

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

Brazil



Seed Collecting Guide

Please cite this guide as:

Embrapa & RBG Kew (2016) Brazil 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: *Ipomoea grandifolia*, CREDIT: Paulo Schwirkowski;

TOP RIGHT: *Eleusine tristachya*, CREDIT: José Francisco Montenegro Valls;

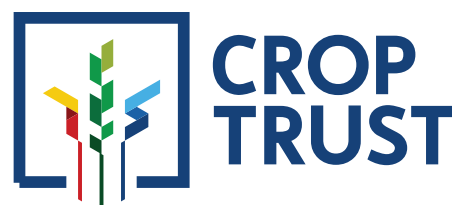
BOTTOM LEFT: *Oryza sativa*, CREDIT: Neil Palmer/CIAT/Flickr;

BOTTOM RIGHT: *Solanum commersonii*, CREDIT: Gustavo Heiden

This work was undertaken as part of the initiative "Adapting Agriculture to Climate Change" which is supported by the Government of Norway and the project "Filling the gaps in Brazilian crop wild relatives in ex situ collections: germplasm collecting of wild *Eleusine*, *Ipomoea*, *Oryza* and *Solanum*."

The project is managed by the Global Crop Diversity Trust with Embrapa, Brazil and 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 programmes 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



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.

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

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.

The project "Filling the gaps on Brazilian crop wild relatives in ex situ collections: germplasm collecting of wild *Eleusine*, *Ipomoea*, *Oryza* and *Solanum*", is lead by Embrapa, Brazil. The data for this guide was compiled by Gustavo Heiden (Embrapa) and Richard Allen (RBG Kew) with the contributions of D. Netto & J.F.M. Valls (*Eleusine*); A.L. Moreira & M.B. Medeiros (*Ipomoea*); A. Abreu, P. Hideo & M.B. Medeiros (*Oryza*) and L.H. Dal Molin, F.A.Costa, C.M Castro & G. Heiden (*Solanum*).

Embrapa

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 was prepared by:

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Royal Botanic Gardens, Kew

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

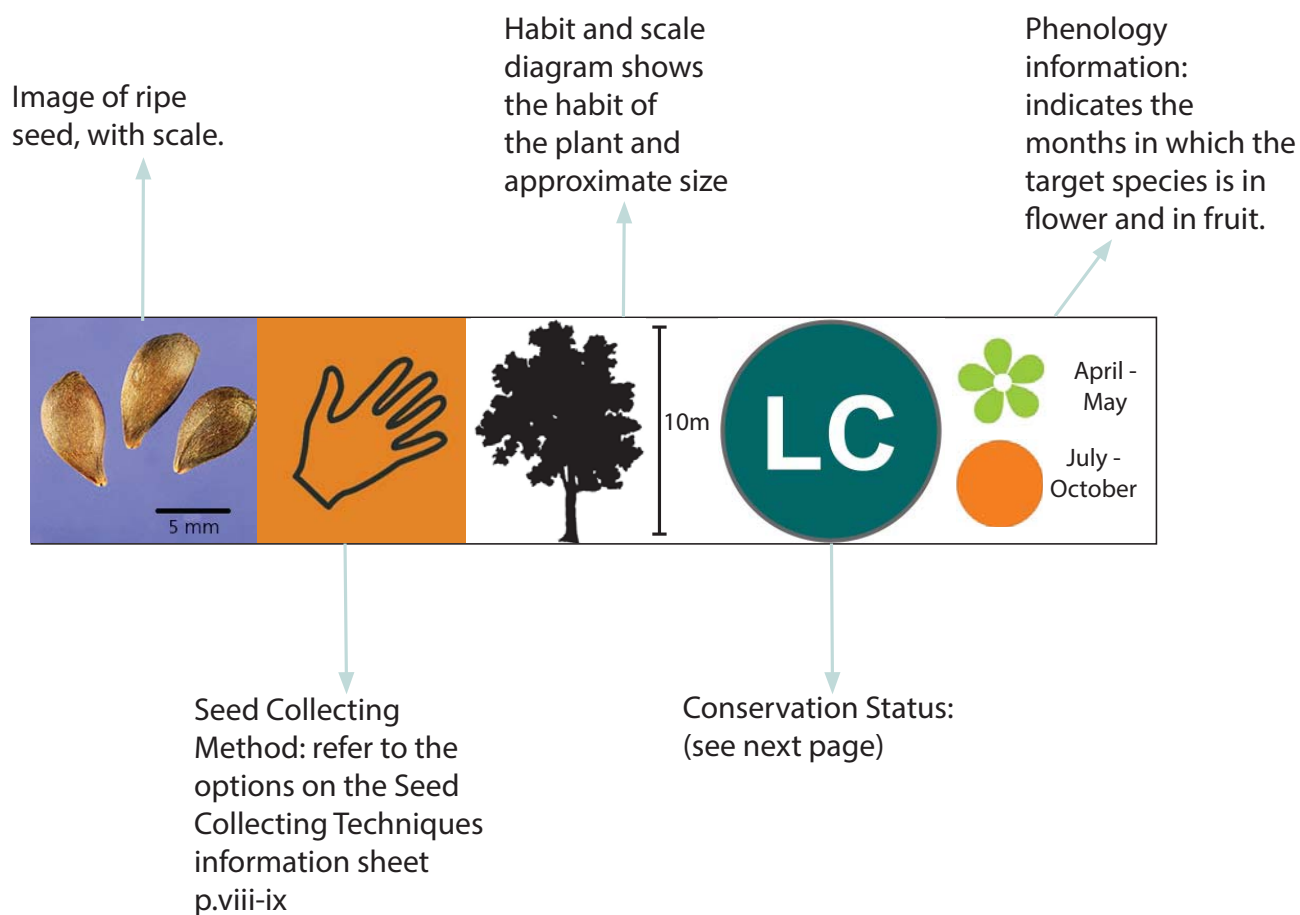
The species included in this guide are a selection of the wild relatives of the 29 key crops which this project covers (African Rice, Alfalfa, Apple, Aubergine, Bambara groundnut, Banana, Barley, Bread Wheat, Butter Bean, Carrot, Chickpea, Common Bean, Cowpea, Faba bean, Finger millet, Grasspea, Lentil,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

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

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

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

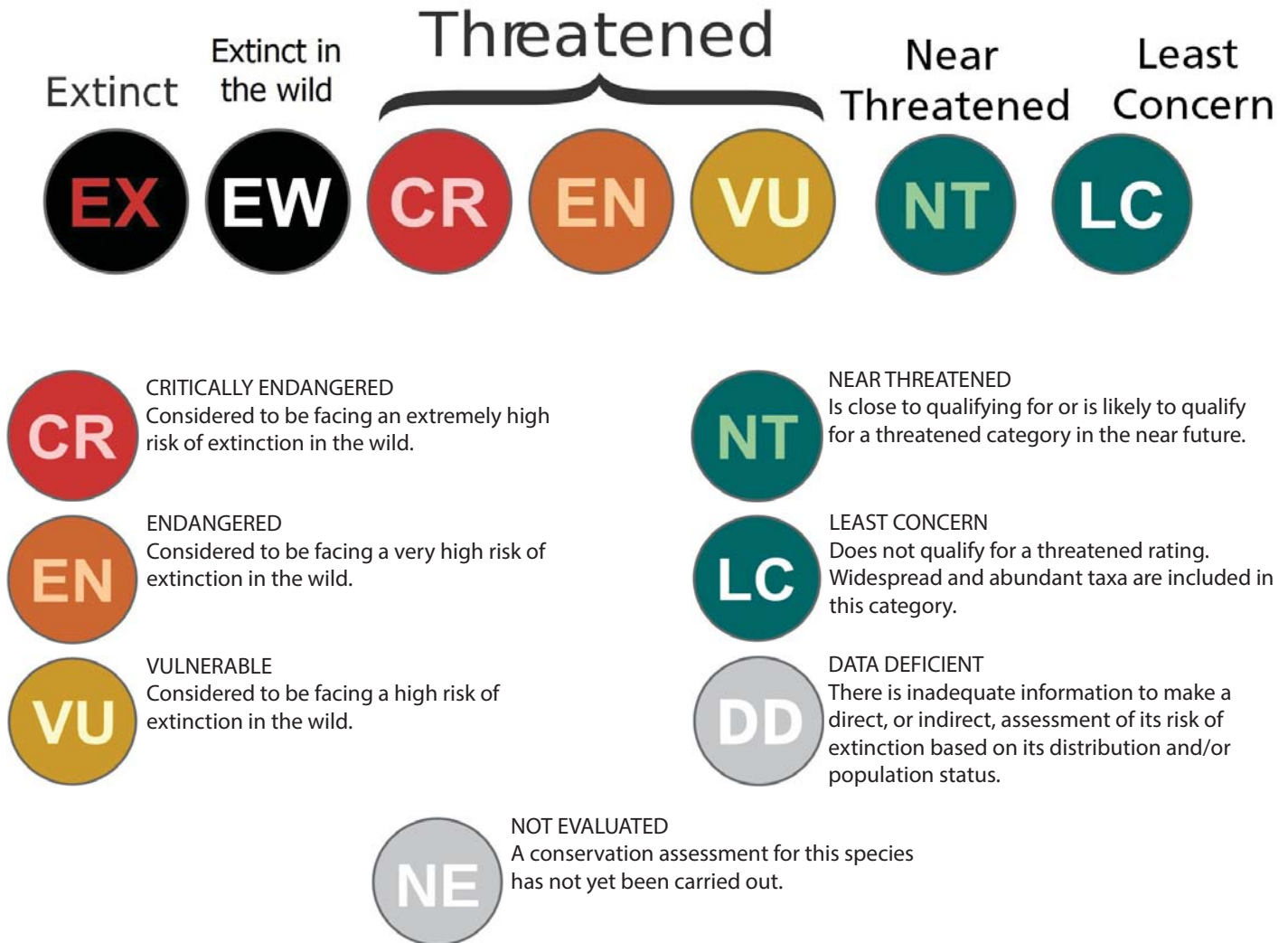
On each species profile, there is a collection of images to help identify the target species, accompanied by a series of symbols :



Conservation Assessments

Conservation Status:

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

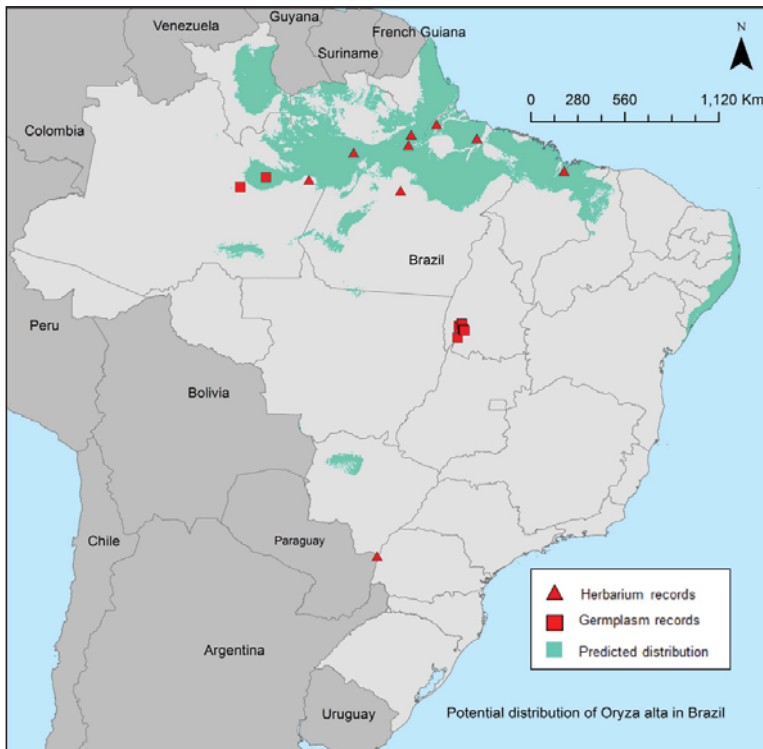


Where a full conservation assessment has not been completed, a preliminary conservation rating may be indicated. Preliminary assessments are produced using specimen locality data and GIS, which calculates two parameters accepted by IUCN as suitable measures of range: namely extent of occurrence (EOO)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

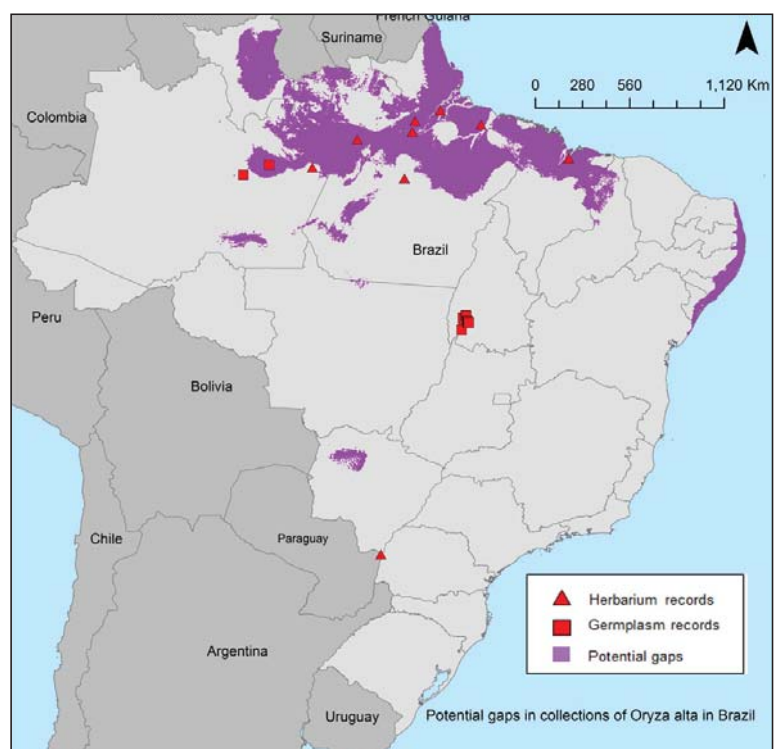
Where a preliminary conservation assessment has been calculated this is indicated by the word PRELIM:



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 data supplied by CIAT.



The second map shows the potential gaps in gene bank collections, where seed collections should be targeted, based on data supplied by CIAT.



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.

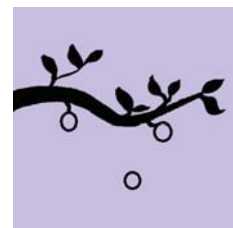


This is a very effective technique when:

- 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.

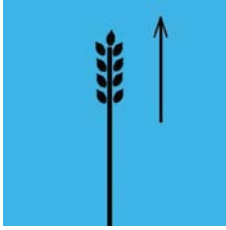
This technique may not be suitable for light, plumed seed from *Bombacaceae* and *Asclepiadaceae*, which may be carried away by air currents.



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

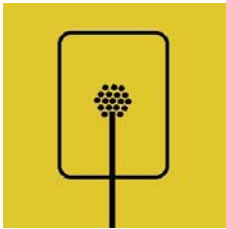


The stripping technique is most suitable for:

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

Bagging seed-heads

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

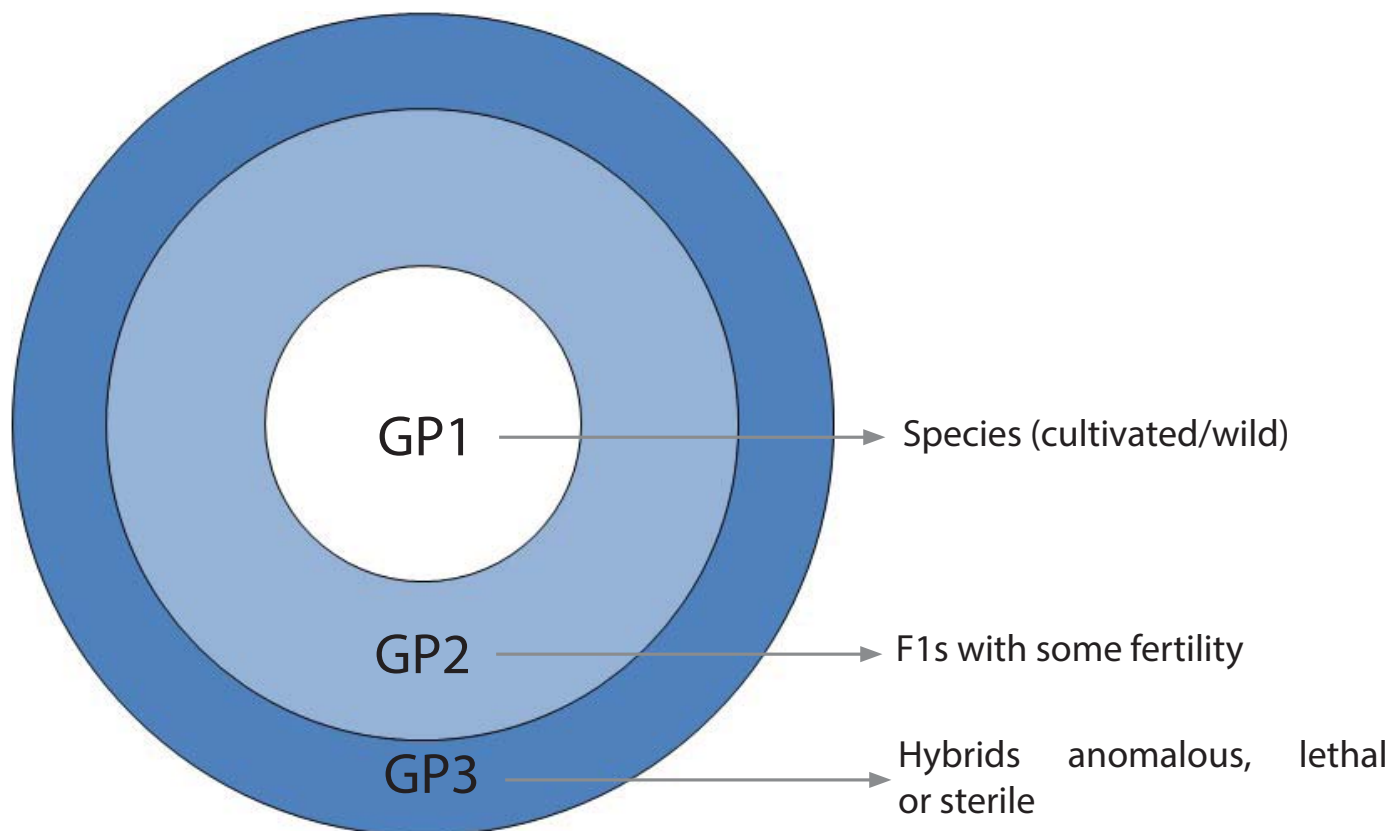
Place collections of dry, ripe seed into cloth or paper bags for transit. Store any awned seed or hooked fruit, that would damage or get stuck in cotton bags, in cardboard boxes or strong paper bags. Never collect or store seeds in plastic bags.

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

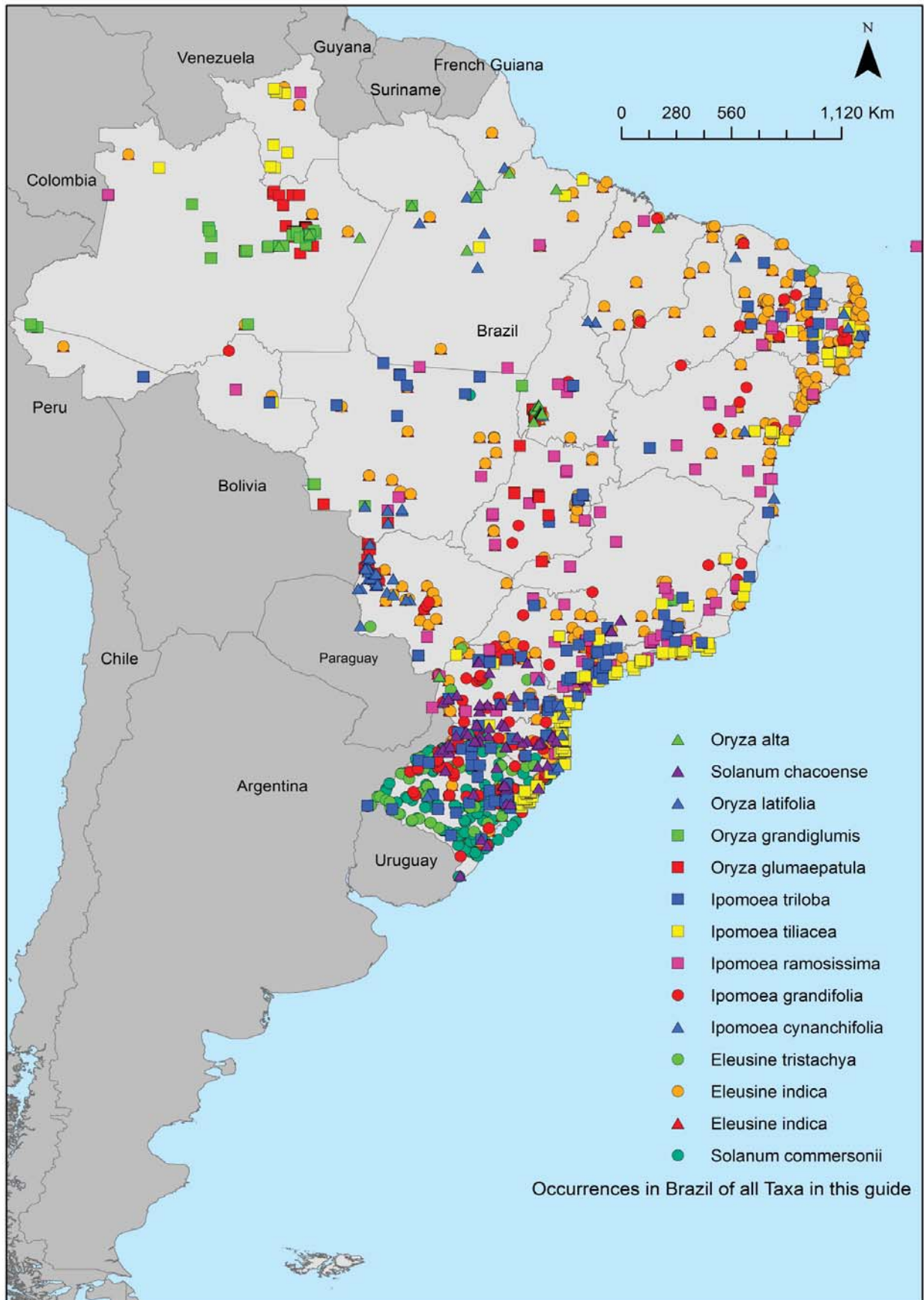
Taxon Group 2 – species in same series/section as crop

Taxon Group 3 – species in same subgenus as crop

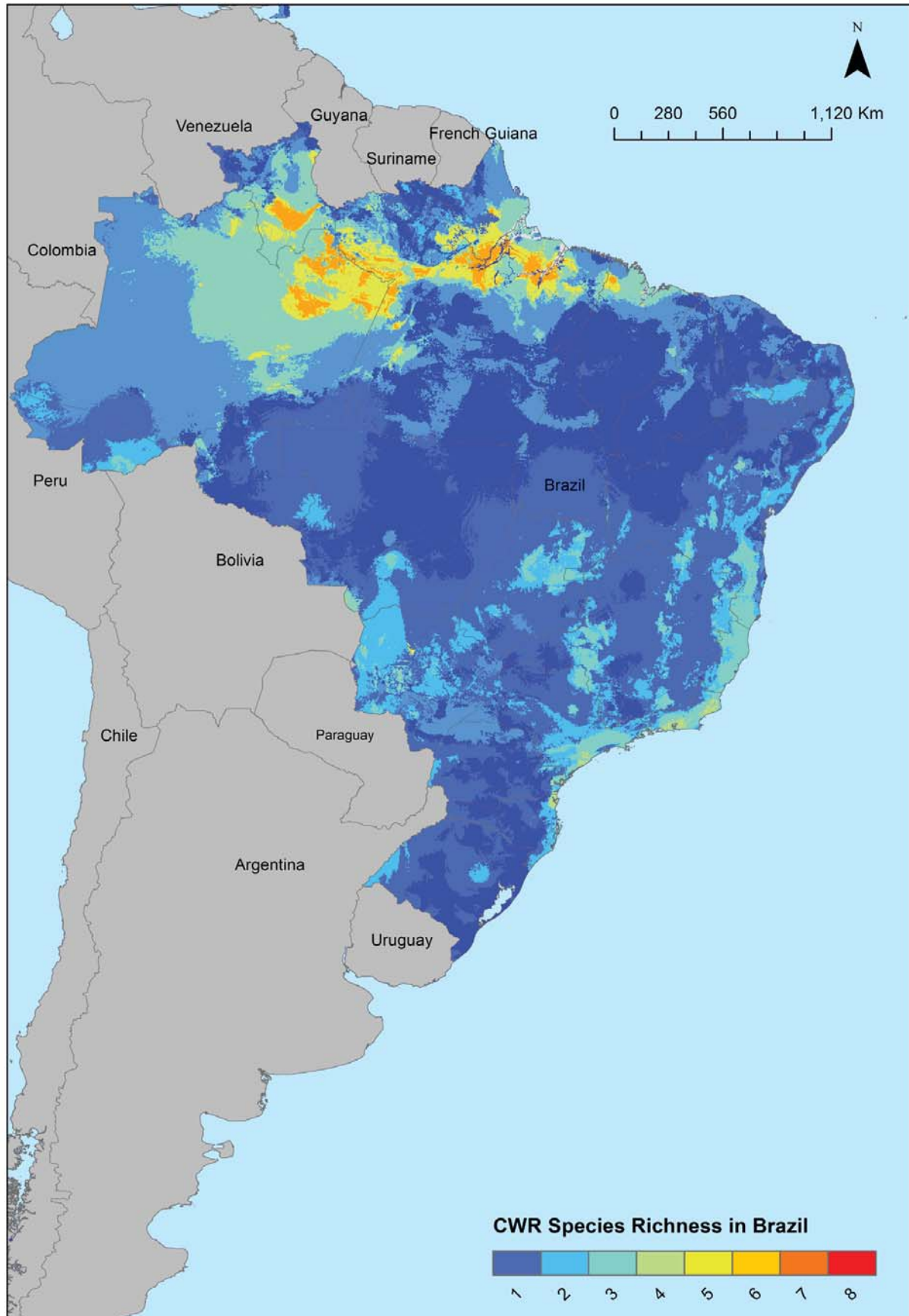
Harlan, J. and J. de Wet (1971). Towards a rational classification of cultivated plants. *Taxon* 20: 509-517.

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.

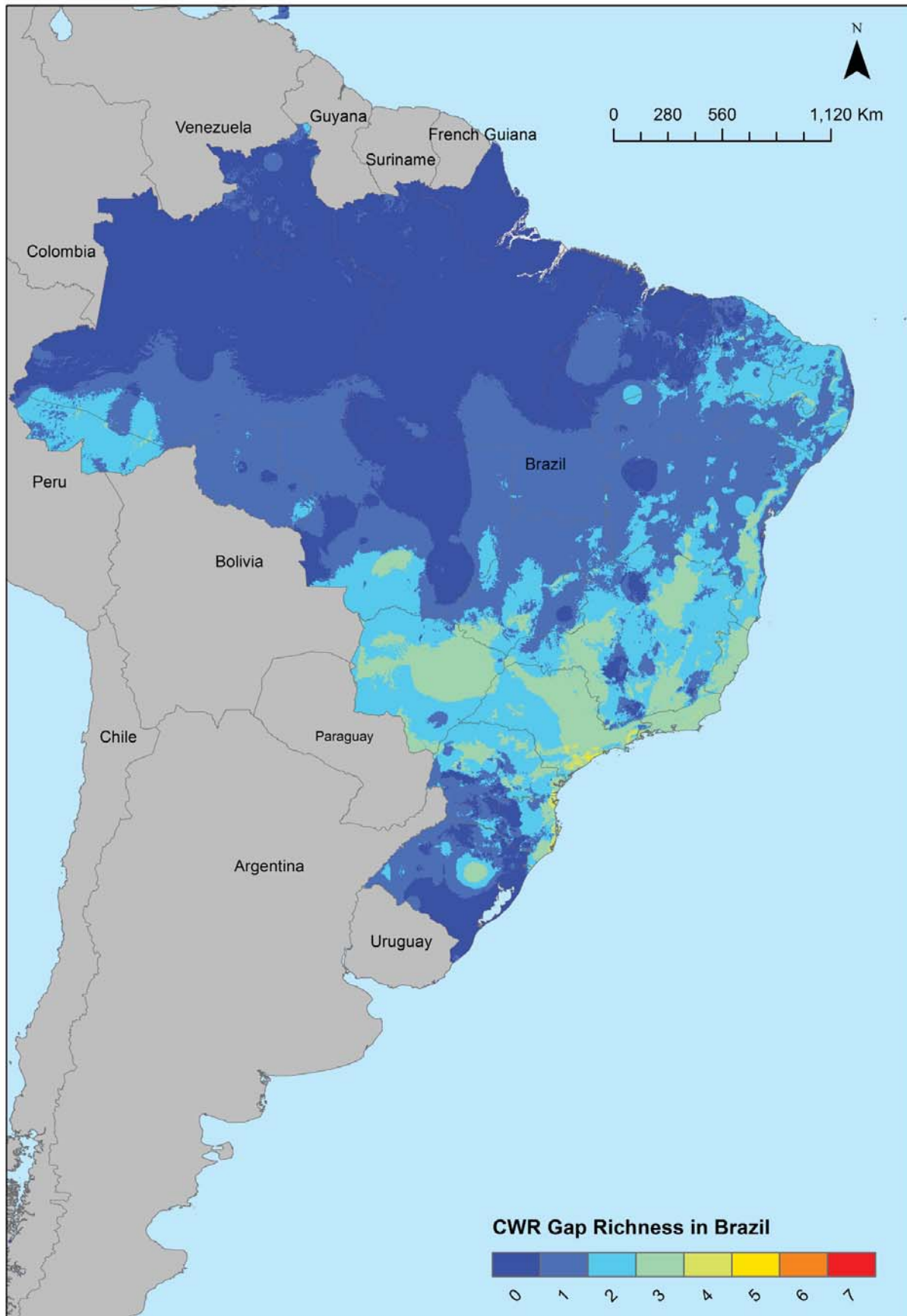
Occurrences of all taxa in this guide, as a point distribution



Species richness



Gap richness



Species in this guide

Species profiles are arranged alphabetically by family and taxon.

Family	Taxon	Genepool	Sheet
Convolvulaceae	<i>Ipomoea cynanchifolia</i>	Sweet Potato	1
Convolvulaceae	<i>Ipomoea grandifolia</i>	Sweet Potato	2
Convolvulaceae	<i>Ipomoea ramosissima</i>	Sweet Potato	3
Convolvulaceae	<i>Ipomoea tiliacea</i>	Sweet Potato	4
Convolvulaceae	<i>Ipomoea triloba</i>	Sweet Potato	5
Poaceae	<i>Eleusine indica</i>	Finger Millet	6
Poaceae	<i>Eleusine tristachya</i>	Finger Millet	7
Poaceae	<i>Oryza alta</i>	Rice	8
Poaceae	<i>Oryza glumaepatula</i>	Rice	9
Poaceae	<i>Oryza grandiglumis</i>	Rice	10
Poaceae	<i>Oryza latifolia</i>	Rice	11
Solanaceae	<i>Solanum chacoense</i>	Potato	12
Solanaceae	<i>Solanum commersonii</i>	Potato	13

Phenology table

Taxon	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<i>Ipomoea cynanchifolia</i>												
<i>Ipomoea grandifolia</i>												
<i>Ipomoea ramosissima</i>												
<i>Ipomoea tiliacea</i>												
<i>Ipomoea triloba</i>												
<i>Eleusine indica</i>												
<i>Eleusine tristachya</i>												
<i>Oryza alta</i>												
<i>Oryza glumaepatula</i>												
<i>Oryza grandiglumis</i>												
<i>Oryza latifolia</i>												
<i>Solanum chacoense</i>												
<i>Solanum commersonii</i>												

KEY

 Species in flower

 Species in fruit

Data gathered from literature and herbarium specimens

HABIT: Vines; several m long, herbaceous, twining, slender.

LEAVES: 3-11 cm long 2-11 cm wide, entire to subtrilobate or trilobed, ovate to ovate-lanceolate in its general form, with generally uniformly short trichomes, evenly distributed on the surface, the base cordate, acute to obtuse apex.

INFLORESCENCE: Simple cymes or corymbose, less often solitary, axillary.

FLOWER: Funnelform, 1.5-2.5 cm long, pink to lavender, the tube darker, glabrous; sepals subequal, 4-5.5 mm long, obovate, mucronate, glabrous or with the upper margins ciliate, rarely with some indumenta on the back; stamens white.

CAPSULES: 5-6 mm in diameter, ovoid, pubescent on the upper part, rarely glabrous.

SEEDS: 3.5-4 mm long, dark brown, glabrous, smooth.

Habitat:

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

Distribution:

Bolivia, Guyana and Brazil in the North (AM, PA, RO, RR); Northeast (BA, MA); Central-West (DF, GO, MS, MT), and Southeast (ES, MG, RJ, SP).

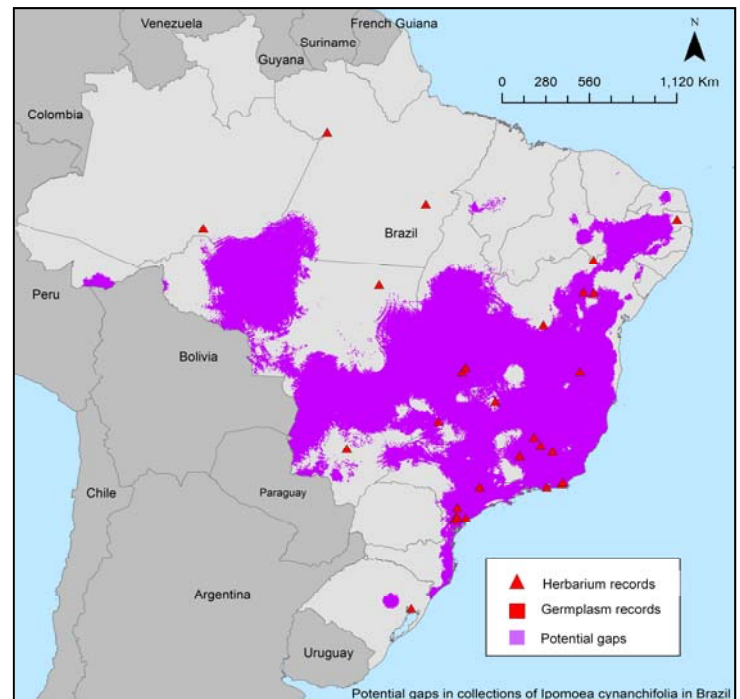
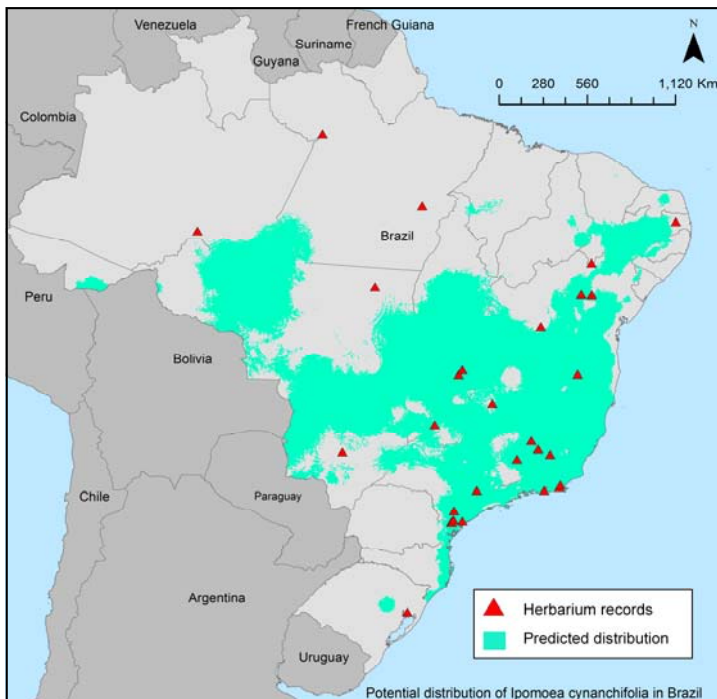
Altitude: 0 - 1200 m

Ipomoea cynanchifolia

May be confused with:
Ipomoea ramosissima

Capsules ovoid, larger than the surrounding sepals. Ovary and capsule usually hirsute at least on the apex. Seeds 3.5-4 mm long.

Capsules subglobose, depressed, not longer than the surrounding sepals. Ovary and capsule glabrous. Seeds 2.5-3 mm long.



References: Austin, D.F. 1978. The *Ipomoea batatas* Complex-I. Taxonomy Bulletin of the Torrey Botanical Club 105(2): 114-129.
Ipomoea in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB7021>

HABIT: Vines; branches 1-6 m long, herbaceous, twining, slender.

LEAVES: 1.5-13 cm long 1-11 cm wide, entire, 1-2-toothed, subtrilobate or trilobed, ovate in its general form, glabrous or sparsely pubescent, the base cordate, acute to acuminate apex, rarely obtuse mucronate.

INFLORESCENCE: Cymes 3-10 flowers, less often solitary, axillary.

FLOWER: Funnelform, 1.3-2.5 cm long, pink or lavender, the tube darker; sepals subequal or the outer slightly longer, the outer 8-11 mm long, the inner 6-10 mm long, lanceolate to ovate-lanceolate, acuminate, mucronate, ciliate, with trichomes on the backs or glabrous; stamens white.

CAPSULES: 6-7 mm in diameter, subglobose, somewhat depressed, hirsute.

SEEDS: 3.5-4 mm long, dark brown, glabrous, smooth.

Habitat:

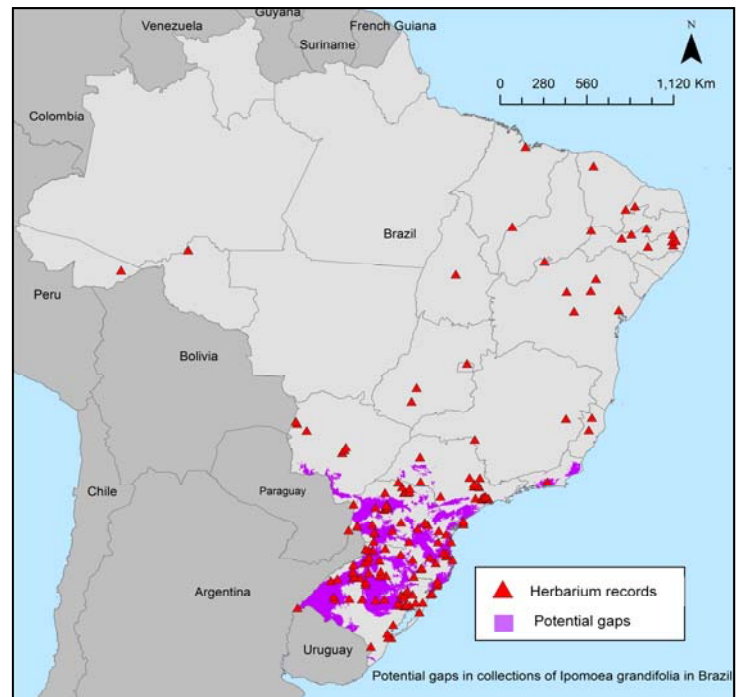
In open anthropic areas, grasslands, savannas and edges of forests in the Amazon Rainforest, Caatinga, Cerrado, Atlantic Rainforest and Pantanal phytogeographic domains.

Distribution:

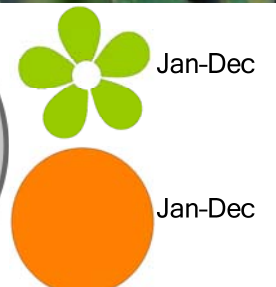
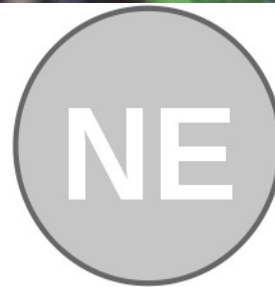
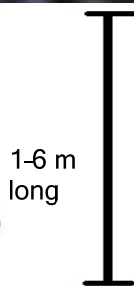
Argentina, Bolivia, Paraguay, Uruguay and Brazil in the North (AM, RO, TO); Northeast (BA, MA, PB, PE, PI); Central-West (DF, GO, MS, MT); Southeast (ES, MG, RJ, SP), and South (PR, RS, SC).

Altitude: 0 - 1000 m

<i>Ipomoea grandifolia</i>	May be confused with: <i>Ipomoea triloba</i>
Sepals lanceolate-acuminate, 8-11 mm long. Corolla pink or lavender. Fruits 6-7 mm diameter.	Sepals oblong-caudate, 5-6 mm long. Corolla lavender. Fruits 5-6 mm diameter.



References: Austin, D.F. 1978. The *Ipomoea batatas* Complex-I. Taxonomy Bulletin of the Torrey Botanical Club 105(2): 114-129.
Ipomoea in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB7021>



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:

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

Distribution:

N. America (Mexico), C. America (Belize, Costa Rica, El Salvador, Guatemala, Nicaragua, Panama) and South America in Argentina, Bolivia, Colombia, Ecuador, Paraguay, Peru, Venezuela, and Brazil in the North (AM, PA, RO, TO); Northeast (BA, CE, MA, PE, SE); Central West (DF, GO, MS, MT); Southeast (ES, MG, RJ, SP), and South (PR, SC).

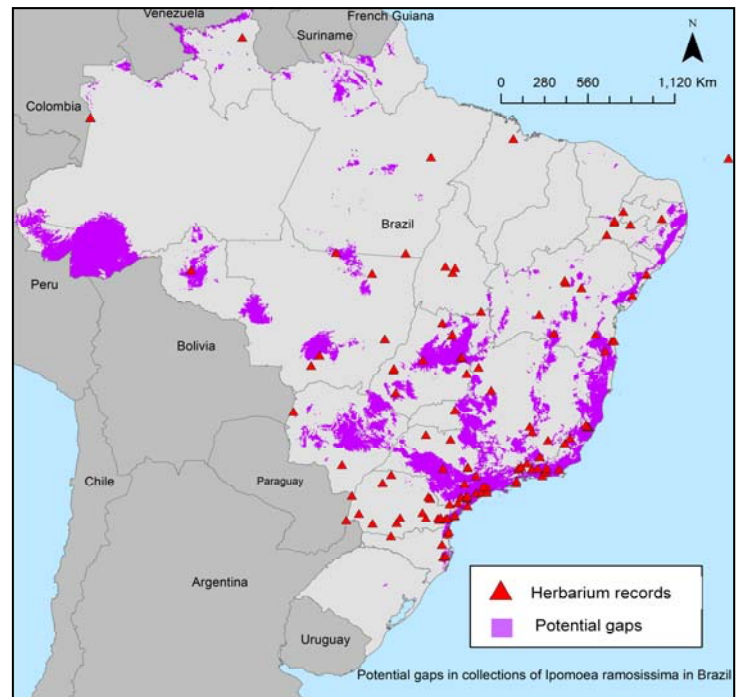
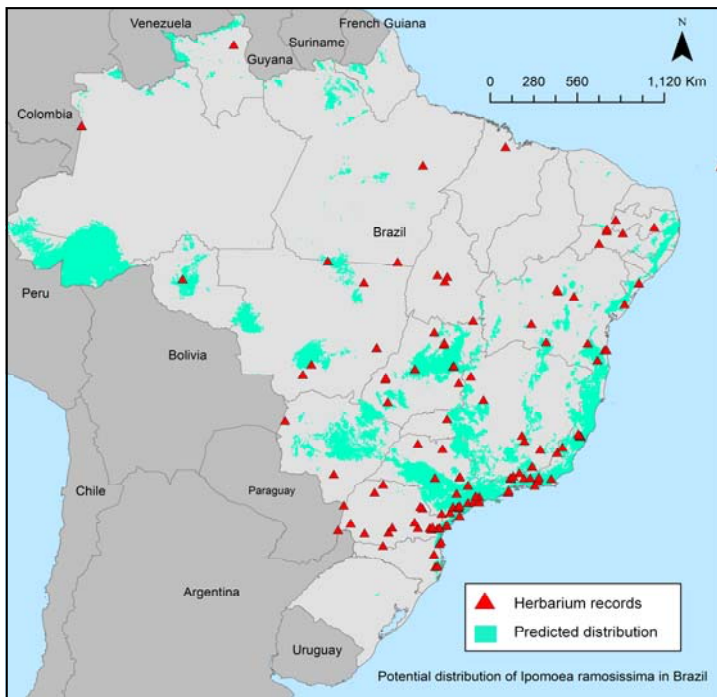
Altitude: 50 - 1250 m

Ipomoea ramosissima

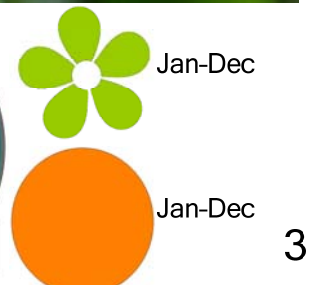
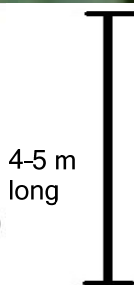
Capsules subglobose, depressed, not longer than the surrounding sepals. Ovary and capsule glabrous. Seeds 2.5-3 mm long.

May be confused with:
Ipomoea cynanchifolia

Capsules ovoid, larger than the surrounding sepals. Ovary and capsule usually hirsute at least on the apex. Seeds 3.5-4 mm long.



References: Austin, D.F. 1978. The *Ipomoea batatas* Complex-I. Taxonomy Bulletin of the Torrey Botanical Club 105(2): 114-129.
Ipomoea in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB7021>



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 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:

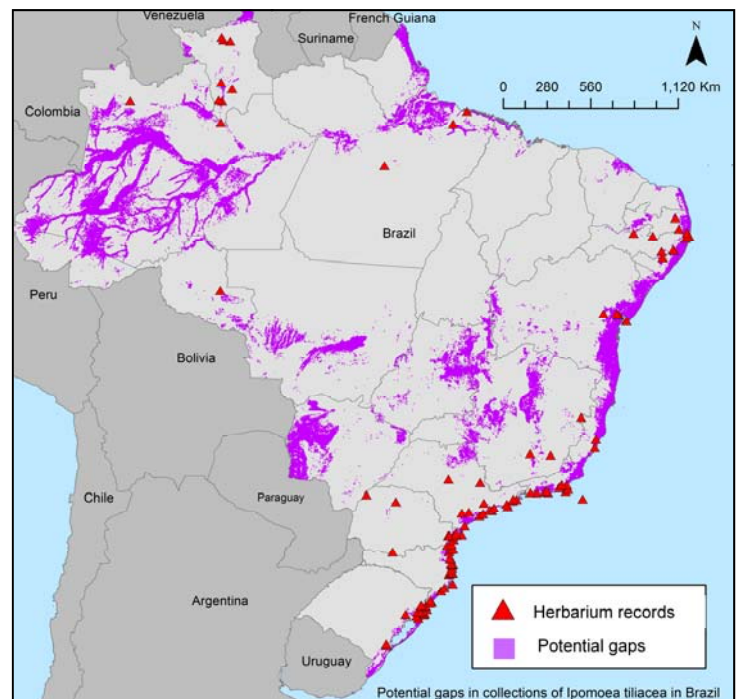
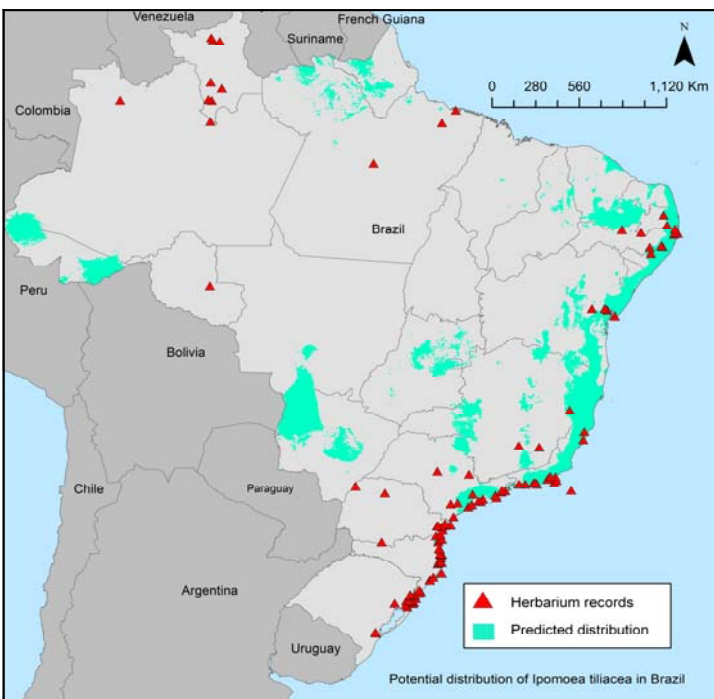
In open anthropic areas, grasslands, savannas and edges of forests in the Amazon Rainforest, Caatinga, Cerrado, and Atlantic Rainforest phytogeographic domains.

Distribution:

Native to Australia and New Zealand, South Eastern Asia, and the Caribbean, Central and South America. In Brazil in the North (AM, PA, RO, RR, TO); Northeast (BA, CE, MA, PE, SE); Central West (DF, GO, MS, MT); Southeast (ES, MG, RJ, SP), and South (PR, SC).

Altitude: 0 - 1050 m

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



References: Austin, D.F. 1978. The *Ipomoea batatas* Complex-I. Taxonomy Bulletin of the Torrey Botanical Club 105(2): 114-129.
Ipomoea in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB7021>

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



Several
m long

LC
PRELIM

Jan-Dec
Jan-Dec

HABIT: Vines; 1-3 m long, herbaceous, twining, slender.

LEAVES: 2-8 cm long 2-7 cm wide, entire, coarsely dentate to deeply 3-5 lobed, broadly ovate to orbicular in its general form, both surfaces glabrous or sparsely pilose, the base cordate, the apex acute to obtuse.

INFLORESCENCE: Cymose or sub-umbellate, less often solitary, axillary.

FLOWER: Funnelform, 1.8-2 cm long, pink to pale purple, the center darker, glabrous; sepals subequal, 7-8(-10) mm long, the outer oblong to narrowly elliptic-oblong, obtuse or acute, mucronulate-caudate, glabrous or sparsely pubescent on the back, always conspicuously ciliate, the inner sepals broader, mostly glabrous; stamens white.

CAPSULES: 5-6 mm in diameter, subglobose, bristly pubescent.

SEEDS: 2.5-3.2 mm long, subglobose, dark brown, glabrous.

Habitat:

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

Distribution:

North America (Mexico, USA), Caribbean, Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama) and South America in Argentina, Ecuador, Peru, and Brazil in the North (AM, PA, RO, TO); Northeast (BA, CE, MA, PE, SE); Central West (DF, GO, MS, MT); Southeast (ES, MG, RJ, SP), and South (PR, SC).

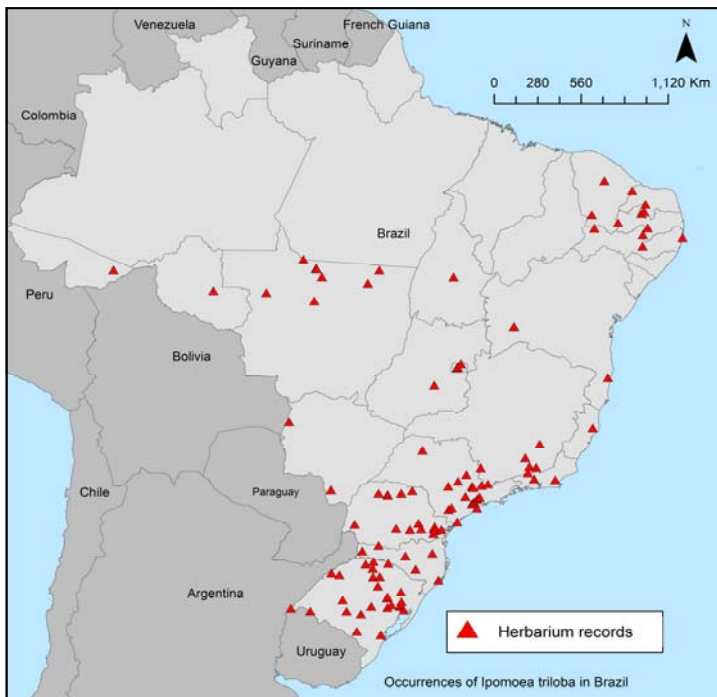
Altitude: 0 - 1050 m

Ipomoea triloba

Sepals oblong-caudate, 5-6 mm long. Corolla lavender. Fruits 5-6 mm diameter.

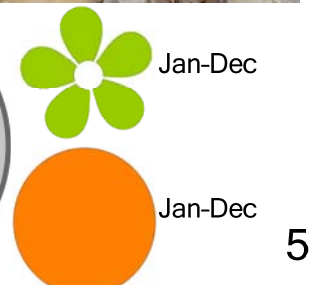
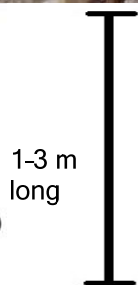
May be confused with:
Ipomoea batatas

Sepals lanceolate-acuminate, 8-11 mm long. Corolla pink or lavender. Fruits 6-7 mm diameter.



All populations priority
for collection.

References: Austin, D.F. 1978. The *Ipomoea batatas* Complex-I. Taxonomy Bulletin of the Torrey Botanical Club 105(2): 114-129.
Ipomoea in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB7021>



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

Capim-pé-de-galinha; Pé-de-galinha

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

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

Distribution:

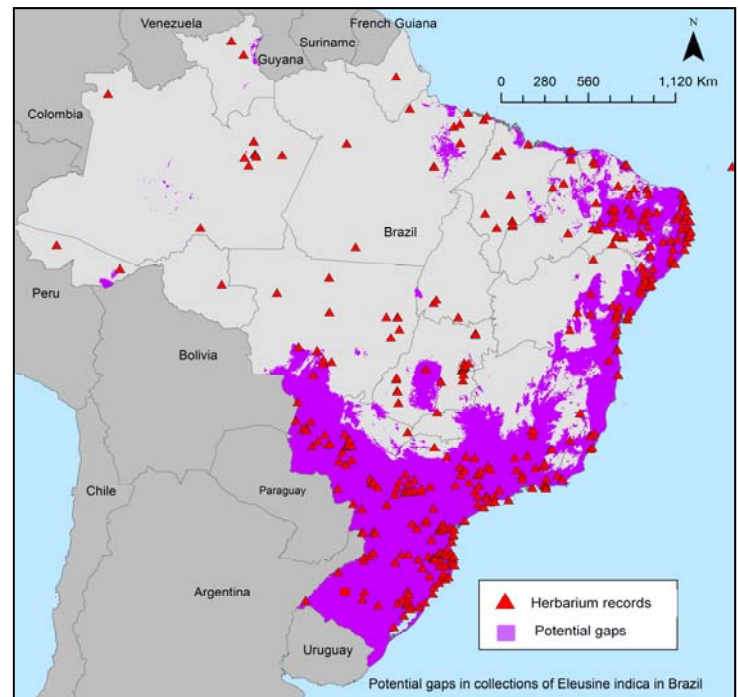
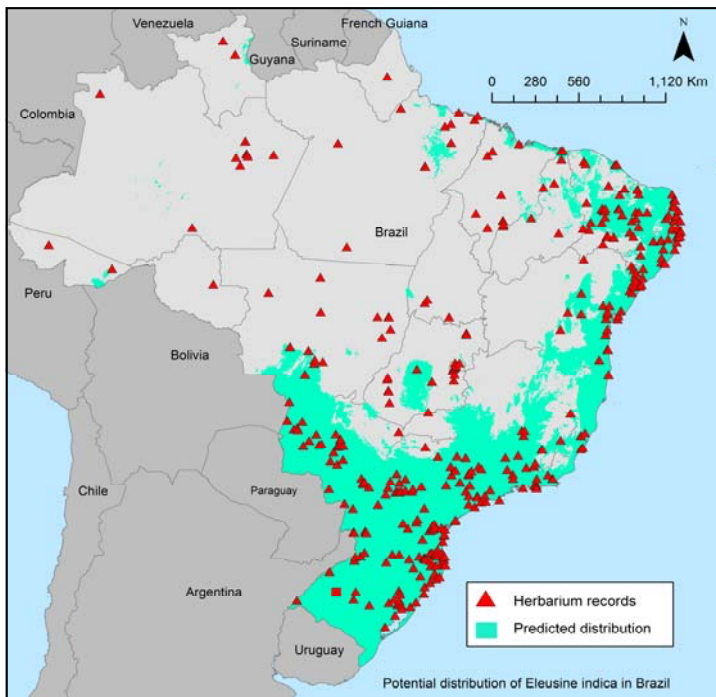
Widespread throughout Africa, the Americas, Southern Europe, Asia and Australasia. In Brazil in the North (AC, AM, AP, PA, RO, RR, TO); Northeast (AL, BA, CE, MA, PB, PE, PI, RN, SE); Central West (DF, GO, MS, MT); Southeast (ES, MG, RJ, SP), and South (PR, RS, SC).

Altitude: 0 - 1200 m*Eleusine indica*

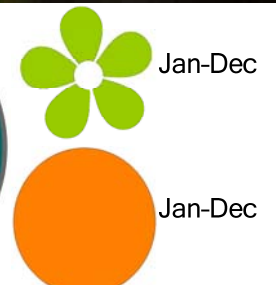
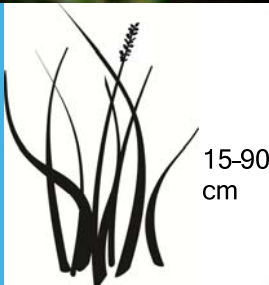
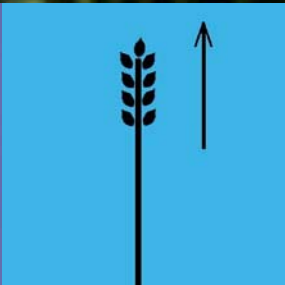
Spikes usually more than 3 cm long, usually less than 7 mm broad; backs of lemmas usually straight or very slightly curved towards apex.

May be confused with:
Eleusine tristachya

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



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



HABIT: Perennial; short-lived; caespitose. Culms geniculately ascending, or decumbent; slender; 10-45 cm long. Culm-internodes elliptical in section. Leaves mostly basal. Leaf-sheaths keeled; outer margin glabrous. Ligule a ciliate membrane. Leaf-blades 6-25 cm long; 1-4 mm wide.

INFLORESCENCE: Composed of racemes.

RACEMES: 2-3; digitate; linear, or oblong; unilateral; 1-4 cm long; 10-16 mm wide. Rhachis broadly winged.

SPIKELETS: Appressed; solitary. Fertile spikelets sessile.

FERTILE SPIKELETS: Spikelets comprising 6-13 fertile florets; with diminished florets at the apex. Spikelets ovate; laterally compressed; 5-9 mm long; 4-6 mm wide; breaking up at maturity; disarticulating below each fertile floret.

GLUMES: Persistent. Lower glume lanceolate; 1.5-2 mm long; 0.5 length of upper glume; membranous; 1-keeled; 1-3 veined. Lower glume apex acute. Upper glume elliptic; 3-4 mm long; 0.7-0.8 length of adjacent fertile lemma.

FLORETS: Fertile lemma ovate; 4-5 mm long; membranous; keeled; 3-veined (excluding subsidiaries). Lemma midvein with contiguous subsidiary veins (3-veined). Lemma apex acute. Palea 0.66 length of lemma; 2-veined.

FLOWER: Lodicules 2; cuneate; fleshy.

FRUIT: Caryopsis with free soft pericarp; orbicular; 2 mm long; dark brown; rugose.

Habitat:

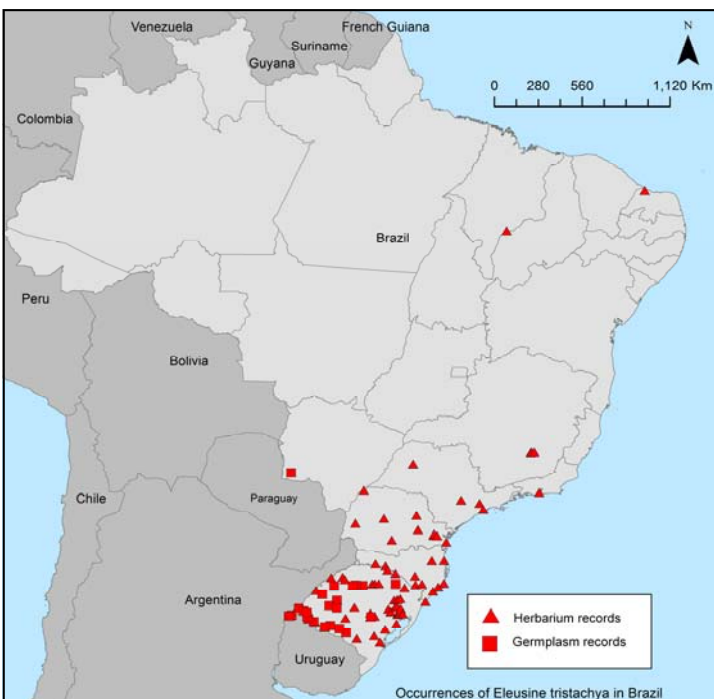
In open anthropic areas and grasslands in the Atlantic Rainforest and Pampa phytogeographic domains.

Distribution:

Africa; Europe; temperate Asia; Australasia; and South America. In Brazil in the Central West (MS), Southeast (SP), and South (PR, RS, SC).

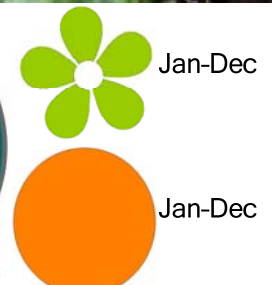
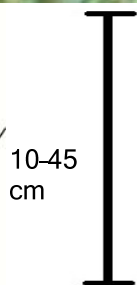
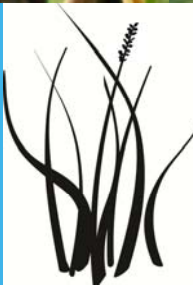
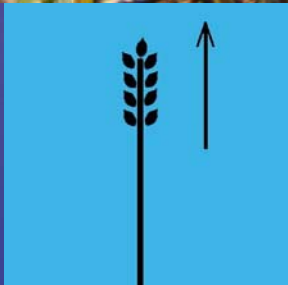
Altitude: 0 - 1350 m

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



All populations priority
for collection.

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



HABIT: Perennial; caespitose. Rhizomes short. Culms erect; 3-4 m long. Leaf-sheaths shorter than the internodes; glabrous, the margins usually hispid ciliate. Ligule 5 mm long; lacerate to hispid ciliate. Leaf-blades flat, acuminate; 25-80 cm long; 2-2.8 mm wide.

INFLORESCENCE: Panicles open, drooping, 30-40 cm long, the branches rather distant, densely pilose in the axils, naked on the lower half, the lower whorled, as much as 15 cm long.

FERTILE SPIKELETS: Spikelets 8-9 mm long, appressed on the short branchlets, the lateral short-pedicellate, the terminal long pedicellate.

GLUMES: Glumes lunate, narrow, acuminate, 1-nerved, about half as long as the spikelet.

FLORETS: Lemna minutely pitted, hispid on the keels and margins, unsymmetrically narrowed at the summit to a short scabrous beak, terminating in a scabrous or somewhat appressed-hispid awn 2-3 cm long. Palea slightly longer than the lemma, similar in texture, terminating in a hispid beak about 1 mm long.

FLOWER: Lodicules 2. Anthers 6. Stigmas 2.

FRUIT: Disseminule comprising a floret.

Habitat:

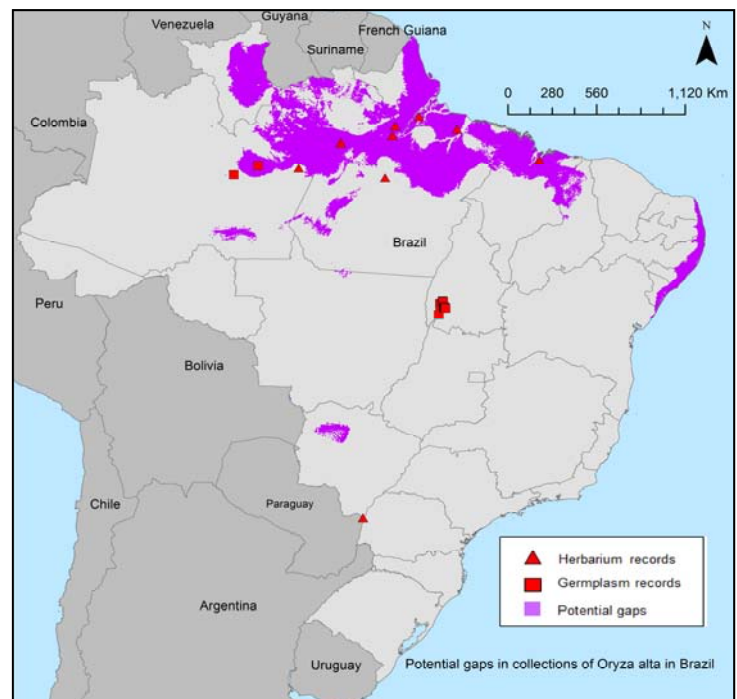
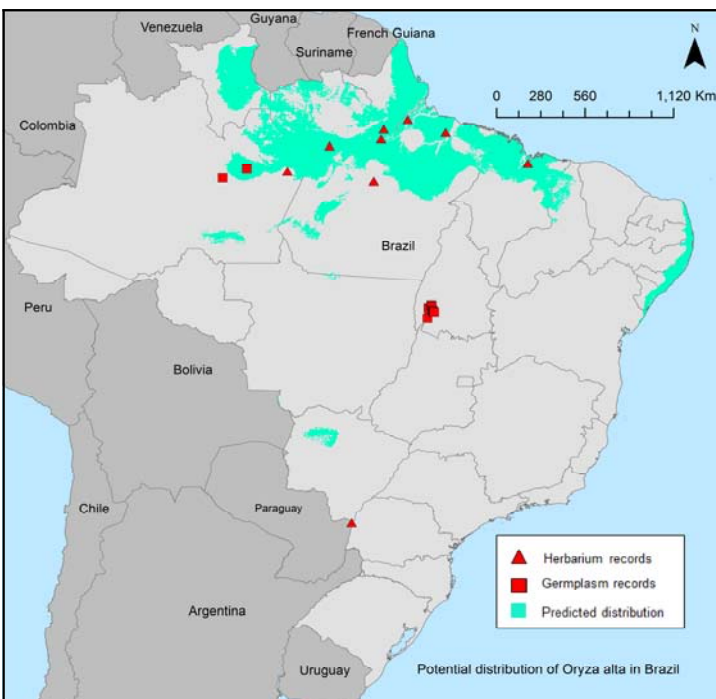
In aquatic floating vegetation, flooded grasslands, wetlands and riverine vegetation in the Amazon Rainforest and Pantanal phytogeographic domains.

Distribution:

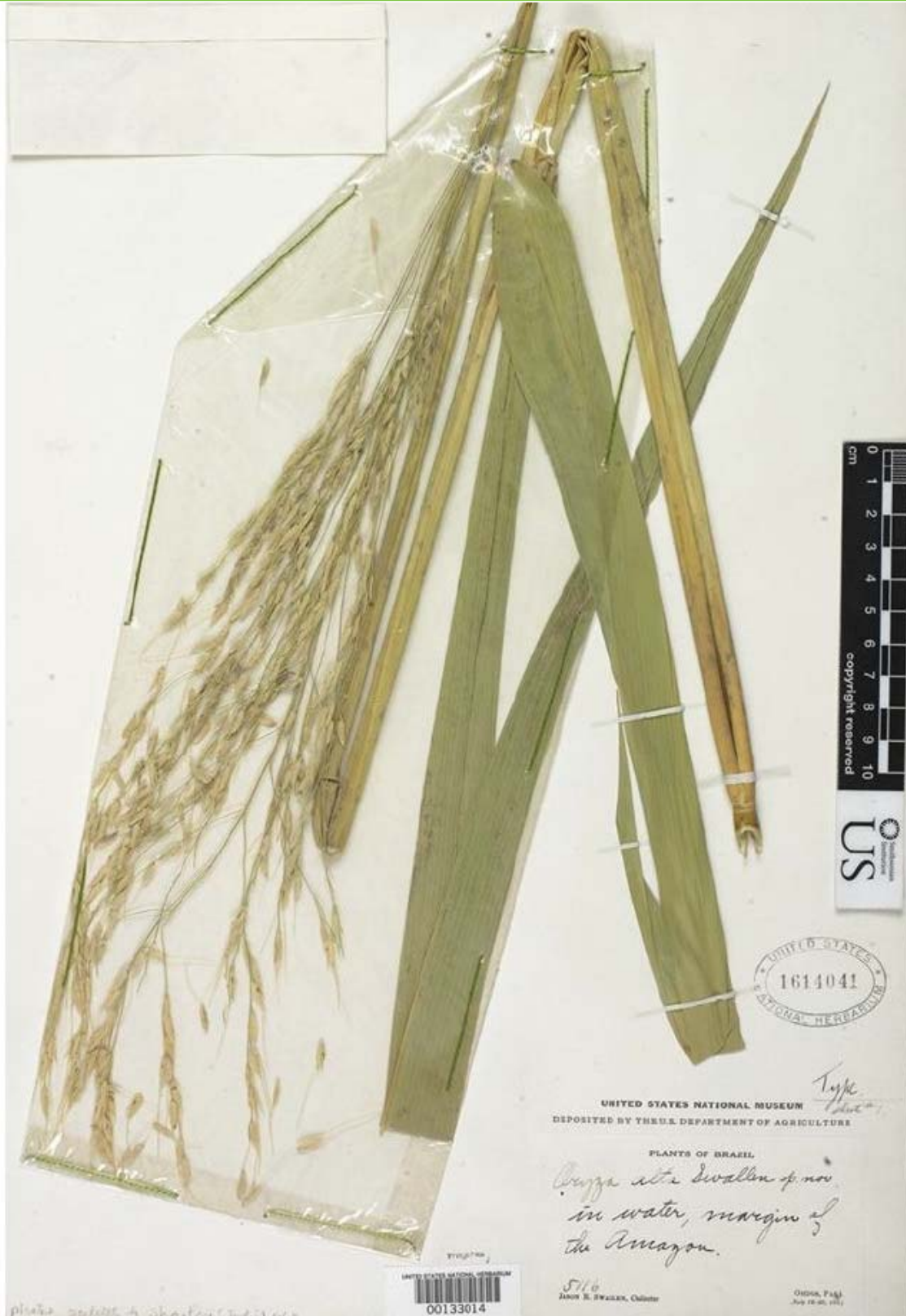
Central America in Belize, Costa Rica and El Salvador, and South America in Argentina, Bolivia, Colombia, Ecuador, French Guiana, Guyana, Paraguay, and Brazil in the North (AM, AP, PA), Northeast (MA), Central West (MT), and Southeast (RJ).

Altitude: 0 - 120 m

<i>Oryza alta</i>	May be confused with: <i>Oryza grandiglumis</i> ; <i>Oryza latifolia</i> ; <i>Oryza sativa</i>
Plants perennial. Spikelets awned, 9 mm long; awns 2-3 cm long. Glumes acuminate.	Leaf-blades 12-65 cm long; 4-18 mm wide. Spikelets 8-11 mm long; 2.5-3.5 mm wide.




References: *Oryza* in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB20422>
Swallen, J.R. 1936. The grasses of British Honduras and the Peten, Guatemala. Carnegie Institution of Washington 461: 141-189.

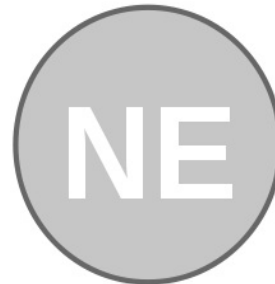


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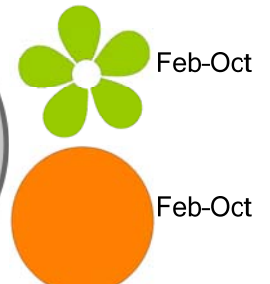
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up to 4 m



NE



Feb-Oct
Feb-Oct

HABIT: Perennial; caespitose. Rhizomes short. Culms erect; 2-3 m long, cylindrical, simple smooth. Leaf-sheaths a little compressed; glabrous. Ligule short; rounded, ciliated-hairy at edge, brown. Leaf-blades linear to linear-lanceolate; 4.5-5.5 cm long; 1.1-1.2 mm wide.

INFLORESCENCE: Panicle 20 cm long, terminal, contracted; branches short, flexuous, angular, very round solitary or twinned, almost simple, briefly bare at base.

FERTILE SPIKELETS: Spikelets linear oblong, 7 mm long, very hairy, arranged in loose clusters along branches; pedicels angular, imperceptibly swollen at tip, ending in small membranous collar.

GLUMES: Glumes spread out, white, scarious 3 mm long, awn 4-5 cm long.

FLORETS: Paleae compressed, one yellow blackish, deeply grooved, finely reticulate, scabrous, glabrous or provided with small thick prickles, pectinated on the keel; lower ending in a fine awn, straight, very hard, whitish, four to five times longer than itself; upper briefly apiculate.

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

FRUIT: Disseminule comprising a floret.

Habitat:

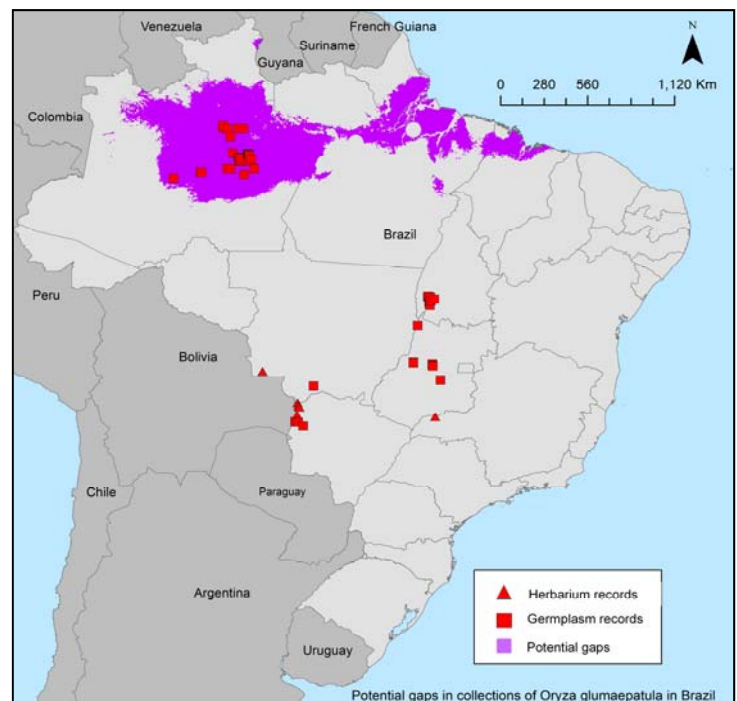
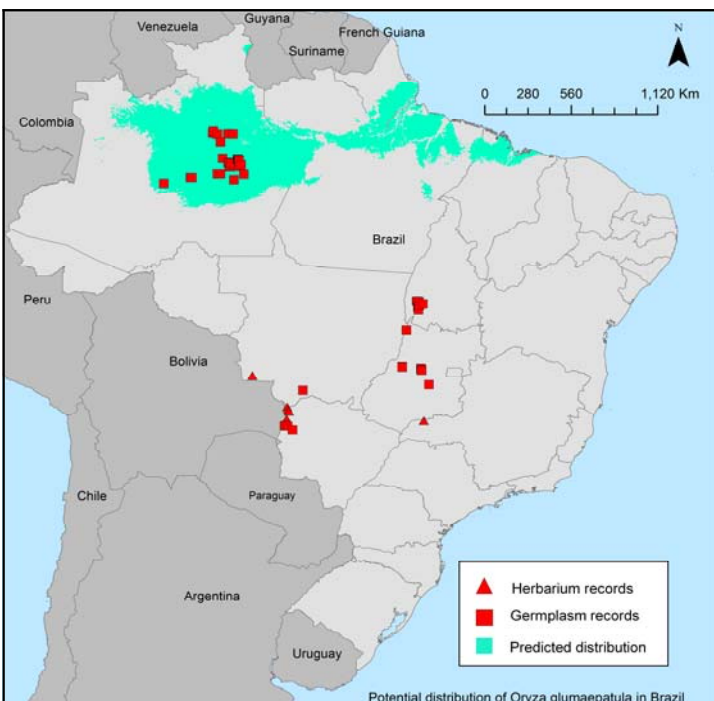
In aquatic floating vegetation, flooded grasslands, wetlands and riverine vegetation in the Amazon Rainforest, Atlantic Rainforest and Pantanal phytogeographic domains.

Distribution:

South America in Bolivia and Brazil in the North (AM, PA, RO), Northeast (CE), Central West (MS, MT) and Southeast (MG).

Altitude: 50 - 650 m

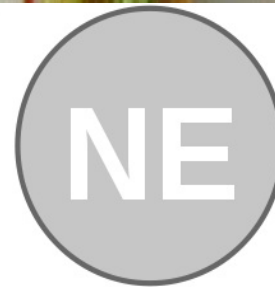
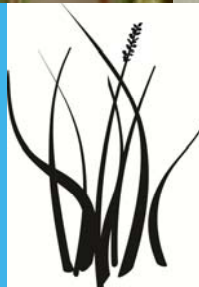
<i>Oryza glumaepatula</i>	May be confused with: <i>Oryza sativa</i>
Panicle contracted, 20 cm long. Spikelets 7 mm long, very hairy. Glumes spread out, white, scarious, 3 mm long, long awn 4-5 cm long.	Leaf-blades 12-65 cm long; 4-18 mm wide. Spikelets 8-11 mm long; 2.5-3.5 mm wide.



References: Nanda, J.S.; Sharma, S.D. 2003. Monograph on Genus *Oryza*. 400 p.
Oryza in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB20422>



No seed image available



Feb-Aug

Feb-Aug

HABIT: Annual; caespitose. Rhizomes short. Culms erect; 200 cm long; 4 - 9 mm diam. Culm-nodes constricted; pallid, or brown. Leaf-sheaths narrower than blade at the collar; glabrous on surface. Ligule 4-6 mm long; entire (often split). Leaf-blades linear to lanceolate; 15-36 cm long; 1.5-4.5 mm wide.

INFLORESCENCE: Peduncle antrorsely scabrous above. Panicle open; lanceolate, or elliptic; 15-40 cm long. Primary panicle branches ascending. Panicle branches angular; scabrous; hispid.

FERTILE SPIKELETS: Spikelets comprising 2 basal sterile florets; 1 fertile florets; without rhachilla extension. Spikelets ovate; laterally compressed; compressed strongly; rostrate; 7-9 mm long; 4-6 mm wide.

GLUMES: Glumes both absent or obscure.

FLORETS: Basal sterile florets similar; barren; without significant palea. Lemma of lower sterile floret lanceolate; 7-8 mm long; 1 length of spikelet; 1 -veined; without lateral veins. Lemma of upper sterile floret lanceolate; 7-8 mm long; 1 length of lower sterile floret. Fertile lemma elliptic; laterally compressed; 6-8 mm long; coriaceous; keeled; 5 -veined. Lemma surface reticulate, margins involute, apex rostrate; 1 -awned. Principal lemma awn 1-18 mm long overall.

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

FRUIT: Disseminule comprising a floret.

Habitat:

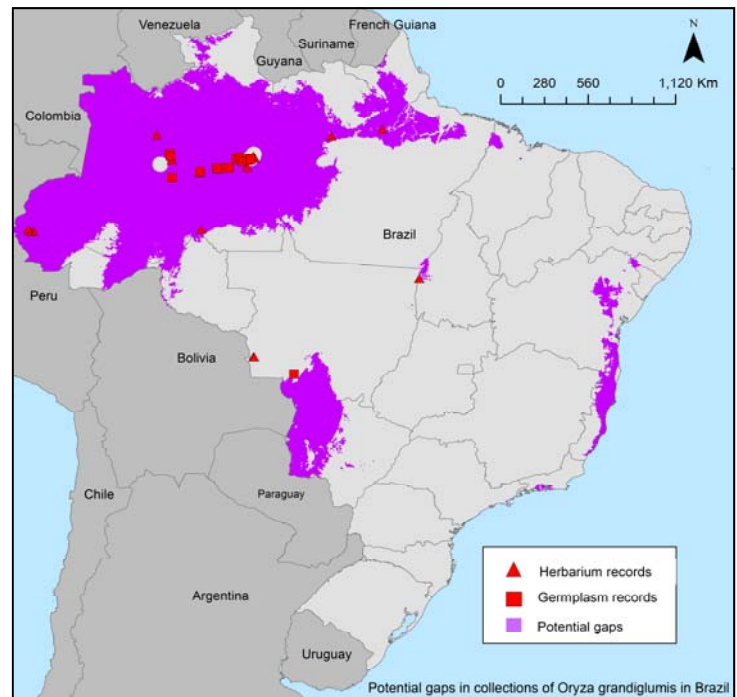
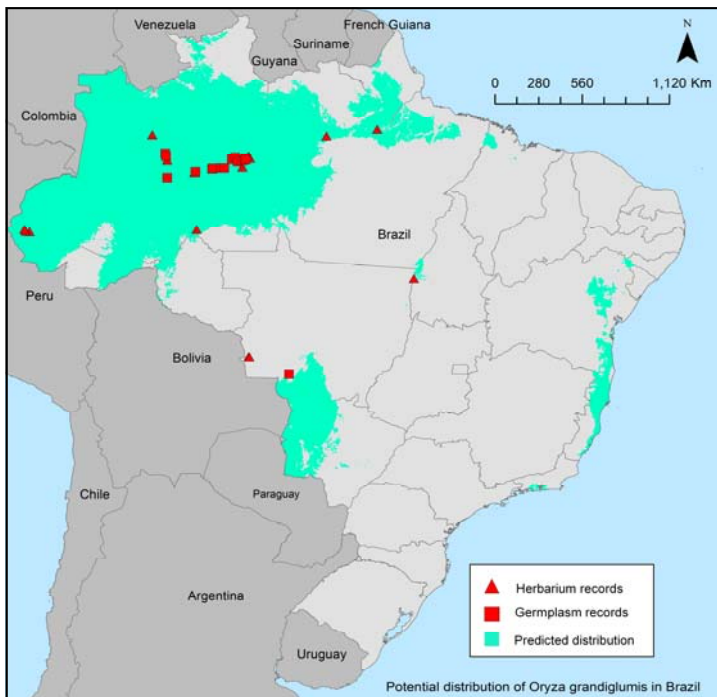
In aquatic floating vegetation, flooded grasslands, wetlands and riverine vegetation in the Amazon Rainforest and Pantanal phytogeographic domains.

Distribution:

Argentina, Bolivia, Colombia, Ecuador, French Guiana, Paraguay, Peru, Suriname, Venezuela and Brazil in the North (AC, AM, PA, TO) and Central West (DF, MS, MT).

Altitude: 0 - 230 m

<i>Oryza grandiglumis</i>	May be confused with: <i>Oryza alta</i> ; <i>Oryza latifolia</i> ; <i>Oryza sativa</i>
Empty glumes. Longer and wider leaves 15-35 cm long x 1.5-4.5 mm wide. Short ligule 4-6 mm long.	Leaf-blades 12-65 cm long; 4-18 mm wide. Spikelets 8-11 mm long; 2.5-3.5 mm wide.



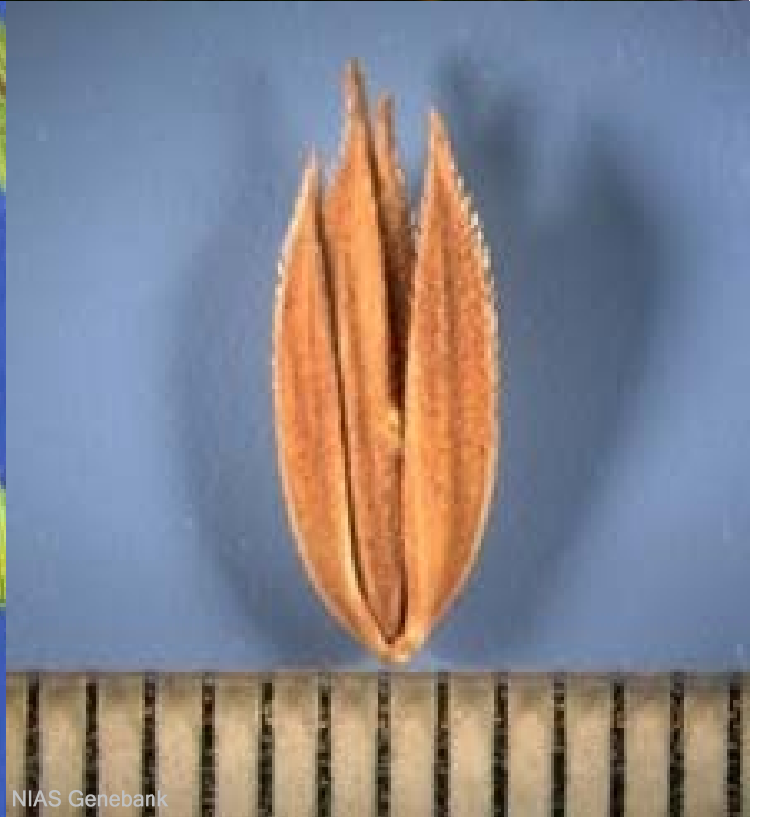
References: GrassBase - The Online World Grass Flora. <http://www.kew.org/data/grasses-db.html>
Nanda, J.S.; Sharma, S.D. 2003. Monograph on Genus *Oryza*. 400 p.
Oryza in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB20422>



R. Vásquez

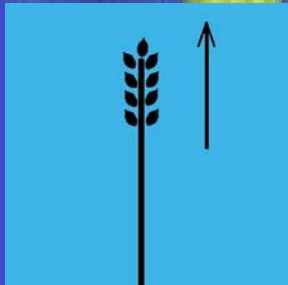


International Rice Research Institute



NIAS Genebank

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up to 4 m



Mar-Nov

Mar-Nov

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:

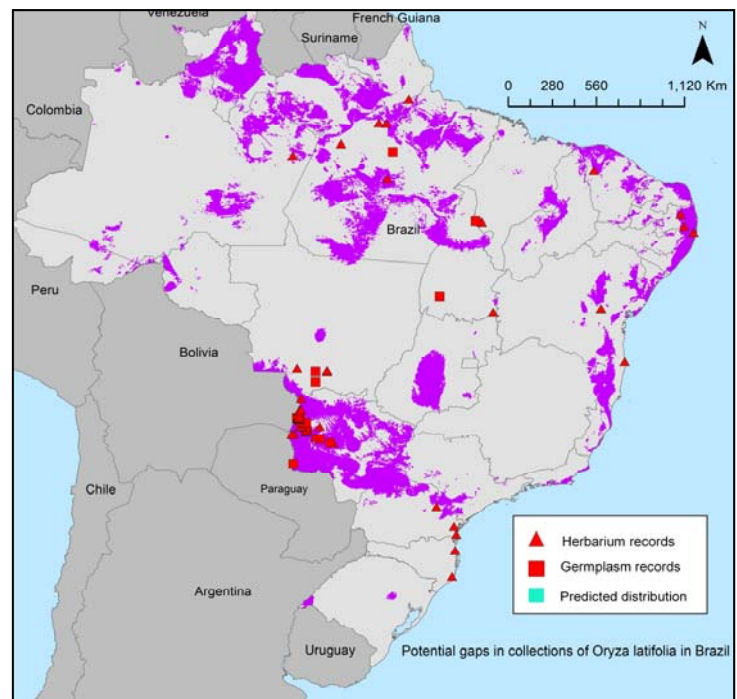
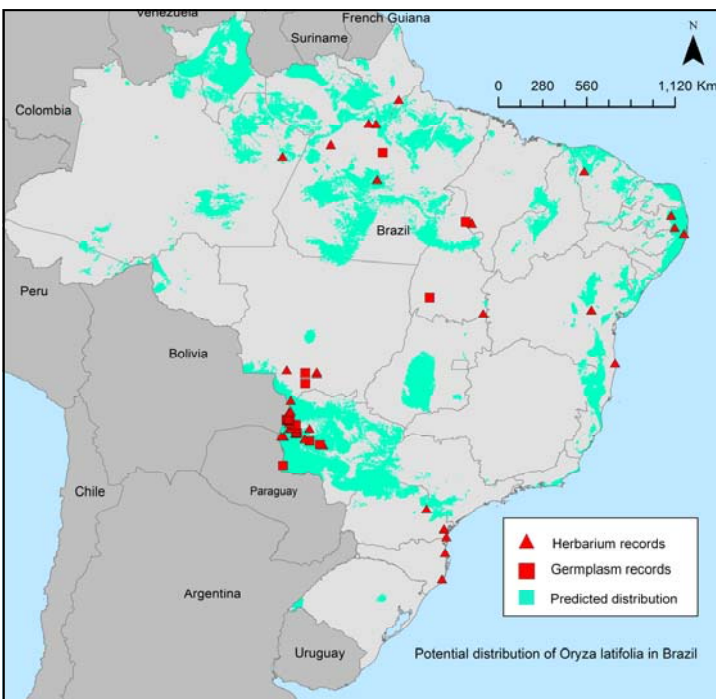
In aquatic floating vegetation, flooded grasslands, wetlands and riverine vegetation in the Amazon Rainforest, Cerrado, Atlantic Rainforest and Pantanal phytogeographic domains.

Distribution:

North America, Central America; Caribbean; S. America in Argentina, Bolivia, Colombia, Ecuador, French Guyana, Guyana, Paraguay, Peru, Suriname, Venezuela and Brazil in the North (AC, AM, AP, PA), Northeast (BA, CE, MA, PA, PB), Central West (DF, MS, MT) and South (PR, SC).

Altitude: 0 - 700 m

<i>Oryza latifolia</i>	May be confused with: <i>Oryza alta</i> ; <i>Oryza grandiglumis</i> ; <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. <http://www.kew.org/data/grasses-db.html>
Nanda, J.S.; Sharma, S.D. 2003. Monograph on Genus *Oryza*. 400 p.
Oryza in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB20422>



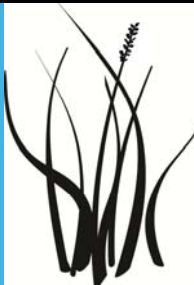
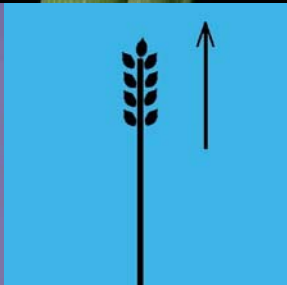
P.T. Lezama



P.T. Lezama



P.T. Lezama



up to 3 m



Jan-Dec

Jan-Dec

HABIT: Herbs 0.5-2 m tall, erect. Stems 3.5-10 mm in diameter at base of plant, green to purple or green and purple mottled, unwinged or with wings to 2 mm, glabrous to densely short pubescent.

LEAVES: Leaves odd-pinnate, the blades 10-39 x 6-24 cm, green, membranous to chartaceous, glabrous to densely short-pubescent adaxially and abaxially with hairs like those of the stems; most distal lateral leaflets 2.7-9 x 0.9-3.5 cm, narrowly to broadly ovate to elliptic, the apex acute to acuminate, the base typically oblique, rounded to truncate, petiolules 0-5 mm long; terminal leaflet 4.1-9.4 x 0.9-4.3 cm, ovate to elliptic; petioles 1-4 cm, glabrous to densely short pubescent.

INFLORESCENCES: 2-15 cm, terminal with a subtending axillary bud, generally in distal half of the plant, usually forked, with 8-25 flowers.

FLOWERS: Homostylous, calyx 3-5 mm long, the tube 1-2 mm, the lobes 1-4 mm; Corolla 1.6-3.7 cm in diameter, deeply stellate to pentagonal, pure white to creamy yellow-white adaxially and abaxially.

FRUITS: Globose to slightly ovoid berry, 1.5-2 cm in diameter, green to green with purple streaks when ripe, often with scattered white dots, glabrous.

SEEDS: Ovoid and ca. 2 mm long, whitish to greenish in fresh condition and drying brownish.

Habitat:

In open anthropic areas, grasslands, and edges of forests in the Atlantic Rainforest and Pampa phytogeographic domains.

Distribution:

South America in Argentina, Bolivia, Paraguay, Peru, Uruguay and Brazil in the Southeast (MG) and South (PR, RS, SC).

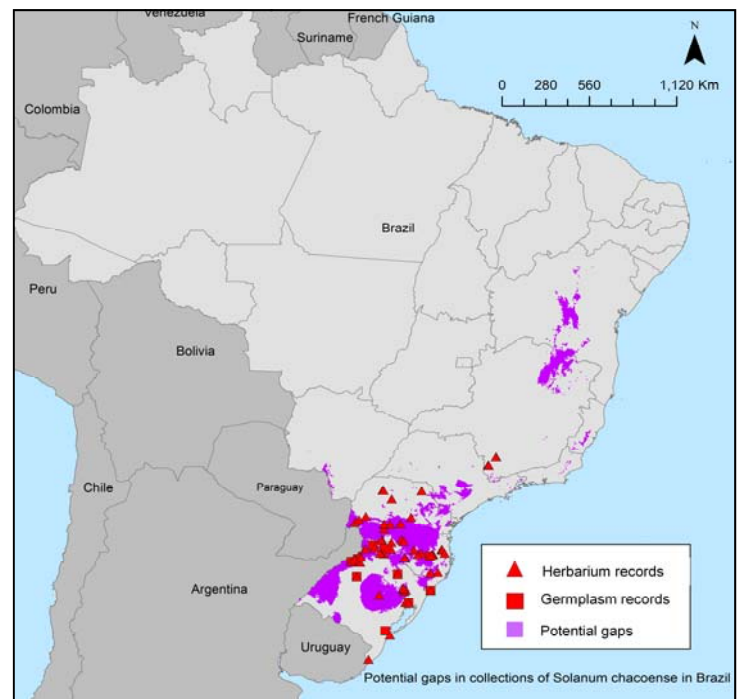
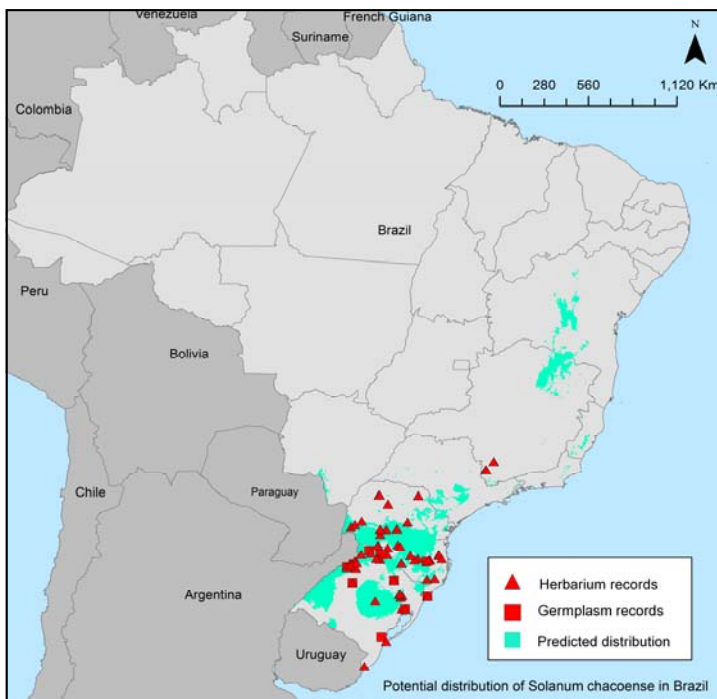
Altitude: 50 - 1450 m

Solanum chacoense

Leaves spirally arranged. Sepals unequal, ovate. Flowers white. Fruit globose or compressed laterally, mostly with white or purplish spots.

May be confused with:
Solanum commersonii

Leaves rosulate. Sepals equal, triangular. Flowers lilac or white. Fruit ovate or elliptic, green.



References: Hawkes, J.G.; Hjerting, J.P. The potatoes of Argentina, Brazil, Paraguay and Uruguay. *Annals of Botany Memoir* 3: 525 p.
Solanaceae Source - A global taxonomic resource for the nightshade family. <http://solanaceaesource.org>
Solanum in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB14716>



No seed image available



0.2-1.5 m



Jan-Dec

May-Jun;
Nov-Jan

Gene Pool Tertiary relative of *Solanum tuberosum* L.

Batata-silvestre; Batatinha-purgante

HABIT: Herbs 0.15-0.3 m tall, in sunny situations, up to 1 m tall in shady situations. Stems 1-3 mm in diameter at base of plant, green, unwinged, glabrous to densely short puberulent.

LEAVES: Leaves odd-pinnate, the blades 6.5-14.5 x 3.3-7.8 cm, green, membranous to chartaceous, glabrous to pubescent adaxially and abaxially with hairs like those of the stems; most distal lateral leaflets 1-3.8 x 0.7-2 cm, narrowly to broadly ovate, the apex acuminate, the base typically oblique, or cordate, to rounded, sessile and slightly decurrent or with petiolules up to 2 mm long; terminal leaflet 3.8-8.3 x 2.3-4 cm, broadly ovate to broadly elliptic; petioles 0.9-2.8 cm, pubescent.

INFLORESCENCES: 2-15 cm, terminal with a subtending axillary bud, generally in distal half of the plant, usually forked, with 3-12 flowers.

FLOWERS: Homostylous, calyx 3-7 mm long, the tube 1-2 mm, the lobes 1-6 mm; Corolla 2-3 cm in diameter, stellate to deeply stellate, violet or sometimes white tinged with violet.

FRUITS: Ovoid to conical berry, 2.5-3 cm long, 2-2.5 cm wide, green when ripe, glabrous.

SEEDS: Ovoid and ca. 2 mm long, whitish to greenish in fresh condition and drying brownish.

Habitat:

In open anthropic areas, grasslands, and edges of forests in the Atlantic Rainforest and Pampa phytogeographic domains.

Distribution:

South America in Argentina, Uruguay and Brazil in the South (PR, RS, SC).

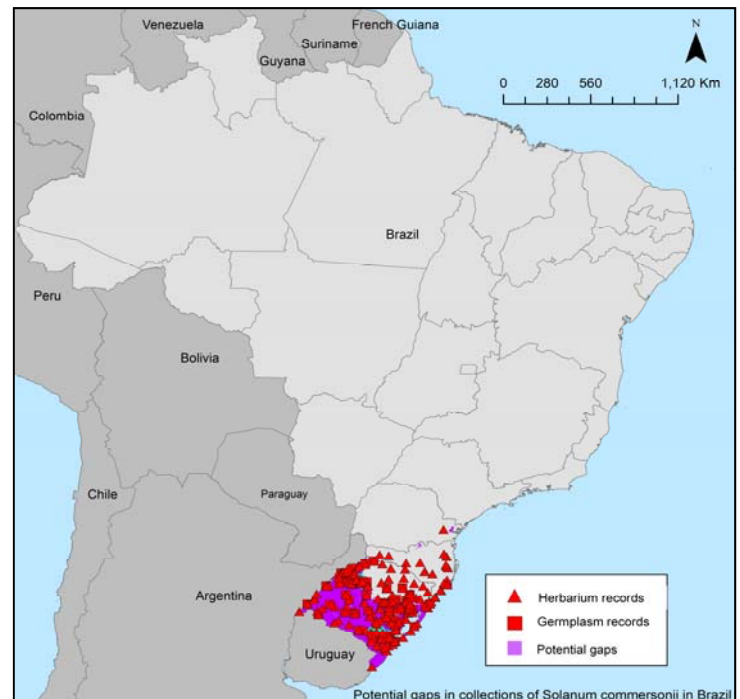
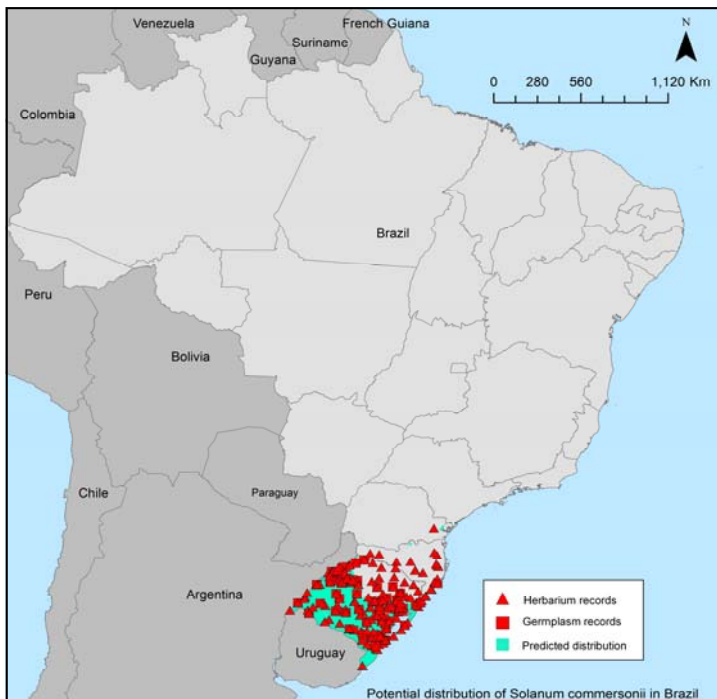
Altitude: 0 - 1050 m

Solanum commersonii

Leaves rosulate. Sepals equal, triangular. Flowers lilac or white. Fruit ovate or elliptic, green.

May be confused with:
Solanum chacoense

Leaves spirally arranged. Sepals unequal, ovate. Flowers white. Fruit globose or compressed laterally, mostly with white or purplish spots.



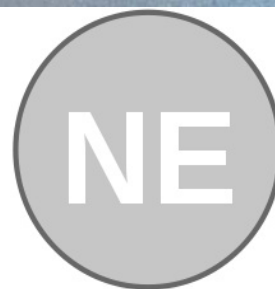
References: Hawkes, J.G.; Hjerting, J.P. The potatoes of Argentina, Brazil, Paraguay and Uruguay. *Annals of Botany Memoir* 3: 525 p.
Solanaceae Source - A global taxonomic resource for the nightshade family. <http://solanaceaesource.org>
Solanum in Flora do Brasil 2020. JBRJ. <http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB14716>



No seed image available



20-45 cm



Jan-Dec

Feb-Jul;
Oct-Nov

Appendix - Synonyms

Taxon		Synonyms
<i>Ipomoea cynanchifolia</i> Meisn.	1	No synonyms
<i>Ipomoea grandifolia</i> (Dammer) O'Donell	2	<i>Ipomoea coccinea</i> var. <i>luteola</i> Arechav.; <i>Jacquemontia grandifolia</i> Dammer
<i>Ipomoea ramosissima</i> (Poir.) Choisy	3	<i>Convolvulus ramosissimus</i> Poir.; <i>Ipomoea dichotoma</i> var. <i>trilobata</i> Meisn.; <i>Ipomoea ebracteata</i> (Poir.) Choisy; <i>Ipomoea perplexa</i> L.O. Williams; <i>Ipomoea quesadana</i> Standl.; <i>Ipomoea ramosissima</i> f. <i>rosea</i> (Hallier) O'Donell; <i>Ipomoea ramosissima</i> var. <i>rosea</i> Hallier
<i>Ipomoea tiliacea</i> (Willd.) Choisy	4	<i>Convolvulus fastigatus</i> Roxb.; <i>Convolvulus tiliaceus</i> Willd.; <i>Ipomoea fastigiata</i> (Roxb.) Sweet
<i>Ipomoea triloba</i> L.	5	<i>Batatas triloba</i> (L.) Choisy; <i>Convolvulus heterophyllus</i> Sessé & Moc.; <i>Convolvulus trilobus</i> (L.) Desr.; <i>Ipomoea blancoi</i> Choisy; <i>Ipomoea eustachiana</i> Jacq.; <i>Ipomoea galapagensis</i> Andersson; <i>Ipomoea triloba</i> var. <i>quinquefolia</i> Kuntze
<i>Eleusine indica</i> (L.) Gaertn.	6	<i>Agropyron geminatum</i> Schult. & Schult.f.; <i>Cynodon indicus</i> (L.) Raspail; <i>Cynosurus indicus</i> L.; <i>Cynosurus pectinatus</i> Lam.; <i>Eleusine distans</i> Link; <i>Eleusine glabra</i> Schumach.; <i>Eleusine gonantha</i> Schrank; <i>Eleusine gouinii</i> E.Fourn.; <i>Eleusine inaequalis</i> E.Fourn.; <i>Eleusine indica</i> var. <i>major</i> E.Fourn.; <i>Eleusine indica</i> var. <i>monostachya</i> F.M.Bailey; <i>Eleusine indica</i> var. <i>oligostachya</i> Honda; <i>Eleusine japonica</i> Steud.; <i>Eleusine macrosperma</i> Stokes; <i>Eleusine marginata</i> Lindl.; <i>Eleusine polydactyla</i> Steud.; <i>Eleusine rigidifolia</i> E.Fourn.; <i>Eleusine scabra</i> E.Fourn.; <i>Juncus loureiroana</i> Schult. & Schult.f.; <i>Leptochloa pectinata</i> (Lam.) Kunth; <i>Triticum geminatum</i> Spreng.
<i>Eleusine tristachya</i> (Lam) Lam	7	<i>Cynosurus tristachyos</i> Lam.; <i>Eleusine barcinonensis</i> Costa; <i>Eleusine geminata</i> (Spreng.) Lange; <i>Eleusine indica</i> var. <i>barcinonensis</i> (Costa ex Willk.) K. Richt.; <i>Eleusine indica</i> var. <i>brachystachya</i> Trin.; <i>Eleusine indica</i> var. <i>condensata</i> Döll; <i>Eleusine indica</i> var. <i>tristachya</i> (Lam.) Fiori; <i>Eleusine italica</i> N.Terracc.; <i>Eleusine oligostachya</i> Link; <i>Eleusine tristachya</i> f. <i>latifolia</i> Hack.
<i>Oryza alta</i> Swallen	8	No synonyms
<i>Oryza glumaepatula</i> Steud.	9	No synonyms
<i>Oryza grandiglumis</i> (Döll) Prodoehl	10	<i>Oryza latifolia</i> var. <i>grandiglumis</i> (Döll) A.Chev.; <i>Oryza sativa</i> var. <i>grandiglumis</i> Döll
<i>Oryza latifolia</i> Desv.	11	<i>Oryza latifolia</i> var. <i>grandispiculis</i> A.Chev.; <i>Oryza latifolia</i> var. <i>latifolia</i> ; <i>Oryza platyphylla</i> Schult. & Schult.f.; <i>Oryza sativa</i> var. <i>latifolia</i> (Desv.) Döll

Appendix - Synonyms

Taxon		Synonyms
Solanum chacoense Bitter	12	<p>Solanum arnezii Cárdenas; Solanum bitteri Hassl.; Solanum boegeri Bukasov; Solanum caipipendense Cárdenas; Solanum chacoense var. angustisectum (Hassl.) Hassl.; Solanum chacoense f. caipipendense (Cárdenas) Correll; Solanum chacoense subsp. chacoense; Solanum chacoense subsp. muelleri (Bitter) Hawkes; Solanum chacoense subsp. subtilius (Bitter) Hawkes; Solanum cuevoanum Cárdenas; Solanum dolichostigma Buk. ex Lechn.; Solanum emmeae Juz. & Bukasov; Solanum garciae Juz. & Bukasov; Solanum gibberulosum Juz. & Bukasov; Solanum guaraniticum var. angustisectum Hassl.; Solanum guaraniticum var. latisectum Hassl.; Solanum horovitzii Bukasov; Solanum horovitzii var. multijugum Hawkes; Solanum jamesii var. grandifrons Bitter; Solanum jujuyense Hawkes; Solanum knappei Juz. & Bukasov; Solanum laplaticum Bukasov; Solanum limense Correll; Solanum muelleri Bitter ; Solanum muelleri f. densipilosum Correll; Solanum parodii Juz. & Bukasov; Solanum saltense Hawkes; Solanum schickii Juz. & Bukasov; Solanum subtilius Bitter; Solanum tuberosum var. glabriusculum Dunal.</p>
Solanum commersonii Dunal	13	<p>Solanum acroleucum Bitter; Solanum chacoense f. pilosulum (Hassl.) Hassl.; Solanum commersonii subsp. commersonii; Solanum commersonii var. glabratum Hook. f.; Solanum commersonii var. glabriusculum Hook. f.; Solanum commersonii f. malmeanum (Bitter) Correll; Solanum commersonii var. pseudostipulatum Hassl.; Solanum commersonii var. pubescens Sendtn.; Solanum compactum Hawkes & Hjerting; Solanum debile Dunal; Solanum guaraniticum f. pilosulum Hassl.; Solanum henryi Bukasov & Lechn.; Solanum malmeanum Bitter; Solanum mechunguense Bukasov; Solanum mercedense Bukasov; Solanum millanii Bukasov & Lechn.; Solanum ohronzii Carrière; Solanum pseudostipulatum (Hassl.) Bukasov; Solanum rionegrinum Lechn.; Solanum sorianum Bukasov; Solanum tenue Sendtn.</p>