

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

Ethiopia



Seed Collecting Guide

Please cite this guide as:
RBG Kew (2016) Ecuador 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: Vilcabamba, Ecuador, CREDIT: The lifted lorax/Wikimedia

TOP RIGHT: *Ipomoea involucrata*, CREDIT: RBG Kew;

BOTTOM LEFT: *Ipomoea cairica*, CREDIT: Sheldon Navie;

BOTTOM RIGHT: *Solanum grandiflorum*, CREDIT: www.colecionandofrutas.org

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.

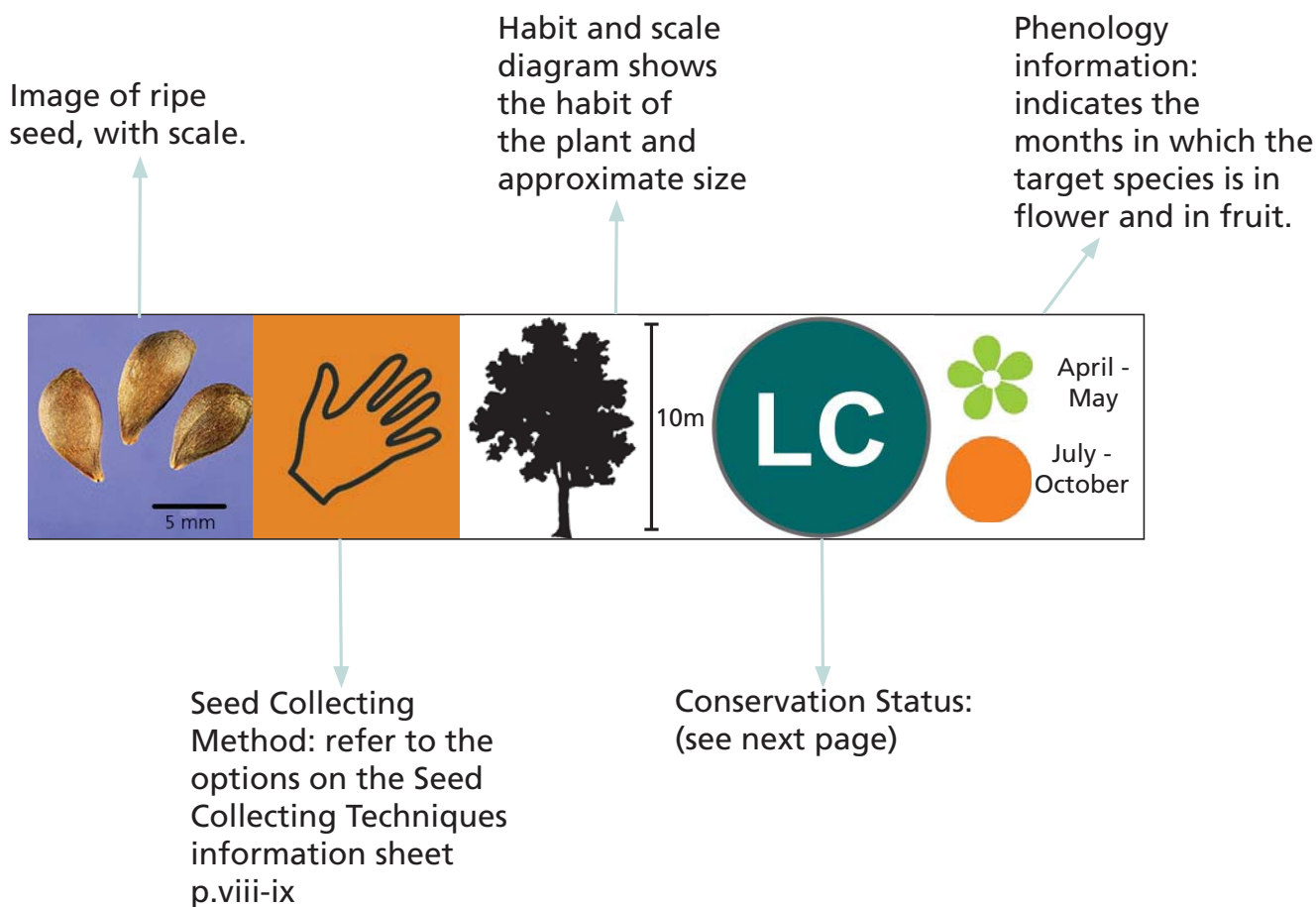
The species included in this guide are a selection of the wild relatives of the 29 key crops which this project covers (African Rice, Alfalfa, Apple, Aubergine, Bambara groundnut, Banana, Barley, Bread Wheat, Butter Bean, Carrot, Chickpea, Common Bean, Cowpea, Faba bean, Finger millet, Grasspea, Lentil, Oat, Pea, Pearl millet, Pigeon pea, Plantain, Potato, Rice, Rye, Sorghum, Sunflower, Sweet potato, Vetch). 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.

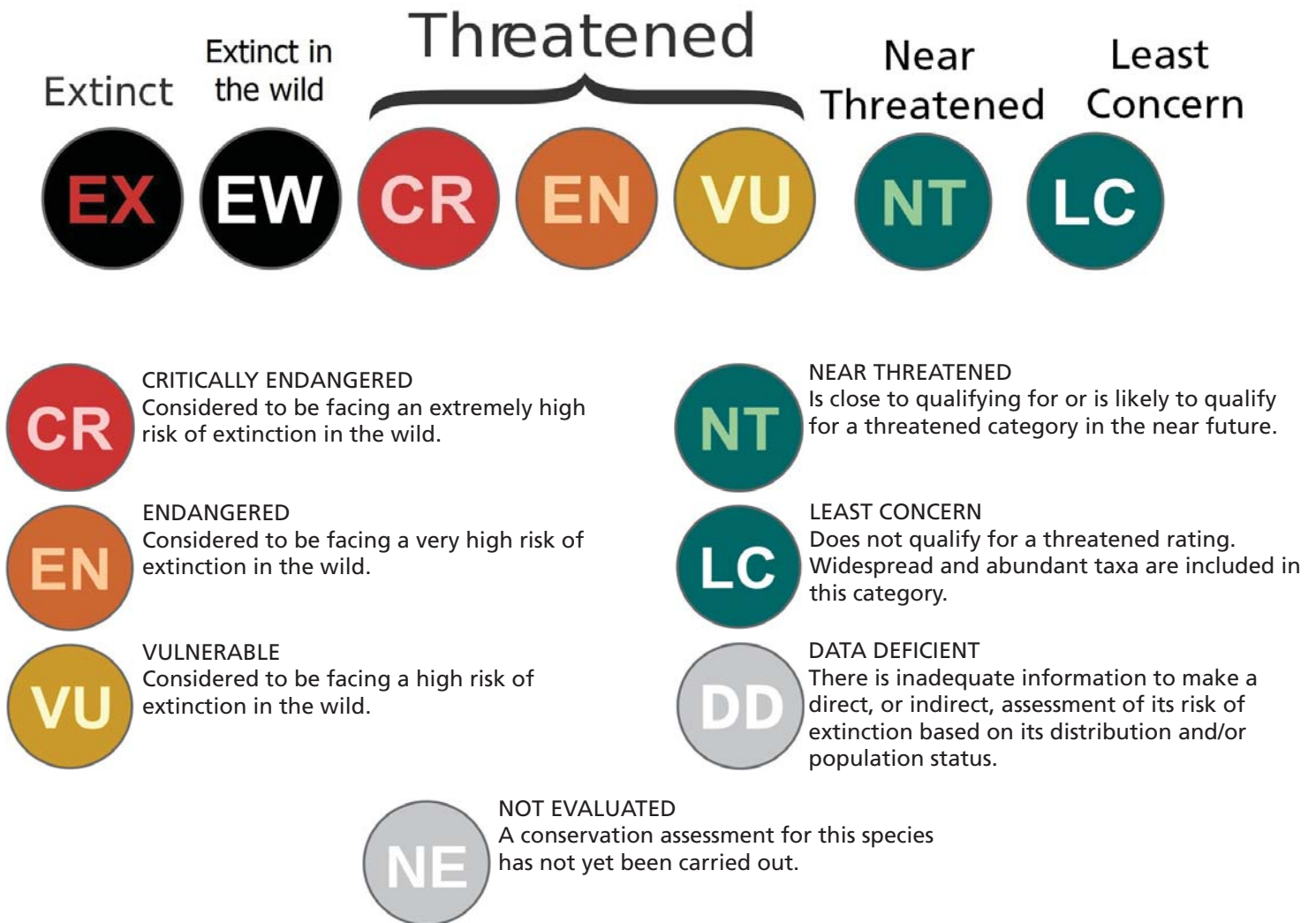
On each species profile, there is a collection of images to help identify the target species, accompanied by a series of symbols :



Conservation Assessments

Conservation Status:

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



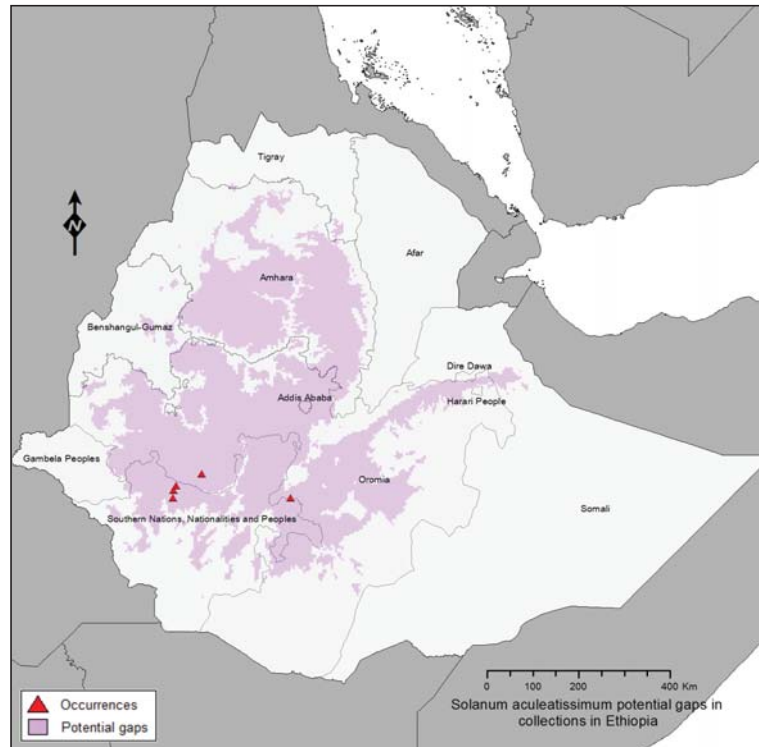
Where a full conservation assessment has not been completed, a preliminary conservation rating may be indicated. Preliminary assessments are produced using specimen locality data and GIS, which calculates two parameters accepted by IUCN as suitable measures of range: namely extent of occurrence (EOO) 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:

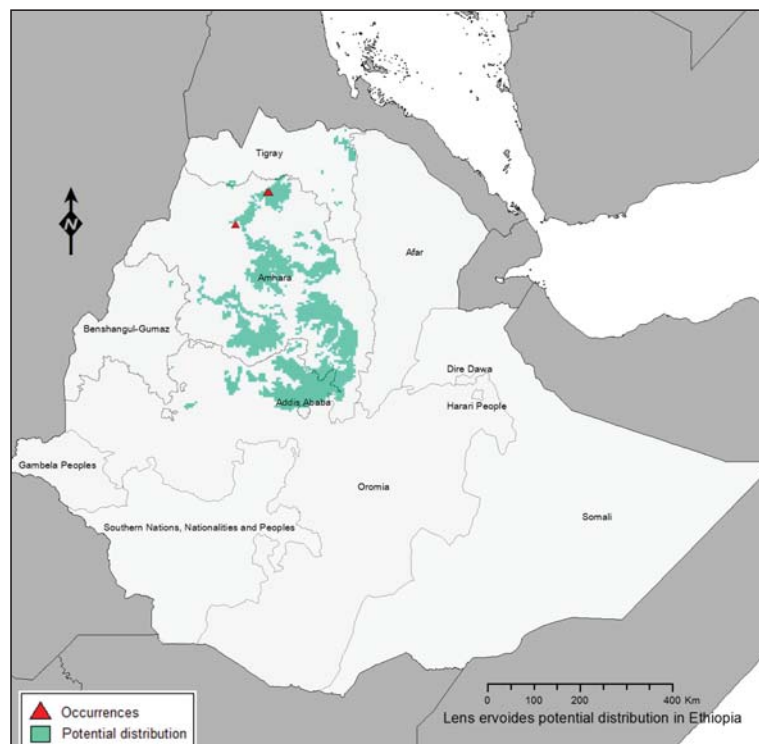


Maps

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.

Kew Grassbase interactive identification key

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

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]

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.

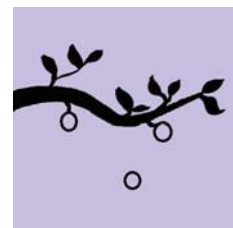


This is a very effective technique when:

- 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.

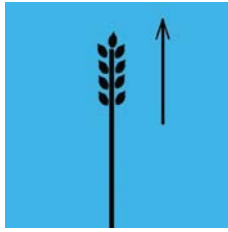
This technique may not be suitable for light, plumed seed from Bombacaceae and Asclepiadaceae, which may be carried away by air currents.



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 infructescences (seedheads). Grasp the seed-heads 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.

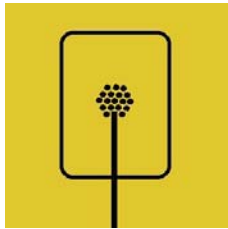


The stripping technique is most suitable for:

- dense, mono-specific stands of target species with no weed or other species present; and
- infructescences 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

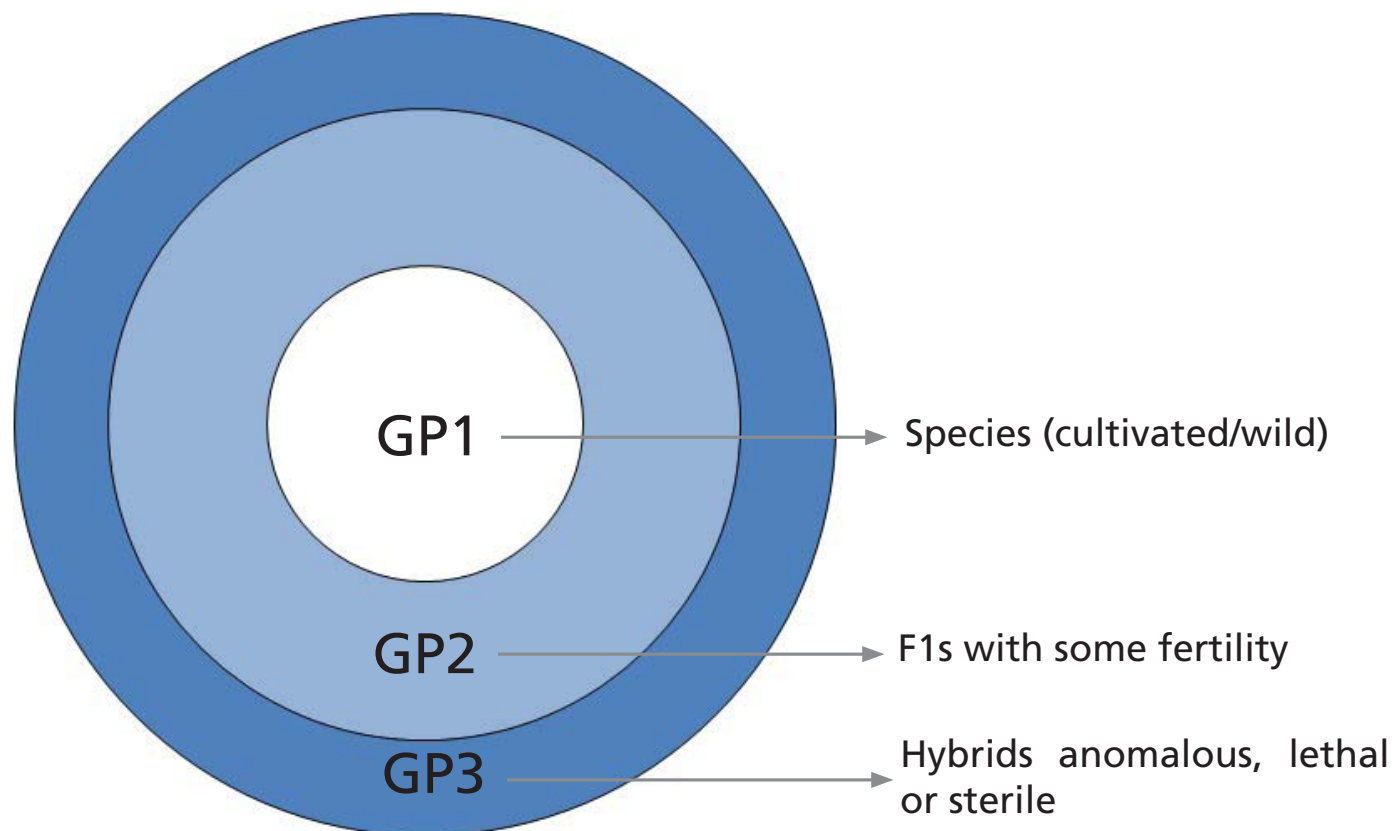
Containers

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

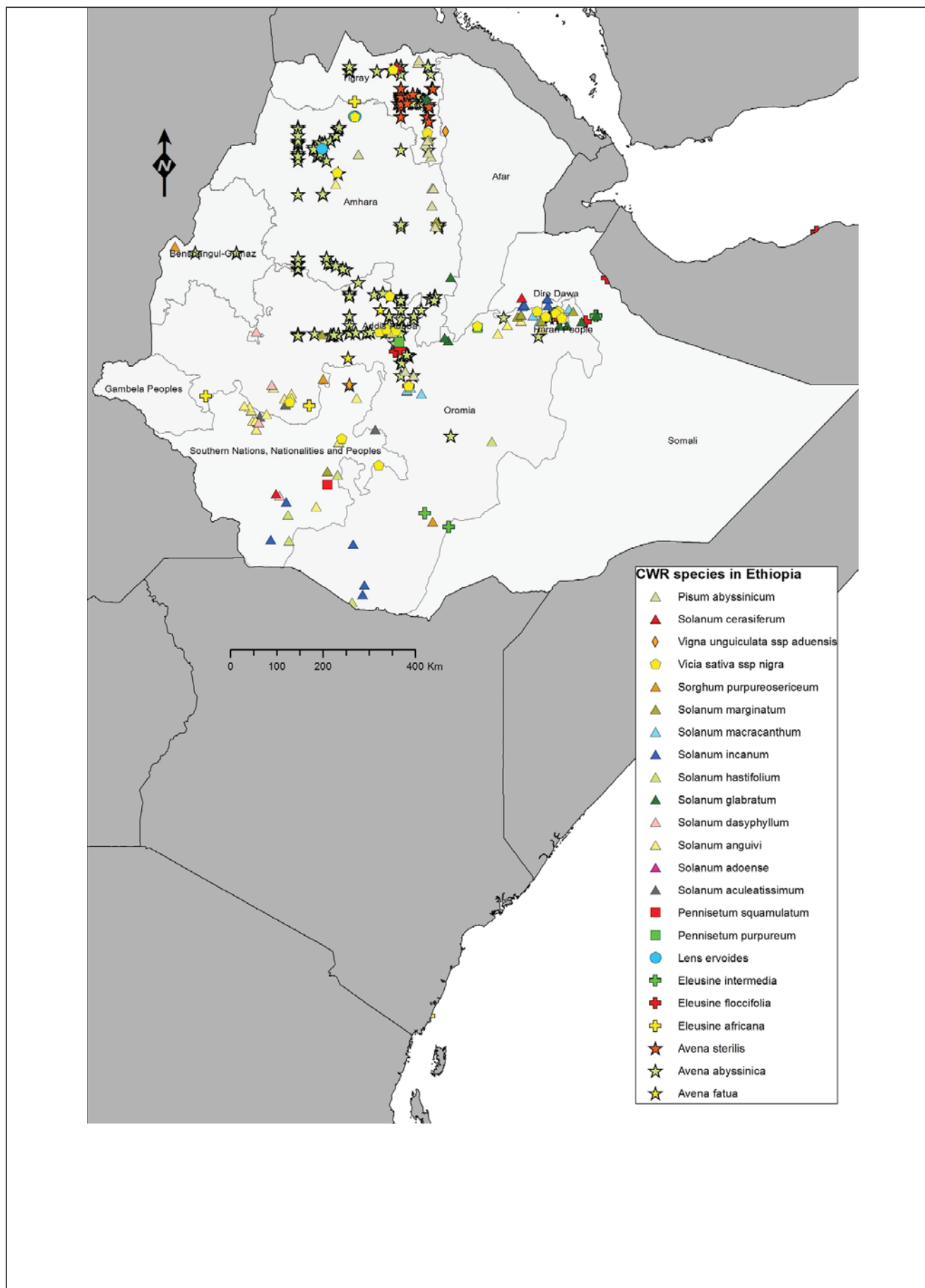
Taxon Group 2 – species in same series/section as crop

Taxon Group 3 – species in same subgenus as crop

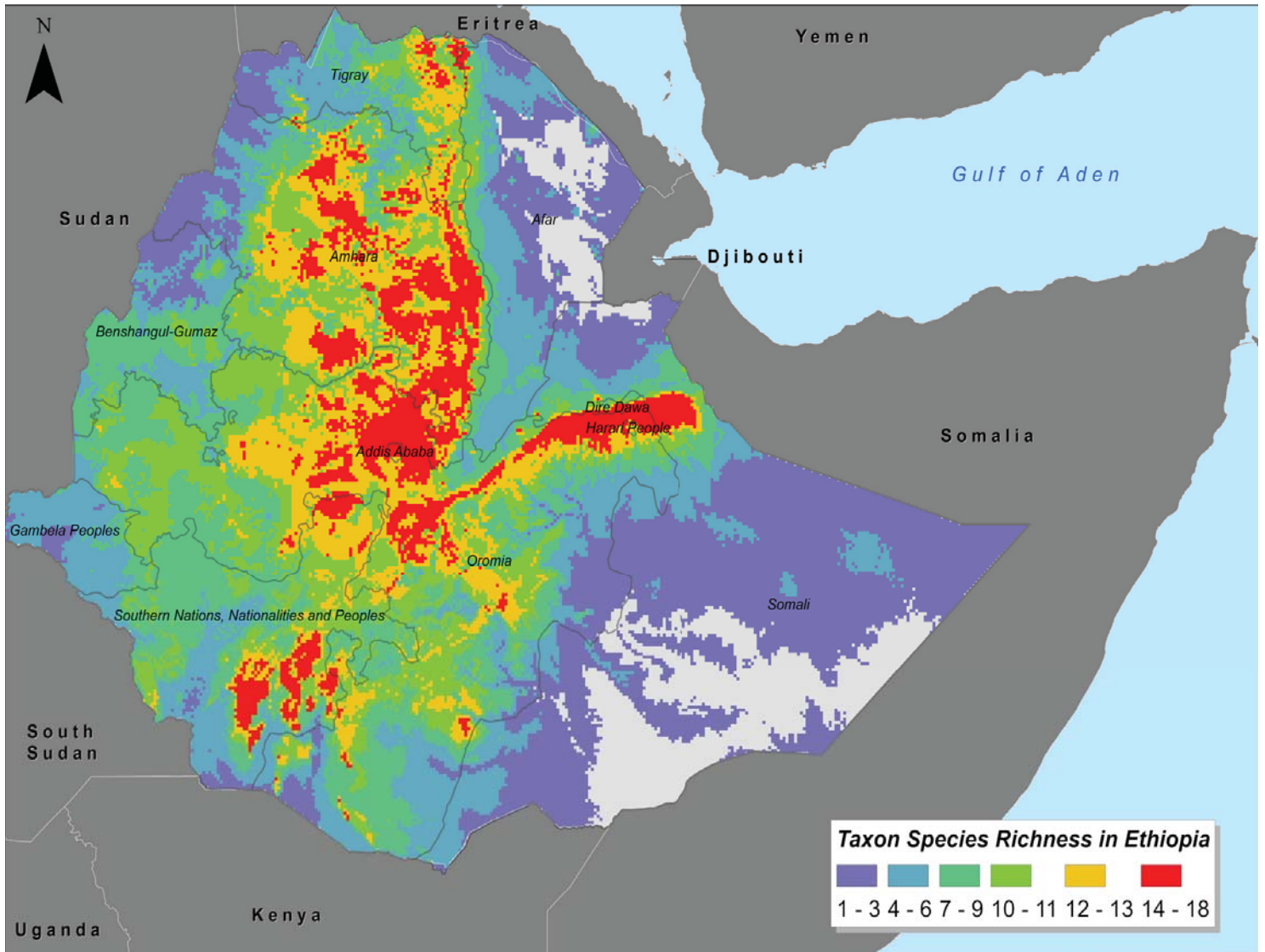
Harlan, J. and J. de Wet (1971). Towards a rational classification of cultivated plants. *Taxon* 20: 509-517.

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.

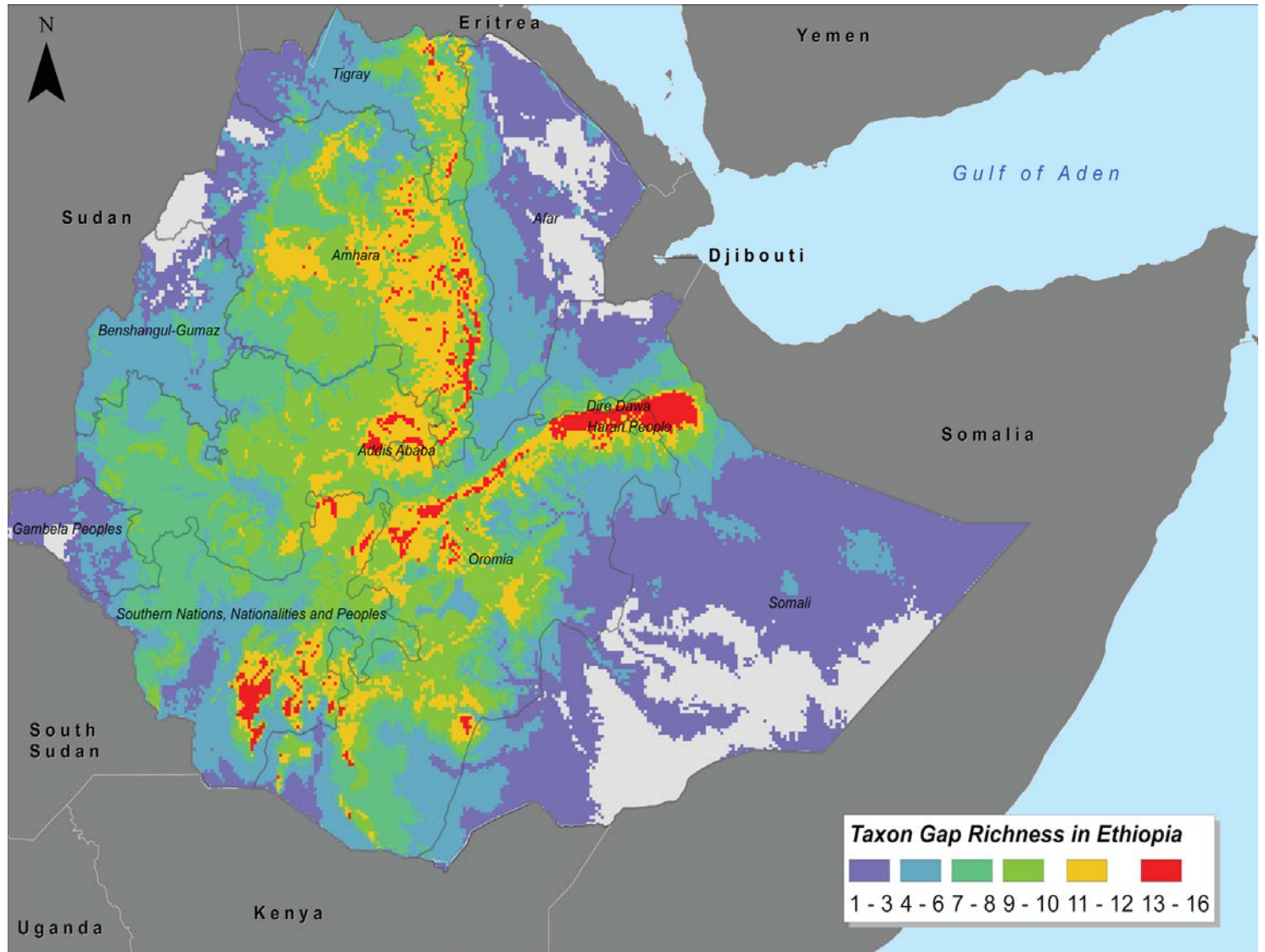
Occurrences of taxa in this guide, as a point distribution



Species richness



Gap richness



Species in this guide

Species profiles are arranged alphabetically according to Family and Taxa.

Family	Taxon	Genepool	Collection Priority	Sheet
Convolvulaceae	<i>Ipomoea cairica</i>	Sweet potato	Low	1
Convolvulaceae	<i>Ipomoea ochracea</i>	Sweet potato	Low	2
Leguminosae	<i>Lens ervoides</i>	Lentil	Low	3
Leguminosae	<i>Pisum abyssinicum</i>	Pea	High	4
Leguminosae	<i>Vicia sativa</i> subsp. <i>nigra</i>	Vetch	Low	5
Leguminosae	<i>Vigna unguiculata</i> subsp. <i>aduensis</i>	Cowpea	High	6
Poaceae	<i>Avena abyssinica</i>	Oat	Low	7
Poaceae	<i>Avena fatua</i>	Oat	Low	8
Poaceae	<i>Avena occidentalis</i>	Oat	Low	9
Poaceae	<i>Avena sterilis</i>	Oat	Low	10
Poaceae	<i>Eleusine africana</i>	Finger Millett	High	11
Poaceae	<i>Eleusine floccifolia</i>	Finger Millett	High	12
Poaceae	<i>Eleusine intermedia</i>	Finger Millett	High	13
Poaceae	<i>Pennisetum purpureum</i>	Pearl Millett	High	14
Poaceae	<i>Pennisetum squamulatum</i>	Pearl Millett	Low	15
Poaceae	<i>Sorghum purpureosericeum</i>	Sorghum	High	16
Solanaceae	<i>Solanum aculeatissimum</i>	Eggplant	Low	17
Solanaceae	<i>Solanum adoense</i>	Eggplant	Low	18
Solanaceae	<i>Solanum anguivi</i>	Eggplant	Low	19
Solanaceae	<i>Solanum campylacanthum</i>	Eggplant	High	20
Solanaceae	<i>Solanum cerasiferum</i>	Eggplant	High	21
Solanaceae	<i>Solanum dasyphyllum</i>	Eggplant	High	22
Solanaceae	<i>Solanum glabratum</i>	Eggplant	High	23
Solanaceae	<i>Solanum hastifolium</i>	Eggplant	High	24
Solanaceae	<i>Solanum incanum</i>	Eggplant	High	25
Solanaceae	<i>Solanum macracanthum</i>	Eggplant	High	26
Solanaceae	<i>Solanum marginatum</i>	Eggplant	High	27

Taxon	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<i>Sorghum purpureosericeum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum aculeatissimum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum adoense</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum anguivi</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum campylacanthum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum cerasiferum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum dasyphyllum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum glabratum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum hastifolium</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum incanum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum macracanthum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower
<i>Solanum marginatum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower

KEY

Species in flower



Species in fruit



data gathered from literature and herbarium specimens

Wild relative of sweet potato

Morning glory, Mile-a-minute vine

HABIT: Perennial herb with twining and trailing stems, reaching up to 5 m. Roots tuberous and plant rooting at nodes. Plants hairless.

LEAVES: Round in outline, 3-10 cm long and wide, deeply 5-segmented with basal segments often lobed; leaf stalk 2-6 cm long.

INFLORESCENCES axillary, 1-3 flowered. Calyx 0.4-0.8 cm long; corolla fused, funnel-shaped, 3.5-6 cm long, 6-8 cm wide, violet (rarely white), with darker violet hairless mid-petal bands, throat usually darker. Stamens and style included in flower tube.

FRUIT: an almost globe-shaped capsule, 9-12 mm wide, with 2 chambers, splitting into 4 valves, contains up to 4 seeds. Seeds dark brown to black, 5-6 mm long, flattened ovoid, hairy with pale brown long hairs on outer ridges.

Habitat:

A common inhabitant of swampy grassland, riverine edges and roadsides, where it may cover extensive areas.

Distribution:

Throughout tropical Africa; also from the eastern Mediterranean region through Asia to Taiwan.

Altitude: Up to 1650 m

<i>Ipomoea cairica</i>	May be confused with: <i>Ipomoea batatas</i>
Deeply 5(-7)-lobed leaves.	Leaves entire.

Reported from
Ethiopia but
no localities known.

All populations priority
for collection.

No accessions
listed on Germplasm
Resources Information
Network (GRIN)
[Online Database] for
this taxon.

References: Hyde, M.A., Wursten, B.T., Ballings, P. & Dondeyne, S. (2013). Flora of Mozambique: Species information: *Ipomoea cairica* var. *cairica*. http://www.mozambiqueflora.com/speciesdata/species.php?species_id=147580, retrieved 22 May 2013; Thorp, J.R., Wilson, M, Weeds Australia - www.weeds.org.au

CONVOLVULACEAE

Wild relative of sweet potato

Ipomoea cairica (L.) Sweet

Morning glory, Mile-a-minute vine



BT Wursten/ Flora of Mozambique website



BT Wursten/ Flora of Mozambique website



BT Wursten/ Flora of Mozambique website



Sheldon Navie



Steve Hurst @ USDA-NRCS PLANTS Database



Up to 5 m



Nov - Jul

Nov - Jul

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.

INFLORESCENCES: 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; 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: Up to 600 m

<i>Ipomoea ochracea</i>	May be confused with: <i>Ipomoea obscura</i>
Corolla bright yellow. 	Corolla white or pale yellow. 

Reported from
Ethiopia but
no localities known.

All populations priority
for collection.

No accessions
listed on Germplasm
Resources Information
Network (GRIN)
[Online Database] for
this taxon.

CONVOLVULACEAE

Wild relative of sweet potato

Ipomoea ochracea (Lindl.) G. Don
Yellow morning glory



Forest & Kim Starr



Forest & Kim Starr

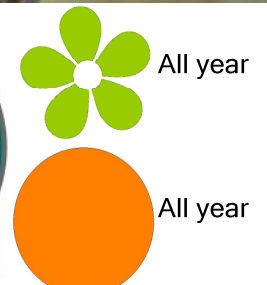
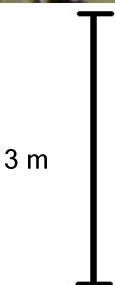
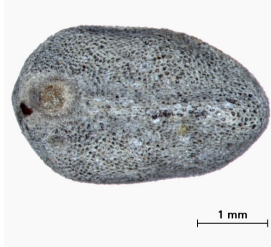


Forest & Kim Starr



Forest & Kim Starr

Gemma Toothill (c) Board of Trustees RBG Kew



HABIT: Suberect, straggling or climbing annual herbs, up to 0.3 m tall. Stems slender, angular, much branched.
LEAVES: 4-6 foliate; leaflets narrowly oblong or linear, 0.4-1.4 cm long, 1-4 mm wide, glabrous to thinly hairy; petiole very short to obsolete; rachis produced into a short awn or slender unbranched tendril, stipules 1-2mm.
INFLORESCENCE: 1-2 flowered (but flowers mostly solitary); calyx glabrescent or hairy; tube 1.5 mm long. Corolla pale to bright blue; standard rounded, +/- 3mm in diameter.
FRUIT: Pods oblong, very compressed, 7-9 mm long, 3.5-4 mm wide, finely puberulous to adpressed pubescent or rarely glabrescent save for ciliate margins. Seeds black and dark brown mottled, more or less circular in outline, compressed, 2-2.5mm in diameter, 1.5mm thick.

Habitat:

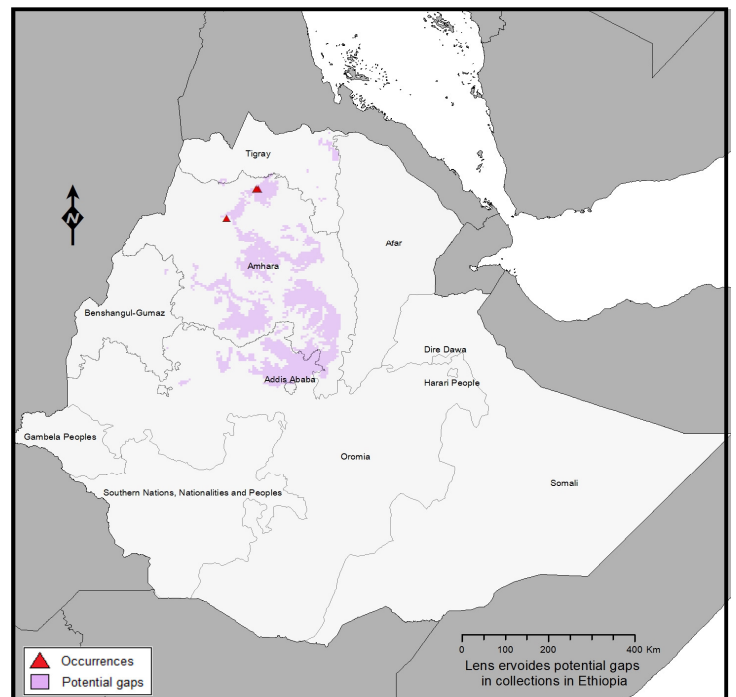
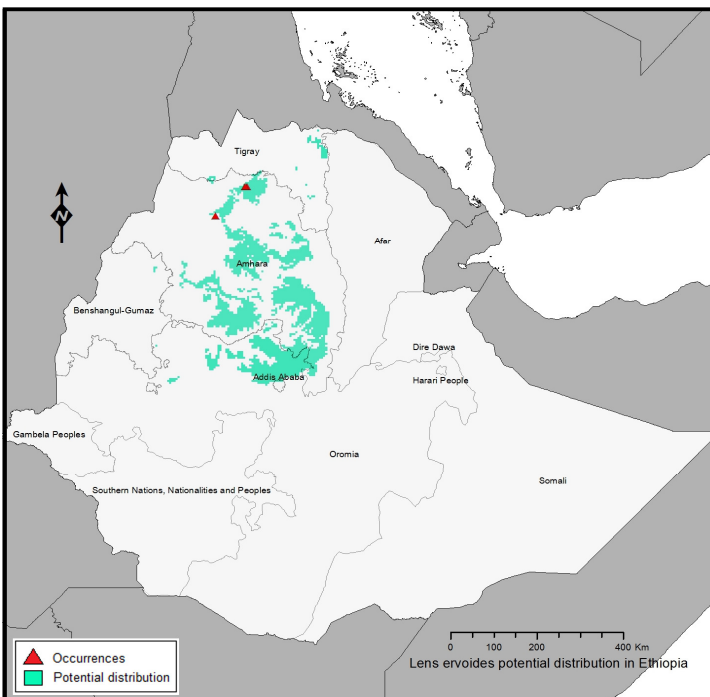
Grasslands, especially in montane areas.

Distribution:

Confined mainly to Mediterranean region, with isolated populations from Ethiopia and Uganda.

Altitude: 2300 - 2550 m

<i>Lens ervoides</i>	May be confused with: <i>Lens culinaris</i>
Leaflets glabrous to thinly hairy. Corolla +/- 3mm.	Leaflets villous on both surfaces. Corolla 4.5 - 6.5 mm.



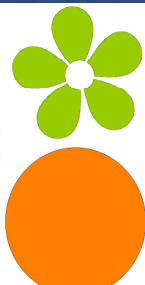
References: Thulin, M. (1989) Fabaceae. In: Flora of Ethiopia and Eritrea. Volume 3, p249.
 Ferguson, M.E., Maxted, N., van Slageren, M. & Robertson, L.D. (2000) A re-assessment of the taxonomy of *Lens* Mill. (Leguminosae, Papilionoideae, Viciae). Botanical Journal of the Linnean Society 133: 41-59.



No seed image available



up to 0.3 m



Jun - Nov

Jun - Jan

HABIT: herbaceous annuals, stems terete, climbing by tendrils, plants completely glabrous, 0.5-2 m long. Stipules larger than leaflets, up to 10 cm long.

LEAVES: alternate, paripinnate, rachis ending in tendril, leaflets 1 pair, opposite.

INFLORESCENCE: racemose, 1-2(-3)-flowered, corolla c. 15 mm long, purple, style longitudinally grooved.

FRUIT: pod 3.5-9.5 cm long by 1-1.8 cm wide. Seeds globose, 5-8 mm in diameter, hilum small, elliptic.

Habitat:

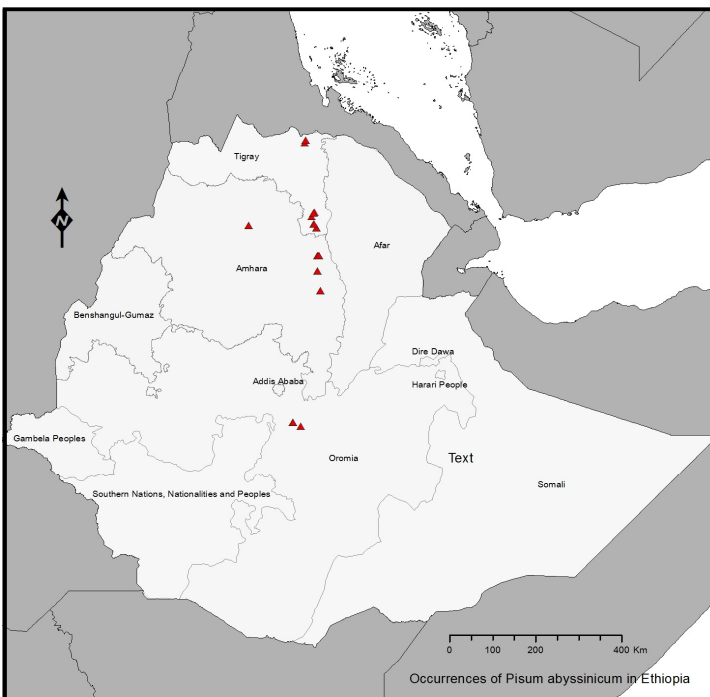
Unknown

Distribution:

Endemic to Ethiopia

Altitude: 1000 - 2700 m

<i>Pisum abyssinicum</i>	May be confused with: <i>Pisum sativum</i>
Leaves with 1 pair of leaflets; corolla purple, c. 15 mm long.	Leaves usually with 2 pairs of leaflets, corolla white or purple, >20 mm long.



All populations priority
for collection.

References: Thulin, M. (1989) Fabaceae. In: Flora of Ethiopia and Eritrea. Volume 3, p248 [as *Pisum sativum* var. *abyssinicum*]



Credit: Herbarium Tubingense

No seed image available



0.5-2 m



No data

No data

HABIT: Annual with scrambling and climbing growth habit, 10-70 cm long. Stems arising from the base hollow, squarish in cross-section. Slender taproot system with numerous lateral branches.

LEAVES: compound pinnate with 3-8 pairs of opposite leaflets and 2-3 terminal tendrils. Leaflets narrowly oblong, square at the apex and with a small projecting mid rib, usually less than 10 mm broad. Stipules small and divided.

INFLORESCENCES: flowers borne singly or in pairs on short peduncles arising at the base of the leaves, mainly blue to purple but sometimes white. Calyx 7-12 mm, teeth c. 2.5 - 8 mm; corolla 10 - 20 mm.

FRUIT: pods narrow. Seeds 4-12 per fruit, flattened, black to greyish in colour, sometimes marbled, 2.5-4 mm.

Habitat:

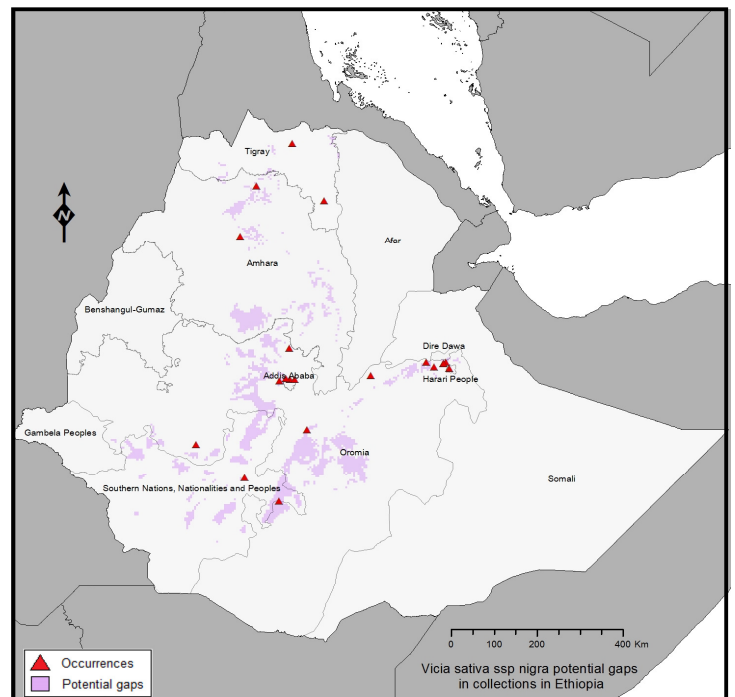
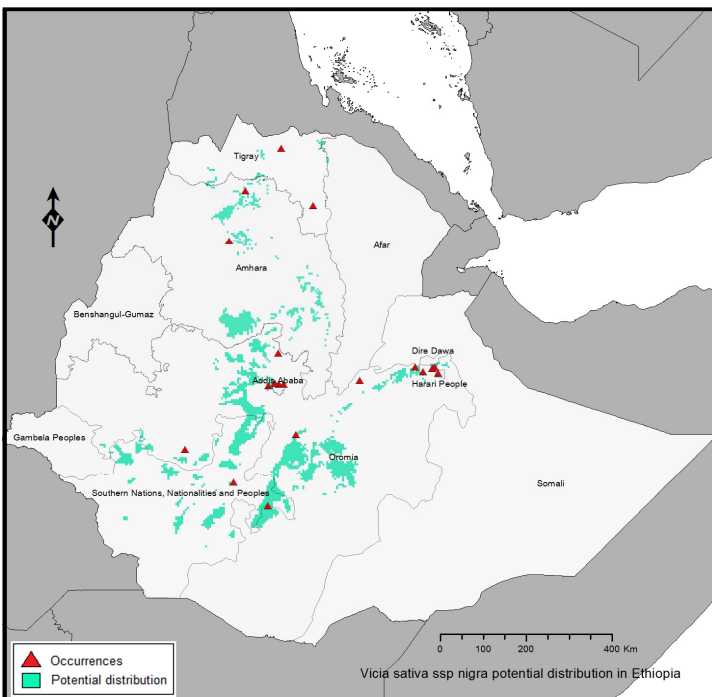
Agricultural and disturbed land, margins of woodland.

Distribution:

Common pan-temperate and semi-tropical weed.

Altitude: 0 - 2900 m

<i>Vicia sativa</i> subsp. <i>nigra</i>	May be confused with: <i>Vicia sativa</i> subsp. <i>sativa</i>
Pod black or brownish black, not contracted between seeds, 25-55 × (2.5-)3-6 mm; usually glabrous.	Pod brown or yellow-brown, contracted between seeds, 35-70 × 6-11 mm, usually hairy.



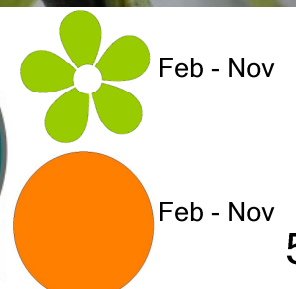
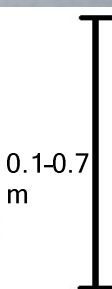
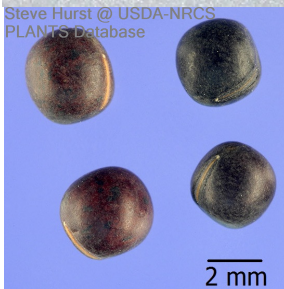
References: Macted, N. (1995) An ecogeographical Study of *Vicia* subgenus *Vicia*.; FAO Grassland Species Profiles <http://www.fao.org/AG/agp/agpc/doc/Gbase/>; Davis, P.H. Flora of Turkey (3) p139

LEGUMINOSAE

Primary Gene Pool relative of *Vicia sativa* L.

Vicia sativa L. subsp. *nigra* (L.) Ehrh.

Black pod vetch



Vigna unguiculata (L.) Walp. subsp. *aduensis* Pasquet

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

HABIT: annual herb, erect, climbing or prostrate, 15-80 cm tall. Stems glabrous or scabrous. Stipules very large, 12-27 mm by 7-10 mm.

LEAVES: alternate, trifoliolate, leaflets entire to 3-lobed, lateral leaflets opposite and asymmetrical, central leaflet symmetrical and ovate, petiole 5-25 cm long.

INFLORESCENCE: racemose, rachis with 3-4 nodes, internodes short, 5mm long. Flowers 20-25 mm long, calyx lobes 10-14 mm long, keel unbeaked, twisted to the left, style allogamous.

FRUIT: seeds 3-3.5 mm by 2mm.

Habitat:

Disturbed areas

Distribution:

Endemic to Ethiopia

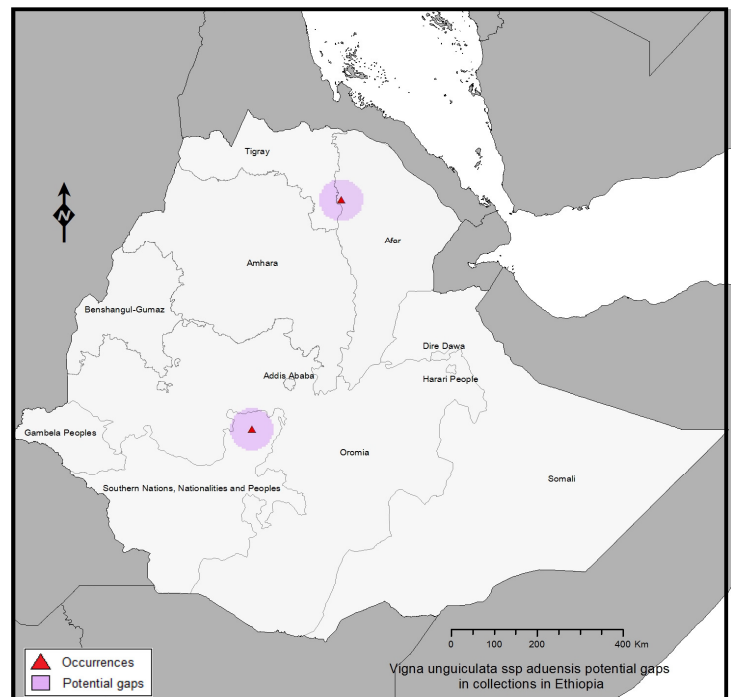
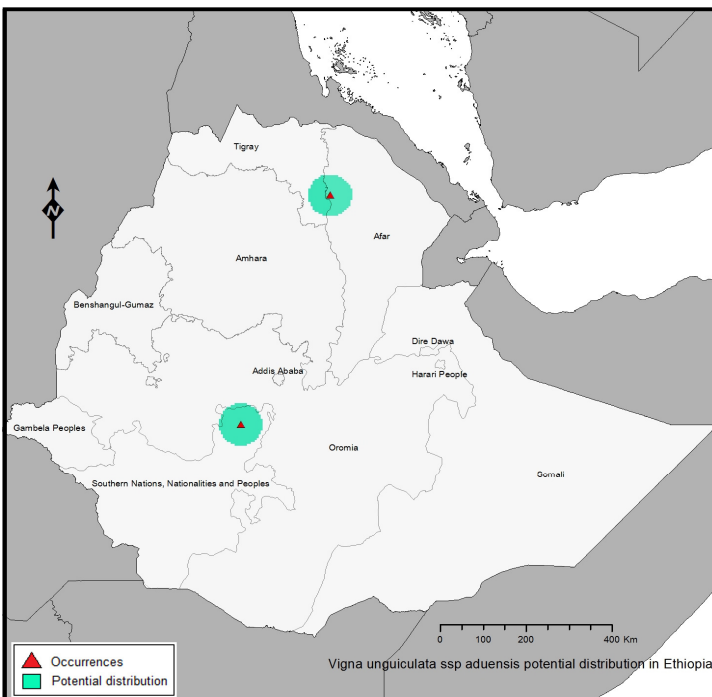
Altitude: 1200- 2900 m

Vigna unguiculata subsp. *aduensis*

May be confused with:
Vigna unguiculata (L.) Walp. ssp. *pawekiae*

Stipules 12-27 mm; rachis 5-25 mm, 3-4-noded; 18-20 ovules per ovary.

Stipules 6-20 mm; rachis 5 mm, 3-4-noded; 15-18 ovules per ovary.



References: Pasquet (1997) Kew Bulletin Volume 52: 840

Vigna unguiculata (L.) Walp. subsp. *aduensis* Pasquet

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



RBG Kew herbarium specimen

No seed image available



0.15-0.8 m



NT
PRELIM



No data

No data

HABIT: Annual. Culms 50-100cm long, robust, erect, 4-noded.

LEAVES: Leaf blades 15-30 cm long, 6-11 mm wide, surface rough, ligule erect, membranous, 5-10 mm long.

INFLORESCENCES: panicle, open, nodding, equilateral, 20-40 cm long, 5-15 cm wide. Spikelets 2-2.5 cm long, laterally compressed, each with 2-4 fertile florets, with a sterile rhachilla extension. Glumes 2, subequal, 20-25 mm long, thinner than lemma, lower glume lanceolate, upper glume elliptic. Lemma 15-18 mm long, coriaceous, surface rough, apex bifid, 3-awned, principal awn 25-35 mm long. Palea keels winged, with rows of cilia along edges.

Florets non-disarticulating at maturity.

FRUIT: Caryopsis 7-8 mm long, with adherant pericarp, sulcate on hilar side, pubescent.

Habitat:

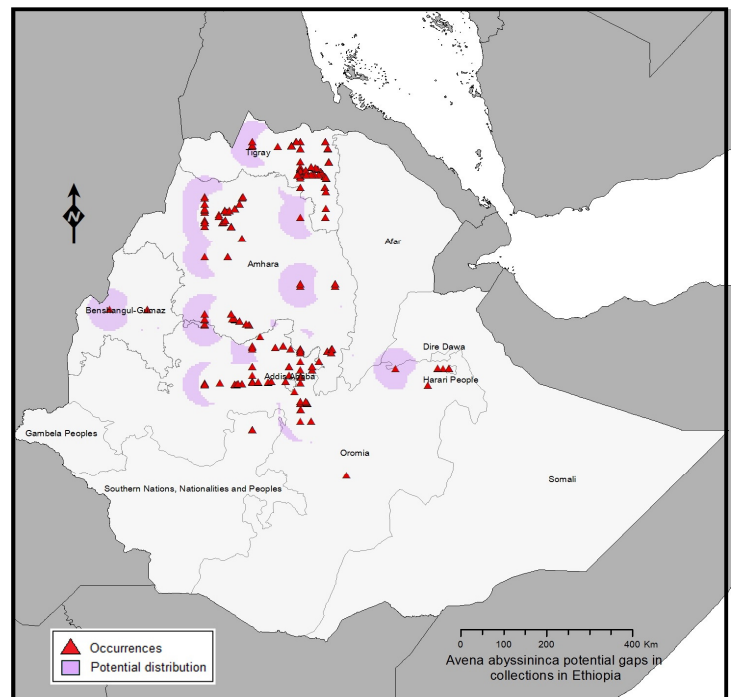
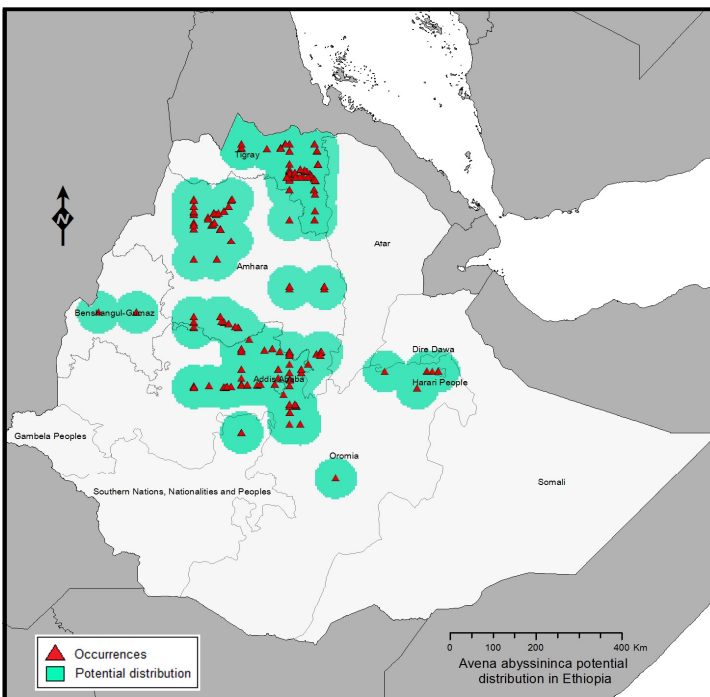
A weed of arable land, particularly barley fields, often harvested with the crop, on elevated basaltic plateaus.

Distribution:

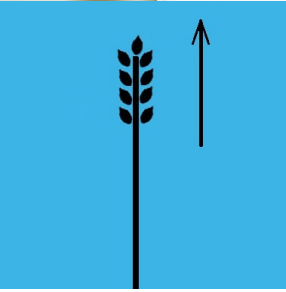
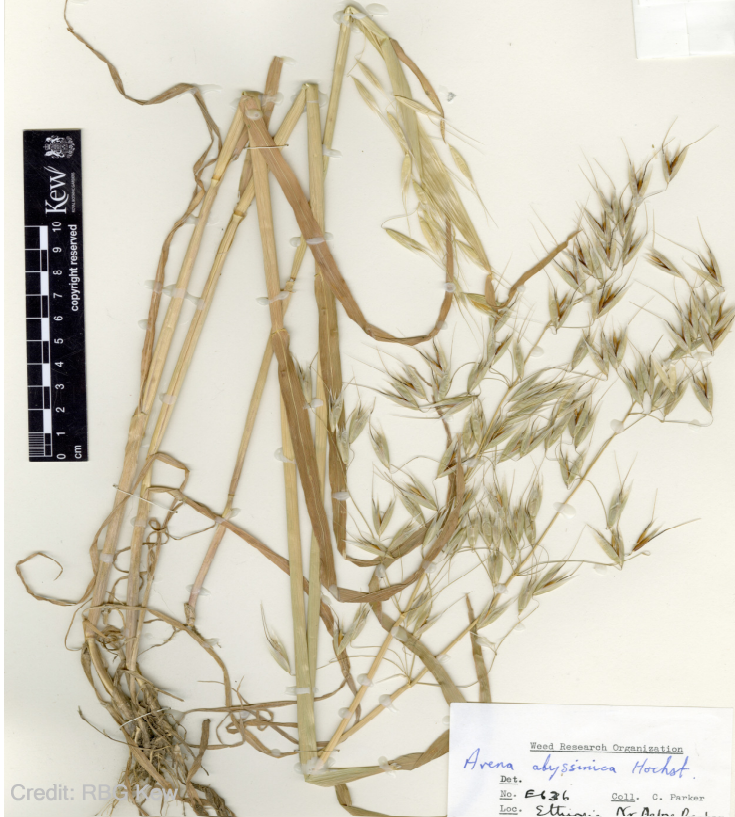
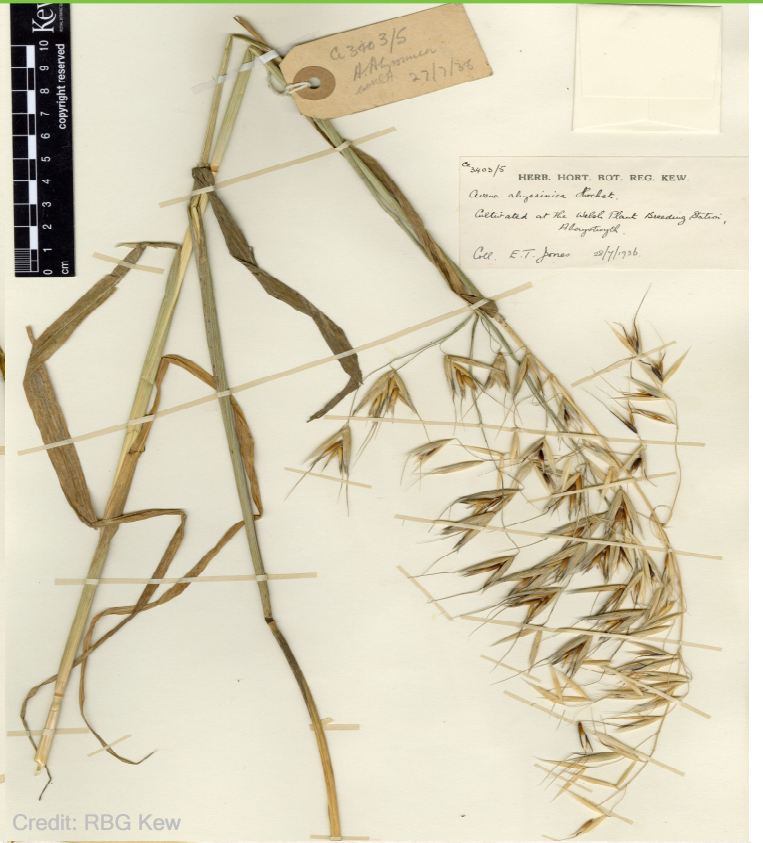
Native to Ethiopia, Djibouti and Eritrea and cultivated for grain in northern Ethiopia. Introduced into Saudi Arabia and Yemen.

Altitude: 1700 - 2800 m

<i>Avena abyssinica</i>	May be confused with: <i>Avena vaviloviana</i>
Rhachilla touch, spikelets not disarticulating; lemmas more or less glabrous; awn sometimes reduced.	Rhachilla fragile, spikelets disarticulating; lemma usually hairy; awn perfect



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>. [accessed 10/06/2014]; Phillips, S. (1995) Poaceae. In: Flora of Ethiopia and Eritrea. Volume 7, pp 33-37.



0.5-1.1 m

LC
PRELIM

Aug - May

Jun - Nov

HABIT: Annual. Culms 30-150 cm long, erect or geniculately ascending, stout, simple.

LEAVES: Leaves cauline. Leaf blades 10-45 cm long, 3-15 mm wide, glabrous, surface rough, ligules up to 6 mm long.

INFLORESCENCES: Panicles nodding (sometimes one-sided), narrowly to broadly pyramidal, 10-40 cm long and up to 20 cm wide, loose with scaberulous branches. Spikelets cuneate, pendulous, 18-30 mm long, 2-3-flowered, the rachilla disarticulating below each floret. Glumes persistent, exceeding florets, 18-28 mm long, lanceolate, apex finely acute.

Fertile lemma 12-25 mm long, with a basal callus, densely bearded around the callus with hairs up to 4 mm long, brown and densely hispid in lower two thirds, green and rough towards the tip, unequally and shortly 2-4-toothed at the apex, awn 2.5-4 cm long, geniculate. Anthers 3 mm long. Ovary pubescent.

FRUIT Caryopsis with adherent pericarp, 6-8 mm long, hairy all over. Hilum linear.

Habitat:

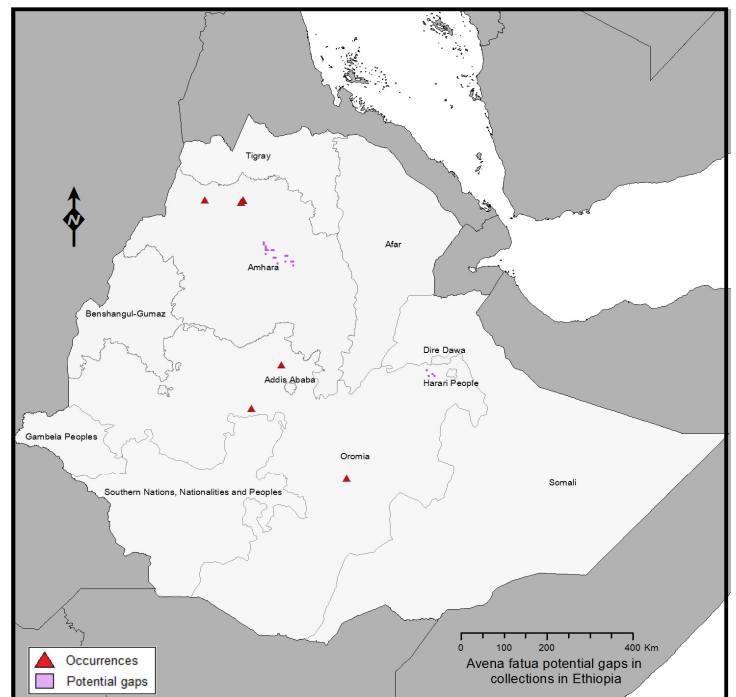
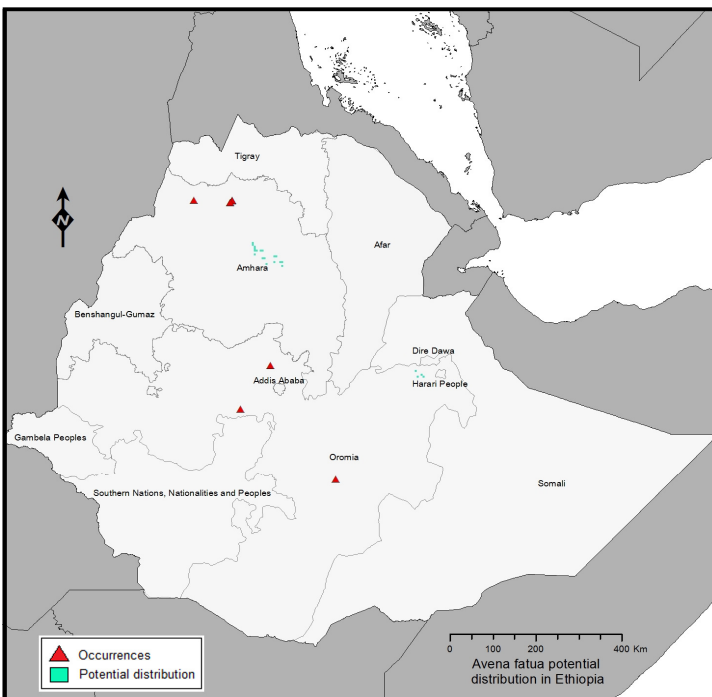
Roadside weed or weed of arable land.

Distribution:

Distributed globally.

Altitude: 0 - 2400 m

<i>Avena fatua</i>	May be confused with: <i>Avena sterilis</i>
Rhachilla disarticulating between each floret; every lemma with a basal callus.	Rhachilla disarticulating only below lowest floret; only lowest lemma with a basal callus.



References: GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>; Phillips, S. (1995) Poaceae. In: Flora of Ethiopia and Eritrea. Volume 7, pp 37



FIGURE 407.—A, *Avena fatua*. Plant, $\times \frac{1}{2}$; spikelet and floret, $\times 2$. (Umbach, III.) B, *A. sativa*, $\times 2$. (Dean, Ind.)

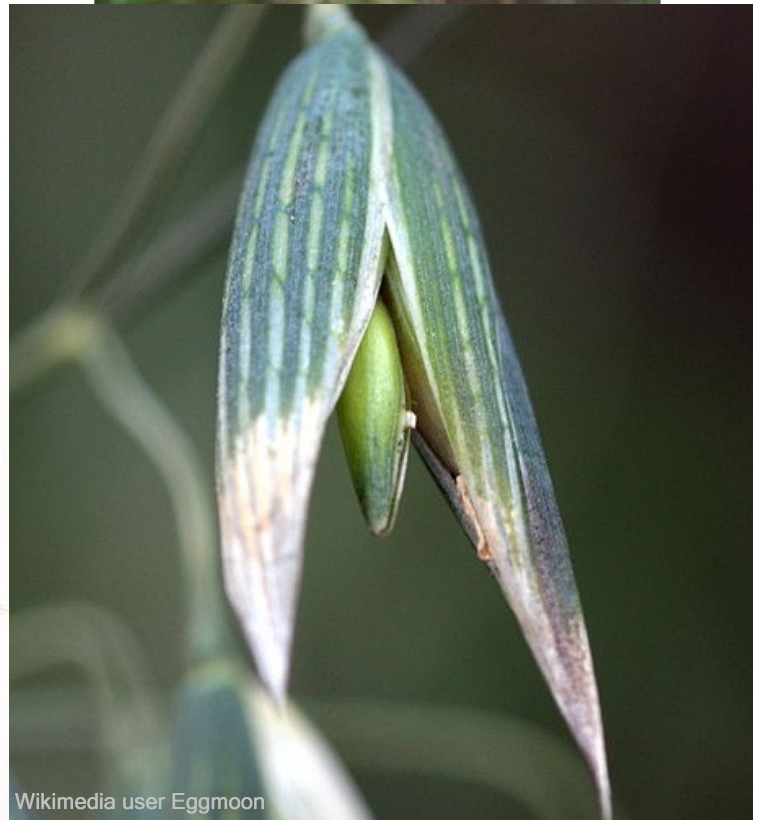
Hitchcock, A.S. (1950) Manual of the grasses of the United States.



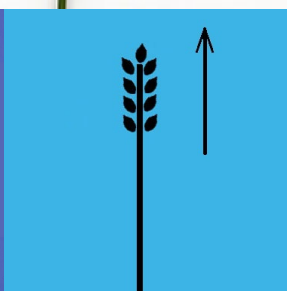
Wikimedia user Philmarin



Wikimedia user Philmarin



Wikimedia user Eggmoon



0.3-1.5 m



Mar - Jul

Mar - Jul

Primary Gene Pool relative of *Avena sativa* L.

HABIT: Annuals, prostrate to erect. Culms erect. Plants 80-160 cm high.

LEAVES: Ligules acute.

INFLORESCENCES: Panicle equilateral. Spikelets 15-22 mm long excluding awns, each spikelet with 2-3 florets. Glumes almost equal in length, 18-25 mm long. Florets all disarticulating at maturity. Scars on florets oval to round, rarely elliptic. Lemma structure tough, apex bidenticulate or bisubulate to bilobed, awn inserted about the middle. Paleas with 1-3 rows of cilia along edges, with prickles along back.

Habitat:

As a weed among cereal crops, on waste ground, by rivers, roadsides and railways, on limestone, in clearings in woodland and valleys.

Distribution:

Throughout Europe, the Middle East and South-east Asia. Introduced and naturalized in North and South America, Australia and South Africa.

Altitude: No data

<i>Avena occidentalis</i>	May be confused with: <i>Avéna vaviloviana</i>
Inflorescence slightly one-sided; spikelet with 3-4 florets; scars elliptic; palea with 1-3 rows of cilia along edges of keels.	Inflorescence equilateral; spikelet with 2-3 florets; scars heart-shaped; palea with 1-2 rows of cilia along edges of keels.

Reported from Ethiopia, but no localities known

All populations priority for collection.

No accessions listed on Germplasm Resources Information Network (GRIN) [Online Database] for this taxon.

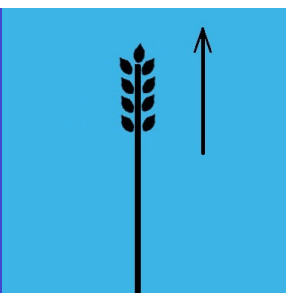
References: Baum, B.R. (1977) Oats: wild and cultivated. A Monograph of the genus *Avena* L. Biosystematics Research Institute Monograph No. 14, Ottawa, Canada. pp 300-305.

Primary Gene Pool relative of *Avena sativa* L.



Credit: RBG Kew

No seed image available



0.8-1.6 m

LC PRELIM



Feb - Oct

No data

HABIT: Annual. Culms 30-180 cm long, geniculately ascending, or decumbent, 2-5-noded.

LEAVES: cauline, blades 10-60 cm long, 4-18 mm wide, surface rough.

INFLORESCENCE Paniculate, nodding, pyramidal, 10-45 cm long, 5-25 cm wide.

Spikelets 23-50 mm long, breaking up at maturity, disarticulating above glumes but not between florets. Fertile spikelets comprising 2-5 fertile florets, with a sterile rhachilla extension. Glumes persistent, exceeding apex of florets.

Fertile lemma lanceolate, 15-40 mm long, coriaceous, much thinner above, apex dentate, bifid, with a dorsal awn, arising 0.5 way up back of lemma, geniculate, 30-80 mm long, with twisted column. Column of lemma awn hispidulous to pubescent. Palea keel ciliate. Ovary pubescent all over. Floret callus evident, bearded, obtuse, disarticulating obliquely.

FRUIT: Caryopsis with adherent pericarp, 11-12 mm long; hairy all over. Hilum linear.

Habitat:

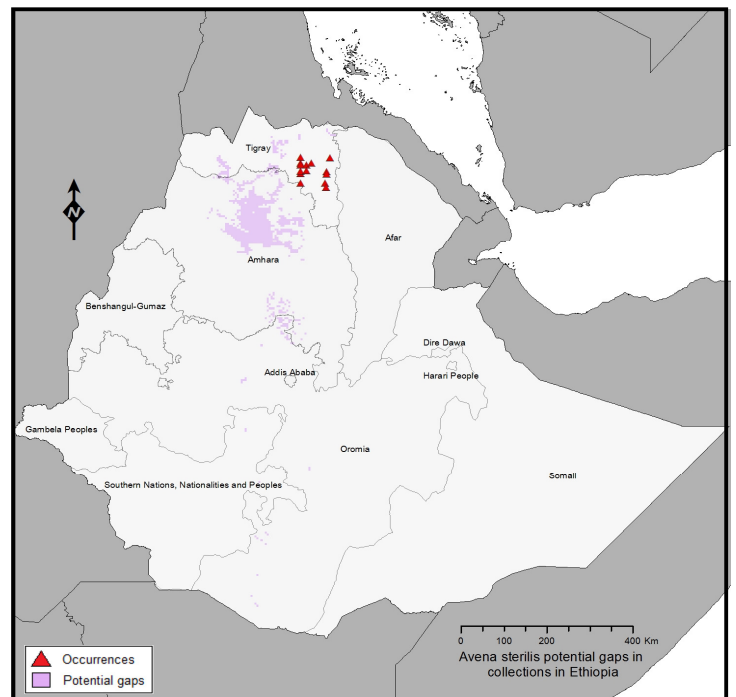
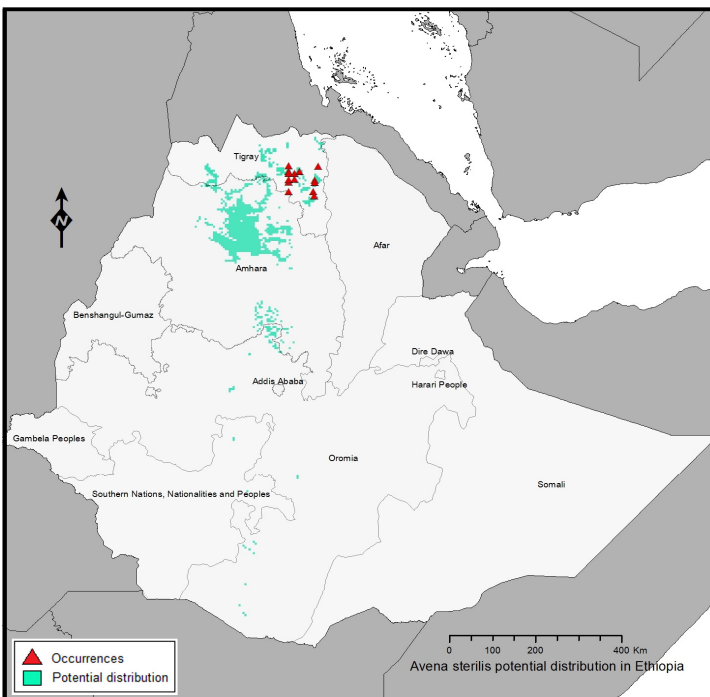
Arable land, especially fields of cereals, disturbed open ground, roadsides and field edges.

Distribution:

Distributed globally.

Altitude: 2100 - 2400 m

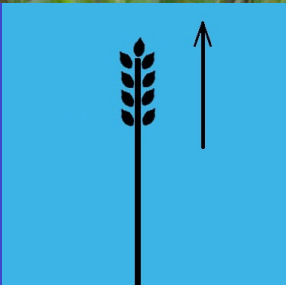
<i>Avena sterilis</i>	May be confused with: <i>Avena fatua</i>
Rhachilla disarticulating only below lowest floret, only lowest lemma with a basal callus.	Rhachilla disarticulating between each floret, every lemma with a basal callus.



References: GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>; Phillips, S. (1995) Poaceae. In: Flora of Ethiopia and Eritrea. Volume 7, p 37



No seed image available



0.3-1.8 m



Feb - May

Feb - May

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.

INFLORESCENCES 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:

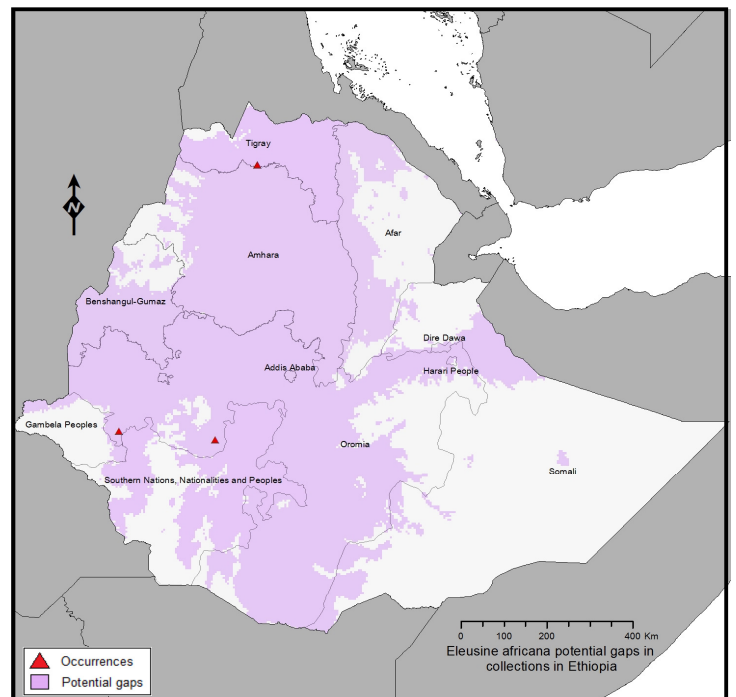
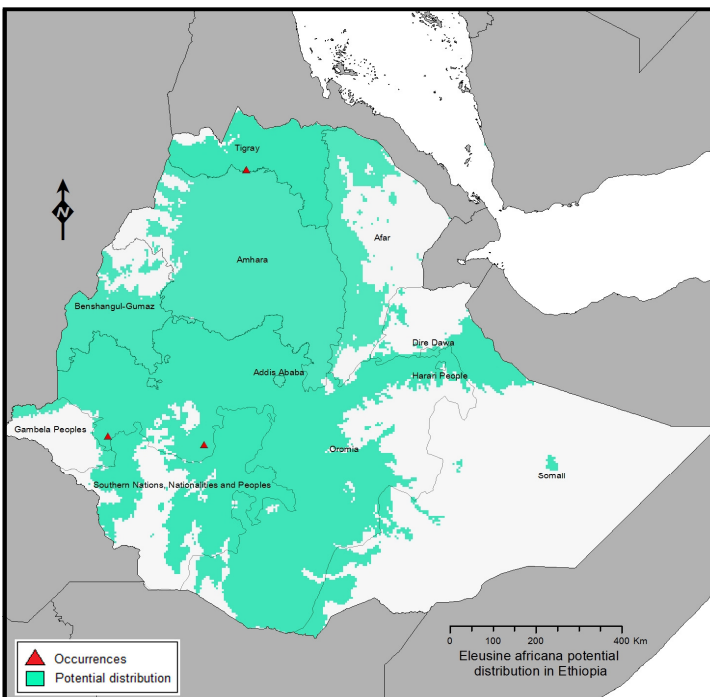
Usually in damp sandy soils beside rivers and dams, and in disturbed ground at roadsides; also in cultivated ground, often as a weed in crops, especially *E. coracana*

Distribution:

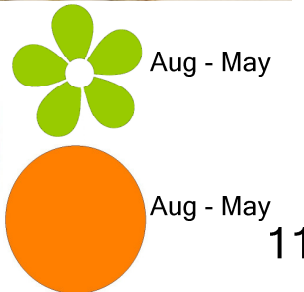
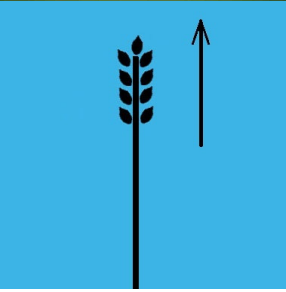
Arabia and Africa, mainly in the uplands of the east and south.

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 (3-5mm), 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.



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

HABIT: Perennial, plants growing in tight groups. Rhizomes tough, branching. Culms 20-70 cm long, ascending, surrounded at base by numerous keeled, pale leaf-sheaths.

LEAVES: Leaf-blades conduplicate, 8-55 cm long by 2.5-5 mm wide, margins mostly smooth, scabrid near tip, upper surface pilose near ligule. Ligule a ciliolate membrane, 0.3-0.5 mm long

INFLORESCENCES subdigitate, composed of 2-8 slender, unilateral spikes. Spikelets in 2 rows, appressed, solitary, each comprising 4-7 fertile florets. Glumes persistent, shorter than spikelets, dark grey. Lemmas narrowly elliptic, often falcate.

FRUIT: Caryopsis 0.9-1.4 mm long, elliptic-oblong, flat on hilar side, minutely rugulose.

Habitat:

Field margins, pasture land and roadsides on heavy clay soils.

Distribution:

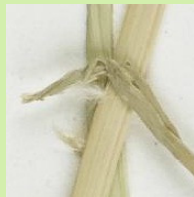
Ethiopia, Somalia and Yemen.

Altitude: 1800 - 3200 m

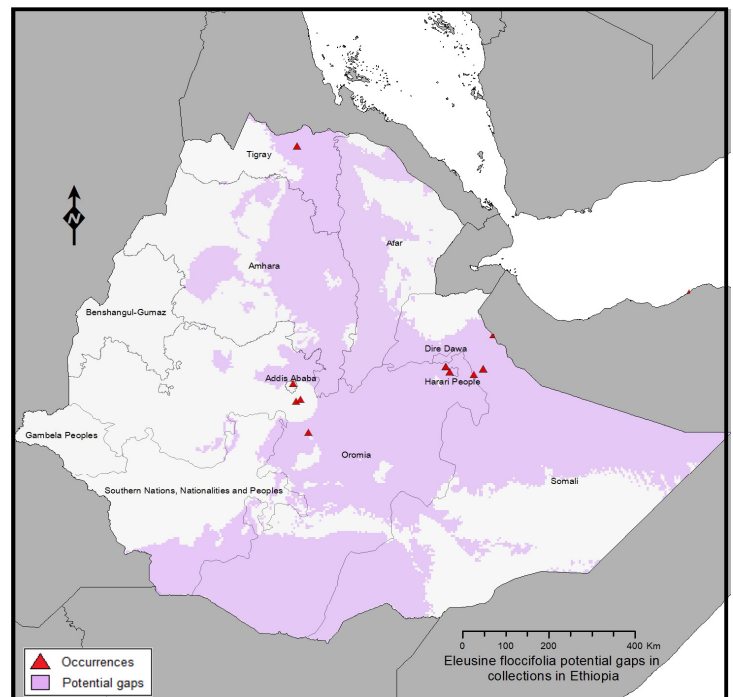
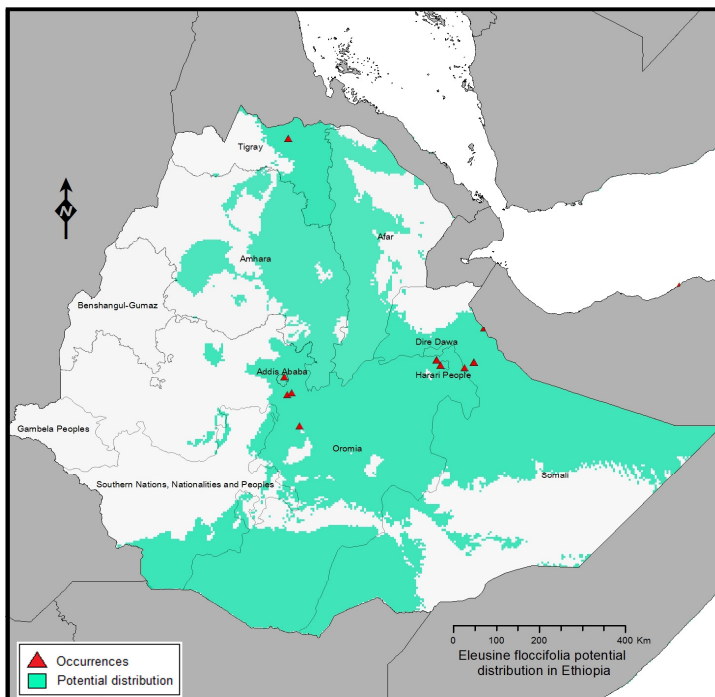
Eleusine floccifolia

May be confused with:
Eleusine intermedia

Tufts of soft white hairs scattered along the leaf margins. Caryopsis minutely rugulose, not striate.

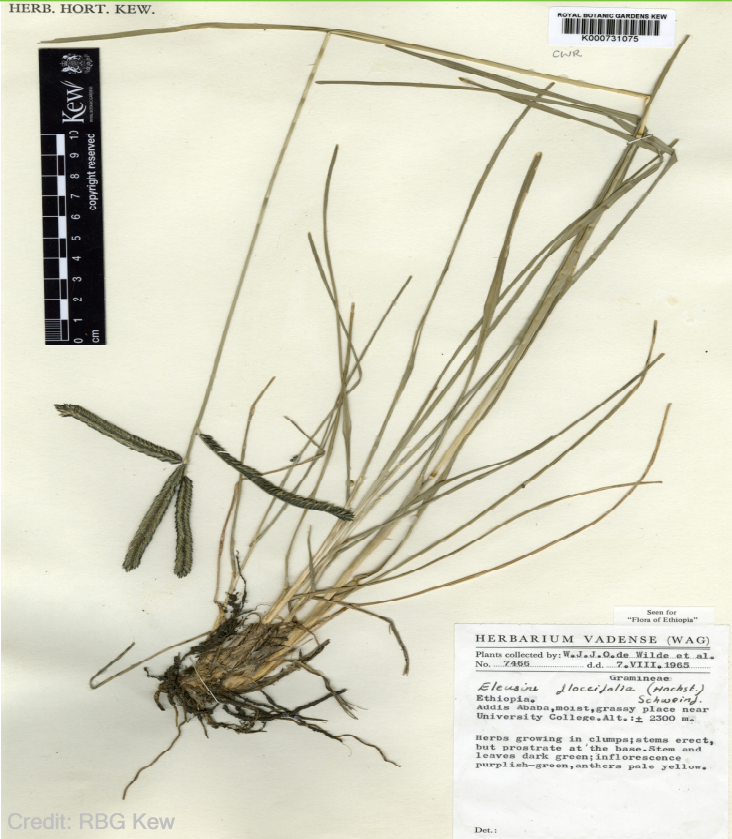


Leaf margins without hairs. Caryopsis finely striate.

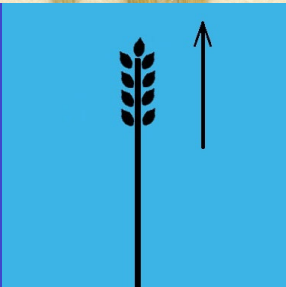


References: Phillips, S. (1995) Poaceae. In: Flora of Ethiopia and Eritrea. Volume 7, p 141; Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. (2006 onwards) GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>. [accessed 20/06/2014]

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

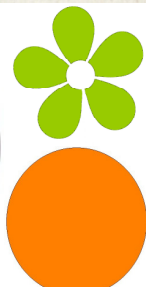


No seed image available



0.2-0.7 m

LC PRELIM



Mar - Aug

Jul - Jan

Primary Gene Pool of *Eleusine coracana* subsp. *coracana*

HABIT: Perennial, plants growing in tight groups. Rhizomes short, ascending. Culms 60-120 cm long, erect or geniculately ascending. Culm-internodes elliptical in section. Lateral branches sparse.

LEAVES: Leaf blades flat or folded, 15-50 cm long; 4-7 mm wide, surface pilose, hairy adaxially, margins smooth (except near tip), glabrous, apex acute. Ligule a ciliolate membrane, 0.6-1 mm long.

INFLORESCENCES racemose, composed of 4-15 spikes, digitate, spreading or ascending, one-sided, 5-12 cm long. Central inflorescence axis 0-7 cm long. Rhachis wingless, flattened. Spikelet packing broadside to rhachis, regular, 2-rowed. Spikelets appressed, solitary. Fertile spikelets sessile.

FRUIT: Caryopsis with free soft pericarp, ellipsoid, trigonous, 1.2-1.3 mm long, black, striate.

Habitat:

Deciduous bushland.

Distribution:

Northeast tropical Africa and east tropical Africa.

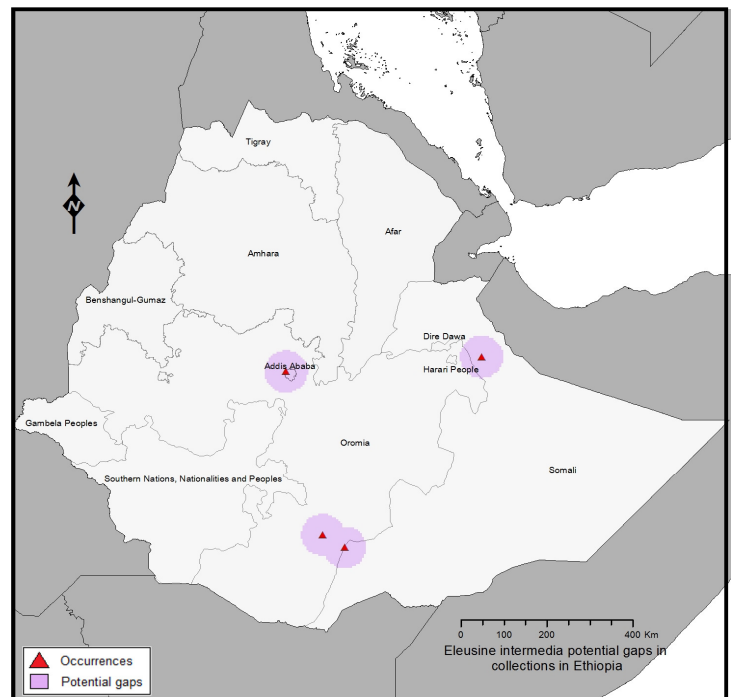
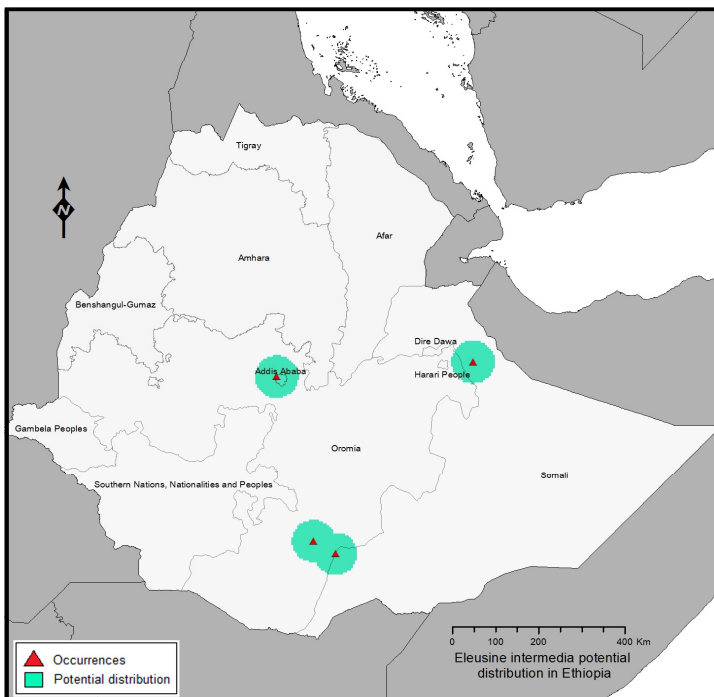
Altitude: 1150 - 1700 m

Eleusine intermedia

Leaf margins without hairs.
Caryopsis finely striate.

May be confused with:
Eleusine floccifolia

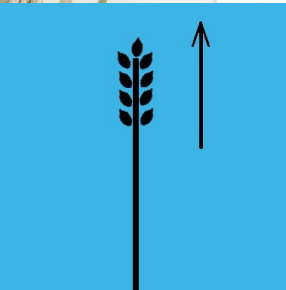
Tufts of soft white hairs scattered along the leaf margins. Caryopsis minutely rugulose, not striate.



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> [accessed 13 August 2012]; Ibrahim, K. M., Kabuye, C. H. S. 1988. An illustrated manual of Kenya grasses. Rome, FAO. 765 pp.; Neves SS, et al. (2005) Phylogeny of *Eleusine* Mol Phylogenet Evol 35:395-419

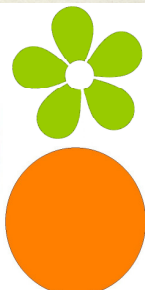


No seed image available



0.6-1.2 m

LC PRELIM



No data

No data

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

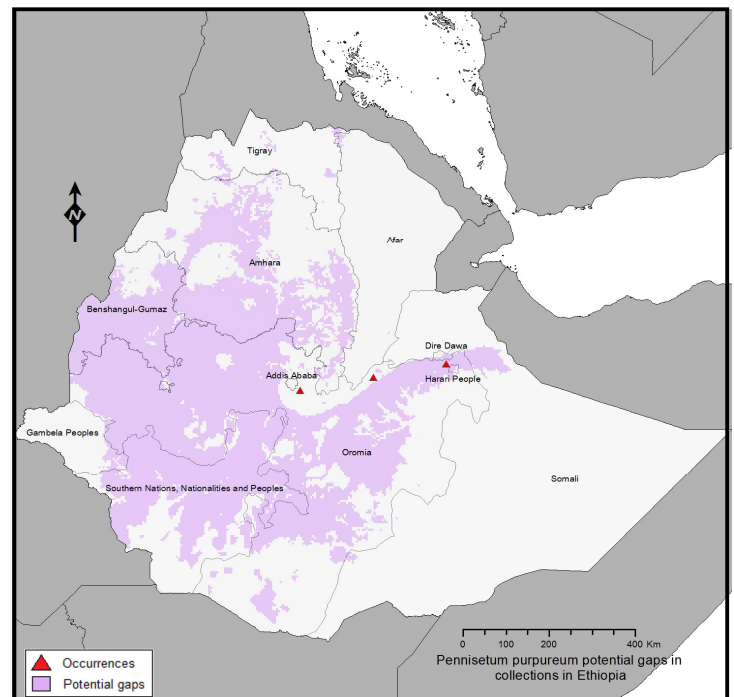
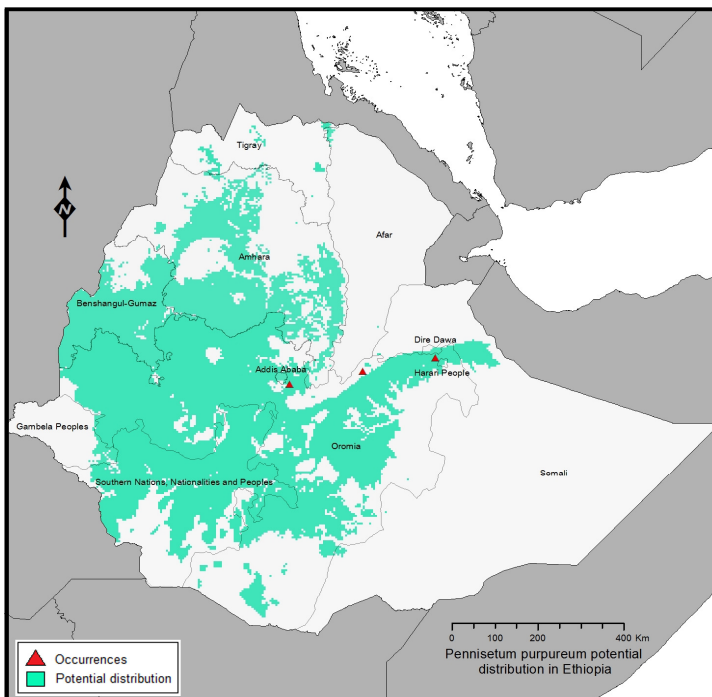
Pennisetum purpureum

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

Pennisetum purpureum Schumach.

Secondary Gene Pool relative of *Pennisetum glaucum* (L.) R. Br.

Elephant grass, Napier grass



Forest & Kim Starr

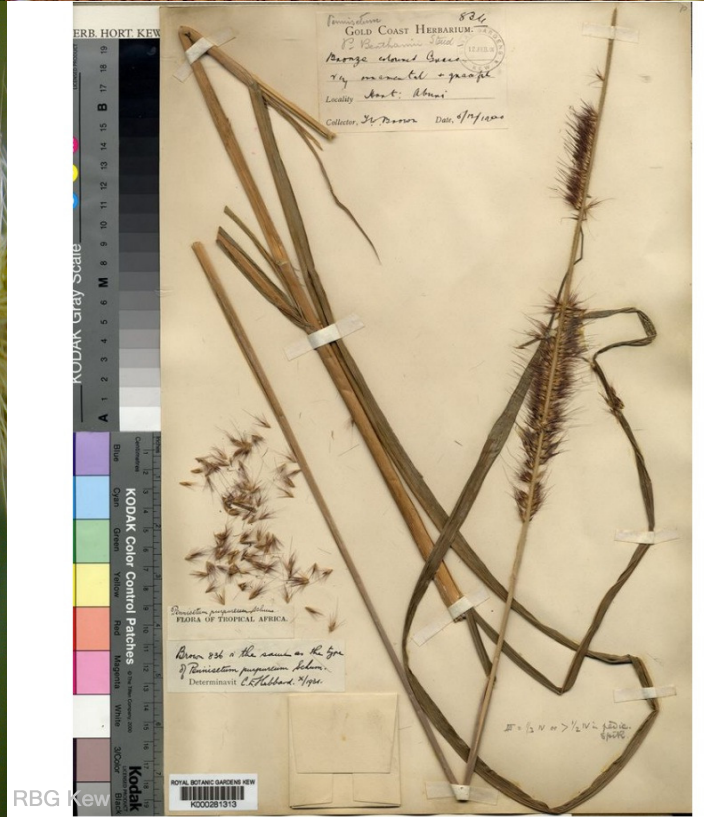


Forest & Kim Starr

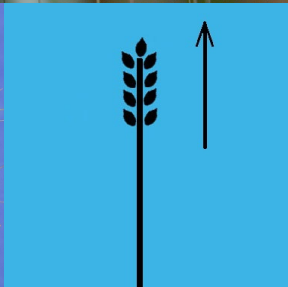
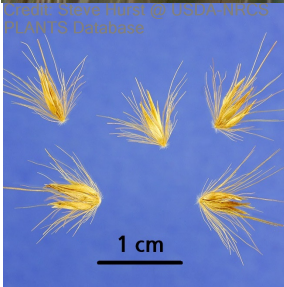


Credit: Forest & Kim Starr

Photo: Steve Hurst @ USDA-NRCS PLANTS Database



RBG Kew



1-6 m



Jan - June

Jan - June

Secondary Gene Pool relative of *Pennisetum glaucum* (L.) R. Br.

HABIT: Perennial; caespitose. Rootstock evident. Culms 30-200 cm long.

LEAVES: Ligule a fringe of hairs. Leaf-blades 15-30 cm long; 2-17 mm wide. Leaf-blade apex filiform. Inflorescence a panicle. Panicle spiciform; linear; curved; 5-25 cm long. Primary panicle branches accrescent to a central axis; with lateral stumps on axis. Panicle axis terete; pubescent; bearing deciduous spikelet clusters. Spikelets subtended by an involucre. Fertile spikelets pedicelled; 1 in the cluster. Fertile Spikelets: Spikelets comprising 1 basal sterile florets; 1 fertile florets; without rhachilla extension. Spikelets lanceolate; dorsally compressed; 4.5-7 mm long; falling entire; deciduous with accessory branch structures. Glumes one the lower absent or obscure; shorter than spikelet; thinner than fertile lemma. Florets: Basal sterile florets barren; without significant palea.

FLOWER: Lodicules absent. Anthers 3; 1.5 mm long; anther tip smooth. Styles connate below.

Habitat:

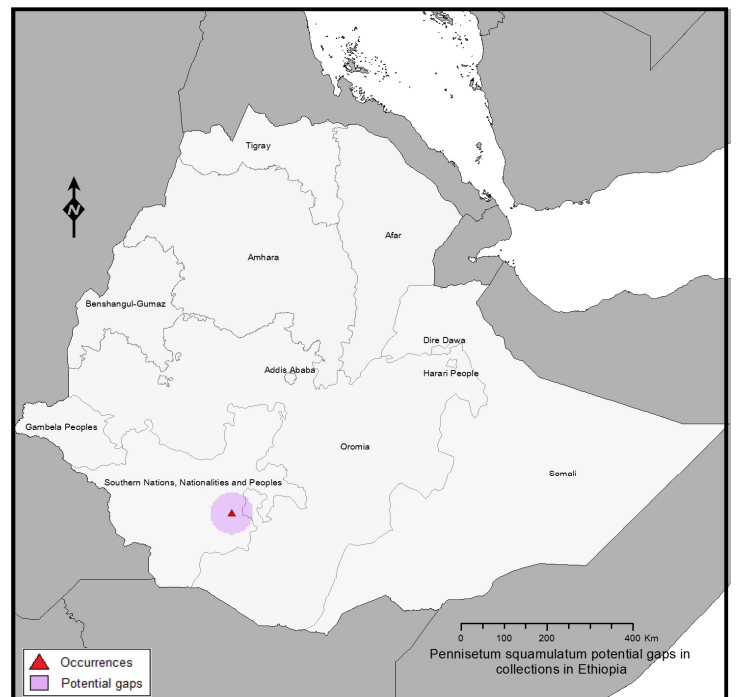
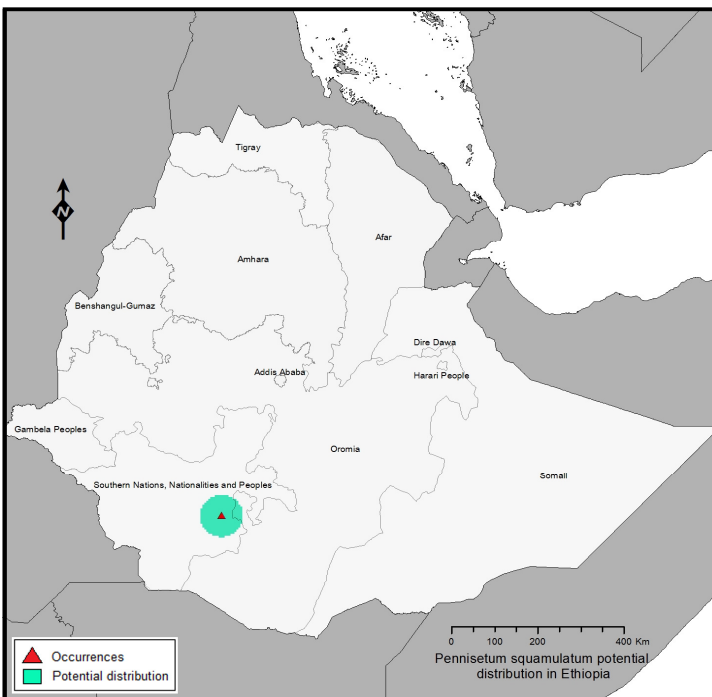
Rocky hillsides in open deciduous bushland.

Distribution:

Northeast tropical and east tropical Africa.

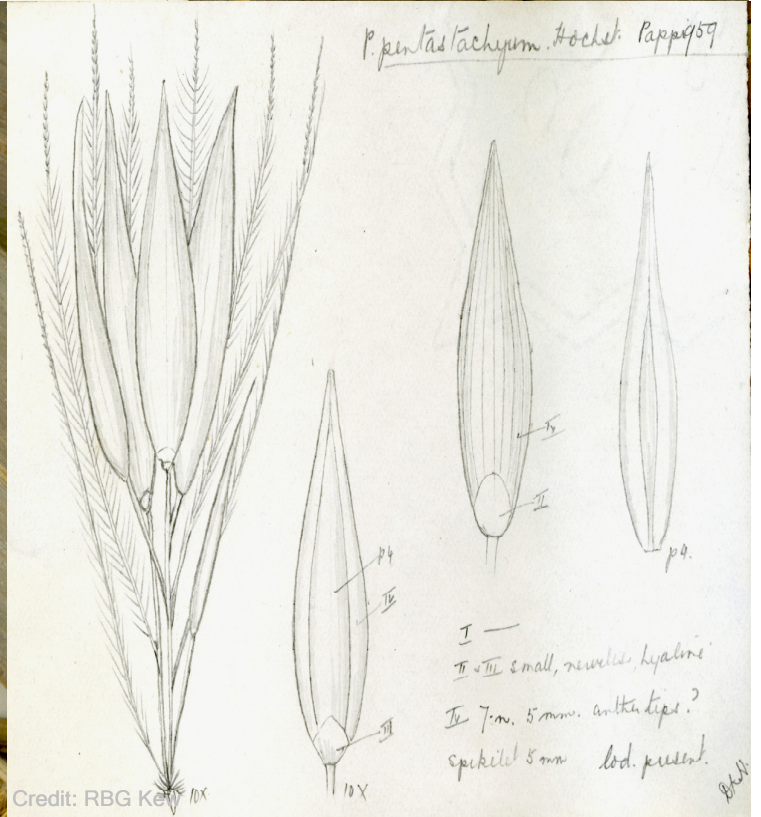
Altitude: 900 - 2100 m

<i>Pennisetum squamulatum</i>	May be confused with: <i>Pennisetum purpureum</i>
Spikelets all pedicelled.	At least one spikelet sessile in each involucre.

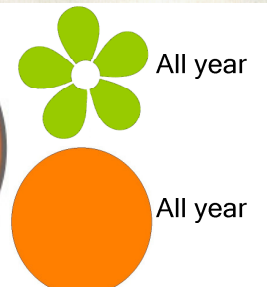
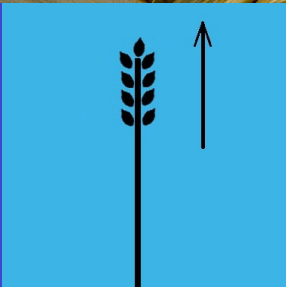


References: Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. (2006 onwards). GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>. [accessed 10th March 2014]; Ibrahim, K.M. & Kabuye, C.H.S (1987) An Illustrated Manual of Kenya Grasses

Secondary Gene Pool relative of *Pennisetum glaucum* (L.) R. Br.



No seed image available



Tertiary Gene Pool relative of *Sorghum bicolor*

HABIT: Annual, culms 30-150 cm high, erect with bearded nodes.

LEAVES: Leaves calvine. Leaf blades 10-50 x 0.2-1 cm. Ligule a ciliate 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 sissimilar, 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.

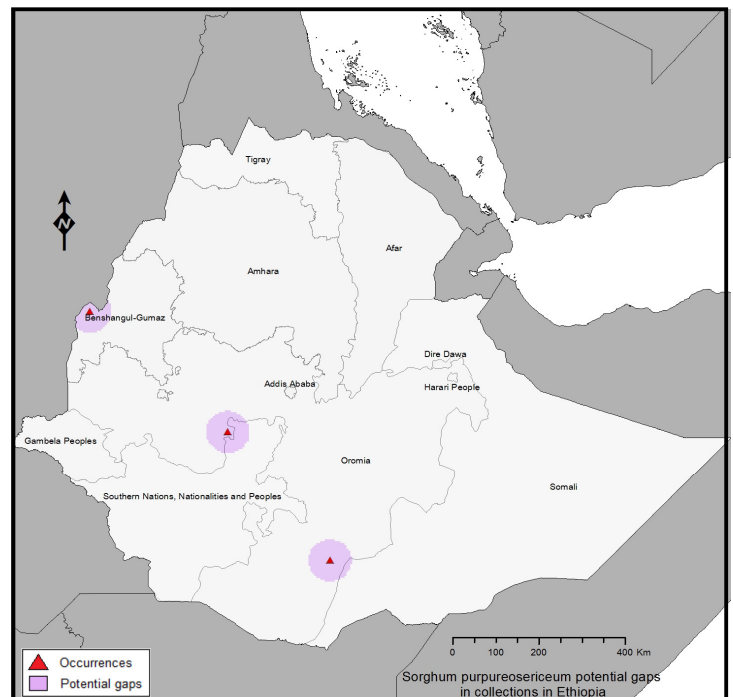
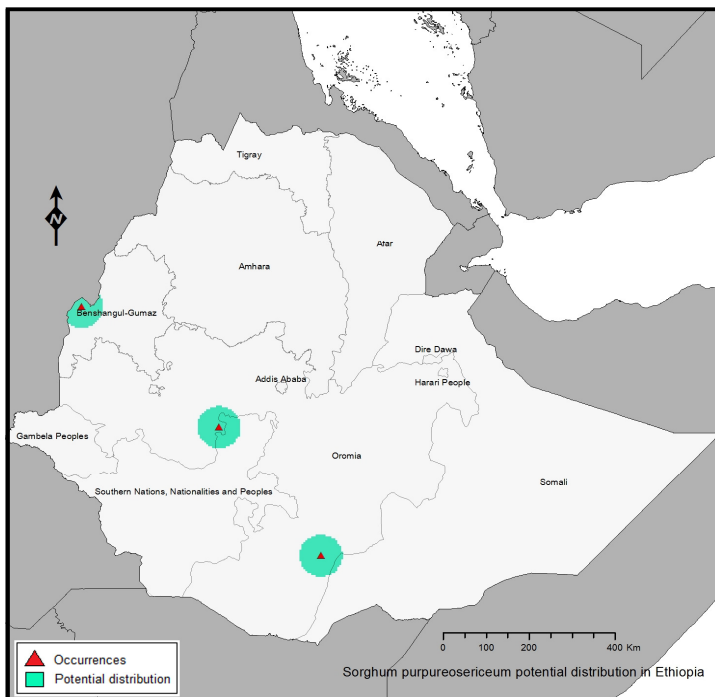
Altitude: 500-1500 m

Sorghum purpureosericeum

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

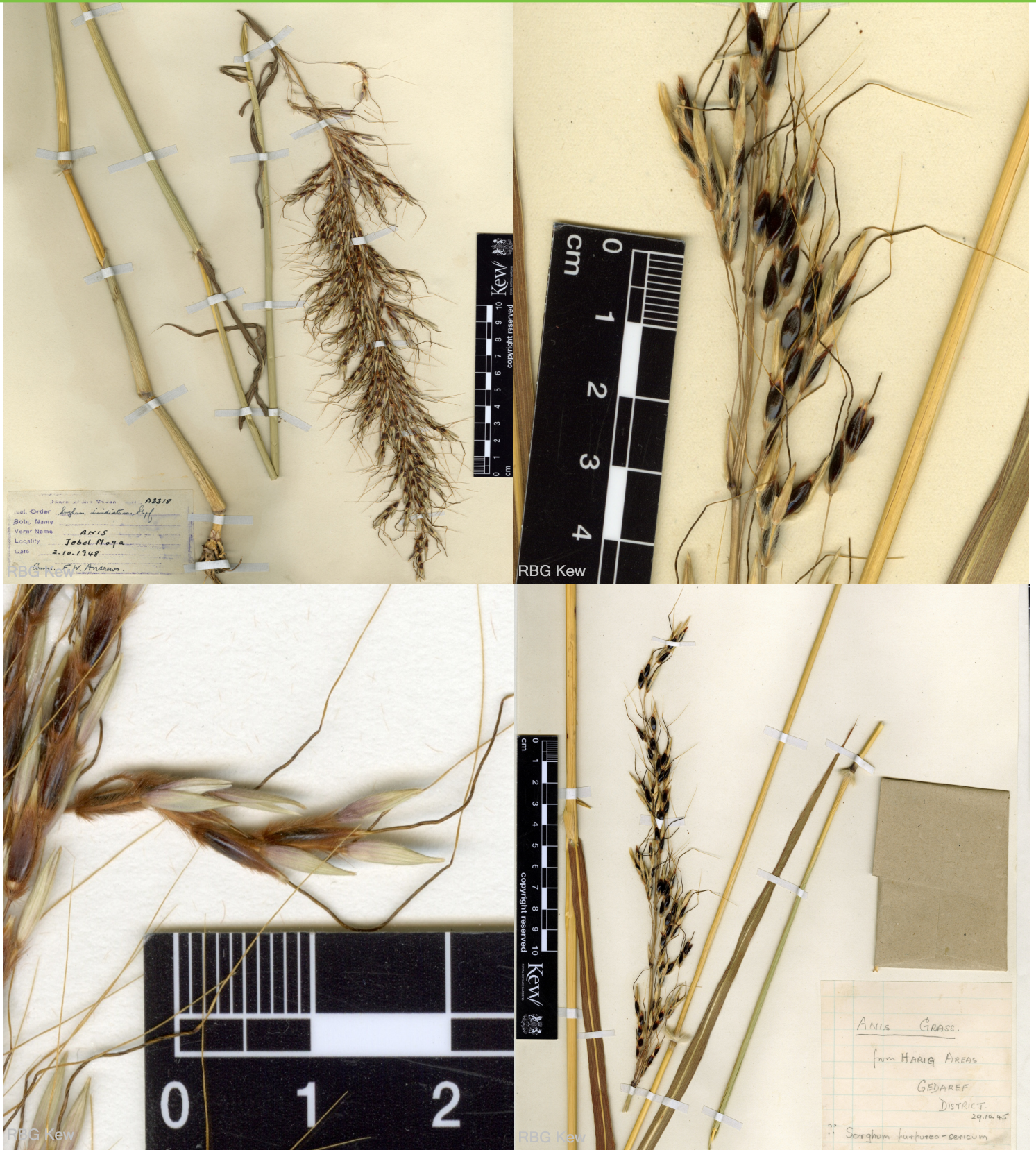
May be confused with:
Sorghum versicolor

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

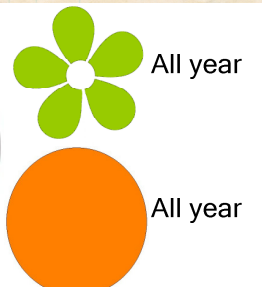
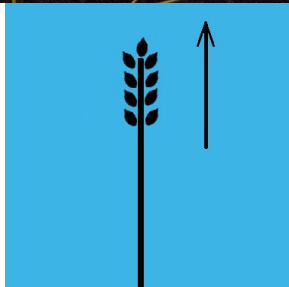


References: Phillips, S. (1995) Poaceae. In: Flora of Ethiopia and Eritrea Volume 7 p 301; Clayton & Renvoize (1982) Flora of Tropical East Africa Graminae (Part 3).

Tertiary Gene Pool relative of *Sorghum bicolor*



(c) Board of Trustees RBG Kew



HABIT: Erect, few-branched shrubs with one or few stems from base, 0.5-2 m tall. Stellate and gland-tipped hairs present on stems and leaves. Stem prickles numerous, straight, slender, 2-8 mm long, spreading or slightly reflexed.

LEAVES: simple, the blades 4-18 x 3-16 cm, ca. 1-1.25 times as long as wide, often dimorphic; margin always decidedly lobed, lobing various.

INFLORESCENCES: 0.1-0.8 cm, unbranched, with 2-7 flowers, the lowermost 1-4 flowers fertile. Flowers with the calyx 7-8.5 mm long; calyx divided almost to the base; corolla 1.3-3 cm in diameter, 8-13 mm long, stellate, thin-textured, white.

FRUIT: 2-3 cm in diameter, globose, light yellow at maturity, glabrous.

Seeds variable in size, mostly (1.8-) 2.2-3 mm in diameter, a few collections from Africa 4.8-5.1 mm in diameter, rounded to subreniform, yellowish tan, minutely pitted.

Habitat:

Disturbed or pastured forest and roadsides.

Distribution:

Brazil, and also Africa.

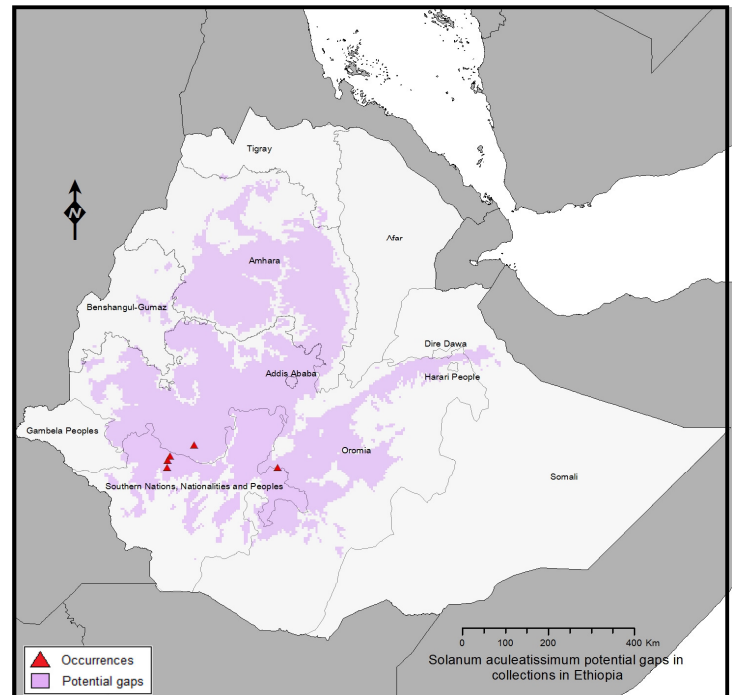
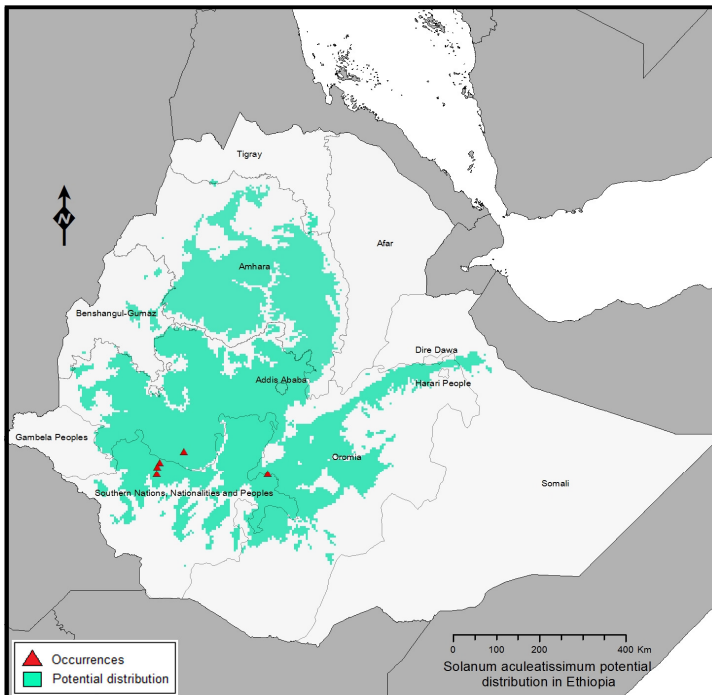
Altitude: 400-1200 m

Solanum aculeatissimum

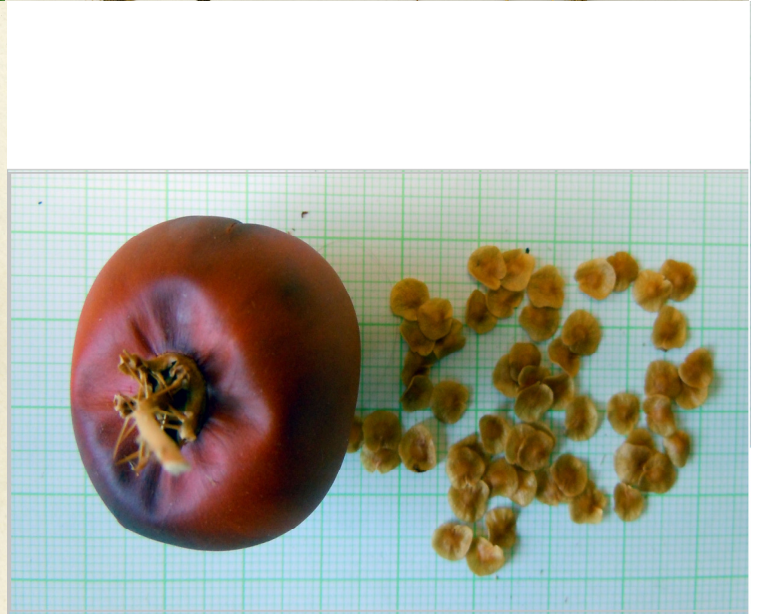
Rounded seeds and fruits cream to yellow when mature.

May be confused with:
Solanum capsicoides

Winged seeds and fruits orange when mature.



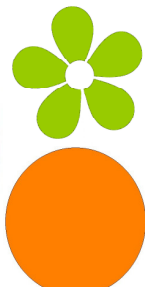
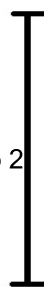
References: Nee, M. (2006) *Solanum aculeatissimum*. In Solanaceae Source. <http://solanaceaesource.org/search/site/Solanum%20aculeatissimum> [Downloaded 22/02/2014]



Gemma Toothill, (c) Board of Trustees RBG Kew



Up to 2 m



Oct - Feb

Oct - Feb

Secondary Gene Pool relative of *Solanum melongena* L.

HABIT: Erect or procumbent shrub, 0.3-1.5 m tall. Stems with straight, flattened prickles 5-10(-12) mm long. Stellate hairs present on stems and leaves.

LEAVES: simple, blades chartaceous, ovate to orbicular, 1-8.5 cm x 0.6-4.5 cm, 1-2 times longer than wide, with 0-5 prickles on both surfaces, margin with 1-3 lobes on each side. Petiole 1/4-1/3 of the leaf blade length, with 0-3 prickles.

INFLORESCENCES: apparently lateral, 1-9 cm long, rarely branched, with 1-13 flowers, 1-3 flowers open at any one time. Calyx 3-5mm long, with 0-5 prickles, lobes narrow, 1.5-2 mm long; corolla 1-2 cm in diameter, white to mauve, often with contrasting rays, stellate abaxially.

FRUIT: 0.5-0.8 cm in diameter, pericarp smooth, orange-red at maturity, glabrous.

Seeds flattened-reniform, 2-2.5 mm long, 1.5-2.5 mm wide, dull yellow to orange-brown.

Habitat:

Scrub and abandoned cultivation

Distribution:

Northeastern Africa, around the Red Sea and in the Arabian peninsula

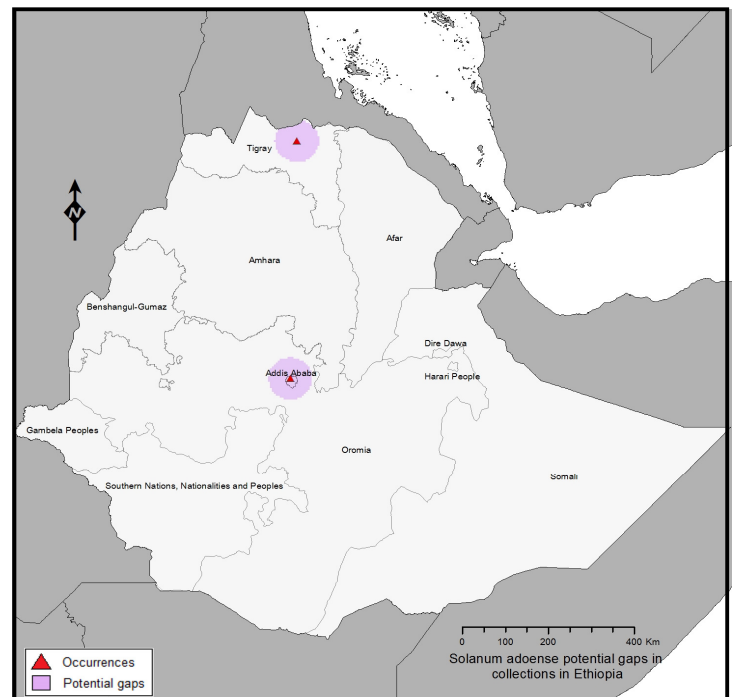
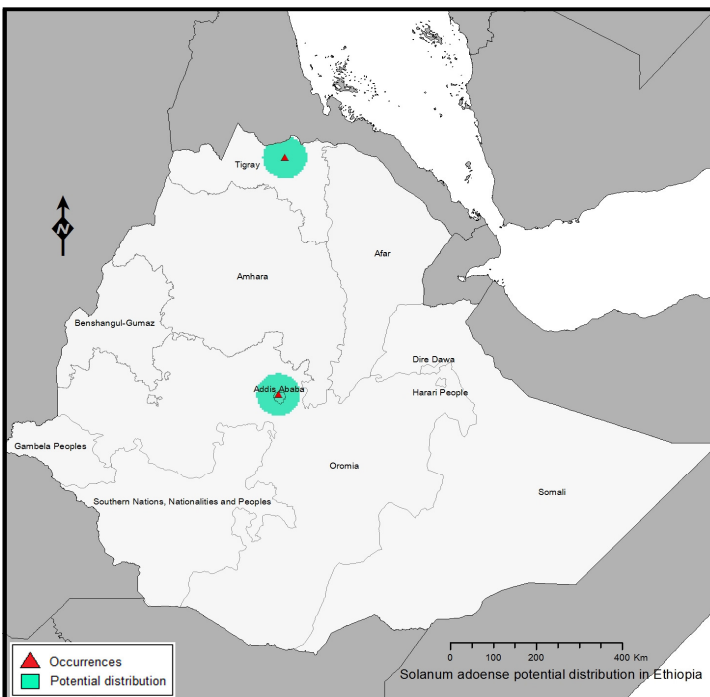
Altitude: 1700-3000 m

Solanum adoense

Ovate to orbicular leaves 1-2 times longer than wide, petiole 1/4 to 1/3 of the leaf blade length, flowering calyx 3-5 mm long, ripe fruit 5-8 mm diameter.

May be confused with:
Solanum macranthum

Ellipsoid leaves 2-3.5 times longer than wide, petiole 1/10 to 1/5 the leaf blade length, flowering calyx 7-12 mm long, ripe fruit 9-13 mm diameter.



References: Vorontsova, M. *Solanum adoense*. In Solanaceae Source <http://solanaceaesource.org/content/solanum-adoense> [Downloaded 06/06/2014]

Secondary Gene Pool relative of *Solanum melongena* L.

KEW.

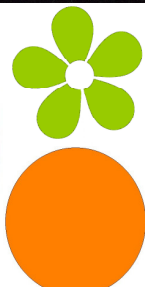


No seed image available



0.3-1.5 m

LC PRELIM



All year

All year

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

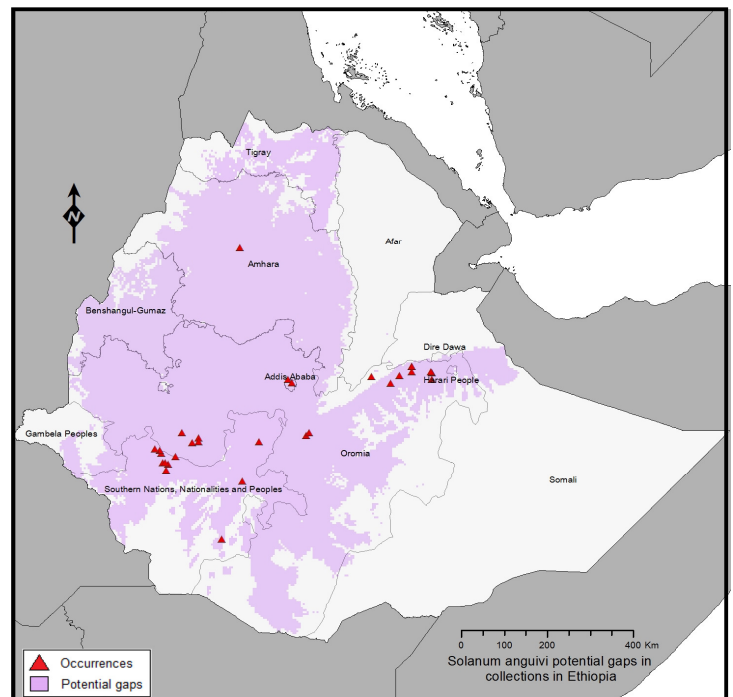
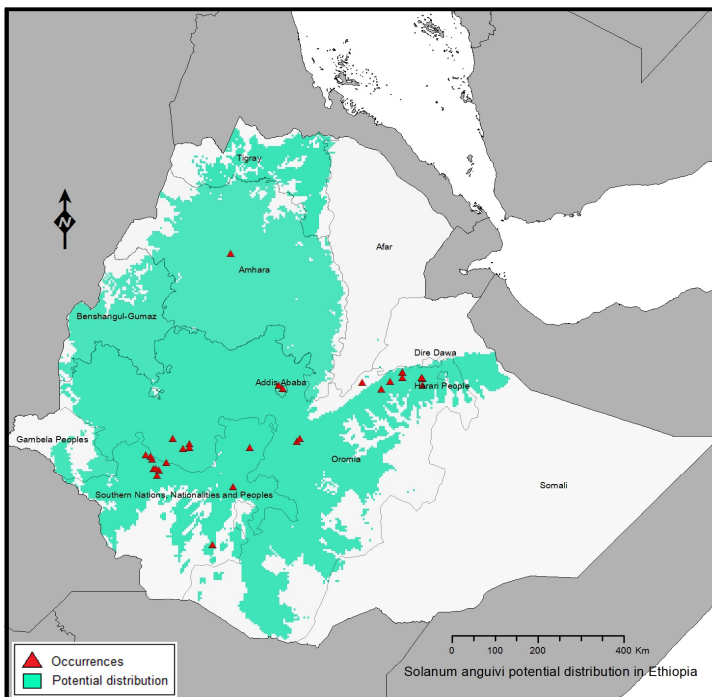
Solanum anguivi

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.



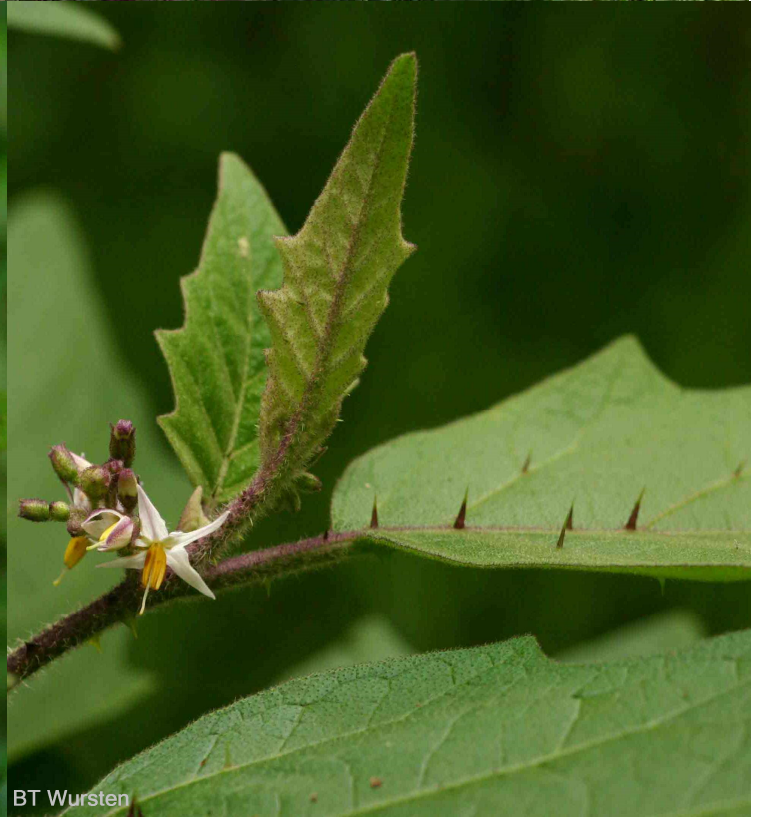
G.A. Cooper, courtesy of Smithsonian Institution.



BT Wursten



BT Wursten



BT Wursten

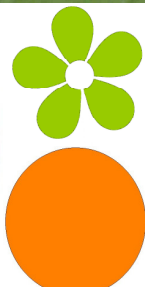
Gemma Toothill (c) Board of Trustees RBG Kew



0.5 mm



2-4 m



Apr - Jul

Apr - Jul

Secondary Gene Pool relative of Eggplant - *Solanum melongena* L.

HABIT: Erect shrub up to 1.5 m, prickly or unarmed. Young stems erect, robust, moderately to densely stellate-pubescent and prickly or unarmed, with porrect, sessile or variously stalked trichomes; bark of older stems moderately stellate-pubescent, green-brown to red-brown.

LEAVES: entire, sometimes lobed, the blades 3.5-17(-40) cm long, 0.6-10(-19) cm wide, 1.5-4 times longer than wide, ovate to elliptic or lanceolate, chartaceous, moderately to densely stellate-pubescent on both surfaces, with porrect, sessile or stalked trichomes.

INFLORESCENCES: terminal or lateral, 2-11 cm long and the plants andromonoecious, with 1-3(5) long-styled flowers at the base of the inflorescence. Flowers (4-)5(-6)-merous, heterostylous. Calyx 7-15 mm long in long-styled flowers, 5-10 mm long in short-styled flowers. Corolla 2.5-4.5 cm in diameter in long-styled flowers, 1.8-4 cm in diameter in short-styled flowers, pale mauve to dark mauve, stellate.

FRUIT: a spherical berry, 1-2(-4) per infructescence, 1.5-3 cm in diameter, the pericarp smooth, dark green with pale green and cream markings when young, yellow at maturity; fruiting pedicels woody, pendulous, with 0-10 prickles.

SEEDS ca. 30-150 per berry, 2.7-3.2 mm long, 1.9-2.6 mm wide, flattened-reniform, dull yellow to orange-brown.

Habitat:

Roadsides, abandoned cultivation, savanna, bushland, dunes, forest edges.

Distribution:

Found throughout Eastern Africa and distributed as far north as Sudan.

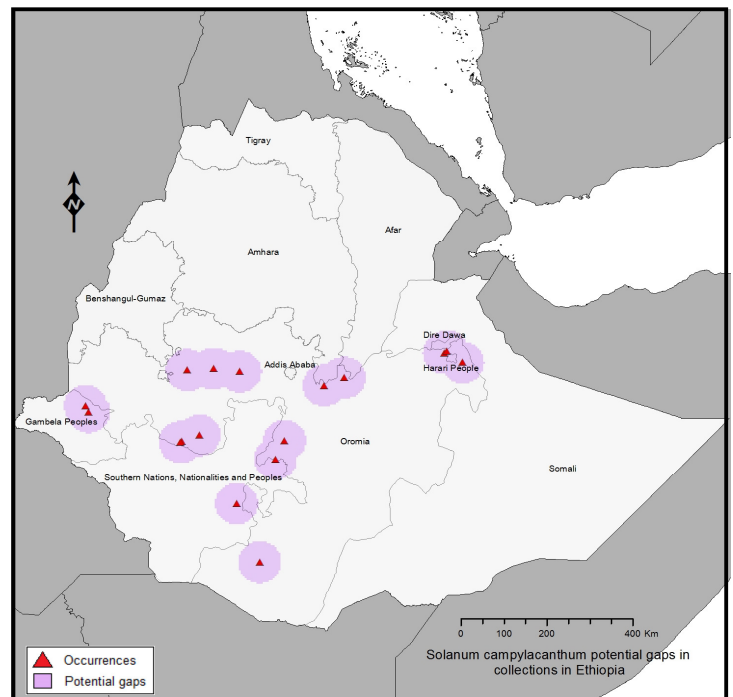
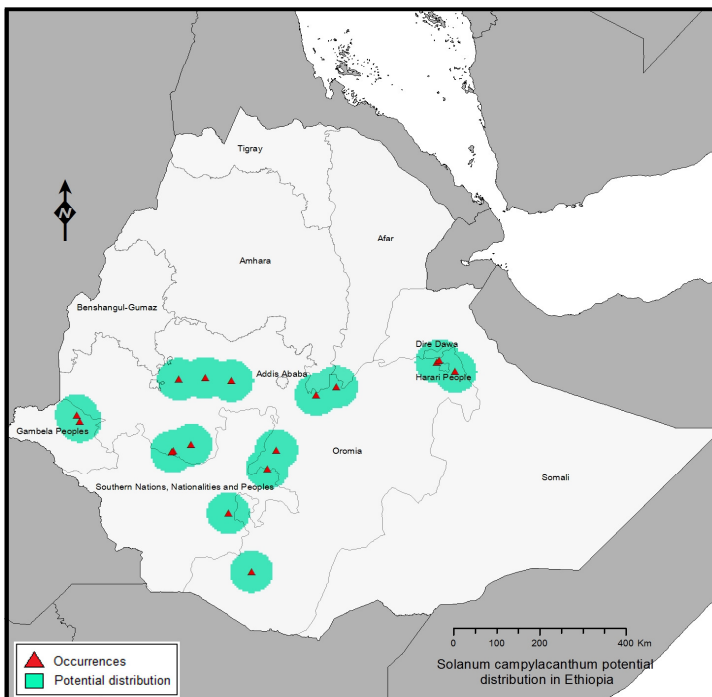
Altitude: 0-2300 m

Solanum campylacanthum

Extremely widespread and variable, recognised by mauve flowers, big bright yellow fruits, a long taproot, and leaves that are usually big (up to 17cm long) and entire.

May be confused with:
Other prickly Solanums

Other *Solanums* in this area do not have this combination of characters.



References: Vorontsova, M. & Knapp, S. *Solanum campylacanthum*. In *Solanaceae Source*. <http://solanaceaesource.org/content/solanum-campylacanthum> [Downloaded 18th April 2013.]

Secondary Gene Pool relative of Eggplant - *Solanum melongena* L.



0.2-1.5 m



All year

All year

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. 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.

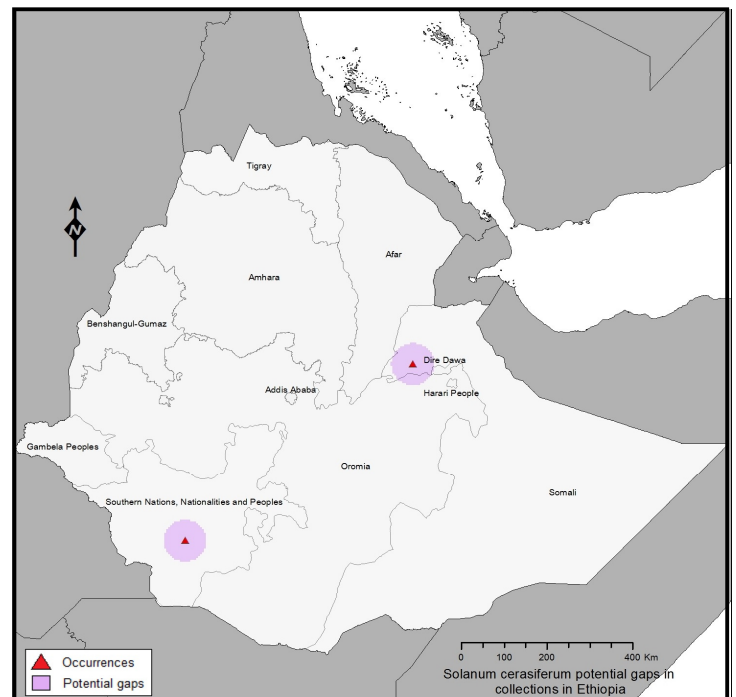
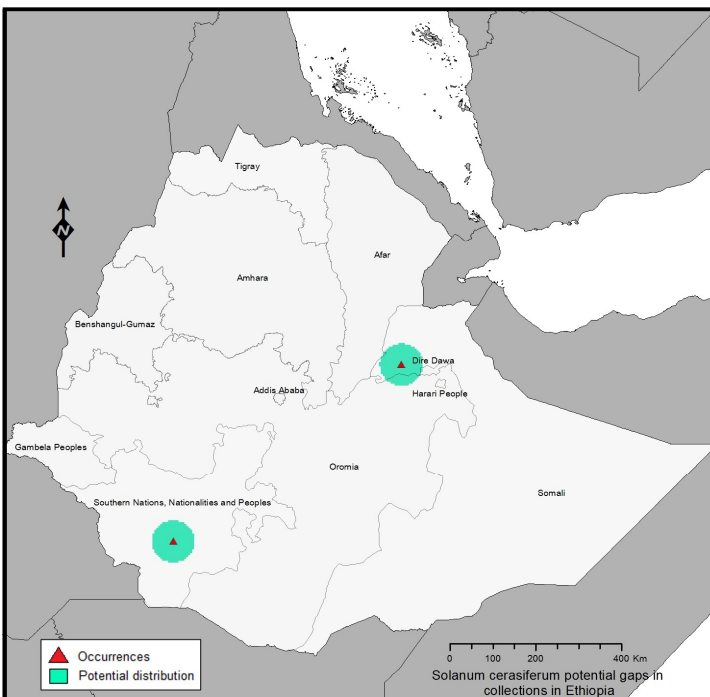
Altitude: 450-1200 m

Solanum cerasiferum

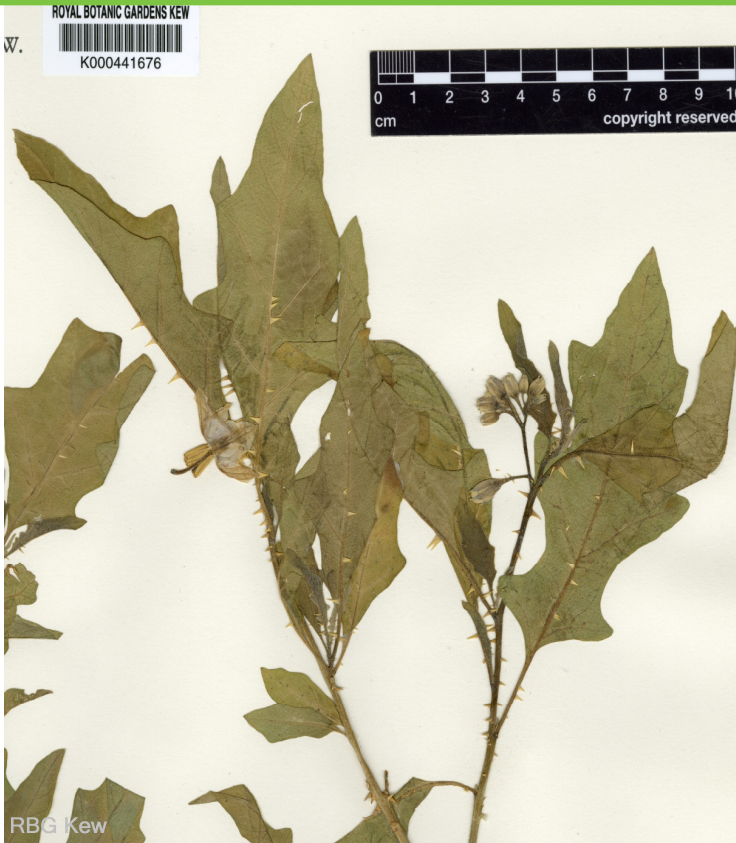
short-attenuate leaf bases and deltate to long-deltate membranous calyx lobes 4-7 mm long with only 0-20 prickles on long-styled flowers.

May be confused with:
Solanum umtuma

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.



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

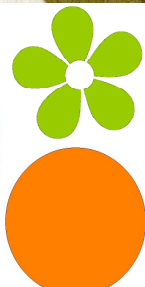


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0.5-1.5 m

LC
PRELIM



All year

All year

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.**INFLORESCENCES:** 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. 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:**

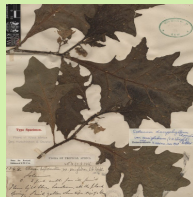
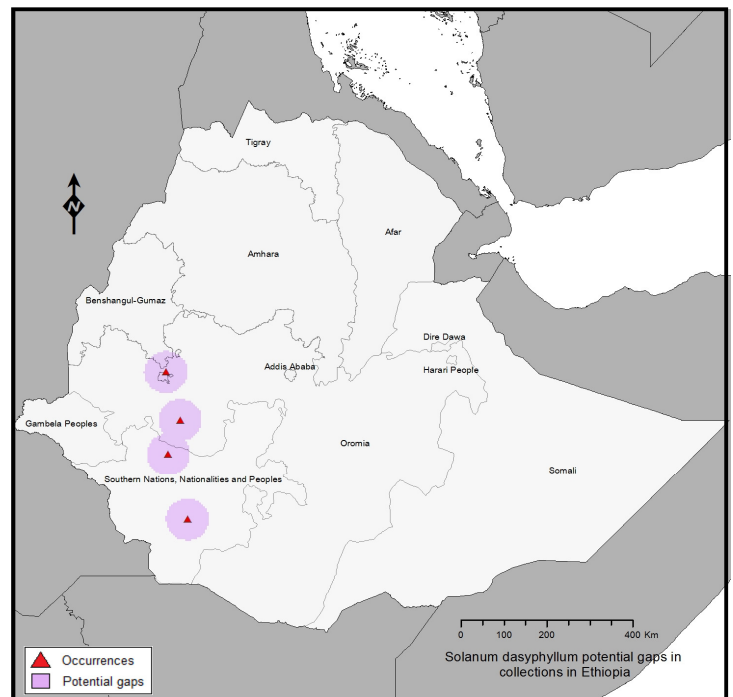
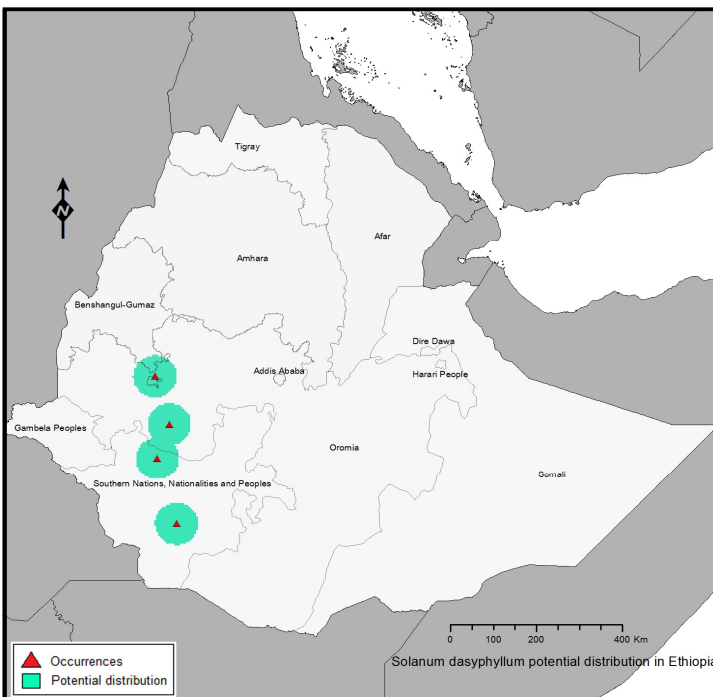
Usually a forest species but also found on hillsides, savannah, grassland, or wasteland, frequently near water.

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*May be confused with:
Other prickly Solanums

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.

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.

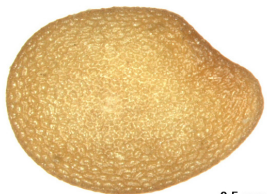
SOLANACEAE

Solanum dasyphyllum Schumach.

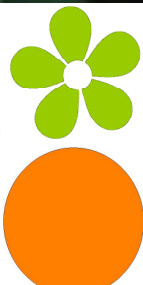
Tertiary Gene Pool relative of *Solanum melongena* L.



Gemma Toothill (c) Board of Trustees RBG Kew



0.5-1 m



All year

All year

Secondary Gene Pool relative of *Solanum melongena* L.

HABIT: Erect woody herb, 30-70 cm, prickles 2-5 mm, hooked, flattened, pale yellow, spaced 1-10 mm apart.

LEAVES simple, blades usually 2-6.5 × 0.2-1.5 cm, 3-6 times longer than wide, narrow-ovate to narrow-obovate, sparsely stellate-pubescent to almost glabrous, unarmed or with 1-4 broad-based slightly curved prickles, attenuate, margin entire or lobed, the lobes 1-3 on each side, broadly rounded, the sinuses shallow to deep, the terminal lobe considerably longer than the rest, apex obtuse to rounded, petiole absent.

INFLORESCENCES apparently lateral, 1.5-3 cm long, not branched, with 1-5 flowers, unarmed or with 1-3 recurved prickles. Calyx 4-6 mm long, obconical, divided for 1/3-2/3 of its length, the lobes 2-4 mm long, deltoid to oblong. Corolla ca. 1.5 cm in diameter, mauve to purple or blue, stellate, tearing unevenly at anthesis, strongly reflexed, lobed for ca. 4/5 of its length, stellate-pubescent abaxially. Stamens appearing sessile, free, equal.

FRUIT a globose berry, 1-5 per infructescence, 4-8 mm in diameter, spherical throughout development, the pericarp thin, smooth, shiny, glabrous when mature, light green with dark green stripes when young, orange to red at maturity, fruiting pedicels woody, pendulous, unarmed, calyx lobes usually reflexed at maturity.

SEEDS ca. 20-30 per berry, 2-2.8 × 1.8-2.2 mm, flattened-reniform to suborbicular, often somewhat irregular in outline, yellow or orange to brown, the surface shiny, smooth or with raised outlines of cells or small pits.

Habitat:

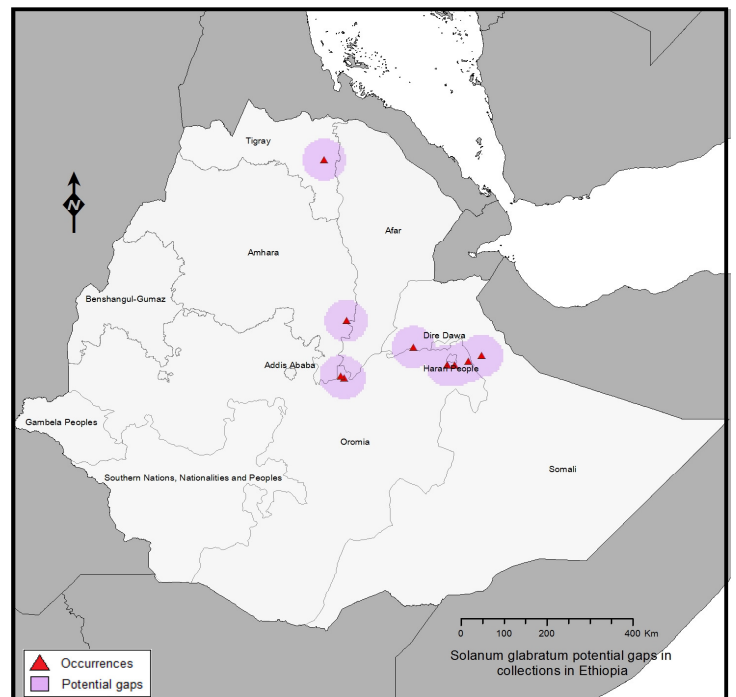
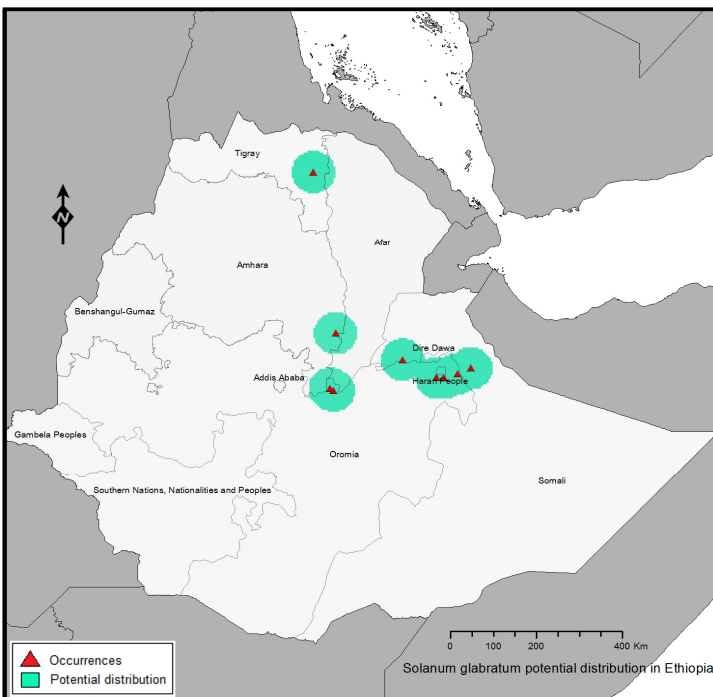
Open dry places, disturbed ground and roadsides, on limestone, silt, loam or sand.

Distribution:

Arabia and North East Africa. The majority of collections are from Yemen and Ethiopia.

Altitude: 1200-2500 m

<i>Solanum glabratum</i>	May be confused with: <i>Solanum hastifolium</i>
Leaves lacking a distinct petiole.	Leaves with a distinct petiole.



References: Vorontsova, M. (2008) *Solanum glabratum*. In Solanaceae Source. <http://solanaceaesource.org/content/solanum-glabratum> [Downloaded 22nd Feb 2013]

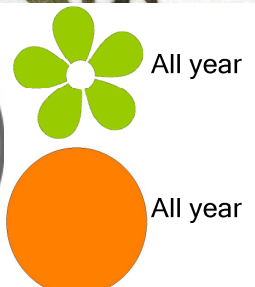
Secondary Gene Pool relative of *Solanum melongena* L.



No seed image available



0.7m



All year

All year

HABIT: Woody herb or small shrub, usually erect, sometimes ascending or climbing, 0.3-1(1.5) m, armed, sparsely branched; bark smooth, grey to brown; leaves evenly distributed along the stems.

LEAVES: simple, the blades 2.5-6.5 × 0.8-2.5 cm, 2-4 times longer than wide, ovate to lanceolate, chartaceous, yellow-green; margin lobed, the lobes 2-4 on each side.

INFLORESCENCES: terminal or lateral, 1-3 cm long, not branched, with 3-5 flowers. Flowers apparently all perfect, 4-merous or 5-merous. Calyx 4-6 mm long, obconical, divided for 1/3-2/3 of its length. Corolla 1.4-2 cm in diameter, pale mauve to purple or blue (white), strongly reflexed, lobed for ca. 4/6 of its length, with a faint to dark midvein.

FRUIT: a globose berry, 1-4 per infructescence, 6-8 mm in diameter, spherical throughout development, the pericarp thin, smooth, shiny, white to light green with dark green lines or spots when young, bright red at maturity, calyx not accrescent, the lobes usually reflexed at maturity.

SEEDS ca. 10 per berry, 2.8-3.3 × 2-2.8 × ca. 0.3 mm, flattened-reniform, often somewhat irregular in outline, yellow-orange, the surface smooth or with raised outlines of cells or small pits.

Habitat:

Dry Acacia scrub, open places, disturbed vegetation and roadsides on sand, clay, loam and black cotton soil.

Distribution:

Widespread, dry, mainly inland East African species found from Sudan, Ethiopia and Somalia to Uganda and northern Tanzania.

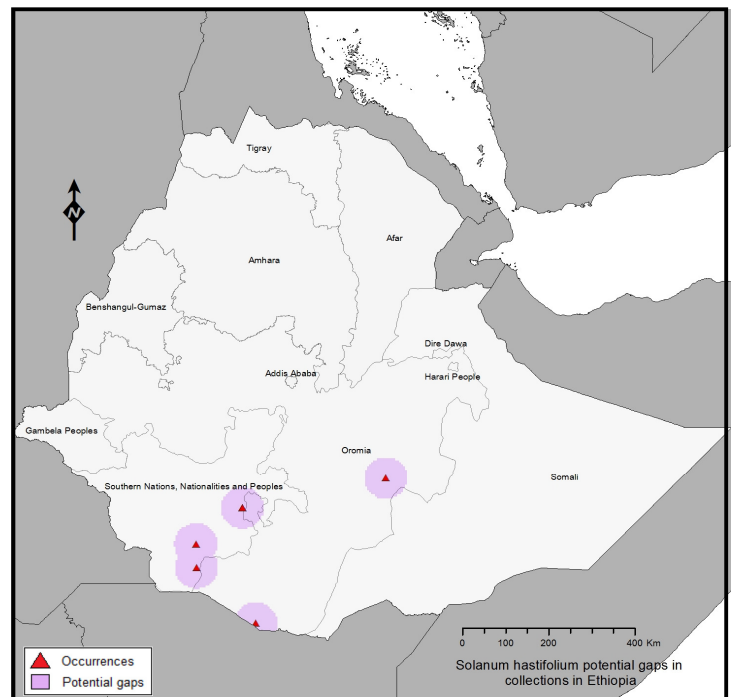
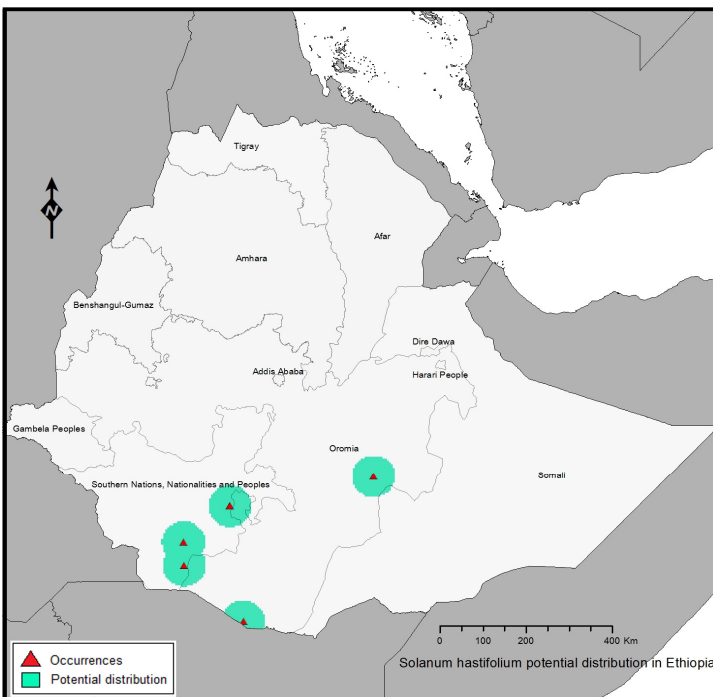
Altitude: 0-1500m

Solanum hastifolium

Lobed leaves 2.6-6.5 cm long; abundant prickles 1-4 mm long; 3-5 flowers per inflorescence; sparsely to moderately pubescent.

May be confused with:
Solanum taitense & *S. setaceum*

Solanum taitense: entire - subentire leaves 1.2-3cm long; inconspicuous prickles 1 mm long; 1-2 flowers per inflorescence; desnsely pubescent.
Solanum setaceum distinguished by prominent stem bristles.



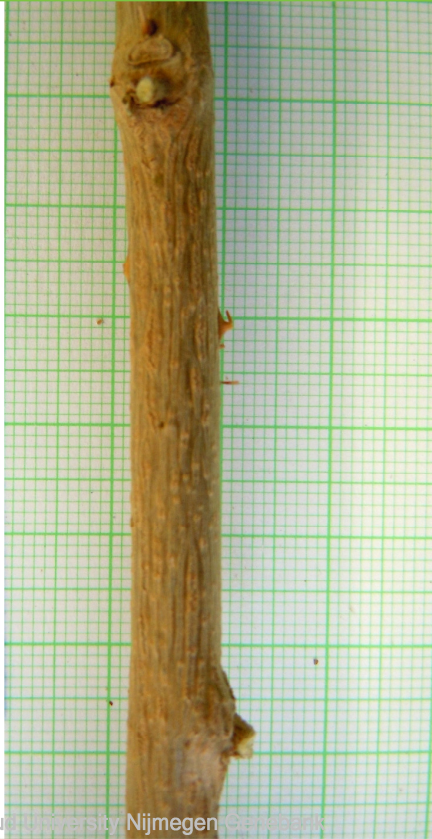
References: Vorontsova, M. (2008) *Solanum hastifolium*. In Solanaceae Source <http://solanaceaesource.org/content/solanum-hastifolium> [Downloaded 22nd Feb 2013]; Edmonds, J.M. 2013, FTEA Solanaceae.

SOLANACEAE

Tertiary Gene Pool relative of *Solanum melongena*

Solanum hastifolium Hochst. ex Dunal

ethsakilele; gala-out; edonamuroi



Credit: Raboud University Nijmegen Genebank



Credit: Raboud University Nijmegen Genebank



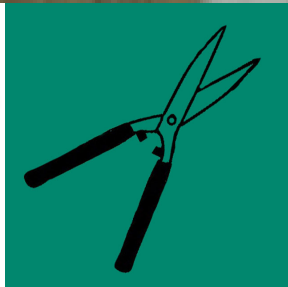
Gemma Toothill (c) Board of Trustees RBG Kew



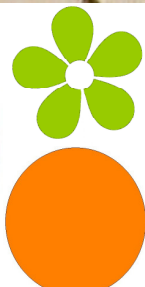
Credit: Raboud University Nijmegen Genebank



0.5 mm



1 m



Apr - Dec

Apr - Dec

HABIT: Erect herb to shrub, 0.4-1.5 m, prickly. Young stems erect, robust, densely stellate-pubescent and prickly, bark of older stems orange-brown to grey.

LEAVES: lobed to almost entire, the blades 6-22 cm long, 4-15 cm wide, ca. 1.5 times longer than wide, ovate, densely stellate-pubescent on both surfaces, with 0-5 prickles on both surfaces, petiole 1-9 cm long.

INFLORESCENCES: 3-8 cm long, not branched, with 5-10 flowers, 1-3 flowers open at any one time, densely stellate-pubescent, peduncle 1-4 mm long; pedicels 0.8-1.5 cm long in long-styled flowers, 0.5-0.9 cm long in short-styled flowers, densely stellate-pubescent, with 0-30 prickles on long-styled flowers, 0-5 prickles on short-styled flowers. Flowers 5-merous, heterostylous, lowermost flower long-styled and hermaphrodite, the distal flowers short-styled and staminate. Corolla 2.4-3 cm in diameter in long-styled flowers, 1.5-2.3 cm in diameter in short-styled flowers, mauve, stellate, lobed for 1/3-1/2 of its length, broad-deltoid, spreading, sparsely stellate-pubescent abaxially.

FRUIT: a spherical berry, 1(-2) per infructescence, 2.5-3.5 cm in diameter, the pericarp smooth, dark green with pale green and cream markings when young, yellow at maturity; fruiting calyx not accrescent, covering ca. 1/6 of the mature fruit, reflexed, with 5-60 prickles. Seeds ca. 100-200 per berry, 2.2-2.8 mm long, 1.8-2.3 mm wide, flattened-reniform, dull yellow to orange-brown.

Habitat:

Thickets, scrubland, and savanna.

Distribution:

Predominantly in Ethiopia, Somalia, Arabia, and India, with some populations in N Kenya, Sudan, and extending to Mali.

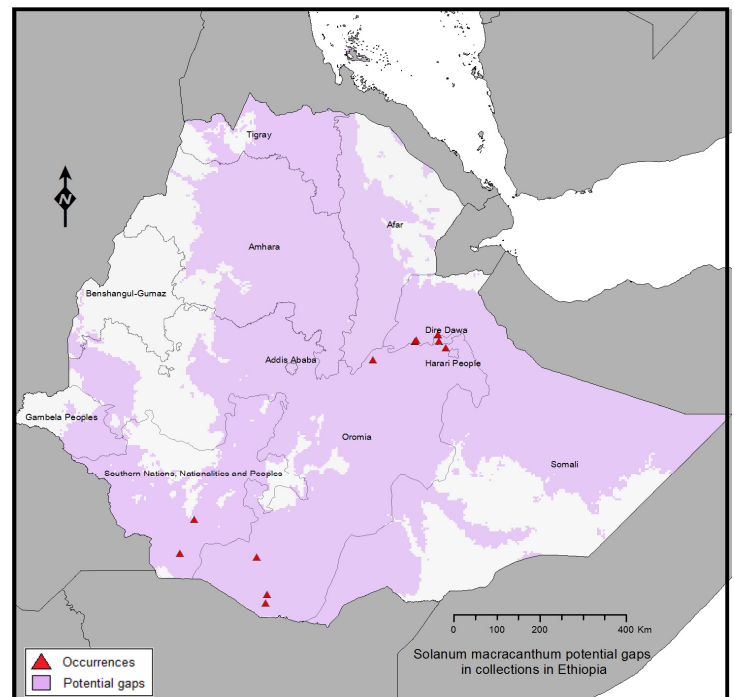
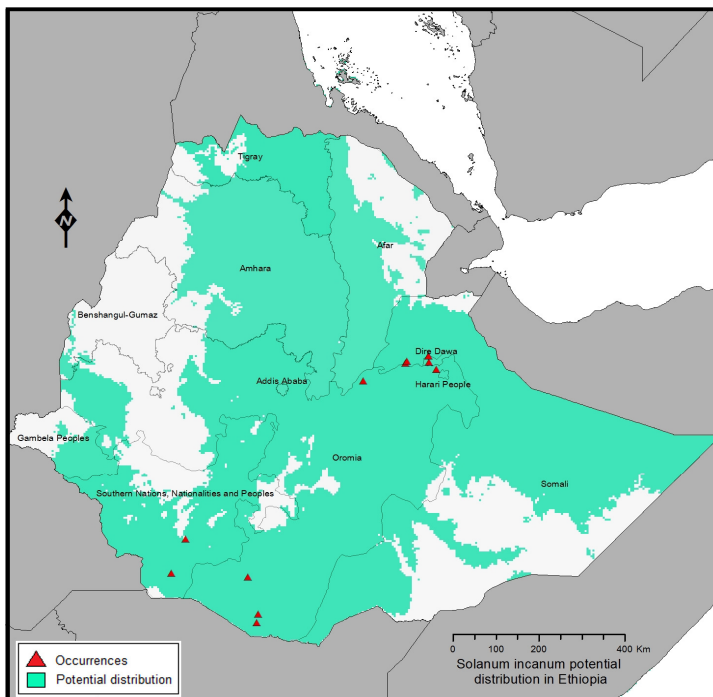
Altitude: 0 - 1900 m

Solanum incanum

Dense stellate trichomes with stalks up to 1 mm long, gently curved prickles (in Africa), leaves yellowish when dry.

May be confused with:
Other prickly Solanums

Other prickly *Solanums* in Africa lack this combination of characters.



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

Secondary Gene Pool relative of *Solanum melongena* L.



No seed
image
available



1.5 m



All year

All year

Tertiary Gene Pool relative of *Solanum melongena* L.

HABIT: Erect or procumbent shrub, 0.7-2 m tall. Young stems with dense stellate hairs and numerous straight, flattened prickles, 8-16 mm long.

LEAVES: simple, chartaceous, blades 1.7-6 cm x 0.8-3 cm, 2-3.5 times longer than wide, with 1-5 prickles on both surfaces, margins entire or with 1-3 lobes each side. Petiole 1/10-1/5 of the leaf blade length, with 0(-1) prickles.

INFLORESCENCES: apparently lateral, 1.5-2.5 cm long, unbranched, with 3-5 flowers, 1-3 flowers open at any one time. Calyx 7-12 mm long with 0-15 prickles, lobes deltate, 4-6 mm long; corolla 1.5-2.3 cm in diameter, white to pale mauve, often with contrasting rays, lobed for 4/5 of its length.

FRUIT: a berry 0.9-1.3 cm in diameter, pericarp smooth, orange-red at maturity, glabrous.

SEEDS flattened-reniform, 2.8-4 mm long, 2.5-3.2 mm wide, dull yellow to orange-brown.

Habitat:

Montane forest, forest edges, open spaces and steep slopes.

Distribution:

Endemic to Ethiopia, primarily in the highlands.

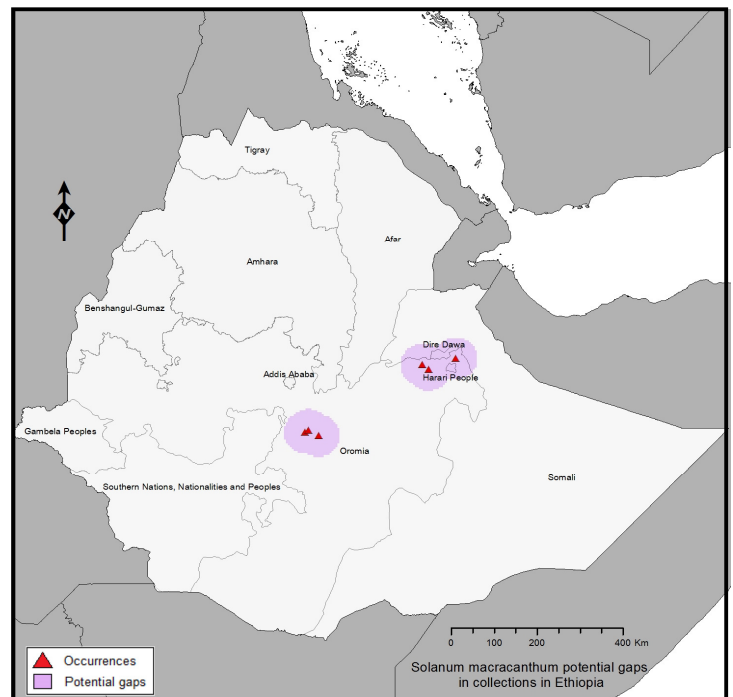
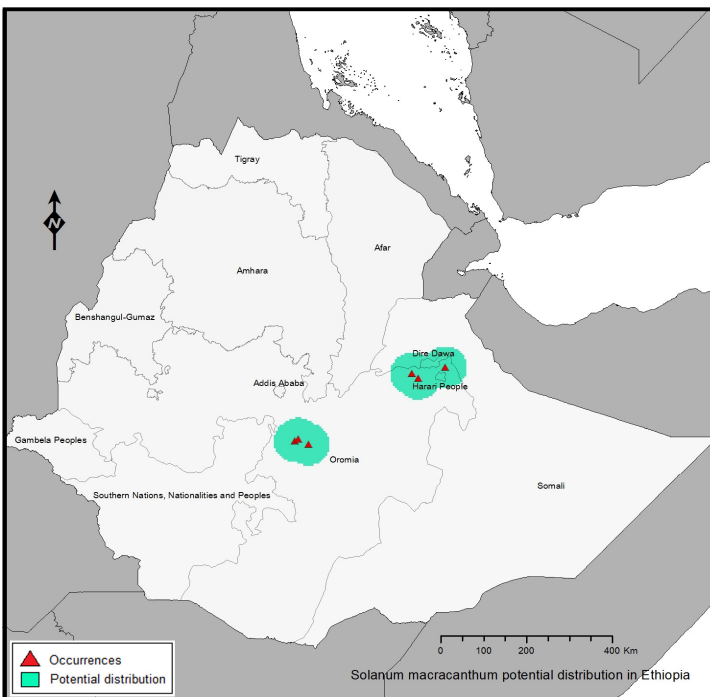
Altitude: 2100 - 3000 m

Solanum macracanthum

Ellipsoid leaves 2-3.5 times longer than wide, petiole 1/10 to 1/5 the leaf blade length, flowering calyx 7-12 mm long, ripe fruit 9-13 mm diameter.

May be confused with:
Solanum adoense

Ovate to orbicular leaves 1-2 times longer than wide, petiole 1/4 to 1/3 of the leaf blade length, flowering calyx 3-5 mm long, ripe fruit 5-8 mm diameter.

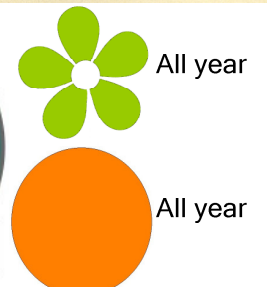
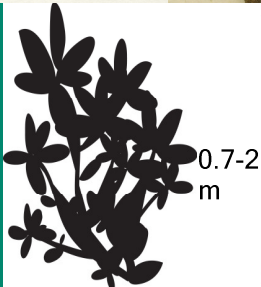


References: Vorontsova, M & Knapp, S. in Solanaceae Source. <http://solanaceaesource.org/content/solanum-macracanthum> [Downloaded 06/06/14]; Friis, I. 2006a. Solanaceae. In Flora of Ethiopia and Eritrea vol. 5, ed. I. Hedberg et al., 103-160 Addis Addis Ababa: Ababa University; Uppsala: Uppsala University.

Tertiary Gene Pool relative of *Solanum melongena* L.



No seed image available



HABIT: Erect herb to shrub, 1-2 m tall. Young stems densely stellate-pubescent and numerous straight (rarely curved) prickles, 5-12 mm long.

LEAVES: simple, chartaceous, blades 8-23 cm x 7-13 cm, ca. 1.5 times longer than wide, margins pale, with 3-4 rounded lobes on each side, prickles 10-40 on both surfaces, abaxial side densely whitish stellate-pubescent, venation whitish. Petiole ca. 1/4 of the leaf blade length, with 0-3 prickles.

INFLORESCENCES: apparently lateral, 3.5-8 cm long, unbranched or branched once, with 6-15(-32) flowers, 2-6 flowers open at any one time. Flowers heterostylus; calyx 7-17 mm long with 10-50 prickles in long-styled flowers, unarmed or with fewer prickles in short-styled flowers, lobes broad-deltate; corolla 1.8-4 cm in diameter, white to pale mauve, almost rotate.

FRUIT: 3.5-4 cm in diameter, pericarp smooth, dark green with pale green and cream markings when young, yellow at maturity. Seeds flattened-reniform, 2.5-3.5 mm long, 1.8-2.8 mm wide, surface shiny, smooth or reticulate, orange-brown.

Habitat:

Scrub, grassland or open woodland on hillsides, wasteland and roadsides.

Distribution:

Native to Ethiopia and Eritrea, introduced and naturalized in Asia and America.

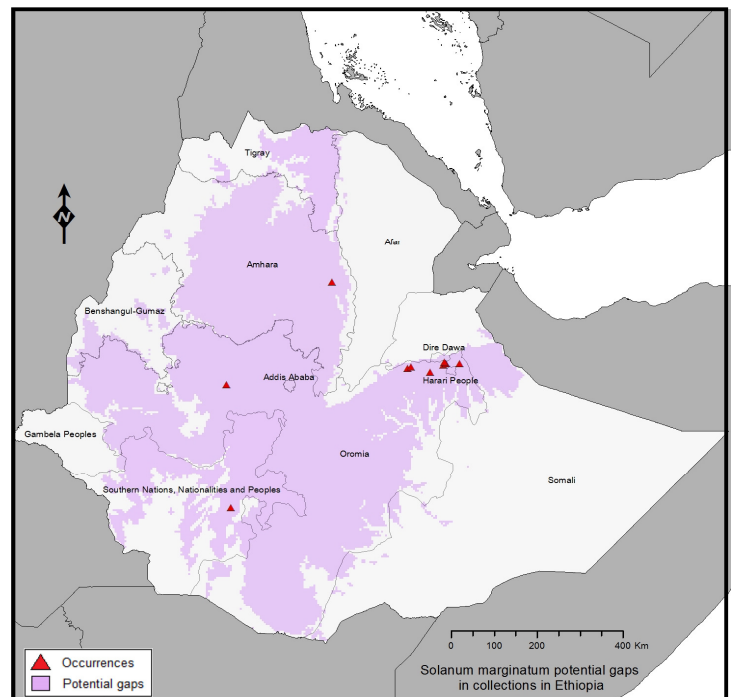
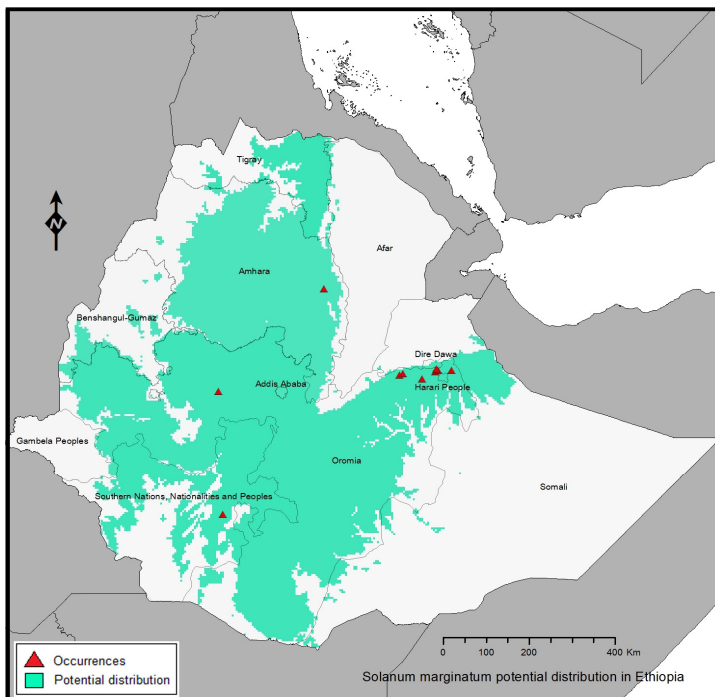
Altitude: 2100 - 2900 m

Solanum marginatum

Leaves with white margins, white veins and regular rounded lobes.

May be confused with:
Other prickly Solanums

Other prickly Solanums in this area do not have this combination of characteristics.



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



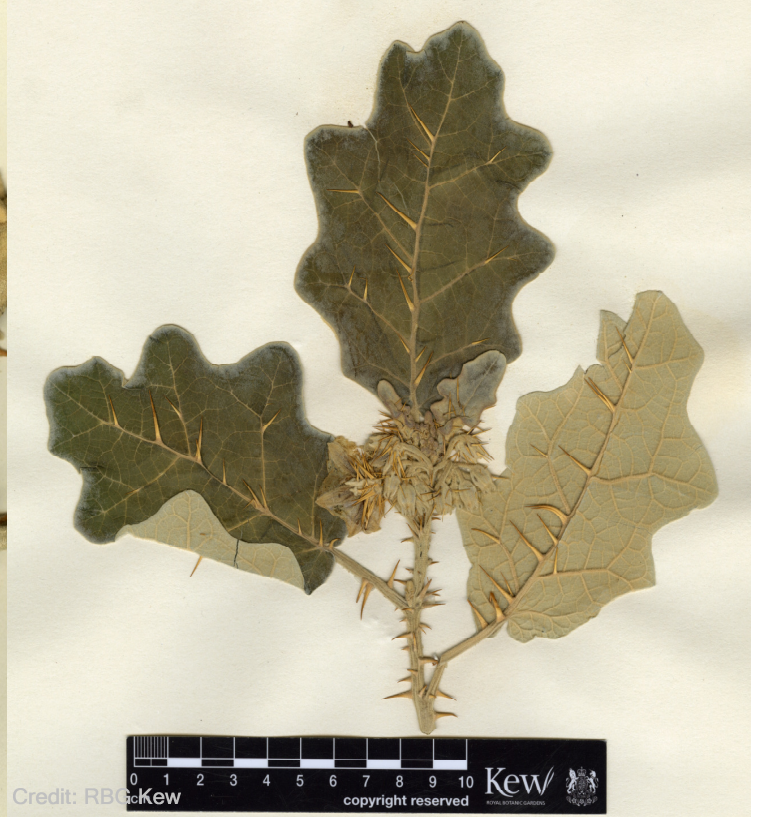
Credit: RBG Kew



Credit: Heidemarie Niemann



Credit: RBG Kew



Credit: RBG Kew

No seed image available



1-2 m



All year

All year

Appendix - Synonyms

a

Taxon	Sheet	Synonyms
Ipomoea cairica	1	Batatas cavanillesii (Roem. & Schult.) G. Don; Batatas senegalensis G. Don; Convolvulus cairicus L.; Convolvulus cavanillesii (Roem. & Schult.) Spreng.; Convolvulus limphaticus Vell.; Ipomoea cavanillesii Roem. & Schult.; Ipomoea funaria Larrañaga; Ipomoea heptaphylla Griseb.; Ipomoea pentaphylla Cav.; Ipomoea rosea var. pluripartita Hassl.; Ipomoea senegalensi Lam.; Ipomoea vesiculosa P. Beauv.
Ipomoea ochracea	2	Ipomoea curtisii House; Ipomoea ochracea var. curtissii (House) Stearn
Lens ervoides	3	Cicer ervoides Brign.; Ervum ervoides (Brign.) Hayek; Ervum hohenakeri Fisch. & C.A. Mey.; Ervum lenticula Schreb. ex Sturm; Lens lenticula; Lens nigricans (M. Bieb.) Godr. subsp. ervoides (Brign.)Ladiz.; Vicia ervoides (Brign.) Fiori; Vicia lenticula (Schreb.) Janka
Pisum abyssinicum	4	Pisum sativum L. subsp. abyssinicum (A. Braun) Govorov
Vicia sativa subsp. nigra	5	Vicia angustifolia subsp. angustifolia L.; Vicia angustifolia subsp. pusilla Boiss.; Vicia angustifolia subsp. segetalis (Thuill.) Arcang.; Vicia angustifolia var. segetalis (Thuill.) Arcang.; Vicia angustifolia var. uncinata (Desv.) Rouy; Vicia bobartii E.Forst.; Vicia bobartii Koch; Vicia canadensis Zuccagni; Vicia cuneata Guss.; Vicia debilis Perez Lara; Vicia heterophylla C.Presl; Vicia lanciformis Lange; Vicia maculata C.Presl; Vicia pilosa M.Bieb.; Vicia sativa subsp. angustifolia (L.) Batt.; Vicia sativa subsp. angustifolia (L.) Gaudin; Vicia sativa subsp. consobrina (Pomel) Quezel & Santa; Vicia sativa subsp. cordata (Hoppe) Batt.; Vicia sativa subsp. cuneata (Guss.) Maire; Vicia sativa subsp. heterophylla (C.Presl) J.Duvign.; Vicia sativa var. angustifolia (L.) Wahlb.; Vicia sativa var. angustifolia L.; Vicia sativa var. minor (Bertol.) Ohwi; Vicia sativa var. nigra L.; Vicia segatalis Thuill.; Vicia angustifolia L.
Vigna unguiculata subsp. aduensis	6	Vigna unguiculata (L.) Walp. subsp. dekindtiana (Harms) Verdc. var. mensensis sensu Marechal.; Vigna unguiculata (L.) Walp. subsp. mensensis sensu Verdc.
Avena abyssinica	7	Avena abyssinica f. glaberrima Chiov.; Avena abyssinica var. baldratiana Cufod.; Avena abyssinica var. chiovendae Mordv.; Avena abyssinica var. neoschimperi Cufod.; Avena alba subsp. abyssinica (Hochst.) Á.Löve & D.Löve; Avena barbata var. abbreviata Hausskn.; Avena barbata var. pseudoabyssinica Tab. Morais; Avena sativa var. abyssinica (Hochst.) Körn.; Avena sativa var. braunii Körn.; Avena sativa var. hildebrandtii Körn.; Avena sativa var. schimperi Körn.; Avena strigosa subsp. abyssinica (Hochst.) Thell.; Avena strigosa var. abyssinica (Hochst.) Hausskn.; Avena strigosa var. glaberrima (Chiov.) Thell.; Avena strigosa var. pseudoabyssinica Thell.; Avena strigosa var. subglaberrima Malzev; Avena vaviloviana var. pseudoabyssinica C.E.Hubb.; Avena wiestii var. pseudoabyssinica Thell.

Appendix - Synonyms

b

Taxon	Sheet	Synonyms
<i>Avena fatua</i>	8	<i>Avena ambigua</i> Schoenb.; <i>Avena cultiformis</i> (Malzev) Malzev; <i>Avena fatua</i> subsp. <i>brevipilosa</i> Kiec; <i>Avena fatua</i> subsp. <i>cultiformis</i> Malzev; <i>Avena fatua</i> subsp. <i>glabrata</i> (Peterm.) Piper & Beattie; <i>Avena fatua</i> subsp. <i>meridionalis</i> Malzev; <i>Avena fatua</i> subsp. <i>septentrionalis</i> (Malzev) Malzev; <i>Avena fatua</i> subvar. <i>naniformis</i> Yamag.; <i>Avena fatua</i> subvar. <i>pseudonana</i> Yamag.; <i>Avena fatua</i> subvar. <i>pumila</i> Yamag.; <i>Avena fatua</i> subvar. <i>zine</i> Yamag.; <i>Avena fatua</i> var. <i>acidophila</i> Kiec; <i>Avena fatua</i> var. <i>alcaliphila</i> Kiec; <i>Avena fatua</i> var. <i>alta</i> Kiec; <i>Avena fatua</i> var. <i>altissima</i> Kiec; <i>Avena fatua</i> var. <i>elongata</i> Malzev; <i>Avena fatua</i> var. <i>glabrata</i> Peterm.; <i>Avena fatua</i> var. <i>glabrescens</i> Coss. & Durieu; <i>Avena fatua</i> var. <i>gravis</i> Kiec; <i>Avena fatua</i> var. <i>hyugaensis</i> Yamag.; <i>Avena fatua</i> var. <i>intermedia</i> (T.Lestib.) Lej. & Courtois; <i>Avena fatua</i> var. <i>leiocarpa</i> Malzev; <i>Avena fatua</i> var. <i>levis</i> Kiec; <i>Avena fatua</i> var. <i>longiflora</i> Malzev; <i>Avena fatua</i> var. <i>longispiculata</i> Malzev; <i>Avena fatua</i> var. <i>mollis</i> Keng; <i>Avena fatua</i> var. <i>nipponica</i> Yamag.; <i>Avena fatua</i> var. <i>pilosa</i> Syme; <i>Avena fatua</i> var. <i>pilosiformis</i> Yamag.; <i>Avena fatua</i> var. <i>pilosissima</i> Gray; <i>Avena fatua</i> var. <i>pseudoculta</i> Malzev; <i>Avena fatua</i> var. <i>vilis</i> (Wallr.) Hausskn.; <i>Avena hybrida</i> Peterm.; <i>Avena intermedia</i> Lindgr.; <i>Avena intermedia</i> T.Lestib.; <i>Avena japonica</i> Steud.; <i>Avena lanuginosa</i> Gilib.; <i>Avena ludoviciana</i> subvar. <i>glabrescens</i> (Durieu ex Godr.) Husn.; <i>Avena ludoviciana</i> var. <i>glabrescens</i> Durieu ex Godr.; <i>Avena meridionalis</i> (Malzev) Roshev.; <i>Avena meridionalis</i> var. <i>grandis</i> Roshev.; <i>Avena nigra</i> Wallr.; <i>Avena occidentalis</i> Durieu; <i>Avena patens</i> St.-Lag.; <i>Avena pilosa</i> Scop.; <i>Avena sativa</i> subsp. <i>fatua</i> (L.) Fiori; <i>Avena sativa</i> var. <i>fatua</i> (L.) Fiori; <i>Avena sativa</i> var. <i>sericea</i> Hook.f.; <i>Avena septentrionalis</i> Malzev; <i>Avena sterilis</i> Delile ex Boiss.; <i>Avena sterilis</i> subvar. <i>glabrescens</i> (Durieu ex Godr.) Husn.; <i>Avena sterilis</i> var. <i>glabrescens</i> (Durieu ex Godr.) Malzev; <i>Avena vilis</i> Wallr.; <i>Anelytrum avenaceum</i> Hack.
<i>Avena occidentalis</i>	9	The Plant List and GrassBase consider <i>A. occidentalis</i> to be a synonym of <i>A. fatua</i> , synonymy follows Baum (1977). <i>Avena fatua</i> f. <i>deserticola</i> Hausskn.; <i>Avena fatua</i> ssp. <i>fatua</i> var. <i>pilosissima</i> subv. <i>deserticola</i> (Hausskn.) Malz.; <i>Avena fatua</i> ssp. <i>meridionalis</i> var. <i>grandis</i> subv. <i>puberula</i> Malz.; <i>Avena fatua</i> ssp. <i>meridionalis</i> var. <i>grandis</i> subv. <i>villosa</i> Malz.; <i>Avena fatua</i> ssp. <i>fatua</i> var. <i>pilosissima</i> subv. <i>parva</i> Tab.; <i>Avena fatua</i> ssp. <i>fatua</i> var. <i>pilosissima</i> subv. <i>puberula</i> (Malz.) Tab.; <i>Avena fatua</i> ssp. <i>fatua</i> var. <i>pilosissima</i> subv. <i>villosa</i> (Malz.) Tab.
<i>Avena sterilis</i>	10	<i>Avena fatua</i> var. <i>sterilis</i> (L.) Fiori & Paol.; <i>Avena macrocarpa</i> Moench; <i>Avena nutans</i> St.-Lag.; <i>Avena sativa</i> var. <i>sterilis</i> (L.) Fiori; <i>Avena sterilis</i> subsp. <i>macrocarpa</i> Briq.
<i>Eleusine africana</i>	11	<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 floccifolia</i>	12	<i>Cynosurus floccifolius</i> Forssk.; <i>Chloris floccifolia</i> Poir.
<i>Eleusine intermedia</i>	13	<i>Eleusine indica</i> var. <i>intermedia</i> Chiov.
<i>Pennisetum purpureum</i>	14	<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

Appendix - Synonyms

b

Taxon	Sheet	Synonyms
<i>Pennisetum squamulatum</i>	15	<i>Cenchrus squamulatus</i> (Fresen.) Morrone; <i>Pennisetum pentastachyum</i> Hochst. ex A.Rich.; <i>Pennisetum pentastachyum</i> var. <i>violaceum</i> Avetta; <i>Pennisetum proximum</i> Leeke; <i>Pentastachya abyssinica</i> Hochst. ex Steud.
<i>Sorghum purpureosericeum</i>	16	<i>Andropogon pappii</i> Gand.; <i>Andropogon purpureosericeus</i> Hochst. ex A.Rich.; <i>Andropogon purpureosericeus</i> var. <i>calomelas</i> Hack.; <i>Andropogon purpureosericeus</i> var. <i>pallidior</i> Hack.; <i>Sarga purpureosericea</i> (Hochst. ex A.Rich.) Spangler; <i>Sorghum deccanense</i> Stapf ex Raizada; <i>Sorghum dimidiatum</i> Stapf; <i>Sorghum purpureosericeum</i> subsp. <i>deccanense</i> Garber; <i>Sorghum purpureosericeum</i> subsp. <i>dimidiatum</i> (Stapf) Garber
<i>Solanum aculeatissimum</i>	17	<i>Solanum aculeatissimum</i> var. <i>hispidissimum</i> Dunal, in DC; <i>Solanum angustispinosum</i> De Wild.; <i>Solanum cavaleriei</i> H.Lév. & Vaniot; <i>Solanum horridum</i> Salisb.; <i>Solanum khasianum</i> C.B.Clarke; <i>Solanum reflexum</i> Schrank.
<i>Solanum adoense</i>	18	-
<i>Solanum anguivi</i>	19	<i>Solanum indicum</i> L.; <i>Solanum indicum</i> var. <i>lividum</i> (Link) Bitter; <i>Solanum indicum</i> var. <i>maroanum</i> Bitter; <i>Solanum lividum</i> Link; <i>Solanum scalare</i> C. H. Wright; <i>Solanum sodomeum</i> L.
<i>Solanum campylacanthum</i>	20	<i>Solanum antidotum</i> Dammer; <i>Solanum astrochlaenoides</i> Dammer; <i>Solanum benguelense</i> Peyr.; <i>Solanum bojeri</i> Dunal, in DC.; <i>Solanum bojeri</i> var. <i>deckenii</i> (Dammer) Bitter; <i>Solanum bojeri</i> var. <i>houyanum</i> Bitter; <i>Solanum bojeri</i> var. <i>integrum</i> Bitter; <i>Solanum bojeri</i> var. <i>sinuatorepandum</i> Dunal, in DC.; <i>Solanum bussei</i> Dammer; <i>Solanum cufodontii</i> Lanza; <i>Solanum deckenii</i> Damme; <i>Solanum delagoense</i> var. <i>astrochlaenoides</i> (Dammer) Bitter; <i>Solanum delagoense</i> var. <i>benguelense</i> (Peyr.) Bitter; <i>Solanum delagoense</i> var. <i>fischeri</i> (Dammer) Bitter; <i>Solanum delpierrei</i> De Wild.; <i>Solanum endlichii</i> Dammer; <i>Solanum fischeri</i> Dammer; <i>Solanum gonicalyx</i> Lanza; <i>Solanum himatacanthum</i> Dammer; <i>Solanum iodes</i> Dammer; <i>Solanum macrosepalum</i> Dammer; <i>Solanum magdalena</i> Dammer; <i>Solanum malacochlamys</i> Bitter; <i>Solanum malacochlamys</i> var. <i>transgrediens</i> Bitter; <i>Solanum maranguense</i> Bitter; <i>Solanum melongenifolium</i> Lanza; <i>Solanum merkeri</i> Dammer; <i>Solanum merkeri</i> subsp. <i>militans</i> Bitter; <i>Solanum merkeri</i> var. <i>endastrophorum</i> Bitter; <i>Solanum merkeri</i> var. <i>intermontanum</i> Bitter; <i>Solanum merkeri</i> var. <i>mediidominans</i> Bitter; <i>Solanum merkeri</i> var. <i>ruandense</i> Bitter; <i>Solanum merkeri</i> var. <i>tobleri</i> Bitter; <i>Solanum mesomorphum</i> Bitter; <i>Solanum neumannii</i> Dammer; <i>Solanum neumannii</i> var. <i>schoense</i> Bitter; <i>Solanum pembae</i> Bitter; <i>Solanum psilostylum</i> Dammer; <i>Solanum repandifrons</i> Bitter; <i>Solanum secedens</i> Dammer; <i>Solanum sennii</i> Chiov.; <i>Solanum ukereuwense</i> Bitter; <i>Solanum urbanianum</i> Dammer; <i>Solanum verbascifrons</i> Bitter; <i>Solanum volkensii</i> Dammer; <i>Solanum volkensii</i> var. <i>himatiacanthum</i> (Dammer) Bitter; <i>Solanum suaveolens</i> Bojer
<i>Solanum cerasiferum</i>	21	<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>	22	<i>Solanum duplosinuatum</i> Klotzsch

Appendix - Synonyms

Solanum glabratum	23	Solanum boselliae Chiov.; Solanum erysimifolium Delile; Solanum glabratum var. erysimifolium (Delile) Bitter; Solanum glabratum var. sepicula (Dunal) J.R.I.Wood; Solanum palmetorum Dunal; Solanum sepicula Dunal; Solanum sepicula var. calvifrons Bitter; Solanum sepicula var. microlepis Bitter; Solanum bahamense Forssk.
Solanum hastifolium	24	Solanum cynanchoides Chiov.; Solanum hastifolium subsp. velutinellum Bitter; Solanum longestamineum Dammer
Solanum incanum	25	Solanum coagulans var. griseum Dunal; Solanum coagulans var. ochraceum Dunal; Solanum floccosistellatum Bitter; Solanum hierochuntinum Dunal; Solanum hierochuntinum var. lanuginosum Dunal; Solanum incanum Forssk.; Solanum incanum subsp. horridescens Bitter; Solanum incanum var. brevitomentosum Bitter; Solanum incanum var. integrascens Bitter; Solanum incanum var. kavirondoense Bitter; Solanum incanum var. pluribaccatum Bitter; Solanum incanum var. unguiculatum (A.Rich.) Bitter.; Solanum melongena var. incanum (L.) Kuntze; Solanum unguiculatum A.Rich.; Solanum sanctum L.
Solanum macracanthum	26	-
Solanum marginatum	27	-