

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

Vietnam



Seed Collecting Guide

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: Yellow beans, CREDIT: Neil Palmer/CIAT;
TOP RIGHT: Wild apples, CREDIT: R Harker/RBG Kew;
BOTTOM LEFT: Banana relative, CREDIT: R Harker/RBG Kew;
BOTTOM RIGHT: Rice, CREDIT: Neil Palmer/CIAT

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.

UNIVERSITY OF
BIRMINGHAM



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.

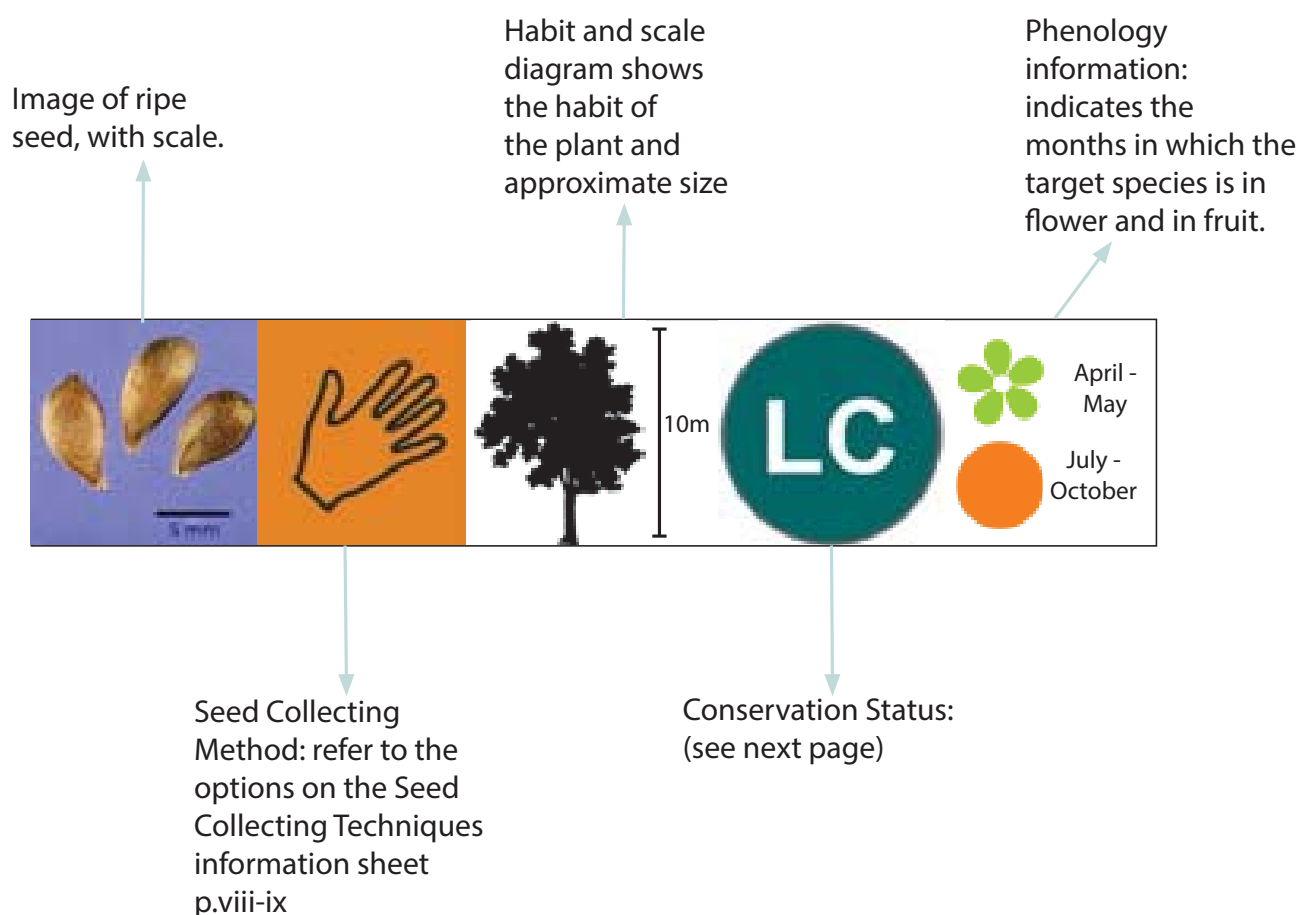
The species included in this guide are a selection of the wild relatives of the 29 key crops which this project covers (African Rice, Alfalfa, Apple, Bambara groundnut, Banana, Barley, Bread Wheat, Butter Bean, Carrot, Chickpea, Common Bean, Cowpea, Eggplant Faba bean, Finger millet, Grasspea, Lentil,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

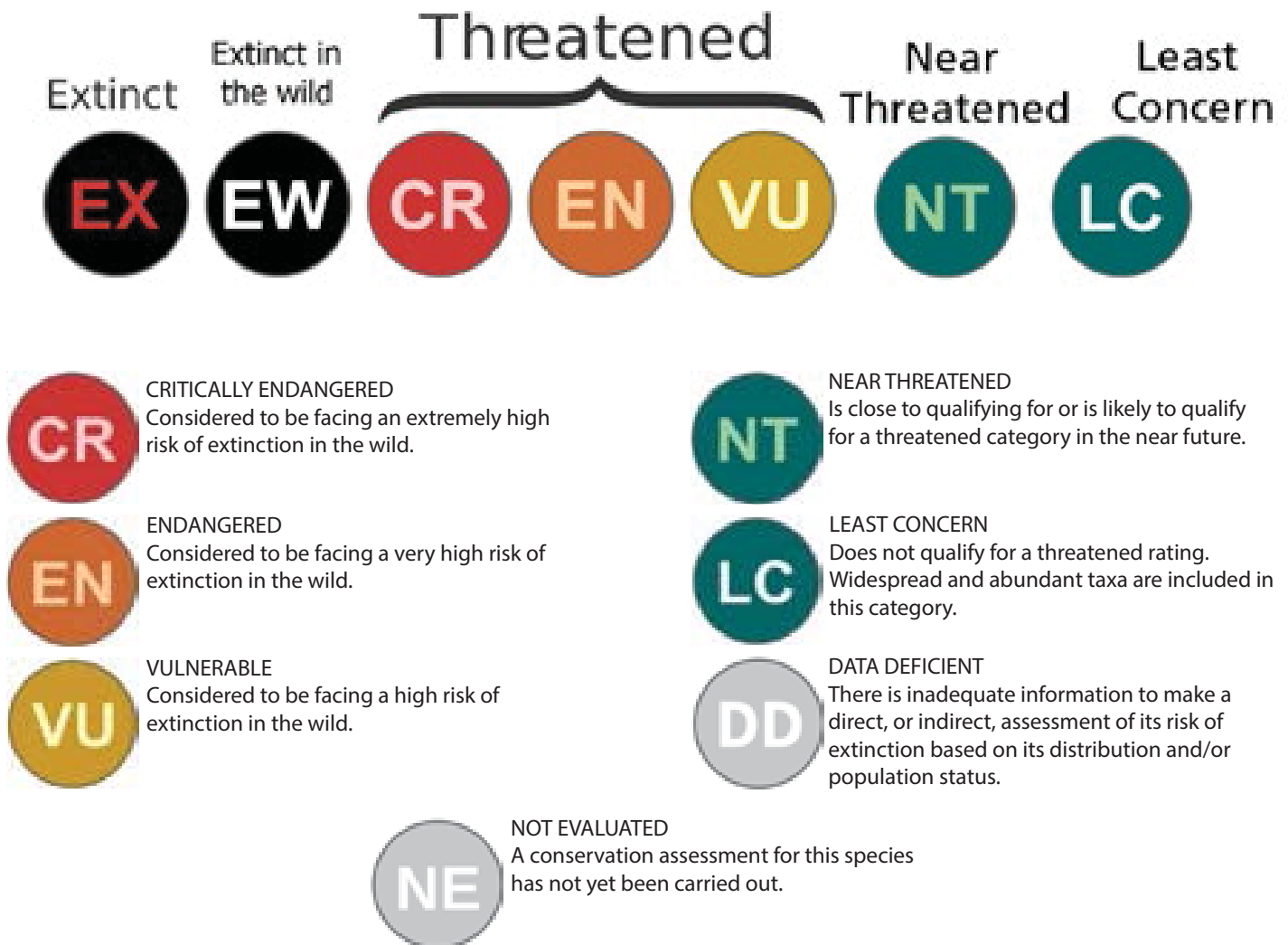
On each species profile, there is a collection of images to help identify the target species, accompanied by a series of symbols :



Conservation Assessments

Conservation Status:

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



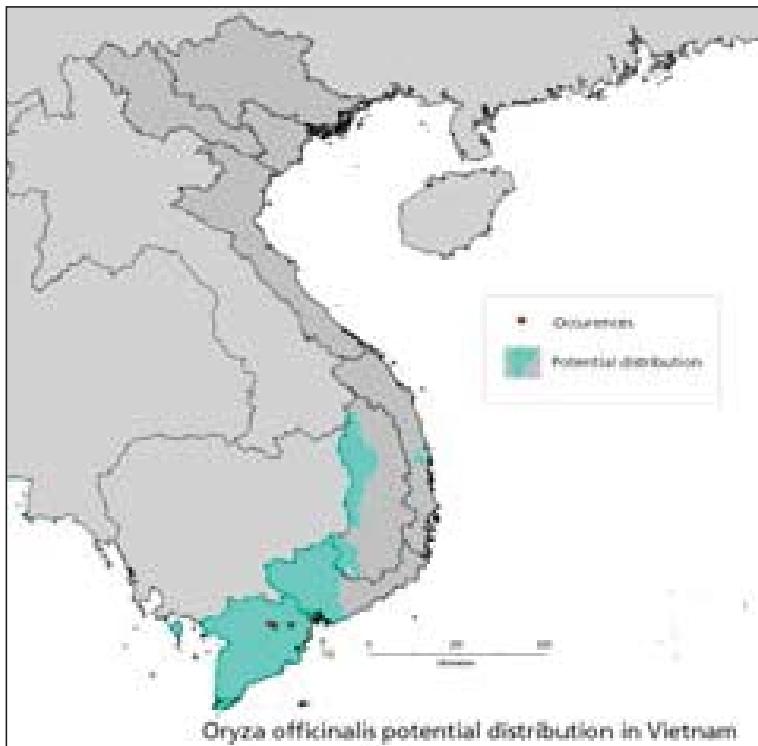
Where a full conservation assessment has not been completed, a preliminary conservation rating may be indicated. Preliminary assessments are produced using specimen locality data and GIS, which calculates two parameters accepted by IUCN as suitable measures of range: namely extent of occurrence (EOO)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

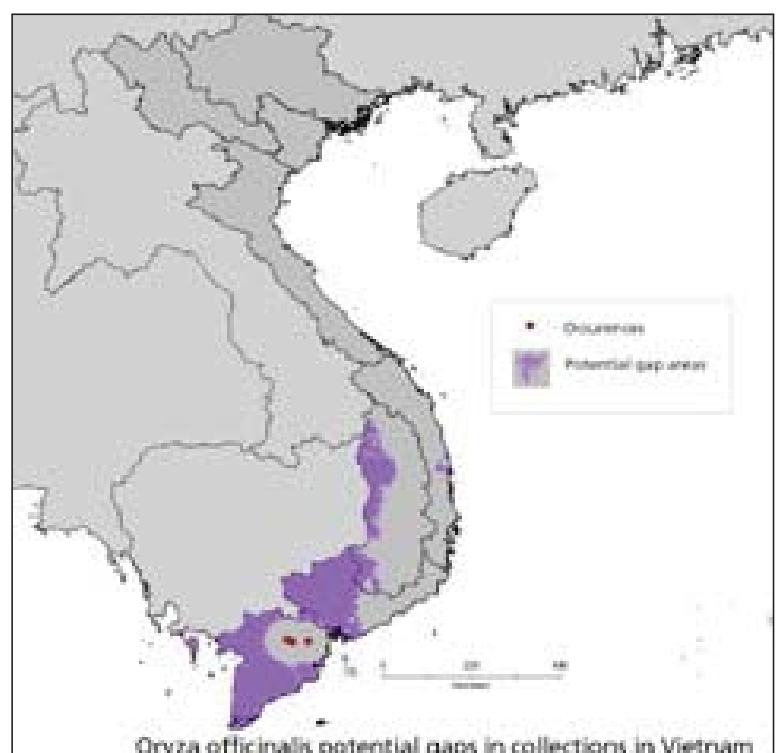


Maps

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, or from the CD accompanying this guide.

[Kew Grassbase interactive identification key](http://www.kew.org/data/grasses-db/ident.htm)

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

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.

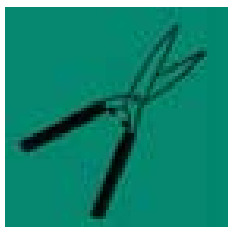


Plucking is particularly suitable when:

- 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.

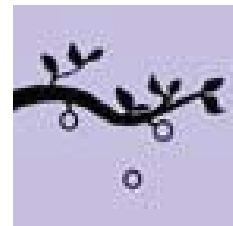


This is a very effective technique when:

- 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

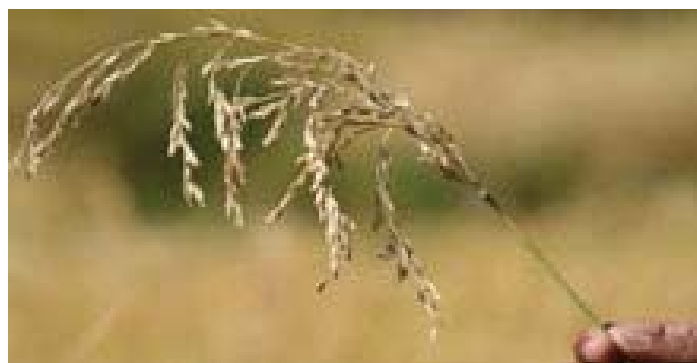
Careful shaking of branches will sometimes dislodge the best available seed, which can be collected in buckets or on a tarpaulin held or spread out beneath the plant. Start with gentle taps, and carefully check each sample of seed dislodged. Light shaking will often dislodge fully ripe fruits and seeds, 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.

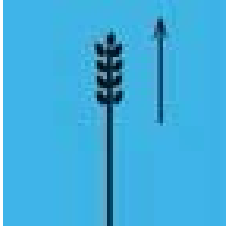
This technique may not be suitable for light, plumed seed from *Bombacaceae* and *Asclepiadaceae*, which may be carried away by air currents.



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.

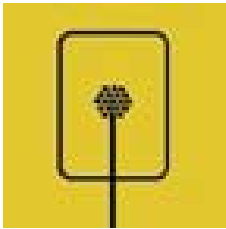


The stripping technique is most suitable for:

- 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.

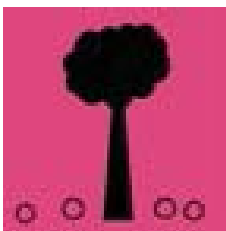
Bagging seed-heads

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.

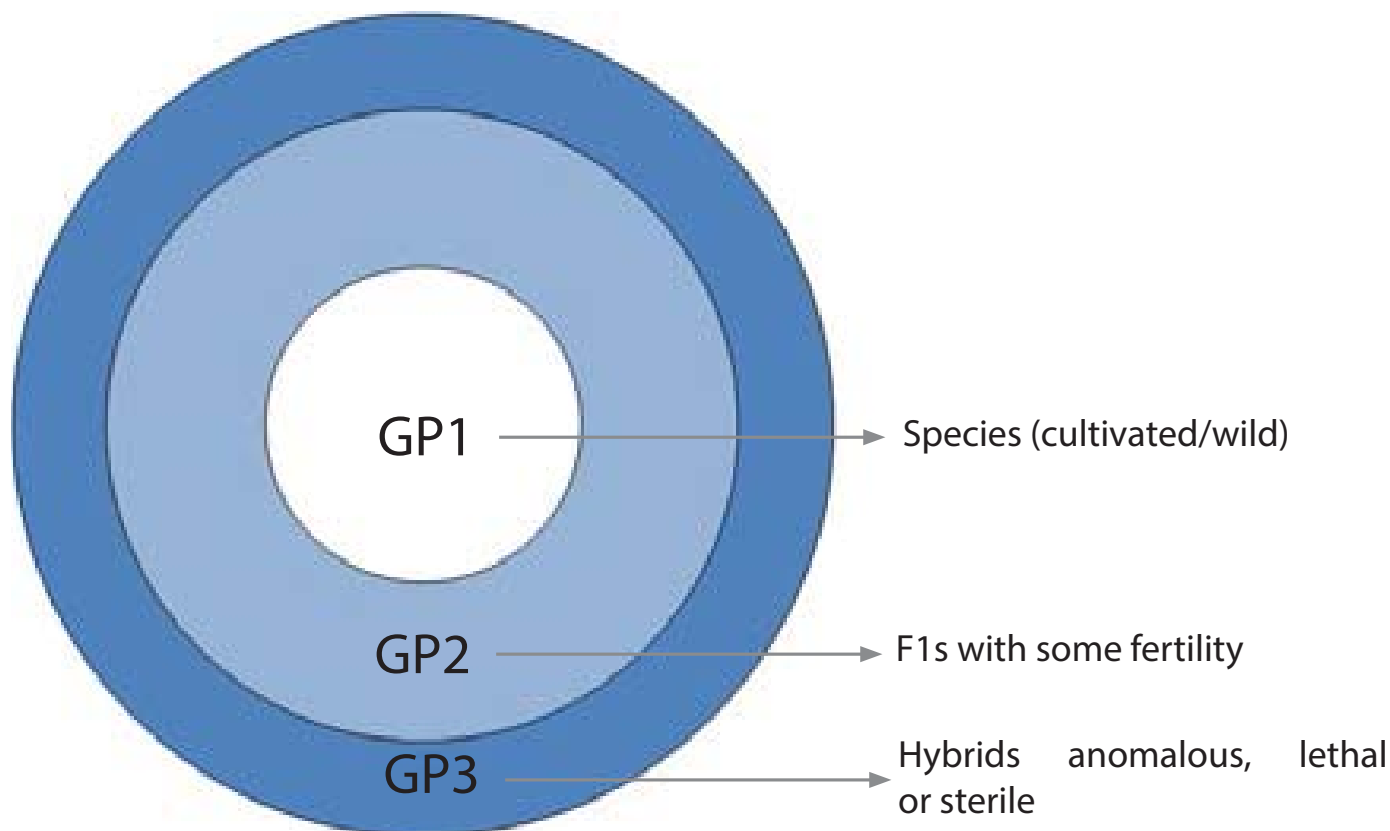
Place collections of dry, ripe seed into cloth or paper bags for transit. Store any awned seed or hooked fruit, that would damage or get stuck in cotton bags, in cardboard boxes or strong paper bags. Never collect or store seeds in plastic bags.

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

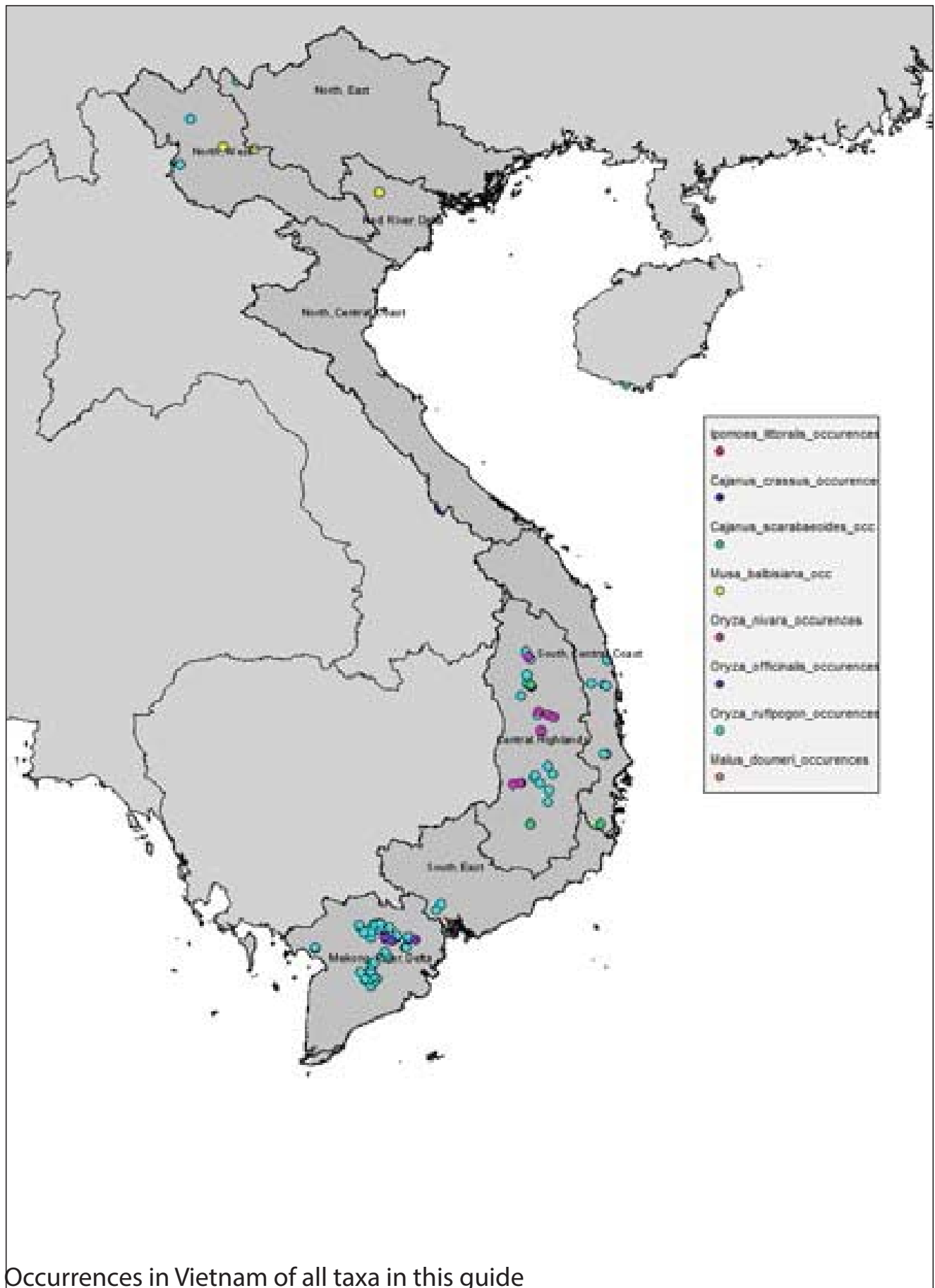
Taxon Group 3 – species in same subgenus as crop

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.

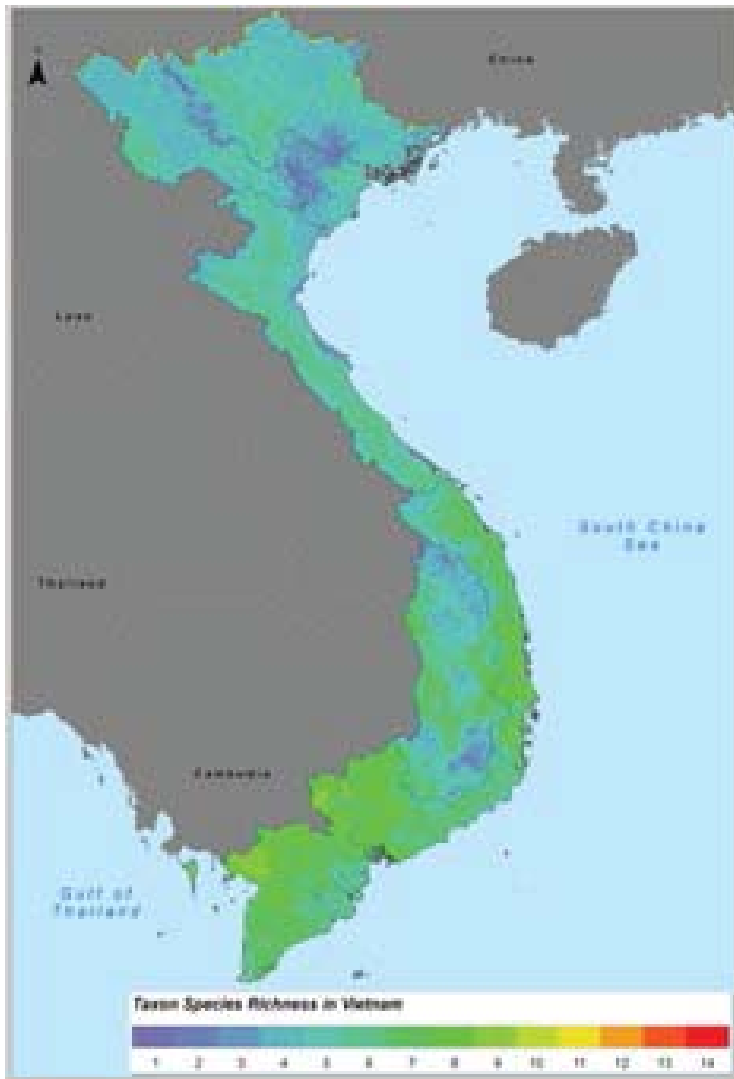
Country Maps

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

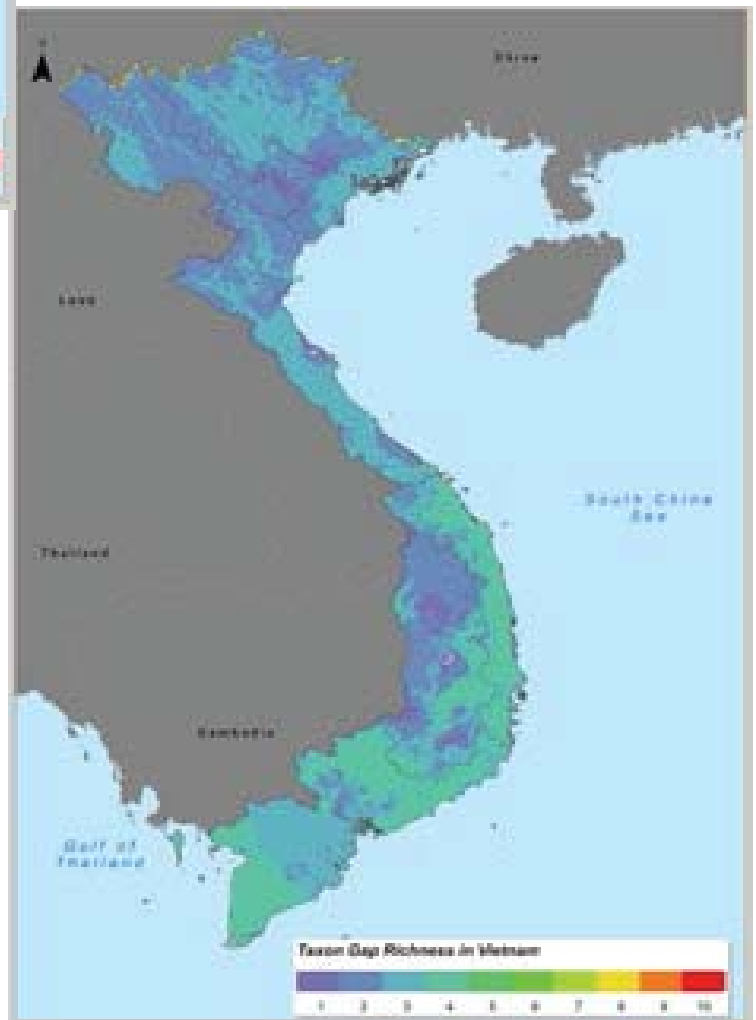


Country Maps

Species richness



Collecting Gaps



Species in this guide

Family	Taxon	Genepool	Collection priority	Sheet
Convolvulaceae	<i>Ipomoea littoralis</i> Blume	Sweet potato	High	1
Leguminosae	<i>Cajanus crassus</i> (King) Maesen	Pigeonpea	High	2
Leguminosae	<i>Cajanus goensis</i> Dalzell	Pigeonpea	Low	3
Leguminosae	<i>Cajanus scarabaeoides</i> (L.) Thouars	Pigeonpea	Low	4
Leguminosae	<i>Vigna dalzelliana</i> (Kuntze) Verdc.	Cowpea	Low	5
Leguminosae	<i>Vigna radiata</i> var. <i>sublobata</i> (Roxb.) Verdc.	Cowpea	Low	6
Leguminosae	<i>Vigna trilobata</i> (L.) Verdc.	Cowpea	Low	7
Leguminosae	<i>Vigna umbellata</i> var. <i>gracilis</i> (Prain) Marechal Mascherpa & Stainier	Cowpea	Low	8
Musaceae	<i>Musa balbisiana</i> Colla var. <i>bakeri</i> (Hook.f.) Häkkinen	Banana	High	9
Musaceae	<i>Musa balbisiana</i> Colla var. <i>balbisiana</i> Colla	Banana	High	10
Musaceae	<i>Musa coccinea</i> Andrews	Banana	Low	11
Musaceae	<i>Musa itinerans</i> Cheesman	Banana	Low	12
Poaceae	<i>Oryza nivara</i> S. D. Sharma & Shastry	Rice	Low	13
Poaceae	<i>Oryza officinalis</i> Wall. ex G. Watt	Rice	Low	14
Poaceae	<i>Oryza rufipogon</i> Griff.	Rice	Low	15
Rosaceae	<i>Malus doumeri</i> (Bois) A. Chev.	Apple	Low	16
Solanaceae	<i>Solanum virginianum</i> L.	Eggplant	Low	17

Phenology table

Taxon	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<i>Ipomoea littoralis</i>												
<i>Cajanus crassus</i>	Green	Green	Orange	Orange								
<i>Cajanus goensis</i>	Green	Orange	Orange	Orange								
<i>Cajanus scarabaeoides</i>									Green	Green	Orange	Orange
<i>Vigna dalzelliana</i> (Kuntze) Verdc.												
<i>Vigna radiata</i> var. <i>sublobata</i>					Green	Orange	Orange	Orange				
<i>Vigna trilobata</i>	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
<i>Vigna umbellata</i> var. <i>gracilis</i>										Green	Orange	
<i>Musa balbisiana</i> var. <i>bakeri</i>												
<i>Musa balbisiana</i> var. <i>balbisiana</i>	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
<i>Musa coccinea</i>						Green	Orange					
<i>Musa itinerans</i>								Green	Orange			
<i>Oryza nivara</i>									Green	Green	Green	Green
<i>Oryza officinalis</i>	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
<i>Oryza rufipogon</i>				Green	Orange	Orange	Orange	Orange	Orange	Green	Orange	
<i>Malus doumeri</i>					Green			Orange				
<i>Solanum virginianum</i>	Green	Green	Green	Green	Green	Orange	Orange	Orange	Orange		Green	Green

KEY



Species in flower



Species in fruit

data gathered from literature and herbarium specimens

HABIT: Perennial herbs, stems prostrate, rooting at nodes, or twining, slender, mostly glabrous.

LEAVES: Petiole 0.5-7 cm, leaf blade ovate to oblong, occasionally circular or reniform, 5-10 x 1-7.5 cm, glabrous or nearly so, base cordate, margin entire or minutely undulate to angular, or \pm 3-lobed, apex acute, obtuse or emarginate, mucronulate.

INFLORESCENCES: Usually 1- flowered, occasionally few-flowered, peduncle 0.1-3 cm; bracts early deciduous, 1-2 mm, pedicel 1-4 cm, glabrous; calyx unequal, glabrous, outer 2 lobes concave, oblong-elliptic, 6-10 mm, apex acute to obtuse, inner 3 lobes elliptic to nearly circular, 0.8-1.2 cm; corolla pink or pink-purple, with a darker center, funnelform, 3-4.5 cm, glabrous; stamens included, filaments unequal, glandular pubescent on basal 1/2; pistil included, ovary glabrous; stigma 2-lobed.

FRUIT: Capsule depressed-globose, 5 x 6-10 mm, calyx lobes persistent at base. Seeds up to 4 per fruit, black, ovoid, 3.5-4 mm, glabrous.

Habitat:

Sandy seashores, coastal thickets, forest floors.

Distribution:

Hainan (Nanhai Zhudao), Taiwan, Cambodia, India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, N Australia, Pacific Islands.

Altitude: 0 - 100 m

<i>Ipomoea littoralis</i>	May be confused with: <i>Ipomoea batatas</i>
Perennial. Although flowers similar size, pedicels are longer 1-4 cm.	Annual. Flowers with pedicel 0.2 - 1 cm.



All populations priority
for collection

No accessions from
Vietnam 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=210000740



No seed image available



several m long

LC PRELIM

Jan - Jul
No data

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:

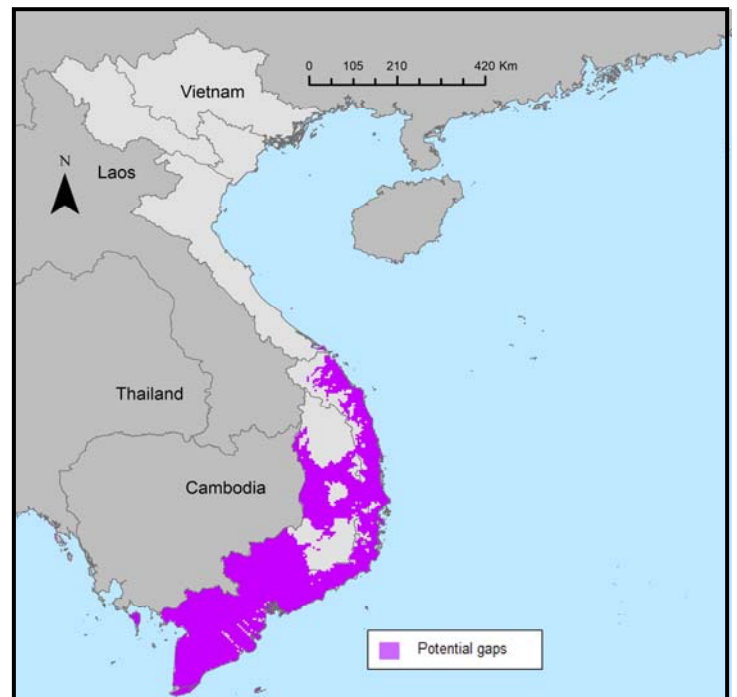
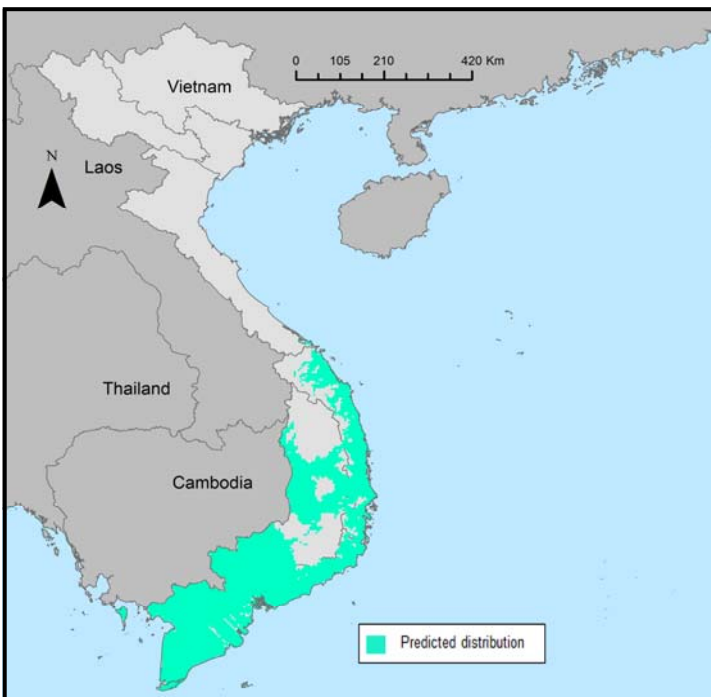
Climber in trees of dry forests (sal, teak, pine) or shrub vegetation, along streams or on dry soils, on alluvium, loam schists, granite rocks.

Distribution:

China, Papua New Guinea, Southcentral and Southeastern Asia.

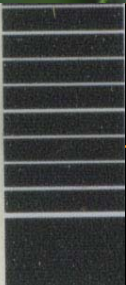
Altitude: 0 - 800 m

<i>Cajanus crassus</i>	May be confused with: <i>Cajanus goensis</i>
End of pod rounded acuminate.	Apex of pod beaked. 



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.

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



Jan - Mar

Jan - Mar

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:

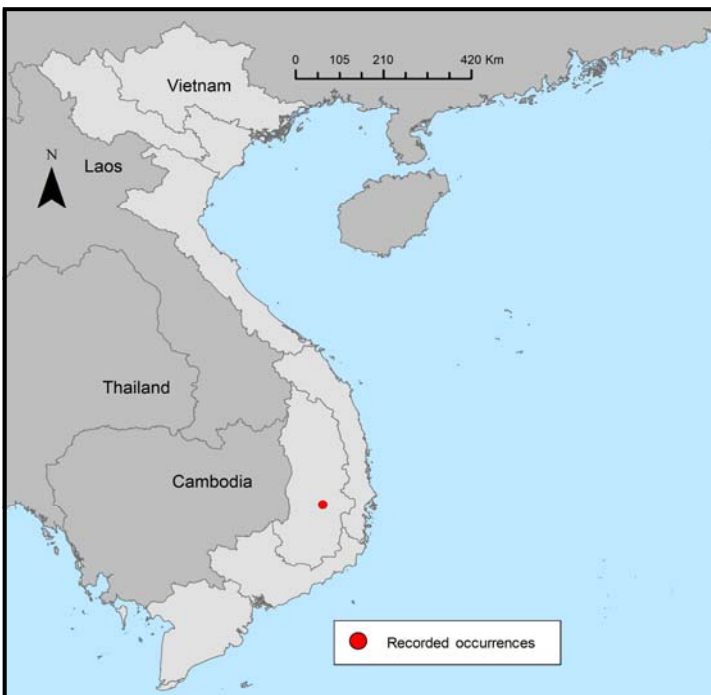
China, Bangladesh, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam.

Altitude: 1000 - 1300 m*Cajanus goensis*May be confused with:
Cajanus crassus

Apex of pod beaked.



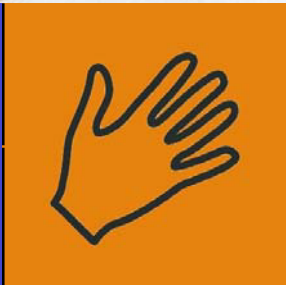
End of pod rounded acuminate.

All populations priority
for collectionNo accessions from
Vietnam 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

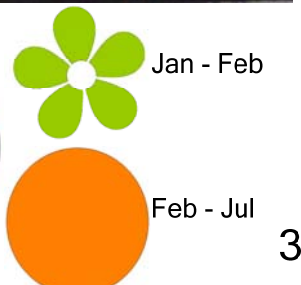
Gene Pool 3 relative of *Cajanus cajan* (L.) Millsp.



No seed image available



several m long



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:

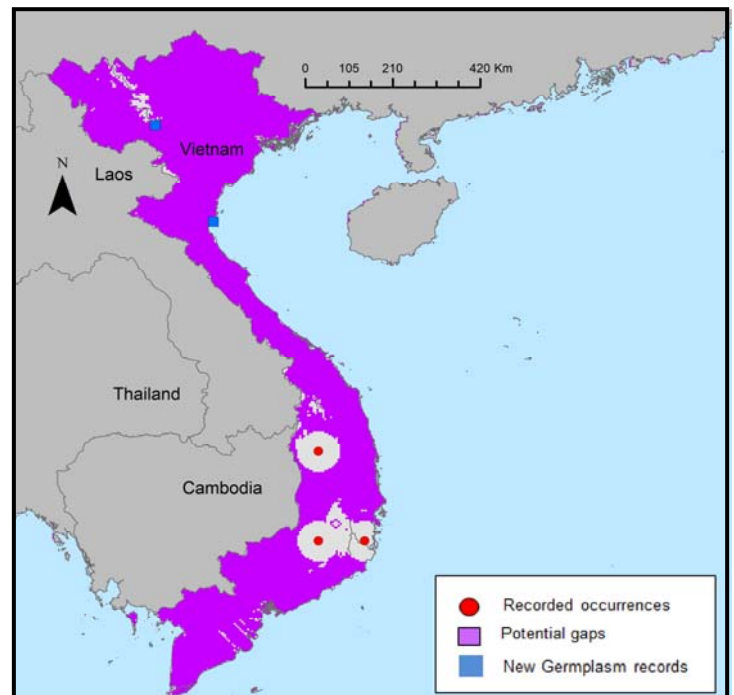
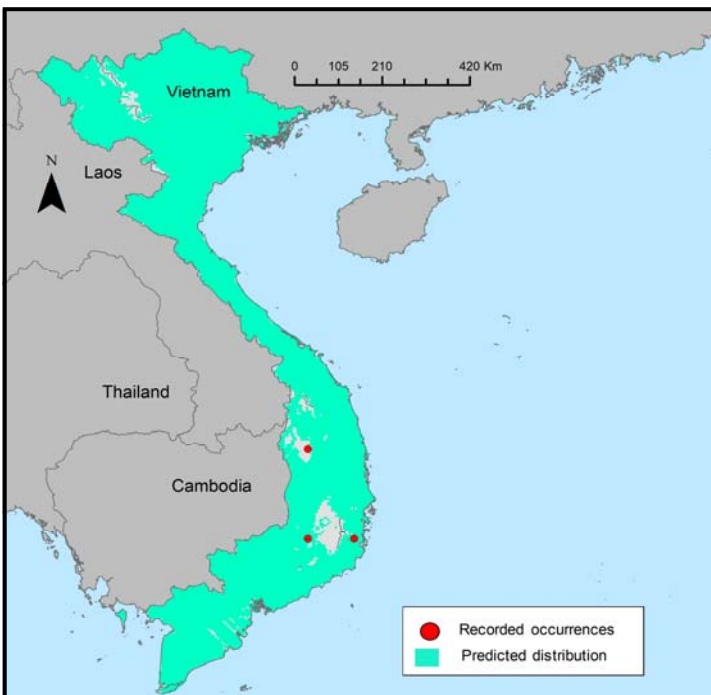
China, Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam; Africa, Oceania.

Altitude: 100 - 1500 m*Cajanus scarabaeoides*

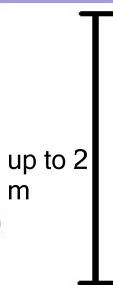
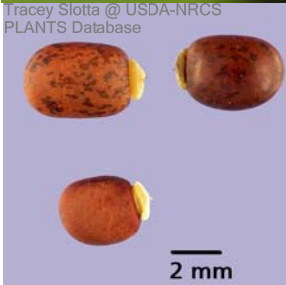
Perennial creepers or twiners; leaflets small (1.2-4 cm long), elliptic to obovate; pods narrow (0.4-0.6 cm wide), slightly rounded in cross-section.

May be confused with:
Cajanus platycarpus

Annual creepers; leaflets larger (3-8 cm long), ovate; pods broad (1-1.5 cm wide), flattened in cross section, papery.

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

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



Gene Pool 3 relative of *Vigna radiata* (L.) Wilczek

HABIT: Twining or creeping herb, stem glabrous. Leaf trifoliolate, petiole 1.2-3.8 cm long, leaflets 1.8-5 cm long, 1.2-3.8 cm broad, lateral leaflets oblique, ovate or rhomboid ovate, sometimes lobed, acuminate, pubescent to subglabrous on both sides, petiolule c. 1.5 mm long, stipels minute; stipules 3-3.5 mm long, produced below the point of attachment.

INFLORESCENCE: A capitate raceme, peduncle 2.5-5.0 cm long, pedicel short, bracteoles c. 5 mm long. Calyx 2.5 mm long, glabrous, teeth shorter than the tube, the upper two mostly connate. Corolla yellow, 5-6 mm long. Fruit c. 3-5.6 cm long, glabrous, beaked, 8-10-seeded.

Habitat:

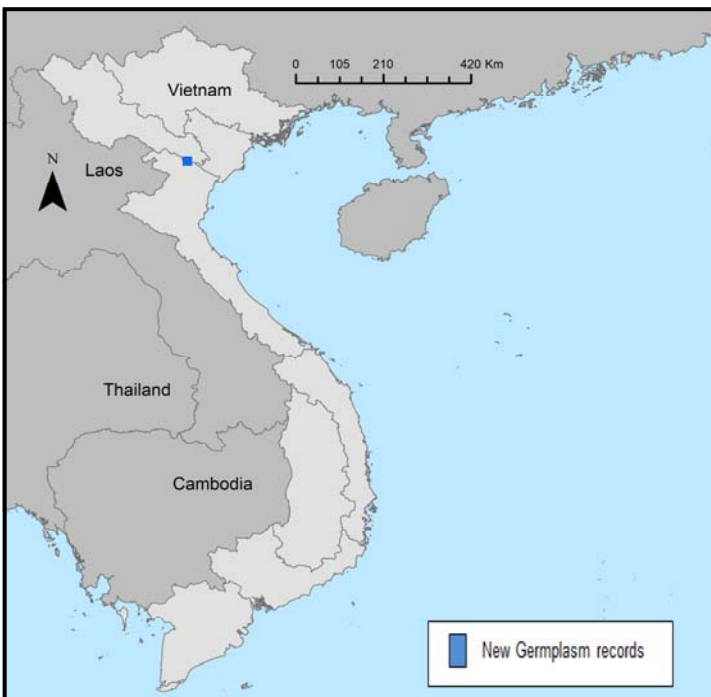
This species forms a component of the ground flora of monsoon forest. It is also found mountain grassland.

Distribution:

India, Cambodia, Laos, Philippines, Thailand, Vietnam.

Altitude:

<i>Vigna dalzelliana</i>	May be confused with: <i>Vigna radiata</i>
Smaller leaflets - up to 5 cm long.	Larger leaflets: 5-16 cm long.



All populations priority
for collection

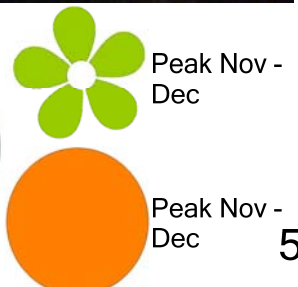
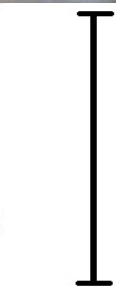
No accessions from
Vietnam listed on
Germplasm Resources
Information Network
(GRIN) [online database]
for this taxon

References: Flora of Pakistan online http://www.efloras.org/florataxon.aspx?flora_id=5&taxon_id=250065279; Chadburn, H. IUCN Conservation Assessment <http://www.iucnredlist.org/details/19892280/0>

Gene Pool 3 relative of *Vigna radiata* (L.) Wilczek



No seed image available



HABIT: Annual herbs, twining, or creeping, 20-60 cm tall. Stems hispid with brown spreading hairs. Stipules peltate, ovate, 0.8-1.2 cm, ciliate; petiole 5-21 cm; leaflets 2- or 3-lobed, 5-16 × 3-12 cm, lateral ones ± oblique, ± sparsely pilose on both surfaces, sometimes 3-veined from base, base broadly cuneate or rounded, apex acute. Racemes axillary, 4- to several flowered (up to 25). Bracteoles linear-lanceolate or oblong, striate.

INFLORESCENCE: Calyx tube 3-4 mm, glabrous; lobes narrowly deltoid, 1.5-4 mm, upper 2 connate into a 2-fid lip. Standard yellow-green outside, sometimes pink inside, suboblate, ca. 1.2 × 1.6 cm, apex emarginate; wings yellow, ovate; keel falcate and incurved through 180°, green tinged with pink.

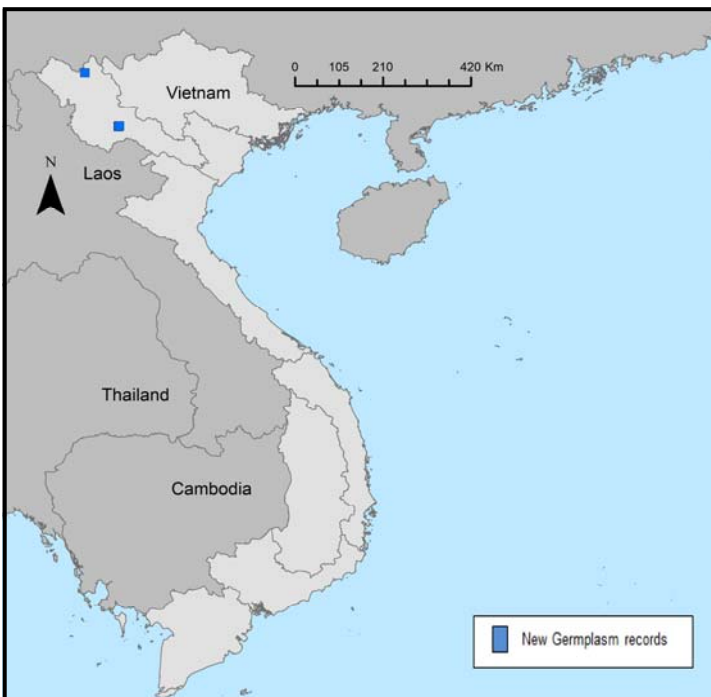
POD: Linear-terete, 4-9 × ca. 0.6 cm, shortly hispid with pale brown hairs. Seeds 8-14, greenish or yellow-brown, shortly cylindrical, 2.5-4 × 2.5-3 mm; hilum white.

Habitat:

Open wastelands, roadsides, thicket margins.

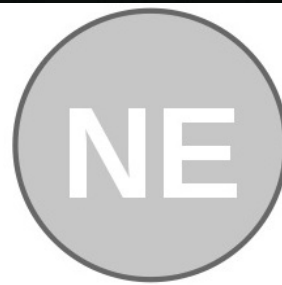
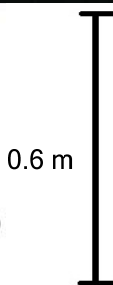
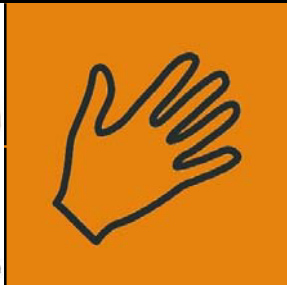
Distribution:

China, Cambodia, India, Indonesia, Laos, Sri Lanka, Thailand, Vietnam; Africa.

Altitude: ca. 500 m*Vigna radiata* var. *sublobata*May be confused with:
Vigna radiata var. *radiata*Stems twining or creeping; leaflets 2
- or 3-lobed, acute at apex.Stems erect; leaflets entire, acuminate at
apex.All populations priority
for collectionNo accessions from
Vietnam 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=242414601



Gemma Toothill (c) Board of Trustees RBG Kew



HABIT: Perennial or annual trailing herbs. Stems 30-60 cm, glabrous or glabrescent.

LEAVES: Stipules peltate, ovate, 0.6-1.9 cm; petiole 5-10 cm; leaflets rhombic or ovate, 2.5-5 cm, in annual cultivated forms often shallowly 3-lobed, in perennial wild forms often deeply 3-lobed, medium lobe broadly spatulate, apex obtuse, glabrous or inconspicuously pubescent. Racemes axillary, headlike; peduncles longer than leaves; pedicels very short.

INFLORESCENCE: 1-3-flowered.

FLOWER: Calyx campanulate; teeth deltoid, ca. 2 mm. Corolla yellow, ca. 6 mm; standard cordate; wings obovate, auriculate; keel apex contorted.

POD: Cylindric, 3-4 cm × 3-4 mm, glabrescent, 6-12-seeded.

SEEDS: Deep brown, cylindric, very small, truncate at both ends.

Habitat:

Grassland.

Distribution:

China, Afghanistan, Bangladesh, Bhutan, India, Indonesia, Kashmir, Myanmar, Nepal, Pakistan, Sri Lanka, Vietnam.

Altitude: ca. 1000 m

<i>Vigna trilobata</i>	May be confused with: <i>Other Vigna species</i>
Characteristically deeply 3 lobed leaflets.	Leaflets usually not deeply lobed.

Reported from
Vietnam, but
no localities
known

All populations priority
for collection

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



RBG Kew herbarium material



RBG Kew herbarium material



RBG Kew herbarium material



RBG Kew herbarium material

0.6 m

NE

All year

All year

7

LEGUMINOSAE

Vigna umbellata var. *gracilis* (Prain) Marschal, Mascherpa & Stainier

Gene Pool 1B relative of *Vigna angularis* (Willd.) Ohwi & Ohashi

HABIT: A twining herb. Stems sparsely to densely covered with retrorse pale brown very fine hairs. Stipules peltate, covered with fine hairs. Petioles 4.3 - 9.2 cm long, sparsely covered with pale brown hairs. Leaflets covered with pale brown hairs on both surfaces; terminal leaflets narrowly ovate to ovate, 6.2 - 7.7 x 3.7 - 4.3cm; lateral leaflets obliquely ovate 5.4 - 6.4 x 3.7 - 4.2 cm, all leaflets acuminate at the apex, rounded at the base, sometimes faintly 3 lobed.
INFLORESCENCE: Axillary, 10 - 30 flowered. Flowers golden yellow. Calyx campanulate, 4.4 mm long, tube 3.0 mm long; standard asymmetrical, obliquely elliptic, 11.9 - 17.7mm, emarginate at the apex, with a prominent appendage at the centre inside. Right wing concealing the upper portion of keel petals. Left wing spreading forward. Keel petals spirally incurved to the left.
PODS: Pendulous, linear, 4.6 - 7.1 x 0.2 - 0.4 cm, blackish brown when mature, glabrous, 6 - 10 seeded.
SEEDS: Elliptic, 4.4 x 2.6 x 2.2 mm, smooth surface; hilum elliptic, 2.5 x 1.0 mm, protruding, aril well developed.

Habitat:

Grows in disturbed habitat such as roadsides, beside paddy-fields and near streams. Sometimes makes very large populations.

Distribution:

China, Japan, Taiwan, Philippines, Vietnam.

Altitude:

<i>Vigna umbellata</i> var. <i>gracilis</i>	May be confused with: <i>Vigna minima</i>
Longer stipule (4.3 - 9.2 cm) and bracteole (6.2cm).	Stipules 4.1 cm; bracteoles 2.6 cm.



All populations priority for collection

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

References: Tomooka, N et al. (2002) The Asian Vigna: Genus Vigna subgenus Ceratopis genetic resources. Kluwer Academic Publishers.

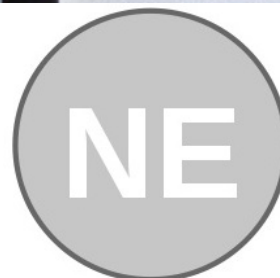
LEGUMINOSAE

Vigna umbellata var. *gracilis* (Prain) Marschal, Mascherpa & Stainier

Gene Pool 1B relative of *Vigna angularis* (Willd.) Ohwi & Ohashi



No seed image available



Oct - Nov

Oct - Nov

Gene Pool 1B relative of *Musa acuminata* Colla

HABIT: Stem 3m high, and 20 - 25 cm in diameter at the base, cylindrical, green, stoloniferous. Leaves distinctly petioled, elongate oblong, seven feet long by two feet broad, bright green on the upper surface, pale green beneath, unequal rounded to subcuneate at the base; petiole two feet long.

INFLORESCENCE: Spike short, drooping; sterile bracts lanceolate; lower floriferous bracts oblong, half a foot long, reddish brown, and intensely glaucous on the outside. bright crimson side. Male flowers nine to twelve in a cluster, distinctly biserial; sepals united except that the tip, 3.8 cm long, teeth short, all cucullate at the tip, the two outer with an erect horn as long as the tooth, intermediate umbonate at the apex; petal whitish, oblong, three-lobed, cuspidate at the apex, half as long as the calyx. Stamens a little longer than the sepals.

FRUIT: Unripe fruit oblong, acutely trigonous, green, narrowed gradually to the base, not distinctly stalked (in an early stage).

Habitat:

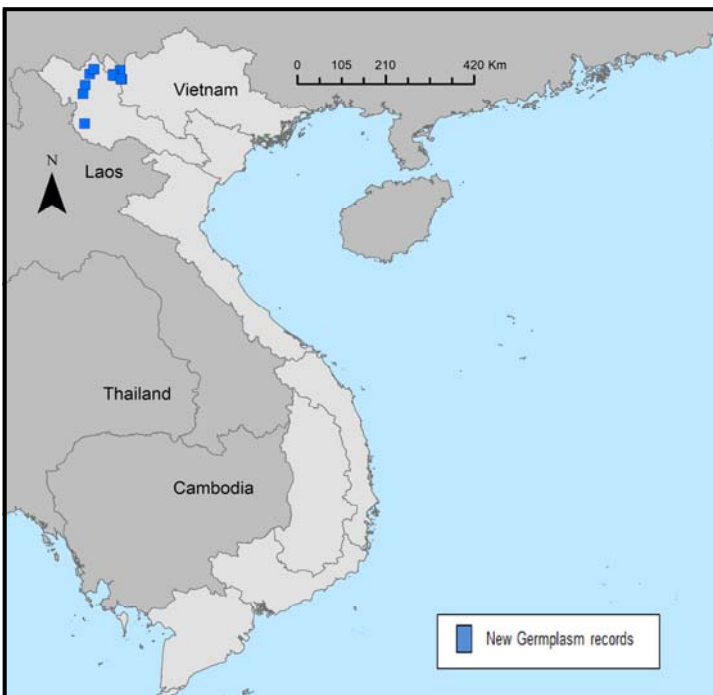
Moist tropical forest.

Distribution:

Endemic to Vietnam.

Altitude:

<i>Musa balbisiana</i> var. <i>bakeri</i>	May be confused with: <i>Musa balbisiana</i> var. <i>balbisiana</i>
Up to 3 m tall.	Up to 6m tall.



All populations priority
for collection

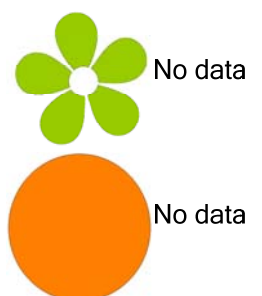
No accessions from
Vietnam listed on
Germplasm Resources
Information Network
(GRIN) [online database]
for this taxon

References:

NO IMAGE AVAILABLE

If you know of an image or link to an image of this species please let us know cropwildrelatives@kew.org

No seed image available



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:

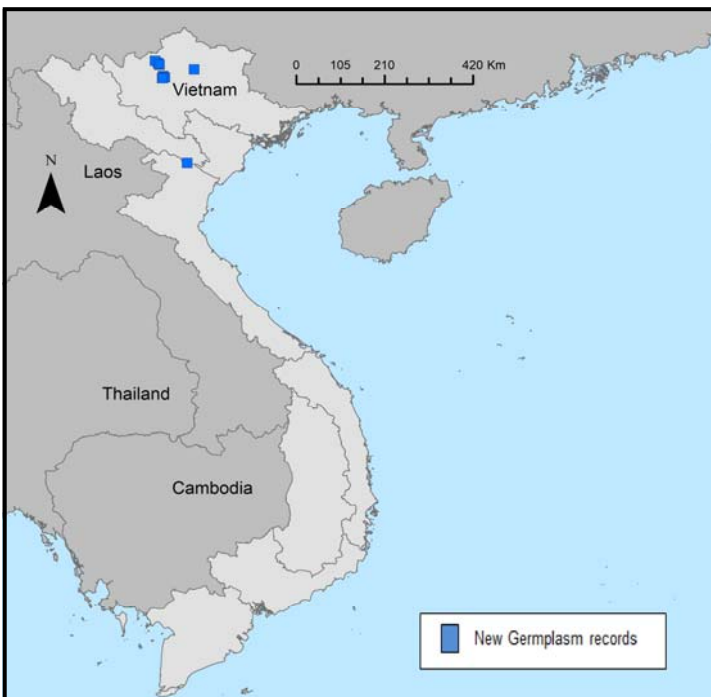
Ravines in evergreen forests

Distribution:

China, Papua New Guinea, Southcentral and Southeastern Asia.

Altitude: 0 -1100 m

<i>Musa balbisiana</i> var. <i>balbisiana</i>	May be confused with: <i>Musa balbisiana</i> var. <i>bakeri</i>
Up to 6m tall.	Up to 3 m tall.



All populations priority
for collection

No accessions from
Vietnam 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

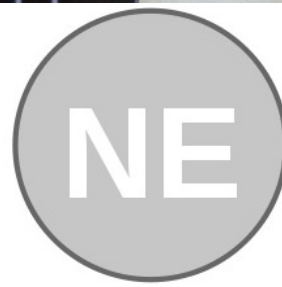
MUSACEAE

Musa balbisiana var. *balbisiana* Colla

Primary Gene Pool relative of *Musa acuminata* Colla



up to 6 m



HABIT: Pseudostems 1--2 m. Petiole 30--50 cm, narrowly winged; leaf blade adaxially yellow-green, abaxially light yellow-green and not pruinose, oblong, 1.8--2.2 m × 70--80 cm, base rounded, noticeably asymmetric. Inflorescence erect; rachis glabrous. Bracts adaxially pink, abaxially scarlet and conspicuously wrinkled.

INFLORESCENCE: Flowers 6 per bract, in 1 row. Tepals of female flowers yellow; outer lobes of compound tepal cornered; free tepal equaling compound tepal, apex acute, finely toothed. Berries obliquely pendulous on rachis, gray-white, straight, 10--12 × ca. 4 cm, not angled; stalk 3--3.5 cm.

SEEDS: Numerous.

Habitat:

Ravines and slopes.

Distribution:

China and Vietnam.

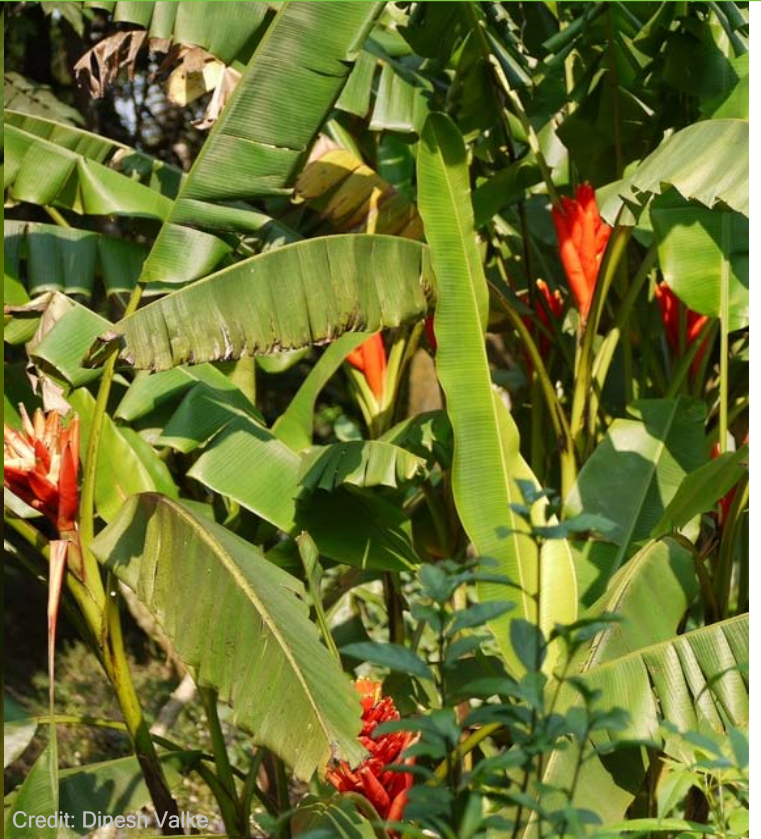
Altitude: 0 - 600 m

<i>Musa coccinea</i>	May be confused with: <i>Other Musa species</i>
Short habit - up to 2 m and characteristic bright red flowers.	

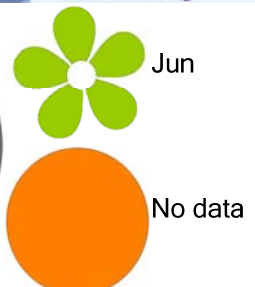
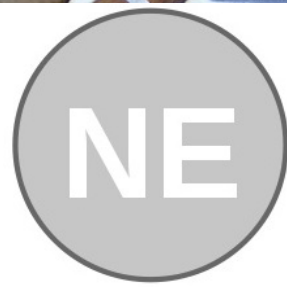
Reported from
Vietnam, but
no localities
known

All populations priority
for collection

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



No seed image available



Taxon Group 4 relative of *Musa textilis* Nee

HABIT: Rhizomes markedly elongating. Pseudostems dull yellow-green, purple when old, 5--7 m, often with withered leaves. Petiole 50--60 cm, margin closed at middle of petiole but gradually opening basally and apically, submembranous; leaf blade adaxially green, abaxially pale green and not pruinose, ovate-oblong, 2.4--3.1 m × 70--90 cm, base rounded, subsymmetric, apex truncate.

INFLORESCENCE: Subpendulous, velvety. Bracts of male flowers adaxially yellow but basally nearly white, abaxially dark reddish purple and often variegated with longitudinal, yellow stripes and with yellow margin.

FLOWERS: 12--16 per bract, in 2 rows. Outer 2 lobes of compound tepal with hooklike appendages; free tepal ca. 1/3 as long as compound tepal, apex minutely apiculate. Infructescence with 5--10 clusters of berries. Berries 15--18 per cluster, ovoid-cylindric, 12--14 × 3--3.5 cm, white velvety, base gradually narrowed into a stalk ca. 3 cm, apex rostrate.

SEEDS: Numerous, depressed, ca. 3 × 5--7 mm, irregularly angled, tuberculate.

Habitat:

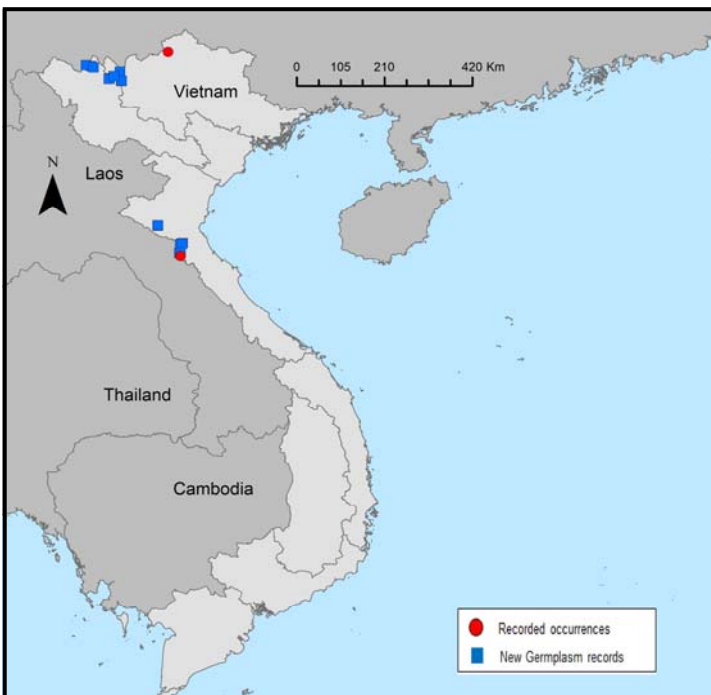
Evergreen forests, ravine bottoms.

Distribution:

China, India, Myanmar, Thailand.

Altitude: 1000 - 1300 m

<i>Musa itinerans</i>	May be confused with: <i>Other Musa species</i>
Bracts dark reddish purple, often with yellow margin and often variegated with longitudinal, yellow stripes.	



All populations priority
for collection

No accessions from
Vietnam 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=200028240

Taxon Group 4 relative of *Musa textilis* Nee



Credit: Markku Hakkinen

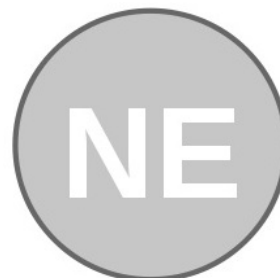


Credit: Markku Hakkinen

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7m



Aug

No data

Primary Gene Pool relative of *Oryza sativa* L and *Oryza glaberrima* Steud.

HABIT: Semierect plant about 1m tall with semierect leaves.

INFLORESCENCES: Panicle branches semi-spreading. Spikelets appressed, solitary, large (6-10.4 mm long by 1.9-3.4 mm wide), with strong awn (4-10 cm long), 2 basal florets sterile, 1 floret fertile. Anthers 1.5-3 mm long.

FRUIT: Kernels often red.

Habitat:

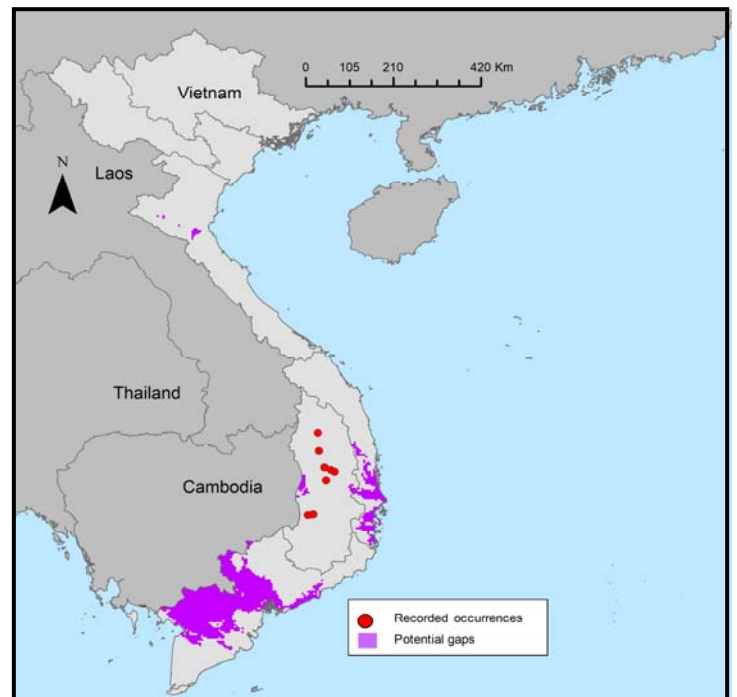
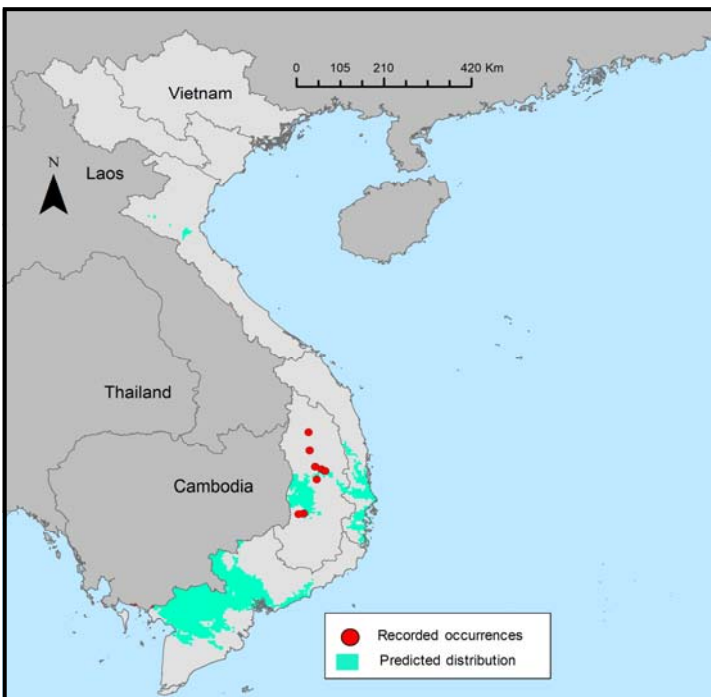
Found in swampy areas, at edges of ponds and tanks, beside streams, in ditches in or around ricefields. Usually grows in shallow water up to 0.3 m, seasonally dry; in open habitats.

Distribution:

Native to Bangladesh, Cambodia, India, Laos, Myanmar, Sri Lanka, Thailand and Vietnam.

Altitude: 0 - 700 m

<i>Oryza nivara</i>	May be confused with: <i>Oryza rufipogon</i>
Annual. Tufted herb, anthers <3mm.	Perennial. Anthers usually >3mm.



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

Primary Gene Pool relative of *Oryza sativa* L and *Oryza glaberrima* Steud.



IRRI Knowledge Bank

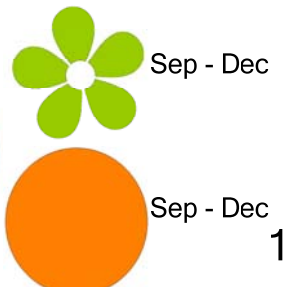


IRRI Knowledge Bank



IRRI Knowledge Bank

No seed image available



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:

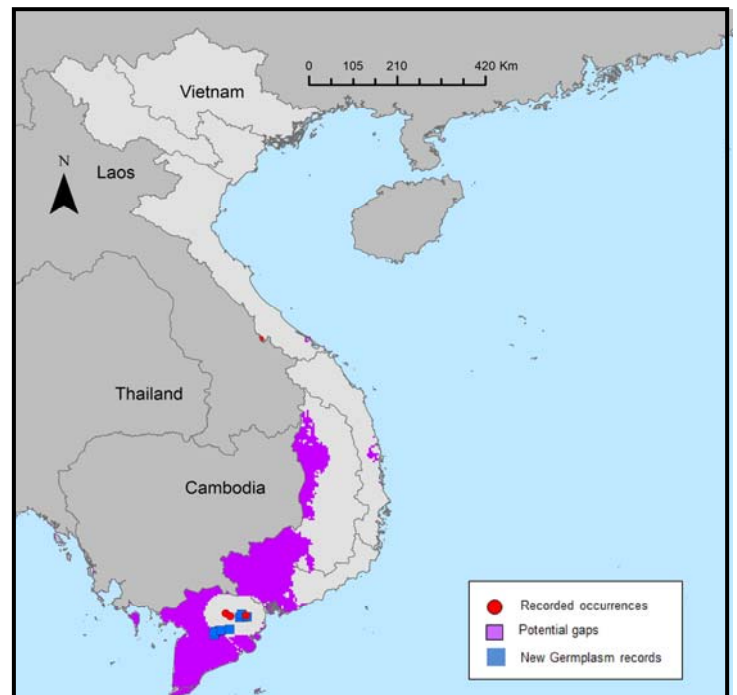
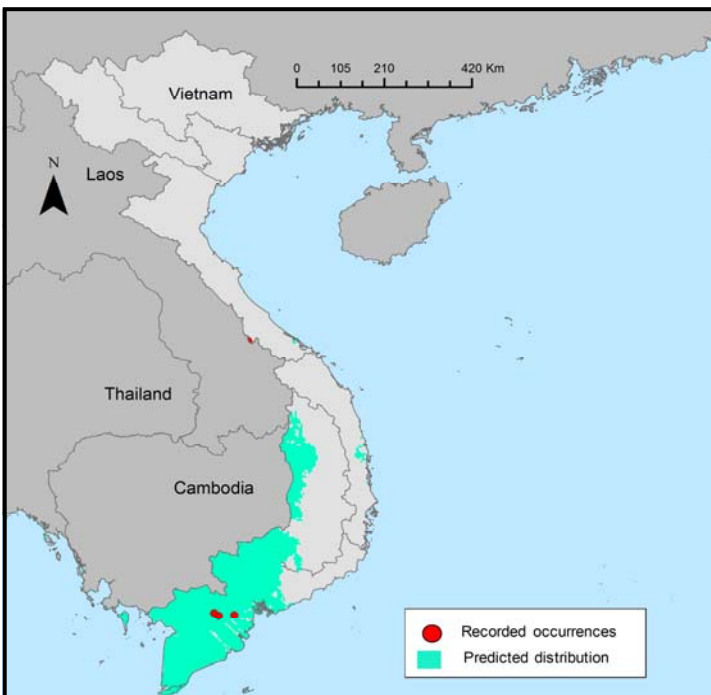
Low hills, alluvial plains, ditch banks.

Distribution:

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

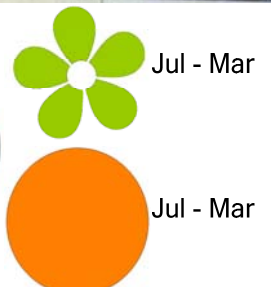
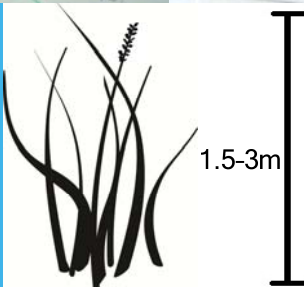
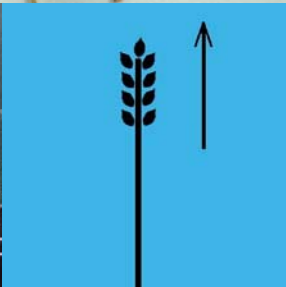
Altitude: 0 - 1000 m

<i>Oryza officinalis</i>	May be confused with: <i>Oryza minuta</i>
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.



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

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



Primary Gene Pool relative of *Oryza sativa* L and *Oryza glaberrima* Steud.

HABIT: Perennial, aquatic, tufted or stoloniferous. Culms decumbent, rooting and tillering at nodes, sometimes floating, lower part spongy, 0.7-1.5 m tall.

LEAVES: Leaf sheaths slightly inflated below, upper sheaths tight, glabrous, auricles conspicuous, glabrous or ciliate; leaf blades up to 40 × 1-2 cm, margins and midrib scabrid, apex acuminate; ligule up to 17 mm.

INFLORESCENCES: Panicle spreading, 12-30 cm, eventually nodding; branches 1-5 at lowest node, longest 2.5-12 cm, axils bearded or glabrous. Spikelets oblong, 8-11 mm, length 2.7-4.5 times width, yellowish green with reddish apex, deciduous; sterile lemmas lanceolate, ca. 2.5 mm, apex acuminate; fertile lemma finely reticulate with scattered short glassy hairs, flanks slightly sulcate, keel stiffly ciliate, apex acuminate; awn 5-40 mm or more, stout, scaberulous. Anthers 4-6 mm.

FRUIT: Caryopsis reddish brown, 5-7 mm.

Habitat:

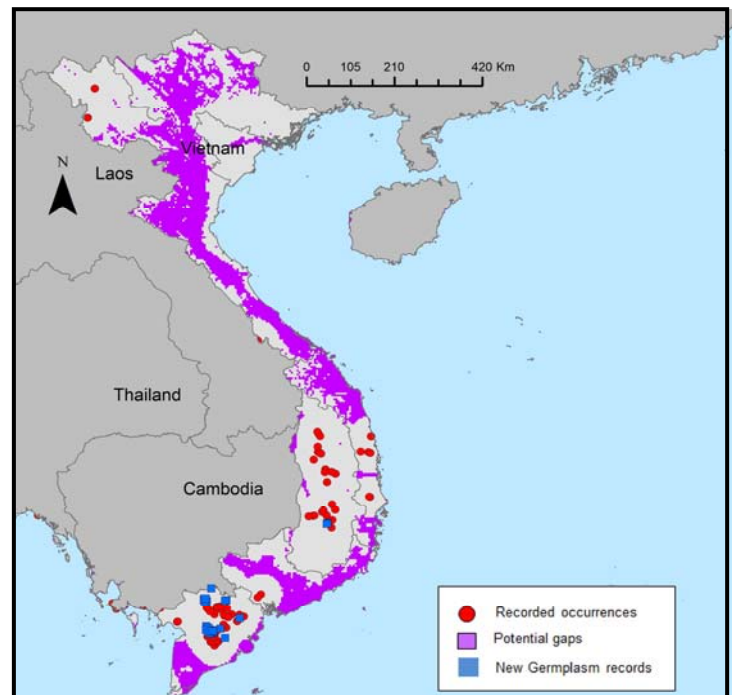
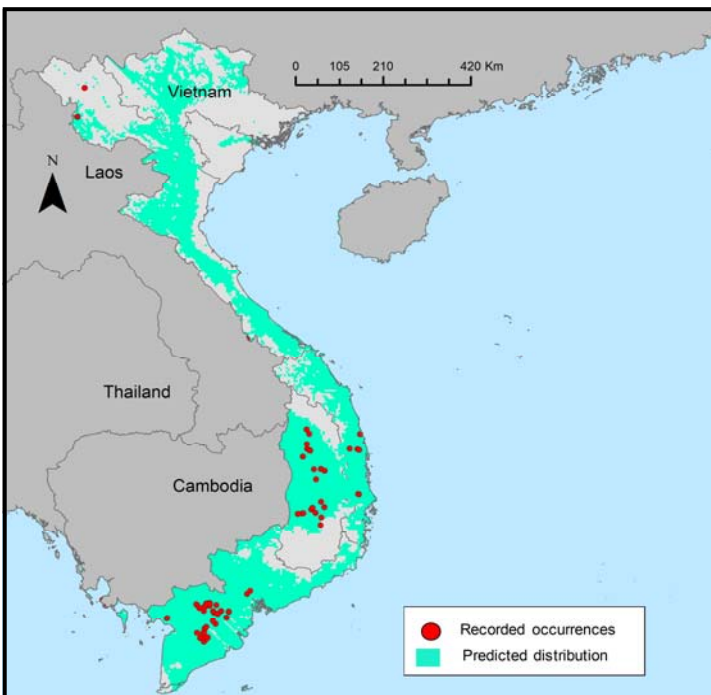
Riversides, ponds, streams, lotus ponds, rice fields, ditches, marshes.

Distribution:

China, Bangladesh, Cambodia, India, Indonesia, Malaysia, Myanmar, New Guinea, Sri Lanka, Philippines, Thailand, Vietnam; Australia.

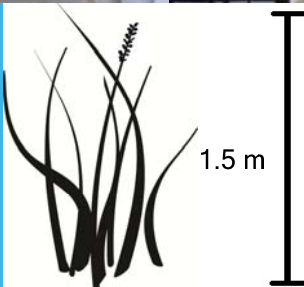
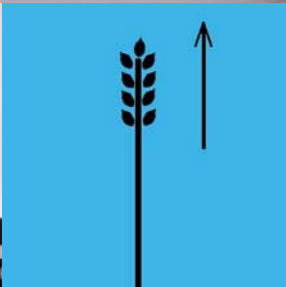
Altitude: 0 - 700 m

<i>Oryza rufipogon</i>	May be confused with: <i>Oryza nivara</i>
Perennial. Anthers usually >3mm.	Annual. Tufted herb, anthers <3mm.



References: Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200025788

Primary Gene Pool relative of *Oryza sativa* L and *Oryza glaberrima* Steud.



Gene Pool 3 relative of *Malus domestica* Borkh.

HABIT: Trees to 15 m tall. Branchlets grayish brown or purplish brown when old, terete, villous when young, glabrous when old; buds reddish purple, ovoid, pubescent or only pubescent along margin of scales. Stipules caducous, linear-lanceolate, membranous, glabrous, margin entire, apex acuminate; petiole 1.5-3 cm, tomentose when young, glabrescent; leaf blade narrowly elliptic-ovate or obovate-lanceolate, 9-15 × 4-6.5 cm, both surfaces white tomentose when young, glabrescent, base rounded or cuneate, margin irregularly serrate, apex acuminate, Corymb umbel-like, 3-5 cm in diam., 4- or 5-flowered; bracts caducous, linear-lanceolate, membranous, glabrous, margin entire, apex obtuse. Pedicel 1.5-3 cm, white tomentose.

FLOWERS: 2.5-3 cm in diam. Hypanthium campanulate, abaxially tomentose, prolonged into short tube at apex. Sepals ovate or lanceolate, ca. 8 mm, ca. as long as or slightly longer than hypanthium, abaxially tomentose, adaxially densely tomentose, margin entire, apex acuminate. Petals yellowish white; obovate, 1-2 cm, base shortly clawed, apex rounded. Stamens unequal, slightly shorter than petals. Ovary 4- or 5-loculed, with 2 ovules per locule; styles 4 or 5, longer than stamens, long tomentose basally. Pome yellowish red, globose, 2.5-5.5 cm in diam.; distal part of hypanthium tubular, 5-8 mm, core free; fruiting pedicel 1-3 cm, glabrous; sepals persistent.

Habitat:

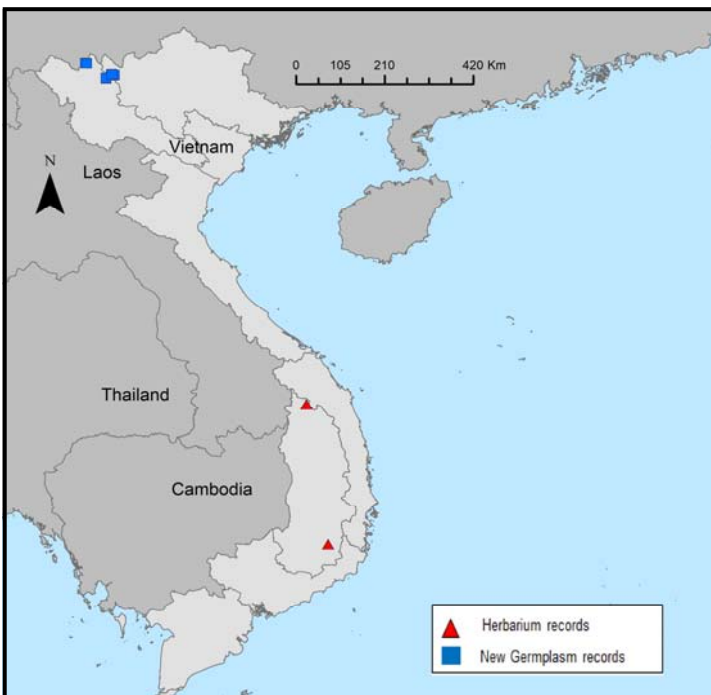
Forests.

Distribution:

China, Laos, Vietnam.

Altitude: 1000 - 2000 m

<i>Malus doumeri</i>	May be confused with: <i>Malus leiocalyca</i>
Pedicels, calyx tubes and sepals tomentose.	Glabrous pedicels, calyx tubes and sepals.

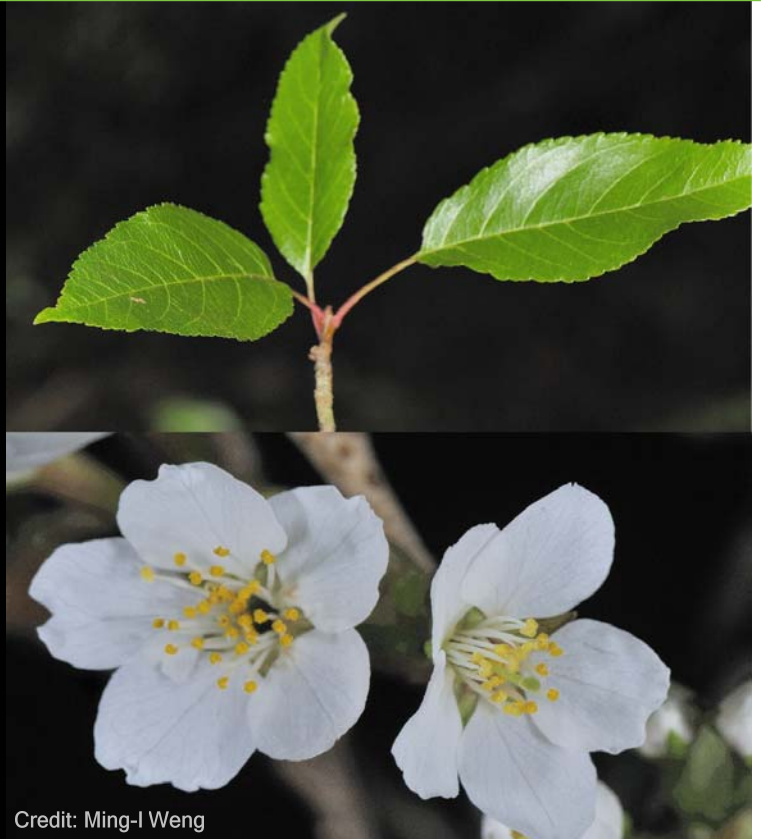
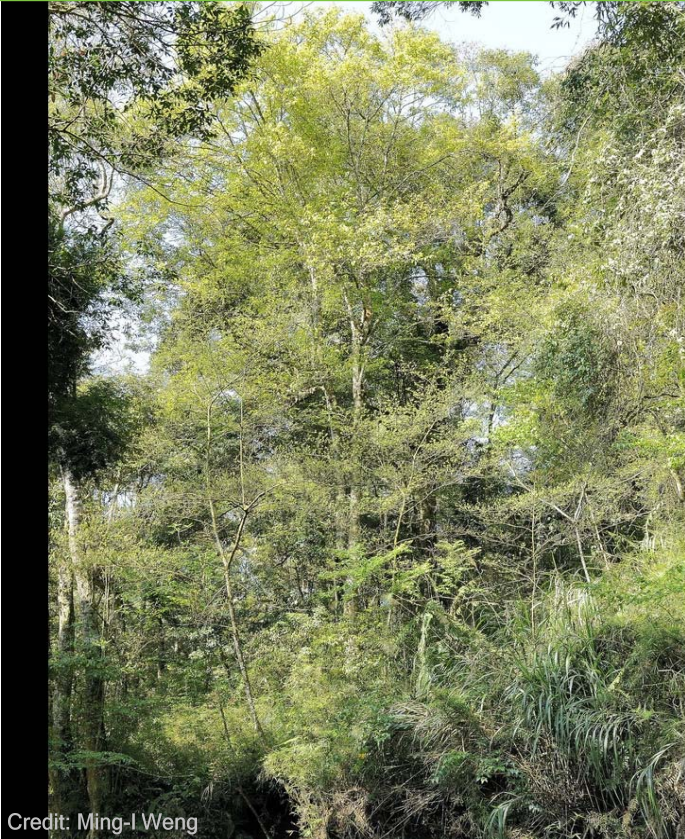


All populations priority
for collection

No accessions from
Vietnam 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=200010900

Gene Pool 3 relative of *Malus domestica* Borkh.



No seed image available



15 m



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.



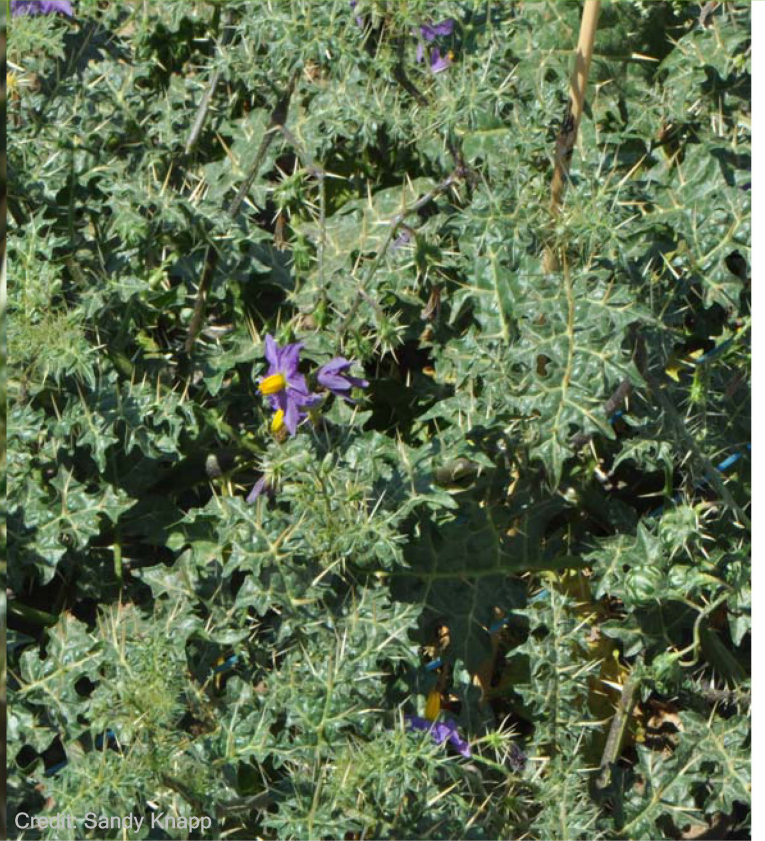
Prickles recurved. Berry orange.



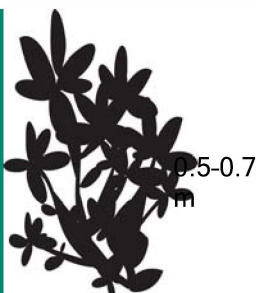
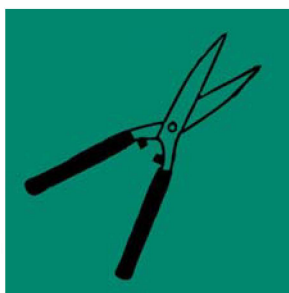
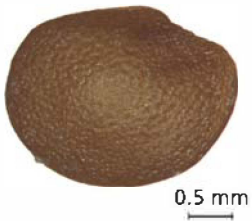
All populations priority
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(GRIN) [online database]
for this taxon

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



Gemma Toothill (c) Board of Trustees RBG Kew



Nov - May

Jun - Sep

Appendix - Synonyms

Taxon		Synonyms
<i>Ipomoea littoralis</i> Blume	1	<i>Convolvulus denticulatus</i> Desrousseaux; <i>Convolvulus littoralis</i> Linnaeus; <i>Ipomoea denticulata</i> (Desrousseaux) Choisy non R. Brown.
<i>Cajanus crassus</i> (Prain ex King) Maesen	2	<i>Atylosia crassa</i> Prain ex King; <i>Atylosia volubilis</i> (Blanco) Gamble; <i>Cantharospermum volubile</i> (Blanco) Merr.; <i>Cantharospermum volubilis</i> (Blanco) Merr.
<i>Cajanus goensis</i> Dalzell	3	<i>Atylosia barbata</i> (Benth.) Baker; <i>Dolichos ornatus</i> Wall. nom. nud.
<i>Cajanus scarabaeoides</i> (L.) Thouars	4	<i>Atylosia pauciflora</i> (Wight & Arnott) Druce; <i>Atylosia scarabaeoides</i> (Linnaeus) Bentham; <i>Atylosia scarabaeoides</i> var. <i>argyrophyllus</i> Y. T. Wei & S. K. Lee; <i>Cajanus scarabaeoides</i> var. <i>argyrophyllus</i> (Y. T. Wei & S. K. Lee) Y. T. Wei & S. K. Lee; <i>Cantharospermum pauciflorum</i> Wight & Arnott; <i>Cantharospermum scarabaeoides</i> (Linnaeus) Baillon; <i>Dolichos medicagineus</i> Roxburgh; <i>Dolichos minutus</i> Wight & Arnott; <i>Rhynchosia biflora</i> Candolle; <i>Rhynchosia scarabaeoides</i> (Linnaeus) Candolle; <i>Stizolobium scarabaeoides</i> (Linnaeus) Sprengel ; <i>Dolichos scarabaeoides</i> L.
<i>Vigna dalzelliana</i> (Kuntze) Verdc.	5	<i>Phaseolus dalzellianus</i> O.Kuntze; <i>Phaseolus dalzelii</i> T. Cooke; <i>Phaseolus pauciflorus</i> Dalzell.
<i>Vigna radiata</i> var. <i>sublobata</i>	6	<i>Phaseolus sublobatus</i> Roxburgh; <i>Phaseolus trinervius</i> Wight & Arnott; <i>Vigna stipulata</i> Hayata.
<i>Vigna trilobata</i> (L.) Verdc.	7	<i>Dolichos trilobatus</i> Linnaeus; <i>Phaseolus trilobatus</i> (Linnaeus) Schreber.
<i>Vigna umbellata</i> var. <i>gracilis</i> (Thunb.) Ohwi & H.Ohashi	8	No Synonyms
<i>Musa balbisiana</i> var. <i>bakeri</i> Colla	9	No Synonyms
<i>Musa balbisiana</i> var. <i>balbisiana</i>	10	<i>Musa dechangensis</i> J. L. Liu & M. G. Liu; <i>Musa lushanensis</i> J. L. Liu; <i>Musa luteola</i> J. L. Liu; <i>Musa paradisiaca</i> Linnaeus subsp. <i>seminifera</i> (Loureiro) Baker; <i>Musa seminifera</i> Loureiro.
<i>Musa coccinea</i> Andrews	11	<i>Musa uranoscopos</i> Loureiro
<i>Musa itinerans</i> Cheesman	12	No Synonyms
<i>Oryza nivara</i> S.D.Sharma & Shastry	13	No Synonyms
<i>Oryza officinalis</i> Wall.	14	<i>Oryza latifolia</i> Desvaux var. <i>silvatica</i> Camus; <i>Oryza minuta</i> Presl var. <i>silvatica</i> (Camus) Veldkamp.
<i>Oryza rufipogon</i> Griff.	15	<i>Oryza sativa</i> Linnaeus subsp. <i>rufipogon</i> (Griffith) de Wet; <i>Oryza sativa</i> var. <i>rufipogon</i> (Griffith) G. Watt.
<i>Malus doumeri</i> A.Chev.	16	<i>Decaisne</i> var. <i>doumeri</i> (Bois) A. Chevalier; <i>Docynia doumeri</i> (Bois) C. K. Schneider; <i>Docynia indica</i> (Wallich); <i>Docynia indica</i> var. <i>laosensis</i> (Cardot) A. Chevalier; <i>Eriolobus doumeri</i> (Bois) C. K. Schneider; <i>Malus asiatica</i> Nakai var. <i>argutiserrata</i> Hu & Chen; <i>Malus doumeri</i> var. <i>formosana</i> (Kawakami & Koidzumi ex Hayata) S. S. Ying; <i>Malus formosana</i> (Kawakami & Koidzumi ex Hayata) Kawakami & Koidzumi; <i>Malus laosensis</i> (Cardot) A. Chevalier; <i>Malus melliana</i> (Handel-Mazzetti) Rehder; <i>Pyrus formosana</i> Kawakami & Koidzumi ex Hayata; <i>Pyrus laosensis</i> Cardot; <i>Pyrus melliana</i> Handel-Mazzetti.; <i>Pyrus doumeri</i> Bois
<i>Solanum virginianum</i> L.	17	<i>Solanum surattense</i> Burm. f.; <i>Solanum xanthocarpum</i> Schrad.