

Adapting agriculture to climate change:
collecting, protecting and preparing crop wild relatives

Nigeria



Seed Collecting Guide

Please cite this guide as:
RBG Kew (2015) Nepal Seed Collecting Guide

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The content of this collecting guide is intended only as a general reference for future collecting missions; the contents and data within are not guaranteed to be complete, correct, timely, current or up-to-date at the time of publishing. For general information and resources on collecting crop wild relatives, visit cwrdiversity.org.

Cover photos

TOP LEFT: Rice, CREDIT: Neil Palmer/CIAT;

TOP RIGHT: Finger millet, CREDIT: RBG Kew;

BOTTOM LEFT: Pigeonpea pods, CREDIT: Swathi Sridharan/ICRISAT;

BOTTOM RIGHT: *Malus baccata*, CREDIT: D.E. Herman/USDA-NRCS PLANTS Database.

This work was undertaken as part of the initiative “Adapting Agriculture to Climate Change” which is supported by the Government of Norway. The project is managed by the Global Crop Diversity Trust with the Millennium Seed Bank of the Royal Botanic Gardens, Kew, in partnership with national and international genebanks and plant breeding institutes around the world. It is implemented in accordance with the International Treaty on Plant Genetic Resources for Food and Agriculture. For further information see the project website: www.cwrdiversity.org/

Many individual scientists, herbaria, genebanks and specialist institutes are contributing advice and information to the Project and these guides. The Project aims to collect the wild relatives of 29 key crops, conserve them in genebanks, and prepare them for use in plant improvement programs to breed new crop varieties adapted to future climates.



The boundaries and names shown on the maps included in this guide do not imply official endorsement or acceptance by the Adapting Agriculture to Climate Change Project. Data source: GADM, Version 1.0 via diva-gis.org

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The Harlan and de Wet Crop Wild Relatives Checklist was developed by Holly Vincent and Nigel Maxted at the University of Birmingham.

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International Center for Tropical Agriculture
Since 1967 *Science to cultivate change*

The Gap Analysis work which informed the list of species included in this guide, and all the map files, were produced by the Gap Analysis team at CIAT: Andy Jarvis, Nora Castañeda, Colin Khoury and Julian Ramirez-Villegas.

RBG Kew is involved in the research and collection phases of the project. This collecting guide was developed based on the work of the Millennium Seed Bank Enhancement Project Species Targeting Team.

Royal Botanic Gardens
Kew



The Crop Wild Relatives Project is led by the Global Crop Diversity Trust. This work was undertaken as part of the initiative.

Specimen data was kindly provided to this project by many individuals and organisations who are listed on the website: <http://www.cwrdiversity.org/home/data-sources>

This data set will be made available for download. Please refer to the website for more information on this dataset.

This collecting guide has been compiled by:

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This collecting guide consists of species profiles and information sheets contained within this folder, alongside a CD which contains localities of the taxa in an excel file.

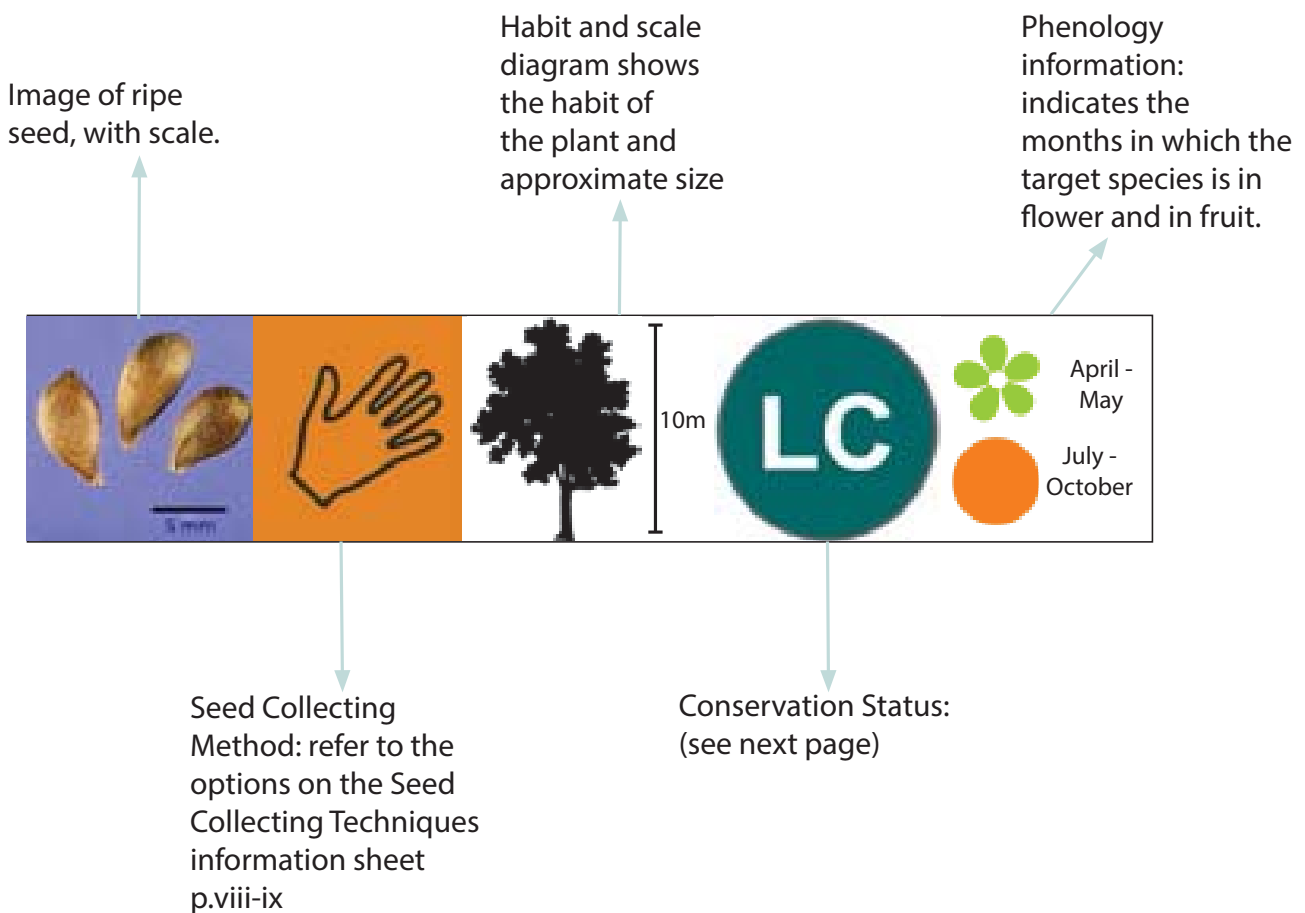
The species included in this guide are a selection of the wild relatives of the 29 key crops which this project covers. It is not a definitive guide to the Crop Wild Relatives in this country.

The guides are designed to be used both in the planning of a collecting trip, and also in the field.

At the front of this guide there is a phenology table showing the flowering and fruiting times of all the taxa to indicate which species may be found at a certain time of year, or when to collect target species.

Synonyms for each species are listed in the Appendix at the end of this guide.

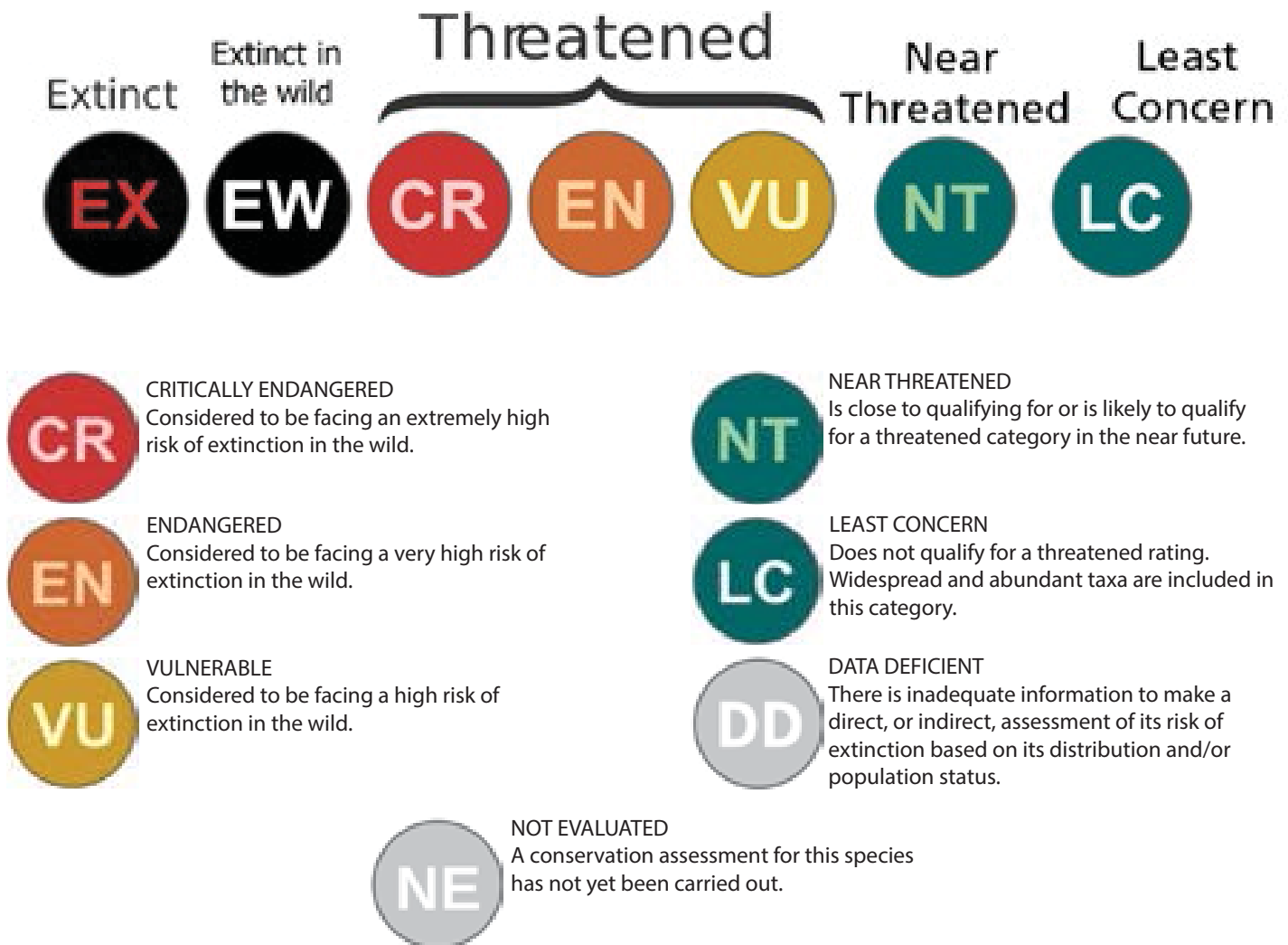
On each species profile, there is a collection of images to help identify the target species, accompanied by a series of symbols :



Conservation Assessments

Conservation Status:

Assessments are completed using 2001 IUCN Red List Categories and Criteria version 3.1 with the following categories:



Where a full conservation assessment has not been completed, a preliminary conservation rating may be indicated. Preliminary assessments are produced using specimen locality data and GIS, which calculates two parameters accepted by IUCN as suitable measures of range: namely extent of occurrence (EOO) and area of occupancy (AOO). These values derived for each species are then compared with thresholds set out by IUCN under Criterion B.

Where a preliminary conservation assessment has been calculated this is indicated by the word PRELIM:

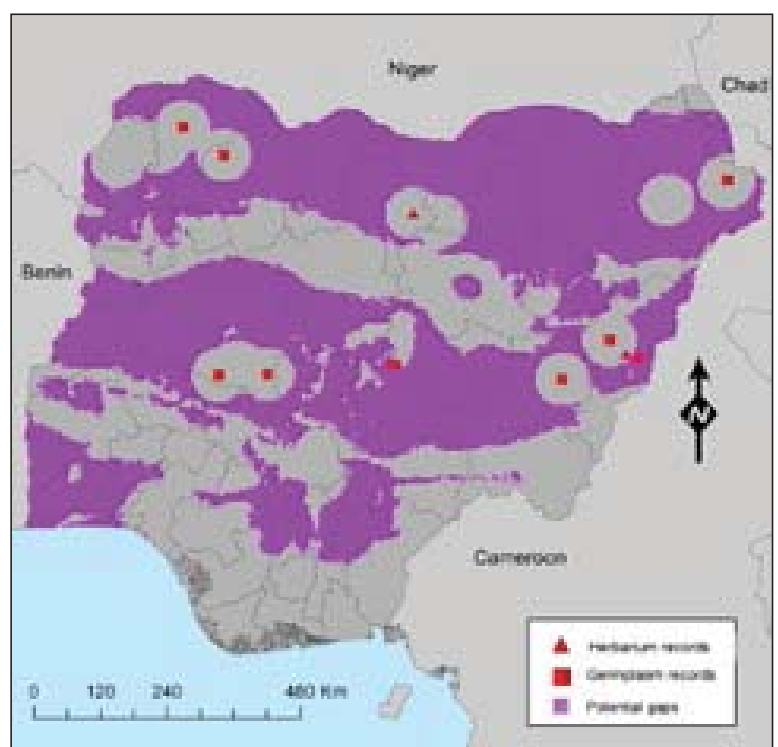


Maps

Two maps are provided for each target species. The first map shows a point distribution of all the known localities of this species based on herbarium specimen records and existing data-sets. The area shaded on this map shows the predicted distribution based on Maxent.



The second map shows the potential gaps in gene bank collections, where seed collections should be targeted.



Useful resources

The following resources are available online.

Kew technical information sheets

- Assessing a potential seed collection:
<http://brahmsonline.kew.org/Content/Projects/msbp/resources/Training/02-Assessing-population.pdf>
- Post-harvest handling of seed collections:
<http://brahmsonline.kew.org/Content/Projects/msbp/resources/Training/04-Post-harvest-handling.pdf>

Other sheets covering the following topics are available from

<http://brahmsonline.kew.org/msbp/Training/Resources>

- Protocol for comparative seed longevity testing
- Measuring seed moisture status using a hygrometer
- Selecting containers for long-term seed storage
- Low-cost monitors of seed moisture status
- Small-scale seed drying methods
- Equilibrating seeds to specific moisture levels
- Identifying desiccation-sensitive seeds
- Seed bank design: seed drying rooms
- Seed bank design: cold rooms for seed storage
- Cleaning seed collections for long-term conservation

ENSCONET seed collecting manual for wild species

http://ensconet.maich.gr/PDF/Collecting_protocol_English.pdf

Seed conservation: turning science into practice

<https://academic.oup.com/aob/article/95/5/888/201951>

Collecting plant genetic diversity: Technical guidelines (Bioversity)

http://cropgenebank.sgrp.cgiar.org/index.php?option=com_content&view=article&id=390&Itemid=557

FAO – Commission on Genetic Resources for Food and Agriculture

<http://www.fao.org/nr/cgrfa/en/>

IUCN Red List Categories and Criteria (Version 3.1)

<https://iucn-csg.org/red-list-categories/>

Plants of the World Online

<http://plantsoftheworldonline.org/>

For more information about the Crop Wild Relatives Project and to access the Harlan and de Wet Crop Wild Relatives checklist, please visit the website:

www.cwrdiversity.org

Identification Keys

Interactive identification keys can be accessed using the links below, or (?) from the CD accompanying this guide.

Kew Grassbase interactive identification key

<http://www.kew.org/data/grasses-db/ident.htm>

African Vigna: an interactive Key

http://keys.lucidcentral.org/keys/African_Vigna/default.htm

(can't get this to work online)

Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. (2006 onwards). GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>. [accessed 15 March 2012; 14:30 GMT]

Maxted, N., Mabuza-Dlamini, P., Moss, H., Padulosi, S., Jarvis, A. & Guarino, L., (2004). An Ecogeographic Survey: African Vigna. *Systematic and Ecogeographic Studies of Crop Genepools* 10. pp. 1-468. IPGRI, Rome.

Al-Atawneh, N., Shehadeh, A., Amri, A. & Maxted, N., (2009). *Conservation Field Guide to Medics of the Mediterranean Basin*. Pp. 1-214. ICARDA, Syria.

Seed Collecting Techniques

Michael Way and Kate Gold, Seed Conservation Department

Seed collecting from wild plants requires care, resourcefulness and determination. There are many different collecting techniques. The most appropriate technique will depend on the species, particularly the type of dispersal unit (fleshy fruit, dry fruit, individual seeds etc). This information sheet outlines the manual techniques most commonly used to make seed collections of adequate quality and quantity, for long term conservation.

Hand picking of whole fruits

The most basic and flexible of techniques, hand picking or plucking, has many benefits. Consider though, if you can use a more efficient technique.

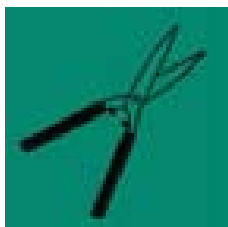


Plucking is particularly suitable when:

- target fruits can easily be selected by eye (e.g. due to colour or texture change of fruit coat, or swelling of fruit);
- non-target (e.g. immature or damaged) fruit cannot be excluded from the collection by more efficient techniques;
- fruits are easily accessible and collectors can tie buckets or similar containers around the waist, releasing both hands for collecting;
- collecting many-seeded fleshy or dry indehiscent fruits; and
- making small seed collections.

Pruning clusters of fruit

This technique is typically used to collect tree seeds. Cut groups or clusters of fruits using secateurs or tree pruners. Assess for ripeness and damage before adding seeds to the collection.

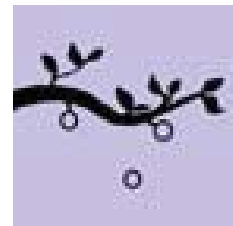


This is a very effective technique when:

- seed is clustered at the distal (terminal) parts of branches;
- the species is abundant and a small associated loss of branch and foliage is acceptable;
- seed is beyond reach of the collectors and has to be obtained using tree pruners.

Shaking branches

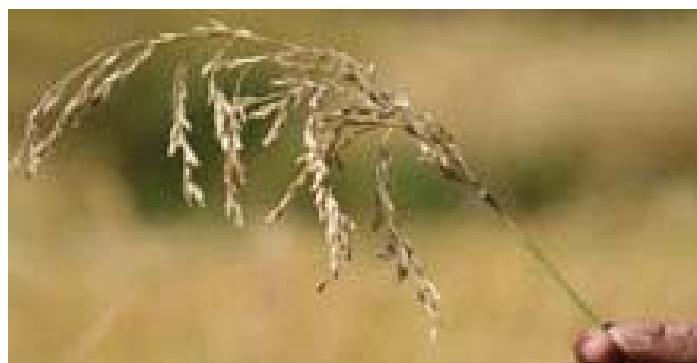
Careful shaking of branches will sometimes dislodge the best available seed, which can be collected in buckets or on a tarpaulin held or spread out beneath the plant. Start with gentle taps, and carefully check each sample of seed dislodged. Light shaking will often dislodge fully ripe fruits and seeds, leaving immature, poorly developed and damaged seeds to be retained on the parent plant. Too-heavy beating of branches may cause damage to the tree, and may also dislodge other plant material and associated insects, necessitating additional cleaning of the collection.



Shaking branches may be useful when collecting:

- dehiscent fruits with medium large seeds;
- seeds with irritant plumes (e.g. *Cercocarpus* of the Rosaceae);
- spiny trees such as *Prosopis* (Fabaceae);
- on level, open terrain suitable for tarpaulin use.

This technique may not be suitable for light, plumed seed from Bombacaceae and Asclepiadaceae, which may be carried away by air currents.



ABOVE: Stripping seed heads may be appropriate for grasses
Credit: Global Crop Diversity Trust/Britta Skagerfalt

Stripping entire seed-heads

This is a popular technique for collecting seed from grasses and may be suitable for other species with erect inflorescences (seedheads). Grasp the seedheads at the base with a gloved hand and slide the hand upwards, dislodging many or all of the seeds. This technique may introduce a proportion of immature seeds into the collection. Such seeds might need further postharvest ripening which can be time consuming and is best avoided.

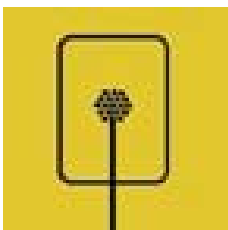


The stripping technique is most suitable for:

- dense, mono-specific stands of target species with no weed or other species present; and
- inflorescences which are completely and consistently at the natural dispersal stage.

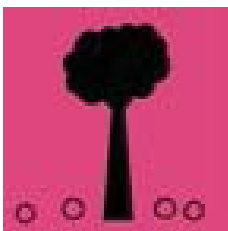
Bagging seed-heads

If there is frequent access to the collecting site, and if seeds would otherwise be lost, fix a well-tied mesh bag loosely over pre-dispersal seed heads. Seeds are captured as soon as they are shed, and can be periodically removed. This has been successfully used on a small scale, e.g. for collecting *Fouquieria* sp.



Collecting from the ground

You will frequently find seeds on the ground below trees or shrubs, but they will often be damaged by pests or pathogens. The seeds may have been on the ground for several months, and could even date from the previous year. Such seed will have aged and life-span in storage will be reduced. Inspect the seed carefully, noting any variation in the fruit, seed coat and internal tissues.



In general, only collect from the ground when:

- the parent tree(s) can be determined without doubt;
- you are certain that you are collecting recently dispersed seeds;
- seeds have not suffered significant damage from pests or pathogens; and
- other techniques or collecting options are unsuitable.

Collecting fleshy fruits

- Collect fleshy fruits directly into strong plastic bags or tubs with as much air as possible.
- Pack the bags in a rigid plastic container to ensure that the fruits are not squashed and help prevent them getting too hot and fermenting during transit.
- You may need to remove the seeds from fleshy fruits either during or immediately after the field trip.



ABOVE Collecting small seeds into paper bags
Credit: Ruth Harker/ RBG Kew

Containers

Collect into buckets, cloth or paper bags, and check each person's sample carefully before combining into a single population collection.

Using buckets has the advantage of allowing you to monitor the quality of the collection whilst associated insects disperse freely.

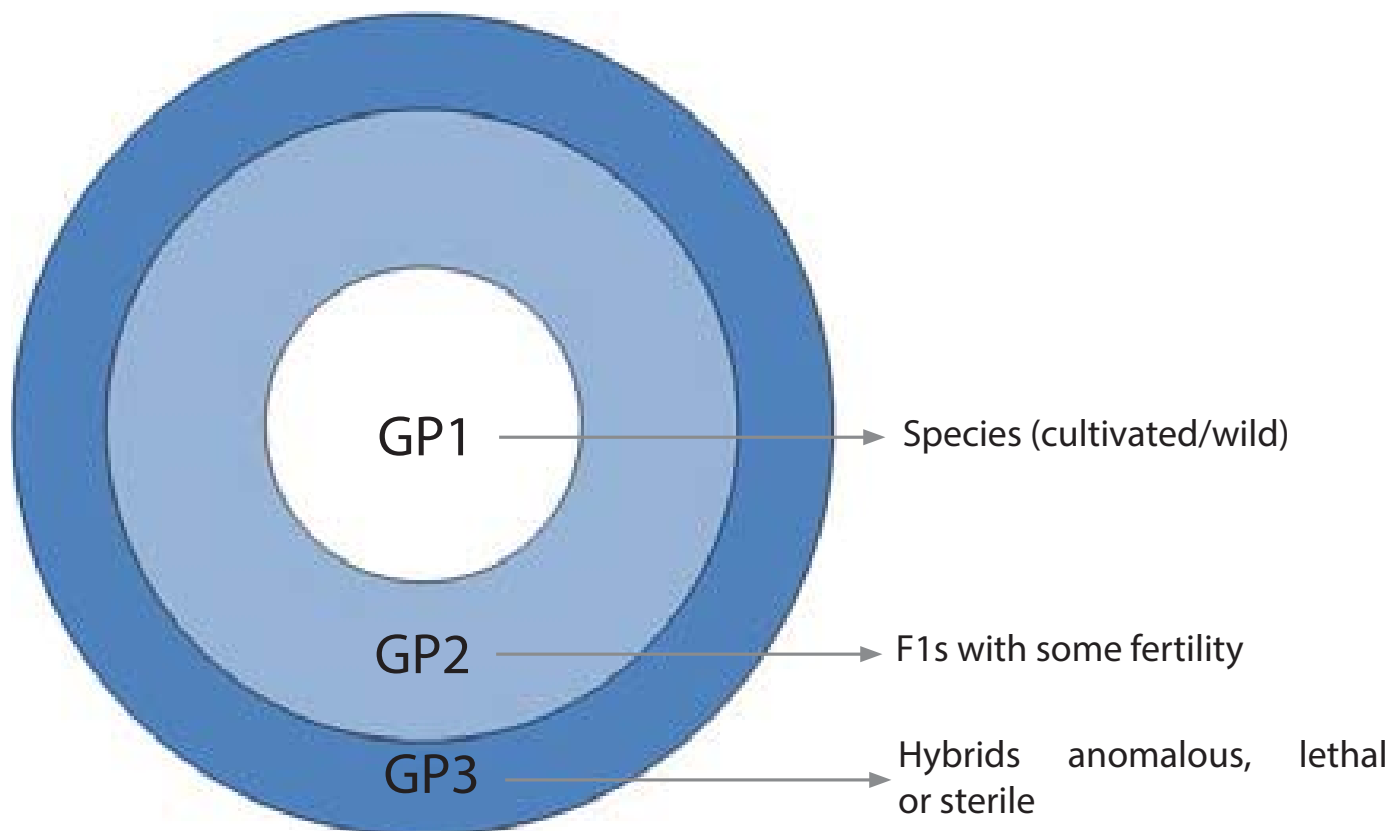
Place collections of dry, ripe seed into cloth or paper bags for transit. Store any awned seed or hooked fruit, that would damage or get stuck in cotton bags, in cardboard boxes or strong paper bags. Never collect or store seeds in plastic bags.

Label all seed containers inside and out with a unique collection number, and seal them securely. It is best to prepare sufficient labels before filling the containers.

Each target species in this guide is a wild relative of a crop. On each species profile it is indicated how closely related the target species is to the crop using either the Gene Pool concept or the Taxon Group concept. Species more closely related to the crop are higher priorities for collecting.

Gene Pool Concept

Harlan and de Wet, 1971



Taxon Group Concept

Maxted et al. 2006

Taxon Group 1 – cultivated/wild form of the crop

Taxon Group 2 – species in same series/section as crop

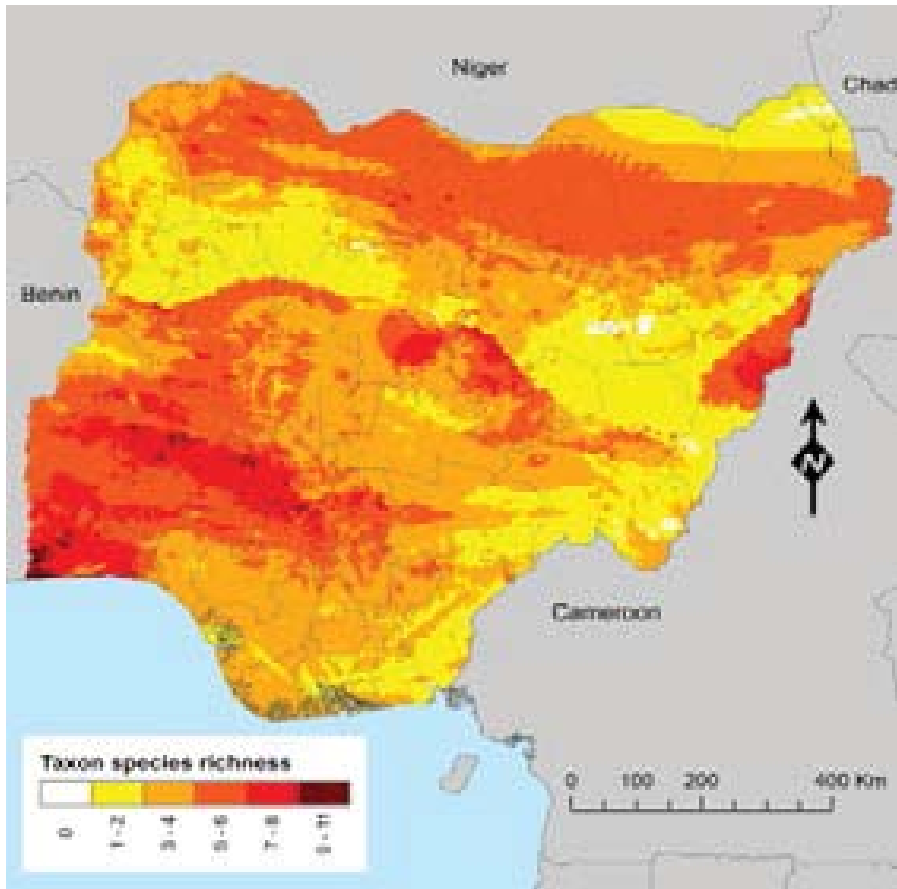
Taxon Group 3 – species in same subgenus as crop

Harlan, J. and J. de Wet (1971). Towards a rational classification of cultivated plants. *Taxon* 20: 509-517.

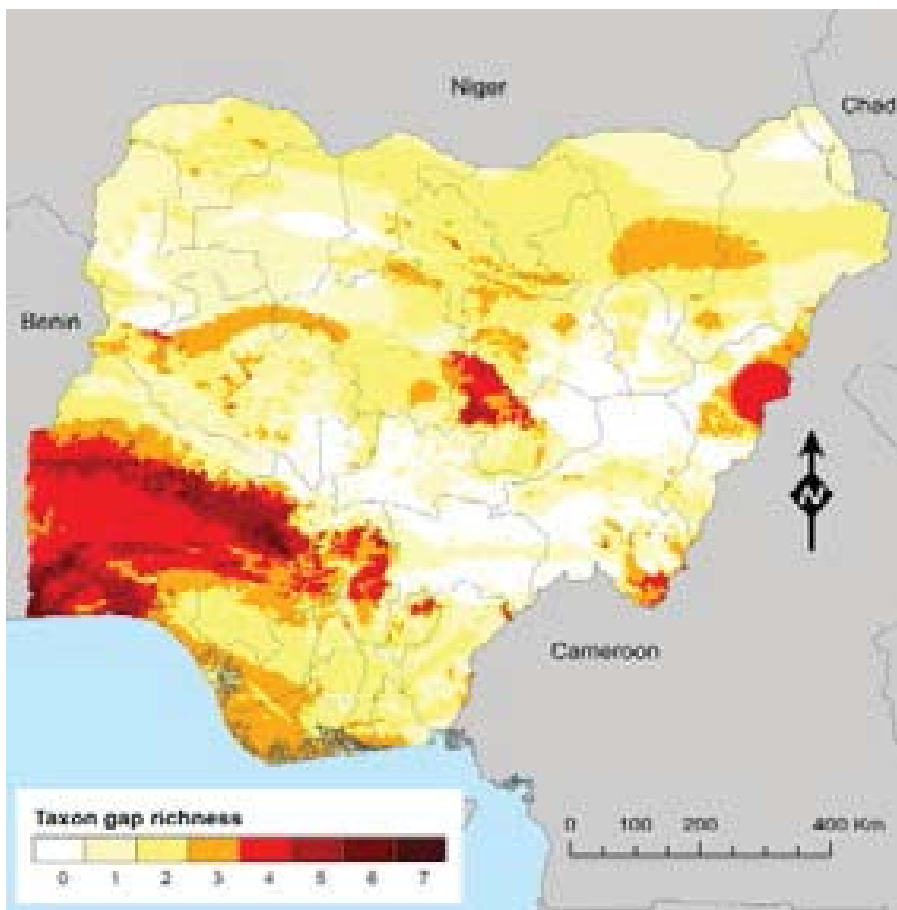
Maxted, N., B.V. Ford-Lloyd, S.L. Jury, S.P. Kell and M.A. Scholten (2006). Towards a definition of a crop wild relative. *Biodiversity and Conservation* 14: 1-13.

Country Maps

Species richness



Gap richness



Species in this guide

Family	Taxon	Genepool	Collection Priority	Sheet
Convolvulaceae	<i>Ipomoea ochracea</i>	Sweet potato	Low	1
Leguminosae	<i>Vigna subterranea</i> var. <i>spontanea</i>	Bambara groundnut	High	2
Leguminosae	<i>Vigna unguiculata</i> subsp. <i>baoulensis</i>	Cowpea	High	3
Poaceae	<i>Eleusine africana</i>	Finger millet	High	4
Poaceae	<i>Eleusine coracana</i>	Finger millet	Low	5
Poaceae	<i>Eleusine indica</i>	Finger millet	High	6
Poaceae	<i>Oryza barthii</i>	Rice	Low	7
Poaceae	<i>Oryza longistaminata</i>	Rice	Low	8
Poaceae	<i>Oryza punctata</i>	Rice	Low	9
Poaceae	<i>Oryza schweinfurthiana</i>	Rice	High	10
Poaceae	<i>Pennisetum purpureum</i>	Pearl millet	High	11
Poaceae	<i>Pennisetum stenostachyum</i>	Pearl millet	High	12
Poaceae	<i>Pennisetum violaceum</i>	Pearl millet	High	13
Poaceae	<i>Sorghum bicolor</i> subsp. <i>verticilliflorum</i>	Sorghum	High	14
Poaceae	<i>Sorghum purpureosericeum</i>	Sorghum	High	15
Solanaceae	<i>Solanum anguivi</i>	Eggplant	High	16
Solanaceae	<i>Solanum anomalum</i>	Eggplant	High	17
Solanaceae	<i>Solanum cerasiferum</i>	Eggplant	High	18
Solanaceae	<i>Solanum dasyphyllum</i>	Eggplant	High	19
Solanaceae	<i>Solanum macrocarpon</i>	Eggplant	High	20

Taxon	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Solanum anguivi												
Solanum anomalum												
Solanum cerasiferum												
Solanum dasyphyllum												
Solanum macrocarpon												

KEY

 Species in flower

 Species in fruit



Data gathered from literature and herbarium specimens

HABIT: Vines, stems twining, herbaceous, up to ca. 3 m long, glabrous.

LEAVES: Leaf blades chartaceous, cordate, 3.5-6 cm long, 3-5 cm wide, glabrous, margins entire, apex narrowly acuminate to acute, mucronulate, petioles up to 8 cm long.

INFLORESCENCE: Flowers solitary, axillary, or few in cymes, pedicels 5-40 mm long; sepals unequal, inner ones ovate, larger than outer ones, ca. 6 mm long, ca. 3 mm wide, apex acute, base rounded, outer ones ca. 5 mm long, ca. 2.5 mm wide, apex acuminate, mucronate, base rounded, all sepals glabrous, minutely verrucose, margins scarious

FLOWER: Corolla yellow, purple within tube, funnelform, 2.5-4 cm long.

FRUIT: Capsules brown, ovoid, 1.0-1.5 cm long, 0.5-0.7 cm in diameter, glabrous.

SEEDS: Often 4, sometimes fewer, black, globose to ovoid, ca. 4 mm in diameter, glabrous to puberulent.

Habitat:

Grows in lower elevation, mesic (moderately wet) disturbed areas.

Distribution:

Found throughout the tropics.

Altitude: 0 - 600 m

Ipomoea ochracea

Corolla bright yellow.



May be confused with:
Ipomoea obscura

Corolla white or pale yellow.



All populations priority
for collection.

References: Wagner, W.L., Herbst, D.R. & Sohmer, S. H. (1999) Manual of the flowering plants of Hawaii. Revised edition. Material for seed image provided by IBPGR.

CONVOLVULACEAE

Wild relative of sweet potato

Ipomoea ochracea (Lindl.) G. Don

Yellow morning glory



Forest & Kim Starr



Forest & Kim Starr

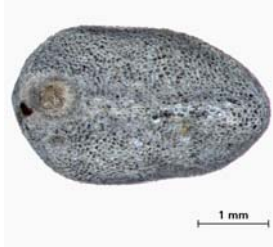


Forest & Kim Starr

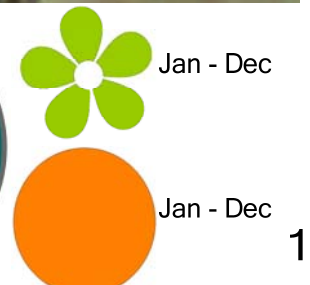


Forest & Kim Starr

Gemma Toothill (c) Board of Trustees RBG Kew



Up to 3 m



Jan - Dec

Jan - Dec

Primary relative of *Vigna subterranea* (L.) Verdc.

HABIT: Annual herbs. Stem short and creeping, sparsely pubescent, densely leafy, internodes short, 0.5-5.5 cm long.
LEAVES: Trifoliolate, held erect, 6-11 × 1-4.5 cm, petiole 5-30 cm long, rhachis 1-2.5 cm long, leaflets elliptic, obovate or oblanceolate, rounded or emarginate at the apex, cuneate at the base, glabrous. Stipules c. 3 mm long, ovate, slightly bilobed at the base, striate, multinerved.
INFLORESCENCE: Peduncle 0.5-3 cm × 0.2-0.8 mm, pubescent, expanding and bending downwards after flowering so that the fruits develop underground; rhachis usually 1-noded. Flower yellow, 9.5-12 × 8-10.5 mm, pedicel 1-5 mm long, expanding as the pod matures, bracteoles c. 2.5 × 0.5 mm, 1-nerved.
FLOWER: Calyx glabrous, tube 1 mm long, lobes 1 mm long, lowest lobe slightly longer than others, the upper pair of lobes joined to form a bifid lip. Standard with 2 obscure central appendages, keel open on the upper side, slightly twisted towards the right, without a beak. Ovary 1-4-ovuled.
FRUIT: Pods 1-3.5 × 1-1.8 cm, irregularly oblong-ovoid, shortly beaked with a recurved style base, glabrous.
SEEDS: Variously coloured, 8.5-15 mm in diameter, almost spherical or truncate if several seeds are present. Hilum elliptic, aril very reduced.

Habitat:

Sandy soils.

Distribution:

Cameroon, Nigeria.

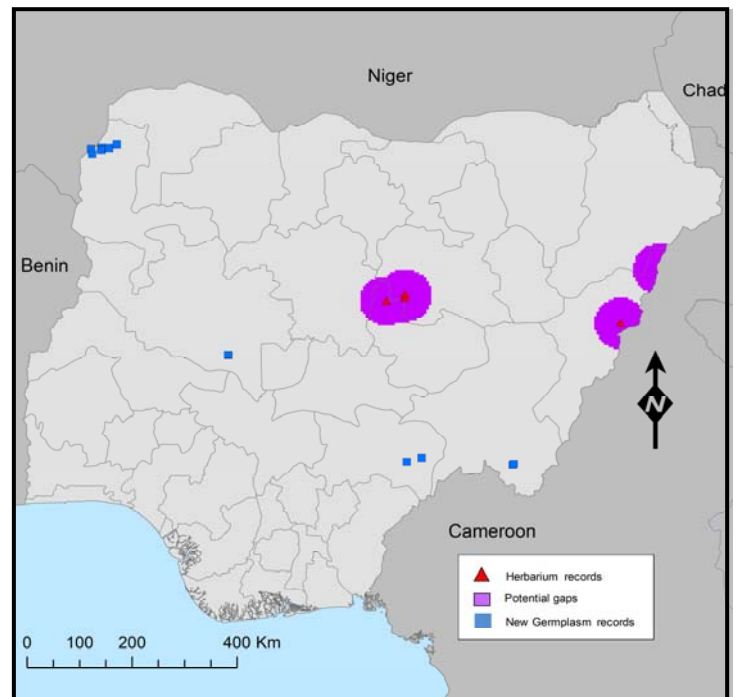
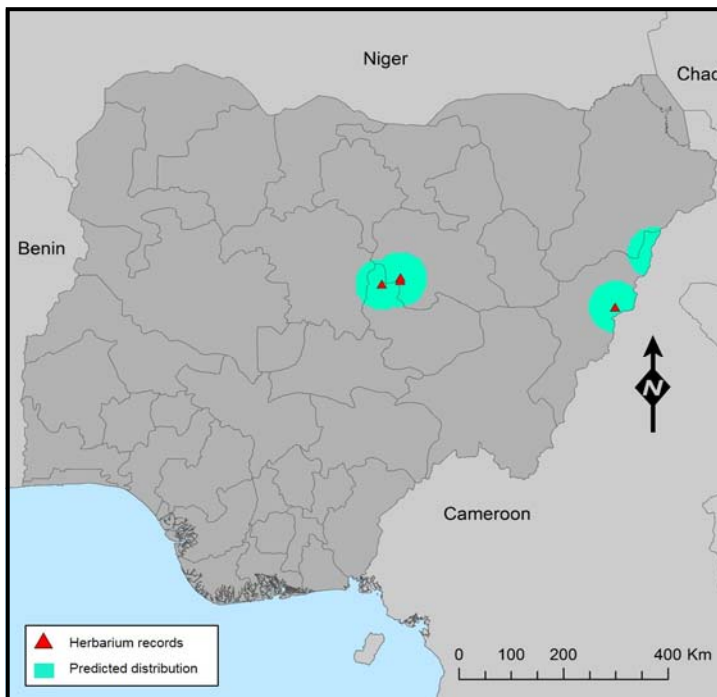
Altitude: 250 - 1200 m

Vigna subterranea var. *spontanea*

Wild variety with open growth habit and thick pods.

May be confused with:
Vigna subterranea var. *subterranea*

Cultivated variety with bunched growth habit and thinner pods.



References: Mackinder, B., Pasquet, R., Polhill, R. & Verdcourt, B. (2001) Leguminosae. Flora Zambesiaca, Volume:3, part: 5; Maxted et al. (2004) An Ecogeographic Study of African Vigna.

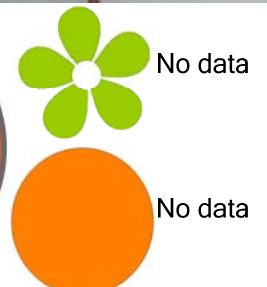
Primary relative of *Vigna subterranea* (L.) Verdc.



No seed image available



prostrate



Primary Gene Pool relative of *Vigna unguiculata* (L.) Walp.

HABIT: Annual herbs, erect, prostrate or climbing. Stipules oblong or ovate, medifixed, erect, 6-20 mm long, with a spur at the base.

LEAVES: Trifoliolate, leaflets lanceolate, ovate or rhombic, 15-165 x 8-90 mm, glabrous or sparsely hairy, apex acute or acuminate, venation reticulate.

INFLORESCENCES: Axillary, few-flowered, lax, rachis glands present. Flowers large, 26-38 mm long, with a strong aroma, calyx lobes short, 0.5-2 mm, keel twisted to the left, not beaked, style with a horizontal stigma directed outwards, number of ovules per ovary usually more than 16.

FRUIT: Pods bourn above ground, erect or pendent, linear-cylindrical or linear-oblong, 3.5-5(-12) mm long, not fleshy, not twisted at dehiscence. Seeds 11-18 per pod, testa black, brown or white, frequently mottled, aril present along rim, white.

Habitat:

Disturbed areas.

Distribution:

Restricted to West Africa (with one Zambian collection).

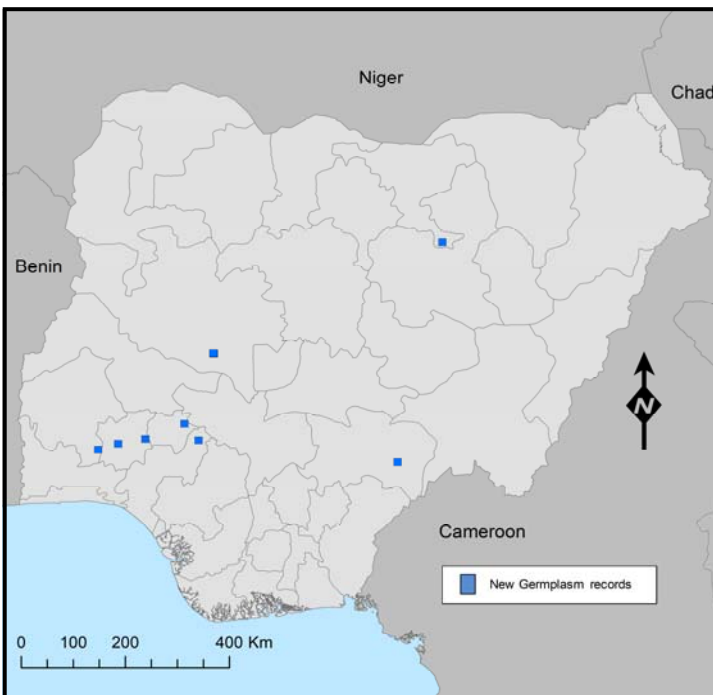
Altitude: 80 - 1250 m

Vigna unguiculata subsp. baoulensis

May be confused with:
Vigna unguiculata subsp. stenophylla

Calyx teeth 0.5-2 mm long; flower 26-38 mm long; ovules usually 17.

Calyx teeth 2-6 mm long; flower 16-21 mm long; ovules 10-14.



All populations priority
for collection.

References: Macted et al. (2004) An Ecogeographic Study of African Vigna.

Primary Gene Pool relative of *Vigna unguiculata* (L.) Walp.



No seed image available



0.5-3 m



No data

No data

Primary Gene Pool relative of *Pennisetum glaucum*

HABIT: Annual or perennial. Culms 30-200 cm. high, copiously branched.

LEAVES: Leaf laminae 3-16 mm. wide.

INFLORESCENCE: Panicle 3-25 cm. long, linear. Rhachis angular with sharp decurrent wings below the involucre scars, glabrous, involucre enclosing 1 sessile spikelet, bristles scaberulous or densely ciliate, tawny or purple, the longest 5-25 mm. Spikelets 2-5 mm long. Inferior glume suppressed or very small, the superior as long as spikelet. Superior floret coriaceous, shining, subacute, readily deciduous at maturity.

Habitat:

Usually found in proximity to the cultivated species.

Distribution:

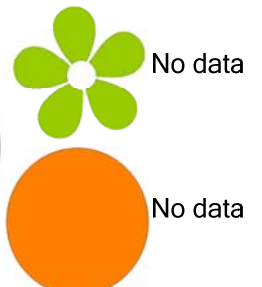
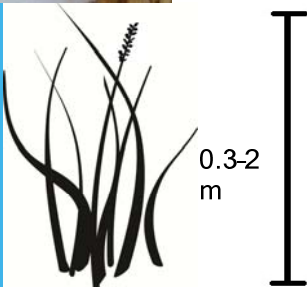
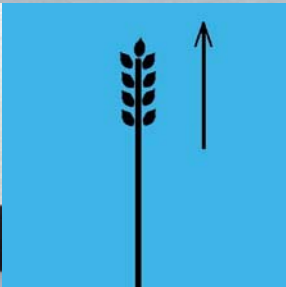
Native to Africa.

Altitude: 900 - 2100 m

<i>Cenchrus polystachios</i> subsp. <i>polystachios</i>	May be confused with: <i>Pennisetum glaucum</i>
Spikelets readily deciduous at maturity.	Spikelets persistent at maturity.

Reported from
Nigeria, but no
localities known.

All populations priority
for collection.



HABIT: Robust perennial forming large, bamboo-like clumps, with culms usually 2-3.5 m high (up to 7.5 m) and branched towards the top. Stem to 3 cm diameter near the base. Spreads by short rhizomes, rooting from lower nodes or falling stems rooting at nodes creating a stolon.

LEAVES: Leaf blades glabrous or hairy, 30-120 cm long and 1-5 cm wide; leaf-sheaths glabrous or with stiff hairs.

INFLORESCENCES: Bristly false spikes 10-30 cm long, 1.5-3 cm wide (excluding bristles) dense, usually yellow-brown in colour, more rarely greenish or purplish.

FRUIT: Caryopsis with adherent pericarp, ellipsoid, or ovoid, dorsally compressed, concealed by floret, 1.8-2.2 mm long.

Habitat:

Riverine sites, valley bottoms and forest margins, with a preference for rich soils.

Distribution:

Tropical Africa; introduced to most other tropical countries.

Altitude: 300 - 1800 m

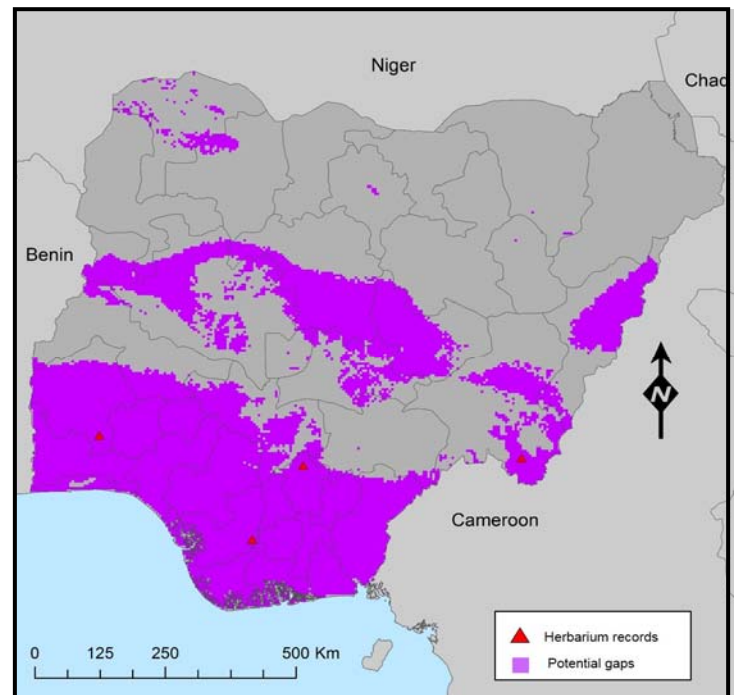
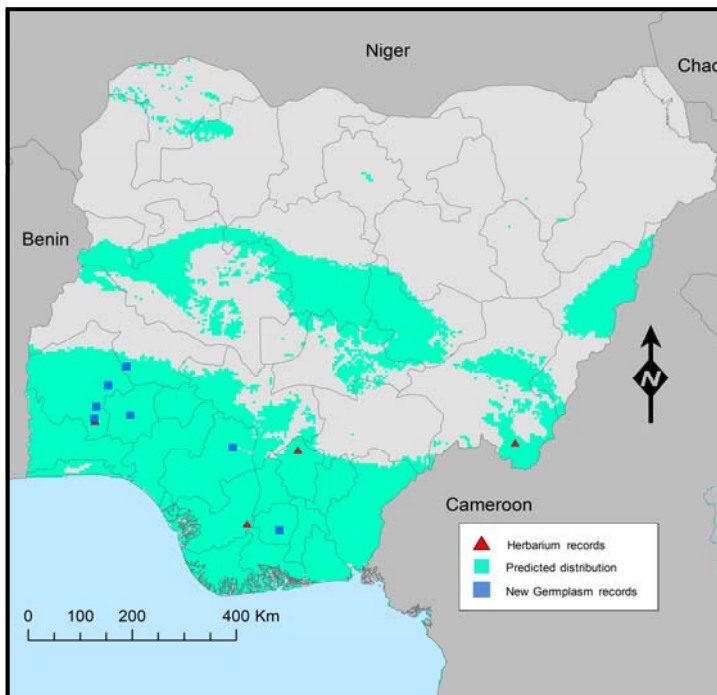
Cenchrus purpureus

Bristles are shed with the seeds.



May be confused with:
Setaria spp.

Seeds are shed without bristles.



References: W. D. Clayton (1989) Flora Zambesiaca, Volume 10, part 3, Gramineae; Cook, B.G., et al. (2005) Tropical Forages: an interactive selection tool <http://www.tropicalforages.info/>; Ibrahim K.M. & Kabuye C.H.S. (1987) An Illustrated Manual of Kenya Grasses



Forest & Kim Starr

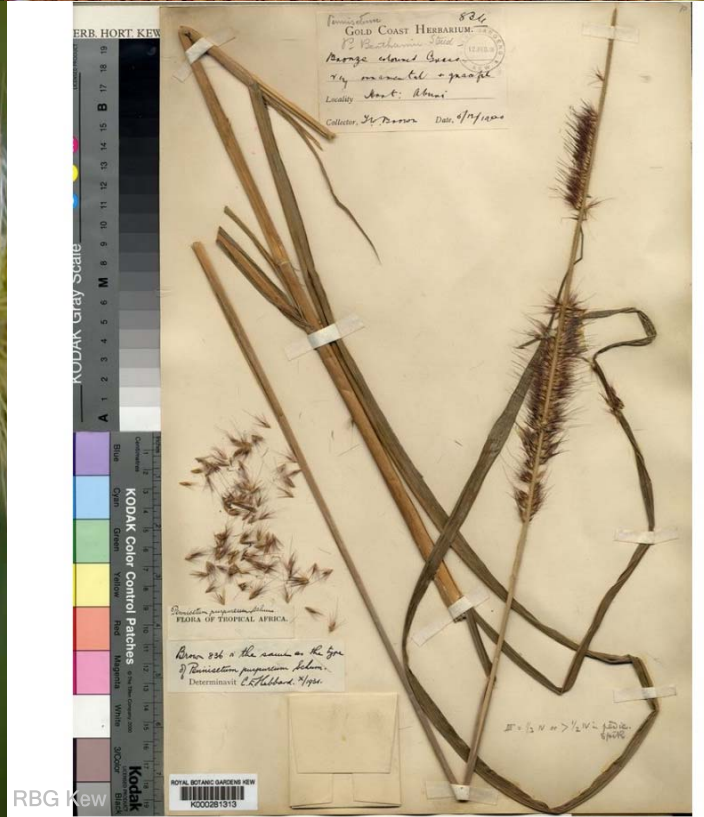


Forest & Kim Starr

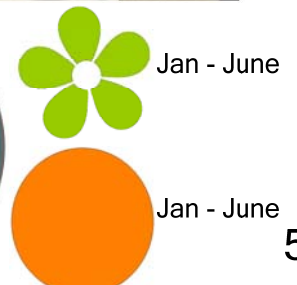
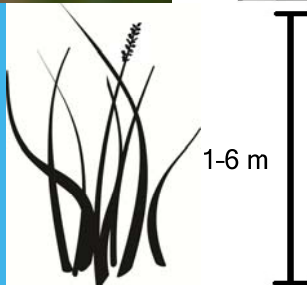
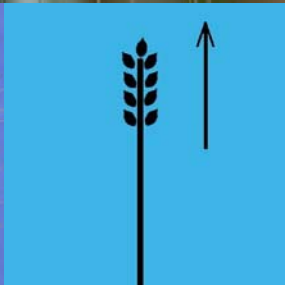
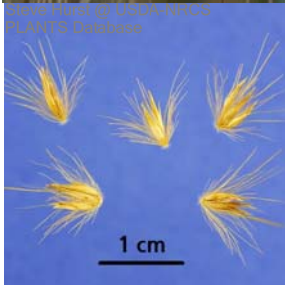


Forest & Kim Starr

Steve Hurst @ USDA-NRCS PLANTS Database



RBG Kew



HABIT Annual. Culms erect, or geniculately ascending, or decumbent; 30-300 cm long.

LEAVES: Ligule a fringe of hairs. Leaf-blades 15-100 cm long, 3-25 mm wide.

INFLORESCENCE: Panicle spiciform, linear; 2.5-20 cm long, 0.8-2 cm wide. Primary panicle branches accrescent to a central axis, with lateral stumps on axis. Panicle axis terete, pubescent. Involucre formed of spikelets subtended by bristles, sessile. Bristles oblong, 4-8 mm long, base obtuse, deciduous with the fertile spikelets, numerous, inner bristles longer than outer; terete, flexible, plumose. Spikelets comprising 1 basal sterile florets and 1 fertile floret, without rhachilla extension. Spikelets lanceolate, dorsally compressed, 4-7 mm long, falling entire with accessory branch structures.

Glumes usually absent or obscure, shorter than spikelet, thinner than fertile lemma. Upper glume oblate; 1-3.5 mm long, hyaline, without keels, primary vein absent, apex obtuse. Basal sterile florets male, or barren, palea present or absent.

Lemma of lower sterile floret lanceolate, 1.5-6 mm long, chartaceous, (1-)3-5 -veined. Fertile lemma lanceolate, or ovate, 5-6.5 mm long, coriaceous, 5-7 -veined, margins flat. Lodicules absent. Anthers 3, 1.5-2.5 mm long, tip penicillate.

FRUIT: Caryopsis with adherent pericarp, lanceolate, or ellipsoid, dorsally compressed, 2-3 mm long by 0.6-1 mm thick, apex obtuse.

Habitat:

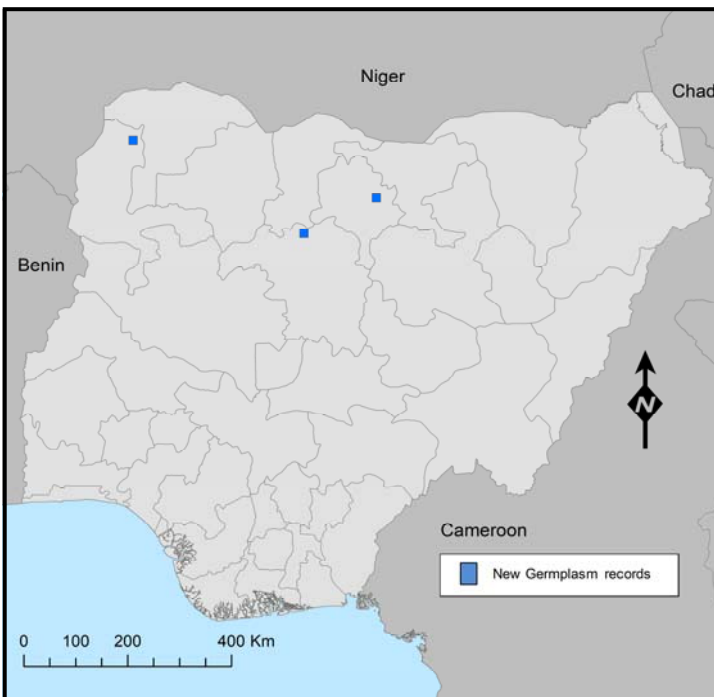
Desert and Xeric Shrubland.

Distribution:

Native to Northern, Central Africa, chiefly the Sahara and Sahel; introduced into Brazil.

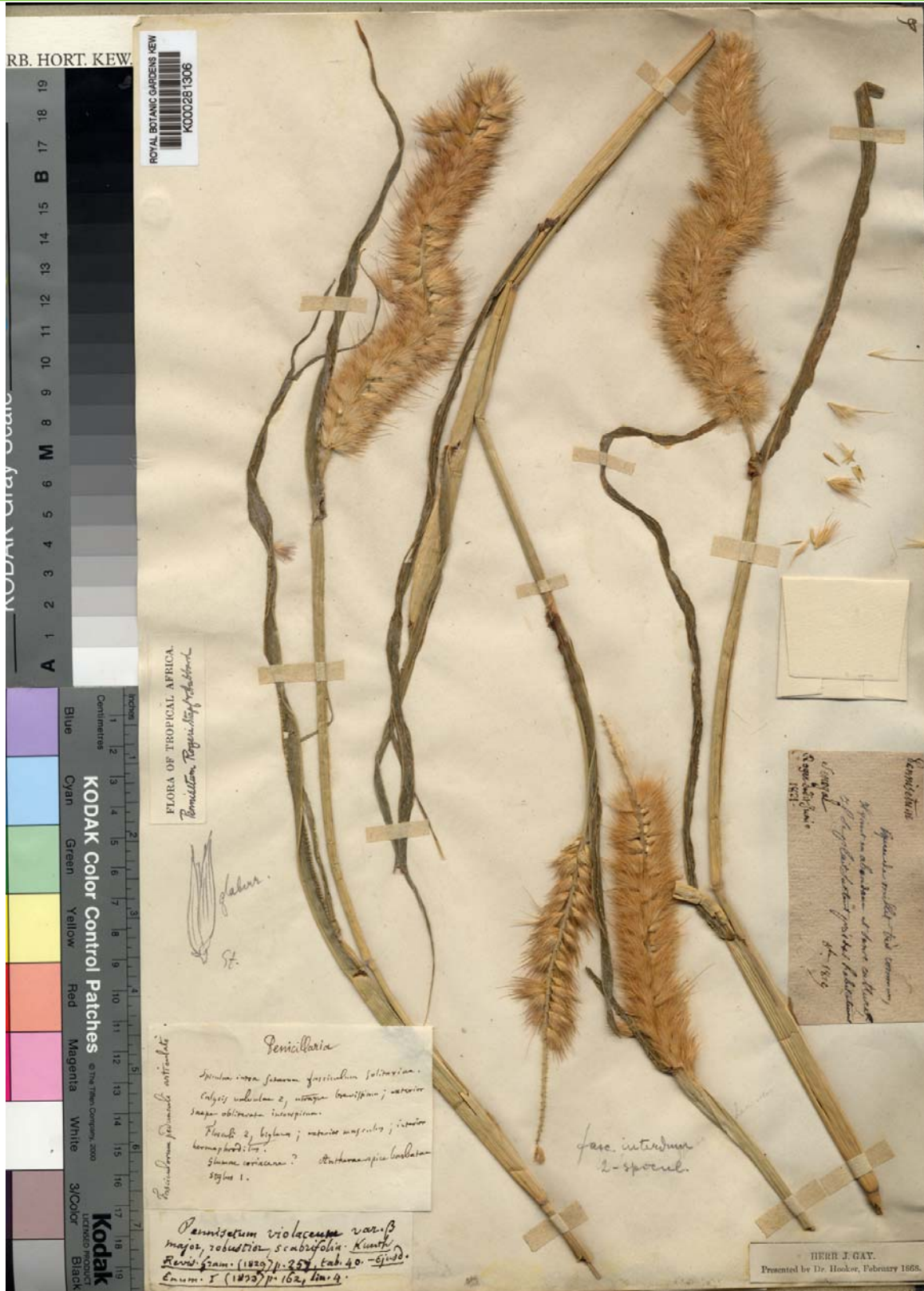
Altitude: unknown

<i>Cenchrus violaceus</i>	May be confused with: <i>Pennisetum glaucum</i>
Inflorescences with readily deciduous spikelets; involucre sessile, containing only a single spikelet.	Inflorescences dense, non-shattering; involucre stiped, containing 1-9 spikelets.



All populations priority
for collection.

References: eMonocot: *Pennisetum violaceum* <http://e-monocot.org/taxon/urn:kew.org:wcs:taxon:433032>
Andrews, D.J. & Kumar, K.A. (2006) Plant Resources of Tropical Africa (PROTA) [http://uses.plantnet-project.org/en/Pennisetum_glaucum_\(PROTA\)](http://uses.plantnet-project.org/en/Pennisetum_glaucum_(PROTA))



RBG Kew

No seed image available

0.33 m

LC

No data
No data

HABIT: Annual, plants growing in tight groups. Culms robust, 40-90 cm tall, erect or geniculately ascending, often rooting at the lower nodes.

LEAVES: Mostly basal, leaf blades 5-35 cm × 3-6 mm, usually folded. Ligule with a definite ciliate fringe.

INFLORESCENCE: Racemose 3-17, 3.5-15.5 cm × 4-7 mm. Spikelets solitary, 4.6-7.8 mm long, elliptic, appressed, disarticulating.

GLUMES: Persistent, shorter than spikelets, the inferior 2-3.2(-3.9) mm long, the superior 3-4.7 mm long. Lemmas 3.7-4.9 mm long, lanceolate in profile, acute to subacute.

FRUIT: Caryopsis 1.2-1.6 mm long, oblong to broadly oblong, the surface uniformly granular and obliquely ridged.

Habitat:

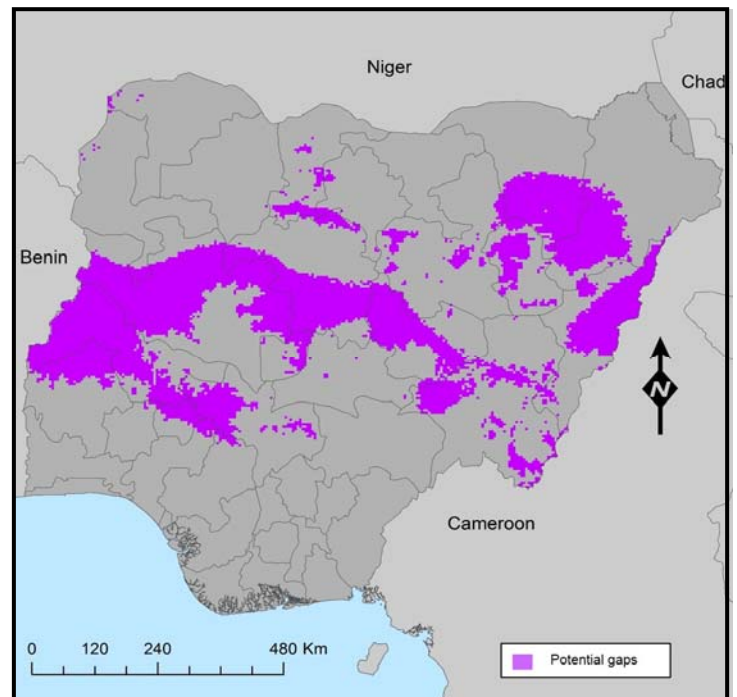
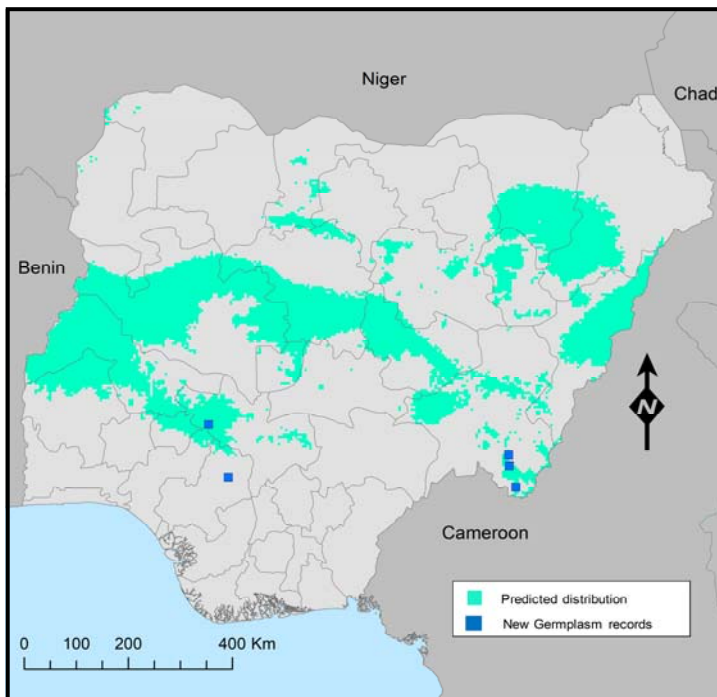
Usually in damp sandy soils beside rivers and dams, and in disturbed ground at roadsides; also in cultivated ground, often as a weed in crops, especially *E. coracana*.

Distribution:

Arabia and Africa, mainly in the uplands of the east and south.

Altitude: 500 - 2200 m

<i>Eleusine africana</i>	May be confused with: <i>Eleusine indica</i>
Larger spikelets (4.6-7.8 mm) and rounded grains.	Smaller spikelets (3-5 mm), oblong grains.



References: Phillips, S. (1995) Poaceae. In: Flora of Ethiopia and Eritrea. Volume 7, p 139; T. Cope (1999) Gramineae. In: Flora Zambesiaca, Volume 10, part 2; Hyde, M.A., Wursten, B.T. & Ballings, P. (2012). Flora of Zimbabwe.

POACEAE

Primary Gene Pool relative of *Eleusine coracana* (L.) Gaertn.

Eleusine africana Kenn.-O'Byrne

African finger millet



RBG Kew



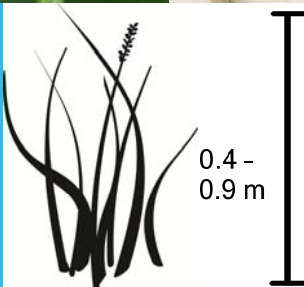
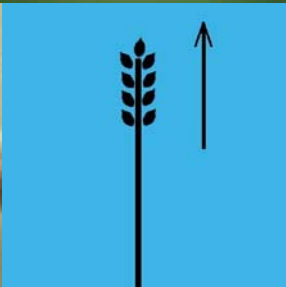
Petra Ballings



Petra Ballings



RBG Kew



Aug - May

Aug - May

HABIT: Clump-forming annual. Culms erect, 60-200 cm long, 5-20 mm diameter, internodes elliptical in section.

LEAVES: Mostly basal. Leaf-sheaths keeled, outer margin hairy. Ligule a cilliolate membrane. Leaf-blades conduplicate, 30-60 x 0.6-1.2 cm.

INFLORESCENCES: Peduncle glabrous, or pilose above (at raceme base). Racemes 4-7, digitate, erect, linear, or oblong, incurved, unilateral, 3-8 x 0.9-1.5 cm. Rhachis wingless, flattened. Spikelet packing broadside to rhachis, crowded, regular, 2 -rowed. Fertile Spikelets comprising 3-9 fertile florets with diminished florets at the apex. Spikelets ovate, laterally compressed, 5-10 mm long, persistent. Glumes similar, shorter than spikelet. Lower glume lanceolate, 2-5 mm long, 0.6-0.7 length of upper glume, membranous, keeled, keel winged, 1-3 -veined, apex acute. Upper glume elliptic, 3.5 mm long, 0.8-0.9 length of adjacent fertile lemma, membranous, keeled, keel winged, 5-7 -veined, apex acute. Fertile lemma lanceolate in profile, 4 mm long, membranous, midvein with contiguous subsidiary veins (3-veined), apex acute. Palea 0.9-1 length of lemma, 2 -veined. Apical sterile florets resembling fertile though underdeveloped. Flower: Lodicules 2, cuneate, fleshy.

FRUIT: Caryopsis with free soft pericarp, orbicular, isodiametric, biconvex, exposed between gaping lemma and palea at maturity, 1.5-2.5 mm long, dark brown, rugose.

Habitat:

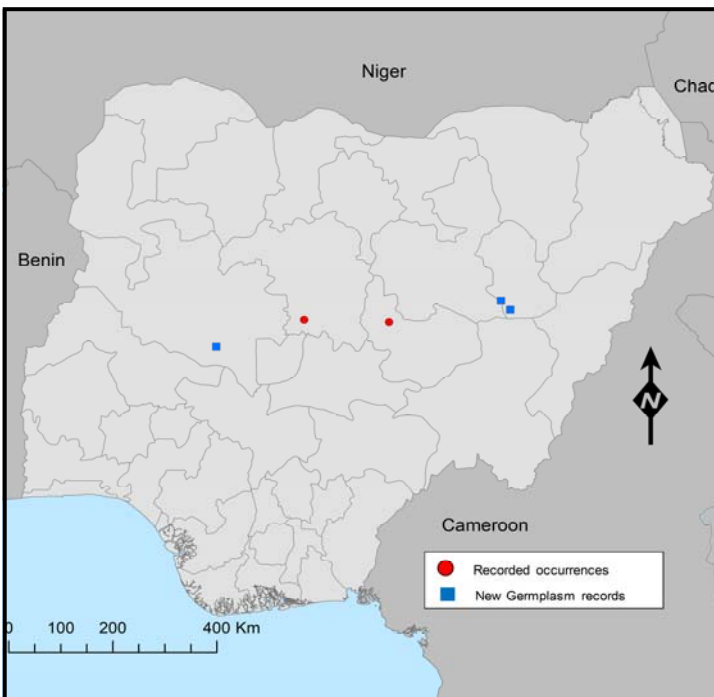
Disturbed ground often along roadsides.

Distribution:

Widespread in Europe, Africa, Asia and Australasia.

Altitude: 730 - 1600 m

<i>Eleusine coracana</i>	May be confused with: <i>Eleusine indica</i>
Spikes 9-15 mm wide. Grain plump, usually brown.	Spikes 3-7mm wide; grain elliptic to oblong, blackish.



All populations priority
for collection.

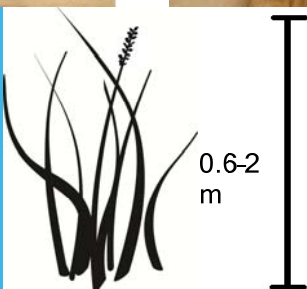
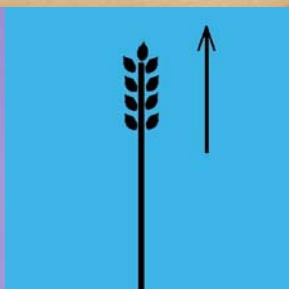
References: Clayton, W.D. et al. (2006 onwards). GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>; Cope, T. (1999) Gramineae, FZ volume:10 part: 2; Phillips, S.M. (1972), A Survey of the Genus *Eleusine* Gaertn. (Gramineae) in Africa, Kew Bulletin, Vol. 27, No. 2, pp. 251-270.

POACEAE

Primary Gene Pool relative of *Eleusine coracana* (L.) Gaertn.

Eleusine coracana Gaertn.

Rapoko; finger millet



Gene Pool Primary relative of *Eleusine coracana* (L.) Gaertn.

Capim-pé-de-galinha; Pé-de-galinha

HABIT: Clump-forming annuals. Culms geniculately ascending, or decumbent, slender, 15-90 cm long.**LEAVES:** Mostly basal. Leaf-sheaths keeled, outer margin hairy. Leaf-blades conduplicate, 5-35 cm long, 2.5-6 mm wide.**INFLORESCENCE:** Racemes 1-10(-17), single (rarely), or digitate, unilateral, 3.5-15.5 cm long, 3-3.5 mm wide. Spikelets comprising 3-9 fertile florets, with diminished florets at the apex. Spikelets elliptic, laterally compressed, 3-5 mm long, breaking up at maturity.**GLUMES:** Persistent, similar, shorter than spikelet. Fertile lemma lanceolate in profile, 2.1-3.6 mm long, membranous, 3-veined (excluding subsidiaries). Lodicules 2, cuneate, fleshy.**FRUIT:** Caryopsis with free soft pericarp, ellipsoid, isodiametric, trigonous, concealed by floret, 1-1.3 mm long, black, striate.**Habitat:**

In open anthropic areas, grasslands and savannas in the Amazon Rainforest, Caatinga, Cerrado, Atlantic Rainforest and Pampa phytogeographic domains.

Distribution:

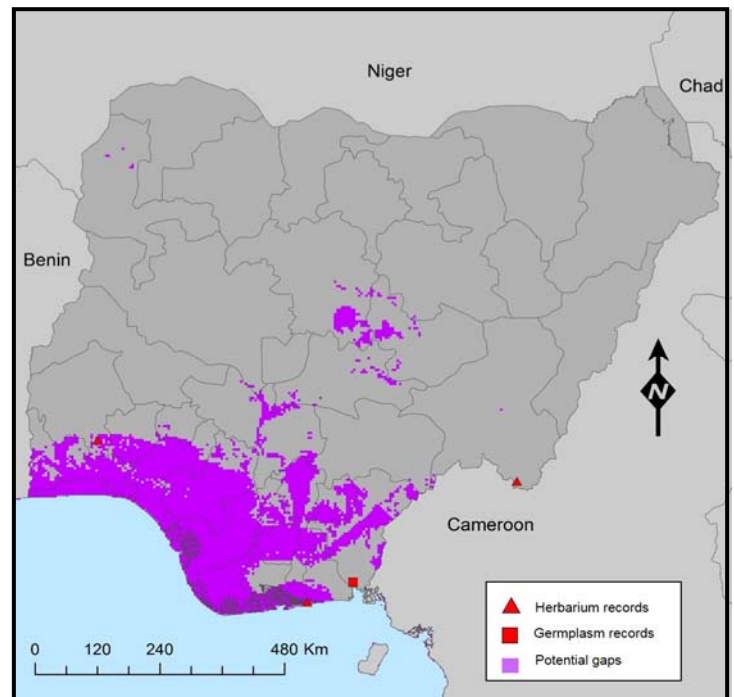
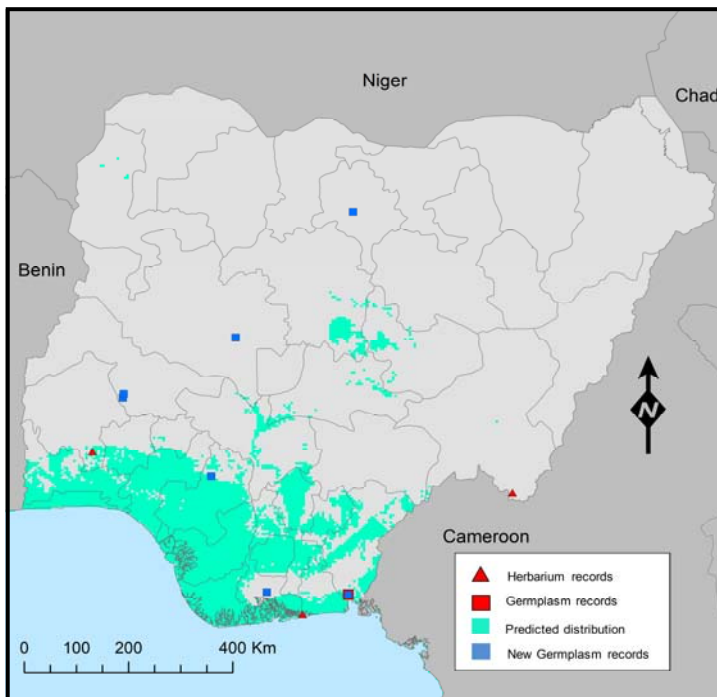
Widespread throughout Africa, the Americas, Southern Europe, Asia and Australasia. In Brazil in the North (AC, AM, AP, PA, RO, RR, TO); Northeast (AL, BA, CE, MA, PB, PE, PI, RN, SE); Central West (DF, GO, MS, MT); Southeast (ES, MG, RJ, SP), and South (PR, RS, SC).

Altitude: 0 - 1200 m*Eleusine indica*

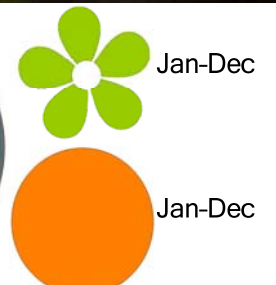
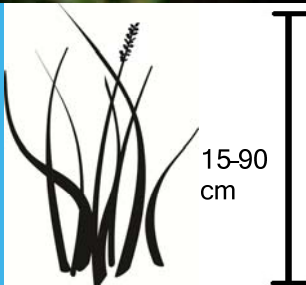
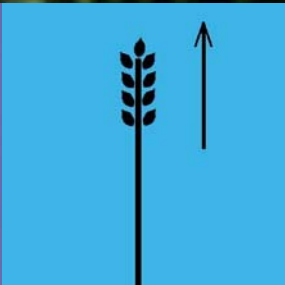
Spikes usually more than 3 cm long, usually less than 7 mm broad; backs of lemmas usually straight or very slightly curved towards apex.

May be confused with:
Eleusine tristachya

Spikes less than 3 cm, 7-10 mm broad; backs curved inward towards lemma.



References: GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>
Eleusine in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB13192>



Primary Gene Pool relative of *Oryza glaberrima* and *Oryza sativa*

HABIT: Clump-forming annuals. Culms geniculately ascending, or decumbent; 60-120 cm long, spongy; 3-8 -noded, rooting from lower nodes.

LEAVES: Leaf-sheaths smooth, glabrous on surface, auricles erect. Ligule an eciliate membrane, 2-6 mm long, truncate, or obtuse. Leaf-blades 15-45 x 0.4-1.3 cm, surface scaberulous; rough adaxially, margins scabrous, apex acute.

INFLORESCENCE: Panicle open, obovate, 20-35 x 3-7.5 cm. Panicle branches angular, scaberulous, primary branches appressed or ascending. Spikelets solitary. Fertile spikelets pedicelled. Pedicels linear, angular; 1-6 mm long, smooth, or scaberulous, tip cupuliform, bibracteate. Spikelets comprising 2 basal sterile florets; and 1 fertile floret, without rhachilla extension. Spikelets oblong, laterally compressed, 7-11 x 2.5-3.4 mm, falling entire, callus glabrous, base truncate, attached obliquely.

GLUMES: Absent or obscure. Basal sterile florets similar, barren, without significant palea.

FLOWER: Lodicules 2, lanceolate, membranous. Anthers 6. Stigmas 2.

FRUIT: Caryopsis with adherent pericarp. Disseminule comprising a floret.

Habitat:

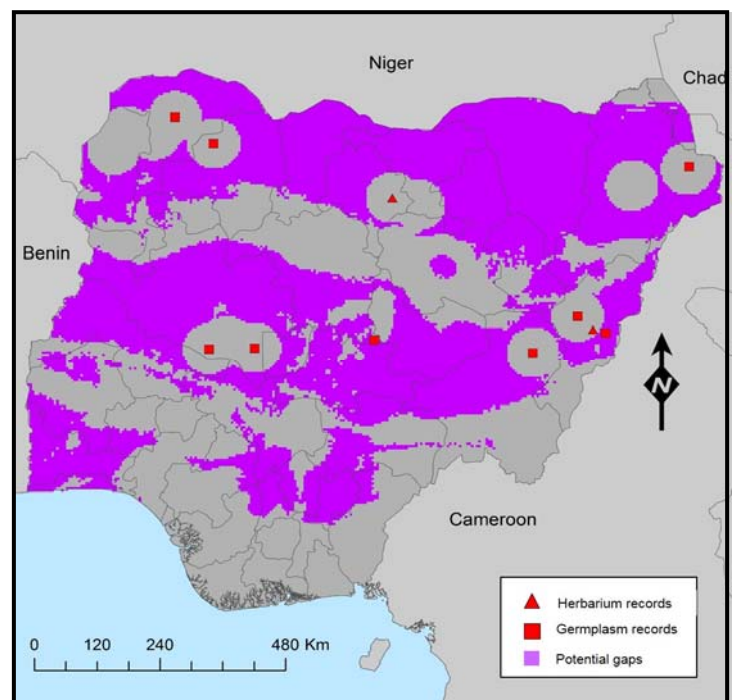
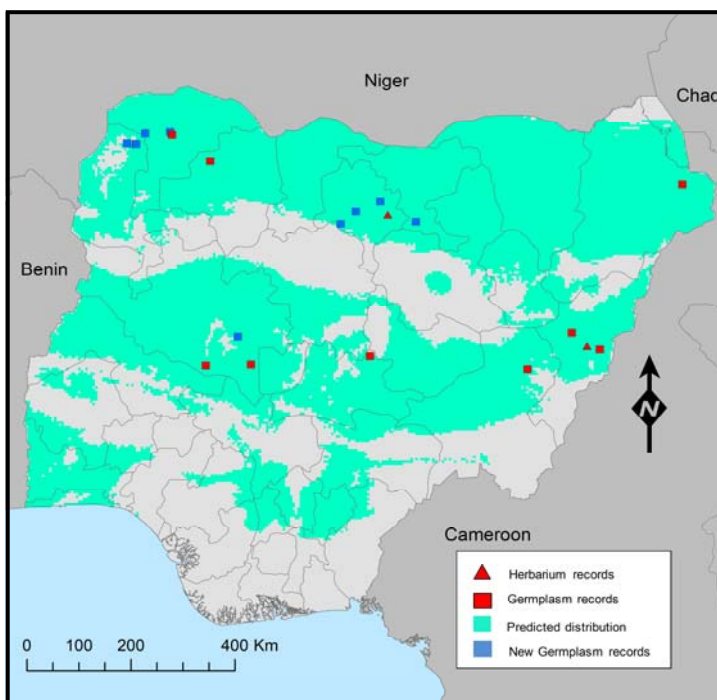
Found in Mopane or savanna woodland, savanna or fadama. Grows in deep water, seasonally flooded land, stagnant water and slowly flowing water or pools; prefers clay or black cotton soils. Found in open habitats.

Distribution:

Found throughout tropical Africa and as far south as Northern Botswana.

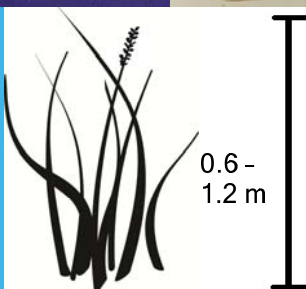
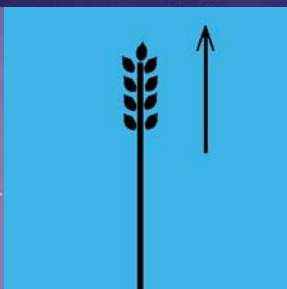
Altitude: 65 - 600 m

<i>Oryza barthii</i>	May be confused with: <i>Oryza longistaminata</i>
Leaves have short ligule (< 13mm).	Ligule of lower leaves > 15mm.



References: Vaughan, D.A. (1994) The Wild Relatives of Rice: A Genetic Resources Handbook.

Primary Gene Pool relative of *Oryza glaberrima* and *Oryza sativa*



Primary Gene Pool relative of *Oryza glaberrima* and *Oryza sativa*

HABIT: Rhizomes elongated. Culms geniculately ascending, or decumbent, 70-120 x 0.5-1 cm.

LEAVES: Leaf-sheaths smooth, glabrous on surface. Ligule an eciliate membrane, Leaf-blades 10-75 x 0.5-2.5 cm.

INFLORESCENCE: Panicle open, elliptic, or oblong, 16-40 cm long, 1.5-8 cm wide. Primary panicle branches appressed, or ascending. Panicle branches angular; scaberulous, glabrous or pubescent in axils. Spikelets solitary. Fertile spikelets pedicelled, comprising 2 basal sterile florets and 1 fertile floret without rhachilla extension. Spikelets oblong, laterally compressed, 7-12 x 2-3 mm, falling entire. Spikelet callus glabrous, base truncate, attached obliquely.

GLUMES: Absent or obscure. Basal sterile florets similar, barren, without significant palea. Lodicules 2, lanceolate, membranous.

FLOWER: Anthers 6, 4.5-5.5 mm long. Stigmas 2.

FRUIT: Caryopsis lanceolate or oblong, 5-7 mm long, laterally compressed, reddish, hilum linear, as long as caryopsis.

Habitat:

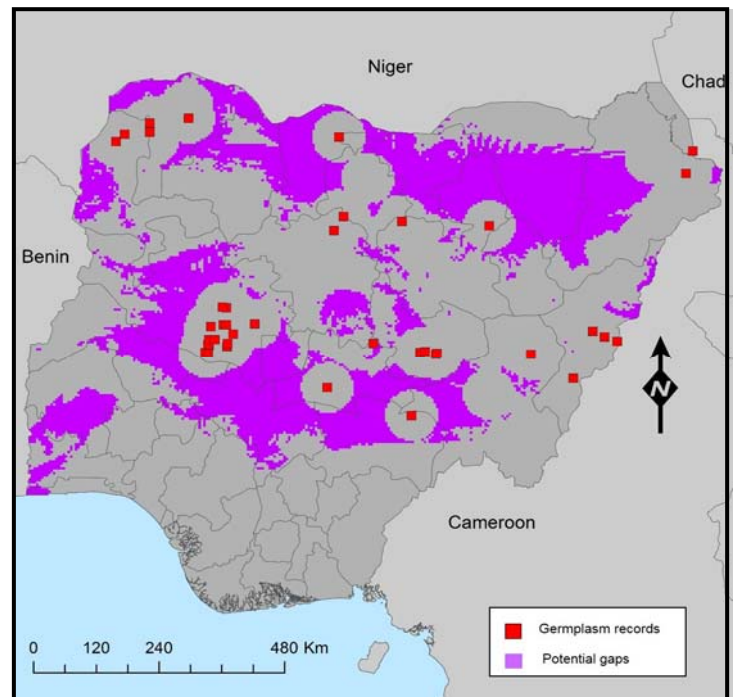
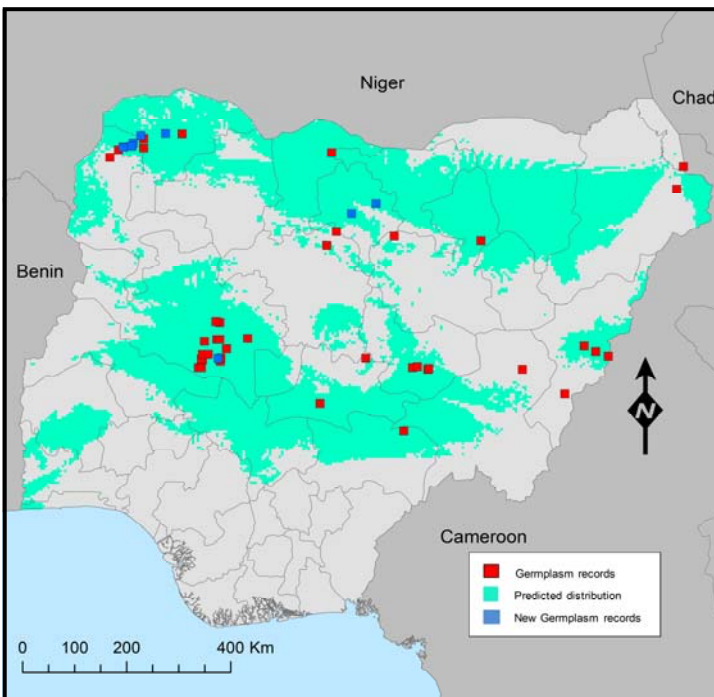
Deep water, standing or running water, salt marshes, dry, sandy fields.

Distribution:

Throughout Africa.

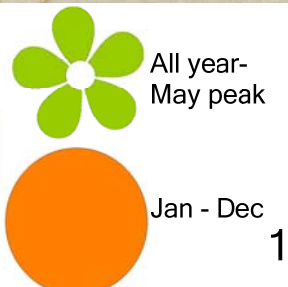
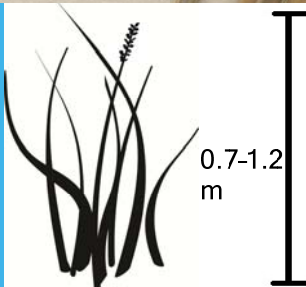
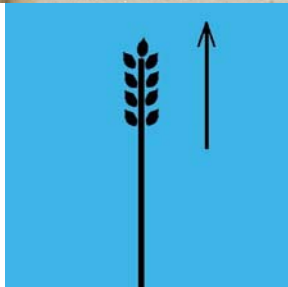
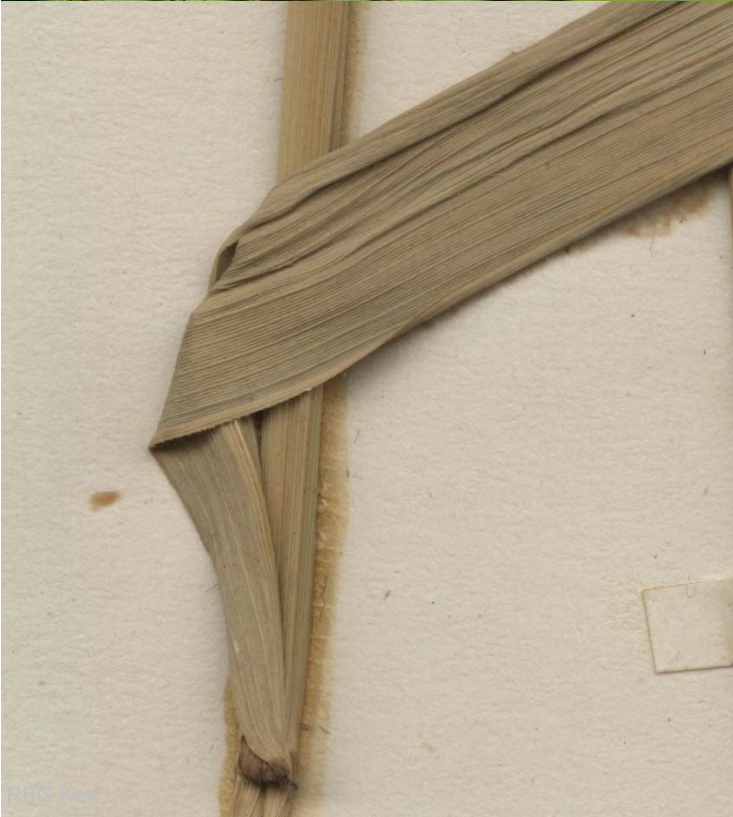
Altitude: 0 - 2000 m

<i>Oryza longistaminata</i>	May be confused with: <i>Oryza sativa</i>
Red caryopsis.	Caryopsis brown to white.



References: Flora of Mozambique website: <http://www.mozambiqueflora.com>; IRRRI Rice Knowledge Bank <http://www.knowledgebank.irri.org>

Primary Gene Pool relative of *Oryza glaberrima* and *Oryza sativa*



HABIT: Clump-forming annuals. Culms 50-120(-150) cm long, 3-6 mm diameter, spongy, 3-5-noded.

LEAVES: Leaf-sheaths smooth, glabrous on surface. Leaf-blade surface scaberulous, rough on both sides, margins scabrous, apex acuminate.

INFLORESCENCE: Panicle open, elliptic; 15-35 x 3-17 cm. Primary panicle branches ascending, or spreading. Panicle branches angular; scaberulous. Spikelets solitary. Fertile spikelets pedicelled. Pedicels linear, angular; 2-5 mm long, scaberulous, tip cupuliform. Fertile spikelets comprising 2 basal sterile florets and 1 fertile floret, without rhachilla extension. Spikelets elliptic, laterally compressed, 4.9-6.2 mm long, 1.9-2.6 mm wide (2.5 times longer than wide), falling entire. Spikelet callus glabrous, base truncate, attached transversely.

GLUMES: Absent or obscure. Basal sterile florets similar, barren, without significant palea.

FRUIT: Caryopsis with adherent pericarp. Disseminule comprising a floret.

Habitat:

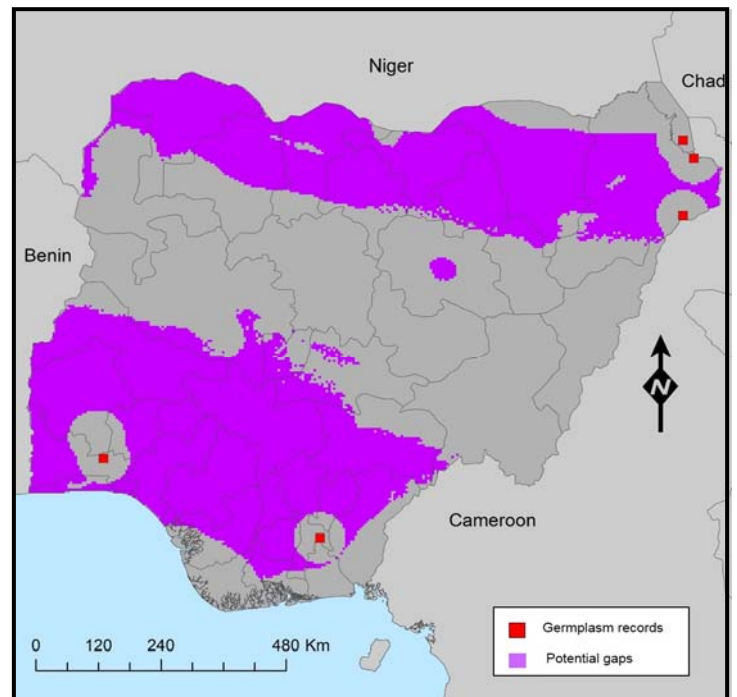
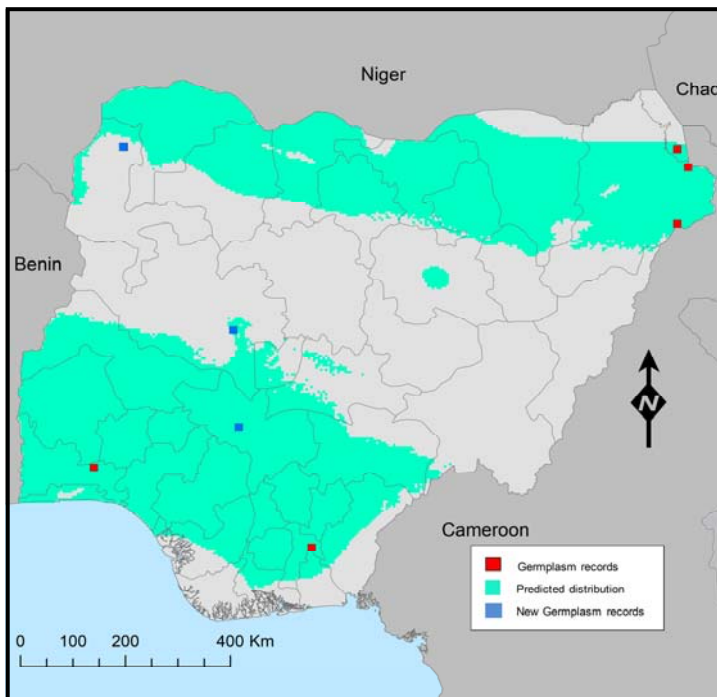
Open/semi-open habitats, forest margins, grassland and thickets, degraded mopane scrub, open bush or shifting cultivation fields; swampy areas, around water holes and pools, on riverbanks that flood to 1 m. Prefers black clay or sandy soil.

Altitude: 33 - 930 m

Distribution:

Distributed across southern, eastern, central and western Africa.

<i>Oryza punctata</i>	May be confused with: <i>Oryza eichingeri</i>
Culms 3-6 mm diameter.	Culms 2-3 mm diameter.

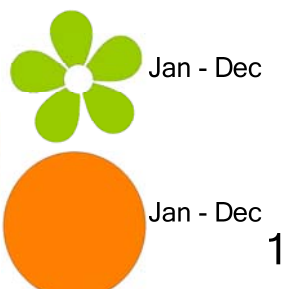
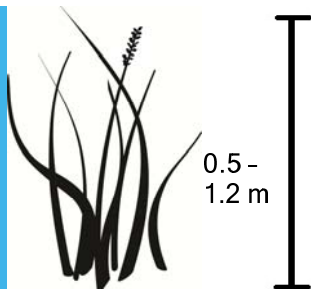
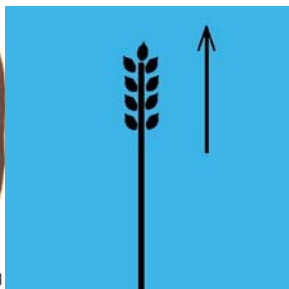


References: Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. (2006 onwards). GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>; IRRRI rice knowledgebank <http://www.knowledgebank.irri.org/extension/oryza-punctata-kotschy-ex-steud.html>



RBG Kew

Gemma Toothill, (c) Board of Trustees RBG Kew



Secondary relative of *Oryza glaberrima* Steud., Secondary relative of *Oryza sativa* L.

HABIT: Perennial, culms 50-120(-150) cm tall, 3-5-noded.

LEAVES: Linear or linear-lanceolate. Leaf-sheaths scarious, often spongy and aerenchymatous, distinctly striate. Ligule 3-10 mm.

INFLORESCENCE: A panicle, erect, branched. Panicle 15-35 x 3-17 cm, narrowly to broadly elliptic, sometimes fan-shaped in outline, loose, erect, or drooping, rhachis obtusely angular; solitary or sometimes adnate, angular, scabrous. Pedicels 2-5 mm long. Spikelets 5.5-6.25 x 2.25-2.8 mm. (usually 2.5 times longer than wide), deciduous, asymmetrically elliptic-oblong or broadly oblong in lateral view, greyish-green or glaucous.

GLUMES: Reduced whitish narrow rim. Sterile lemmas about equal in shape and size, 1-1.5 mm long, lanceolate to lanceolate-deltate, acuminate, glabrous. Fertile lemmas slightly shorter than the spikelet, cymbiform, semi-elliptic-oblong in lateral view, coriaceous, flanks finely tessellate, shortly but stiffly hispid, rarely glabrous, keel and margins stiffly ciliate, lateral apical protrusions usually distinct, awn (1)2-7.5 cm long, very slender, flexuous, scaberulous, pale yellow. Palea slightly shorter than the lemma and much narrower.

FRUIT: Caryopsis 4-4.75 x 1.5-1.75 mm, oblong, glabrous, light brown.

Habitat:

Semi-open or shaded habitats of forest margins and forests. Swampy areas, around water holes and pools, and flooding riverbanks. Clay or sandy soil.

Distribution:

West Tropical Africa, West-Central Tropical Africa, Northeast Tropical Africa, South Tropical Africa, Western Indian Ocean. Benin, Ghana, Ivory Coast. Cameroon, Congo, Drc. Chad. Angola, Mozambique, Zambia, Zimbabwe. Swaziland. Madagascar.

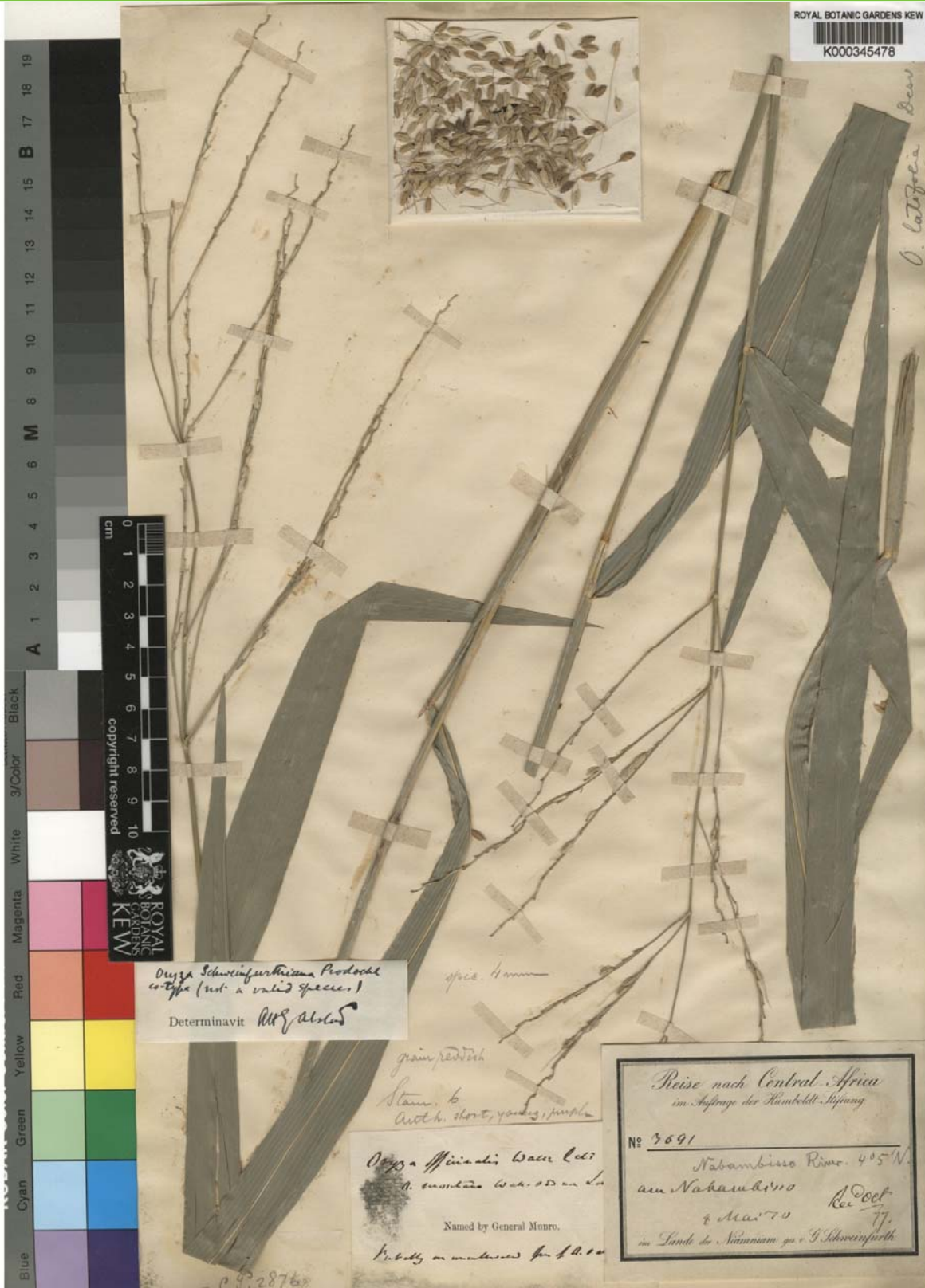
Altitude: Unknown

<i>Oryza schweinfurthiana</i>	May be confused with: <i>Oryza officinalis</i>
Lower branches of inflorescence long, up to 11 cm, bear spikelets almost from base. Awns 2.5-3 cm long.	Lower branches of inflorescence long, up to 11 cm, in lower half without spikelets. Awns 0.8-1.5 cm long.

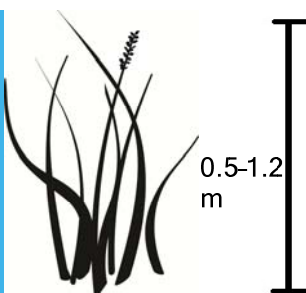
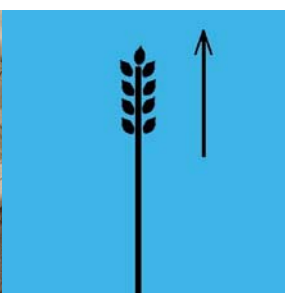
Reported from Nigeria, but no localities known.

All populations priority for collection.

Secondary relative of *Oryza glaberrima* Steud., Secondary relative of *Oryza sativa* L.



RBG Kew



HABIT: Annual, rarely short-lived perennial, culms 30-400 cm high, robust, branched.

LEAVES: Leaf sheaths glabrous, ligule a membrane, edged with a fringe of fine hairs and hairy on the back, leaf laminas often large, 5-75 × 0.5-0.7 cm, broadly lanceolate, flat, glabrous on both surfaces, with a prominent whitish midrib.

INFLORESCENCE: Panicle 10-60 cm long, broadly spreading, main axis angular, glabrous, primary branches divided, pubescent at the nodes, 2-7-jointed, rachis internodes and pedicels pilose. Sessile spikelet (4-)7(-9) mm long, lanceolate to narrowly ovate.

GLUMES: Coriaceous, inferior glume dorsally compressed, narrowly ovate, 2-keeled on the margins, superior glume glabrescent or with sparse hairs on the back, inferior floret empty, its lemma c. 5.5 mm long, lanceolate, ciliate on the margins, superior floret bisexual, its lemma c. 3 mm long, deeply lobed, ciliate on the lobes and margins, 1-awned, glabrous. Palea c. 2 mm long. Pedicelled spikelets neuter, c. 6.5 mm long, linear to lanceolate, glumes chartaceous, inferior glume glabrous, superior glume slightly shorter than the inferior, glabrous, inferior lemma glabrous, with a truncate apex.

Habitat:

Swampy soils, streamsides, disturbed places and old farmland.

Distribution:

Native to Africa, Madagascar, and perhaps to the Mascarenes. Introduced to India, Australia, and the Americas.

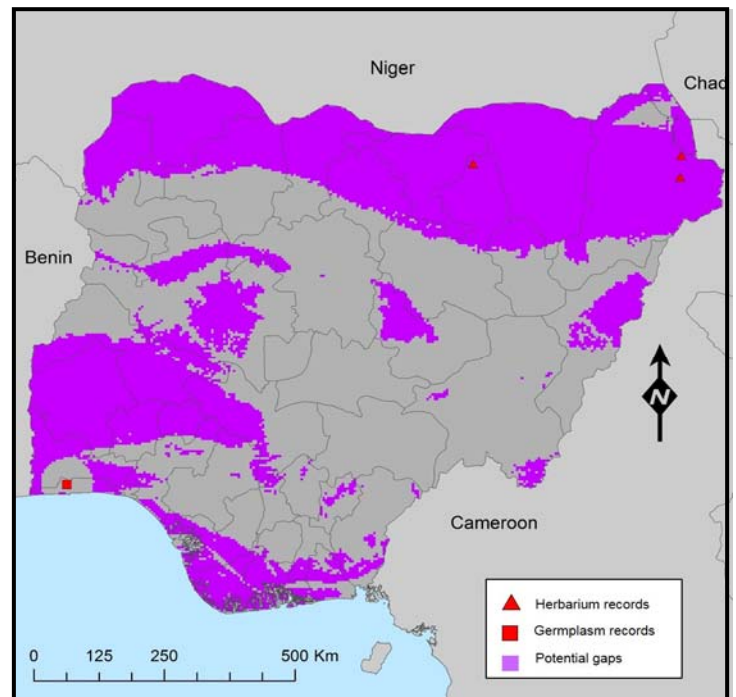
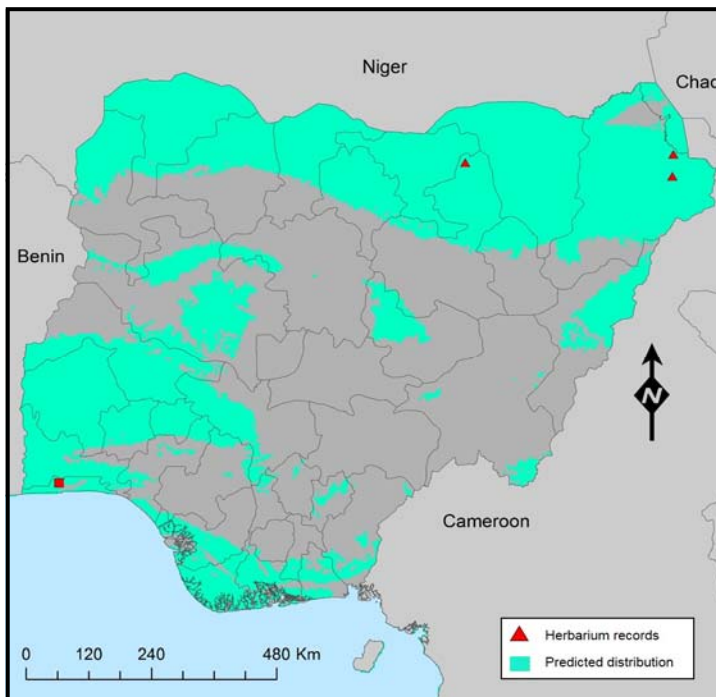
Altitude: 50 - 1400 m

Sorghum bicolor subsp. verticilliflorum

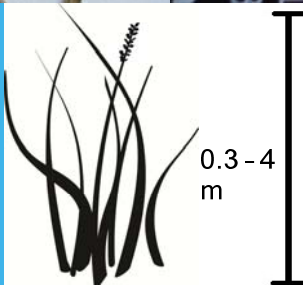
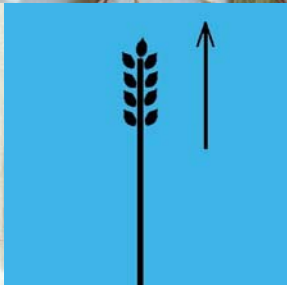
Leaf blades linear lanceolate, up to 75 x 7 cm, panicle up to 60 cm long x 25 cm wide.

May be confused with:
Sorghum bicolor subsp. drumondii

Leaf blades lanceolate 50 x 6 cm, panicles 30 cm long x 15 cm wide.



References: Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. (2006 onwards). GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>.



Tertiary Gene Pool relative of *Sorghum bicolor***HABIT:** Annual, culms 30-150 cm high, erect with bearded nodes.**LEAVES:** Leaves cauline. Leaf blades 10-50 x 0.2-1 cm. Ligule a ciliolate membrane, pilose on abaxial surface.**INFLORESCENCES:** Open, oblong panicles, whorled at most nodes, bearing racemes of 3-5 spikelet pairs, 5-35 cm long. Rhachis fragile at the nodes, ciliate on margins, with red or white hairs 2-3 mm long. Internodes filiform, 5 mm long, tip transverse and cupuliform. Spikelets paired. Pedicels filiform, ciliate. Fertile spikelets sessile, 1 per cluster, lanceolate, dorsally compressed, 7.5-10 mm long, falling entire, deciduous with accessory branch structures, callus bearded, base obtuse, callus hairs white, or red. Companion sterile spikelets pedicelled, 1 per cluster, well-developed, male, linear to lanceolate, 6-10 mm long, shorter than fertile and separately deciduous, glumes chartaceous, muticous, lemmas enclosed by glumes.**GLUMES:** Dissimilar, lower wider than upper, exceeding apex of florets, shiny. Lemma margins ciliate, apex dentate, 2-fid, 1-awned. Principal lemma awn from a sinus, geniculate, 20-40 mm long, with twisted column. Column of lemma awn pubescent; hairy on the spiral. Palea absent or minute.**Habitat:**

Riverine or lakeside alluvial soils and on black clays.

Distribution:

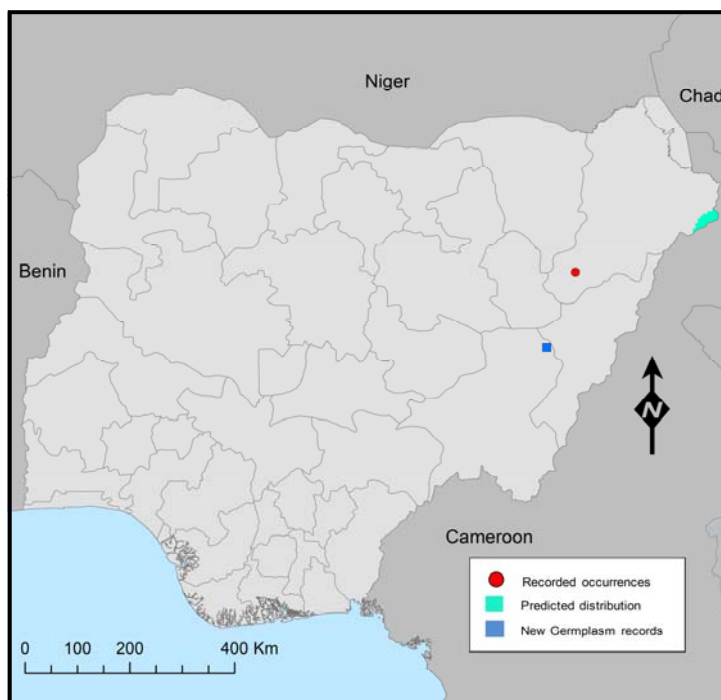
Middle and Eastern Africa, and Southcentral Asia.

Altitude: 500 - 1500 m*Sorghum purpureosericeum*

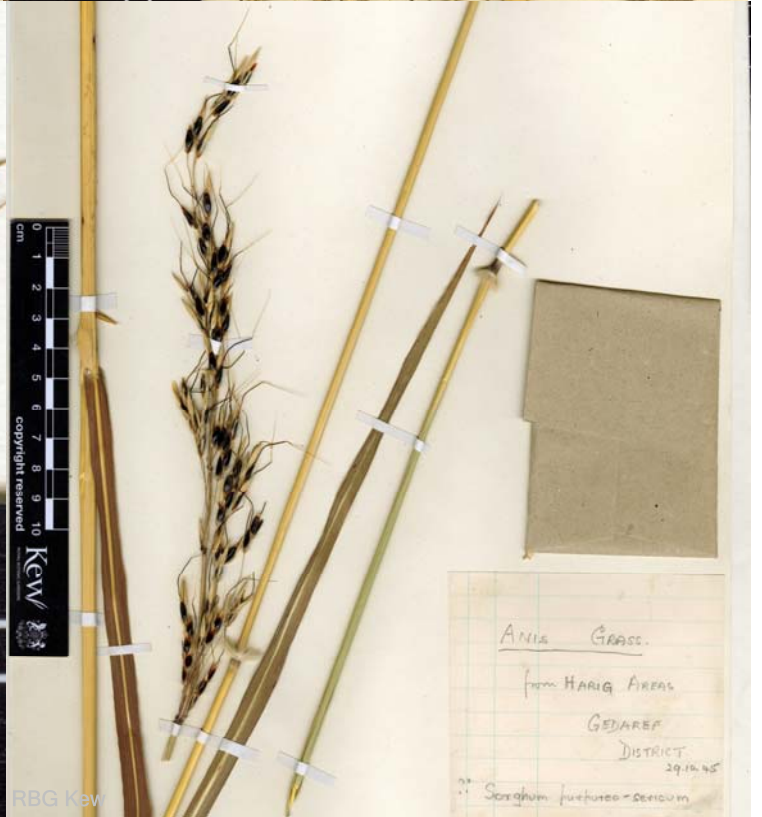
Sessile spikelet 8-10 mm long, lanceolate; pedicelled spikelet 6-10 mm long.

May be confused with:
Sorghum versicolor

Sessile spikelet 5-7 mm long, elliptic-oblong; pedicelled spikelet 3-5 mm long.

All populations priority
for collection.**References:** Phillips, S. (1995) Poaceae. In: Flora of Ethiopia and Eritrea Volume 7 p 301; Clayton & Renvoize (1982) Flora of Tropical East Africa Graminae (Part 3).

Tertiary Gene Pool relative of *Sorghum bicolor*



(c) Board of Trustees RBG Kew

Summary graphic for *Sorghum purpureosericeum*. It includes three dark blue seeds with a 2 mm scale bar, a stylized plant icon with an upward arrow, a height scale of 0.3-1.5 m, a circular logo with the letters "LC", and a green flower icon.

Jan - Dec

Jan - Dec

HABIT: Erect woody herb or shrub, up to c. 4 m tall. Stems and leaves armed with straight or somewhat curved spines, yellowish to brownish, sometimes purple near the base, up to 13 mm long, branches often purple tinged. All parts covered in stellate hairs.

LEAVES: Rhombic-ovate, elliptic or lanceolate, thinly stellate hairy above, densely so below. The central ray of the stellate hairs often much longer than the lateral rays. Leaf margin subentire to triangularly lobed. Prickles usually present on the midrib and main veins.

INFLORESCENCES Racemose heads, up to 20-flowered. Corolla pale mauve or purple to almost whitish, star-shaped.

FRUITS: 6-12 mm in diameter, spherical, green, turning yellow and glossy orange-red when ripe. Edible when mature.

Habitat:

Markedly tolerant of open and shady sites in and at edges of both dry and wet forests, montane grassland and bushland, riverine associations, savanna woodland, thickets and coastal bushland.

Distribution:

Widespread in tropical Africa: distributed from Ethiopia southwards to South Africa (KwaZulu-Natal), also in Indian Ocean islands and the Arabian Peninsula.

Altitude: 0 - 2380 m

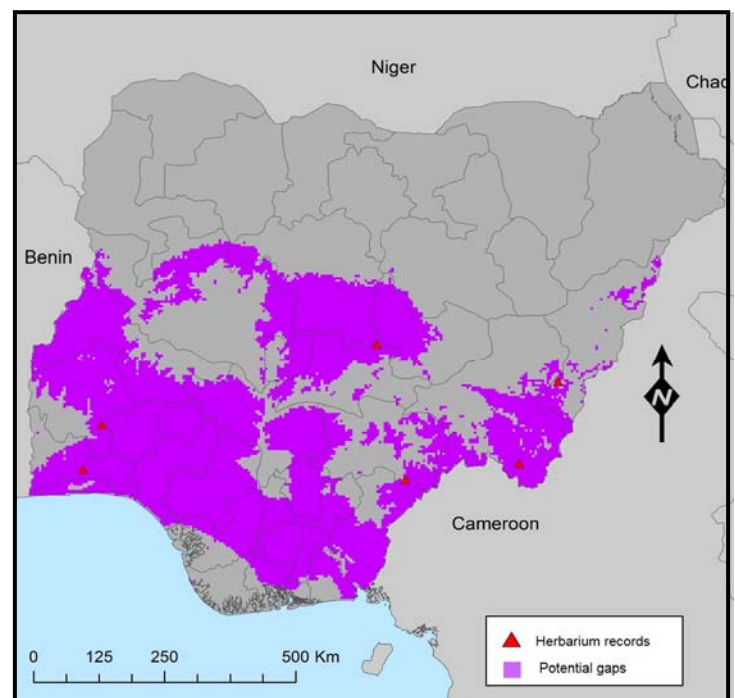
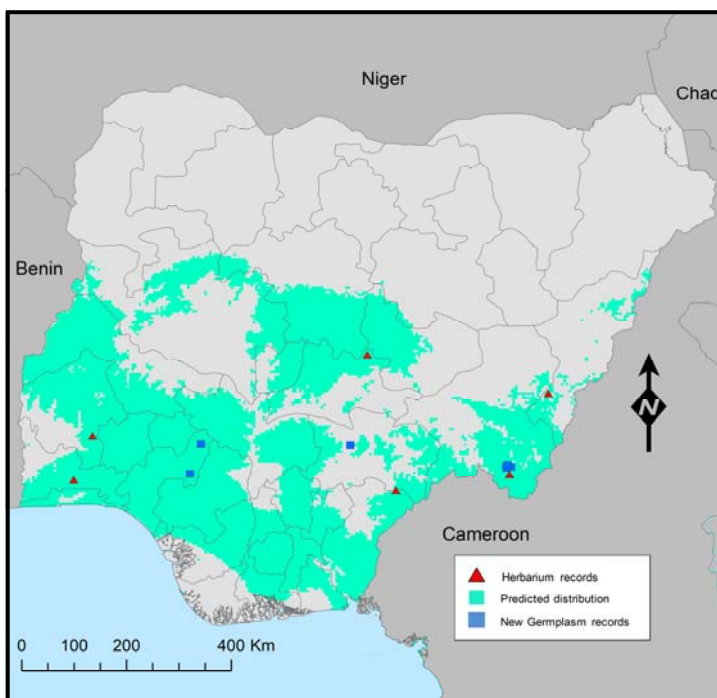
Solanum anguivi

Ripe fruit is red. No glands on trichomes.

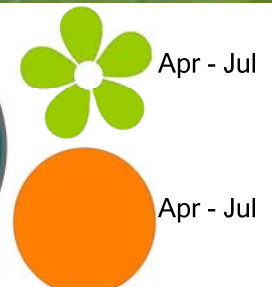
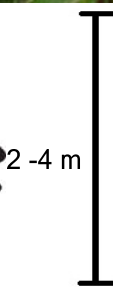


May be confused with:
Solanum torvum

Fruit yellow when fully ripe. Gland tipped trichomes on inflorescence axis.



References: FZ volume:8 part:4 (2005) Solanaceae by A.E. Gonçalves; Hyde, M.A., Wursten, B.T. & Ballings, P. (2012). Flora of Zimbabwe: Species information: *Solanum anguivi*; Plant Resources of Tropical Africa (PROTA) website: <http://www.prota.co.ke/en/home>; Edible Wild Plants of Tanzania, Ruffo, C.K., 2002. Material for seed image provided by South African National Biodiversity Institute.



HABIT: Erect shrub, 0.4-2 m, prickly. Young stems erect, slender, the prickles 4-10 mm long, straight, deltoid, flattened, pale yellow to pale-brown; bark of older stems glabrescent, green-grey.

LEAVES: Lobed, sometimes subentire, lobes 1-3(-6) on each side, blades 7-17 cm long, 3-6.5 cm wide, 2-2.5 x longer than wide, elliptic, membranous, primary veins 5-7 pairs, base cuneate.

INFLORESCENCES: Lateral, 1-2.5 cm long, with 10-20 flowers, ca. 5 flowers open at any one time, unarmed, peduncle up to 2 mm long, pedicels 0.4-0.5 cm long. Flowers 4-5-merous, calyx 1.5-3 mm long, corolla 0.7-1.3 cm in diameter, white, stellate, lobed for ca. 3/4 of its length, lobes 4.5-5.5 mm long, 1-2 mm wide. Stamens equal, filament tube 1-1.5 mm long, free section of the filaments 0.5-0.7 mm long, anthers 2.5-4.5 mm long.

FRUIT: A spherical berry, 5-18 per infructescence, 0.55-0.9 cm in diameter, pericarp smooth, evenly green when young, bright red at maturity, fruiting pedicels 6.5-8 cm long, 0.3-0.5 mm diameter at base, woody, largely erect, unarmed.

Fruiting calyx not accrescent, covering ca. 1/4 of the mature fruit, reflexed, unarmed.

SEEDS: ca. 20 per fruit, 2.5-2.8 mm long, 2-2.5 mm wide, flattened-reniform, dull yellow to orange-brown.

Habitat:

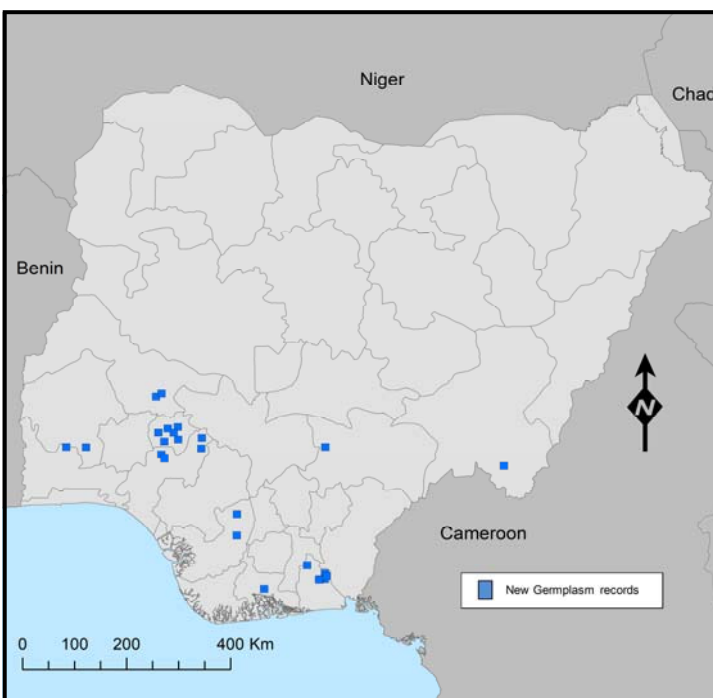
Forest margins, thickets, beaches, roadsides and disturbed vegetation; sandy or rocky soil.

Distribution:

Cameroon, D.R. Congo, Gabon and Nigeria.

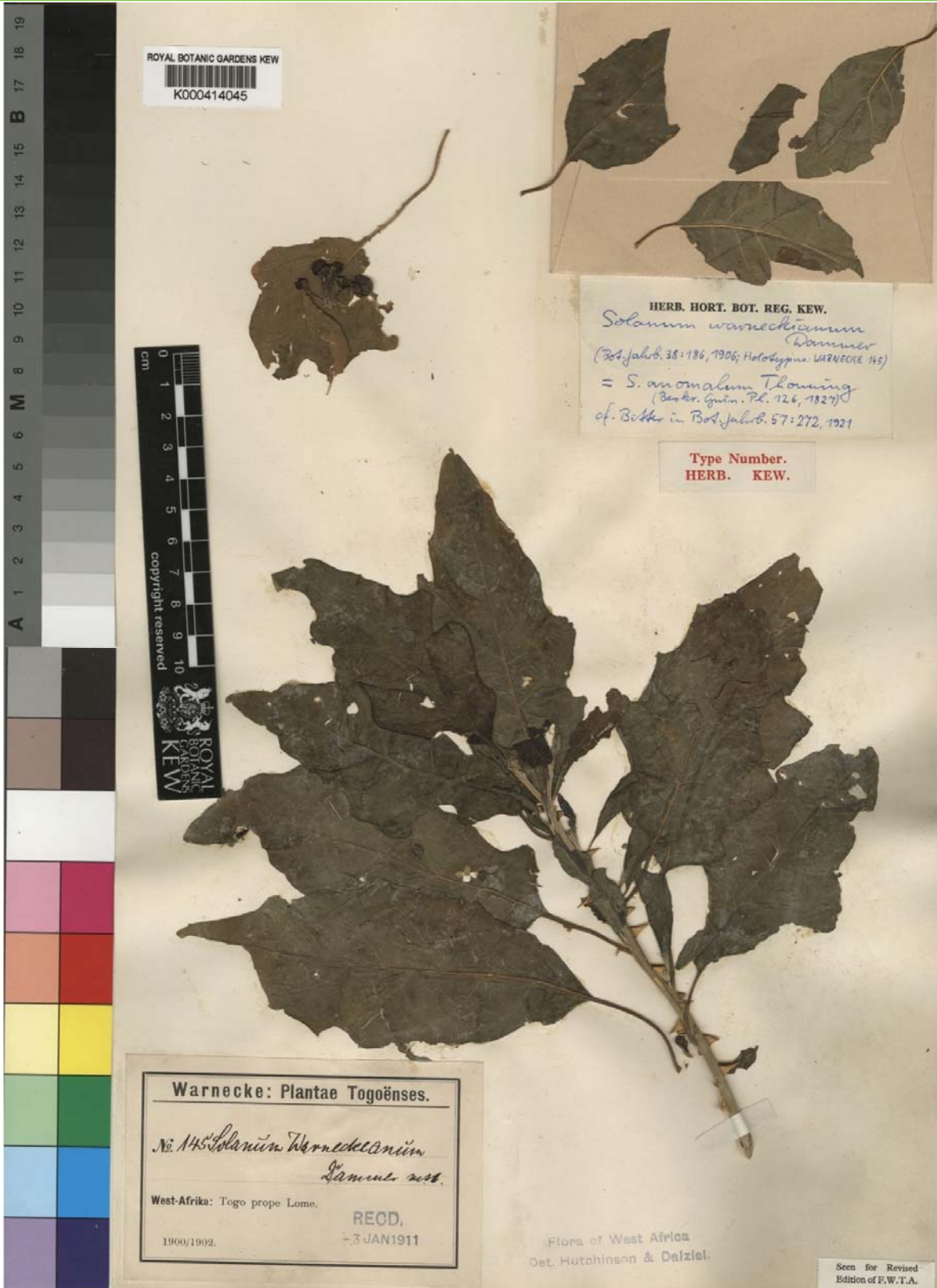
Altitude: 0 - 2000 m

<i>Solanum anomalum</i>	May be confused with: <i>Solanum giganteum</i>
10-20 flowers per inflorescence.	30-150 flowers per inflorescence.



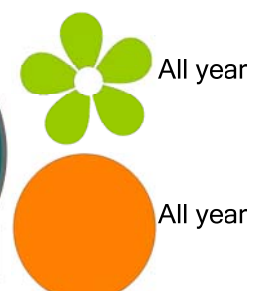
All populations priority
for collection.

References: Solanaceae Source website: synonyms list *Solanum anomalum* accessed 5th August 2013



RBG Kew

No seed
image
available



HABIT: Erect shrub, 0.5-1.5 m, prickly. Young stems erect, slender.

LEAVES: Lobed, the blades 6-17 cm long, 4-14 cm wide, 1.5-2.5 times longer than wide, ovate to elliptic, membranous to chartaceous.

INFLORESCENCES: Terminal or lateral, 3-7 cm long, rarely branched, with 4-10 flowers, 1-4 flowers open at any one time.

FLOWER: Flowers 5-merous, heterostylous and the plants andromonoecious, with the lowermost flower long-styled and hermaphrodite, the distal flowers short-styled and staminate. Corolla 2.4-3 cm in diameter in long-styled flowers, 1.8-2.5 cm in diameter in short-styled flowers, white to mauve, stellate, lobed for 1/3-1/2 of its length.

FRUIT: A spherical berry, 1-3 per infructescence, ca. 3.5 cm in diameter, the pericarp smooth, dark green with pale green and cream markings when young, yellow at maturity; fruiting pedicels ca. 2.5 cm long, 1.5-2 mm at base, woody, pendulous, with 0-10 prickles; fruiting calyx not accrescent, covering ca. 1/6 of fruit, reflexed, with 0-20 prickles.

SEEDS: ca. 100-200 per berry, 2.4-2.6 mm long, 1.8-2 mm wide, flattened-reniform, orange-brown.

Habitat:

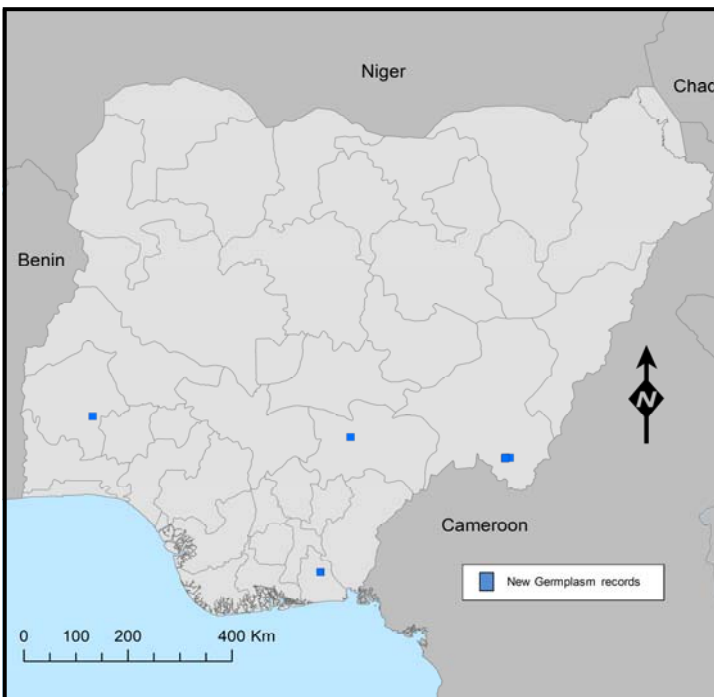
Fallow land, scrubland, and woodland.

Distribution:

From Senegal to Cameroon, Sudan and Ethiopia.

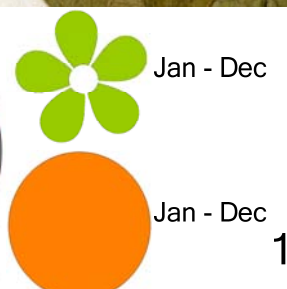
Altitude: 450 - 1200 m

<i>Solanum cerasiferum</i>	May be confused with: <i>Solanum umtuma</i>
Short-attenuate leaf bases and deltate to long-deltate membranous calyx lobes 4-7 mm long with only 0-20 prickles on long-styled flowers.	Cuneate to truncate leaf bases and ovate foliaceous calyx lobes 7-10 mm long with between 30-80 prickles at anthesis on long-styled flowers.



All populations priority
for collection.

References: Vorontsova, M. & Knapp, S. *Solanum cerasiferum*. In Solanaceae Source <http://solanaceaesource.org/content/solanum-cerasiferum> [Downloaded 09/06/14]



Tertiary Gene Pool relative of *Solanum melongena* L.**HABIT:** Erect woody perennial herb, 0.5-1 m, heavily armed, branched at the base.**LEAVES:** Simple, blades 10-35 × 6-20 cm, 1.2-2 times longer than wide, elliptic, chartaceous, sparsely to densely stellate-pubescent on both sides.**INFLORESCENCE:** Lateral, extra-axillary, 4-7 cm long, unbranched, with 5-10 flowers. Plants strongly andromonoecious, with one long-styled flower at the base of the inflorescence and all other flowers short-styled, the flowers 5-merous.**FLOWER:** Calyx 1-3 cm long in long-styled flowers, 0.8-2 cm long in short-styled flowers. Corolla 3.5-6 cm in diameter in long-styled flowers, 1.5-3.5 cm in diameter in short-styled flowers, (white) pale mauve to purple, almost rotate, the abundant interpetalar tissue often tearing.**FRUIT:** A globose berry, 1(-2) per infructescence, 2.5-4 cm in diameter, spherical throughout development, rarely somewhat elongate, the pericarp thin, smooth, shiny, glabrous, plain green or with dark green stripes when young, yellow at maturity, drying orange-brown.**SEEDS:** ca. 50-100 per berry, 2.8-4.5 × 2-3.5 mm, flattened-reniform, almost round, orange to brown or almost black.**Habitat:**

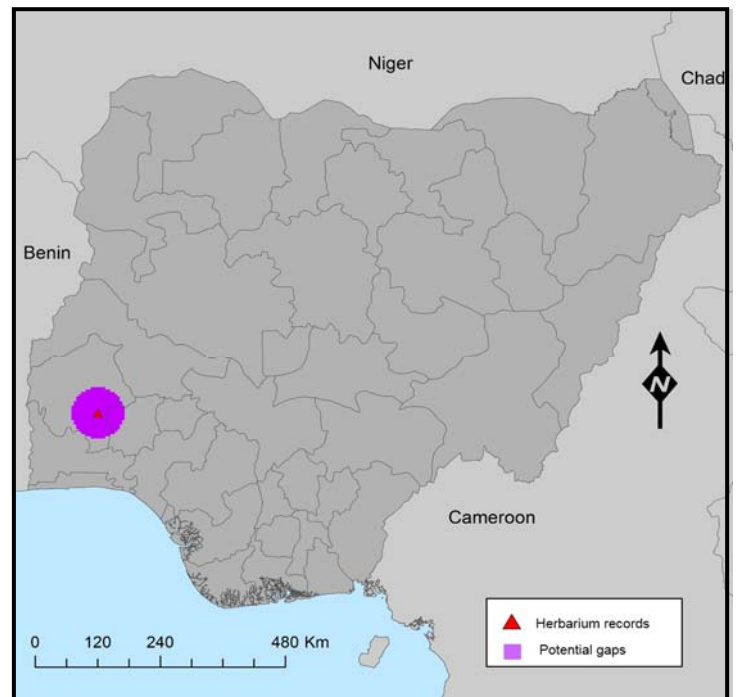
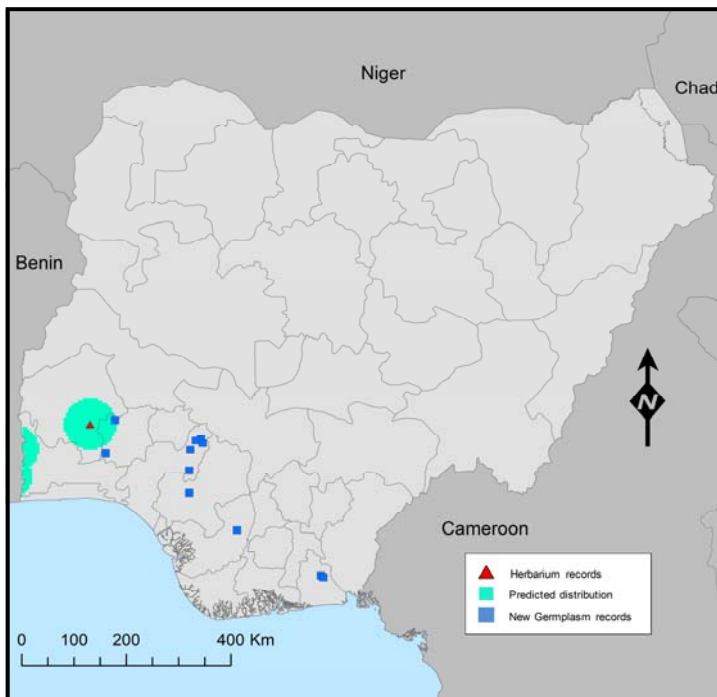
Usually a forest species but also found on hillsides, savannah, grassland, or wasteland, frequently near water.

Distribution:

Common throughout the highlands of West, Central and East Africa, between ca. 15°N and ca. 5°S.

Altitude: 600 - 1600 m*Solanum dasyphyllum*

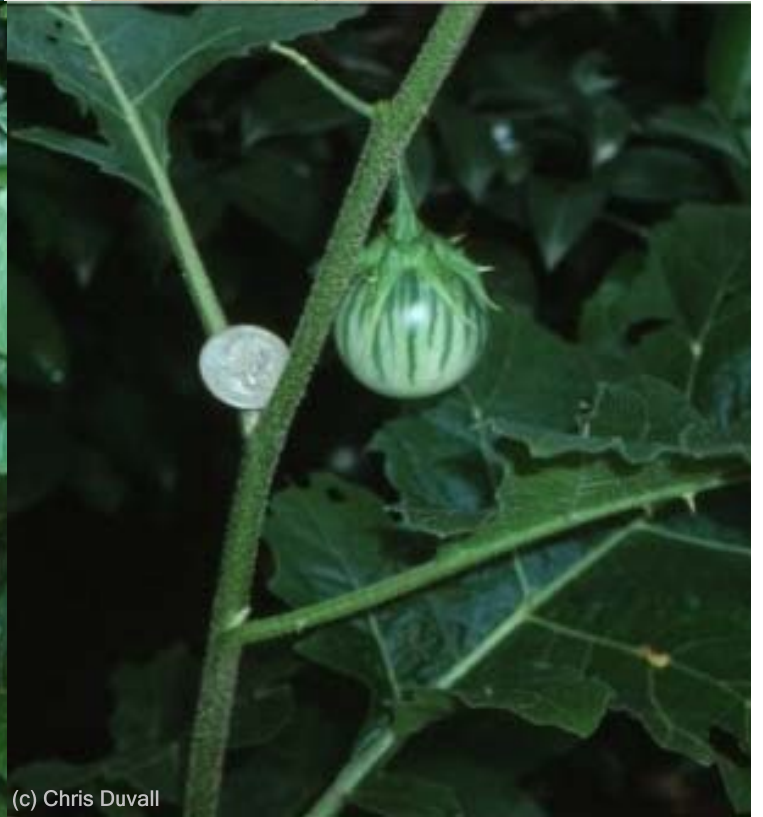
Distinguished by lack of distinct petiole or long-attenuate leaf bases, almost rotate corolla on short-styled flowers, and only 4(5) rays on the stellae on vegetative parts of the plant.

May be confused with:
*Other prickly Solanums*Other prickly *Solanums* in this area do not have this combination of characteristics.**References:** Vorontsova, M, (2009) *Solanum dasyphyllum*. In: Solanaceae Source. <http://solanaceaesource.org/content/solanum-dasyphyllum>. Material for seed photo provided by IBPGR.

SOLANACEAE

Solanum dasyphyllum Schumach.

Tertiary Gene Pool relative of *Solanum melongena* L.



Gemma Toothill (c) Board of Trustees RBG Kew



0.5-1 m



Jan - Dec

Jan - Dec

HABIT: Erect herb 0.3-1 m, unarmed or with occasional prickles; young stems long, robust, flattened or ribbed, usually purple-black, almost glabrous, with a few simple hairs.

LEAVES: Simple, the blades 10-35 × 6-20 cm, elliptic, chartaceous, glabrous adaxially and abaxially, margin lobed to subentire, the lobes 3-5 on each side.

INFLORESCENCES: 3-5 cm long, unbranched, with 1-10 flowers. Plants strongly andromonoecious, with one long-styled flower at the base at the base of the inflorescence and all other flowers short-styled, flowers 5-merous. Corolla 3.5-5 cm in diameter in long-styled flowers, 1.2-2.5 cm in diameter in short-styled flowers, white, mauve or deep purple, almost rotate. Stamens with the filament tube 2-4 mm; anthers 4-7 mm.

FRUIT: A globose berry, 1(-2) per infructescence, 4-6 cm in diameter, globose or depressed-globose at maturity, pericarp thin, smooth, sometimes shiny, glabrous, plain green or with dark green stripes when young, usually yellow or orange at maturity, calyx accrescent, elongating up to 3-6 cm long often becoming broad and foliaceous, covering 1/3-3/4 of the mature fruit, usually reflexed, sometimes with a few prickles. Seeds ca. 50-100 per berry, 2.8-3.8 × 2.2-3.2, flattened-reniform, almost round, yellow to orange-brown, surface smooth or with raised outlines of cells or small pits.

Habitat:

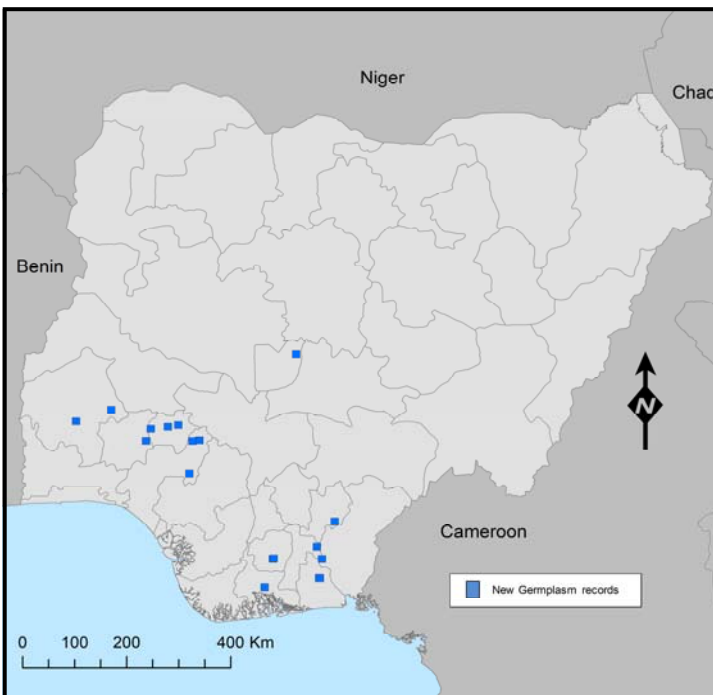
Tropical, non-arid areas.

Distribution:

Cultivated across Africa and sometimes outside. Particularly common in West Africa, frequent in Central and East Africa, occasional in Southern Africa.

Altitude: 0 - 1800 m

<i>Solanum macrocarpon</i>	May be confused with: <i>Solanum dasyphyllum</i>
Fruit more than 4 cm diameter.	Presence of prominent prickles and indumentum, as well as fruit less than 4 cm in diameter.



All populations priority
for collection.

References: Vorontsova, M. & Knapp, S. (2014) *Solanum macrocarpon*. In: Solanaceae Source <http://solanaceaesource.org/content/solanum-macrocarpon>



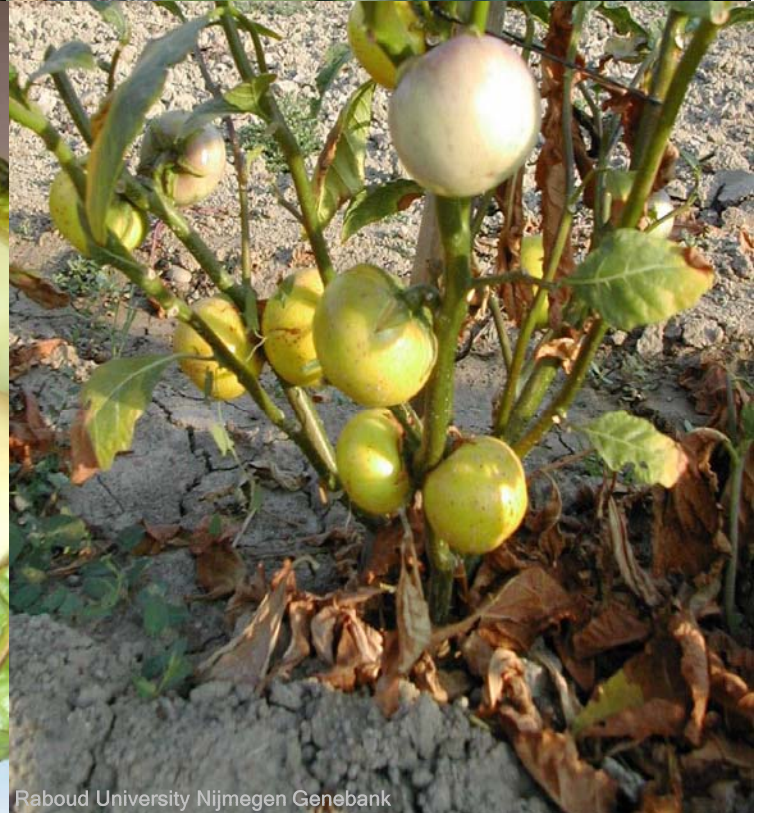
Wikimedia Commons user BotBln



Raboud University Nijmegen Genebank



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Raboud University Nijmegen Genebank

No seed image available



0.3-1 m



No data

No data

Appendix - Synonyms

a

Taxon	Sheet	Synonyms
<i>Ipomoea ochracea</i>	1	<i>Ipomoea curtisii</i> House; <i>Ipomoea ochracea</i> var. <i>curtisii</i> (House) Stearn
<i>Vigna subterranea</i> var. <i>spontanea</i>	2	<i>Voandzeia subterranea</i> (L.) Thouars f. <i>spontanea</i> Harms
<i>Vigna unguiculata</i> subsp. <i>baoulensis</i>	3	<i>Vigna baoulensis</i> A. Chev.
<i>Cenchrus polystachios</i>	4	<i>Pennisetum stenostachyum</i> Peter; <i>Cenchrus setosus</i> Swartz; <i>Panicum polystachion</i> L.; <i>Pennisetum polystachion</i> subsp. <i>setosum</i> (Swartz) Brunken; <i>Pennisetum setosum</i> (Swartz) Rich.; <i>Pennisetum stenostachyum</i> Peter
<i>Cenchrus purpureus</i>	5	<i>Pennisetum purpureum</i> Schumach.; <i>Pennisetum benthamii</i> Steud.; <i>Pennisetum purpureum</i> subsp. <i>benthamii</i> (Steud.) Maire & Weiller; <i>Pennisetum purpureum</i> subsp. <i>flexispica</i> (K.Schum.) Maire & Weiller
<i>Cenchrus violaceus</i>	6	<i>Pennisetum violaceum</i> (Lam.)Rich.; <i>Cenchrus rogeri</i> (Stapf & C.E.Hubb.) Verloove; <i>Cenchrus violaceus</i> (Lam.) Morrone; <i>Chasea violacea</i> (Lam.) Nieuwl.; <i>Panicum violaceum</i> Lam.; <i>Penicillaria fallax</i> Fig. & De Not.; <i>Penicillaria raddiana</i> Fig. & De Not.; <i>Pennisetum americanum</i> subsp. <i>monodii</i> (Maire) Brunken; <i>Pennisetum chudeaui</i> Maire & Trab.; <i>Pennisetum chudeaui</i> subsp. <i>monodianum</i> Maire ex A.Chev.; <i>Pennisetum chudeaui</i> subsp. <i>monodii</i> Maire; <i>Pennisetum cognatum</i> Steud.; <i>Pennisetum darfuricum</i> Stapf & C.E.Hubb.; <i>Pennisetum elegans</i> Rupr. ex Steud.; <i>Pennisetum fallax</i> (Fig. & De Not.) Stapf & C.E.Hubb.; <i>Pennisetum glaucum</i> (L.) R. Br. subspecies <i>monodii</i> (Maire) Brunken [nom. illeg.]; <i>Pennisetum glaucum</i> subsp. <i>violaceum</i> (Lam.) Rich.; <i>Pennisetum molle</i> Hitchc.; <i>Pennisetum mollissimum</i> Hochst.; <i>Pennisetum ochrops</i> Stapf & C.E.Hubb.; <i>Pennisetum ramosissimum</i> Steud.; <i>Pennisetum rogeri</i> Stapf & C.E.Hubb.; <i>Pennisetum senegalense</i> Steud. ex Jard.; <i>Pennisetum spicatum</i> var. <i>fallax</i> (Fig. & De Not.) T.Durand & Schinz; <i>Pennisetum subeglume</i> Trab.; <i>Pennisetum versicolor</i> Schrad.; <i>Pennisetum violaceum</i> var. <i>chudeaui</i> (Maire & Trab.) Maire; <i>Pennisetum violaceum</i> var. <i>majus</i> Kunth; <i>Pennisetum violaceum</i> var. <i>monodianum</i> (Maire ex A.Chev.) Maire
<i>Eleusine africana</i>	7	<i>Eleusine coracana</i> subsp. <i>africana</i> (Kenn.-O'Byrne) Hilu & de Wet; <i>Eleusine indica</i> subsp. <i>africana</i> (Kenn.-O'Byrne) S.M.Phillips
<i>Eleusine coracana</i>	8	<i>Eleusine stricta</i> Roxb.; <i>Eleusine stricta</i> var. <i>alboabbreviata</i> Cif.; <i>Eleusine stricta</i> var. <i>alboelongata</i> Cif.; <i>Eleusine stricta</i> var. <i>fuscoabbreviata</i> Cif.; <i>Eleusine stricta</i> var. <i>fuscoelongata</i> Cif.; <i>Eleusine stricta</i> var. <i>rufabbreviata</i> Cif.; <i>Eleusine stricta</i> var. <i>rufelongata</i> Cif.; <i>Eleusine tocussa</i> Fresen.; <i>Eleusine tocussa</i> var. <i>erytroleuca</i> Chiov.; <i>Eleusine tocussa</i> var. <i>erytromelana</i> Chiov.; <i>Eleusine tocussa</i> var. <i>flavocarpa</i> Chiov.; <i>Eleusine tocussa</i> var. <i>leucocarpa</i> Chiov.; <i>Eleusine tocussa</i> var. <i>melanocarpa</i> Chiov.; <i>Eleusine tocussa</i> var. <i>olivacea</i> Chiov.

Appendix - Synonyms

b

Taxon	Sheet	Synonyms
Eleusine indica	9	Agropyron geminatum Schult. & Schult.f.; Chloris repens Steud.; Cynodon indicus (L.) Raspail; Cynosurus ara Buch.-Ham. ex Wall.; Cynosurus indicus L.; Cynosurus pectinatus Lam.; Eleusine distachya Trin. ex Steud.; Eleusine distans Link; Eleusine distans Moench; Eleusine domingensis Sieber ex Schult.; Eleusine glabra Schumach.; Eleusine gonantha Schrank; Eleusine gouinii E.Fourn.; Eleusine inaequalis E.Fourn.; Eleusine indica var. major E.Fourn.; Eleusine indica var. monostachya F.M.Bailey; Eleusine indica var. oligostachya Honda; Eleusine indica var. sandaensis Vanderyst; Eleusine japonica Steud.; Eleusine macrosperma Stokes; Eleusine marginata Lindl.; Eleusine polydactyla Steud.; Eleusine rigidifolia E.Fourn.; Eleusine scabra E.Fourn.; Eleusine textilis Welw.; Juncus loureiroana Schult. & Schult.f.; Leptochloa pectinata (Lam.) Kunth; Paspalum dissectum Kniph.; Poa spicata Willd. ex Steud.; Triticum geminatum Spreng.
Oryza barthii	10	Oryza breviligulata A.Chev. & Roehr.; Oryza glaberrima subsp. barthii (A.Chev.) De Wet; Oryza mezii Prodoehl; Oryza perennis subsp. barthii (A.Chev.) A.Chev.; Oryza stapfii Roshev.
Oryza longistaminata	11	Oryza dewildemanii Vanderyst [Invalid]; Oryza madagascariensis (A.Chev.) Roshev.; Oryza perennis subsp. madagascariensis A.Chev.; Oryza silvestris Stapf ex A.Chev. [Invalid]
Oryza punctata	12	Oryza eichingeri var. longiaristata Peter; Oryza sativa var. punctata (Kotschy ex Steud.) Kotschy; Oryza schweinfurthiana Prodoehl
Oryza schweinfurthiana	13	Oryza punctata Kotschy ex Steud..
Sorghum bicolor subsp. verticilliflorum	14	Sorghum verticilliflorum (Steud.) Stapf; Sorghum brevicarinatum Snowden; Andropogon sorghum (L.) Brot. var. aethiopicus Hack.; Andropogon sorghum (L.) Brot. subsp. vogelianus Piper; Sorghum vogelianum (Piper) Stapf; Sorghum usambarense Snowden; Sorghum macrochaeta Snowden; Sorghum bicolor (L.) Moench subsp. arundinaceum (Desv.) de Wet & J. R. Harlan ex Davidse; Rhaphis arundinacea Desv.; Sorghum virgatum (Hack.) Stapf; Sorghum stapfii (Hook. f.) C. E. C. Fisch.; Holcus sorghum L. var. effusus Hitchc.; Andropogon arundinaceus Willd.; Andropogon sorghum (L.) Brot. var. virgatus Hack.; Andropogon sorghum (L.) Brot. var. effusus Hack.; Andropogon verticilliflorus Steud.; Sorghum pugionifolium Snowden; Holcus sorghum L. var. verticilliflorus (Steud.) Hitchc.; Sorghum arundinaceum (Desv.) Stapf; Sorghum lanceolatum Stapf; Sorghum aethiopicum (Hack.) Rupr. ex Stapf; Andropogon stapfii Hook. f.
Sorghum purpureosericeum	15	Andropogon pappii Gand.; Andropogon purpureosericeus Hochst. ex A.Rich.; Andropogon purpureosericeus var. calomelas Hack.; Andropogon purpureosericeus var. pallidior Hack.; Sarga purpureosericea (Hochst. ex A.Rich.) Spangler; Sorghum deccanense Stapf ex Raizada; Sorghum dimidiatum Stapf; Sorghum purpureosericeum subsp. deccanense Garber; Sorghum purpureosericeum subsp. dimidiatum (Stapf) Garber
Solanum anguivi	16	Solanum indicum L.; Solanum indicum var. lividum (Link) Bitter; Solanum indicum var. maroanum Bitter; Solanum lividum Link; Solanum scalare C. H. Wright; Solanum sodomeum L.

Appendix - Synonyms

Taxon	Sheet	Synonyms
<i>Solanum anomalum</i>	17	<i>Solanum anomalum</i> var. <i>cinerascens</i> Bitter; <i>Solanum anomalum</i> var. <i>trifurcatum</i> Bitter; <i>Solanum durandii</i> Dammer ex De Wild. & T.Durand; <i>Solanum laurentii</i> De Wild.; <i>Solanum lescrauwaetii</i> De Wild.; <i>Solanum mannii</i> var. <i>compactum</i> C.H.Wright; <i>Solanum marquesii</i> Dammer; <i>Solanum umbrosum</i> Vahl ex Dunal; <i>Solanum warneckeanum</i> Dammer
<i>Solanum cerasiferum</i>	18	<i>Solanum crepinii</i> Van Heurck; <i>Solanum duchartei</i> Heckel; <i>Solanum heteracanthum</i> Dunal; <i>Solanum pachycalyx</i> Van Heurck & Müll.Arg.; <i>Solanum yolense</i> Hutch. & Dalziel
<i>Solanum dasyphyllum</i>	19	<i>Solanum duplosinuatatum</i> Klotzsch
<i>Solanum macrocarpon</i>	20	<i>Solanum atropo</i> Schumach. & Thonn.; <i>Solanum crassifolium</i> Salisb.; <i>Solanum dimorphum</i> Matsum.; <i>Solanum macrocarpon</i> var. <i>calvum</i> Bitter; <i>Solanum macrocarpon</i> var. <i>columnaristellatum</i> Bitter; <i>Solanum macrocarpon</i> var. <i>parcesetosum</i> Bitter; <i>Solanum macrocarpon</i> var. <i>primovestitum</i> Bitter; <i>Solanum macrocarpon</i> var. <i>setosiciliatum</i> Bitter; <i>Solanum mors-elephantum</i> Dammann.; <i>Solanum thonningianum</i> J.Jacq.; <i>Solanum zanonii</i> Gouan.