

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

Guatemala



Seed Collecting Guide



Please cite this guide as:
RBG Kew (2016) Guatemala Seed Collecting Guide

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

Cover photos

TOP LEFT: *Solanum asperolanatum*, CREDIT: Dick Culbert/Wikimedia;
TOP RIGHT: *Ipomoea involucreata*, CREDIT: Andrew McRobb/RBG Kew;
BOTTOM LEFT: Rice, CREDIT: Neil Palmer/CIAT/Flickr;
BOTTOM RIGHT: *Phaseolus costaricensis*, CREDIT: Daniel Debouck

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.

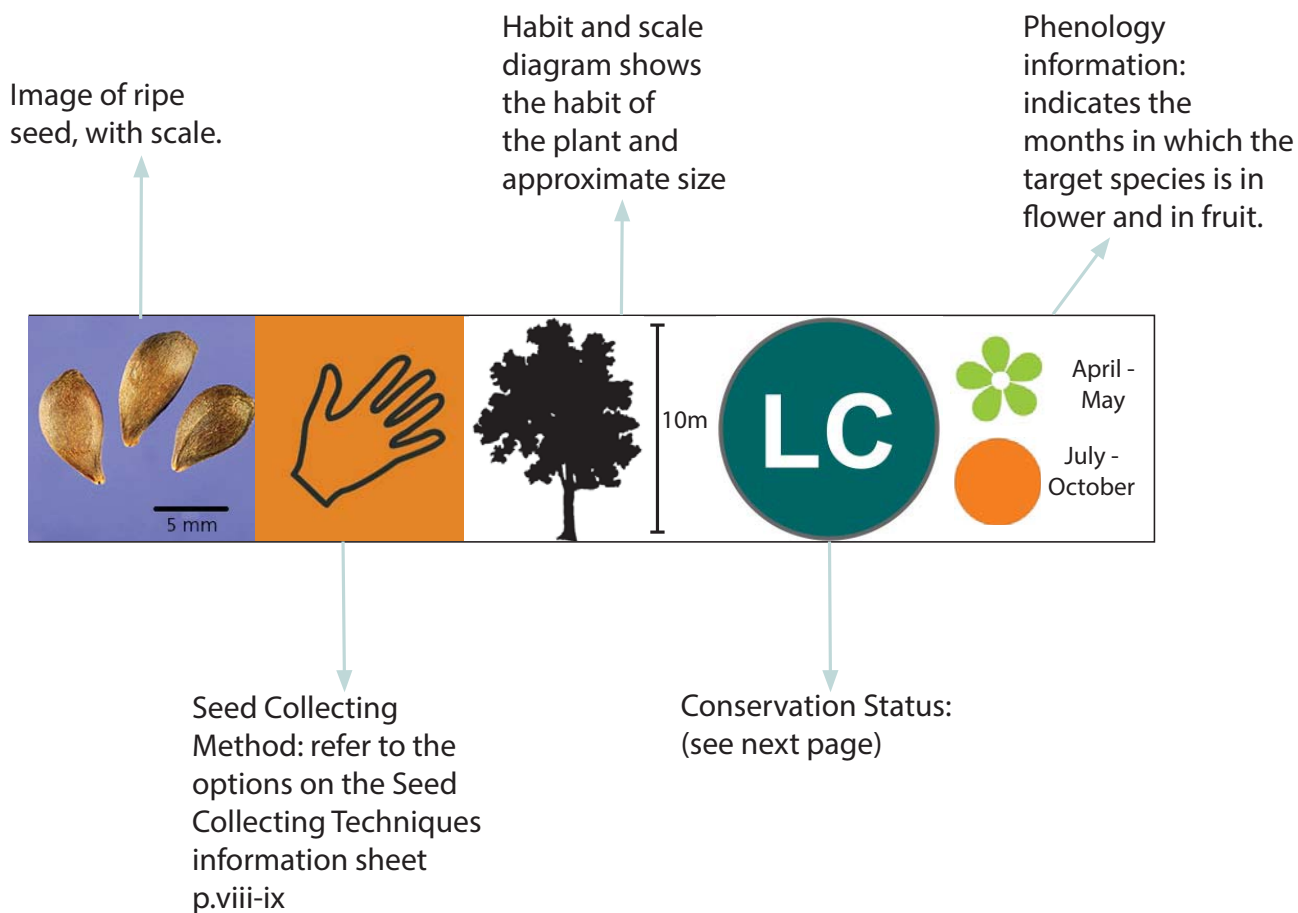
The species included in this guide are a selection of the wild relatives of the 29 key crops which this project covers (African Rice, Alfalfa, Apple, Aubergine, Bambara groundnut, Banana, Barley, Bread Wheat, Butter Bean, Carrot, Chickpea, Common Bean, Cowpea, Faba bean, Finger millet, Grasspea, Lentil, Oat, Pea, Pearl millet, Pigeon pea, Plantain, Potato, Rice, Rye, Sorghum, Sunflower, Sweet potato, Vetch). It is not a definitive guide to the Crop Wild Relatives in this country.

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

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

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

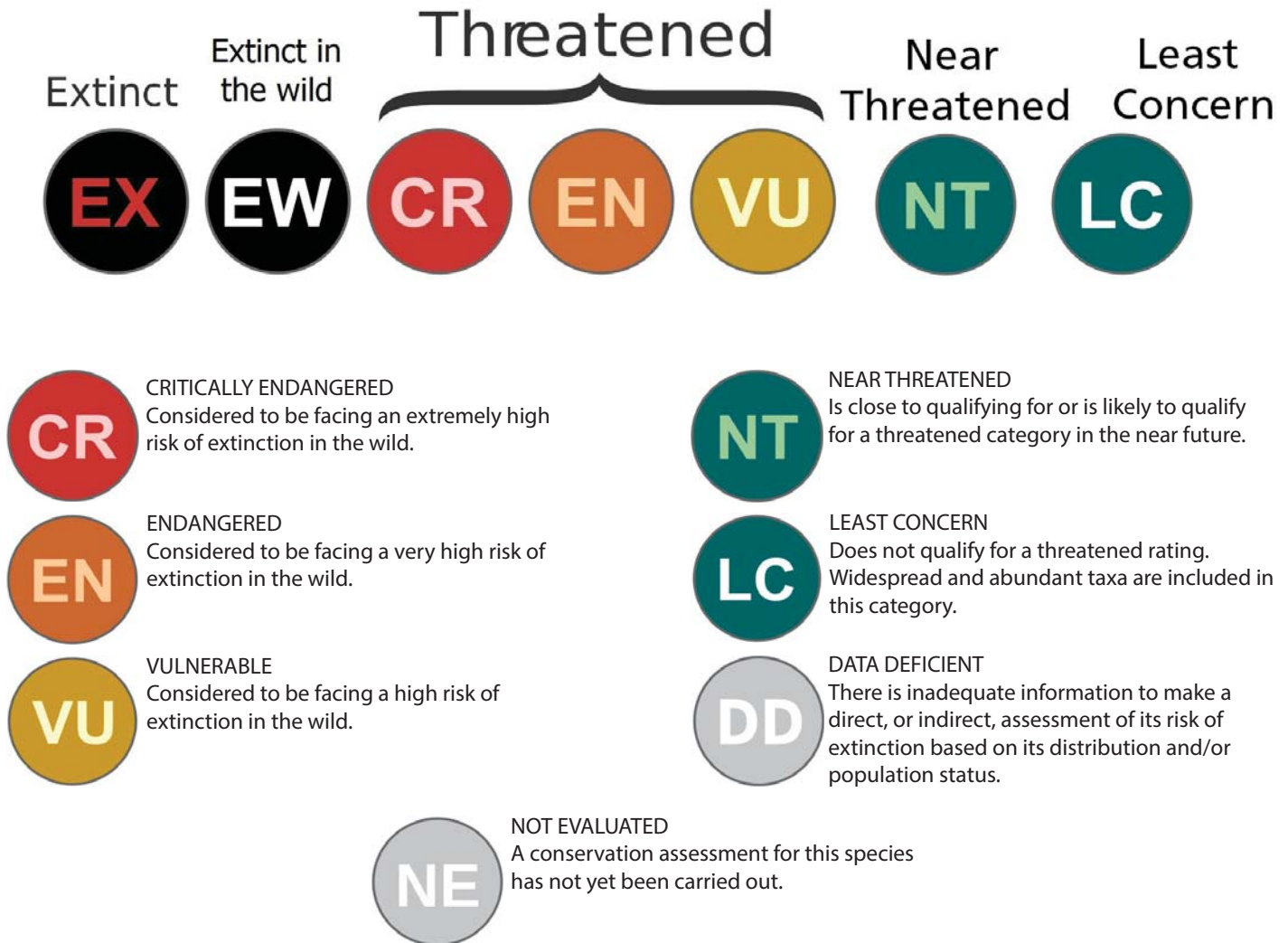
On each species profile, there is a collection of images to help identify the target species, accompanied by a series of symbols :



Conservation Assessments

Conservation Status:

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



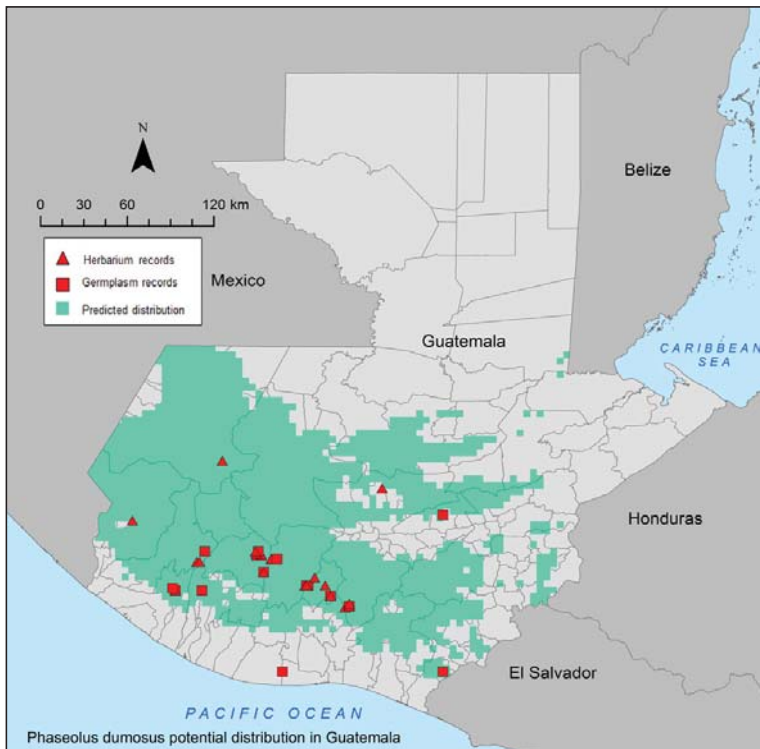
Where a full conservation assessment has not been completed, a preliminary conservation rating may be indicated. Preliminary assessments are produced using specimen locality data and GIS, which calculated two parameters accepted by IUCN as suitable measures of range: namely extent of occurrence (EOO)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

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

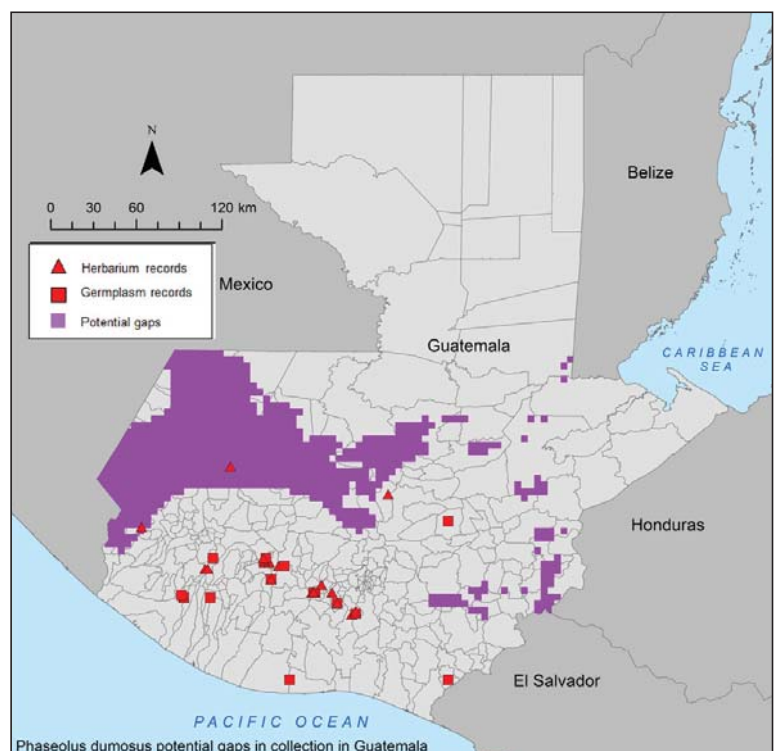


Maps

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



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



Useful resources

The following resources are available online.

Kew technical information sheets

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

Other sheets covering the following topics are available from

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

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

ENSCONET seed collecting manual for wild species

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

Seed conservation: turning science into practice

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

Collecting plant genetic diversity: Technical guidelines (Bioversity)

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

FAO – Commission on Genetic Resources for Food and Agriculture

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

IUCN Red List Categories and Criteria (Version 3.1)

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

Plants of the World Online

<http://plantsoftheworldonline.org/>

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

www.cwrdiversity.org

Identification Keys

Interactive identification keys can be accessed using the links below.

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

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

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

Seed Collecting Techniques

Michael Way and Kate Gold, Seed Conservation Department

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

Hand picking of whole fruits

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



Plucking is particularly suitable when:

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

Pruning clusters of fruit

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

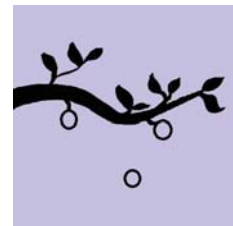


This is a very effective technique when:

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

Shaking branches

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



Shaking branches may be useful when collecting:

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

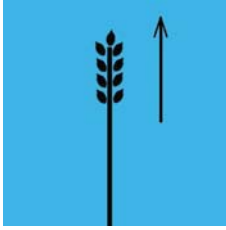
This technique may not be suitable for light, plumed seed from *Bombacaceae* and *Asclepiadaceae*, which may be carried away by air currents.



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

Stripping entire seed-heads

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

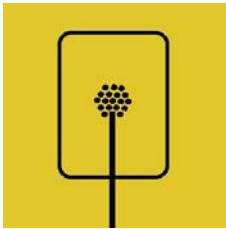


The stripping technique is most suitable for:

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

Bagging seed-heads

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



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.

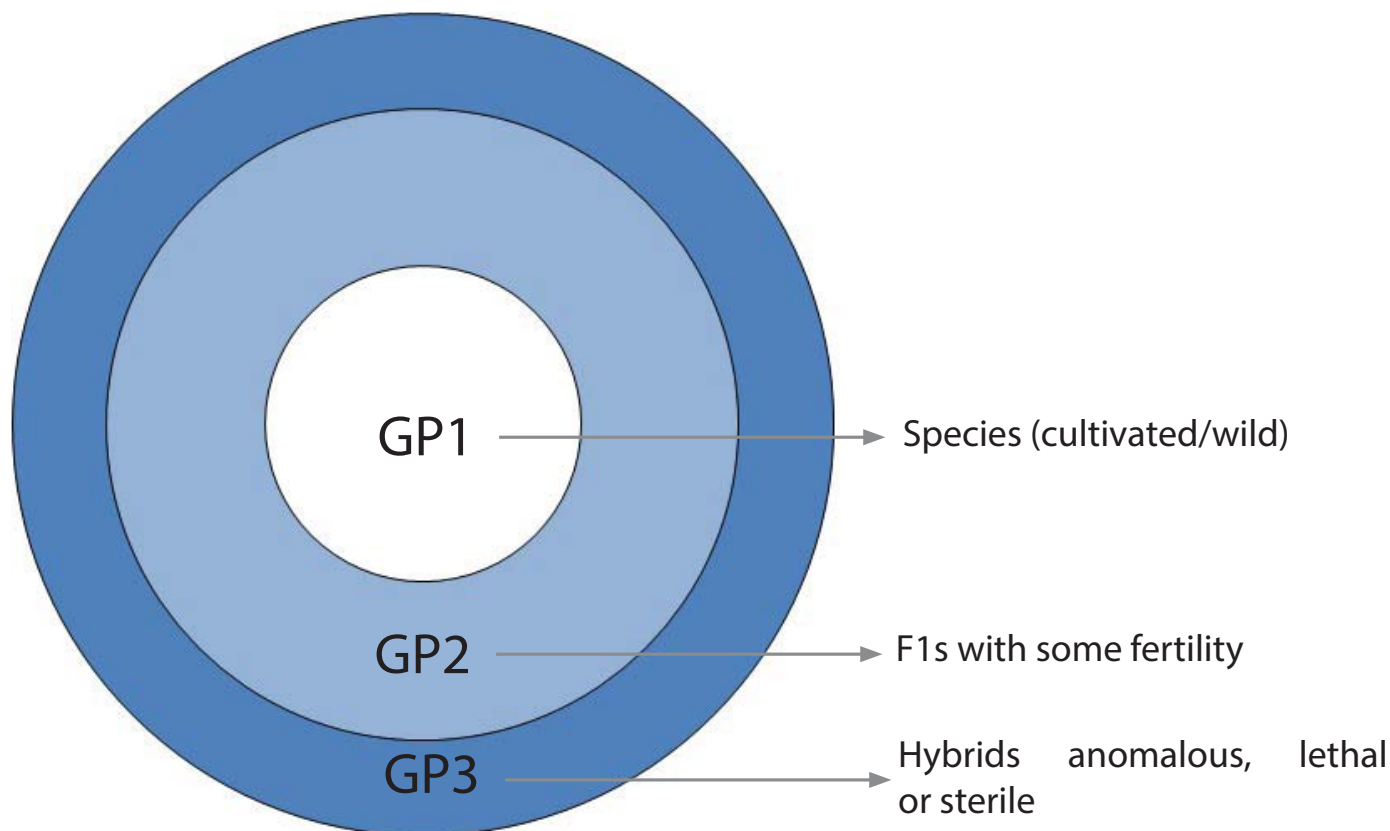
Place collections of dry, ripe seed into cloth or paper bags for transit. Store any awned seed or hooked fruit, that would damage or get stuck in cotton bags, in cardboard boxes or strong paper bags. Never collect or store seeds in plastic bags.

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

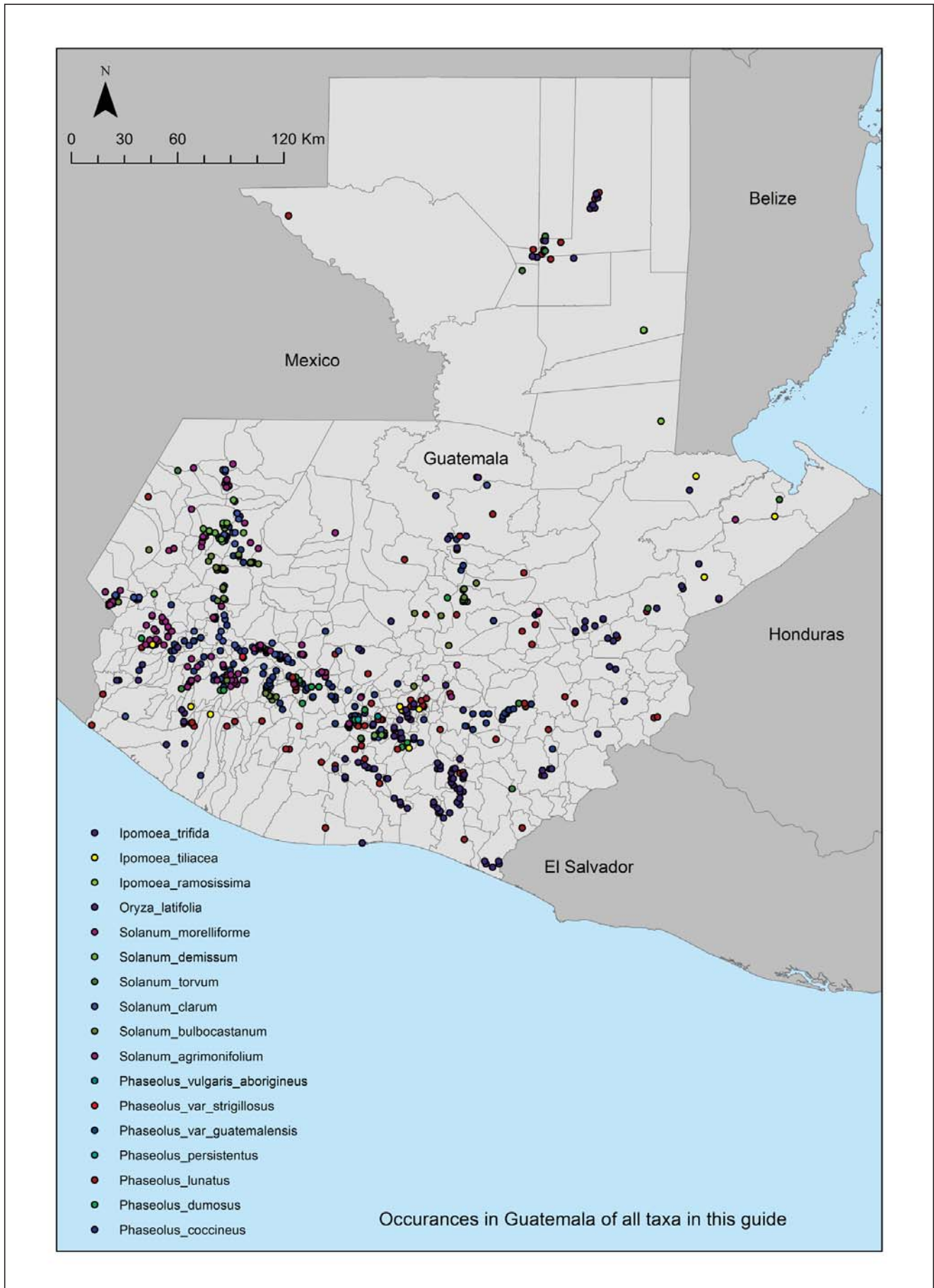
Taxon Group 2 – species in same series/section as crop

Taxon Group 3 – species in same subgenus as crop

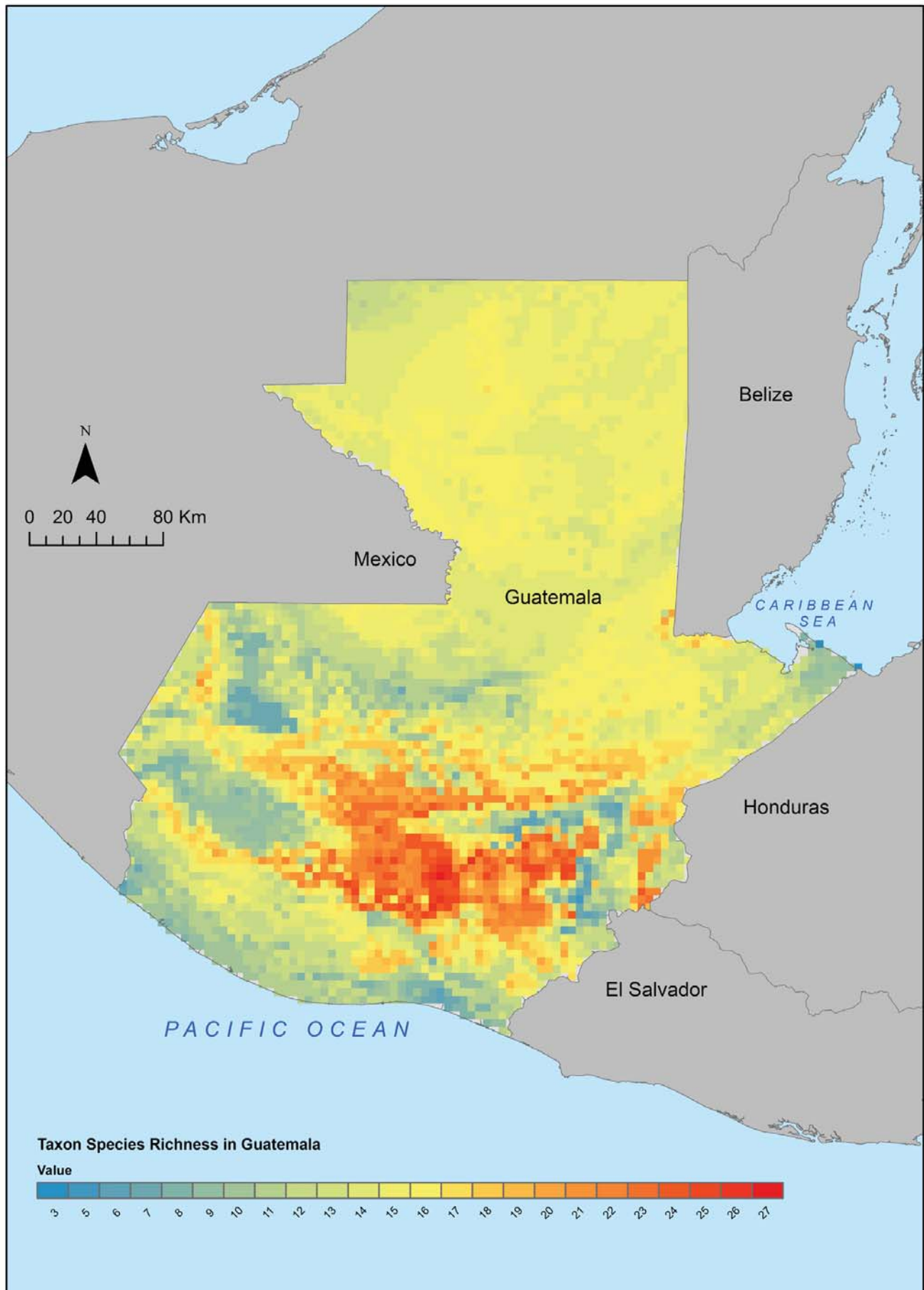
Harlan, J. and J. de Wet (1971). Towards a rational classification of cultivated plants. *Taxon* 20: 509-517.

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.

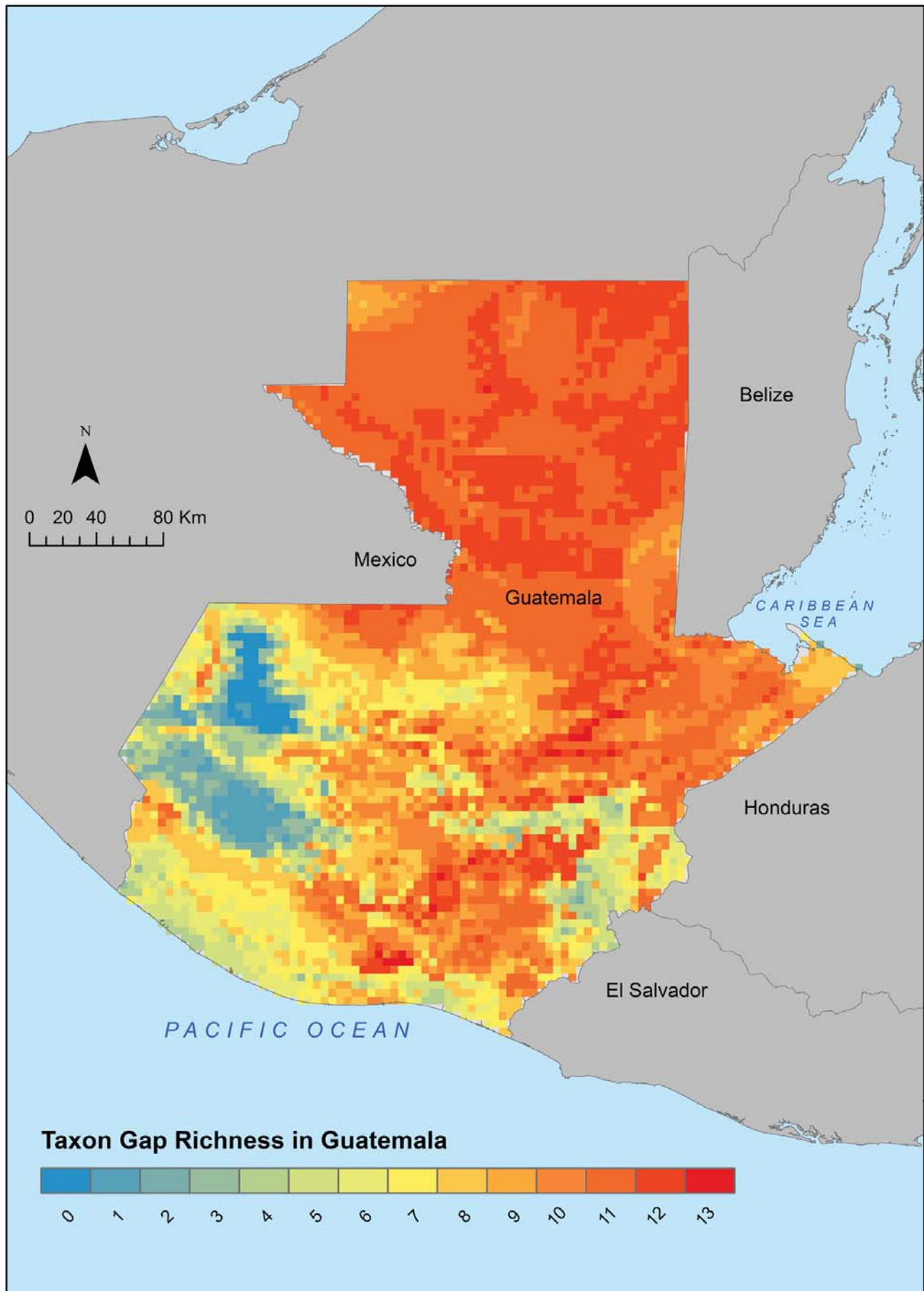
Occurences of all taxa in this guide, as a point distribution



Species richness



Gap richness



Species in this guide

Species profiles are arranged alphabetically by family and taxon.

Family	Taxon	Genepool	Collection Priority	Sheet
Leguminosae	<i>Ipomoea ramosissima</i>	Sweet Potato	High	2
Leguminosae	<i>Ipomoea tiliacea</i>	Sweet Potato	High	3
Leguminosae	<i>Ipomoea trifida</i>	Sweet Potato	Low	4
Leguminosae	<i>Phaseolus coccineus</i> subsp. <i>coccineus</i>	Common Bean	Low	6
Leguminosae	<i>Phaseolus coccineus</i> var. <i>guatemalensis</i>	Common Bean	Low	7
Leguminosae	<i>Phaseolus coccineus</i> var. <i>pubescens</i>	Common Bean	Low	8
Leguminosae	<i>Phaseolus coccineus</i> var. <i>strigillosus</i>	Common Bean	Low	9
Leguminosae	<i>Phaseolus dumosus</i>	Common Bean	Low	10
Leguminosae	<i>Phaseolus lunatus</i>	Common Bean	Low	11
Leguminosae	<i>Phaseolus parvifolius</i>	Common Bean	Low	12
Leguminosae	<i>Phaseolus persistentus</i>	Common Bean	High	13
Leguminosae	<i>Phaseolus vulgaris</i> var. <i>aborigineus</i>	Common Bean	Low	14
Poaceae	<i>Hordeum guatemalense</i>	Barley	Low	1
Poaceae	<i>Oryza latifolia</i>	Rice	High	5
Solanum	<i>Solanum agrimonifolium</i>	Potato	Low	15
Solanum	<i>Solanum bulbocastanum</i>	Potato	Low	16
Solanum	<i>Solanum clarum</i>	Potato	Low	17
Solanum	<i>Solanum demissum</i>	Potato	Low	18
Solanum	<i>Solanum morelliforme</i>	Potato	Low	19
Solanum	<i>Solanum torvum</i>	Eggplant	Low	20

Phenology table

Taxon	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<i>Hordeum guatemalense</i>										Green		
<i>Ipomoea ramosissima</i>	Green	Green	Green	Orange							Green	Orange
<i>Ipomoea tiliacea</i>												
<i>Ipomoea trifida</i>												
<i>Oryza latifolia</i>	Green	Green	Green	Orange	Orange							
<i>Phaseolus coccineus</i> var. <i>coccineus</i>									Green	Orange		
<i>Phaseolus coccineus</i> var. <i>pubescens</i>												Orange
<i>Phaseolus coccineus</i> var. <i>guatemalensis</i>	Green	Orange										
<i>Phaseolus coccineus</i> var. <i>strigillosus</i>									Green	Orange		
<i>Phaseolus dumosus</i>												
<i>Phaseolus lunatus</i>	Green	Green	Green	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
<i>Phaseolus parvifolius</i>											Orange	
<i>Phaseolus persistentus</i>												Orange
<i>Phaseolus vulgaris</i> var. <i>aborigineus</i>					Green	Orange	Orange	Orange	Orange	Orange		
<i>Solanum agrimonifolium</i>	Green	Green	Green	Orange							Green	Orange
<i>Solanum bulbocastanum</i>							Green	Orange	Orange	Orange	Orange	

Phenology table

Taxon	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<i>Solanum clarum</i>							Flower	Flower	Flower	Flower	Flower	
<i>Solanum demissum</i>					Flower	Flower	Flower	Flower	Fruit	Fruit	Fruit	
<i>Solanum morelliforme</i>							Flower	Flower	Flower	Flower		
<i>Solanum torvum</i>	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower	Flower

KEY



Species in flower

Species in fruit

Data gathered from literature and herbarium specimens

Gene Pool Tertiary relative of *Ipomoea batatas* (L.) Poir**HABIT:** Perennial vines; 4-5 m stems, herbaceous, twining, slender, glabrous.**LEAVES:** 2-9 cm long 1-7 cm wide, entire, toothed, 3-7-lobed, 2-9 cm long, 1-7 cm wide, narrow to broadly ovate in its general form, entire, irregularly dentate, glabrous, the base cordate, acute to acuminate apex.**INFLORESCENCE:** Simple to composite tops, 2-12 flowered; sepals 4-5 mm, roughly equal or slightly shorter exterior, oblong-obovate to obovate, obtuse to truncate at the apex, apiculate.**FLOWER:** Funnelform, 1.3-2.4 cm long, pink to purple, interior of the tube purple, glabrous; sepals subequal or the outer slightly shorter, the outer obovate to elliptic-obovate, 4.5-6.5 mm long, obtuse, the inner obovate to elliptic, 5.5-7 mm long, obtuse, all mucronate and glabrous, at least the inner cochleate; stamens with white anthers and filaments.**CAPSULES:** 5-7 mm in diameter, more or less globose, glabrous.**SEEDS:** 1-4, 2-2.5 mm long, brown to black, subglobose to ellipsoid, glabrous or with short caducous trichomes on the margins.**Habitat:**

Rainforest, Semideciduous Forest, pastures and roadsides.

Distribution:

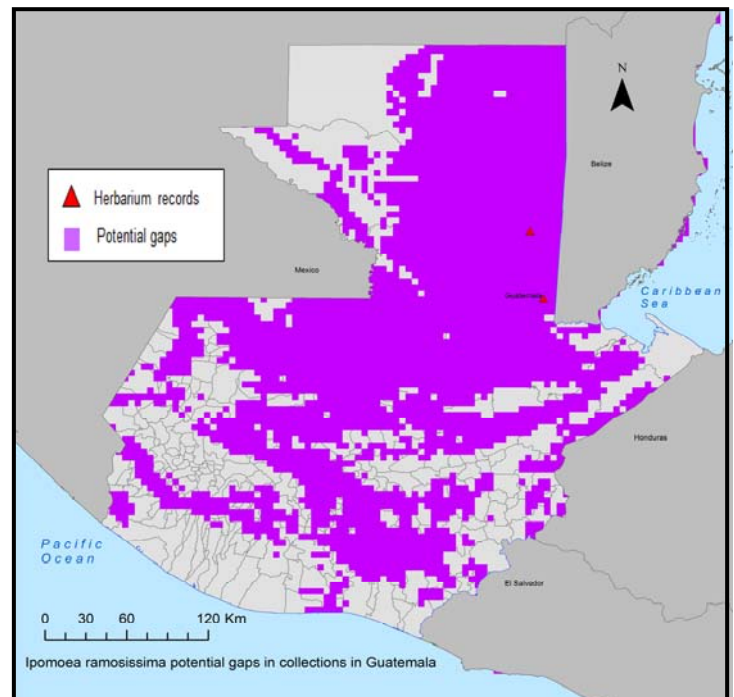
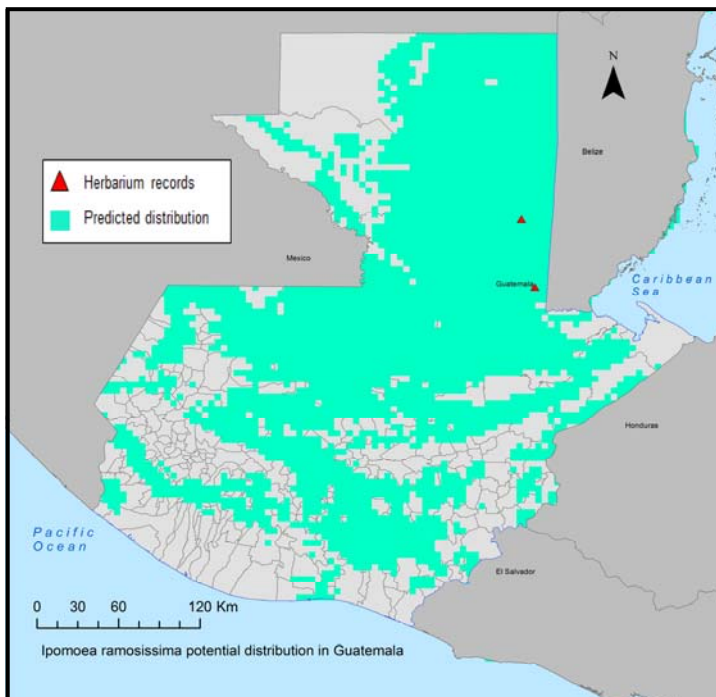
Ecuador, Costa Rica, Guatemala, Peru, Argentina, Paraguay, Bolivia, Mexico, Brazil.

Altitude: 0 - 2000 m*Ipomoea ramosissima*

Flowers, 1.3-2.4 cm long. Capsules, glabrous or with short caducous trichomes on the margins.

May be confused with:
Ipomoea trifida

Flowers 3-4 cm long. Capsules, short-bristly pubescent.

**References:** Austin, D.F., (1978), Bulletin of the Torrey Botanical Club.

Gene Pool Tertiary relative of *Ipomoea batatas* (L.) Poir



See above
for seed
image



4-5 m



Nov-Mar

Nov-Apr

Provisional Secondary Gene Pool relative of *Ipomoea batatas* (L.) Poir

HABIT: Stems twining, slender, several metres long, glabrous or hirsute, lignescent.

LEAVES: Ovate, 5- 15 by 3-10 cm, cordate at the base, acuminate, with an acute or obtusish mucronulate acumen, mostly entire, glabrous or appressed-pilose; petiole slender, 3-7 cm.

INFLORESCENCES: Axillary; peduncles solitary or in pairs, as long as, or often longer than the petiole, 4-15 cm, cymosely few- to several-flowered. Pedicels 5-12 mm. Bracts minute, narrow-lanceolate.

FLOWERS: Sepals glabrous or sparsely fimbriate at the margins, nearly equal in length or the outer ones shorter; outer sepals oblong or ovate-lanceolate, acute, mucronulate, 5-10 mm long, inner ones elliptic, acute or obtuse, often with a less distinct mucronate, to 10 mm long. Corolla funnel-shaped, ca 4-6 cm long, glabrous, pink or purple, often with a darker centre, or rarely white. Stamens and style included; filaments sparsely pubescent nearly to the apex. Ovary glabrous.

FRUITS: Capsule globular, 2-celled, 4-valved.

SEEDS: 4, glabrous or pilose along the edges.

Habitat:

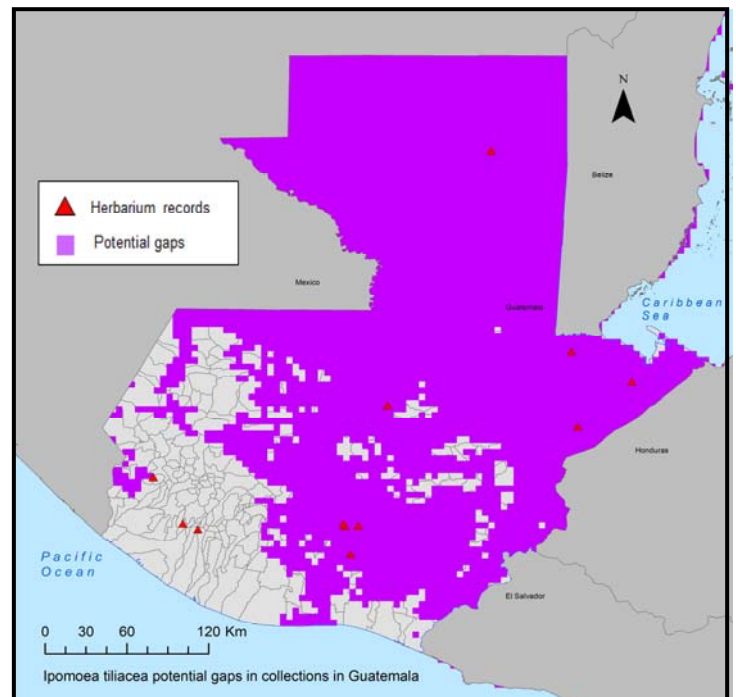
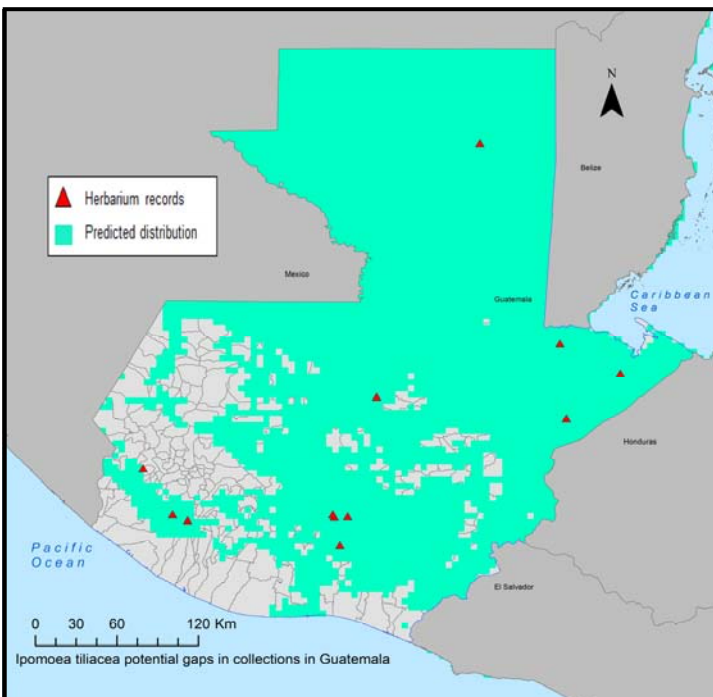
River-banks, clearings in secondary forests.

Distribution:

Native to Australia and New Zealand, the Caribbean, South and Central America, and South Eastern Asia. Also known from Cameroon.

Altitude: 0 - 100 m

<i>Ipomoea tiliacea</i>	May be confused with: <i>Ipomoea littoralis</i>
Corolla funnel shaped 4-6 cm. Capsule globular.	Corolla funnel shaped 3-4.5 cm. Capsule depressed globose.



References:

Provisional Secondary Gene Pool relative of *Ipomoea batatas* (L.) Poir



several
m long

LC
PRELIM



No data

No data

Gene Pool Secondary relative of *Ipomoea batatas* (L.) Poir

HABIT: Vines, twining or prostrate stems mostly over 1 m long, glabrous or commonly with short-pilose indumenta.
LEAVES: Broadly ovate to suborbicular, entire, coarsely dentate to deeply 3-5 lobed, occasionally 7-lobed, 3-10 cm long and wide, basally cordate, the basal lobes rounded or angular to lobed, the apex acute, obtuse or sometimes acuminate, both surfaces glabrous or short-pilose.
INFLORESCENCES: Axillary, the peduncle variable in length and either shorter or longer than the petiole, short-pilose, angular, minutely verruculose toward the apex, more slender than most of the other species, mostly few-flowered cymes.
FLOWERS: Funnelform, 3-4 cm long, rarely shorter, glabrous, dark pink to lavender, the centre purple, the limb obtuse, lobes mucronulate; sepals usually markedly unequal, the outer 4-10 mm long, ovate, acute, with a short mucronate tip, densely pilose with small, appressed trichomes, the margins with similar indument, the inner sepals broader, 5-12 mm long, glabrous or with an indument similar to the outer, calyces are straw-yellow, at least the inner sepals cochleate; stamens with white anthers and filaments; ovary pubescent; nectary yellow to yellow-orange.
CAPSULES: Subglobose, 5-7 mm in diameter, short-bristly pubescent, 2 -celled, 4 -valved.
SEEDS: 4 or less, 3-3.5 mm long, subglobose, glabrous, brown.

Habitat:

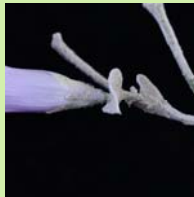
In thickets and hedges.

Distribution:

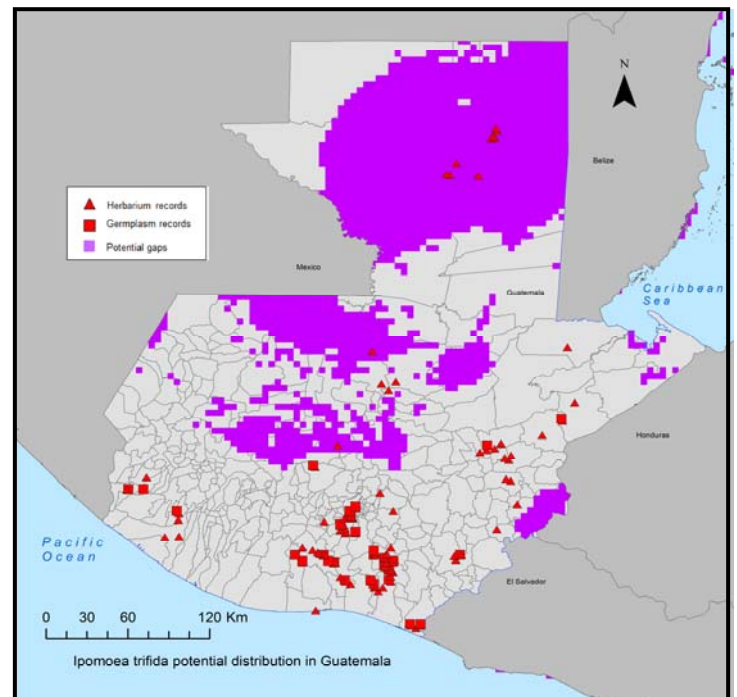
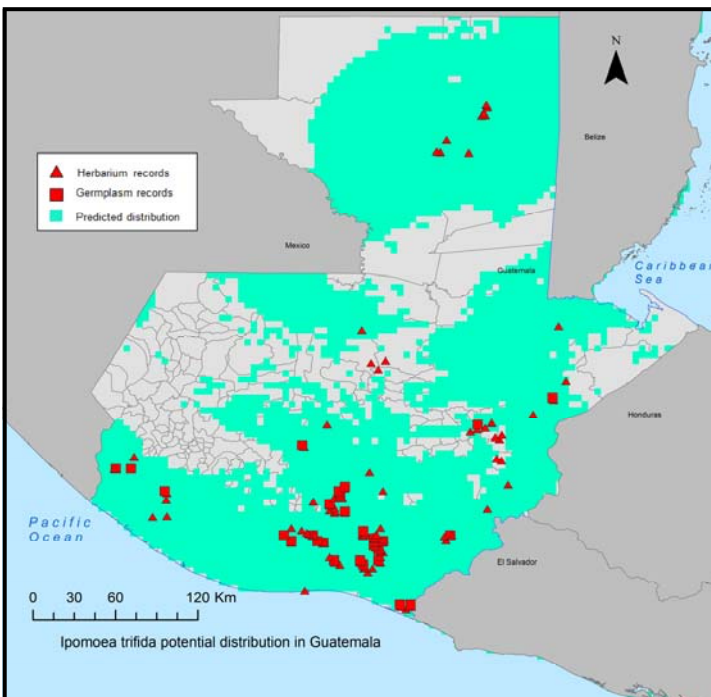
Native of Tropical America.

Altitude: 0 - 300 m*Ipomoea trifida*May be confused with:
Ipomoea trichocarpa

Sepals straw yellow with small trichomes.



Sepals brown-green to red, glabrous.

**References:** Austin, D.F., (1978), Bulletin of the Torrey Botanical Club., The Ipomoea batatas complex,

Gene Pool Secondary relative of *Ipomoea batatas* (L.) Poir



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See above
for seed
image



Over 1
m long



No data

No data

Gene Pool Primary relative of *Phaseolus coccineus* L.**HABIT:** Vigorous climber or rarely prostrate indeterminate vine, 1-5 m long, branches often pendent.**LEAVES:** 6.5-16 cm long; petiole 23-75 mm long; petiolule 0.9-2 cm long; pulvini 2.5-4 mm long, heavily pubescent; terminal leaflet broadly ovate to rhomboid to lanceolate, 3-6 cm long, 2.5-5 cm wide at about 1/4 of length from base, acuminate, apiculate.**INFLORESCENCE:** Short erect raceme to 20 cm long, the peduncle 7-14 cm long, the rachis 1-8 cm long, of mostly 2-6 (14) flowering nodes, nearly glabrous to heavily hooked pubescent primary bracts ovate to lanceolate, 4.5-10 mm long, 2-2.5 mm wide, nearly glabrous to heavily pubescent.**FLOWER:** Red/brown (scarlet) mostly 2 per node but often 3, calyx 5 mm long, acute, glabrous to sparsely covered by strigose hairs mostly on the lower central tooth; standard light to dark red, very large, thickened, nearly round, 14-18 mm long, 14-19 mm wide.**POD:** Small nearly straight, 6 cm long, 1 cm wide, 0.5-0.8 cm deep, inflated, the valves fibrous, with somewhat thickened sutures, pubescent, green or tan with purple strips, early dehiscent by one complete twist.**SEED:** Oblong squarish, flattened, 7 mm long, 6 mm wide, 3 mm thick.**Habitat:**

In or around mostly mixed forest of Pine-Oak, or with hawthorn, liquidamber or juniper, often on steep slopes or along stream beds, or in open Pine-Oak grassy areas.

Distribution:

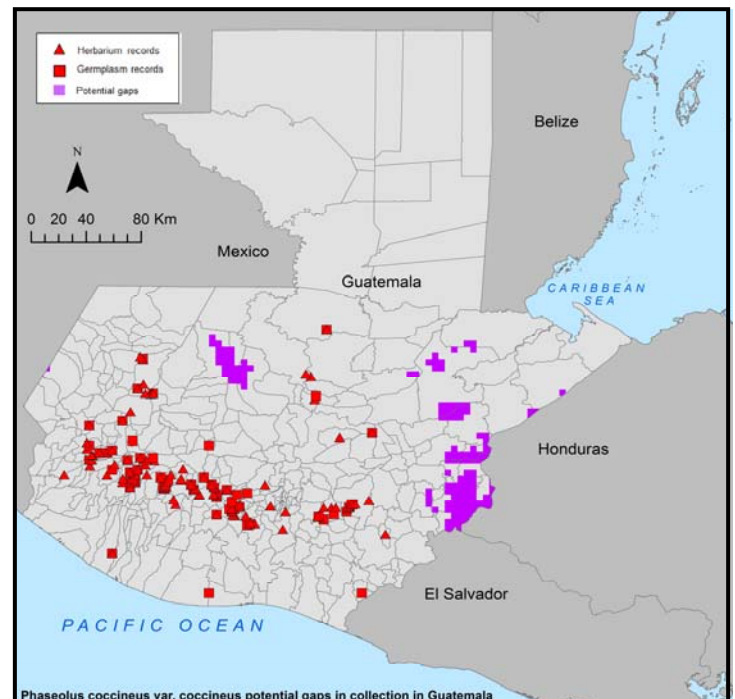
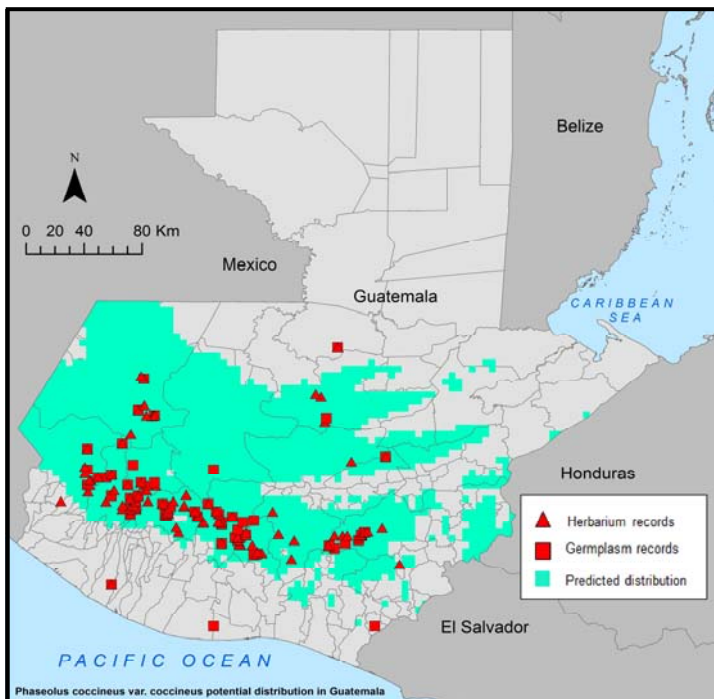
Mexico, South through the Highlands of Central America.

Altitude: 1170 - 3250 m*Phaseolus coccineus* var. *coccineus*

Flowers, scarlet. Leaves dark green adaxially, lighter green abaxially.

May be confused with:
Other Phaseolus species

Leaves dark green adaxially, silvery or grey abaxially.



References: Freytag, G.F. & Debouck, D.G. (2002), Taxonomy, Distribution and Ecology of the Genus *Phaseolus* in North America, Mexico and Central America

Gene Pool Primary relative of *Phaseolus coccineus* L.



RBG Kew

No seed
image
available



up to 5
m



Sep

Sep-Oct

Gene Pool Primary relative of *Phaseolus coccineus* L.**HABIT:** A large climbing, indeterminate vine, to 10 m long.**LEAVES:** 23-27.5 cm long; petiole 9-12 cm long, delicate, sparsely covered with yellowish-strigose hairs; terminal leaflet broadly rounded ovate, 10-10.5 cm long, 8-9 cm wide, widest at midpoint, acuminate, apiculate, thin membranous, nearly glabrous, sparsely covered with long, white hispid hairs adaxially.**INFLORESCENCE:** Erect few flowered pseudoraceme; peduncle to 24 cm long; rachis 7-9 cm long of 5-7 nodes, sparsely covered by strigose pubescence; pedicel 20-22 mm long, stout, covered with strigose hairs.**FLOWER:** Large, purple to lilac, drying and fading to cream or yellow; calyx flaring oblique campanulate, the 2 upper lobes somewhat rounded-dentate, acute, the lower 3 subequal, 2 mm long, 1.25 mm wide, acute, covered by strigose hairs; standard broadly ovate, 11 mm long, 10 mm wide, reflexed at 4 mm from base, enrolled at margin; stamen tube, 8 mm long to bend and 3 mm more to filaments.**POD:** Falcate to nearly straight, 4.5-6.5 cm long, 1-1.2 cm wide, farinaceous when immature, when immature compressed fibrous brittle, very sparsely covered strigose and minute uncinated hairs.**SEED:** Orbicular to rounded, flattened, 8-9 mm long, 6.8-7.4 mm wide, 3-3.4 mm thick pinto black on reddish brown background, shiny, dark ring around hilum.**Habitat:**

In thickets in high mountain cloud-forests, or along streams in dense Pine-Oak forests at high altitudes.

Distribution:

Guatemala, Nicaragua.

Altitude: 2000 - 2500 m

<i>Phaseolus coccineus</i> var. <i>guatemalensis</i>	May be confused with: <i>Other Phaseolus species</i>
Large leaves, 23-27.5 cm long; terminal leaflet 10-10.5 cm long, 8-9 cm wide.	Leaves up to 15 cm long

Reported in Guatemala,
but no localities known.All populations priority for
collection**References:** Freytag, G.F. & Debouck, D.G. (2002) Taxonomy, Distribution and Ecology of the Genus *Phaseolus* (Leguminosae-Papilionoideae) in North America, Mexico and Central America.

Phaseolus coccineus var. *guatemalensis* Freytag

Gene Pool Primary relative of *Phaseolus coccineus* L.

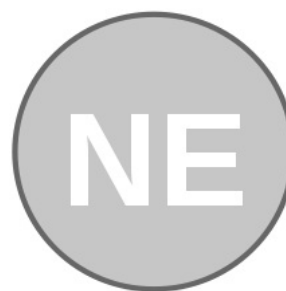


Jstor

No seed image available



up to 10 m



Jan

Jan

Phaseolus coccineus var. *pubescens* Freytag

Gene Pool Primary relative of *Phaseolus coccineus* L.

HABIT: A climbing indeterminate vine, to 5 m long. Stems terete, slender, striate, sparsely covered by yellow, retrorse pubescence; internodes 6-14 cm long, mostly glabrous except for a few strigose hairs at nodes, young stems densely covered with yellow strigose hairs.

LEAVES: 9.6-15.6 cm long, dark gray-green adaxially, silvery and reticulately veined abaxially; petioles, delicate, 1.5-5.5 cm long, sparsely covered with long, yellowish strigose hairs; petiolule 1.5-2.5 cm long, sparsely covered with similar hairs.

INFLORESCENCE: A short to long pseudoraceme; pedunde 5-19-27 cm long, glabrous; rachis 1-5 cm long of 2-14 flowers, sparsely covered by long, yellowish strigose hairs; primary bract broadly ovate to lanceolate, acute, 4.5-5 mm long, 2-3.5 mm wide, purplish, glabrous adaxially, with long, yellowish strigose hairs on abaxial surface.

FLOWER: Red or scarlet to salmon; calyx flaring campanulate, 4 mm long, the upper 2 lobes united into one entire, 1 mm long, 3.5 mm wide, the lower 3 dentate, subequal, 1 mm long, 1.5 mm wide, the central one slightly longer and bearded by long, white strigose hairs.

POD: Mature pods 3-5 cm long, 0.8-1 cm wide, of 2-4 seed, broad and blunt, base somewhat stipitate, smooth, brittle, glabrous.

Habitat:

Growing over shrubs in moist thickets on steep slopes in pine-oak forest, sometimes with spruce and with an understory of composites. Deep organic loam derived from volcanic or limestone rock.

Distribution:

West Central Mexico, North Guatemala.

Altitude: 1700 - 3100 m

<i>Phaseolus coccineus</i> var. <i>pubescens</i>	May be confused with: <i>Other Phaseolus species</i>

Reported in Guatemala,
but no localities known.

All populations priority for
collection

References: Freytag, G.F. & Debouck, D.G. (2002), Taxonomy, Distribution and Ecology of the Genus *Phaseolus* in North America, Mexico and Central America

Phaseolus coccineus var. *pubescens* Freytag

Gene Pool Primary relative of *Phaseolus coccineus* L.



Escuela Agrícola Panamericana El Zamorano

No seed
image
available

Up To
5 m

DD

No Data

Dec

Gene Pool Primary relative of *Phaseolus coccineus* L.Frijolillo, Chamborote
silvestre

HABIT: Climber, indeterminate vine to 5 m long. Stems terete, covered with reflexed white hispid and uncinate hairs, to nearly glabrous, slightly ribbed, internodes 8-15 cm long. Stipules broad triangular, obtuse, 2-3-6 mm long, 1.5-2 mm wide, glabrous, ciliate.

LEAVES: 10.8-21 cm long, stipels lanceolate, the lower ones 3 mm long, 0.75 mm wide, densely covered with uncinata hairs adaxially; terminal leaflet broadly ovate, 5-9 cm long, 4-9 cm wide at 1/4 to 1/3 from the base, minutely apiculate, nearly glabrous, only a few long hispid hairs on adaxial surface, covered by hispid and strigose hairs abaxially.

INFLORESCENCE: 12-20-35 cm long, the peduncle 10-16-25 cm long, many nodes and flowers.

FLOWER: Scarlet; calyx campanulate, tube 3 mm long, upper 2 lobes joined into one 5 mm long, scarcely elongate, emarginate, covered by hispid hairs, the lower 3 lobes dentate, subequal, 1.75 mm long, 2 mm wide, acute, covered by scattered hispid and strigose hairs, reflexed at 3-6 mm from base, terminal portion 5-9 mm long, apex with few hispid hairs especially in bud, the large flap-like auricles 3 mm long, 1 mm wide, the blade abovate, cupped, 8-9 mm long, 10-12 mm wide, the claw 3.5-4 mm long, 0.5 mm wide, spur not well-developed.

Habitat:

Mostly found in openings in undisturbed oak or pine forest, on high mountains.

Distribution:

Guatemala, Honduras, Mexico.

Altitude: 1000 - 2580 m

<i>Phaseolus coccineus</i> var. <i>strigillosus</i>	May be confused with: <i>Phaseolus dumosus</i>
Flowers, scarlet, pyramidal clusters of buds & flowers. Long, narrow bracteoles 5-6-10 mm long.	Purple flower.



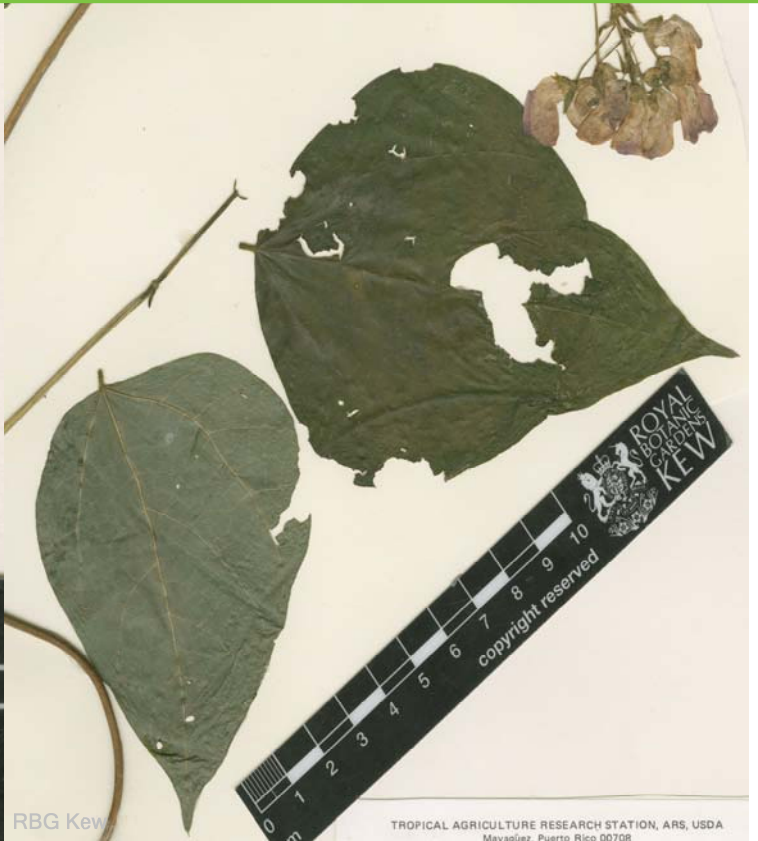
All populations priority for collection

References: Freytag, G.F. & Debouck, D.G. (2002), Taxonomy, Distribution and Ecology of the Genus *Phaseolus* in North America, Mexico and Central America

Phaseolus coccineus var. *strigillosus* (Piper) Freytag

Gene Pool Primary relative of *Phaseolus coccineus* L.

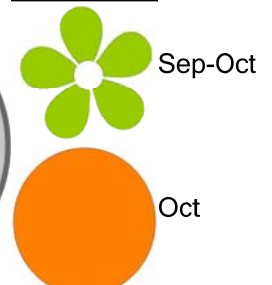
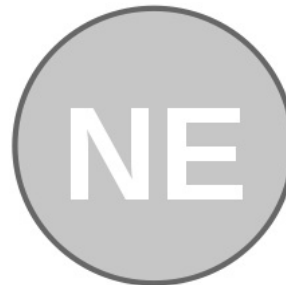
Frijolillo, Chamborote silvestre



No seed image available



up to 5 m



Gene Pool Tertiary relative of *Phaseolus acutifolius* A. Gray

HABIT: Annual tending to perennial, indeterminate vine, 8-10 m or more. Stems terete, younger stems 3 mm in diameter or more, ribbed, sparsely covered with strigose pubescence, older stems near ground level robust.

LEAVES: 30-39 cm long; petiole 15-20 cm long; petiolule 4-5 cm long, stout to 3 mm in diameter, heavily ribbed, sparsely covered with forward appressed-strigose hairs; terminal leaflet very broadly ovate, to 13 cm long, 12.5 cm wide at 1/3 from base, acuminate, apiculate.

INFLORESCENCE: A panicle with 2 early flowers per node and a secondary branch axis produced between them at about anthesis; primary bracts lanceolate, 6-7 mm long, 1.5 mm wide, densely covered with strigose pubescence; pedicel rather stout 6-7 mm long.

FLOWER: Purple rarely white; calyx tube 3-4 mm long; blade broadly rounded, erect, 5 mm from base to flexure and 7 mm more to emarginate tip, 12 mm wide, laterally enrolled, a few minute hairs at apex; wings purple rarely white, round, widely spreading and cupped, unequal.

POD: Straight, tapered near stem 7 cm long, 12-13 mm wide, 7-10 mm thick; beak nearly straight, 7-8 mm long.

SEED: Oblongoid, flattened, 11.5 mm long, 8.6 mm wide, 3.9mm thick, smooth, black streaked and striped on a tan background.

Habitat:

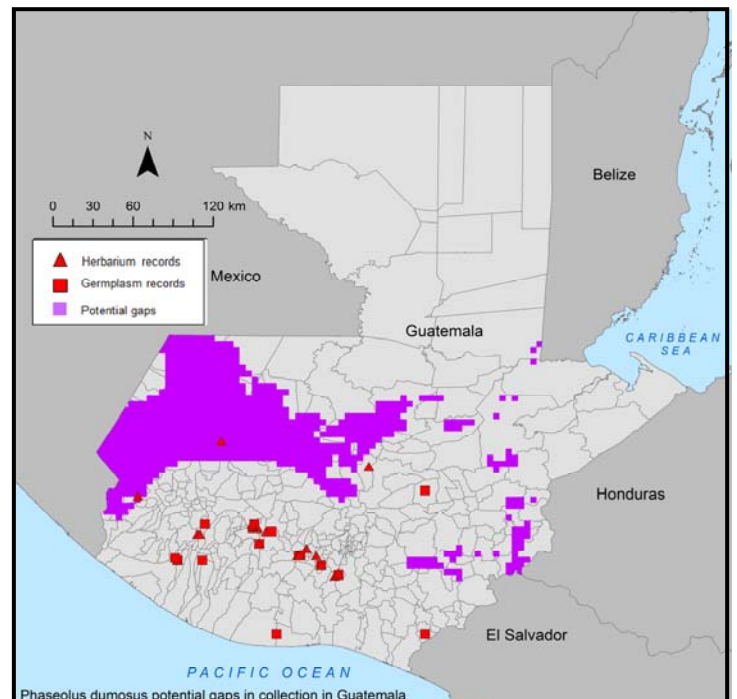
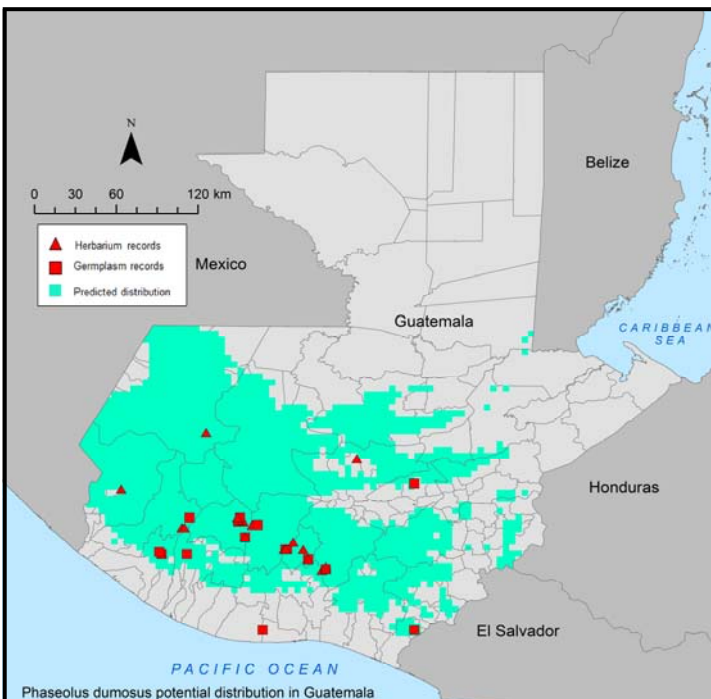
Humid pine-oak or humid montane forests, in and along ravines of small streams, deep, moist well drained, humus soil.

Distribution:

Mexico, Guatemala.

Altitude: 1300 - 1940 m

<i>Phaseolus dumosus</i>	May be confused with: <i>Phaseolus coccineus</i> var. <i>strigillosus</i>
Long, narrow bracteoles, 6-8mm long. Flower, purple.	Long, narrow bracteoles 5-6-10 mm long; pyramidal clusters of buds & flowers. Flower scarlet.



References: Freytag, G.F. & Debouck, D.G. (2002) Taxonomy, Distribution and Ecology of the Genus *Phaseolus* (Leguminosae-Papilionoideae) in North America, Mexico and Central America.

Gene Pool Tertiary relative of *Phaseolus acutifolius* A. Gray



RBG Kew

No seed
image
available



8-10 m



No Data

No Data

Primary Gene Pool relative relative of *Phaseolus lunatus* L.

HABIT: Usually perennial, woody, climbing vines with fibrous to somewhat fleshy rootstock. Stems pubescent or glabrous, 1-4.5 m long. Stipules triangular, persistent, 2-3.5 mm long.

LEAVES: Leaflets 3, variable in shape, but usually somewhat triangular-ovate, 5-12 cm long by 3-9 cm wide, base rounded or cuneate, apex acute or acuminate. Petiole 1.5-2 cm long, rachis 0.7-5 cm long, petiolules 3-5 mm long.

INFLORESCENCES: Axillary lax racemes, few-flowered, peduncle 1.5-30 cm long, rachis 1-7 cm long, bracts persistent, 1.5 mm long, bracteoles persistent, 1.5-2 mm long. Calyx campanulate, 2-3 mm, pubescent. Corolla white, yellowish, or pink; standard 5-10 mm long, apex emarginate; wings obovate; keel apex twisted for 1-2 turns. Ovary pubescent.

FRUIT: Pods oblong-falcate, 2-4-seeded, flattened, apex beaked.

SEEDS: Variable in colour, usually white or purple, reniform to rhomboid, longest dimension 1-1.5 cm, hilum whitish, 2.5-4 mm long.

Habitat:

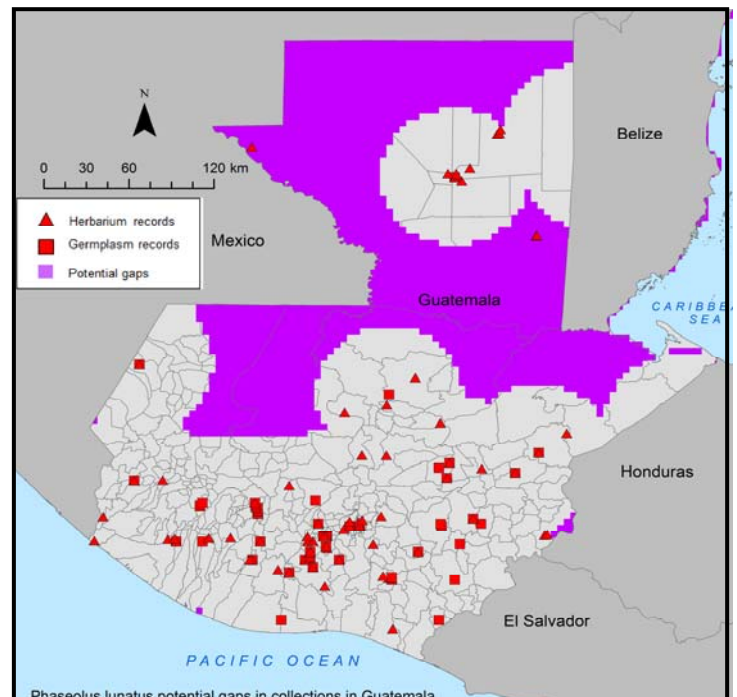
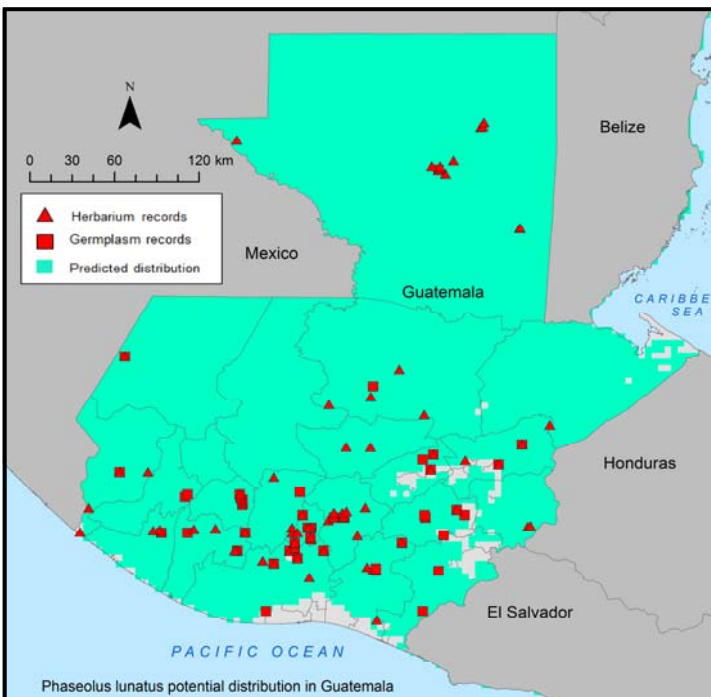
Grasslands, forests, cultivated areas.

Distribution:

Native to tropical America, widely cultivated and naturalized throughout the rest of the tropics and subtropics.

Altitude: 0 - 2250 m

<i>Phaseolus lunatus</i>	May be confused with: <i>Other Phaseolus species</i>
Woody vines with fibrous rootstock; bracteoles very small, c.1.5 mm long; leaflets usually somewhat triangular-ovate, nearly glabrous; pod oblong-falcate.	



References: Freytag, G.F. & Debouck, D.G. (2002) Taxonomy, Distribution and Ecology of the Genus *Phaseolus* (Leguminosae-Papilionoideae) in North America, Mexico and Central America.

Primary Gene Pool relative relative of *Phaseolus lunatus* L.



No seed image available



1-4.5 m

LC
PRELIM

Jan-Dec
Jan-Dec

Gene Pool Secondary relative of *Phaseolus acutifolius* A. Gray

HABIT: Small, slender, scrambling and climbing, indeterminate vine, 0.5-1 m long. Stems terete, 1.5-2 mm thick, mostly much less, much branched from near base, stipules triangular, acute, 1.25 mm long, 0.75 mm wide.

LEAVES: 7-12.5 cm long; petiole about 2.5-4.5 cm long; petiolules 5-10 mm long, covered by minute hispid and uncinata hairs; terminal leaflet very narrow, almost linear to somewhat broader, acutely rounded at base, 4-5.5-7 cm long, 4-6 mm wide, some to 1 cm wide at about midpoint.

INFLORESCENCE: Mostly a small erect pseudoraceme, mostly 1-flowered at each node, most nodes setting pods.

FLOWER: Light purple to pink 7-8 mm long, calyx campanulate 3-3.5 mm long, the blade 4 mm long, 5 mm wide, not laterally enrolled, slightly emarginate at tip and glabrous or with a few minute hispid hairs.

POD: Straight to falcate, somewhat compressed, 4-5 cm long, 5-6 mm wide, 1.5 mm thick pronounced sutures; beak straight.

SEED: Mostly oblongoid and smoothly rounded, sometimes with flattened ends, 3.4-4.5 mm long, 3-3.5 mm wide, 1.3-2.5 mm thick smooth, more or less shiny, black-speckled on light tan, sometimes almost completely solid black.

Habitat:

Rare. On rocky soils in dry grassland parks and along stream beds.

Distribution:

Mexico, Guatemala.

Altitude: 1000 - 2000 m

<i>Phaseolus parvifolius</i>	May be confused with: <i>Other Phaseolus species</i>
Seed less than 4 mm.	Seed more than 4 mm

Reported in Guatemala,
but no localities known.

All populations priority for
collection

References: Freytag, G.F. & Debouck, D.G. (2002), Taxonomy, Distribution and Ecology of the Genus *Phaseolus* in North America, Mexico and Central America

Gene Pool Secondary relative of *Phaseolus acutifolius* A. Gray



UNAM Mexico/JSTOR

No seed image available



0.5-1 m

DD

No Data
Nov

Secondary Genepool of *Phaseolus vulgaris* var. *vulgaris*

HABIT: A small climbing vine.

LEAVES: 8-12 cm long; petiole 3-4 cm long; terminal leaflet ovate, 4-6 cm long, 3-4.5 cm wide at 1/3 from base, acute, apiculate, dark olive green, densely pubescent.

INFLORESCENCE: Stout; peduncle 2-4 cm long, rachis 0-1 cm long, of 1-2 floral nodes and 2-4 flowers; bract broadly ovate acuminate, 2 mm long; pedicel 5-7 mm long; bracteoles broadly ovate, 5-6 mm long, 3-4 mm wide, heavily 9-nerved, acute to obtuse, glabrous, persistent.

FLOWER: Colour unknown; calyx near tubular, tube 2.5 mm long, 2.5 mm diameter, upper 2 teeth united into 1 entire, the lower 3 acute, the centre one somewhat longer, slightly pubescent; standard round, entire, 6 mm long, 7 mm wide, slightly reflexed at 2 mm from base.

POD: (immature) Falcate, 3-4 cm long, 6-7 mm wide, narrow at base and wider at apex; beak nearly straight, 2 mm long.

Habitat:

This species was found growing in cut over forest of oak with an understorey of Mimosoideae, Lamiaceae, Compositae, and Graminae. The soil was sandy and rocky from volcanic ash. Other *Phaseolus* species were found nearby.

Altitude: Collected at 1820 m

Distribution:

Known only from Sacatepéquez, Guatemala, on the slopes of Acatenango Volcano.

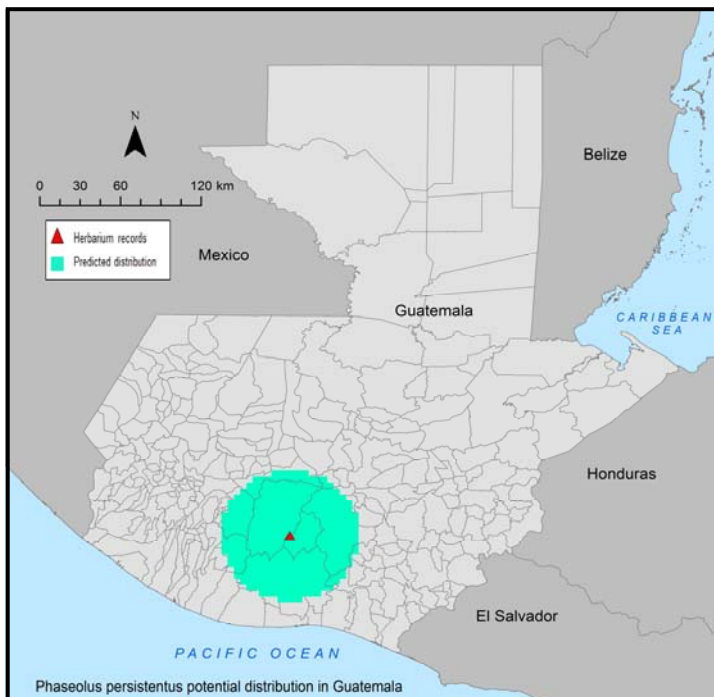
Phaseolus persistentus

Bracteoles broadly ovate, and flower parts persistent on the apex of the pod even when nearing maturity.



May be confused with:
Phaseolus leptostachyus

Bracteoles minute and scalelike.
Flowers not persisting on apex of developing pod.



References: Freytag GF & Debouck DG, Taxonomy Distribution and Ecology of the Genus *Phaseolus* in North America Mexico and Central America, Sida Botanical Miscellany 23 (2002).



RBG Kew

No seed
image
available

No Data

Dec

Gene Pool Tertiary relative of *Phaseolus acutifolius* A. Gray

HABIT: Perennial climbing indeterminate vine, tending to be annual, 1-6 m long, at ground level to 2-3 cm thick, strongly twining erect, often branching.

LEAVES: 8-16 cm long; petiole 3-5 cm long; petiolule 1.5-2.5 cm long, moderately covered with strigose and shorter uncinata hairs; pulvini 3-5 mm long, moderately covered with strigose hairs; terminal leaflet ovate to broadly ovate, 4-8 cm long, 3-7 cm wide at just below midpoint.

INFLORESCENCE: Pseudoraceme, often 2-4 flowers, sometimes many flowered, vertical to extending horizontally; peduncle 5-8 cm long, rachis 3-9 cm long, usually 4-6 flowering nodes but may have as many as 8 or more, with 2 flowers per node, heavily to moderately covered with short uncinata hairs; primary bracts broadly ovate, 4 mm long, 3.5 mm wide, heavily 8- to 12- nerved, glabrous to pubescent, minutely ciliate near tip.

FLOWER: Purple, white, or bicolor, infrequently veined purple; calyx bilabiate, 4 mm long, the upper two teeth united, scarcely elongated, emarginated.

POD: Nearly linear to slightly curved, 5-6.5 cm long, 5-7 mm wide, 3-5 mm thick, inflated but compressed, the beak curved, 3-6 mm long.

SEED: Oblong-rhomboid to spherical, 5-10 mm long, 4-7 mm wide, 3-4.5 mm deep.

Habitat:

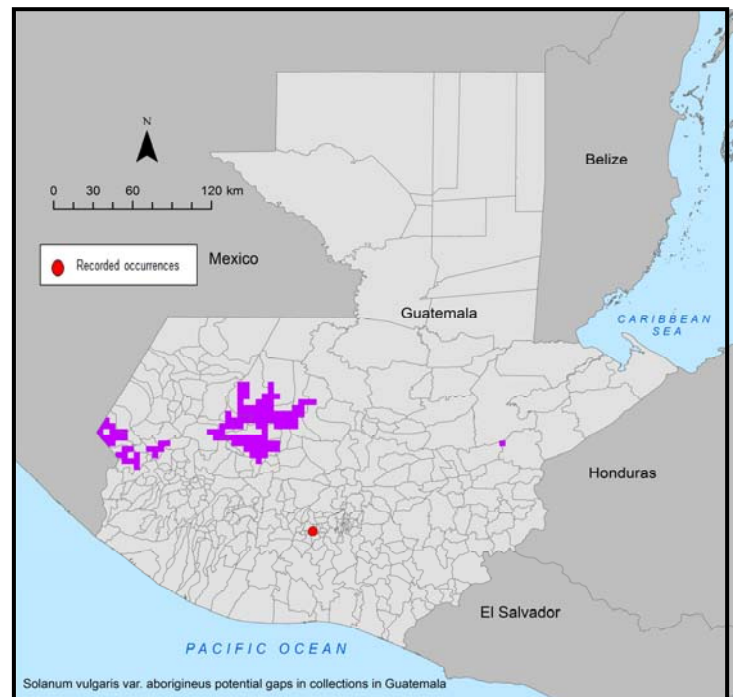
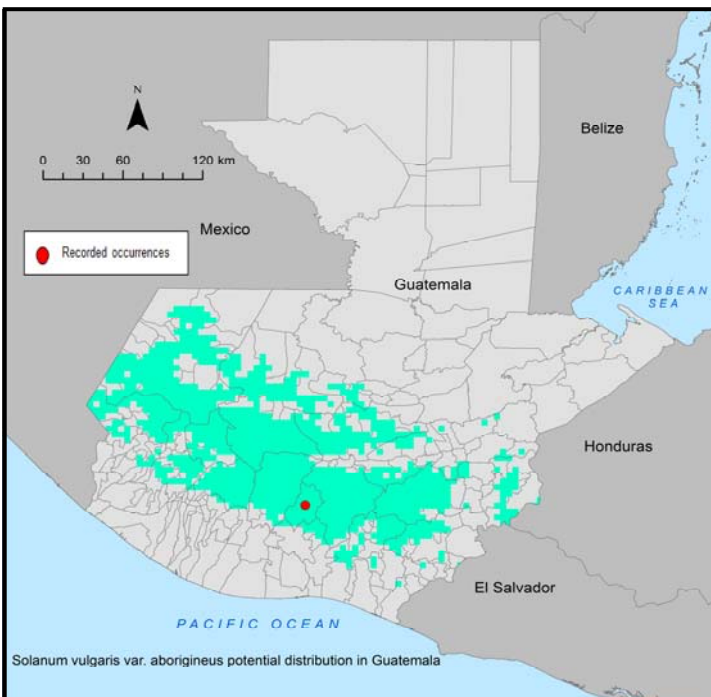
Dryer localities of desert to thorny scrub, on hill sides or steep slopes in open Pine-Oak forest.

Distribution:

Argentina, Guatemala, Peru, Venezuela.

Altitude: 1000 - 2800 m

<i>Phaseolus vulgaris</i> var. <i>aborigineus</i>	May be confused with: <i>Other Phaseolus species</i>
Large seed 5-10 mm long, 4-7 mm wide, 3-4.5 mm deep.	Normal <i>Phaseolus</i> seed ca. 6 mm long, 4.6 mm wide, 2.8 mm deep.



References: Freytag, G.F. & Debouck, D.G. (2002) Taxonomy, Distribution and Ecology of the Genus *Phaseolus* (Leguminosae-Papilionoideae) in North America, Mexico and Central America; Berglung-Brucher, O., Brucher, H., (1976). The South American Wild Bean (*Phaseolus aborigineus* Burk.) as Ancestor of the Common Bean.

Phaseolus vulgaris var. *aborigineus* (Burk.) C. Baudet

Gene Pool Tertiary relative of *Phaseolus acutifolius* A. Gray



No seed image available



1-6 m

LC
PRELIM



May-Jul

Aug-Nov

Gene Pool Tertiary relative of *Hordeum vulgare* L.**HABIT:** Perennial. Culms 20-70 cm long.**LEAVES:** Leaf-sheath auricles absent. Leaf-blade surface glabrous, or pubescent. 4-10 cm long, 3-6 mm wide.**INFLORESCENCE:** Racemes single; bilateral; 3-6 cm long. Rhachis fragile at the nodes; flattened. Spikelet packing broadside to rhachis. Rhachis internodes oblong; falling with spikelet above. Spikelets in threes. Fertile spikelets sessile; 1 in the cluster. Companion sterile spikelets pedicelled; 2 in the cluster. Pedicels oblong. Companion sterile spikelets well-developed; containing empty lemmas; lanceolate; dorsally compressed; 5-8 mm long; deciduous with the fertile.

Companion sterile spikelet glumes subulate; 5-8 mm long. Companion sterile spikelet lemmas 1; 1-3 mm long; muticous, or 1-awned; with 0-0.7 mm long awn. Fertile spikelets comprising 1 fertile florets; with a barren rhachilla extension.

Spikelets lanceolate; dorsally compressed; 4.8-7.9 mm long; falling entire; deciduous with accessory branch structures.

Glumes collateral; similar; gaping. Lower glume subulate; 4.8-7.9 mm long; 1 length of upper glume. Lower glume surface scabrous. Upper glume subulate; 4.8-7.9 mm long. Upper glume surface scabrous.

FLORETS: Fertile lemma lanceolate; 7 mm long; coriaceous, 5 -veined. Ovary apex pubescent. spike is often intense dark purple or greenish purple.**FRUIT:** Caryopsis with adherent pericarp; ellipsoid; sulcate on hilar side; hairy at apex. Hilum linear; 1 length of caryopsis.**Habitat:**

The species is only known from a very small area in the mountain range of Cuchumatanes in N Guatemala, occurs in marshy meadows or along streams, often temporarily submerged.

Distribution:

Guatemala.

Altitude: 3000 - 3500 m

<i>Hordeum guatemalense</i>	May be confused with: <i>Other Hordeum species</i>
Companion sterile spikelet lemmas 1; 1-3 mm long.	

Reported in Guatemala,
but no localities known.

All populations priority for
collection

Hordeum guatemalense Bothmer, N. Jacobsen & R.B. Jørg.

Gene Pool Tertiary relative of *Hordeum vulgare* L.



Jstor (Ada Hayden Herbarium)

No seed
image
available

0.2 -
0.7 m

DD

Oct

No Data

13

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

HABIT: Perennial. Rhizomes short. Culms erect; 100-300 cm long. Culm-nodes glabrous. Leaf-sheaths 22-42 cm long, smooth. Ligule lacking membrane, 1-7 mm long; obtuse. Leaf-blades lanceolate; 25-72 cm long; 10-40 mm wide.

FERTILE SPIKELETS: Spikelets comprising 2 basal sterile florets; 1 fertile florets; without rhachilla extension. Spikelets oblong; laterally compressed; 5-9 mm long; 2.5-2.8 mm wide; falling entire. Spikelet callus glabrous; base truncate.

GLUMES: Both absent or obscure.

FLORETS: Basal sterile florets similar; barren; without significant palea. Lemma of lower sterile floret linear; 2.5-4.5 mm long; 0.5 length of spikelet; 1 -veined; without lateral veins. Lemma of upper sterile floret linear; 2.5-4.5 mm long; 1 length of lower sterile floret. Fertile lemma oblong; laterally compressed; 5-9 mm long; coriaceous; keeled; 5 -veined. Lemma midvein spinulose. Lemma surface granulate. Lemma margins interlocking with palea margins. Lemma apex rostrate; 1 -awned. Principal lemma awn 8-10 mm long overall; limb scabrous. Palea elliptic; coriaceous; 3 -veined; 1-keeled. Palea keels spinulose. Palea surface granular. Palea apex acute.

FLOWER: Lodicules 2; membranous. Anthers 6, 3.5-4 mm long.

FRUIT: Caryopsis with adherent pericarp; oblong; 6-6.5 mm long. Disseminule comprising a floret.

Habitat:

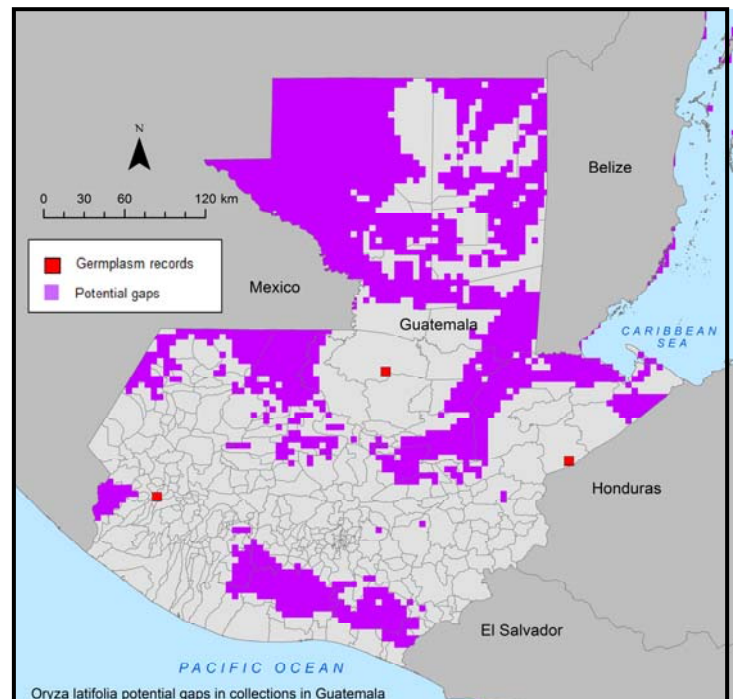
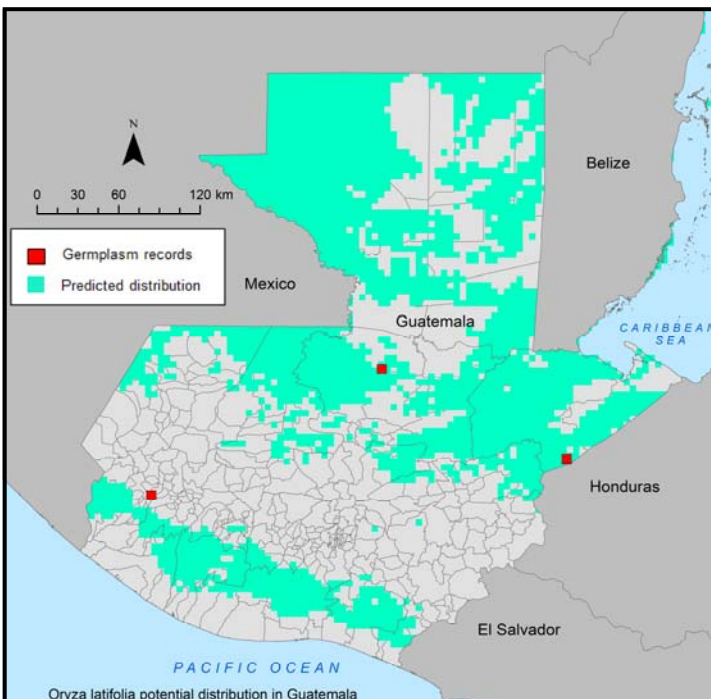
Low forest, rainforest, secondary growth forest, open woodland, undulating savanna, pasture, cultivated fields, open swamp. In or near water.

Distribution:

North America: Mexico. South America: Mesoamericana, Caribbean, northern South America, western South America, Brazil, and southern South America.

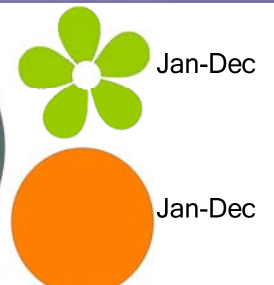
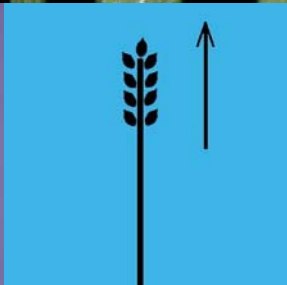
Altitude: 0 - 700 m

<i>Oryza latifolia</i>	May be confused with: <i>Oryza sativa</i>
Coarse growth, wide sharply-scabrous leaves, 10-40 mm wide, short ligule, form of branching and narrower spikelets, 5-9 mm long; 2.5-2.8 mm wide.	Leaf-blades 12-65 cm long; 4-18 mm wide. Spikelets 8-11 mm long; 2.5-3.5 mm wide.



References: GrassBase - The Online World Grass Flora; Nanda, J.S., Sharma, S.D., (2003) Monograph on Genus *Oryza*; Vaughan, D.A., (1994) The Wild Relatives of Rice.

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



Gene Pool Secondary relative of *Solanum tuberosum* L.

HABIT: Herbaceous perennial, 0.5-2 m tall, erect to ascending. Non-tuber bearing or with small ellipsoid tubers. Stems 2-13 mm in diameter at base of plant. Pseudostipules 2-10 mm long, lunate. Stem often purple tinged.

LEAVES: 14-48 cm long, 10-24 cm wide, Odd pinnate, finely pubescent adaxially and abaxially; petioles 1-5 cm long, lateral leaflet pairs (3-) 6-7 (-8), most distal lateral leaflets 4.5-10.1 cm long 1.8-2.7 cm wide, narrowly ovate to elliptical, apex acuminate, base oblique, rounded to cunate, sessile to subsessile with petiolules up to 2 mm long, terminal leaflet 6.2-12.5 m long. 1.8-3.9 cm wide, ovate to elliptical, apex acute to acuminate, base attenuate, interjected leaflets 4-31.

INFLORESCENCE: Generally in distal half of the plant; peduncle 2.8-9.5 cm long .

FLOWERS: 3-38; pedicels 15-30 cm long, calyx 4.5-12.5 mm long, lobes acute to long-attenuate, acumens 1-4 mm long, corolla 2-3 cm in diameter, acumens 0-6 mm, edges of corolla flat, not folded dorsally, blue to purple abaxially and adaxially, anthers 4-5.5 mm long, connate; style 5-8 mm long exceeding stamens by 2-3 mm, straight.

Habitat:

Humus, sandy or clayey soils of mountain rain forests, alpine thickets, shaded barrancas or stream-banks.

Distribution:

Widespread from northwestern Mexico (Durango and Nayarit) south to Honduras.

Altitude: 1900 - 3400 m

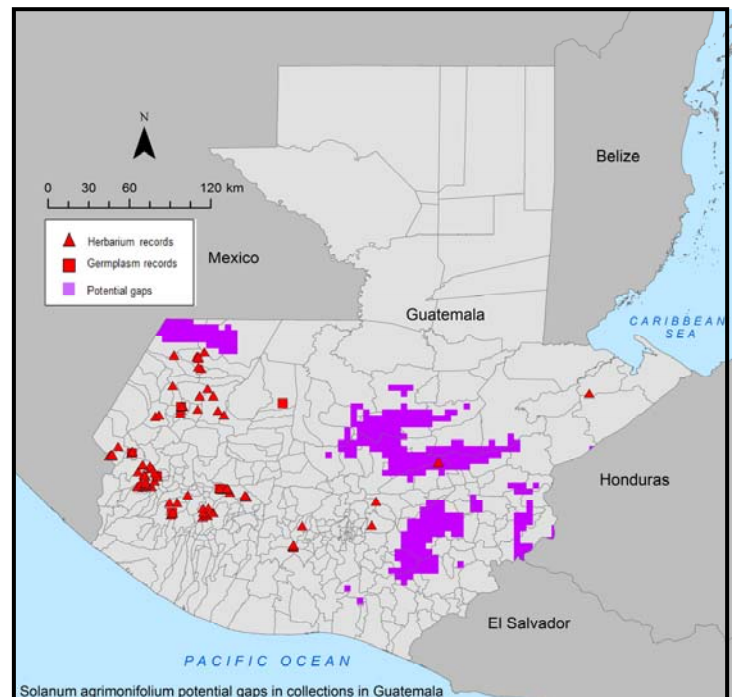
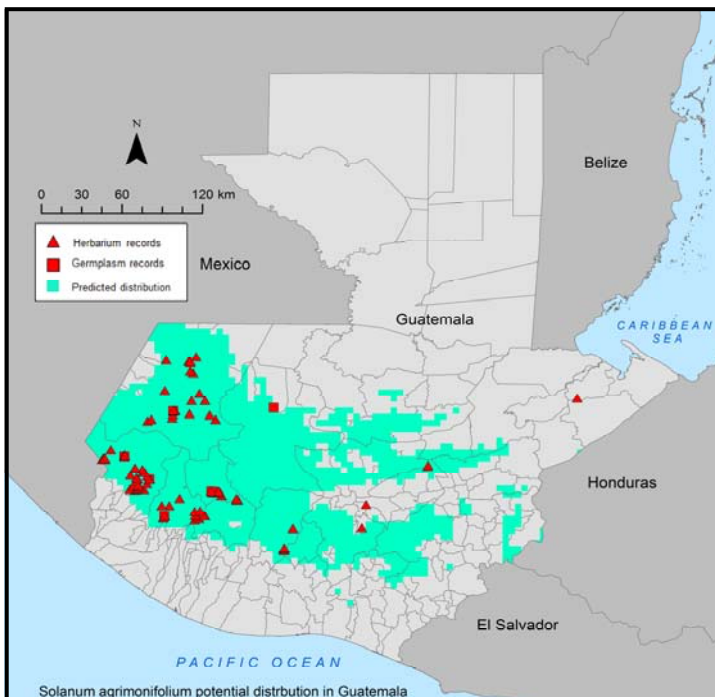
Solanum agrimoniifolium

May be confused with:
Solanum canense

Interstitial leaflets sessile, leaflets sessile or subsessile.



Leaflets and interstitial leaflets have a slender petiolule.



References: Freytag, G.F. & Debouck, D.G. (2002), Taxonomy, Distribution and Ecology of the Genus Phaseolus in North America, Mexico and Central America

Gene Pool Secondary relative of *Solanum tuberosum* L.



No seed image available



0.5-2 m

LC PRELIM



Jun-Mar



Jun-Mar

HABIT: Herbaceous tuber-bearing perennials up to 1 m tall. Stems 3-6 mm in diameter at base of plant.
LEAVES: Odd-pinnate, 2-17 cm long, 0.9-7.2 cm wide, simple, margins entire but often sinuate, broadly ovate, lanceolate to linear lanceolate, apex acute to obtuse, base rounded, cuneate to decurrent, densely pubescent adaxially and abaxially; petioles 0.8-7 cm long.
FLOWERS: Calyx 3-8.5 mm long, lobes oblong, apiculate, corollas 1.3-2.1 cm in diameter, stellate, without acumens, edges of corolla flat, not folded dorsally, white-cream to light-yellow.
INFLORESCENCE: Dichasially branched, ebracteate, monochasial or dichasial cyme, 2-3 forked, generally in the distal half of the plant, with 5-35 flowers, all flowers perfect, peduncle 0.3-4.5 cm long; pedicels 3-17 mm long, articulate between the proximal 1/4 and the distal 1/4.
FRUITS: 1-1.3 cm in diameter, globose, light green throughout.
SEEDS: Green-white throughout, ovoid, ca. 2 mm long, with a thick covering of "hair-like" lateral walls of the testal cells that make the seeds mucilaginous when wet.

Habitat:

Among grasses, cacti, tropical deciduous forests, scrub and oak forests, pine forests, often in shallow or dry rocky soil, steep rocky slopes, among piles of stones or along fencerows, railroad tracks, sometimes in cultivated fields.

Altitude: 1200 - 2300 m

Distribution:

Mexico, Guatemala, Colombia, Honduras.

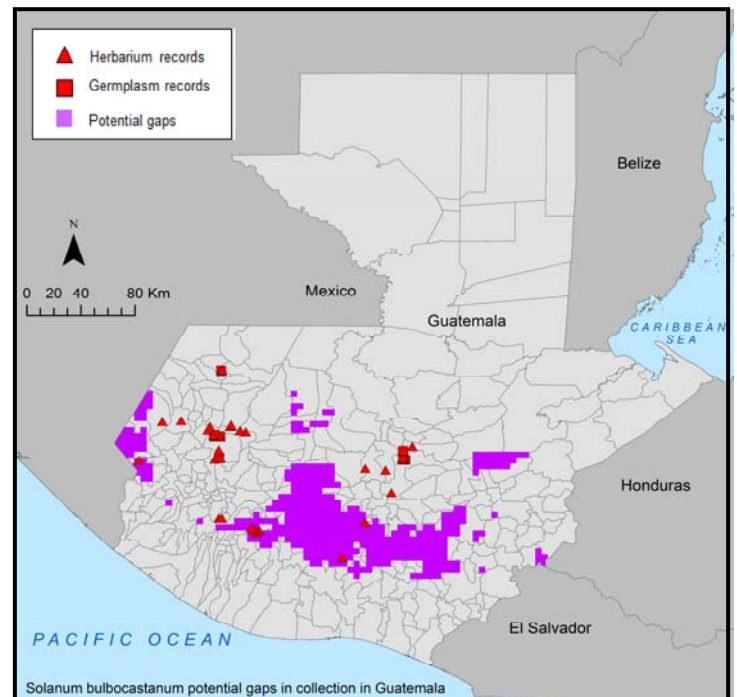
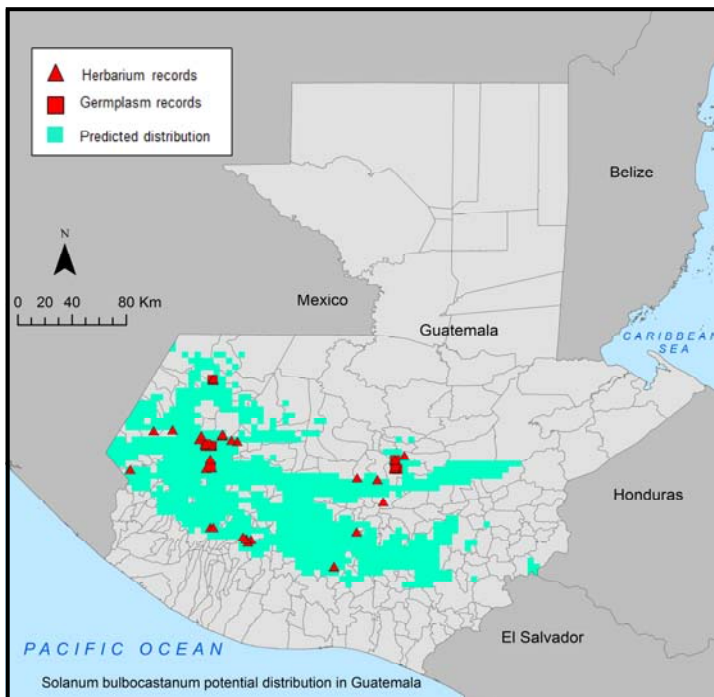
Solanum bulbocastanum

Cream to light yellow corollas. Up to 1 m tall.



May be confused with:
S. clarum and *S. morelliforme*

Much smaller plants, white corollas.



References: <http://solanaceaesource.org/solanaceae/solanum-bulbocastanum>



No seed image available



Up to 1 m



Jul-Nov

Jul-Nov

Gene Pool Secondary relative of *Solanum tuberosum* L.

HABIT: Herbaceous tuber-bearing perennials 0.15-0.35 m tall, terrestrial, but growing in epiphytic-like conditions in moss, or more rarely epiphytic. Stems 2-3 mm in diameter at base of plant.

LEAVES: Odd-pinnate, 2-6 cm long, 1.5-4.2 cm wide, simple, ovate, apex acute to acuminate, base cordate to truncate or attenuate, finely pubescent adaxially and abaxially; petioles 1-3 cm long.

INFLORESCENCE: A dichasially branched, ebracteate, monochasial or dichasial cyme, 2-3 forked, generally in the distal half of the plant, with 4-15 flowers, all flowers perfect, peduncle 1.2-6 cm long; pedicels 10-15 mm long, articulate between the proximal 1/4 and the distal 1/4.

FLOWERS: With calyx 2-5 mm long, lobes acute to mucronate, acumens 1-1.5 mm long. Corollas 1.5-2.3 cm in diameter, stellate, without acumens, edges of corolla flat, not folded dorsally, white with tones of violet. Anthers 3-5.5 mm long, connate, yellow, apically poricidally dehiscent and often maturing to a short introrse apical slit, filaments 1-4 mm long. Ovary with style 6-7.5 mm long, exceeding stamens by 2-3 mm, straight, with stigma globose.

FRUITS: 0.5-0.8 cm in diameter, globose, yellow-green to green.

SEEDS: Green-white throughout, ovoid, ca. 2 mm long, with a thick covering of "hair-like" lateral walls of the testal cells that make the seeds mucilaginous when wet.

Habitat:

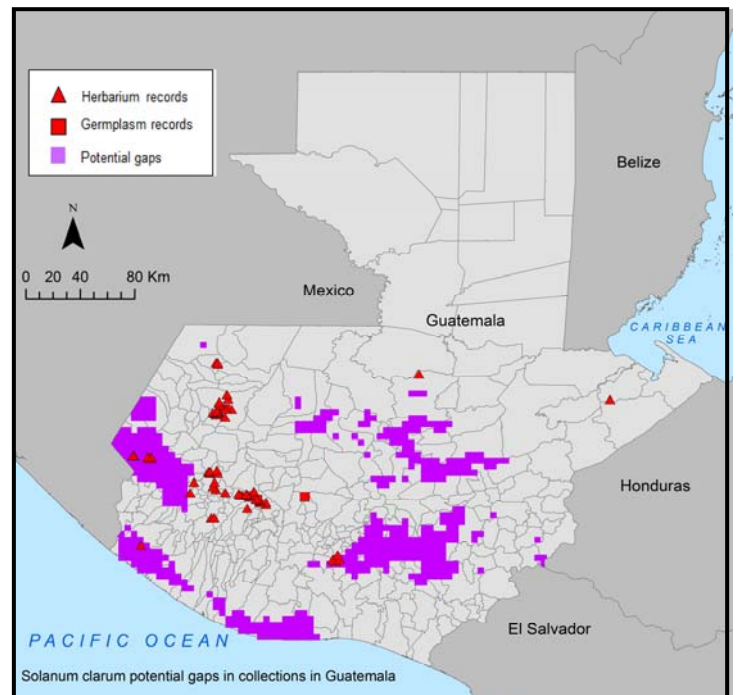
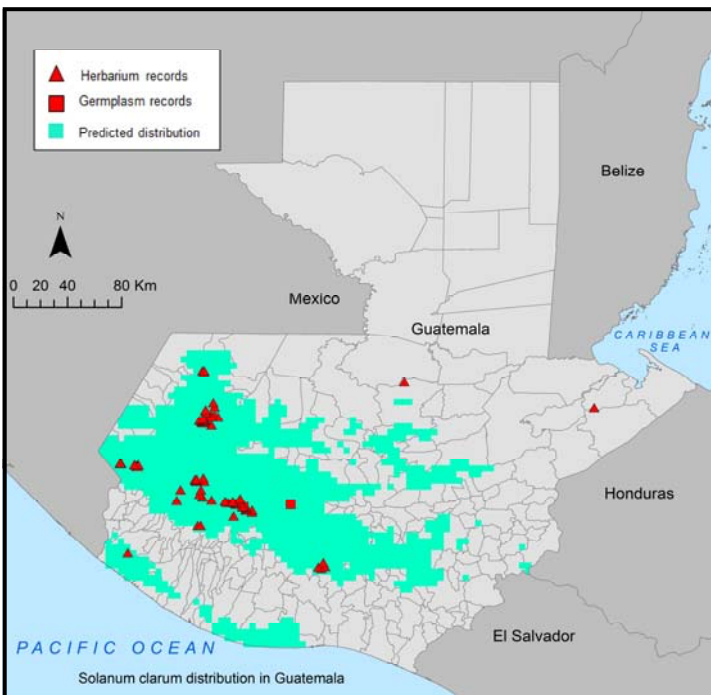
Terrestrial, but growing in epiphytic-like conditions in moss, or more rarely epiphytic, under junipers and pine.

Distribution:

Mexico, Guatemala.

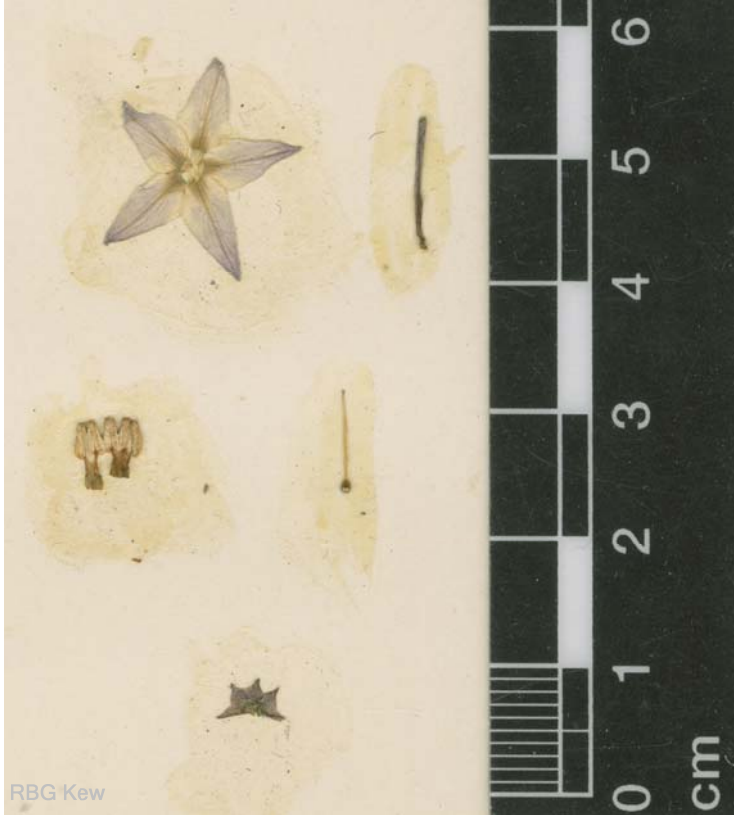
Altitude: 2740 - 3800 m

<i>Solanum clarum</i>	May be confused with: <i>Solanum bulbocastanum</i>
Corollas light yellow. Leaves 2-6 cm long. 0.15-0.35 m tall.	Cream/yellow corollas, much bigger plant. Leaves 2-17 cm long. Up to 1 m tall.



References: <http://solanaceaesource.org/taxonomy/term/106301/descriptions>

Gene Pool Secondary relative of *Solanum tuberosum* L.



No seed image available



0.15-0.35 m



Jul-Nov

Jul-Nov

HABIT: Herbaceous tuber-bearing perennials up to 0.6 m tall, varying from a basal rosette to erect. Stems 3-6 mm in diameter at base of plant.

LEAVES: Odd-pinnate, 3.5-20 cm long, 1.5-10 cm wide, finely to coarsely pubescent adaxially and abaxially. Petioles 1.5-3 cm long. Lateral leaflet pairs 2-4, the size of the lateral leaflets diminishing gradually towards the base of the leaf.

INFLORESCENCE: A dichasially branched, ebracteate, monochasial or dichasial cyme, 2-3 forked, generally in the distal half of the plant, with 5-10 flowers, all flowers perfect, peduncle 0.2-1.9 cm long; pedicels 3-15 mm long.

FLOWERS: With calyx 4.5-8 mm long, lobes acute, minute, acumens up to 1mm long. Corollas 1.5-2.6 cm in diameter, rotate, edges of corolla flat, not folded dorsally, violet to violet-purple adaxially, uniform abaxially or lighter purple in the rays and interpetiolar tissue. Anthers 2-4.5 mm long, connate, yellow, apically poricidally dehiscent and often maturing to a short introrse apical slit, filaments 1-4 mm long. Ovary with style 5-6 mm long, exceeding stamens by 2mm.

SEEDS: Green-white throughout, ovoid, ca. 2 mm long, with a thick covering of "hair-like" lateral walls of the testal cells that make the seeds mucilaginous when wet.

FRUITS: 1-2.5 cm in diameter, globose to ovoid, light to medium green, sometimes with smooth white dots.

Habitat:

High elevations in fir and pine or oak or alder or juniper forests, often in very rich organic soil in clearings or edges of dense forests, sometimes in deep shade, among shrubs and forest undergrowth, roadside thickets, grasslands.

Altitude: 1900 - 3700 m

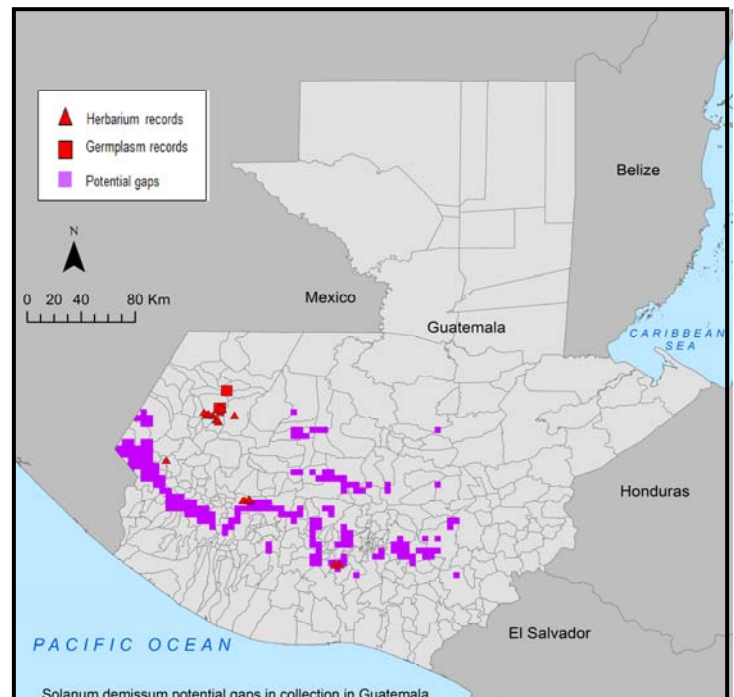
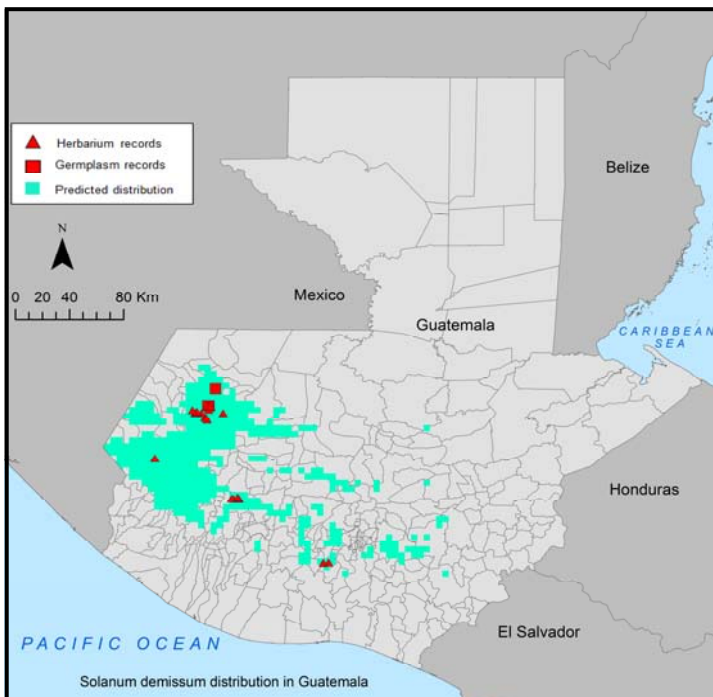
Distribution:

Mexico and Guatemala.

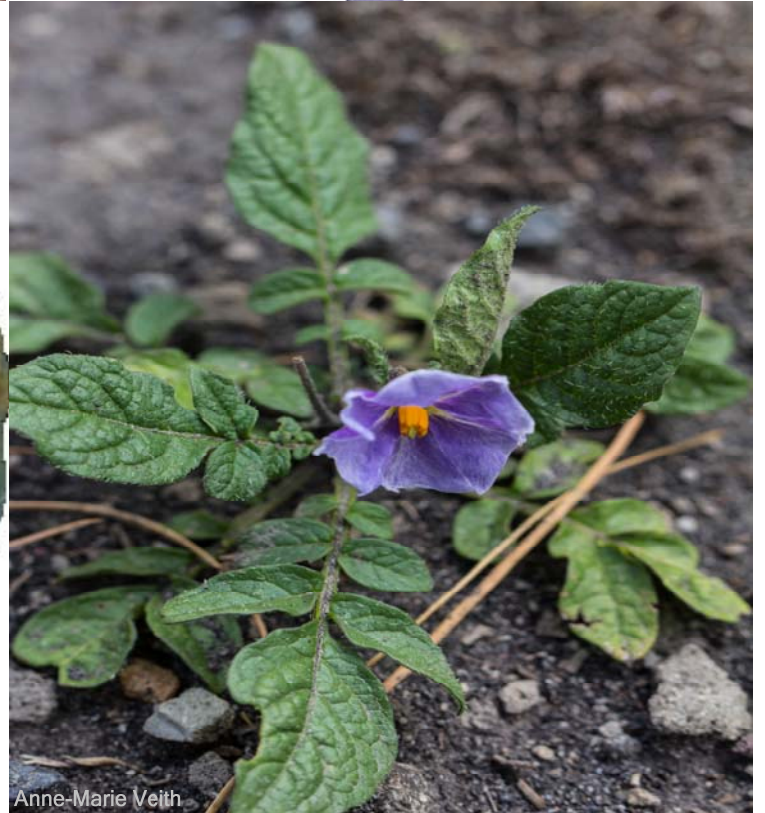
Solanum demissum

May be confused with:
Other Solanum species

Generally easily distinguished by its high pedicel articulation (in the distal 1/4 of the pedicel) and inflorescences in the proximal 1/2 of the plant.



References: <http://solanaceaesource.org/taxonomy/term/106594/descriptions>



No seed image available



Up to 0.6 m



May-Oct

May-Oct

Gene Pool Secondary relative of *Solanum tuberosum* L.

HABIT: Herbaceous tuber-bearing perennials 0.1-0.6 m tall, herbaceous, epiphytic, commonly on pine and oak trees, growing in leaf mould and moss or more rarely on ground at base of trees. Stems 2-3 mm in diameter at base of plant.

LEAVES: Simple, 3-14 cm long, 1.5-4.9 cm wide, elliptic to narrowly ovate, apex acute to acuminate, base attenuate, finely pubescent adaxially and abaxially; petioles 1-4 cm long. Pseudostipules 5-15 mm long, lanceolate to narrowly ovate.

INFLORESCENCE: Dichasially branched, ebracteate, monochasial or dichasial cyme 2-3 forked, generally in the distal half of the plant, with 7-15 flowers, all flowers perfect, peduncle 0.7-2.2 cm long; pedicels 10-15 mm long.

FLOWERS: With calyx up to 1.5-2 mm long, lobes acute to mucronate, acumens up to 0.5 mm long. Corollas 1.5-2 cm in diameter, stellate, without acumens, edges of corolla flat, not folded dorsally, white with tones of violet. Ovary with style 6-8 mm long, about equaling stamens, straight, with stigma globose.

FRUITS: 0.5-0.8 cm in diameter, globose, yellow-green to green throughout. Seeds green-white throughout, ovoid, ca. 2 mm long, with a thick covering of "hair-like" lateral walls of the testal cells that make the seeds mucilaginous when wet.

SEEDS: Green-white, ovoid, ca. 2 mm long.

Habitat:

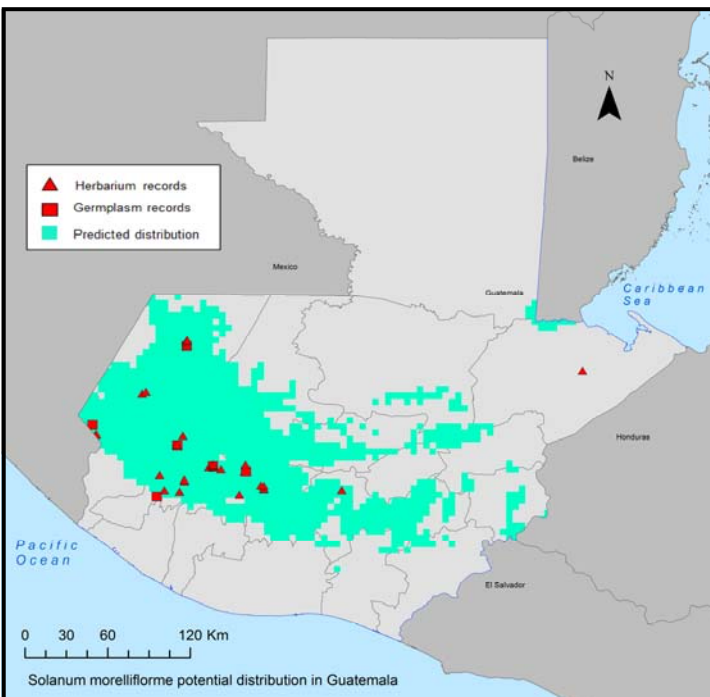
Almost exclusively as an epiphyte on horizontal branches of mature arbutus, cyprus, elm, juniper, pine, or oak trees, often in moss and organic litter.

Distribution:

Mexico, Guatemala, Honduras.

Altitude: 1870 - 3050 m

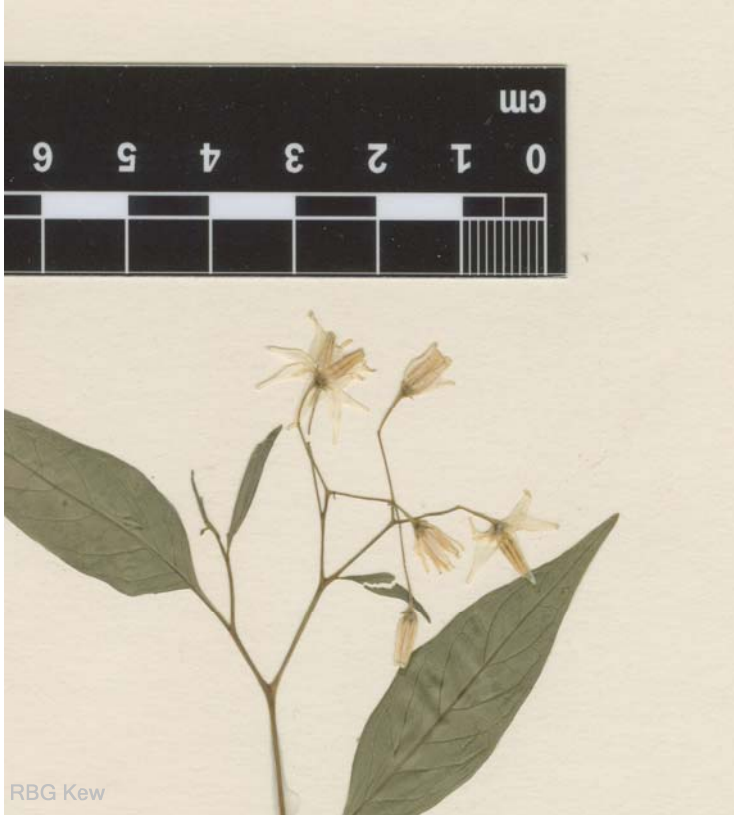
<i>Solanum morelliforme</i>	May be confused with: <i>Other Solanum species</i>
Almost exclusively as an epiphyte. Corolla white; leaves elliptic to narrowly ovate.	



All populations priority for collection

References: <http://solanaceaesource.org/taxonomy/term/108324/descriptions>

Gene Pool Secondary relative of *Solanum tuberosum* L.




No seed image available




0.1-0.6 m

LC PRELIM



Jul-Oct



Jul-Oct

Gene Pool Tertiary relative of *Solanum melongena* L.

HABIT: Shrubs to 3 m, many-branched from the base, armed or unarmed. Young stems terete, pubescent with a mixture of short and long stalked porrect trichomes to 0.5 mm.

LEAVES: Simple, (5.5-) 9-17 cm long, (4-)5-12 cm wide, ca. 1.5 times as long as wide, elliptic to ovate; adaxial surfaces evenly and sparsely to densely pubescent with sessile porrect stellate trichomes, abaxial surfaces densely pubescent with short to long-stalked stellate trichomes to 0.5 mm long, the stalks multiseriate; apex acute to acuminate; petioles 1.5-4 cm long, densely stellate-pubescent.

INFLORESCENCES: 2-6 cm long, 15-20 mm diam., 1-4 times branched, with more than 50 flowers, peduncle 0.5-2 cm long; pedicels 1-1.2 cm long.

FLOWERS: White, 5-numerous, all perfect. Calyx 4-6 mm long, sparsely to densely stellate-pubescent and glandular, the lobes 3-4 mm long, the caudate tip ca. 1 mm long. Corolla 1.5-2 cm in diameter, stellate, lobed 1/2 to 2/3 of the way to the base, the lobes 7-9 mm long, 4-5 mm wide.

FRUIT: A globose berry, 5-40+ per infructescence, 1-1.3 cm in diameter, pale grayish green.

SEEDS: Up to 100 per berry, 2.5-3 mm long, 2-2.5 mm wide, flattened reniform, pale yellowish tan, the surfaces minutely pitted to smooth.

Habitat:

Among grasses, cacti, tropical deciduous forests, scrub and oak forests, pine forests, often in shallow or dry rocky soil, steep rocky slopes, among piles of stones or along fencerows, railroad tracks, sometimes in cultivated fields.

Altitude: 1870 - 3050 m

Distribution:

Widespread throughout central Mexico (southern Jalisco to Querétaro and Veracruz), south to southeastern and south-central Guatemala, to southern Honduras.

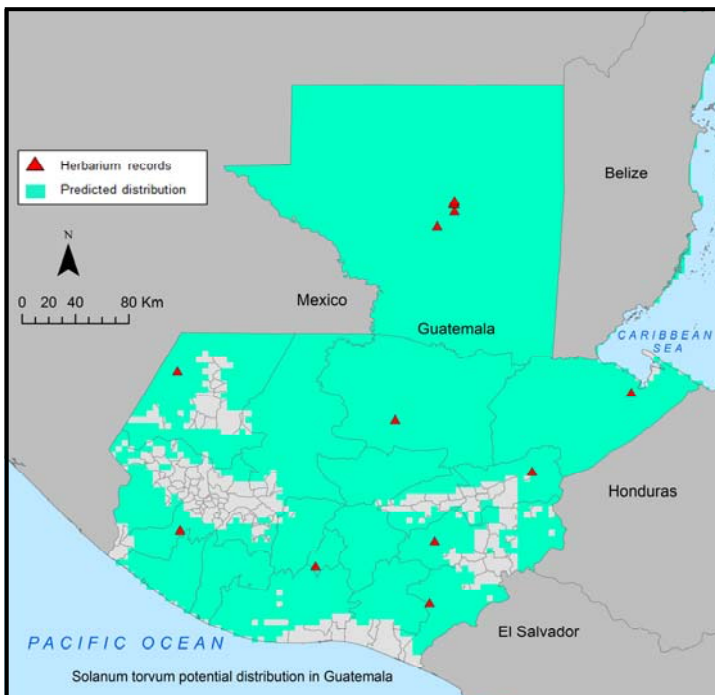
Solanum torvum

May be confused with:
Solanum anguivi

Fruit green at maturity, inflorescences with small simple, gland-tipped trichomes. Flowers 15-20mm



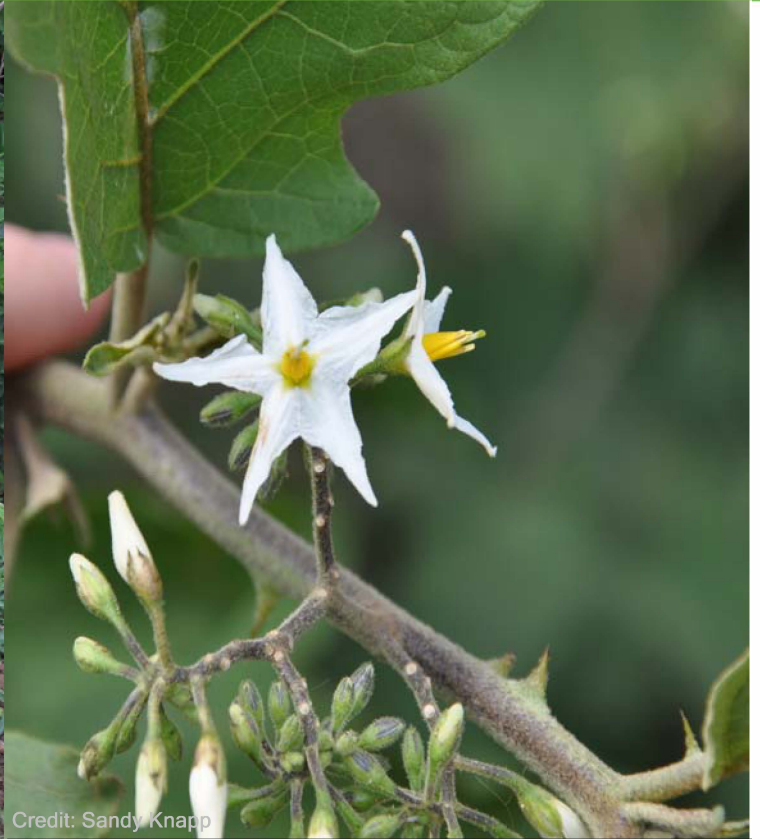
Red fruit and smaller flowers, 8-15mm diam.



All populations priority for collection

References: <http://solanaceaesource.org/taxonomy/term/105995/descriptions>

Gene Pool Tertiary relative of *Solanum melongena* L.



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Up to 3 m

LC
PRELIM



Jan-Dec

Jan-Dec

Appendix - Synonyms

Taxon		Synonyms
Hordeum guatemalense Bothmer, N. Jacobsen & R.B. Jørg.	1	No Synonyms
Ipomoea ramosissima (Poiret) Choisy	2	Convolvulus ramosissimus Poir.; Ipomoea dichotoma var. trilobata Meisn.; Ipomoea ebracteata (Poir.) Choisy; Ipomoea perplexa L.O. Williams; Ipomoea quesadana Standl.; Ipomoea ramosissima f. rosea (Hallier) O'Donell; Ipomoea ramosissima var. rosea Hallier
Ipomoea tiliacea (Willdenow) Choisy in D.C.	3	Convolvulus fastigiatus Roxb.; Ipomoea fastigiata (Roxb.) Sweet; Convolvulus tiliaceus Willd.
Ipomoea trifida (H.B.K.) G.Don.	4	Convolvulus trifidus Kunth; Ipomoea confertiflora Standl.; Ipomoea radicans Blume; Ipomoea ramonii Choisy; Ipomoea roseana House
Oryza latifolia Desv.	5	Oryza latifolia var. grandispiculis A.Chev.; Oryza alta Swallen; Oryza platyphylla Schult. & Schult.f.; Oryza sativa var. latifolia (Desv.) Döll
Phaseolus coccineus var. coccineus L.	6	No Synonyms
Phaseolus coccineus var. guatemalensis Freytag	7	No Synonyms
Phaseolus coccineus var. pubescens Freytag	8	No Synonyms
Phaseolus coccineus var. strigillosus (Piper) Freytag	9	Phaseolus strigillosus Piper
Phaseolus dumosus Macfad.	10	No Synonyms
Phaseolus lunatus L.	11	Dolichos tonkinensis Bui-Quang-Chieu; Phaseolus bipunctatus Jacq.; Phaseolus ilocanus Blanco; Phaseolus inamoenus L.; Phaseolus limensis Macfad.; Phaseolus lunatus var. lunatus Phaseolus lunatus var. macrocarpus (Moench) Benth.; Phaseolus macrocarpus Moench; Phaseolus portoricensis Spreng.; Phaseolus puberulus Kunth; Phaseolus rosei Piper; Phaseolus saccharatus Macfad.; Phaseolus tunkinensis Lour.; Phaseolus vexillatus "sensu Blanco, non L."; Phaseolus viridis Piper; Phaseolus vulgaris "sensu Blanco, non L."; Phaseolus xuaresii Zuccagni

Appendix - Synonyms

Phaseolus parvifolius Freytag	12	No Synonyms
Phaseolus persistentus Freytag & Debouck	13	No Synonyms
Phaseolus vulgaris var. aborigineus (Burkart) Baudet	14	Phaseolus vulgaris subsp. aborigineus (Burkart) Burkart & Brucher
Solanum agrimonifolium Rydb.	15	No Synonyms
Solanum bulbocastanum Dunal	16	Solanum symphysicaulis Pav. ex Dunal
Solanum clarum Correll	17	No Synonyms
Solanum demissum Lindl.	18	Solanum alpicum Standl. & Steyerl.; Solanum demissum var. perotatum Hawkes; Solanum stoloniferum var. pumilum M. Martens & Galeotti
Solanum morelliforme Bitter & Munch	19	No Synonyms
Solanum torvum Sw.	20	Solanum ficifolium Ortega; Solanum mayanum Lundell