeans, shejain kawa, shouk shami, spinho, taco, thacco, tornillos, trupi, trupillo, uweif, vallahonda, velikaruvel, velimullu, vilayati babool, vilayati babul, vilayati babul, vilayati jand, vilayati khejra, vilayati kikar, vilayati kikar, wawahi, yaque, yaque blanco, yaque negro

26. [Psidium guajava](#) (tree, shrub) 

*Psidium guajava* is a tropical tree or shrub. It is native to central America from Mexico to northern South America. It has been introduced to most tropical and sub-tropical locations around the world for its edible fruit. In some countries the harvesting, processing and export of the fruit forms the basis of a sizeable industry. Due in part to its ability to grow on a variety of soils and across a range of climates, *P. guajava* has become invasive. Pastures and fields are overrun and native plants are outcompeted by this species, which has the ability to form dense thickets. This has led to its designation in many areas as a noxious weed to be controlled or eradicated. It is ranked by some authorities amongst the highest invasive categories.

**Common Names:** abas, abwas, amarood, amrut, apas, araca, banjiro, bayabas, bayawas, biyabas, dipajaya jambu, djamboe, djambu, farang, goaibeira, goavier, goejaaba, goejaba, goiaba, goiabeiro, gouyav, gouyave, goyave, goyavier, guabang, guahva, guava, guave, guavenbaum, guayaba, guayaba silvestre, guayabilla, guayabo, guayave, guayavo, guwafah, guyaaba, guyabas, guyava, jambu batu, jambu batu, jambu berase, jambu biji, jambu kampuchia, jambu klutuk, jamphal, jamrukh, kautoga, kautoga tane, kautonga, kautonga tane, koejawal, kuabang, kuafa, kuahpa, kuava, ku'ava, kuawa, kuawa ke'oke'o, kuawa lemi, kuawa momona, kuhfahfah, kuma, kuwawa, lemon guava, ma-kuai, man-man, ngguava ni India, nguava, oi, pauwa, perala, petokal, quwawa, sapari, si da, te kuava, te kuawa, tokal, trapaek sruk, tuava, tu'ava, tu'avu, tumu tuava, tuvava, xalxocot

**Synonyms:** *Guajava pyrifera* (L.) Kuntze, *Myrtus guajava* var. *pyrifera* (L.) Kuntze, *Myrtus guajava* (L.) Kuntze, *Psidium aromaticum*, *Psidium cujavillus* Burm. f., *Psidium guajava* var. *cujavillum* (Burman) Krug and Urb., *Psidium guajava* var. *guajava*, *Psidium guava* Griseb., *Psidium guayava* Raddi, *Psidium igatemyensis* Barb. Rodr., *Psidium pomiferum* L., *Psidium pumilum* var. *guadalupense*, *Psidium pumilum* Vahl, *Psidium pyriferum* L.

27. [Rubus niveus](#) (shrub)

*Rubus niveus* is a shrub native to Asia that may form dense, impenetrable, thorny thickets that can displace native species. It produces sweet, palatable fruit enjoyed by birds, rodents, reptiles and humans and has been cultivated in many regions throughout the world for this reason. It is also used as a living fence. Mechanical management of the species is difficult due to its growth form and persistent seedbank, but chemical methods have been developed and biological means of management are being explored.

**Common Names:** Ceylon raspberry, frambuesa, hill raspberry, hong pao ci teng, Java bramble, kala hinsalu, khiradi, kolalinda, komuli, Mahabaleshwar raspberry, mbolinmomoniyil, mora, Mysore raspberry, Mysorehimbeere, pilai, pinit, snowpeaks raspberry

**Synonyms:** *Rubus pedunculatus* D. Don, *Rubus albescens* Roxb., *Rubus foliolosus* D. Don, *Rubus horsfieldii* Miq., *Rubus lasiocarpus* Sm., *Rubus micranthus* D. Don

28. [Salmo trutta](#) (fish) 

*Salmo trutta* has been introduced around the world for aquaculture and stocked for sport fisheries. It is blamed for reducing native fish populations, especially other salmonids, through predation, displacement and food competition. It is a popular angling fish.

**Common Names:** an breac geal, aure, bachforelle, blacktail, breac geal, brook trout, brown trout, denizalabaligi, denizalasi, Europäische Forelle, finnock, forelle, galway sea trout, gillaroo, gwyniedyn, havørred, havsöring, herling, hirling, kumzha, k'wsech, lachförch, lachsforelle, lassföhren, losos taimen, losos' taimen, mahiazad-e-daryaye khazar, meerforelle, meritaimen, morska postrv, morskaya forel', orange fin, öring, orkney sea trout, ørred, ørret, pastrav de mare, peal, pstruh morsky, pstruh obecny, pstruh obecny severomorský, pstruh obycajný, salmo trota, salmon trout, sea trout, sewin, siwin, sjøaure, sjøørret, sjourrioi, taimen, thalasopestrofa, troc, troc wedrowna, trota fario, trout, trucha, trucha común, trucha marina, truita, truite brune, truite brune de mer, truite de mer, truite d'europe, truta marisca, truta-de-lago, truta-fário, truta-marisca, urriði, whiting, whitling, zeeforel



**Synonyms:** *Fario argenteus* Valenciennes, 1848, *Salar ausonii parcepunctata* Heckel & Kner, 1858, *Salar ausonii semipunctata* Heckel & Kner, 1858, *Salar ausonii* Valenciennes, 1848, *Salar bailloni* Valenciennes, 1848, *Salar gaimardi* Valenciennes, 1848, *Salar spectabilis* Valenciennes, 1848, *Salmo albus* Bonnaterre, 1788, *Salmo albus* Walbaum, 1792, *Salmo brachypoma* Günther, 1866, *Salmo caecifer* Parnell, 1838, *Salmo cambricus* Donovan, 1806, *Salmo caspius* Kessler, 1877, *Salmo cornubiensis* Walbaum, 1792, *Salmo cumberland* Lacepède, 1803, *Salmo eriox* Linnaeus, 1758, *Salmo fario loensis* Walbaum, 1792, *Salmo fario major* Walecki, 1863, *Salmo gadoides* Lacepède, 1803, *Salmo gallivensis* Günther, 1866, *Salmo islayensis* Thomson, 1873, *Salmo lacustris septentrionalis* Fatio, 1890, *Salmo levenensis* Yarrell, 1839, *Salmo mistops* Günther, 1866, *Salmo montana* Walker, 1812, *Salmo orcadensis* Günther, 1866, *Salmo orientalis* McClelland, 1842, *Salmo phinoc* Shaw, 1804, *Salmo polyosteus* Günther, 1866, *Salmo saxatilis* Paula Schrank, 1798, *Salmo spurius* Pallas, 1814, *Salmo stroemii* Gmelin, 1788, *Salmo sylvaticus* Gmelin, 1788, *Salmo taurinus* Walker, 1812, *Salmo trutta abanticus* Tortonese, 1954, *Salmo trutta ciscaucasicus* Dorofeyeva, 1967, *Salmo trutta ezenami* (non Berg, 1948), *Salmo trutta trutta* Linnaeus, 1761, *Salmo trutta* Linnaeus, 1759, *Trutta fluviatilis* Duhamel, 1771, *Trutta marina* Duhamel, 1771, *Trutta marina* Moreau, 1881, *Trutta salmanata* Ström, 1784, *Trutta salmonata* Ruddy, 1772

29. [Salvelinus fontinalis](#) (fish)

*Introduced as a highly desirable fish for both angling and aquaculture throughout the world, Salvelinus fontinalis (brook trout) is an invasive that threatens native amphibians and fish, as well as the ecology of lakes and streams. Several native fish and amphibians face threatened or endangered status as a result of their introduction. Removal of Salvelinus fontinalis has been conducted in many places to allow for the recovery of endemic species.*

**Common Names:** Âait, aanaatik, aanak, American brook charr, Amerikanischer bachsaibling, Amerikanischer saibling, Amerikanski goletz, Amerikanskiy golets, ana, Âna, anakleq, anokik, anuk, aurora trout, azad mahi cheshmahi, Bachsaibling, bäckröding, baiser, Beekforel, bekkeror, bekkerøye, breeder, bronforel, brook char, brook charr, brook trout, brookie, char, coaster, common brook trout, eastern brook trout, eastern speckled trout, Elsässer saibling, fântânel, giigaq, humpbacked trout, i ha luk, iqaluk, iqaluk tasirsiutik, kawamasu, kaynak alabaligi, kildeorred, kildeørred, lindableikja, lord-fish, masamek, masamekos, masamekw, masumèk, mountain trout, mud trout, native trout, omble de fontaine, pastrav fântânel, pataki szajbling, pstrag zrodiany, puronieriä, salmerino di fontaine, salmerino di fontana, salmerino di fonte, salter, salvelino, salvelinos, saumon de fontaine, sea trout, siven, siven americký, sivon americký, sivon potocny, slob, speckled char, speckled trout, specks, squaretail, square-tail, squaretailed trout, Tiegerfisch, trout, trucha de arroyo, truite, truite de mer, truite mouchetée, truta-das-fontes, whitefin

**Synonyms:** *Baione fontinalis* (Mitchill, 1814), *Salmo canadensis* Griffith & Smith, 1834, *Salmo fontinalis* Mitchill, 1814, *Salmo hudsonicus* Suckley, 1861, *Salvelinus timagamiensis* Henn & Rinckenbach 1925

30. [Salvinia molesta](#) (aquatic plant, herb)  

*Salvinia molesta is a floating aquatic fern that thrives in slow-moving, nutrient-rich, warm, freshwater. A rapidly growing competitive plant, it is dispersed long distances within a waterbody (via water currents) and between waterbodies (via animals and contaminated equipment, boats or vehicles). Salvinia molesta is cultivated by aquarium or pond owners and it is sometimes released by flooding, or by intentional dumping.*

*Salvinia molesta* may form dense vegetation mats that reduce water-flow and lower the light and oxygen levels in the water. This stagnant dark environment negatively affects the biodiversity and abundance of freshwater species, including fish and submerged aquatic plants. *Salvinia molesta* can alter wetland ecosystems and cause wetland loss and also poses a severe threat to socio-economic activities dependent on open, flowing and/or high quality waterbodies, including hydro-electricity generation, fishing and boat transport.

**Common Names:** African payal , African pyle, aquarium watermoss, fougère d'eau, giant salvinia , giant salvinia , kariba weed , koi kandy, salvinia, water fern , water spangles

**Synonyms:** *Salvinia auriculata* Aubl.

31. *Setaria verticillata* (grass)

*Setaria verticillata* is a native European grass, invading agricultural, urban, and other disturbed areas throughout North America, Central America, South America Africa, Asia, and the North and South Pacific. A problematic crop weed *S. verticillata*, has inflicted considerable environmental and economic costs, is known to adapt to local conditions rapidly, and has developed resistance to atrazine and other C 1/5 herbicides.

**Common Names:** almorejo, almorejo verticilado, alorejo, amor de hortelano, bristly foxtail, bur bristle grass, bur grass, capim-grama, carreig, cola de zorro, dukhain, fieno stellino, foxtail, hooked bristlegrass, kamala, khishin, kirpi dari, Kletten Borstenhirse, kolvhirs, Kransnaaldaar, lagartera, lossaig, mau' pilipili , milha-verticilada, oehoe, panico maggiore, panissola, pata de gallina, pega-pega, pega-saias, quam el-far, Quirl Bortenhirse, rabo de zorro, rough bristle grass, setaire verticillée, whorled pigeon grass, Wirtel Borstenhirse, yah hang chnig-chok, zacate pegarropa, zaratsukienokorogusa

**Synonyms:** *Chaetochloa verticillata* (L.) (Scribn.), *Ixophorus verticillatus* (L.) (Nash, 1859), *Panicum adhaerens* (Forssk., 1775), *Panicum aparine* (Steud., 1854) , *Panicum asperum* (Lamk., 1778), *Panicum respiciens* (A. Rich., 1854), *Panicum rottleri* (Nees, 1841) , *Panicum verticillatum* (L., 1762), *Panicum verticillatum* L., *Pennisetum respiciens* (A. Rich., 1851) , *Pennisetum verticillatum* (L.) (Nash, 1817), *Pennisetum verticillatum* R. Br., *Setaria adhaerens* (Forssk., 1919), *Setaria ambigua* (Guss.), *Setaria aparine* (Stued. 1912), *Setaria carnei* (A.S. Hitchc.), *Setaria nubica* (Link), *Setaria respiciens* (A. Rich, 1852), *Setaria verticilliformis* (Dumort.), *Setaria viridis* (Terracc., 1894)

32. *Tradescantia fluminensis* (herb)

*Tradescantia fluminensis* is endemic to the tropical rainforests of south east Brazil and has naturalised in New Zealand, south-eastern Australia, Portugal, Italy, Russia, Japan and the south-eastern USA. *Tradescantia fluminensis* is a persistent invasive weed of natural areas where it carpets the ground and prevents native regeneration. It alters litter decomposition, nutrient cycling and the successional trajectory of New Zealand lowland podocarp-broadleaf forests and probably native vegetation elsewhere. *Tradescantia fluminensis* propagates and spreads easily from fragments.

**Common Names:** nohakata karakusa, small-leaf spiderwort, spiderwort, Vandrande Jude, wandering creeper, wandering Jew, wandering Willie, white flowered wandering Jew

**Synonyms:** *Tradescantia albiflora* (Kunth)

33. *Tradescantia spathacea* (herb) 

*Tradescantia spathacea* is a beautiful succulent that has been introduced to south Asia and many Pacific Islands from its native range in the tropical Americas. Although it has not yet been declared a pest, in many areas it has become a very invasive weed, especially in Florida where it invades and disrupts native plant communities. *Tradescantia spathacea* creates a dense groundcover on the forest floor which prevents native plants from germinating. *Tradescantia spathacea* has diverse reproductive methods and grows in areas other plants cannot. These two characteristics make this plant a potential danger to many areas. Monitoring is recommended wherever this species is present.

**Common Names:** boat lily, boat plant, faina kula, moses in a boat, Moses-in-a-basket, oyster plant, riri mangio, riri raei, talotalo, laupapaki

**Synonyms:** *Rhoeo discolor* Hance ex Walp, *Rhoeo spathacea* (Sw.) Stear, *Rhoeo discolor* (L'Hér.) Hance, *Rhoeo spathacea* (Sw.) Stearn, *Rhoeo spathacea* (Sw.) Stearn forma *concolor* (Baker) Stehle, *Rhoeo spathacea* (Sw.) Stearn forma *variegata* (Hook) Stehle, *Tradescantia discolor* L'Hér., *Tradescantia discolor* L'Hér., *Tradescantia discolor* L'Hér. var. *concolor* Baker, *Tradescantia discolor* L'Hér. var. *variegata* Hook.

34. [Trogoderma granarium](#) (insect) **See eradication or other absence information**

*Trogoderma granarium* are considered a pest of considerable impact to stored foodstuffs. It maintains its presence in food storage in very low numbers and is able to survive long periods of time in an inactive state.

**Common Names:** escarabajo khapra, khapra beetle, khaprakäfer, trogoderma (dermeste) du grain

**Synonyms:** *Trogoderma afrum* Priesner, *Trogoderma khapra* Arrow, *Trogoderma quinquefasciata* Leesberg

35. [Verbena brasiliensis](#) (herb)

*Verbena brasiliensis* is a herb native to South America that is planted as an ornamental in much of the world. It displaces native vegetation through most of its non-native range and is considered invasive. Management for *Verbena brasiliensis* includes avoiding its introduction into new areas and using herbicide where necessary.

**Common Names:** Brazilian vervain, gin case

**Synonyms:** *Verbena approximata* Briq, *Verbena bonariensis* auct. non L., *Verbena litoralis* var. *brasiliensis* Vell., *Verbena litoralis* var. *pyncnostachya* Schauer, *Verbena quadrangularis* Vell.

36. [Vibrio cholerae](#) (micro-organism)

*Vibrio cholerae* is the bacteria that causes cholera; a potentially epidemic and life-threatening secretory diarrhea characterised by numerous, voluminous watery stools, often accompanied by vomiting and resulting in hypovolemic shock and acidosis. It can also cause mild or unapparent infections. *Vibrio cholerae* occurs in both marine and freshwater habitats in mutualistic associations with aquatic animals. *Vibrio cholerae* is endemic or epidemic in areas with poor sanitation; it occurs sporadically or as limited outbreaks in developed countries. Cholera is transmitted by the fecal-oral route. In coastal regions it may persist in shellfish and plankton. Long-term convalescent carriers are rare.

**Common Names:** Asiatic cholera, epidemic cholera

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**Biostatus not specified**

1. [Acacia farnesiana](#) (tree, shrub)  

Probably a native of tropical America, *Acacia farnesiana* was introduced to many tropical countries for its bark, gum, seed and wood. It is often planted as an ornamental or to check erosion, and is also used in the perfume industry because of its scented flowers. This thorny, deciduous shrub grows to 4m in height forming impenetrable thickets or sometimes a more open cover and prefers dry habitats between sea level and 1000 m. In Australia it occurs along watercourses on rangeland and farmland limiting access to water. It has also become an invasive species in Fiji, French Polynesia, New Caledonia, Solomon Islands, and Vanuatu.

**Common Names:** acacia jaune, aroma, aroma, aramo, aweet acadia, ban baburi, carambuco, cashia, cassie, debena, Ellington curse, espino blanco, espino ruco, esponja, esponjeira, huisache, huisache dulce, kandaroma, kandaroma, klu, klu, klu bush, kolu, kolu, mimosa, mimosa bush, needle bush, oki, opoponax, popinac, popinac, rayo, Small's acacia, sweet acacia, tekaibakoa, titima, vaivai vakavotona, Westindische akazie

**Synonyms:** *Acacia acicularis* Humb. & Bonpl. ex Willd., *Acacia densiflora* (Alex. ex Small) Cory, *Acacia edulis* Humb. & Bonpl. ex Willd., *Acacia farnesiana* (L.) Willd. var. *pedunculata* (Willd.) Kuntze, *Acacia ferox* M. Martens & Galeotti, *Acacia indica* (Pers.) Desv.,

*Acacia lenticellata* F.Muell., *Acacia minuta* (M.Jones) Beauchamp subsp. *densiflora* (Alex. ex Small) Beauchamp, *Acacia pedunculata* Willd., *Acacia smallii* Isely, *Farnesia odora* Gasp., *Mimosa acicularis* Poir., *Mimosa farnesiana* L., *Mimosa acicularis* (Humb. & Bonpl. ex Willd.) Poir., *Mimosa edulis* (Humb. & Bonpl. ex Willd.) Poir., *Mimosa farnesiana* L., *Mimosa indica* Pers., *Mimosa pedunculata* (Willd.) Poir., *Vachellia densiflora* Alex. ex Small, *Vachellia farnesiana* (L.) Wight & Arn., *Vachellia farnesiana* (L.) Wight & Arn. var. *typica* Speg., *Vachellia farnesiana* (L.) Wight & Arn. forma *typica* Speg.

2. [Acanthophora spicifera](#) (algae)  

*Acanthophora spicifera* is a red algae which is found in most tropical or subtropical seas of the world. Its plastic morphology allows it to adapt to a variety of environmental conditions, and hence it can invade a diverse range of habitats. It is an alien invasive species in Hawaii. It is amongst the most successful alien algal species in this region, where it may modify native communities and compete with native algae.

**Common Names:** bulung tombong bideng, culot, red alga, spiny alga, spiny seaweed

**Synonyms:** *Acanthophora antillarum* Montagne ex Kützing 1865, *Acanthophora intermedia* Crouan, *Acanthophora orientalis* J. Agardh 1863, *Acanthophora orientalis* var. *wightii* (J. Agardh) Sonder 1879, *Acanthophora spicifera* f. *orientalis* (J. Agardh) Weber-van Bosse 1923, *Acanthophora spicifera* f. *wightii* (J. Agardh) Weber-van Bosse 1923, *Acanthophora spicifera* var. *orientalis* (J. Agardh) Zaneveld 1956, *Acanthophora thierryi* f. *gracilis* P.L. Crouan & H.M. Crouan 1878, *Acanthophora thierryi* J.V. Lamouroux 1813, *Acanthophora wightii* J. Agardh 1863, *Chondria acanthophorara* C. Agardh 1822, *Fucus acanthophorus* J.V. Lamouroux 1805, *Fucus spicifer* M. Vahl 1802

3. [Batrachochytrium dendrobatidis](#) (fungus)

*Batrachochytrium dendrobatidis* is a non-hyphal parasitic chytrid fungus that has been associated with population declines in endemic amphibian species in upland montane rain forests in Australia and Panama. It causes cutaneous mycosis (fungal infection of the skin), or more specifically chytridiomycosis, in wild and captive amphibians. First described in 1998, the fungus is the only chytrid known to parasitise vertebrates. *B. dendrobatidis* can remain viable in the environment (especially aquatic environments) for weeks on its own, and may persist in latent infections.

**Common Names:** chytrid frog fungi, chytridiomycosis, chytridiomycosis, Chytrid-Pilz, frog chytrid fungus

4. [Ceratitis capitata](#) (insect)  

*Ceratitis capitata* is considered a major tephritid fruit fly pest of economic importance attacking more than 300 different hosts, primarily temperate and subtropical fruits. The medfly as it is commonly called has invaded many countries and caused major economic losses for fruit farmers. *C. capitata* has the ability to tolerate cooler climates better than most other species of fruit flies. It lays its eggs under the skin of fruit, usually around already broken skin. Due to this reproduction habit, *C. capitata* thrives in agricultural areas where fruit is left out and becomes damaged. It spreads to new locations via exports and the local sale of fruit that contains eggs.

**Common Names:** medfly, Mediterranean fruit fly

**Synonyms:** *Ceratitis citriperda* MacLeay, *Ceratitis hispanica* De Brême, *Paradalspis asparagi* Bezzi, *Tephritis capitata* Wiedemann, *Trypeta capitata* Wiedemann, 1824

5. [Gracilaria salicornia](#) (algae)  

The introduction of alien algae in the marine environment is a potential threat to the health and stability of near-shore ecosystems. *Gracilaria salicornia* threatens coral reefs and native benthic communities in Hawaii and elsewhere. It may reduce marine species diversity and alter marine community structure.

**Common Names:** canot-canot, red algae


**Synonyms:** *Corallopsis cacalia* Agardh, *Corallopsis concrescens* Reinbold, *Corallopsis dichotoma* Ruprecht, *Corallopsis opuntia* Agardh, *Corallopsis salicornia* Greville, *Corallopsis salicornia* var. *minor* Sonder, *Gracilaria cacalia* Dawson, *Sphaerococcus salicornia* Agardh

6. [Phellinus noxius](#) (fungus)

Root and crown rot caused by *Phellinus noxius* is pantropical in distribution. Also known as brown root rot disease, it is present in native forests but most often noticed in disturbed areas. It has a broad host range and causes major losses in timber and hardwood plantations, agroforests and landscapes. The fungus forms an infection centre and spreads from tree to tree by root contact. It can exist on decaying roots in the soil for more than 10 years.

**Common Names:** brown root rot, limu mea

**Synonyms:** *Fomes noxius* Corner, 1932

7. [Rinderpest virus](#) (micro-organism) 

*Rinderpest virus* is a species of morbillivirus causing cattle plague, a highly fatal viral disease of domestic cattle, buffaloes and yaks. It also affects sheep, goats, some breeds of pigs and a large variety of wildlife species. Although humans are not susceptible to Rinderpest, famine devastates human populations dependant on cattle and buffalo for their food and livelihood. Mass vaccinations over the last century have greatly reduced outbreaks of Rinderpest. The Global Rinderpest Eradication Program (GREP), which was established in 1987 by the United Nation's FAO to develop strategies of control in high risk countries, will lead to the total eradication of the Rinderpest virus by 2010.

**Common Names:** cattle plague

8. [Tubastraea coccinea](#) (coral) 

*Tubastraea coccinea* (orange-cup coral) has been introduced to all continents except Antarctica and is thought to compete with native benthic invertebrates for space and to compromise their communities. The reduction of native sponges and native corals could also have significant flow-on effects for entire ecosystems.

**Common Names:** colonial-cup coral, orange-cup coral, orange-tube coral, tubastrée orange

**Synonyms:** *Astropsammia pedersenii* , *Caryophyllia aurantiaca* , *Coenopsammia affinis* , *Coenopsammia aurea* , *Coenopsammia coccinea* , *Coenopsammia ehrenbergiana*, *Coenopsammia manni* , *Coenopsammia radiata*, *Coenopsammia tenuilamellosa* , *Coenopsammia urvillii* , *Coenopsammia willeyi* , *Dendrophyllia affinis* , *Dendrophyllia aurantiaca* , *Dendrophyllia danae* , *Dendrophyllia ehrenbergiana* , *Dendrophyllia manni* , *Dendrophyllia surcularis* , *Dendrophyllia turbinata* , *Dendrophyllia willeyi* , *Lobophyllia aurea* , *Placopsammia darwini* , *Tubastraea aurea* , *Tubastraea pedersenii* , *Tubastraea tenuilamellosa*, *Tubastraea willeyi*

## Native Species

1. [Achatina fulica](#) (mollusc) 

*Achatina fulica* is a threat to the sustainability of crop systems and native ecosystems, having a variety of negative impacts on native fauna, from competition for resources to the spread of diseases to direct herbivory of native plants. Native snails in fragile island ecosystems such as Hawaii and the French Polynesian islands are particularly susceptible to the negative effects of *Achatina fulica* and other introduced snails.

**Common Names:** achatine, Afrikanische Riesenschnecke, escargot géant d'Afrique, giant African land snail, giant African snail

2. [Anas platyrhynchos](#) (bird) 

The mallard (*Anas platyrhynchos*) is the most common and widely distributed dabbling duck, having a widespread global distribution throughout the northern hemisphere. This migratory species is a highly valued game bird and the source of all domestic ducks with the exception of the Muscovy. Introductions and range expansions of *A. platyrhynchos* for game purposes pose a threat of competition and hybridization to native waterfowl. Also, recent studies hold the mallard as a likely vector for the highly pathogenic avian influenza virus (HPAIV) (H5N1).

**Common Names:** canard colvert, mallard, pato de collar

**Synonyms:** *Anas boschas* Linnaeus, 1758, *Anas oustaleti* Salvadori, 1894

3. **Cardiospermum grandiflorum** (vine, climber)

*Balloon vine (Cardiospermum grandiflorum) is an invasive tendril climber growing in damp situations, often near river banks. It forms dense but localised infestations and competes with, and smothers, indigenous plant species.*

**Common Names:** balloon vine, blaasklimop, heart seed, intandela, kopupu takaviri

**Synonyms:** *Cardiospermum barbicule*, *Cardiospermum hirsutum*

4. **Colubrina asiatica** (shrub)

*In its non-native locations, especially in coastal habitats, Colubrina asiatica aggressively outcompetes native vegetation. It is found, most often at the interface of uplands and submerged lands or between beach dune and maritime hammock. C. asiatica is also frequently found along elevated road shoulders in coastal areas, from where it can spread into adjacent natural areas. Plants grow rapidly in full sun. Its seeds are constantly dispersed at a rapid rate by ocean currents, and seed-eating birds may also ingest them as crop stones, producing a wider dispersal range. C. asiatica exhibits tremendous vegetative regeneration, including adventitious rooting from branches coming in contact with the soil and vigorous resprouting from cut or injured stems.*

**Common Names:** Asian snakewood, hoop with, Indian snakewood, latherleaf, wild coffee

**Synonyms:** *Ceanothus asiaticus* L.

5. **Columba livia** (bird)  

*Columba livia is native to Europe and has been introduced worldwide as a food source, or for game. These pigeons prefer to live near human habitation, such as farmland and buildings. They cause considerable damage to buildings and monuments because of their corrosive droppings. They also pose a health hazard, since they are capable of transmitting a variety of diseases to humans and to domestic poultry and wildlife.*

**Common Names:** pombo-doméstico, agreste, b? câu, bákteduvvá, balandis, bareski-golumbaika, baresko-golumbo, bjargdúfa, bládúgva, bládúva, bydue, calman-creige, calmane creggey, carrier pigeon, colm aille, colom roquer, colom roquer,, colom wyls, colomba salvaria, colomen ddôf, , colomen y graig, colomp salvadi, columba da chasa, columba selvadia, columbu agreste, columbu aresti, columbu de is arrocas, colu'r aille, common pigeon, didu, div gulab, divlji golub, dobato, domaci golob, domestic dove, domestic pigeon, dubet, , dziwi holb, Felsentaube, feral pigeon, feral rock pigeon, golab miejski!Golab skalny, golab skalny, golub pecinar, golub pecinar, gradski Golub, güvercin, haitz-uso, Haustaube, Strassentaube, holub domáci, holub skalní, homing pigeon, húsdúfa, kaljutuvi, kalliokyyhky, kawarabato, kawara-bato, kesykyyhky, kieminis, klinšu balodis, klippduva, klippedue, kolombo, kolomm an garrek, naminis karvelis, paloma, paloma bravia, paloma casera, paloma común, paloma de castilla, paloma doméstica, pecinar, pëllumbi i egër i shkëmbit, piccione, piccione domestico, piccione selvatico, piccione selvatico semidomestico, piccione terraiolo, piccione torraiolo, pichon, pigeon, pigeon biset, pigeon biset domestique, pigeon de ville, pigeon domestique, pomba brava, pombo da rocha, pombo o pombo-doméstico, pombo-das-rochas, porumbel de stâncă, pustynnik, rock dove , rock dove pigeon, rock pigeon, rotsduif, ruve, sizij golub, sizy Golub, sizyj golub', skalen g"l"b, , šzyz holub, , szirti galamb, tamduva, tidori, tidu, Tkhakapuyt Aghavni, tudun tal-gebel, tzidu, Verwilderte Haustaube, Xixella, yuan ge, ziyw golub

6. **Commelina benghalensis** (herb)

*Believed to be native only to tropical Asia and Africa, Commelina benghalensis is a widely distributed herbaceous weed that commonly invades agricultural sites and disturbed areas. Though not commonly reported to invade natural areas, this rapidly reproducing plant is considered one of the most troublesome weeds for 25 crops in 29 different countries.*

**Common Names:** alikbangon, Benghal dayflower, bias-bias, bias-bias, blue commelina, comméline, commeline du Bengale, dayflower, gewor, golondrina, hairy honohono, hairy wandering-Jew, herbe aux cochons, Indian dayflower, kanaibashi, kanasiri, kanchara, kanchura,

kaningi, kanini, kankaua, kena, konasimalu, krishnaghas, kuhasi, kulkulasi, mankawa, matalí, mau 'u Toga, mau 'u Tonga, musie matala pulu, myet-cho, sabilau, sabilau, trapoeraba, tropical spiderwort, tsuyukusa, tsuyukusa, wandering-jew, yu-je-tsai

**Synonyms:** *Commelina canescens* Vahl, *Commelina cucullata* L., *Commelina delicatula* Schldt., *Commelina kilimandscharica* K. Schum., *Commelina mollis* Jacq., *Commelina nervosa* Burm. f., *Commelina procurrens* Schldt., *Commelina prostrata* Regel, *Commelina pyrrhoblepharis* Hassk. (1867), *Commelina turbinata* Vahl

7. **Erythrocebus patas** (mammal)

*Erythrocebus patas* (patas monkey) is native to Africa and is an internationally popular laboratory animal for biomedical and behavioural research. Introduced to Puerto Rico for research purposes, *Erythrocebus patas* have escaped to established populations. Wild *Erythrocebus patas* represent a potential threat to humans due to their strength and aggressiveness and because they can carry diseases that are transmittable to humans. *Erythrocebus patas* invade farms and consume produce and also pose a predatory threat to native plants, birds and small animals, especially insects and other arthropods.

**Common Names:** Air patas, black-nosed patas, blue Nile hussar monkey, dancing red monkey, engabwor, husarapa, husarenaffe, Ikoma patas, le singe rouge, military monkey, mono patas, Nile patas, nisanas, patas, patas monkey, patasapa, red hussar monkey, red monkey, west African patas, west Africans red monkey

**Synonyms:** *Cercopithecus patas* (Schreber, 1775)

8. **Lates niloticus** (fish)

The Nile perch (*Lates niloticus*) is a large freshwater fish. Also known as capitaine, mputa or sangara, it can grow up to 200kg and two metres in length. It was introduced to Lake Victoria in 1954 where it has contributed to the extinction of more than 200 endemic fish species through predation and competition for food.

**Common Names:** chengu, mbuta, nijlbaars, nilaborre, Nilbarsch, Nile perch, perca di nilo, perche du nil, persico del nilo, sangara, Victoria perch, victoriabaars, victoriabarsch

**Synonyms:** *Lates albertianus* Worthington, 1932, *Lates niloticus rudolfianus* Worthington, 1932, *Lates niloticus* var. *macrolepidota* Pellegrin, 1922, *Perca latus* Geoffroy Saint-Hilaire, 1827

9. **Lotus corniculatus** (herb)

*Lotus corniculatus* (bird's foot trefoil) is a low growing perennial legume that has long been valued as an agricultural crop. *Lotus corniculatus* is native to much of Europe, Asia and parts of Africa, but now has a near global distribution. Over most of its range, *Lotus corniculatus* is not considered invasive, although in a few areas it has out-competed native vegetation.

**Common Names:** bacon and eggs, birdfoot deervetch, birdsfoot trefoil, bird's-foot trefoil, bloomfell, buinuzlu Gurdotu, butter and eggs, cat's clover, common lotus, cornette, cornichão, crowtoes, cube, cuernecillo, cuernecillo del campo, Devil's fingers, devil's-claw, Dutchman's clogs, ebert khoshhoontzor, ekhdzherarvuit, gafgaz gurdotu, garden birdsfoot trefoil, garden bird's-foot-trefoil, Gemeiner Hornklee, ghizdei marunt, ginestrina, granny's toenails, ground honeysuckle, harilik noiahammas, hen and chickens, hop 'o my thumb, Hornklee, karingtand, keltamaite, komonica zwycrajna, kurdglisprchkhila, kurdliis prukhila, lady's fingers, lady's slippers, lotier corniculé, loto corniculado, lyadvenetz baltiiski, lyadvenetz kavkazski, lyadvenetz komarova, lyadvenetz krymski, lyadvenetz olgi, lyadvenetz polevoi, lyadvenetz rogatyi, lyadvenetz ruprekhta, lyadvenetz somnitelnyi, lyadvenetz zhigulevski, palyavaya akatzyya, paprastasis garzdenis, pied-de-poule, ragaine vanagnadzini, rutvitza ragataya, sheep-foot, tryzaouka, upright trefoil, yellow trefoil, zayachy bratki

**Synonyms:** *Lotus ambiguus* Besser ex Spreng., *Lotus ambiguus* Spreng, *Lotus arvensis* Pers., *Lotus balticus* Miniaev, *Lotus carpetanus* Lacaíta, *Lotus caucasicus* Kuprian, *Lotus caucasicus* Kuprian., *Lotus ciliatus* sensu Schur, *Lotus corniculatus* L. var. *crassifolia* Fr., *Lotus corniculatus* L. var. *kochii* Chrtkova, *Lotus corniculatus* L. var. *maritimus* Rupr., *Lotus corniculatus* subsp. *major* (Scop.) Gams, *Lotus corniculatus* var. *arvensis* (Pers.) Ser., *Lotus corniculatus* var. *glaber* Opiz, *Lotus corniculatus* var. *major* (Scop.) Brand, *Lotus corniculatus*

var. *arvensis* (Schkuhr) Ser. ex DC., *Lotus filicaulis* Durieu, *Lotus frondosus* (Freyn) Kuprian, *Lotus japonicus* (Regel) K.larson, *Lotus komarovii* Miniaev, *Lotus major* Scop., *Lotus olgae* Klokov, *Lotus peczoricus* Miniaev and Ulle, *Lotus ruprechtii* Miniaev , *Lotus tauricus* Juz., *Lotus ucrainicus* Klokov, *Lotus zhegulensis* Klokov

10. [Lutjanus kasmira](#) (fish)  

*Lutjanus kasmira* is a commercially important reef-associated tropical fish that has been introduced into Hawaii for fisheries. In introduced areas of Hawaii it has become abundant, forming dense schools. It may outcompete native fish for space, crowding them out of important refuge areas.

**Common Names:** blouband snapper, blue-banded hussar, bluebanded snapper , blueline snapper, blue-lined sea perch, bluelined snapper, blue-lined snapper fish, bluestripe seaperch, bluestripe snapper, bluestriped snapper , common bluestripe snapper, common blue-stripe snapper, common bluestriped snapper, gorara tikus, hamra, hobara, ikan nonya , irri ranna, janja, kelea, kuning-kuning , kunyit, kunyit-kunyit , madras, mbawaa, merah, naisarah, nga-wet-panni, nisar, pargo de raios azuis , pargo de rayas , pargo de rayas azules, perche à raies bleues, pla ka pong deng thab nam nger, pla kapong, savane, taape, tanda-tanda, tembo-uzi , vali ranna , verikeechan, vivaneau à raies bleues , yellow and blue seaperch , yosuji-fuedai

11. [Lygodium microphyllum](#) (fern)

**Common Names:** Old World climbing fern, small leaf climbing fern, small-leaf climbing fern

**Synonyms:** *Ugena microphylla* Cav

12. [Oreochromis niloticus](#) (fish)  

*Oreochromis niloticus* (Nile tilapia) is a highly invasive fish that plagues a variety of ecosystems, particularly those located in the tropics. *Oreochromis niloticus*' effective mouthbrooding reproductive strategy allows it to increase in numbers at a rate which, not only crowds native species, but pollutes and unbalances the water column. *Oreochromis niloticus* is a frequently farmed aquatic species, due to its relative ease of culture and rapid reproduction rates. Most infestations are a result of aquaculture.

**Common Names:** chhnoht, chikadai, munruvare, Nile mouthbrooder, Nile tilapia, pla pla, planil, telepia, tilapia, tilapie, trey tilapia, wass

**Synonyms:** *Chromis guentheri* (Steindachner, 1864), *Oreochromis niloticus baringoensis* (Trewavas, 1983), *Oreochromis niloticus filoa* (Trewavas, 1983), *Oreochromis niloticus sugutae* (Trewavas, 1983), *Oreochromis niloticus tana* (Seyoum & Kornfield, 1992), *Perca nilotica* (Linnaeus, 1758), *Tilapia calciati* (Gianferrari, 1924), *Tilapia cancellata* Nichols, 1923, *Tilapia eduardiana* (Boulenger, 1912), *Tilapia inducta* (Trewavas, 1933), *Tilapia nilotica* (Uyeno & Fujii, 1984), *Tilapia regani* (Poll, 1932), *Tilapia vulcani* (Trewavas 1933)

13. [Panicum repens](#) (grass)

*Panicum repens* is a perennial grass that frequently forms dense colonies and has long, creeping rhizomes. It grows in moist, often sandy soils and its rhizomes often extend several feet out into the water. *Panicum repens* frequently forms dense floating mats that impede water flow in ditches and canals and restrict recreational use of shoreline areas of lakes and ponds. Management of *Panicum repens* involves the repeated application of herbicides. There is very little physical management that can be used to control *Panicum repens*, as disturbance encourages its growth.

**Common Names:** canota, couch panicum , creeping panic , kriechende Hirse, millet rampant , panic rampant , torpedo grass , torpedograss , Victoria grass , wainaku grass

**Synonyms:** *Panicum airoides* R. Br. , *Panicum aquaticum* A. Rich. , *Panicum arenarium* Brotero , *Panicum chromatostigma* Pilg. , *Panicum convolutum* P.Beauv. ex Spreng. , *Panicum gouinii* (Fourn.), *Panicum hycrocharis* Steud. , *Panicum ischaemoides* Retz. , *Panicum kinshassense* Vanderyst , *Panicum leiogonum* Delile , *Panicum littorale* C.Mohr ex Vasey , *Panicum nyanzense* K.Schum. , *Panicum roxburghianum* Schult. , *Panicum sieberi* Link , *Panicum tuberosum* Llanos , *Panicum uliginosum* Roxb. ex Roem. & Schult.

14. [Paspalum scrobiculatum](#) (grass) **Interim profile, incomplete information**

*Paspalum scrobiculatum* is a noxious weed in the United States and is potentially invasive in the Pacific.

**Common Names:** co duru levu, cow grass, creeping paspalum, desum, ditch millet, Indian crown grass, Indian paspalum, kodo, kodo millet, Kodohirse, kodomillet, kodo-millet, kodra, mijo koda, native Paspalum, rice grass, ricegrass paspalum, tho ndina, tho nduru levu, tho ni ndina, water couch

**Synonyms:** *Paspalum cartilagineum* J. Presl, *Paspalum commersonii* Lam., *Paspalum orbiculare* G. Forst., *Paspalum polystachyum* R. Br., *Paspalum scrobiculatum* var. *bispicatum*, *Paspalum scrobiculatum* var. *commersonii* (Lam.) Stapf, *Paspalum scrobiculatum* var. *polystachyum* (R. Br.) Stapf, *Paspalum scrobiculatum* var. *scrobiculatum*

15. [Pennisetum ciliare](#) (grass)

*Pennisetum ciliare*, commonly known as buffel grass, is a perennial bunchgrass that forms thick mats. It is also known by its basionym *Cenchrus ciliaris*. Buffel grass has been widely introduced in the dry tropics and subtropics as a pasture grass, for erosion control and revegetation of arid areas. The characteristics of buffel grass which make it suitable for erosion control are rapid germination, high propagation and establishment rates on poor and infertile soils. *Pennisetum ciliare*'s dominance and resistance to fire, drought and heavy grazing on arid soils make it a suitable arid zone pasture grass. In Australia, the south-western United States and Mexico (where it has been introduced as a pasture grass and for erosion control) *Pennisetum ciliare* often forms extensive dense monocultures excluding native species and promoting intense and frequent fires. It is widely distributed and is resilient to a number of harsh environmental conditions. *Pennisetum ciliare* changes plant communities by encouraging and carrying wildfires through communities that are not adapted to fire. It burns readily and recovers quickly after fire. *Pennisetum ciliare* has a robust root system; its swollen stem base accumulates carbohydrate reserves, so the loss of leaf surface area after a fire or drought is not fatal to the plant and allows regrowth in favourable conditions.

**Common Names:** African foxtail grass, Büffelgras, buffelgrass, cenchrus cilié, dhaman, pasto buffel, zacate buffel

**Synonyms:** *Cenchrus ciliaris* L., *Cenchrus glaucus* C. R. Mudaliar & Sundararaj, *Pennisetum cenchroides* Rich., *Pennisetum incomptum* Nees ex Steud.

16. [Pennisetum polystachion](#) (grass)  

*Pennisetum polystachion* (alternative spelling *Pennisetum polystachyon*) is a large grass species originating from Africa and India. It has spread to many Pacific islands and thrives in tropical climates. *Pennisetum polystachion* causes major problems in the Northern Territory of Australia, where it has greatly increased the amount of flammable material in the wooded savanna ecosystem, leading to greater devastation from bushfires.

**Common Names:** dipw rais, feathery pennisetum, mechen katu, missiongrass, o tamata, pwokso, queue de chat, thin napier grass, West Indian pennisetum

**Synonyms:** *Cenchrus setosus* Sw. 1788, *Gymnotrix geniculata* Schult. 1824, *Panicum barbatum* Roxb. 1820, *Panicum cauda-ratti* Schumach. 1827, *Panicum cenchroides* Rich. 1792, *Panicum densispicum* Poir. 1816, *Panicum erubescens* Willd. 1809, *Panicum polystachion* L. 1759, *Panicum subangustum* Schumach., *Panicum triticooides* Poir. 1816, *Pennisetum alopecurooides* Desv. ex Ham. 1825, *Pennisetum atrichum* Stapf & C.E.Hubb. 1933, *Pennisetum borbonicum* Kunth 1830, *Pennisetum cauda-ratti* (Schumach.) Franch. 1895, *Pennisetum elegans* Nees ex Steud. 1854, *Pennisetum erubescens* (Willd.) Link 1827, *Pennisetum flavescens* J.Presl 1830, *Pennisetum gabonense* Franch. 1895, *Pennisetum gracile* Benth. 1849, *Pennisetum hamiltonii* Steud. 1841, *Pennisetum hirsutum* Nees 1829, *Pennisetum indicum* Murray var. *purpurascens* (Kunth) Kuntze 1891, *Pennisetum nicaraguense* E.Fourn. 1880, *Pennisetum pallidum* Nees 1829, *Pennisetum polystachion* (L.) Schult. subsp. *setosum* (Sw.) Brunken 1979, *Pennisetum polystachion* (L.) Schult. subsp. *atrichum* (Stapf & C.E.Hubb.) Brunken 1979, *Pennisetum purpurascens* Kunth 1816, *Pennisetum reversum* Hack. ex Buettner var. *gymnochaetium* Hack. 1901, *Pennisetum reversum* Hack. ex Buettner 1890, *Pennisetum richardii* Kunth 1829, *Pennisetum setosum* (Sw.) L. Rich., *Pennisetum setosum* (Sw.) Rich. 1805, *Pennisetum sieberi* Kunth 1829, *Pennisetum stenostachyum* Peter 1930, *Pennisetum subangustum* (Schumach.) Stapf & C.E.Hubb. 1933, *Pennisetum*

*tenuispiculatum* Steud. 1854, *Pennisetum uniflorum* Kunth 1816 , *Setaria cenchroides* (Rich.) Roem. & Schult. 1817, *Setaria erubescens* (Willd.) P.Beauv. 1812

17. [Ricinus communis](#) (tree, shrub) 

*Ricinus communis* is a perennial shrub that can assume tree-like status if it establishes in a suitable climate. It is frequently found invading riparian areas where it displaces native vegetation. The seed of this species is toxic to variety of species including humans. Consuming only a few seeds can be fatal.

**Common Names:** agaliya, agaliya , belenivalalagi, castor, castor bean, castor-oil-plant , gelug, higuerrilla, ka'apeha, kamakou, kasterolieboom, koli, la'au 'aila, lama palagi, lama palagi, lama papalagi, lepo , maskerekur, maskerekur, mbele ni vavalagi, pa'aila , pakarana, pakarani, palma-christi, piritu , ricin, rícino, Rizinus, tiairi , tiairi papa'a, tiairi popa'a, tiarili, toto ni vavalagi, toto ni vavalagi, tuitui, tuitui fua ikiiki , tuitui papa'a, uluchula skoki, uluchula skoki , utouto

**Synonyms:** *Ricinus africanus* Willd. , *Ricinus angulatus* Thunb. , *Ricinus armatus* Haw. , *Ricinus badius* Rchb. , *Ricinus chinensis* Thunb. , *Ricinus digitatus* Noronha , *Ricinus europaeus* T.Nees , *Ricinus glaucus* Hoffmanns. , *Ricinus hybridus* Besser , *Ricinus inermis* Mill. , *Ricinus japonicus* Thunb. , *Ricinus laevis* DC. , *Ricinus leucocarpus* Bertol. , *Ricinus lividus* Jacq. , *Ricinus macrophyllus* Bertol. , *Ricinus medicus* Forssk. , *Ricinus megalospermus* Delile , *Ricinus minor* Mill. , *Ricinus nanus* Balbis , *Ricinus peltatus* Noronha , *Ricinus purpurascens* Bertol. , *Ricinus rugosus* Mill. , *Ricinus sanguineus* Groenland , *Ricinus scaber* Bertol. ex Moris , *Ricinus speciosus* Burm.f. , *Ricinus spectabilis* Blume , *Ricinus tunisensis* Desf. , *Ricinus undulatus* Besser , *Ricinus urens* Mill. , *Ricinus viridis* Willd. , *Ricinus vulgaris* Mill.

18. [Rottboellia cochinchinensis](#) (grass) 

*Rottboellia cochinchinensis* is an erect annual grass that reaches heights of 4 metres. It is a weed of warm-season crops around the world, preferring tropical and subtropical climates. It grows along roadsides and in other open, well-drained sites. *R. cochinchinensis* is an aggressive weed, considered to be one of the 12 worst weeds that infest sugarcane (*Saccharum officinarum*) in the world. It is also a very competitive weed with maize crops. *R. cochinchinensis* has irritating hairs on its stem which makes it difficult to control it manually in small-scale farms. It is tolerant to most herbicides that are applied in cotton and maize fields. Management and removal of *R. cochinchinensis* requires the use of many man hours and the application of several techniques to ensure control.

**Common Names:** anguigay, annarai, bandjangan, barsali, bukal, bura, caminadora, capim-camalote, cebada fina, corn grass, dholu, doekoet kikisian, fataque duvet, gaho, girum nagei, graminea corredora, guinea-fowl grass , herbe à poils, herbe de riz, herbe fataque-duvet, herbe queue-de-rat, itch grass, itchgrass , jointed grass, Kelly grass , kokoma grass , konda panookoo, lisofya, paja peluda, prickle grass, Raoul grass, rice grass, sagisi, sancarana, shamva grass, sugarcane weed, swooate, tsunoaiashi

**Synonyms:** *Aegilops exaltata* L., *Manisuris exaltata* (L. f.) Kuntze , *Ophiurus appendiculatus* Steud., *Rottboellia arundinacea* Hochst. ex A. Rich , *Rottboellia denudata* Steud., *Rottboellia exaltata* L. f., nom. illeg, *Rottboellia setosa* J.S. Presl ex C.B. Presl , *Stegosia cochinchinensis* Lour, *Stegosia exaltata* Nash

19. [Tilapia zillii](#) (fish)

In its native, tropical range, *Tilapia zillii* is important as a food fish as well as for aquaculture. *Tilapia zillii* provided 70% of Egypt's fish production, however outside its native range, this freshwater fish has the ability to establish itself even in highly salinated waters, only being held back by a low tolerance to cold water. Often introduced for use in aquatic weed control, *Tilapia zillii* can alter native benthic communities through the elimination of macrophytes and exhibits aggressive behaviour towards other fish species.

**Common Names:** akpadi sila, akpasila, amnun matzui, a-sannoh, bere, biare, biering, bugu, bulti, cichlid, didee, disiwulen, Engege, Epia, Erihere, falga, garagaza, gargaza, gba gba ferah, gbatchekede, guring, ifunu, isiswe, karfasa, karwa, ka-yainkain, kido, kokine, kpro ibre, kuda, loroto, mango fish, mojarra, mojarrita, mpupa, ngege, ngipie, ngorkei, njabb, obrouyou, pastenague boulee, perege, punavatsatilapia, redbelly

tilapia, sato, sili, silla, sohn, striped tilapia, tegr-pere, tha thompo, tihil, tilapia, tome, tsokungi, ukuobu, waas, waas gnoul, wesafun, Zilles Buntbarsch, zilli's cichlid, zill's tilapia

**Synonyms:** *Acerina zilli* (Gervais, 1848), *Chromis andreae* (Gunther, 1864), *Chromis coeruleomaculatus* (Rochebrune, 1880), *Chromis faidherbii* (Rochebrune, 1880), *Chromis melanopleura* (Dumeril, 1861), *Chromis menzalensis* (Mitchell, 1895), *Chromis tristrami* (Gunther, 1860), *Chromis zillii* (Gervais, 1848), *Coptodon zillii* (Gervais, 1848), *Coptodus zillii* (Gervais, 1848), *Glyphisidon zillii* (Gervais, 1848), *Haligenes tristrami* (Gunther, 1860), *Sarotherodon zillei* (Gervais, 1848), *Sarotherodon zillii* (Gervais, 1848), *Tilapia faidherbi* (Rochebrune, 1880), *Tilapia melanopleura* (Dumeril, 1861), *Tilapia menzalensis* (Mitchell, 1895), *Tilapia multiradiata* (Holly, 1928), *Tilapia shariensis* (Fowler, 1949), *Tilapia sparrmani multiradiata* (Holly, 1928), *Tilapia tristrami* (Gunther, 1860)

20. ***Typha latifolia*** (aquatic plant)

*Typha latifolia* (cattails) are among the most common of all aquatic plants. They are often a nuisance but also perform an important function in keeping a lake healthy by filtering the runoffs. *Typha latifolia* form dense monocultures when there is a wetland disturbance. They can reach up to 2 or 3 metres and grow prolifically from thick underground rhizomes, forming dense rhizome mats and litter which has an impact on species diversity by alteration of habitat. Dense *Typha latifolia* growth and litter may reduce the opportunity for other plants to establish or survive.

**Common Names:** broadleaf cattail , broad-leaf cattail , cattail , cattail (common) , common cattail , Cooper's reed, cumbungi, espadaña común, giant reed-mace, great cattail , piriopé, roseau des étangs , soft flag, tabua-larga, totora, tule espidilla

Source: <http://www.issg.org/database/species/search.asp?sts=sss&st=sss&fr=1&sn=&rn=kenya&hci=-1&ei=-1&lang=EN&Image1.x=20&Image1.y=11>

## Annex 5: Questionnaire (ke)

### Q.1 Questionnaire on Needs Assessments for Taxonomic tools and Products for invasive species, pest and pollinators

Name of Institution:.....

Address:.....

Name of Respondent:.....

Telephone:.....

Email:.....

1. Do you consider your institution
  - (a) Creator of taxonomical information
  - (b) Consumer of taxonomical information
  - (c) Both a and b above
  - (d) Others specify
2. (If applicable). Please rank the following taxonomical tools used by your institution in order of priority; 0 low, 1 medium, 2 high and 3 very high
  - (i) Identification keys (a) 0 (b) 1 (c) 2 (d) 3
  - (ii) Publications such as journal articles (a) 0 (b) 1 (c) 2 (d) 3
  - (iii) Books, check lists, manuals (a) 0 (b) 1 (c) 2 (d) 3
  - (iv) Pamphlets/posters (a) 0 (b) 1 (c) 2 (d) 3
  - (v) Collections specimen (a) 0 (b) 1 (c) 2 (d) 3
  - (vi) Online information (a) 0 (b) 1 (c) 2 (d) 3
  - (vii) Others tools (specify)
3. In the tools given in no. 2 above, please highlight one or two strengths and/or limitations
4. What are the major challenges in generating and disseminating taxonomical information
5. Who are your target clients
  - (a) farmers
  - (b) Students
  - (c) Researchers
  - (d) Business community (industries)
  - (e) Forensic experts (e.g. police)
  - (f) Others specify
6. Is taxonomical information easily accessible to intended target groups?
  - (a) Yes
  - (b) No
7. If, no give suggestion for improvement
8. Are formats in which taxonomical products are provided (especially on invasive alien species, pests & pollinators) user friendly?
  - (a) Yes
  - (b) No
9. If, no please give suggestion for improvement
10. List some national, regional or international institutions/researchers/projects which could provide for some of your taxonomic needs in your field.
11. Give any other information that you feel is important eg brief on the species you deal with.

**Annex 5. Guiding Notes: ToRs**

1. Prepare the tools/methodologies for the review and agree them with Project Team.
2. Carry out a stakeholder analysis to define institutional landscape and categories of end-users for IAS /pests/pollinators thematic areas at national level.
3. Carry out an end user Needs Assessment for taxonomic tools and products for the three themes with special emphasis on those needed by farmers and local communities, for training Para-taxonomists and taxonomists and for use by regulatory agencies e.g. plant health and quarantine, and conservation institutions.
4. Document existing tools and products e.g. national checklists, guides, species lists appended to National Legislation, identification keys, etc of the IAS /pests/pollinators and analyse the gaps therein.
5. Recommend any other relevant tools and products that would improve in knowledge, identification and / or use of IAS/pests/pollinators at national level in Kenya, Uganda and Tanzania.
6. Assess priority tools and products needed for efficient delivery of the UVIMA project objectives, within participating institutions.
7. Identify gaps in infrastructure needs of taxonomic institutions for each theme and outline options for further development including useful partnerships and linkages needed for their development at national, regional and international levels.
8. Make recommendations on opportunities for and potential for creating and/or strengthening synergies at institutional level in the three themes and collaborations between institutions to reduce duplication of efforts.
9. Scope out options for linking with and effectively disseminating tools and products to end-users e.g. farmers and local communities, government agencies, organizations and taxonomic institutions.
10. Document and address any other relevant issues concerning tools and products for IAS /pests/pollinators needs not mentioned above.

**Annex 6.Key deliverables**

Focus: community, extension, management agencies that are end-users of taxonomic products and tools

Key Questions: What, Where, When, How and Why

Existing tools and products (What, where, why, how) documented
Target users (Stakeholder analysis) of UVIMA products i.e. taxonomic products and tools for invasive, pest and pollinator management to enhance food security, ecosystem services, trade, agricultural productivity and ultimately human well being, environmental integrity and sustainability determined and prioritised
Tools and products that are with end users and which are in use assessed
Means of dissemination for existing products and tools - successes, failures and challenges to avoid – assessed
Suitability of tools and products for key target audiences assessed

The question: which are the weakest links - production of tools that are not suitable for target audience or ineffective dissemination or use of inappropriate or ineffective platforms – answered
Demand for or potential applications of taxonomic products and tools UVIMA could produce assessed and prioritised
Current and potential infrastructure for developing these tools and products to identify the Niche for the UVIMA project (is the infrastructure such as software and imaging technologies robust enough or does UVIMA need to build on, enhance or otherwise, if so what information / training / software etc is need?) documented.
Existing strategic partnerships and collaborations and the gaps identified