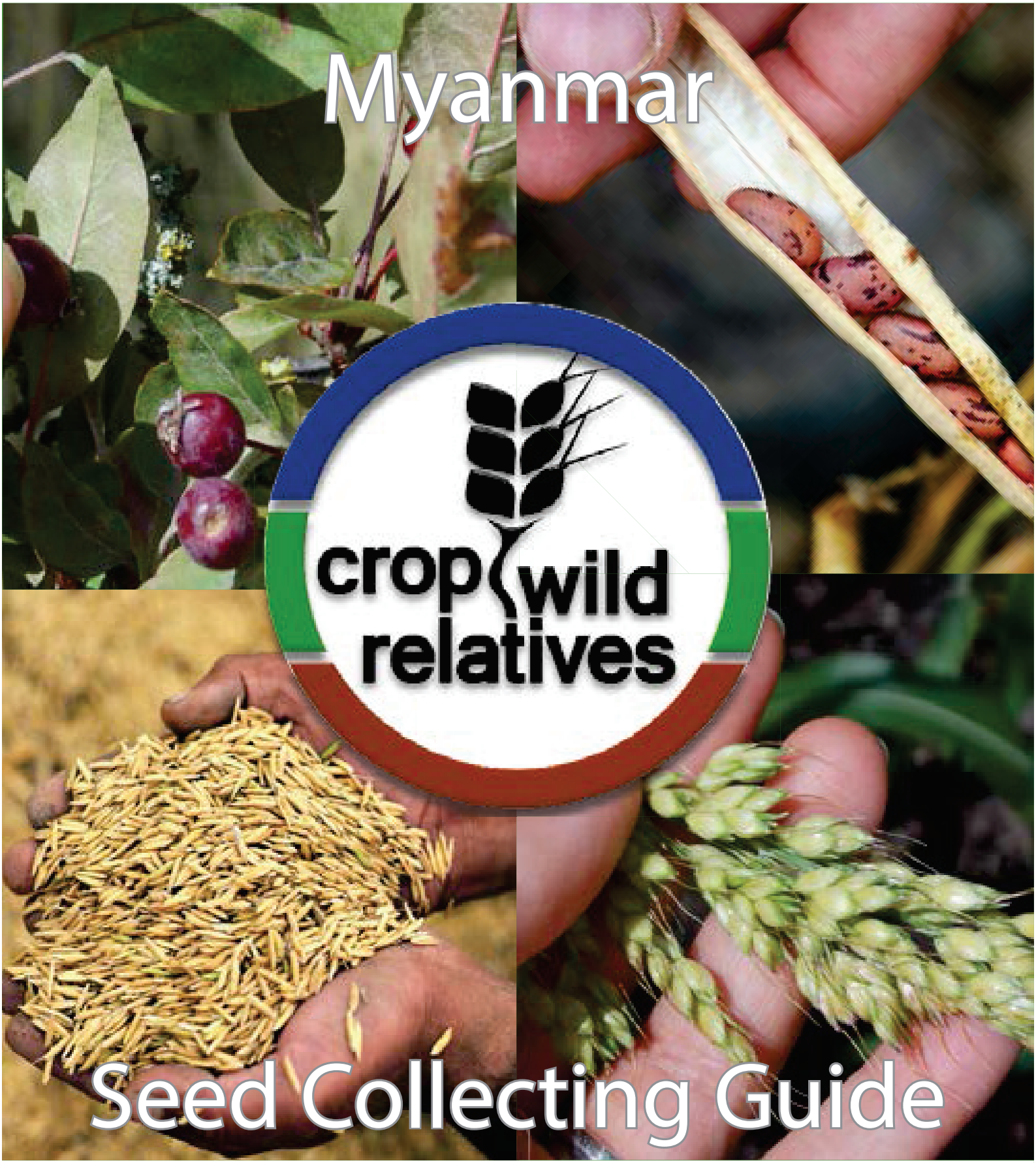
Adapting agriculture to climate change:
collecting, protecting and preparing crop wild relatives

Myanmar



crop wild relatives

Seed Collecting Guide

MILLENNIUM SEED BANK PARTNERSHIP
Royal Botanic Gardens Kew
CROP TRUST

Please cite this guide as:
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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: Wild apples, CREDIT: RBG Kew;
TOP RIGHT: Orange Beans, CREDIT: Neil Palmer/CIAT;
BOTTOM LEFT: Rice, CREDIT: Neil Palmer/CIAT;
BOTTOM RIGHT: Sorghum CREDIT: RBG Kew.

Introduction

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

Acknowledgements

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

UNIVERSITY OF BIRMINGHAM

CIAT
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

CROP TRUST

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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How to use this guide

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.

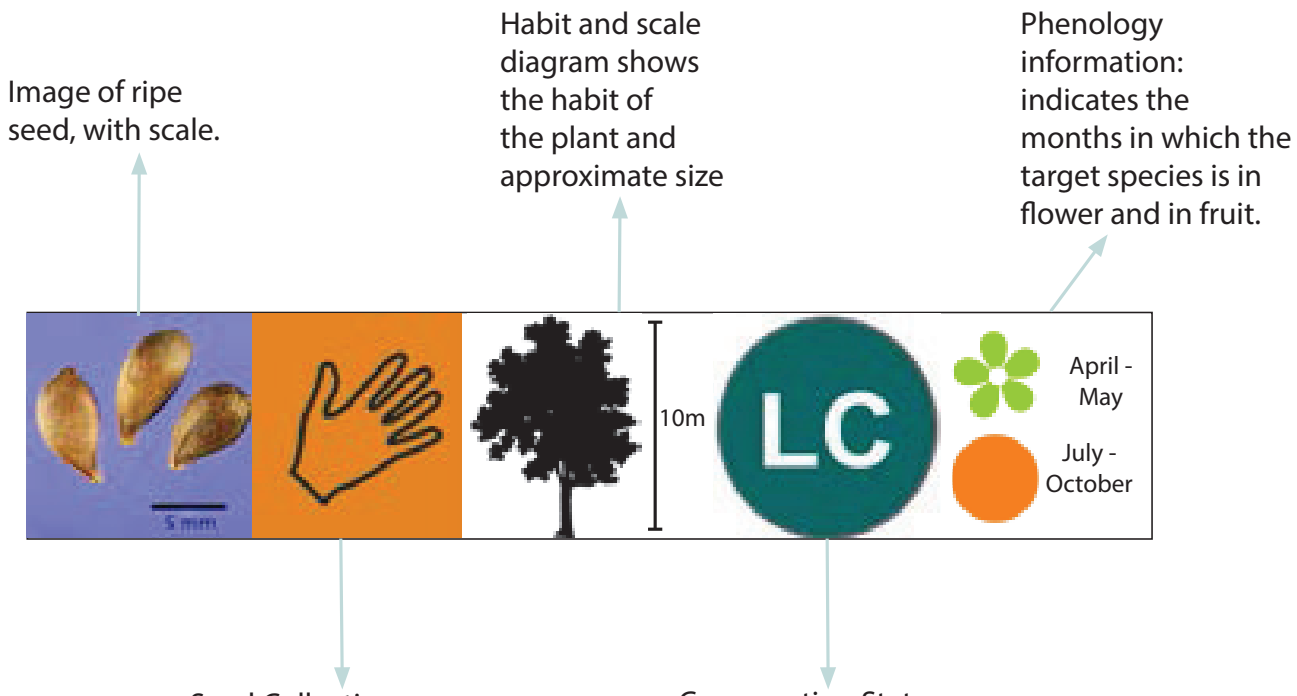
The species included in this guide are a selection of the wild relatives of the 29 key crops which this project covers (African Rice, Alfalfa, Apple, Aubergine, Bambara groundnut, Banana, Barley, Bread Wheat, Butter Bean, Carrot, Chickpea, Common Bean, Cowpea, Faba bean, Finger millet, Grasspea, Lentil, 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.

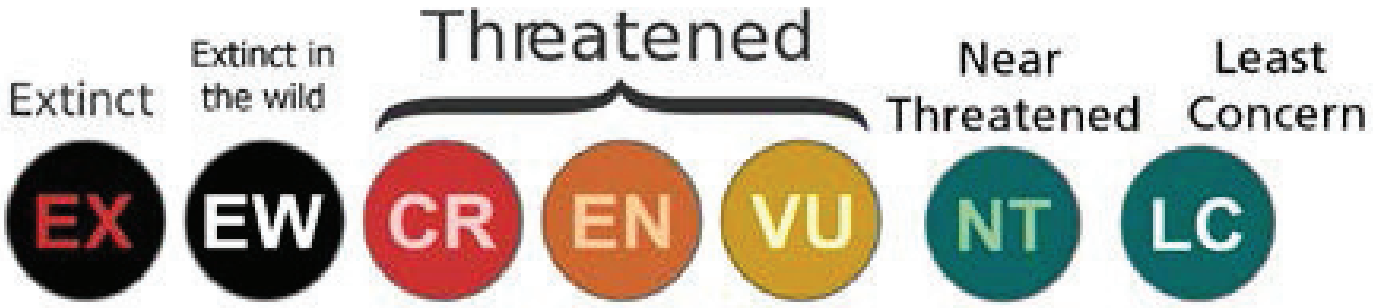
Synonyms for each species are listed in the Appendix at the end of this guide.

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:



CR
CRITICALLY ENDANGERED
Considered to be facing an extremely high risk of extinction in the wild.

EN
ENDANGERED
Considered to be facing a very high risk of extinction in the wild.

VU
VULNERABLE
Considered to be facing a high risk of extinction in the wild.

NT
NEAR THREATENED
Is close to qualifying for or is likely to qualify for a threatened category in the near future.

LC
LEAST CONCERN
Does not qualify for a threatened rating. Widespread and abundant taxa are included in this category.

DD
DATA DEFICIENT
There is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.

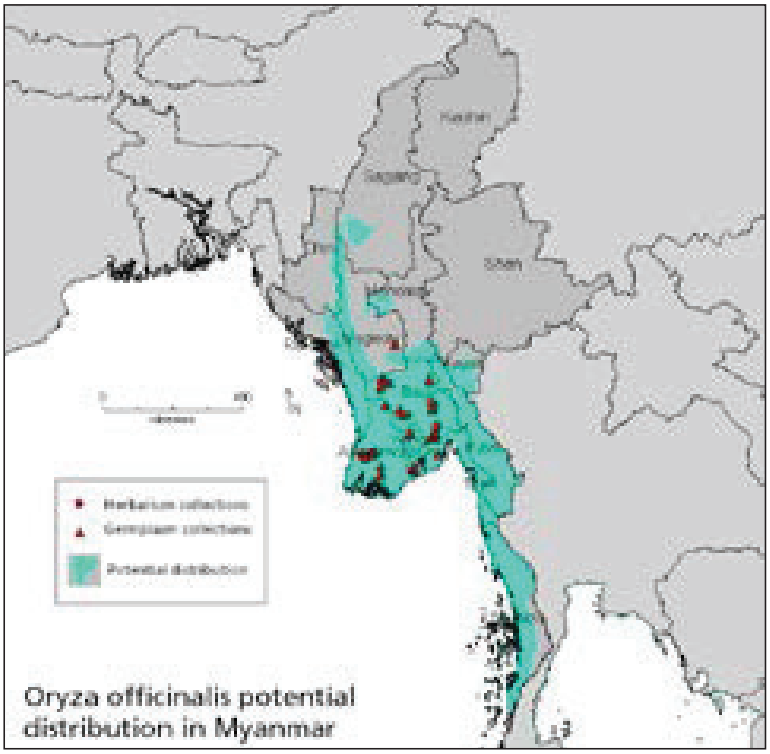
NE
NOT EVALUATED
A conservation assessment for this species has not yet been carried out.

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 occurence (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:

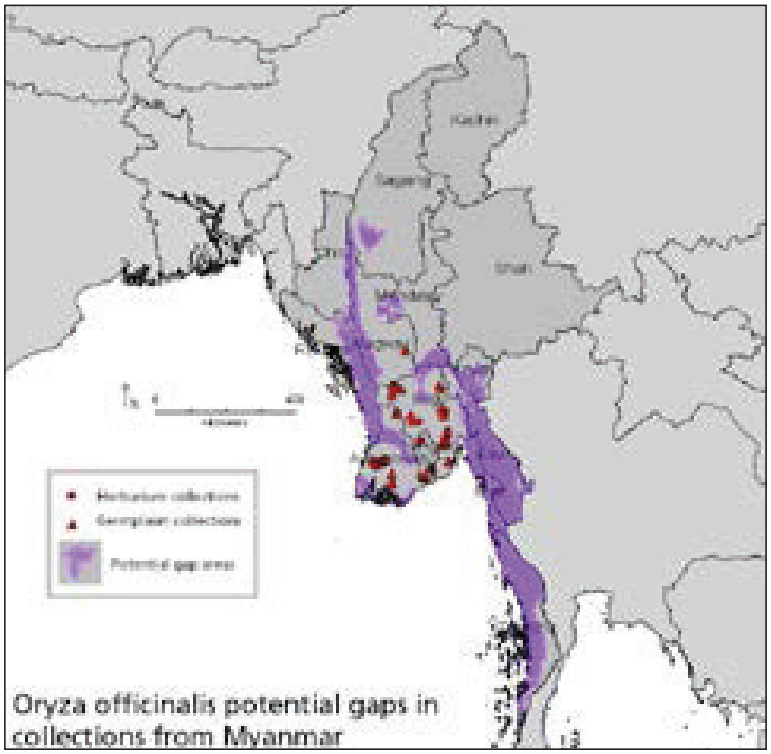
IUCN Graphics Credit: Peter Halasz

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 targetted.



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.

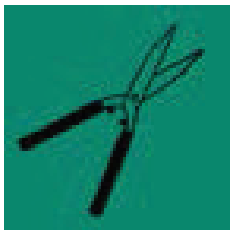
Hand picking of whole fruits

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

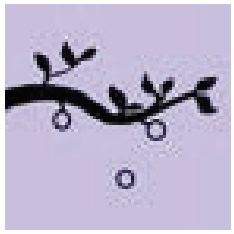


This technique is typically used to collect tree seeds. Cut groups or clusters of fruits using secateurs or tree pruners. Assess for ripeness and damage before adding seeds to the collection.

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:

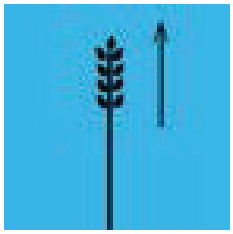
- dehiscent fruits with medium large seeds;
- seeds with irritant plumes (e.g. Cercocarpus of the Rosaceae);
- spiny trees such as Prosopis (Fabaceae);
- on level, open terrain suitable for tarpaulin use.

This technique may not be suitable for light, plumed seed from Bombacaeae 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

Technical Information Sheet produced by Michael Way and Kate Gold for the Millennium Seed Bank Project, 2008.

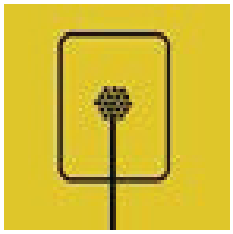
Stripping entire seed-heads



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.

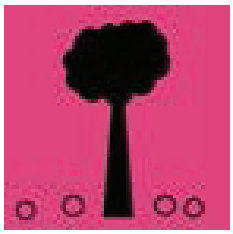
The stripping technique is most suitable for:
• dense, mono-specific stands of target species with no weed or other species present; and
• infructescences which are completely and consistently at the natural dispersal stage.

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 immedately after the field trip.

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

Containers

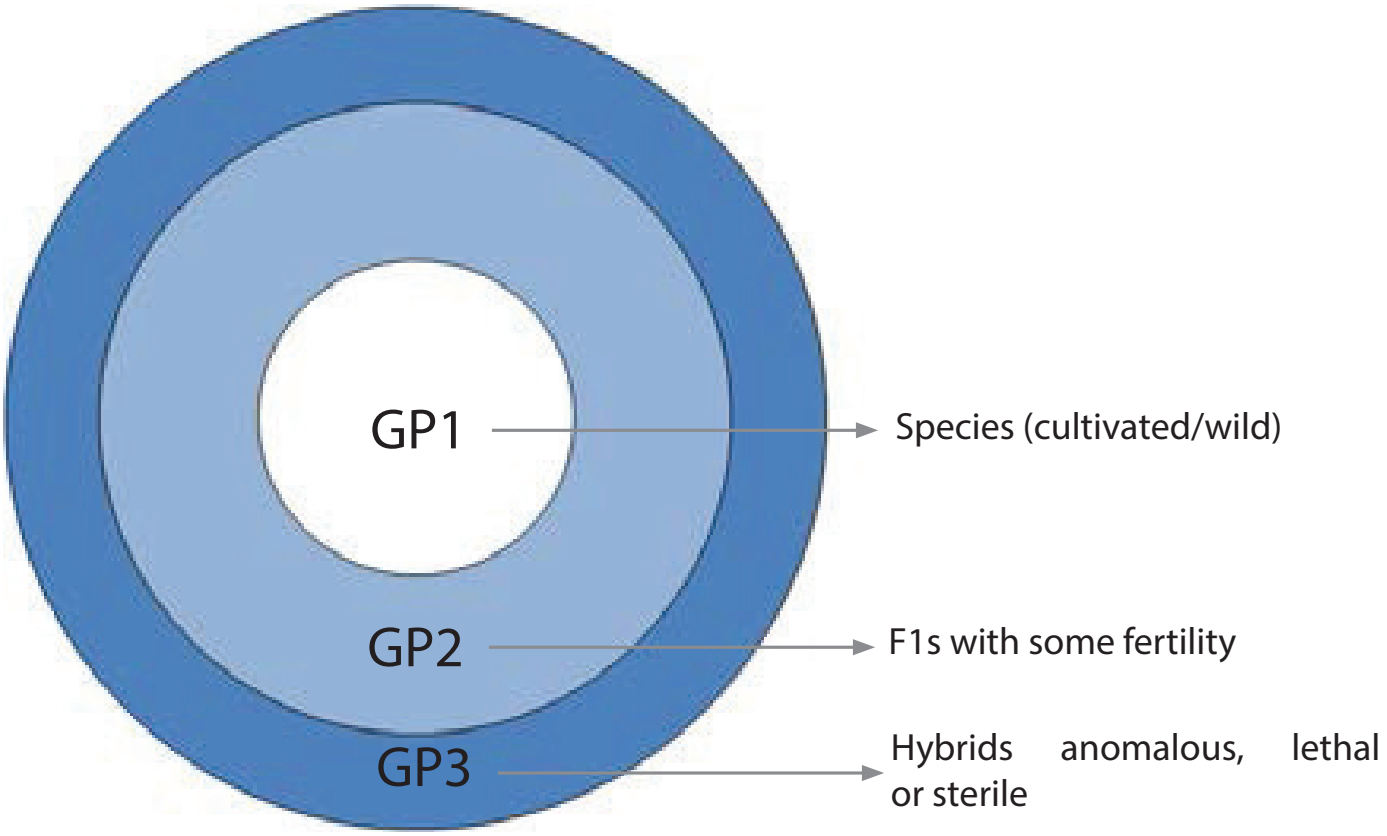
Collect into buckets, cloth or paper bags, and check each person's sample carefully before combining into a single population collection.
Using buckets has the advantage of allowing you to monitor the quality of the collection whilst associated insects disperse freely.
Place collections of dry, ripe 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.

How we define crop wild relatives

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

Gene Pool Concept

Harlan and de Wet, 1971



Taxon Group Concept

Maxted et al. 2006

Taxon Group 1 – cultivated/wild form of the crop

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

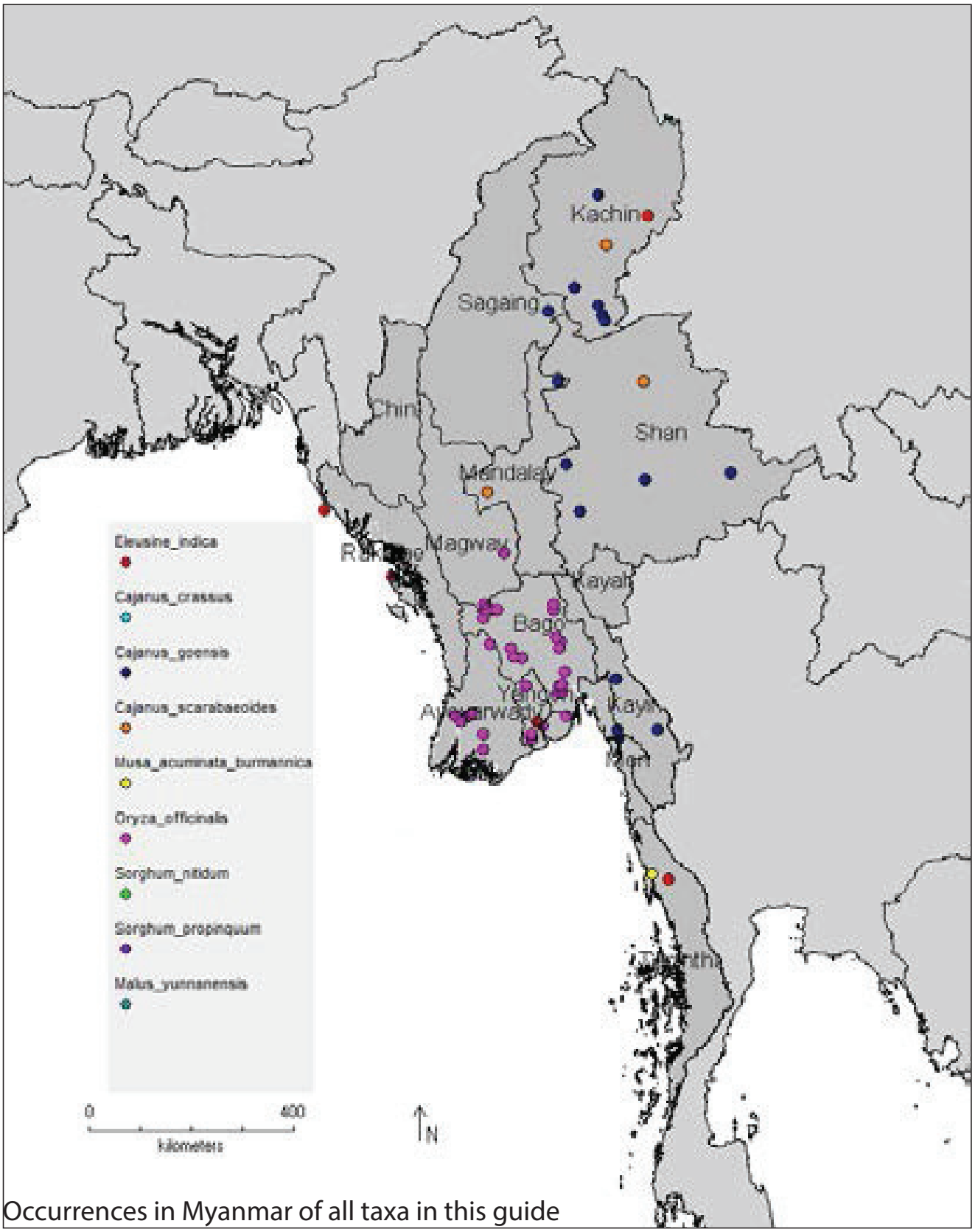
Taxon Group 3 – species in same subgenus as crop

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

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

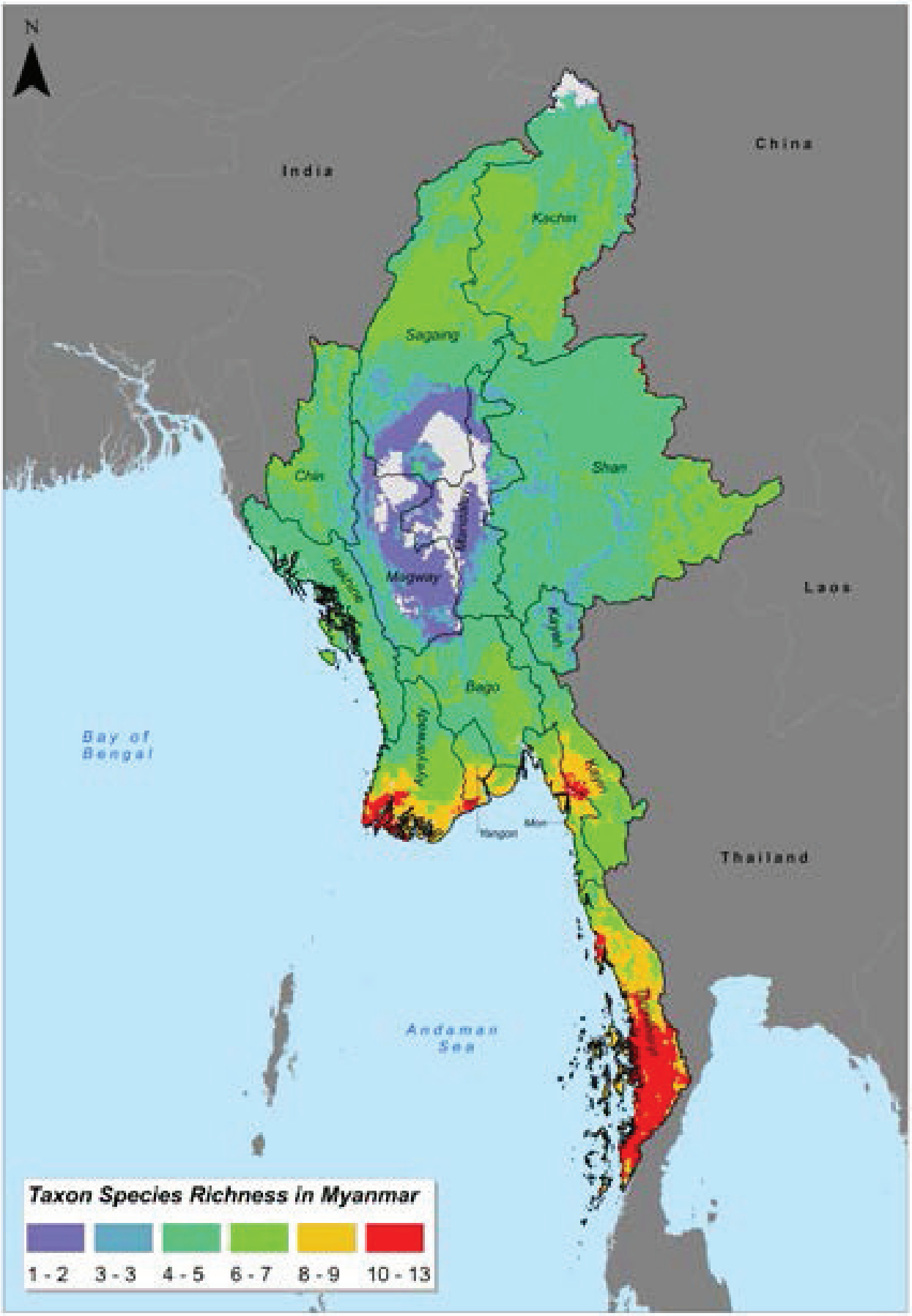
Country Maps

Occurences of all taxa in this guide, as a point distribution

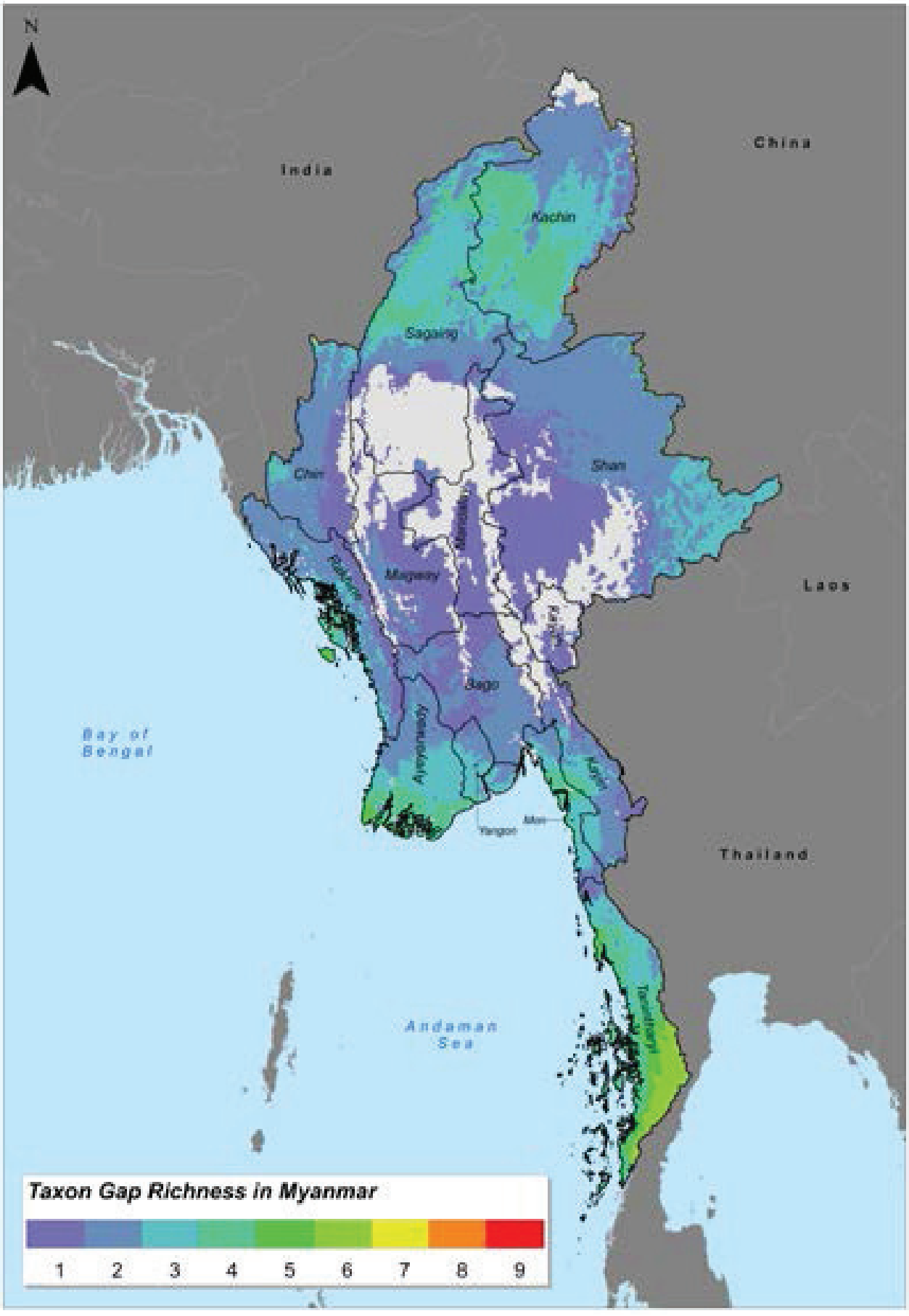


Occurrences in Myanmar of all taxa in this guide

Species richness



Collecting Gaps



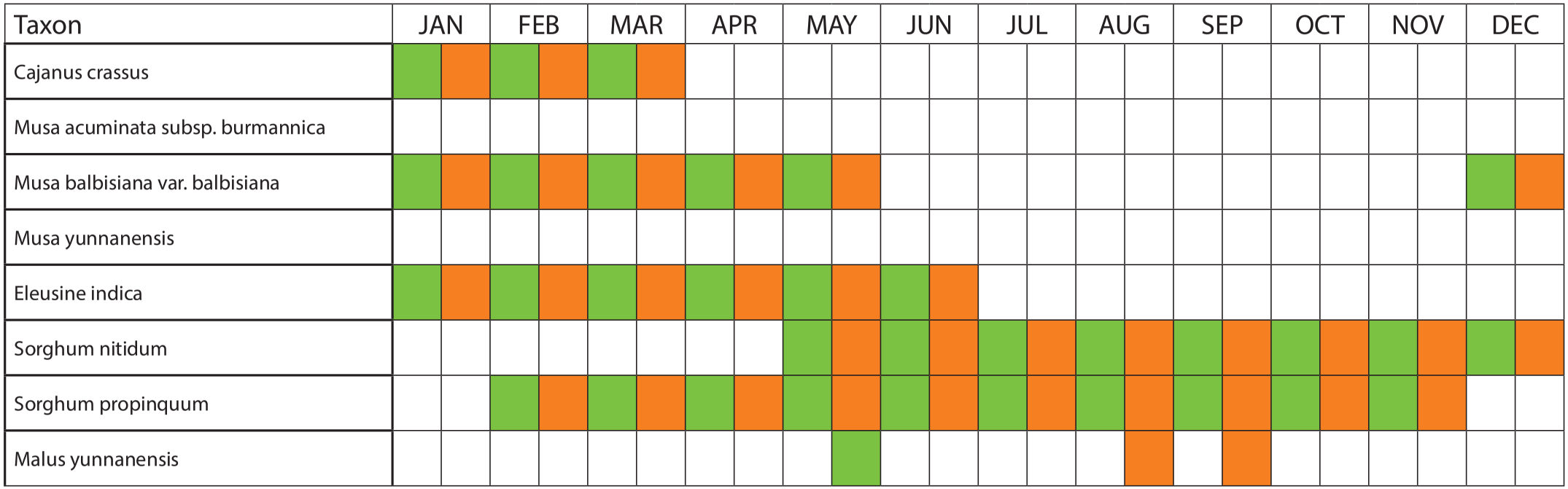
Species in this guide - High priority for collecting

Family	Taxon	Genepool	Sheet	Conservation Status
Leguminosae	Cajanus crassus (Prain ex King) Maesen	Gene Pool 3 relative of Cajanus cajan (L.) Millsp.	1	LC prelim
Musaceae	Musa acuminata subsp. burmannica N.W.Simmonds	Gene Pool Primary relative of Musa acuminata Colla	2	DD
Musaceae	Musa balbisiana var. balbisiana Colla	Gene Pool 1B relative of Musa acuminata Colla	3	DD
Musaceae	Musa yunnanensis Hakkinen & H.Wang	Gene Pool Secondary relative of Musa balbisiana Colla; Gene Pool Secondary relative of Musa acuminat	4	DD
Poaceae	Eleusine indica (L.) Gaertn.	Relative of Finger millet - Eleusine coracana (L.) Gaertn.	5	LC
Poaceae	Sorghum nitidum (Vahl) Pers.	Gene Pool Tertiary relative of Sorghum bicolor (L.) Moench	6	LC prelim
Poaceae	Sorghum propinquum (Kunth) Hitchc.	Gene Pool Primary relative of Sorghum bicolor (L.) Moench	7	LC prelim
Rosaceae	Malus yunnanensis C.K.Schneid.	Gene Pool Secondary relative of Malus domestica Borkh.	8	LC prelim

Species in this guide - Lower priority for collecting

Family	Taxon	Genepool	Sheet	Conservation Status
Convolvulaceae	Ipomoea cairica (L.) Sweet	Wild relative of sweet potato	9	LC prelim
Leguminosae	Cajanus goensis Dalzell	Gene Pool 3 relative of Cajanus cajan (L.) Millsp.	10	LC prelim
Leguminosae	Cajanus scarabaeoides (L.) Thouars	Gene Pool 2 relative of Cajanus cajan (L.) Millsp.	11	LC prelim
Poaceae	Oryza meyeriana var. granulata (Watt) Duist.		12	NE
Poaceae	Oryza officinalis Wall.	Gene Pool 2 relative of Oryza sativa L and Oryza glaberrima Steud.	13	LC
Poaceae	Oryza ridleyi Hook.f.	Gene Pool Tertiary relative of Oryza sativa L. and Oryza glaberrima Steud.	14	LC prelim
Solanaceae	Solanum virginianum L.	Gene Pool 3 relative of Solanum melongena L.	15	LC prelim

Phenology table



Taxon	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC	
Ipomoea cairica																								
Cajanus goensis																								
Cajanus scarabaeoides																								
Oryza meyeriana var. granulata																								
Oryza officinalis																								
Oryza ridleyi																								
Solanum virginianum																								

KEY

Species in flower

Species in fruit

data gathered from literature and herbarium specimens

CONVOLVULACEAE

Ipomoea cairica (L.) Sweet

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.
INFLORESCENCE: Axillary, 1–3 flowered.
FLOWER: 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. Calyx 0.4–0.8 cm long.
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

Ipomoea cairica	May be confused with: *Ipomoea batatas*
Deeply 5(-7)-lobed leaves. 	Leaves entire. 

Reported from Myanmar , but no localities known

All populations priority for collection

No accessions from Myanmar 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

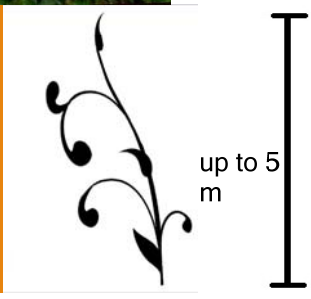
Adapting Agriculture to Climate Change Project, 2013. Myanmar Crop Wild Relatives Seed Collecting Guide. Compiled by Ruth Harker, RBG Kew

CONVOLVULACEAE

Ipomoea cairica (L.) Sweet

Wild relative of sweet potato

Morning glory, Mile-a-minute vine



LC

PRELIM

Nov - Jul

Nov - Jul

LEGUMINOSAE

Cajanus crassus (Prain ex King) Maesen

Tertiary Gene Pool relative of Cajanus cajan (L.) Millsp.

HABIT: Perennial climbers, supported by trees. Branches brownish pubescent (hairs very short), terete, firm, length up to 10 m. Stipules minute, ca 1 mm, triangular, caducous.
LEAVES: Pinnately trifoliolate, petiole 4–11 cm, rachis 0.3–1 cm. Leaflets coriaceous, thick, lower surface brownish pubescent, also on the thick prominent ribs, glandular-punctate, upper surface dark green, thinly puberulous especially on the veins; top leaflet subtrapezoid, acuminate, 3.5–10 cm long, 3–9.5 cm wide, below the middle narrowing to the rounded or cordate base, apex acuminate-cuspidate, side leaflets obliquely so, 3.5-10 cm long, 2.5–7.5 cm wide, petiolules 2–3 mm.
INFLORESCENCE: Racemes crowded, 3–6 cm, up to ca 20 flowers, 1–2 flowers per node.
FLOWER: Corolla yellow, marcescent, pedicels 4–10 mm, in fruit firm. Bracts large, elliptic-ovate, apex obtuse, fringed or acute, 10–15 mm long, 6–12 mm wide, thinly pubescent, caducous. Calyx pubescent (interior also), tube 4–6 mm, teeth triangular, shorter than the tube.
FRUIT: Pods sturdy, oblong, ends rounded acuminate, 2.5–5 cm long, 0.8–1.4 cm wide, (4–)5–6 seeds, shortly puberulous, sticky, transverse depressions oblique or straight, deep when fully developed.
SEEDS: Rectangular-rounded, ca. 4–5 mm long and wide, 3 mm thick, black with cream mosaic, or cream, strophiole 1 x 2.5 mm, divided, yellowish white.

Habitat:

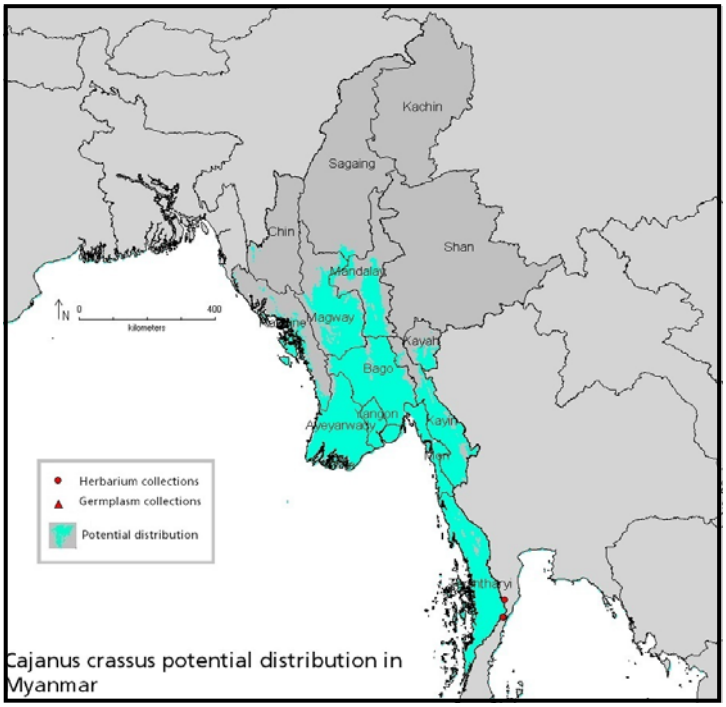
Climber in trees of dry forests (sal, teak, pine) or shrub vegetation, along streams or on dry soils, on alluvium, loam schists, granite rocks.

Distribution:

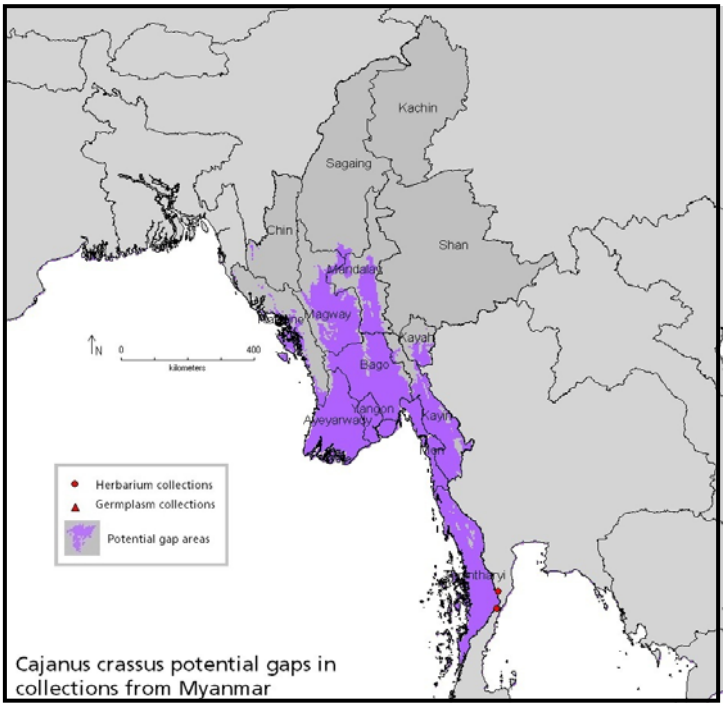
China, Papua New Guinea, Southcentral and Southeastern Asia.

Altitude: 0 - 800 m

Cajanus crassus	May be confused with: *Cajanus goensis*
End of pod rounded acuminate.	Apex of pod beaked. 



Cajanus crassus potential distribution in Myanmar



Cajanus crassus potential gaps in collections from Myanmar

References: van der Maesen, L.J.G. (1985). Cajanus DC. and Atylosia W.& A. (Leguminosae). A revision of all taxa closely related to the pigeonpea, with notes on other related genera within the subtribe Cajaninae. Wageningen Papers 85-4.

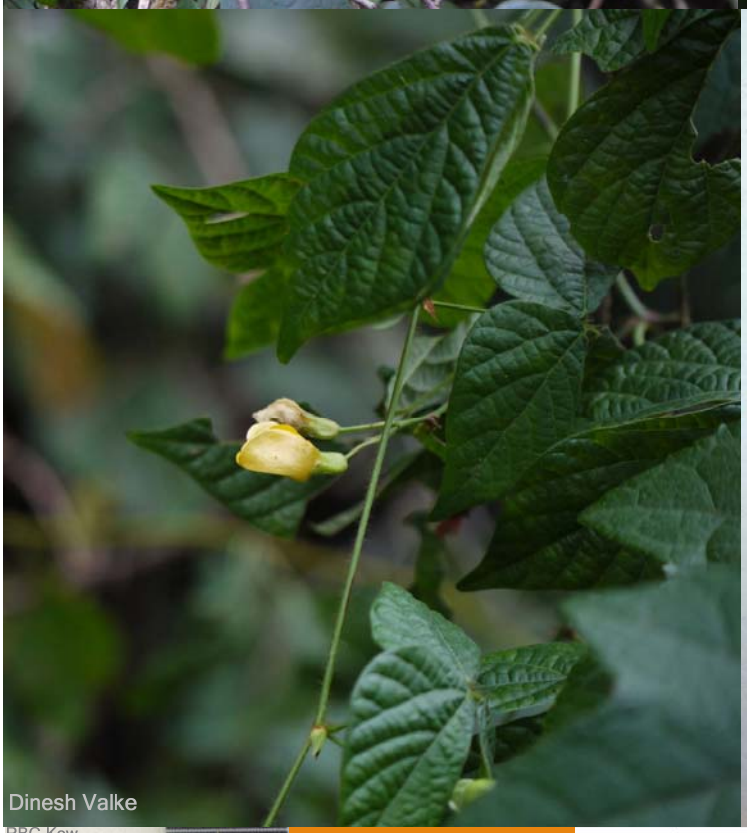
LEGUMINOSAE

Cajanus crassus (Prain ex King) Maesen

Tertiary Gene Pool relative of Cajanus cajan (L.) Millsp.


Dinesh Valke


Dinesh Valke


Dinesh Valke

RBG Kew Herbarium material


RBG Kew

10 m

LC
PRELIM

Jan - Mar

Jan - Mar

Cajanus goensis Dalzell

Gene Pool 3 relative of Cajanus cajan (L.) Millsp.

HABIT: Vines, woody, twining, to several meters tall, yellow-brown villous except for corolla. Stems densely hairy when young, later glabrescent, to dark brown. Stipules ovate-lanceolate, 7–12 mm, persistent.
LEAVES: Pinnately trifoliolate, terminal leaflet ovate to ovate-elliptic, 5–10 × 3–5.5 cm, densely villous when young, later glabrescent, base rounded, apex acuminate with hard mucro. Petiole 3–7 cm long.
INFLORESCENCES: Peduncle a few centimetres long, bracts ovate, densely villous. Flowers ca. 3 cm long, pedicels slender, 11–15 mm; calyx campanulate, lobes linear-lanceolate, lowest lobe ca. 2 × as long as tube; corolla yellow, standard obovate-elliptic, ca. 2.8 cm, base with an inflexed auricle on each side, apex slightly emarginate, wings broadly elliptic, base with auricle on one side, keels sickle shaped, slightly shorter than wings, clawed, without auricle. Ovary linear, densely villous, style long, curved, glabrous, stigma capitate.
FRUIT: Pod long elliptic, 4–6 × ca. 1 cm, straight, densely villous, apex beaked. Seeds 5–7, brown, subspherical, ca. 4 mm in diam., wider than long; strophiole acute and white, succulent.

Habitat:

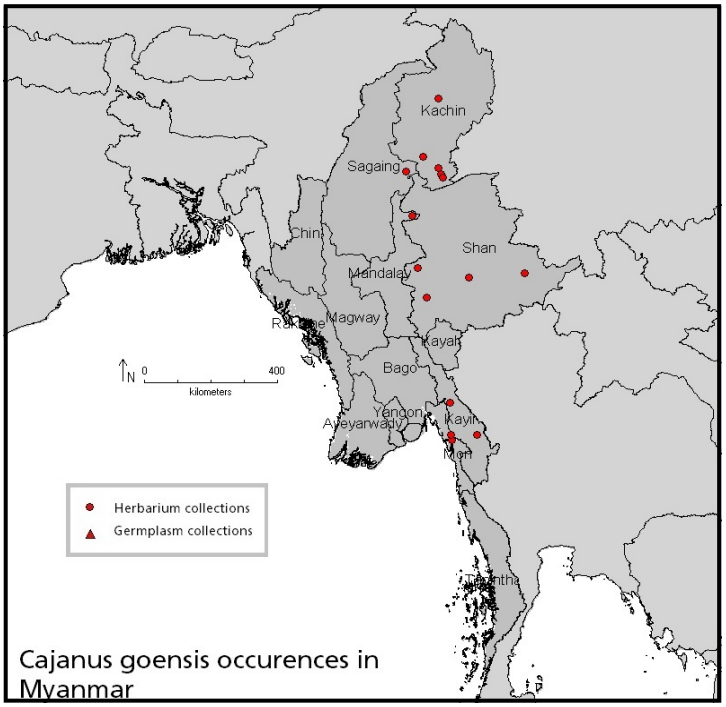
Roadsides, river valleys.

Distribution:

China, Bangladesh, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam.

Altitude: 1000 - 1300 m

Cajanus goensis	May be confused with: *Cajanus crassus*
Apex of pod beaked. 	End of pod rounded acuminate.



Cajanus goensis occurences in Myanmar

All populations priority for collection

No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

References: Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=242309513

LEGUMINOSAE

Cajanus goensis Dalzell

Gene Pool 3 relative of Cajanus cajan (L.) Millsp.

No seed image available

several m long

LC PRELIM

Jan - Feb

Feb - Jul

Cajanus scarabaeoides (L.) Thouars

Secondary Gene Pool relative of Cajanus cajan (L.) Millsp.

HABIT: Perennial, woody, creepers or twiners, stems to 2 m. Stems slender, ± pubescent.
LEAVES: Pinnately 3-foliolate; stipules small, ovate, hairy, usually deciduous; petiole 1–2 cm; stipels absent; petiolules extremely short; leaflets papery or nearly leathery, with glandular spots, sparsely pubescent on both surfaces, denser abaxially, basal veins 3, obviously convex below; terminal leaflet elliptic or obovate-elliptic to obovate, 1.2–4 × 0.8-1.5(–3) cm, apex obtuse or rounded; lateral leaflets smaller, obliquely elliptic to obliquely obovate.
INFLORESCENCE: Raceme axillary, usually less than 2 cm, 1–5-flowered; peduncle 2–5 mm, densely brown to dull brown villous.
FLOWER: Calyx campanulate, 5-lobed, or 4-lobed with upper 2 incompletely connate, lobes linear-lanceolate. Corolla yellow, ca. 1 cm, usually deciduous, standard obovate, with emarginate auricle and claw at base, wings narrowly elliptic, slightly curved, base auriculate, keels curved at apex, densely very pale brown villous. Ovules several.
FRUIT: Pod oblong, 1.5–2.5 × 0.4–0.6 cm, leathery, densely villous, transversely constricted between seeds.
SEEDS: 2–7, dark brown, ellipsoidal, ca. 4 mm, strophiole convex.

Habitat:

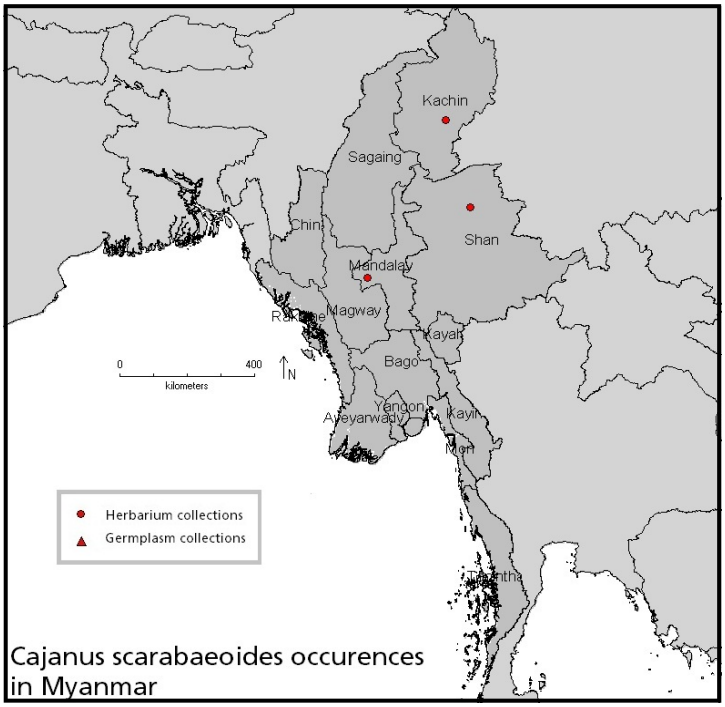
Fields, roadsides, grassy slopes, coastal areas.

Distribution:

China, Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam; Africa, Oceania.

Altitude: 100 - 1500 m

Cajanus scarabaeoides	May be confused with: *Cajanus platycarpus*
Perennial creepers or twiners; leaflets small (1.2–4 cm long), elliptic to obovate; pods narrow (0.4–0.6 cm wide), slightly rounded in cross-section. 	Annual creepers; leaflets larger (3-8 cm long), ovate; pods broad (1-1.5 cm wide), flattened in cross section, papery. 



Cajanus scarabaeoides occurences in Myanmar

All populations priority for collection

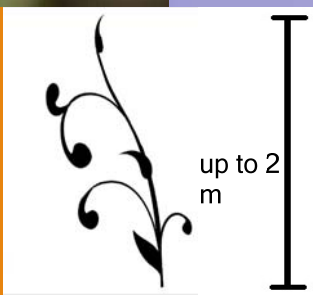
No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

References: Flora of China, Volume 10, p232 via www.efloras.org http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=242309519

LEGUMINOSAE

Cajanus scarabaeoides (L.) Thouars

Secondary Gene Pool relative of Cajanus cajan (L.) Millsp.



LC

Sep - Nov

Oct - Dec

Musa acuminata subsp. burmannica N.W.Simmonds

Gene Pool Primary relative of Musa acuminata Colla

Pseudostems with light brown markings, ca. 4.8 m. Leaf sheath and petiole pruinose; petiole ca. 80 cm, margin erect or spreading and basally with scarious wings; foliage yellowish green and waxless; leaf blade oblong, 1.9--2.3 m × 50--70 cm. Inflorescence subhorizontal or vertically reflexed; peduncle usually downy or hairy. Bracts purple and strongly imbricate. Male flowers ca. 20 per bract, in 2 rows. Compound tepal white or cream, lemon yellow at apex, 3.5--4 cm, apex of outer lobes with a hooklike, hairy appendage; free tepal not more than 1/2 as long as compound tepal, apex emarginate, shortly apiculate. Infructescence ca. 1.2 m; compact and pendulous, peduncle to 70 × ca. 4 cm, white setose. Berries incurved, green to yellow-green, 5-angled when young, cylindric at maturity, ca. 9 cm, white setose, base curved and attenuate into a stalk, apex contracted into a rostrum 6--10 mm. Seeds numerous in wild plants but absent in cultivated clones, brown, depressed, 5--6 mm in diam., irregularly angled.

Habitat:

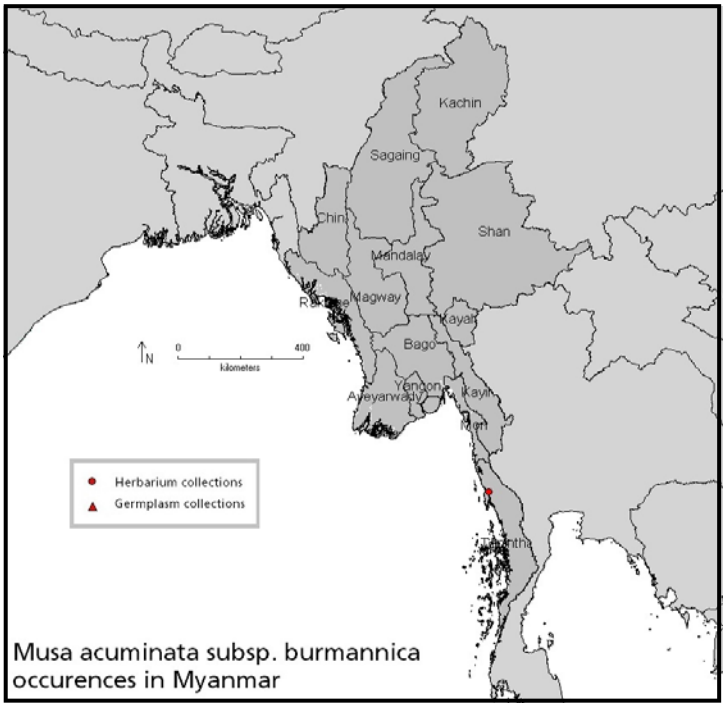
No info available

Distribution:

Native to Myanmar and Thailand.

Altitude: Unknown

Musa acuminata subsp. burmannica	May be confused with: *Other Musa acuminata subspecies*
Distinguished by yellowish and waxless foliage, light brown markings on the pseudostem and by its compact pendulous bunch and strongly imbricate purple bracts.	



All populations priority for collection

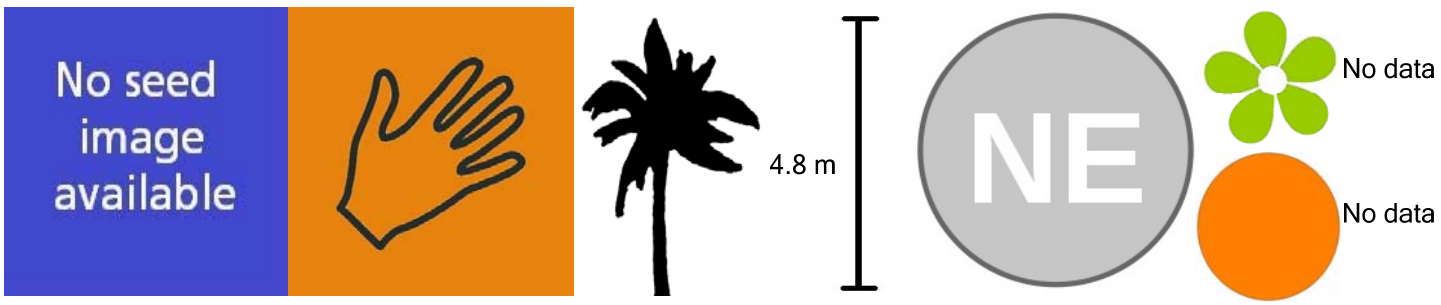
No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

References:

Adapting Agriculture to Climate Change Project, 2013. Myanmar Crop Wild Relatives Seed Collecting Guide. Compiled by Ruth Harker, RBG Kew

Musa acuminata subsp. burmannica N.W.Simmonds

Gene Pool Primary relative of Musa acuminata Colla



MUSACEAE

Musa balbisiana var. balbisiana Colla

Primary Gene Pool relative of Musa acuminata Colla

HABIT: Pseudostems clumped, yellow-green, often with large, black markings, ca. 6 m. Petiole 60-75 cm, margin open, ca. 2 cm wide, often closed when young; leaf blade adaxially green and slightly pruinose or not, ovate-oblong, ca. 2.9 m × 90 cm, base auriculate, asymmetric.
INFLORESCENCES: Pendulous, ca. 2.5 m; peduncle and rachis glabrous. Bracts of bisexual and male flowers adaxially purple-red, abaxially brownish purple to yellow-green and pruinose, ovate to lanceolate, persistent, apex obtuse, reflexed after flowering; bracts of female flowers deciduous. Male flowers up to 20 per bract, in 2 rows. Compound tepal adaxially pale purple, abaxially pale purple-white, 4-5 cm, striate, teeth yellow to orange; free tepal milky white, translucent, obovate, ca. 1/2 as long as compound tepal, apex emarginate, shortly mucronate-apiculate.
INFRUCTESCENCES: Pendulous, with ca. 8 clusters ('hands') each of 15 or 16 berries in 2 rows.
FRUIT grey-green, obovoid, ca. 13 × 4 cm, distinctly angled at maturity, base narrowed into a stalk ca. 2.5 cm, apex contracted or not into a short, angled column ca. 2 cm.
SEEDS numerous, brown, oblate, 5-10 mm in diam., minutely warty.

Habitat:

Ravines in evergreen forests

Distribution:

China, Papua New Guinea, Southcentral and Southeastern Asia.

Altitude: 0 -1100 m

Musa balbisiana var. balbisiana	May be confused with: *Musa balbisiana var bakeri*
Up to 6m tall.	Up to 3 m tall.

Reported from Myanmar , but no localities known

All populations priority for collection

No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

References: Kuo, M.L. (ed.) (2012). Flora of Taiwan , ed. 2, Suppl.: 1-414. Editorial Committee of the Flora of Taiwan, Second Edition, National Taiwan University

MUSACEAE

Musa balbisiana var. balbisiana Colla

Primary Gene Pool relative of Musa acuminata Colla

up to 6 m

NE

Dec - May

Dec - May

MUSACEAE

Musa yunnanensis Hakkinen & H.Wang

Secondary relative of Musa acuminata Colla, Secondary relative of Musa balbisiana Colla — **Yunnan banana or wild forest banana**

HABIT: Herbaceous plant up to 5 m tall. The stem is a pseudostem, formed by tightly packed leaf sheathes, underlying color light green with purple black blotches, waxy, sap watery.
LEAVES: Large, paddle-shaped, solid green-colored. Petiole to 70 cm, waxy, petiole margins curved inward with purple black sparse blotching, petiole bases winged and clasping the pseudostem, very waxy; leaf habit intermediate, lamina to 250 X 60 cm, narrowly elliptic, truncate at the apex, green adaxially, medium green abaxially, appearance dull, surface partially covered with a waxy coating, leaf bases symmetric, both sides rounded and auriculate.
INFLORESCENCE: Consists of small yellow flowers and purple bracts, at first horizontal and then falling vertically down ward, peduncle to 45 X 4 cm, very pubescent with short hairs.
FLOWER: Purple
FRUIT: Fruit bunch lax, with 8 hands and 15 fruits per hand on average, in 2 rows, individual fruit ca. 8 cm, curved with a pronounced ridge, pedicel ca. 22 mm, glabrous, fruit apex rounded, without relictual floral remains, immature peel color green, becoming light yellowish green with black blotches and splitting lengthwise at maturity, immature fruit pulp white, becoming white and soft at maturity.
SEEDS: Nearly flat, wrinkled, ca. 3.5 mm diam., 80 to 100 seeds per fruit.

Habitat:

Moist Soils, Well-Drained Soils.

Distribution:

Native to China and Myanmar.

Altitude: 1100 - 1200 m

Musa yunnanensis	May be confused with: *Musa acuminata subsp. burmannica*
Sap watery; petiole margins curved inward; leaf bases auriculate; peduncle pubescent with short hairs; bracts red-purple externally, cream internally, with sharp yellowish apex, not imbricate.	Sap milky; petiole margins erect; leaf bases rounded; peduncle glabrous, bracts blue-purple externally, dark red internally, with obtuse cream apex, imbricate.

Reported from Myanmar , but no localities known

All populations priority for collection

No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

References: Novon, Vol. 17, No. 4 (Dec., 2007), pp. 440-446, https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=7190

Musa yunnanensis Hakkinen & H.Wang

Secondary relative of Musa acuminata Colla, Secondary relative of Musa balbisiana Colla

Yunnan banana or wild forest banana

Courtesy Plant Delights Nursery, Inc. plantdelights.com

No seed image available

0-5 m

NE

No data

No data

POACEAE

Eleusine indica (L.) Gaertn.

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

Capim-pé-de-galinha; Pé-de-galinha

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

Habitat:

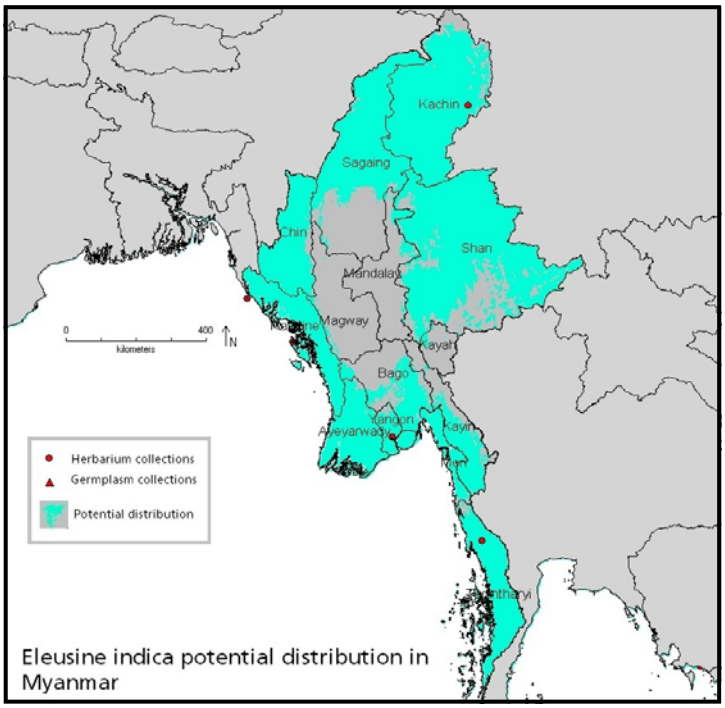
In open anthropic areas, grasslands and savannas in the Amazon Rainforest, Caatinga, Cerrado, Atlantic Rainforest and Pampa phytogeographic domains.

Distribution:

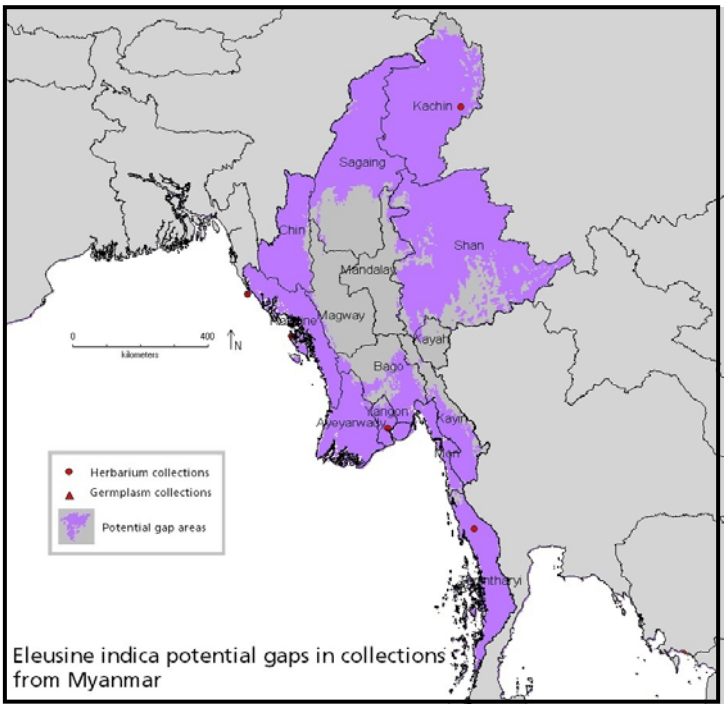
Widespread throughout Africa, the Americas, Southern Europe, Asia and Australasia. In Brazil in the North (AC, AM, AP, PA, RO, RR, TO); Northeast (AL, BA, CE, MA, PB, PE, PI, RN, SE); Central West (DF, GO, MS, MT); Southeast (ES, MG, RJ, SP), and South (PR, RS, SC).

Altitude: 0 - 1200 m

Eleusine indica	May be confused with: *Eleusine tristachya*
Spikes usually more than 3 cm long, usually less than 7 mm broad; backs of lemmas usually straight or very slightly curved towards apex.	Spikes less than 3 cm, 7-10 mm broad; backs curved inward towards lemma.



Eleusine indica potential distribution in Myanmar



Eleusine indica potential gaps in collections from Myanmar

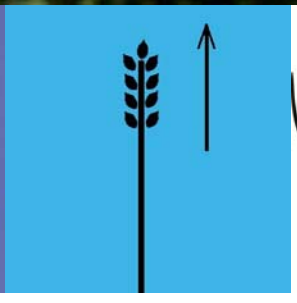
References: GrassBase - The Online World Grass Flora. http://www.kew.org/data/grasses-db.html
Eleusine in Flora do Brasil 2020. JBRJ. http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB13192

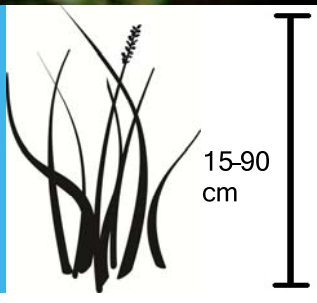
POACEAE

Eleusine indica (L.) Gaertn.

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

Capim-pé-de-galinha; Pé-de-galinha





POACEAE

Oryza meyeriana var. granulata (Watt) Duist.

Tertiary Gene Pool relative of Oryza glaberrima Steud. and Oryza sativa L. **Jungle rice**

HABIT: Perennial, loosely tufted or sometimes shortly stoloniferous. Culms erect or ascending, 0.3-0.7m tall.
LEAVES: Leaf sheaths shorter than internodes, auricles ciliate; leaf blades thin, 5–20 × 0.6–2 cm, inrolled when dry, abaxial surface smooth, adaxial surface scabrid along veins, margins scabrid, base rounded, narrowed at insertion, apex acuminate; ligule 1–2 mm.
INFLORESCENCES: Panicle narrow, erect, 3–15 cm; branches 2–5, inserted singly, 2–6 cm, unbranched, ascending, bearing few spikelets. Spikelets elliptic-oblong, 5–6.5 mm, length 2–3 times width, light green or gray; sterile lemmas narrowly lanceolate, slightly unequal, ca. 1 mm; fertile lemma irregularly granular, flanks sulcate, apex obtuse or shortly 3-toothed, awnless. Anthers 3.5–4.5 mm.
FRUIT: Caryopsis brown.

Habitat:

Hill forests, on well drained soils and damp places by streams.

Distribution:

China, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand

Altitude: 500 - 1000 m

Oryza meyeriana var. granulata	May be confused with: *Oryza meyeriana var. meyeriana*
Spikelets 5 - 6.5 mm; length 2-3 times width.	It has longer, (6–)7–10 mm spikelets, with length 3–6 × width.

Reported from Myanmar , but no localities known

All populations priority for collection

No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

References: FOC Vol. 22 Page 183

Adapting Agriculture to Climate Change Project, 2013. Myanmar Crop Wild Relatives Seed Collecting Guide. Compiled by Ruth Harker, RBG Kew

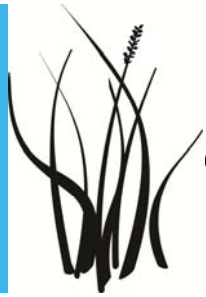
Oryza meyeriana var. granulata (Watt) Duist.

Tertiary Gene Pool relative of Oryza glaberrima Steud. and Oryza sativa L.

Jungle rice

RBG Kew

No seed image available



0.3-0.7 m

NE

All year

All year

Oryza officinalis Wall.

Secondary Gene Pool relative of Oryza sativa L and Oryza glaberrima Steud.

HABIT: Perennial. Culms erect or creeping and rooting at lower nodes, 1.5–3 m tall, 7–10 mm in diam.
LEAVES: Leaf sheaths more than 3 times internode length, auricles inconspicuous; leaf blades thick, 30–50 × 2–3 cm, abaxial surface and margins scabrous, adaxial surface scattered villous, midrib stout, lateral veins inconspicuous, base narrowed, puberulous, apex acuminate; ligule 1–4 mm.
INFLORESCENCE: Panicle loosely contracted, 30–50 cm, base often included in terminal sheath; branches 3–5 at lowest node, axils bearded, longest 10–25 cm, naked in lower half, apices of lowermost branches drooping. Spikelets broadly ovate-oblong, 4–5 mm, length 1.5–2 times width, yellowish green or tinged brownish black, deciduous; sterile lemmas linear-lanceolate, 1.5–2 mm, apex acuminate; fertile lemma papillose, keel and marginal veins with hard glassy hairs; awn 5–10(–25) mm, slender, scabrid. Anthers 1.5–2.5 mm.
FRUIT: Caryopsis reddish brown

Habitat:

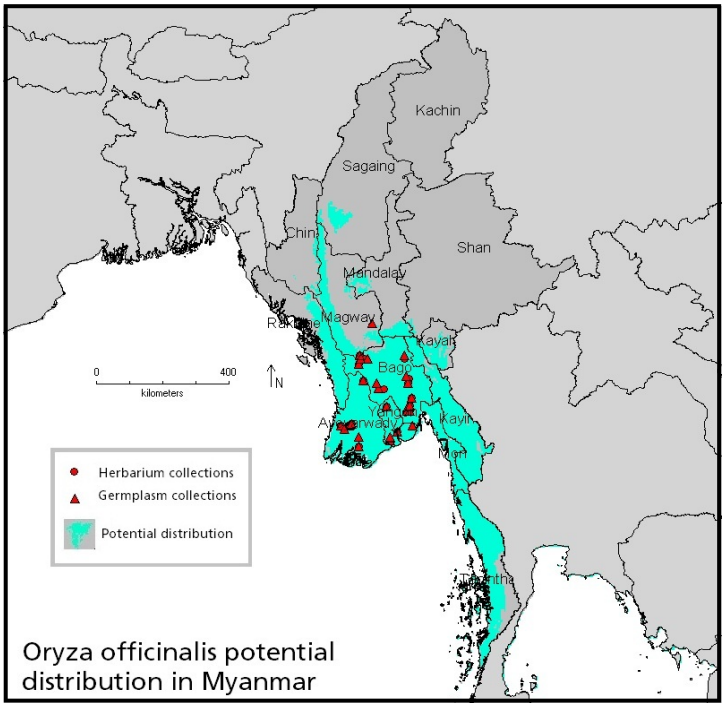
Low hills, alluvial plains, ditch banks.

Distribution:

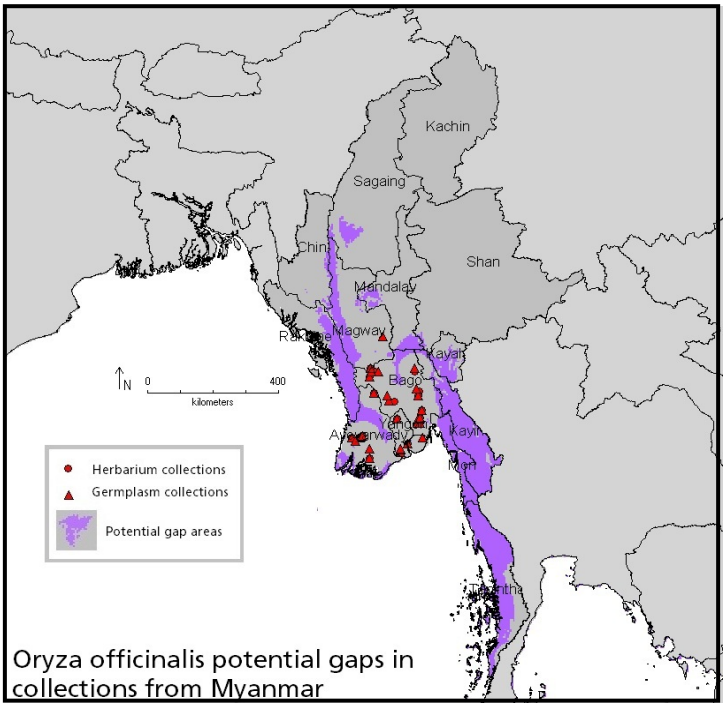
China, Bhutan, Cambodia, India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam.

Altitude: 0 - 1000 m

Oryza officinalis	May be confused with: *Oryza minuta*
Lower panicle branches naked in lower half, and branches drooping. Spikelet length 1.5 - 2 x width.	Differs only slightly morphologically, the lowermost panicle branches having a shorter naked portion and ascending at the tip. It also has proportionately narrower spikelets with length 2–2.7 × width.



Oryza officinalis potential distribution in Myanmar



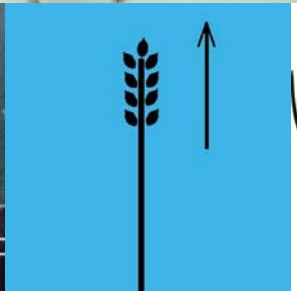
Oryza officinalis potential gaps in collections from Myanmar

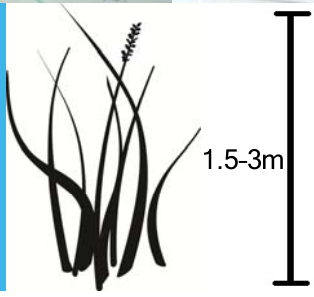
References: Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200025785

POACEAE

Oryza officinalis Wall.

Secondary Gene Pool relative of Oryza sativa L and Oryza glaberrima Steud.





LC

Jul - Mar

Jul - Mar

Oryza ridleyi Hook.f.

Tertiary Gene Pool relative of Oryza sativa L. and Oryza glaberrima Steud.

HABIT: Perennial. Culms 100–150 cm long.
LEAVES: Leaf-sheaths smooth, glabrous on surface. Leaf-blades 15–30 cm long, 15–25 mm wide, surface smooth, margins scabrous, apex acuminate. Ligule an eciliate membrane, 3–5 mm long.
INFLORESCENCES: Panicle open, elliptic, 25–35 cm long, 10–15 cm wide, primary branches ascending, simple, scaberulous, 6–12 cm long. Spikelets appressed. Pedicels of fertile spikelets linear, angular, tip cupuliform. Fertile spikelets comprising 2 basal sterile florets and 1 fertile floret, without rhachilla extension. Spikelets oblong, laterally compressed, 8–9 mm long, 2–5 mm wide, falling entire. Glumes both absent or obscure. Basal sterile florets similar, barren; without significant palea. Lemma of lower sterile floret subulate, 6–7.5 mm long, 0.8 length of spikelet; scaberulous. Lemma of upper sterile floret subulate, 6–7.5 mm long, 1 length of lower sterile floret. Fertile lemma elliptic, laterally compressed, 7–8 mm long, coriaceous, keeled, 5 -veined. Lemma surface scaberulous, rough on veins, margins interlocking with palea margins, apex awned. Principal lemma awn 4–8 mm long overall. Palea elliptic, 9 mm long, coriaceous, 3 -veined, 1-keeled, keel spinulose. Lodicules 2, membranous, anthers 6, stigmas 2.
FRUIT: Caryopsis with adherent pericarp. Disseminule comprising a floret.

Habitat:

Found in old secondary, evergreen or dipterocarp forest; flooded rainforest; old rubber plantations; dense thickets or open spaces. Grows in marshes or riverbanks near streams in highly organic, friable soil such as decaying tree trunks; commonly in full shade.

Altitude: 0 - 200 m

Distribution:

Cambodia, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, and Thailand.

Oryza ridleyi	May be confused with: *Oryza longiglumis*
Sterile lemma shorter than palea and lemma.	Sterile lemma as long or longer than fertile lemma.

Reported from Myanmar , but no localities known

All populations priority for collection

No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

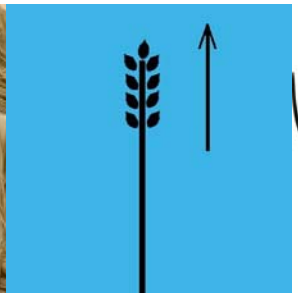
References:

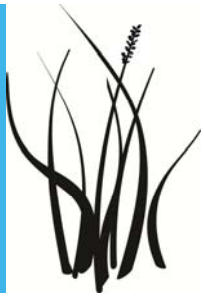
Adapting Agriculture to Climate Change Project, 2013. Myanmar Crop Wild Relatives Seed Collecting Guide. Compiled by Ruth Harker, RBG Kew

Oryza ridleyi Hook.f.

Tertiary Gene Pool relative of Oryza sativa L. and Oryza glaberrima Steud.

RBG Kew herbarium material





1-1.5 m

LC PRELIM

Sep - Dec peak

Sep - Dec peak

Sorghum nitidum (Vahl) Pers.

Tertiary Gene Pool relative of Sorghum bicolor (L.) Moench

HABIT: Perennial forming loose tufts. Culms erect, 0.6–2 m tall; nodes bearded with pale spreading hairs. Leaf sheaths glabrous or pilose.
LEAVES: Leaf blades linear, 10–40(–50) × 0.4–1 cm, glabrous to hispid, bearded at base; ligule 1–1.5 mm.
INFLORESCENCE: Panicle lanceolate in outline, 15–30 cm, glabrous but with soft hairs at the nodes; primary branches whorled, simple, flexuous, 2–5 cm, lower part bare; racemes borne at branch ends, fragile, composed of 2–4 spikelet pairs; internodes and pedicels brown-ciliate. Sessile spikelet ovate-lanceolate, 3.5–5 mm; lower glume leathery, black-brown at maturity, glossy, glabrous below middle, upper part and margins hispid with brown hairs; upper lemma awnless or awned; awn 1–1.5 cm. Pedicelled spikelet usually staminate, elliptic, 3–3.7 mm, papery, light brown.

Habitat:

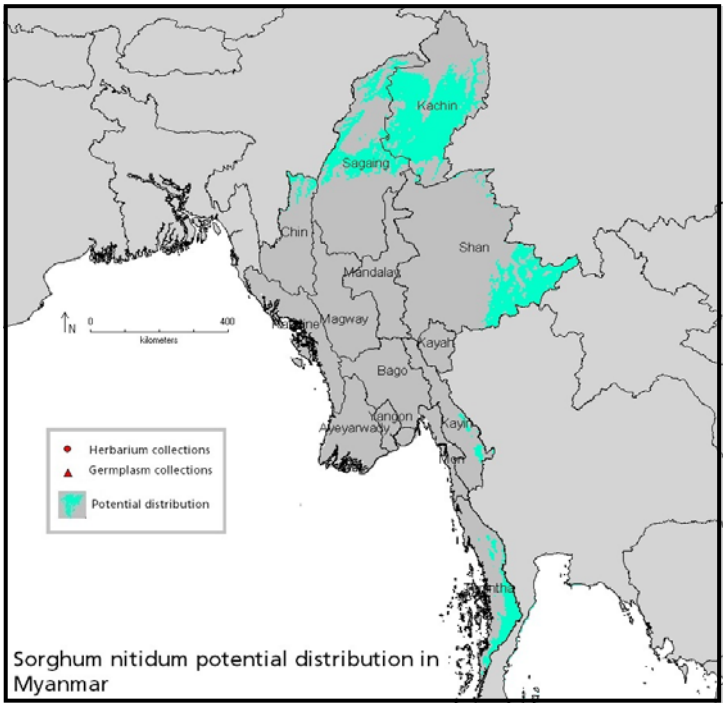
Meadows, grassy hillsides.

Distribution:

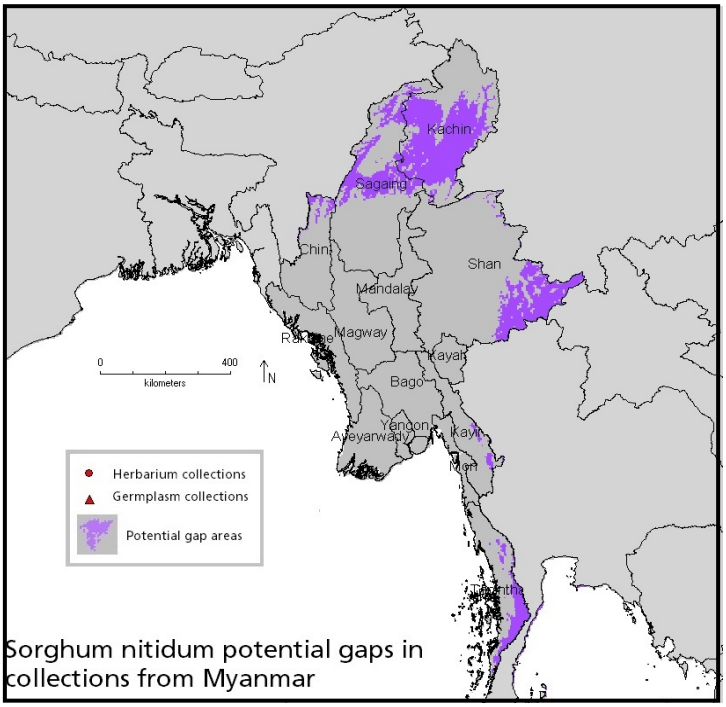
Native to Australia & New Zealand, Eastern Asia, Melanesia, Southcentral Asia and Southeastern Asia.

Altitude: 300-1400 m

Sorghum nitidum	May be confused with: *Sorghum bicolor*
Up to 2 m tall.	3-5 m tall.



Sorghum nitidum potential distribution in Myanmar



Sorghum nitidum potential gaps in collections from Myanmar

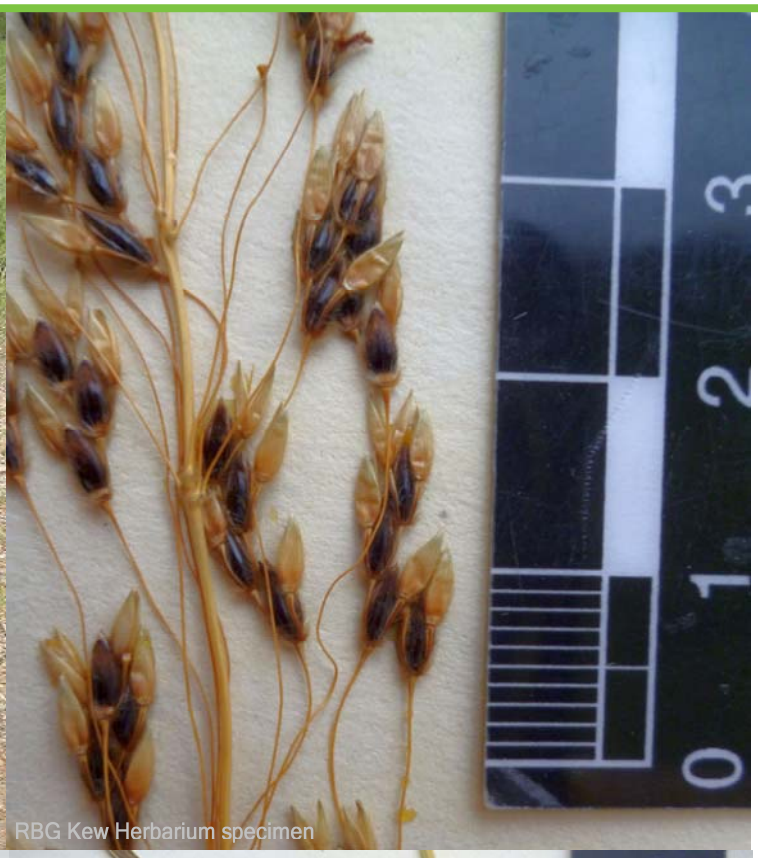
References: Flora of China, Volume 22, p600.

POACEAE

Sorghum nitidum (Vahl) Pers.

Tertiary Gene Pool relative of Sorghum bicolor (L.) Moench

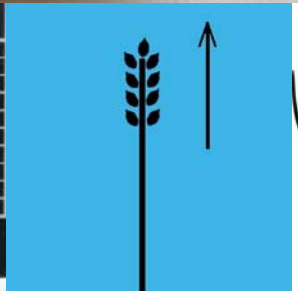

Credit: Wikimedia Commons user Mark Marathon

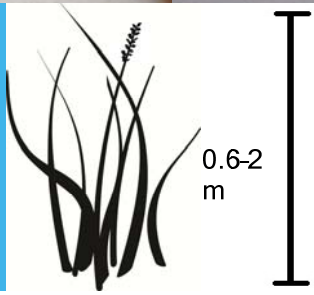

RBG Kew Herbarium specimen


RBG Kew Herbarium specimen


RBG Kew Herbarium specimen

RBG Kew





LC
PRELIM

May - Dec

May - Dec

POACEAE

Sorghum propinquum (Kunth) Hitchc.

Primary Gene Pool relative of Sorghum bicolor (L.) Moench

HABIT: Perennial, loosely tufted with a few stout rhizomes. Culms 1.5–3 m tall, up to 1 cm in diam., many-noded; nodes puberulous.
LEAVES: Leaf sheaths glabrous, ciliate at mouth and margins; leaf blades yellowish green, linear or linear-lanceolate, 40–90 × 3–5 cm, glabrous, midvein robust, margins ciliolate; ligule 0.5–1 mm, puberulous.
INFLORESCENCE: Panicle open, ovate or broadly ovate, 30–55 cm; primary branches in whorls of 3–6; lower part bare, upper part branched, branches tipped by racemes; racemes fragile, composed of 3–7 spikelet pairs. Sessile spikelet ovate, 3.8–4.5 mm; callus obtuse, pubescent with pale hairs; lower glume subleathery, pale or purple-tinged, thinly pilose, 9–13-veined, veins distinct in upper part, apex acute to apiculate or tridenticulate; upper lemma acute or emarginate, awnless, rarely with short awn. Pedicelled spikelet staminate, linear-lanceolate, 4–5.5 mm, yellowish to pale purple.

Habitat:

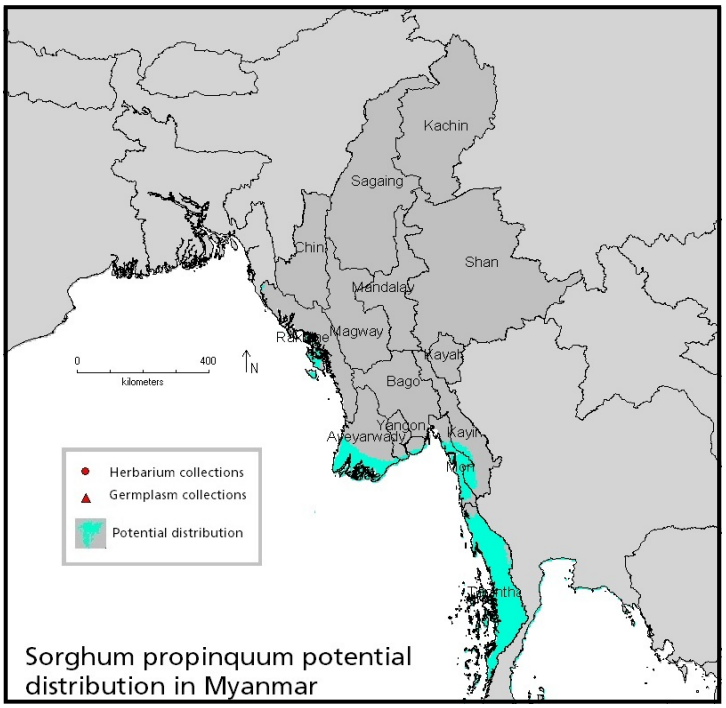
No info available

Distribution:

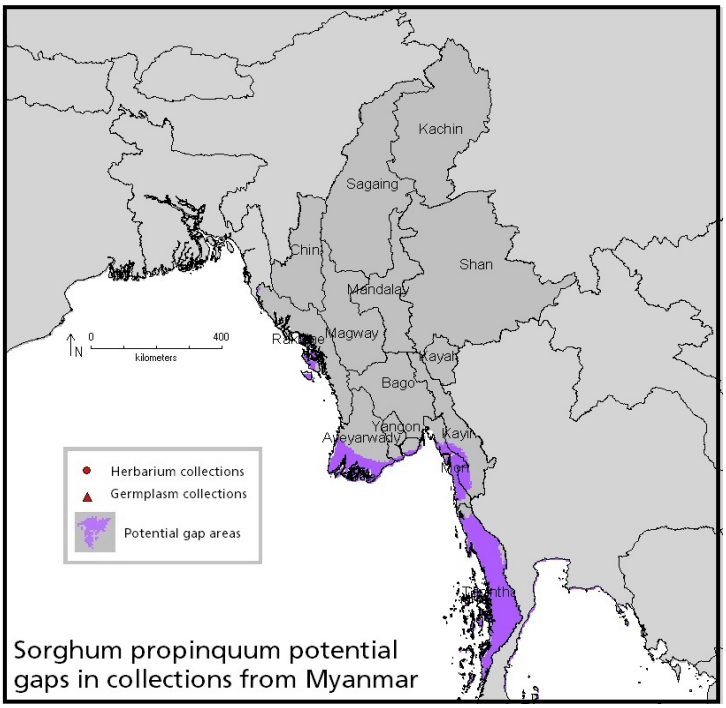
Native to Southcentral and Southeastern Asia.

Altitude: Unknown

Sorghum propinquum	May be confused with: *Sorghum bicolor*
Perennial. Sessile spikelet pale or purple-tinged.	Annual. Sessile spikelet pale creamy-green to dark brown or blackish at maturity.



Sorghum propinquum potential distribution in Myanmar



Sorghum propinquum potential gaps in collections from Myanmar

References:

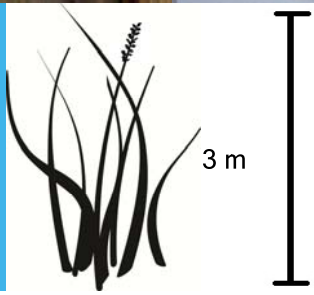
Adapting Agriculture to Climate Change Project, 2013. Myanmar Crop Wild Relatives Seed Collecting Guide. Compiled by Ruth Harker, RBG Kew

POACEAE

Sorghum propinquum (Kunth) Hitchc.

Primary Gene Pool relative of Sorghum bicolor (L.) Moench

No seed image available



LC PRELIM

Feb - Nov

Feb - Nov

Malus yunnanensis C.K.Schneid.

Gene Pool Secondary relative of Malus domestica Borkh.

Trees to 10 m tall. Branchlets dark purple or purplish brown when old, terete, robust, tomentose when young, glabrous when old; buds dark purple, ovoid, glabrous or scales sparsely puberulous at margin. Stipules caducous, linear, 6–8 mm, membranous, white tomentose adaxially, margin sparsely glandular denticulate, apex acute; petiole 2–3.5 cm, tomentose; leaf blade ovate, broadly ovate, or narrowly elliptic-ovate, 6–12 × 4–7 cm, abaxially tomentose or subglabrous, adaxially subglabrous, base rounded or cordate, margin doubly serrate, each side 3–5-lobed, apex acute. Corymb umbel-like, 5–9 cm in diam. 8–12-flowered; bracts caducous, linear-lanceolate, membranous, adaxially tomentose, margin sparsely glandular denticulate, apex acuminate. Pedicel 1.5–3 cm, tomentose. Flowers ca. 1.5 cm in diam. Hypanthium campanulate, abaxially tomentose. Sepals triangular-ovate, 3–4 mm, ca. as long as hypanthium, both surfaces tomentose, margin entire, apex acuminate. Petals white, suborbicular, ca. 8 mm, base shortly clawed, apex rounded. Stamens 20–25, unequal, slightly shorter than petals. Ovary 5-loculed, with 2 ovules per locule; styles 5, nearly as long as stamens, glabrous basally. Pome red or yellow, globose, 1–1.5 cm in diam., white punctate; fruiting pedicel 2–3 cm; sepals persistent.

Habitat:

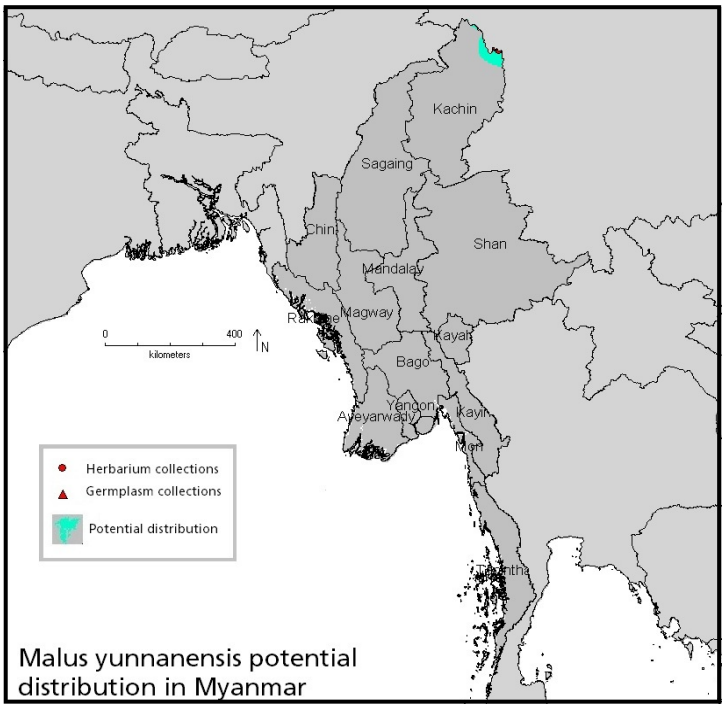
Mixed forests on slopes or by streams in valleys

Distribution:

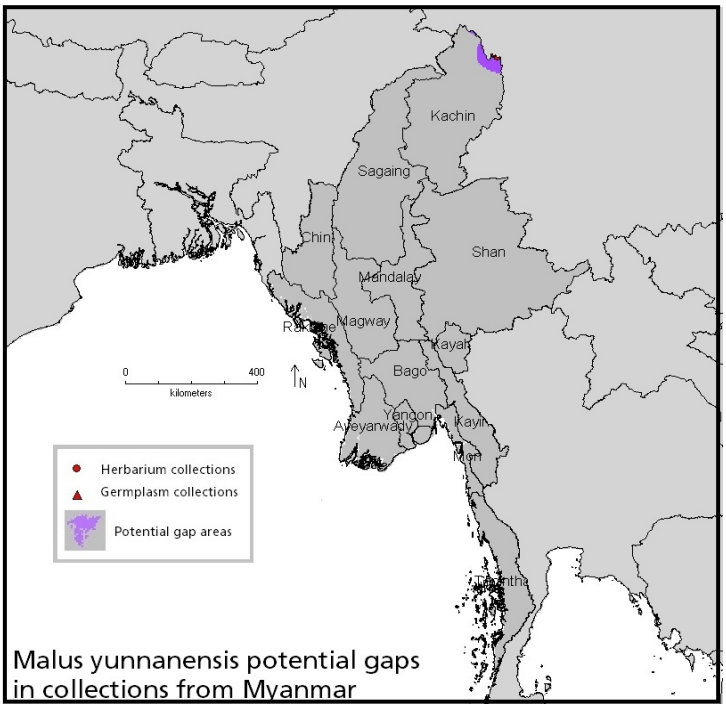
Native to China and Myanmar.

Altitude: 1600 - 2800 m

Malus yunnanensis	May be confused with: *Malus baccata*
Styles nearly as long as stamens. Fruit 1-1.5 cm diameter. Sepals persistent.	Styles longer than stamens. Fruit smaller than M. yunnanensis 8-10 mm in diameter. Sepals not persistent.



Malus yunnanensis potential distribution in Myanmar



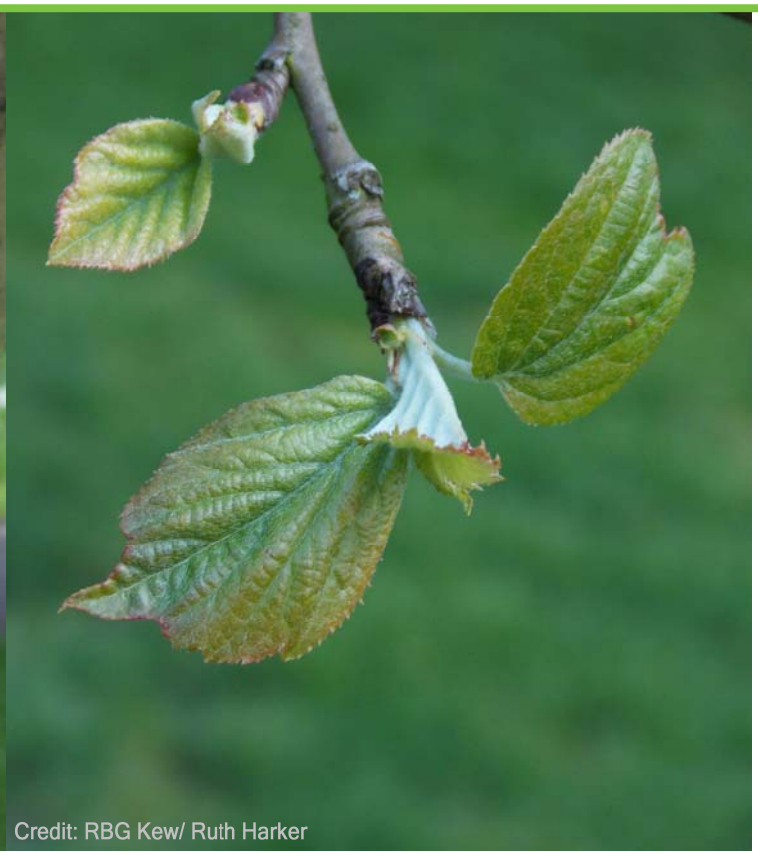
Malus yunnanensis potential gaps in collections from Myanmar

References: FOC Vol. 9 Page 188

ROSACEAE

Malus yunnanensis C.K.Schneid.

Gene Pool Secondary relative of Malus domestica Borkh.



No seed image available

10 m

DD

May

Aug - Sep

Solanum virginianum L.

Tertiary Gene Pool relative of Solanum melongena L.

Yellow-fruit nightshade

HABIT: Herbs erect or creeping, sometimes woody at base, 0.5-0.7 m tall, copiously armed with sturdy, needlelike, broad-based prickles 0.5-2 cm × 0.5-1.5 mm, pubescent with 7-9-rayed stellate hairs, overall glabrescent.
LEAVES: Unequal paired; petiole 2-3.5 cm, prickly, with sessile stellate hairs; leaf blade ovate-oblong, 4-9 × 2-4.5 cm, pubescent and prickly along veins, glabrescent, base subcordate or unequal, margin usually 5-9-lobed or pinnately parted, lobes unequal, sinuate, apex acute.
INFLORESCENCE: Elongate racemes 4-7 cm, peduncle unbranched, copiously armed. Pedicel ca. 1 cm.
FLOWER: Calyx campanulate, ca. 1 cm in diam.; lobes oblong, pubescent, prickly. Corolla blue-purple, rotate, 1.4-1.6 × 2.5 cm; lobes ovate-deltate, 6-8 mm, densely pubescent with stellate hairs. Filaments ca. 1 mm; anthers ca. 8 mm. Style ca. 1 cm.
FRUIT: Fruiting pedicel 2-3.6 cm, with prickles and sparse stellate hairs. Fruiting calyx prickly, sparsely pubescent. Berry pale yellow, 1.3-2.2 cm in diam.
SEEDS: Subreniform, ca. 1.5 mm in diam.

Habitat:

Sandy river beaches.

Distribution:

China, Afghanistan, India, S Japan, Malaysia, Nepal, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Pacific Islands.

Altitude: 100 -1300 m

Solanum virginianum	May be confused with: *Solanum violaceum*
Prickles straight and needle-like. Berry pale yellow. 	Prickles recurved. Berry orange. 

Reported from Myanmar , but no localities known

All populations priority for collection

No accessions from Myanmar listed on Germplasm Resources Information Network (GRIN) [online database] for this taxon

References: Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200020613

SOLANACEAE

Solanum virginianum L.

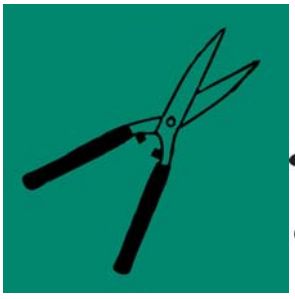
Tertiary Gene Pool relative of Solanum melongena L.

Yellow-fruit nightshade


Credit: Sandy Knapp


Credit: Sandy Knapp

Gemma Toothill (c) Board of Trustees RBG Kew



0.5-0.7 m

LC

PRELIM

Nov - May

Jun - Sep

Appendix - Synonyms

Taxon	Sheet	Synonyms
Cajanus crassus (Prain ex King) Maesen:	1	Atylosia crassa Prain ex King; Atylosia volubilis (Blanco) Gamble; Cantharospermum volubile (Blanco) Merr.; Cantharospermum volubilis (Blanco) Merr.
Musa acuminata subsp. burmannica Colla:	2	Musa acuminata var. burmannicoides De Langhe
Musa balbisiana var. balbisiana :	3	Musa dechangensis J. L. Liu & M. G. Liu; Musa lushanensis J. L. Liu; Musa luteola J. L. Liu; Musa paradisiaca Linnaeus subsp. seminifera (Loureiro) Baker; Musa seminifera Loureiro.
Musa yunnanensis Häkkinen & H.Wang:	4	
Eleusine indica (L.) Gaertn.:	5	Agropyron geminatum Schult. & Schult.f.; Chloris repens Steud.; Cynodon indicus (L.) Raspail; Cynosurus ara Buch.-Ham. ex Wall.; Cynosurus indicus L.; Cynosurus pectinatus Lam.; Eleusine distachya Trin. ex Steud.; Eleusine distans Link; Eleusine distans Moench; Eleusine domingensis Sieber ex Schult.; Eleusine glabra Schumach.; Eleusine gonantha Schrank; Eleusine gouinii E.Fourn.; Eleusine inaequalis E.Fourn.; Eleusine indica var. major E.Fourn.; Eleusine indica var. monostachya F.M.Bailey; Eleusine indica var. oligostachya Honda; Eleusine indica var. sandaensis Vanderyst; Eleusine japonica Steud.; Eleusine macrosperma Stokes; Eleusine marginata Lindl.; Eleusine polydactyla Steud.; Eleusine rigidifolia E.Fourn.; Eleusine scabra E.Fourn.; Eleusine textilis Welw.; Juncus loureiroana Schult. & Schult.f.; Leptochloa pectinata (Lam.) Kunth; Paspalum dissectum Kniph.; Poa spicata Willd. ex Steud.; Triticum geminatum Spreng.
Sorghum nitidum (Vahl) Pers.:	6	Andropogon serratus Thunb.; Holcus fulvus R. Br.; Holcus nitidus Vahl; Sorghum fulvum (R. Br.) P. Beauv. ex Rendle.
Sorghum propinquum (Kunth) Hitchc.:	7	Andropogon propinquus Kunth
Malus yunnanensis C.K.Schneid.:	8	

Appendix - Synonyms

Ipomoea cairica (L.) Sweet	9	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.
Cajanus goensis Dalzell	10	Dolichos ornatus Wall. nom. nud.; Atylosia barbata (Benth.) Baker
Cajanus scarabaeoides (L.) Thouars	11	Dolichos scarabaeoides L.; Atylosia pauciflora (Wight & Arnott) Druce; Atylosia scarabaeoides (Linnaeus) Bentham; Atylosia scarabaeoides var. argyrophyllus Y. T. Wei & S. K. Lee; Cajanus scarabaeoides var. argyrophyllus (Y. T. Wei & S. K. Lee) Y. T. Wei & S. K. Lee; Cantharospermum pauciflorum Wight & Arnott; Cantharospermum scarabaeoides (Linnaeus) Baillon; Dolichos medicagineus Roxburgh; Dolichos minutus Wight & Arnott; Rhynchosia biflora Candolle; Rhynchosia scarabaeoides (Linnaeus) Candolle; Stizolobium scarabaeoides (Linnaeus) Sprengel
Oryza meyeriana var. granulata Baill.	12	
Oryza officinalis Wall.	13	Oryza latifolia Desvaux var. silvatica Camus; Oryza minuta Presl var. silvatica (Camus) Veldkamp.
Oryza ridleyi Hook.f.	14	Oryza stenothyrsus K.Schum.
Solanum virginianum L.	15	Solanum xanthocarpum Schrad.; Solanum surattense Burm. f.