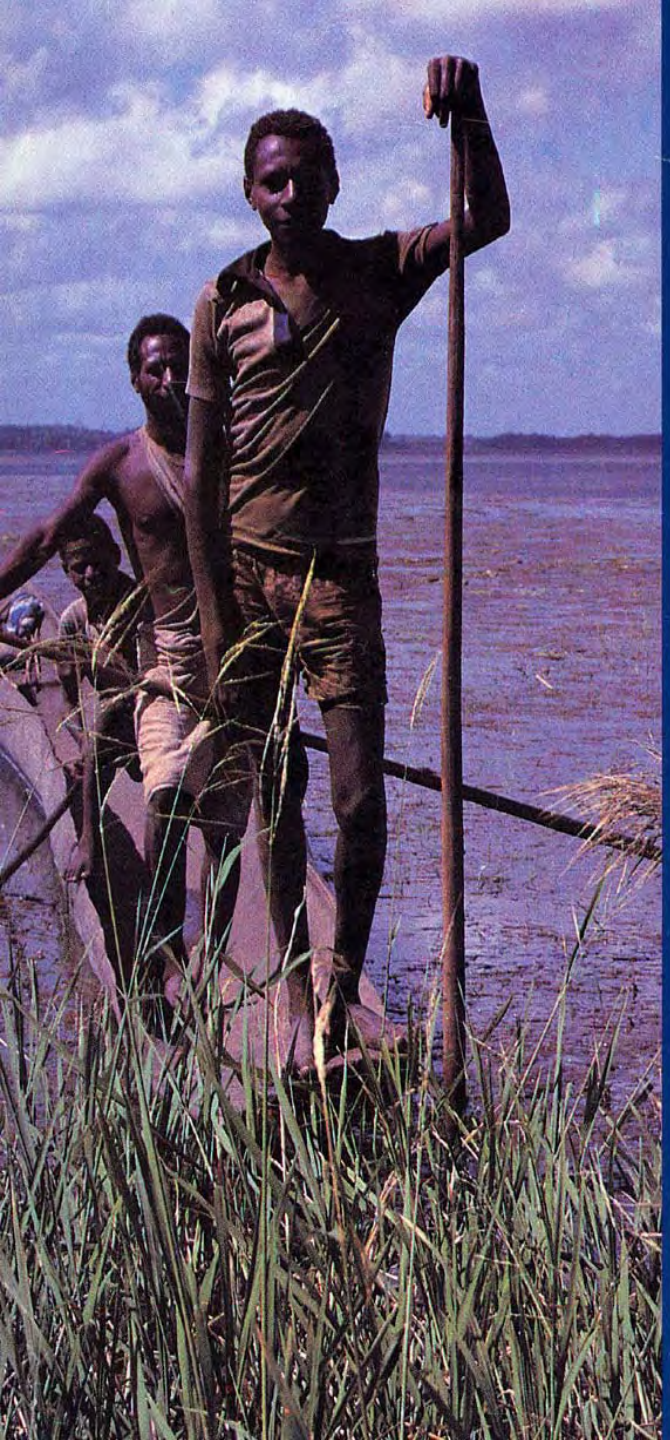
Collecting germplasm: a wild perspective

Duncan Vaughan
FAO-RAP

Lecture outline

- Rice - *Oryza*
- How to find a species
- Back at base
- Keeping track of germplasm/helping with evaluation
- Asian beans - *Vigna*
- Site variation, plant variation
- The hidden half
- Population dynamics



The Wild Relatives of Rice

A Genetic Resources Handbook

Duncan A. Vaughan

IRRI: 1994

The Asian *Vigna*:

Genus *Vigna* subgenus *Ceratotropis* genetic resources

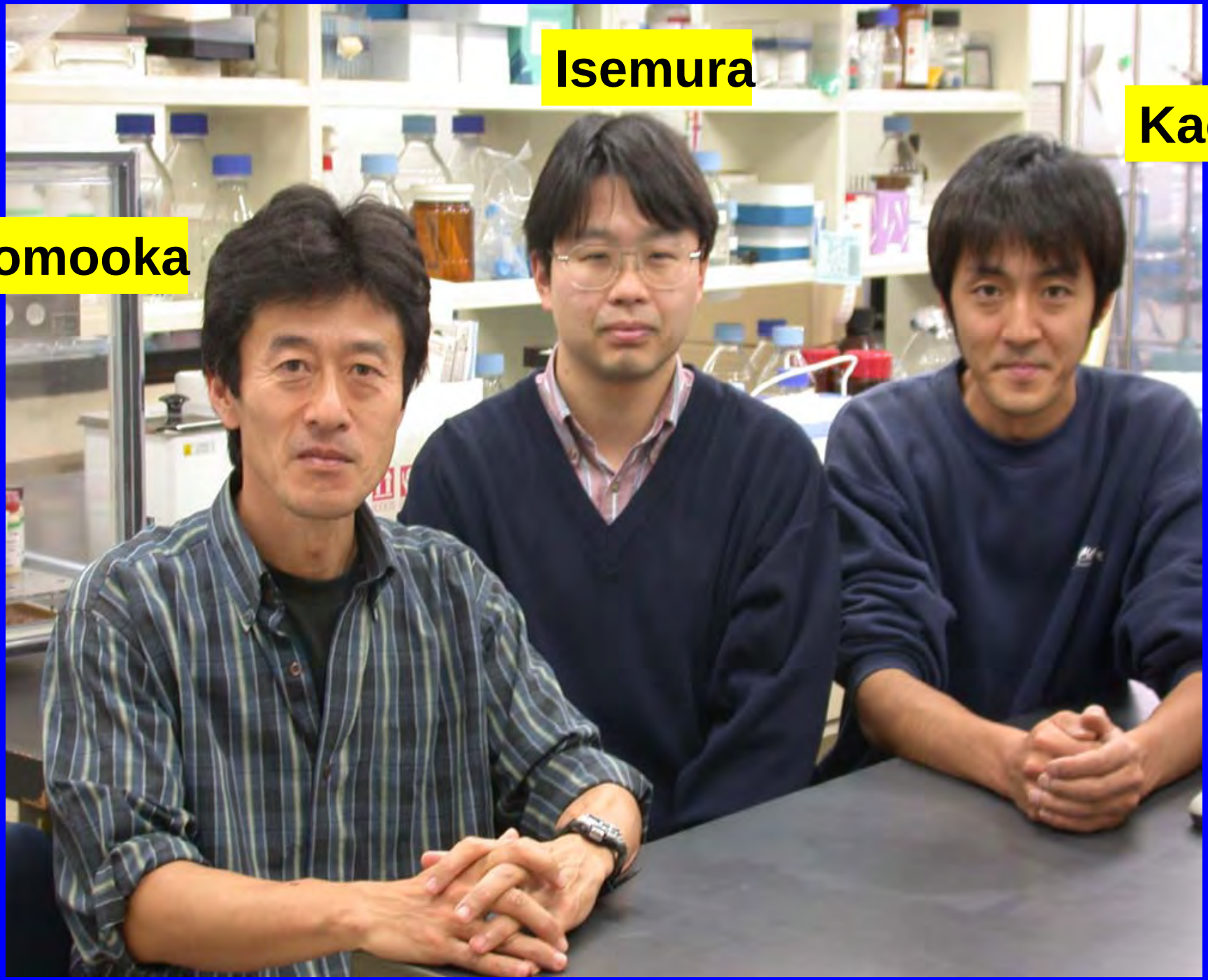
Norihiko Tomooka, Duncan Vaughan,
Helen Moss and Nigel Maxted




NIAS
National Institute of Agrobiological Sciences

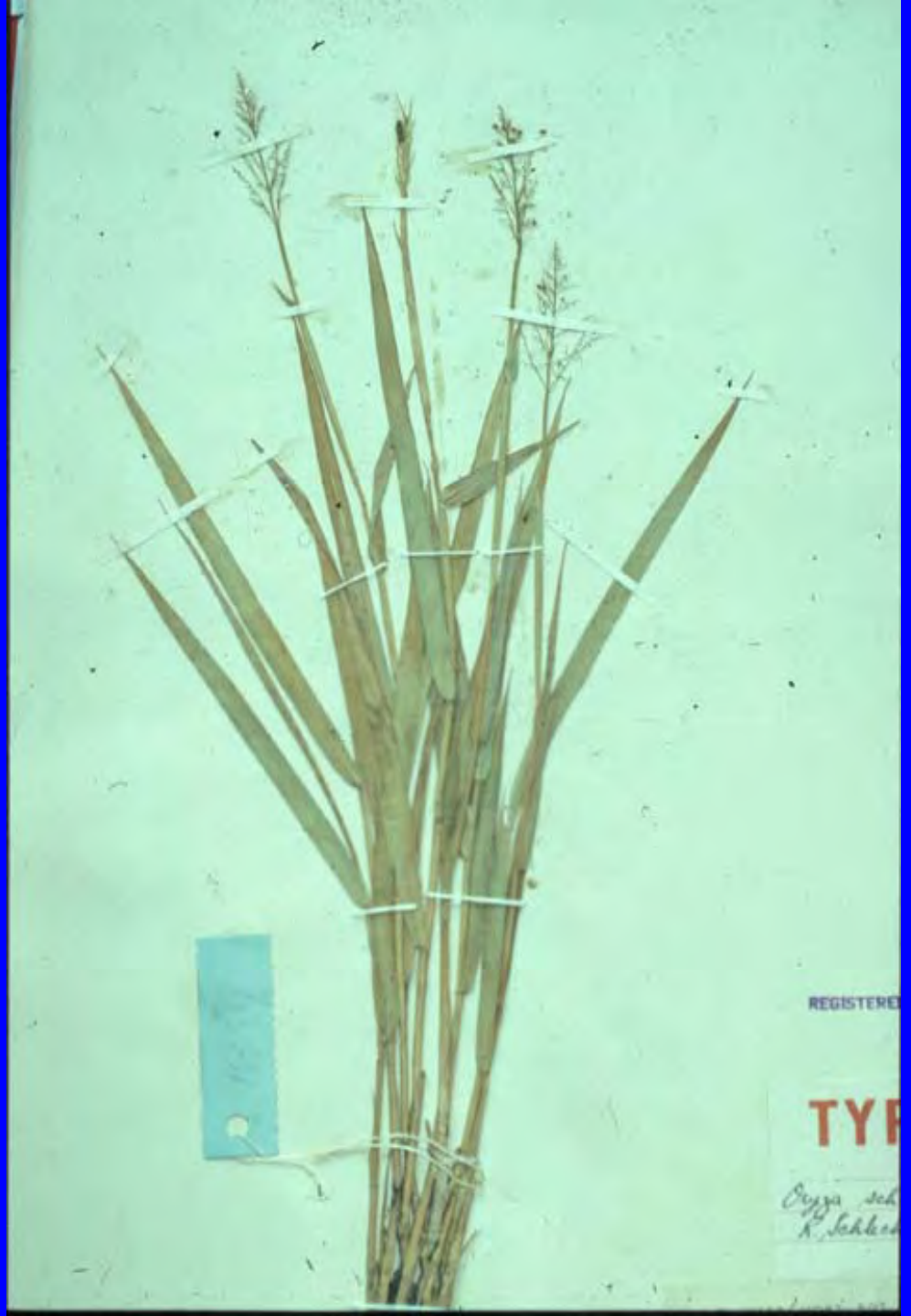
IPGRI

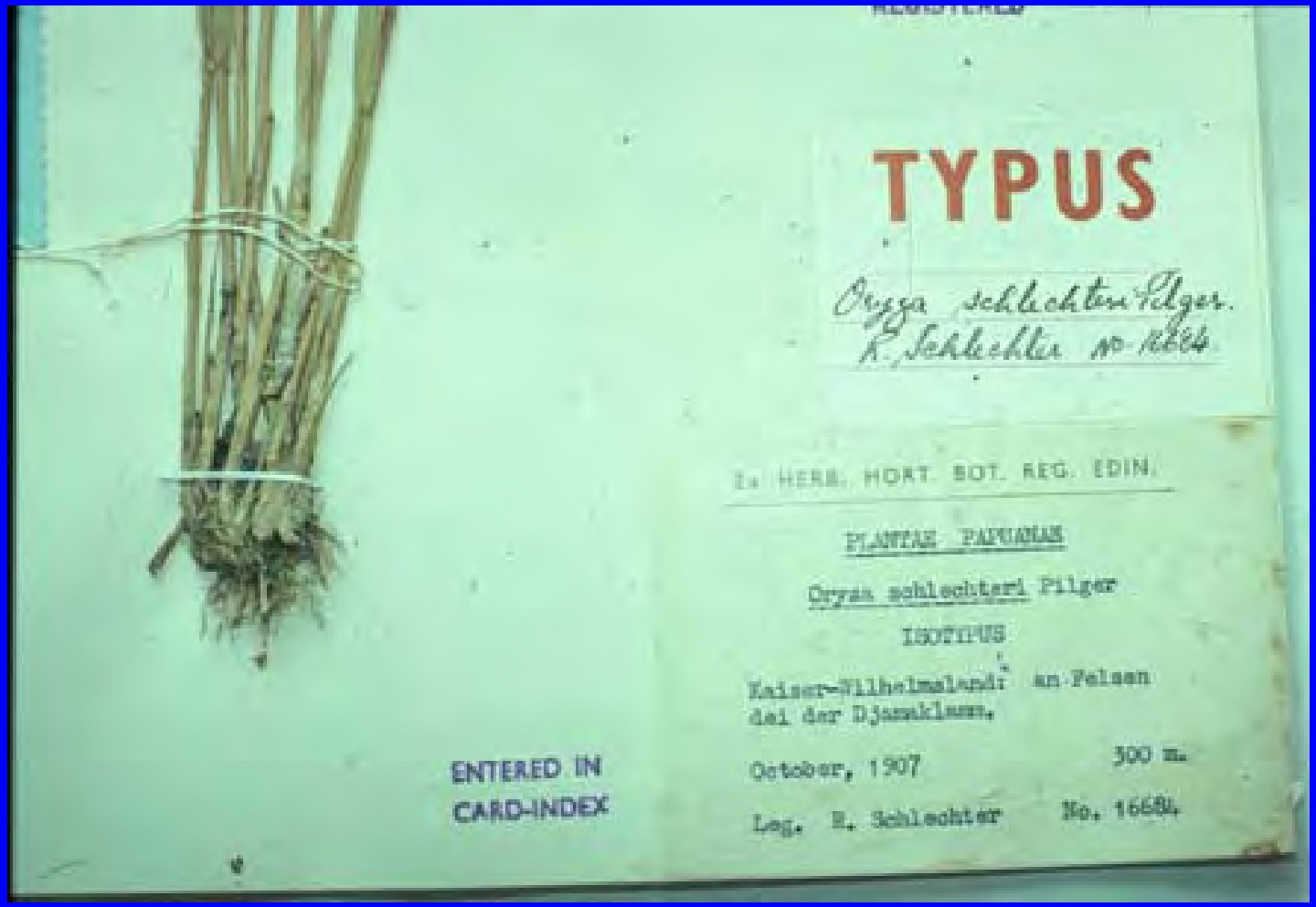
Kluwer: 2002


Isemura
Kaga
Tomooka

The story of re-finding the last *Oryza* species *Oryza schlechteri*

Type specimen
Singapore Botanic Gardens Herbarium

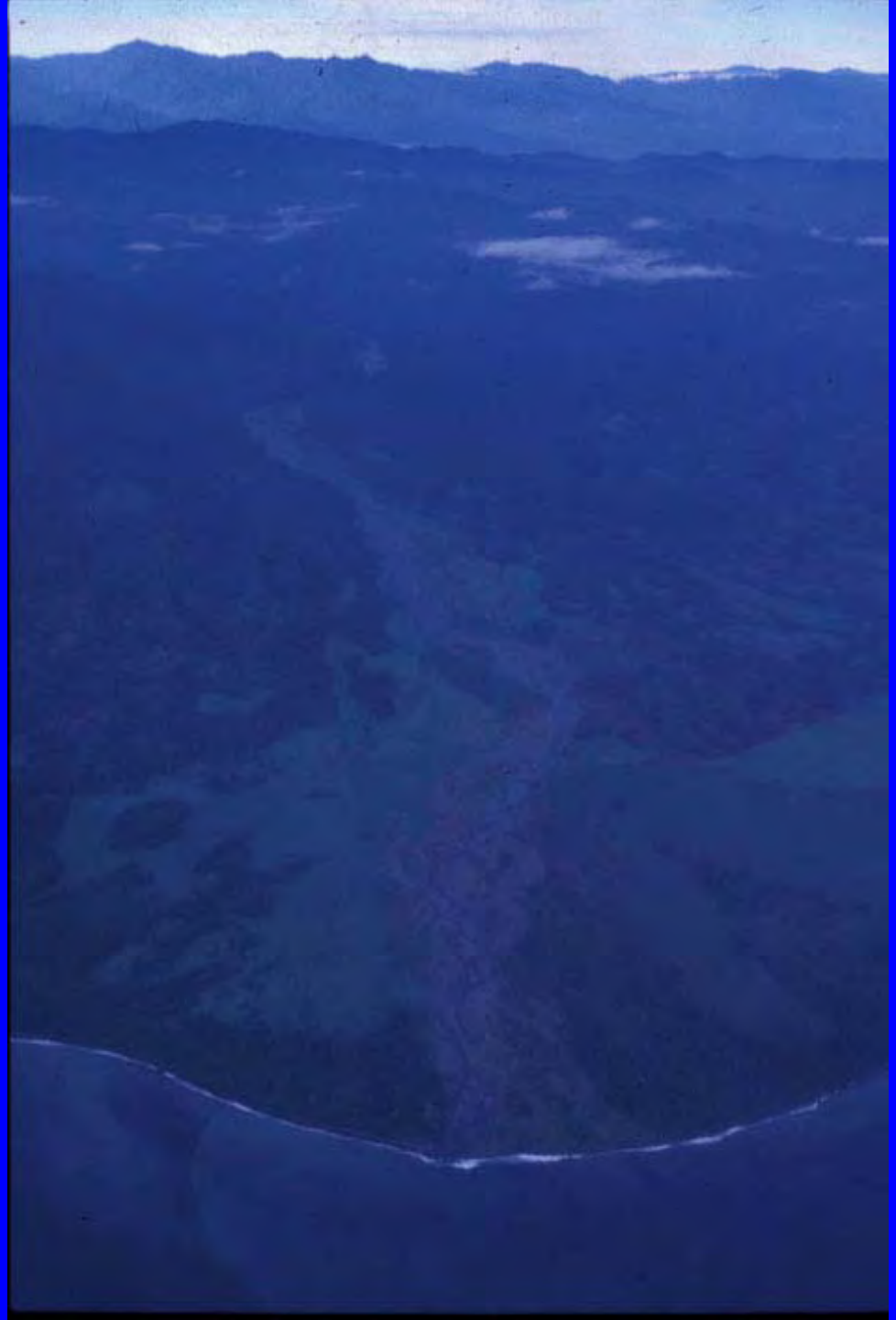




Kaiser Wilhelmsland, an Felsen dei der Djamuklam. October 1907. 300 meters

Pascual seeking information in Bodajim fishing village

The Minajim river with Finnestre Mountains in background



The confluence of the Minajim and Jamu rivers.

Collecting team with Mr. Aro village chief.

Felsen Gorge


No luck

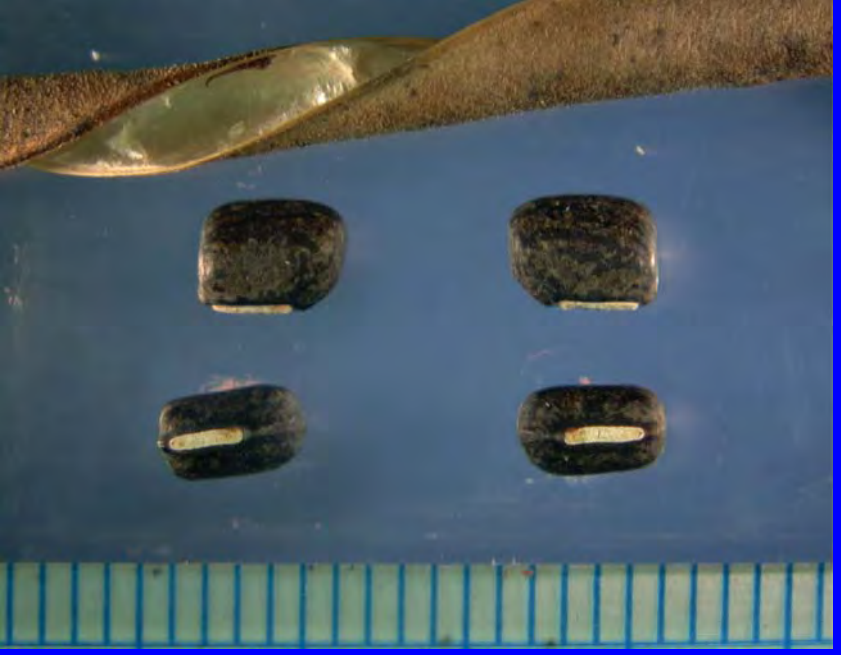
Return journey

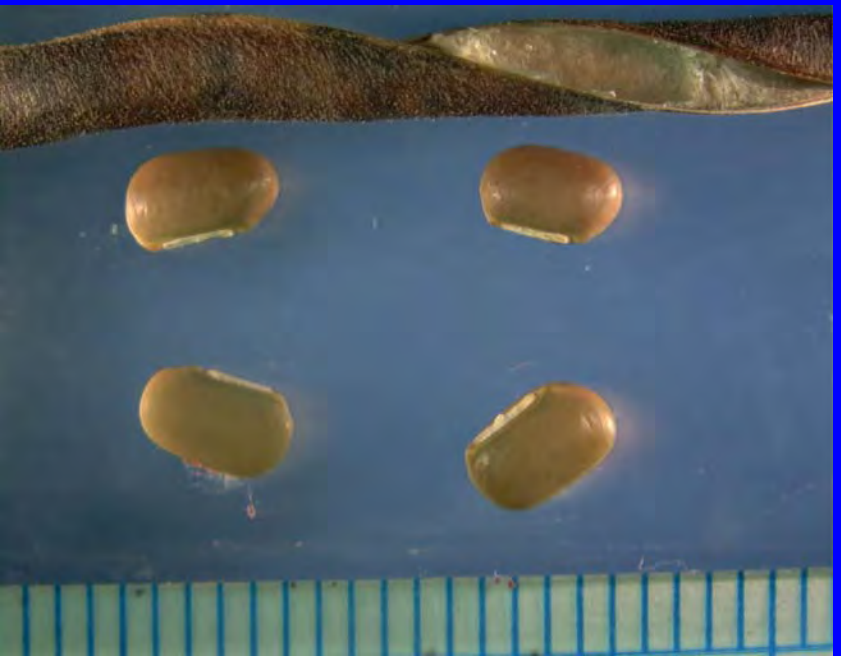

330m

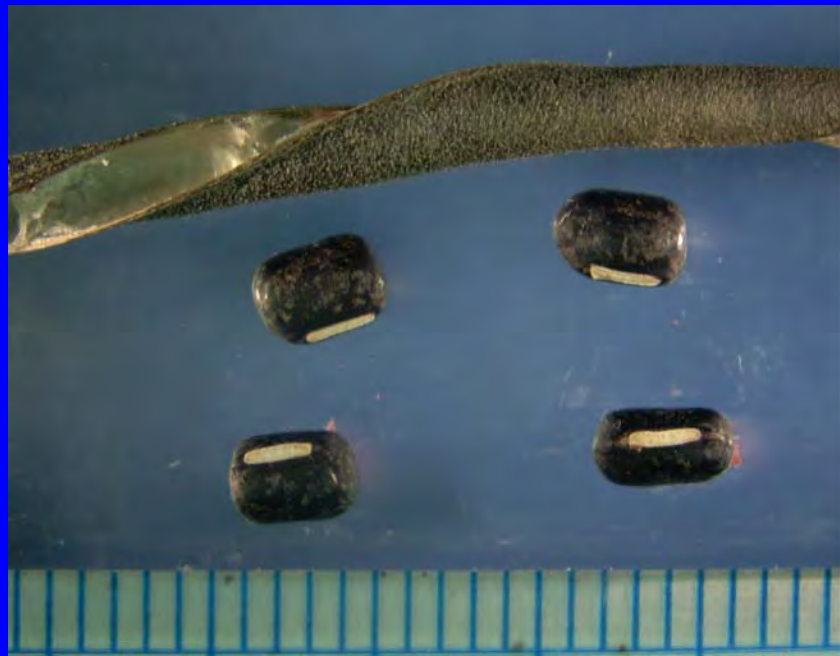
Back at Base

Trip report

Seed photos



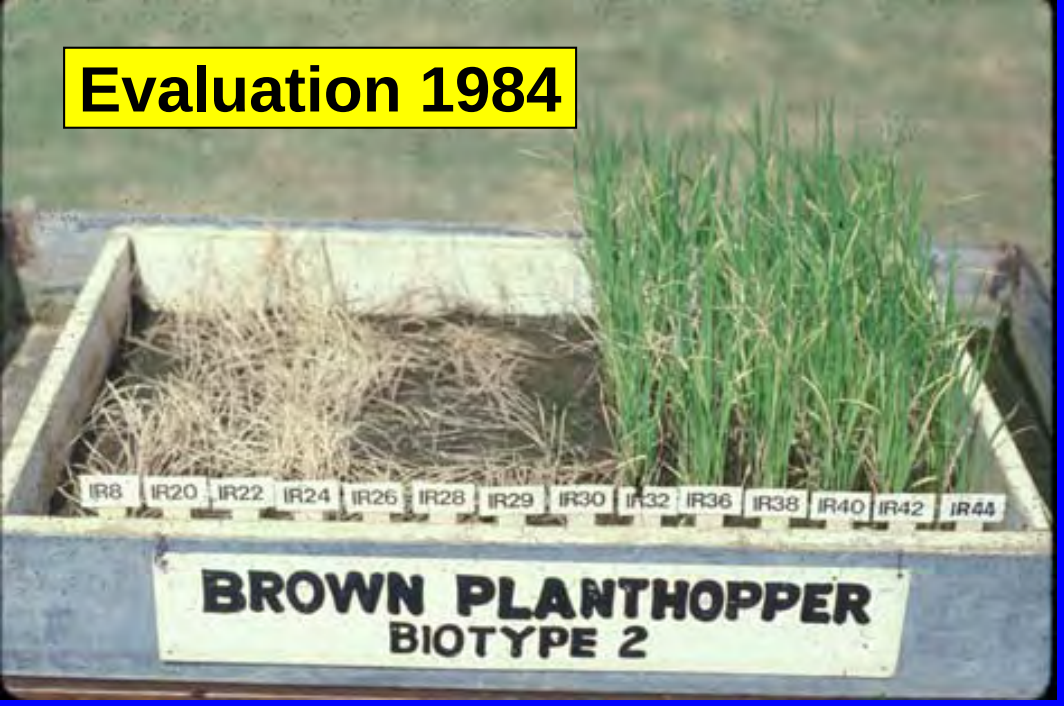




Keeping track of germplasm and helping the evaluators

***Oryza officinalis* growing in Thailand**

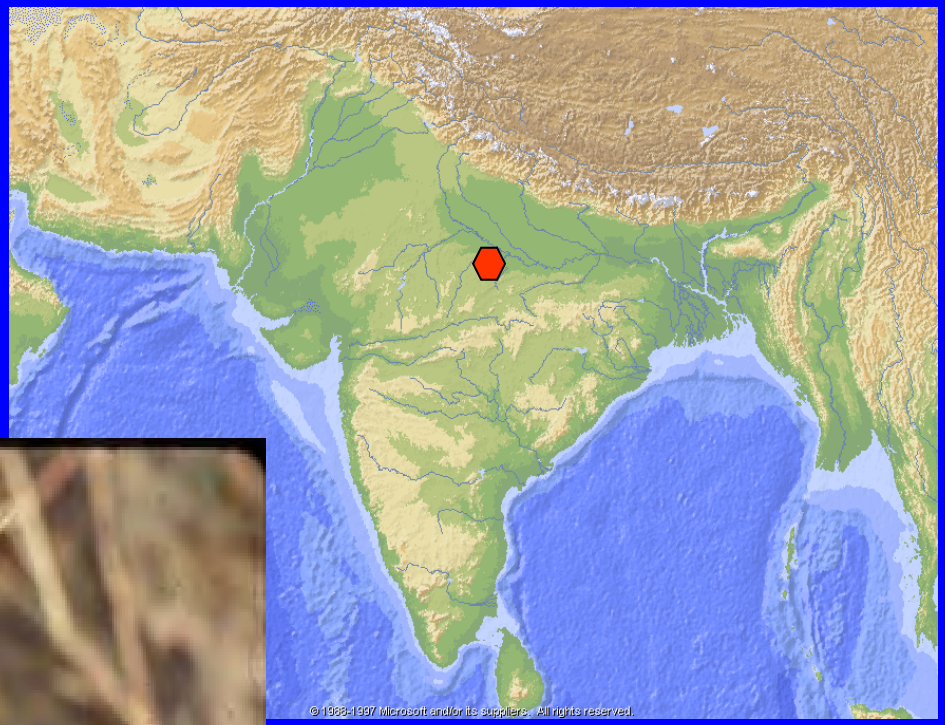
Evaluation 1984



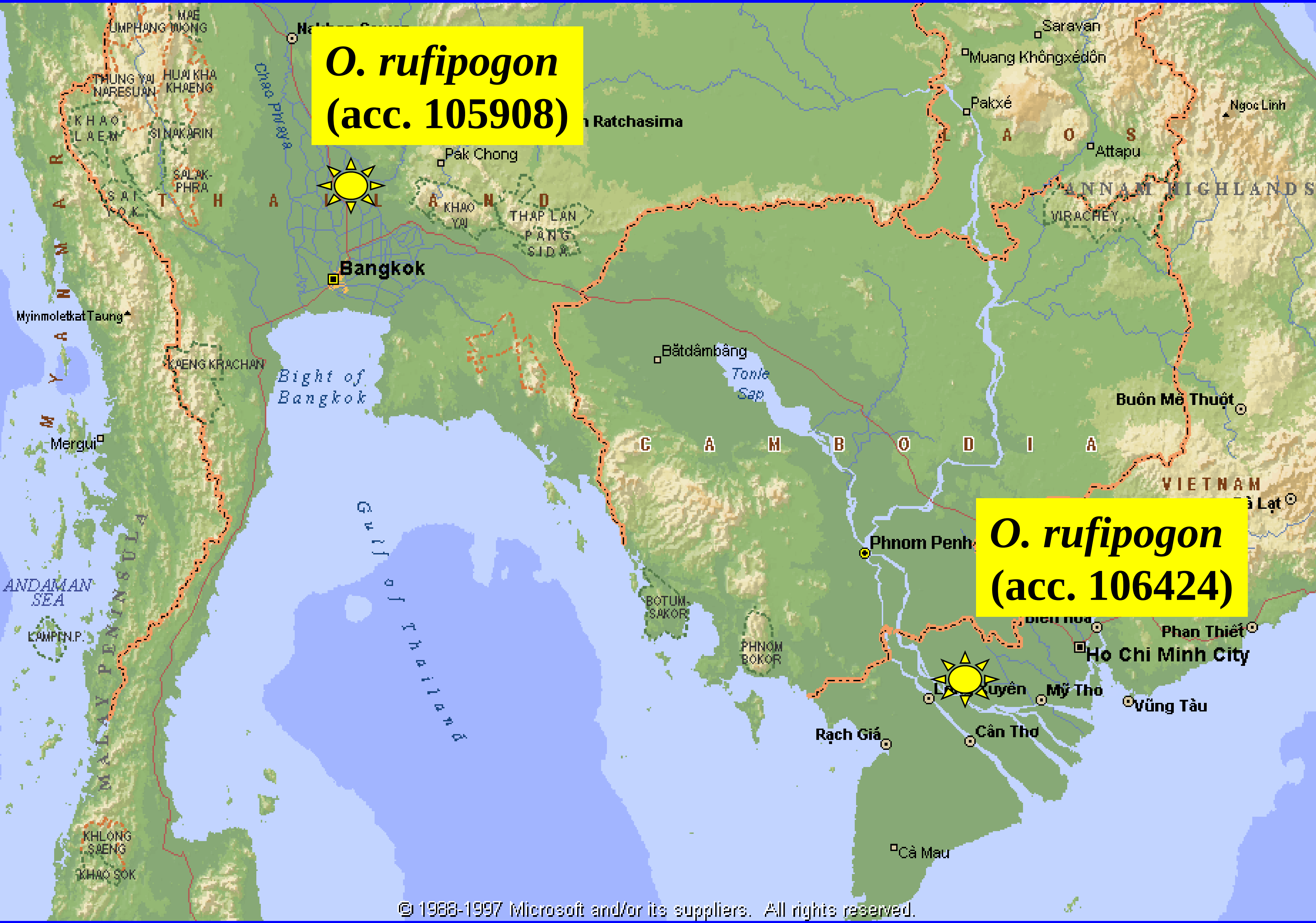
Hybridization 1984

Selection 1987

Grassy stunt virus resistance from *O. nivara*




IR36



1. Collection

Acc. 105908 was collected 6th Jan. 1989 close to Ayuttaya in deep water rice area.

Sonkran Chitrakon

2. Evaluation

1. Core collection approach using wild Oryza.

Species	Acc	RTBV	RTSV	GLH antibiosis
O. rufipogon	105908	0	0	Moderate
O. rufipogon	105910	0	0	Moderate

3. Use

1. **Use in wide hybridization**
2. **Release in Philippines of Matatag 9 because of its tolerance to tungro**

Nguyen Trong
Nguyen Ha

1. Collection

Location where *O. rufipogon* (106424) was collected growing in acid sulphate soils of the Mekong delta, at Go Thap, Dong Thap province on 23 Dec 1990

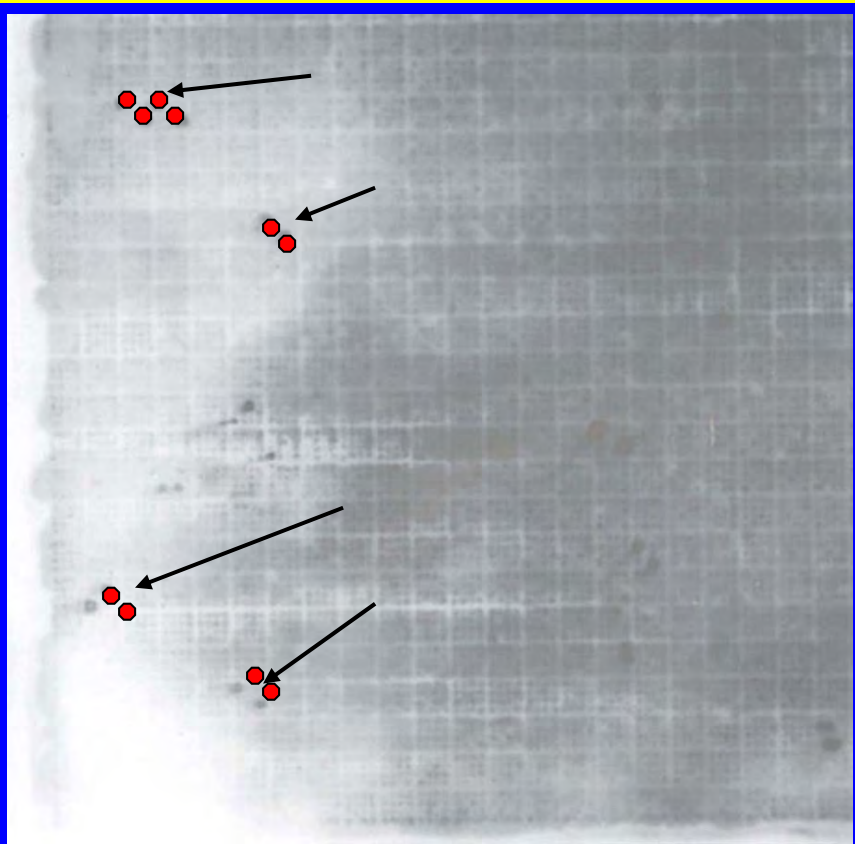
2. Evaluation

- Passport data enabled *O. rufipogon* to be quickly evaluated.
- Aluminum tolerance and also tungro tolerance were found in the germplasm.
- Based on root length analysis 5 QTL's have been found that explain aluminium tolerance (Nyugen et al. 2003).

3. Use

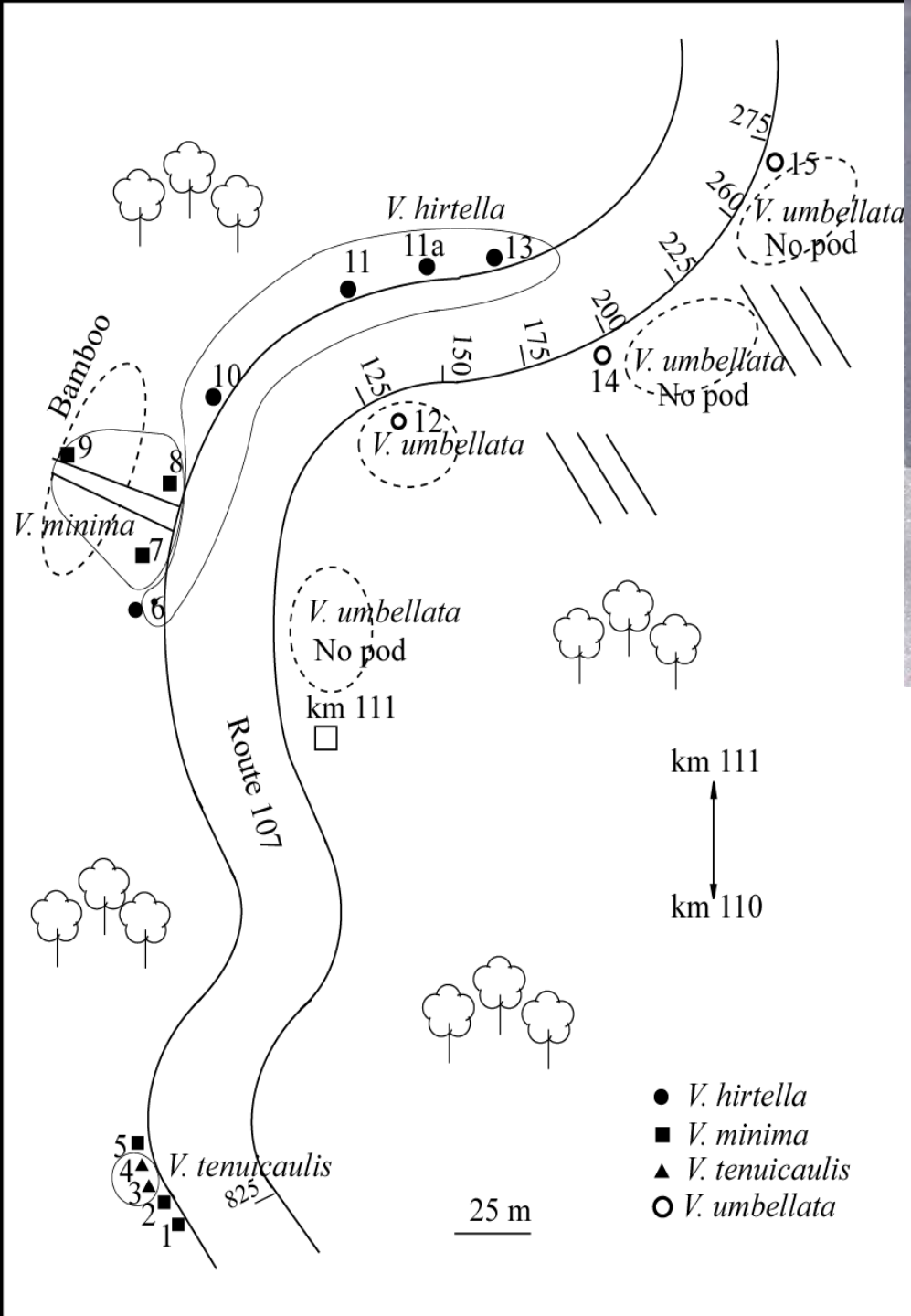
- Accessions crossed with IR64.
- Chosen for analysis in the *Oryza* Map Alignment Project.

BAC library screening



Vigna – Asian beans

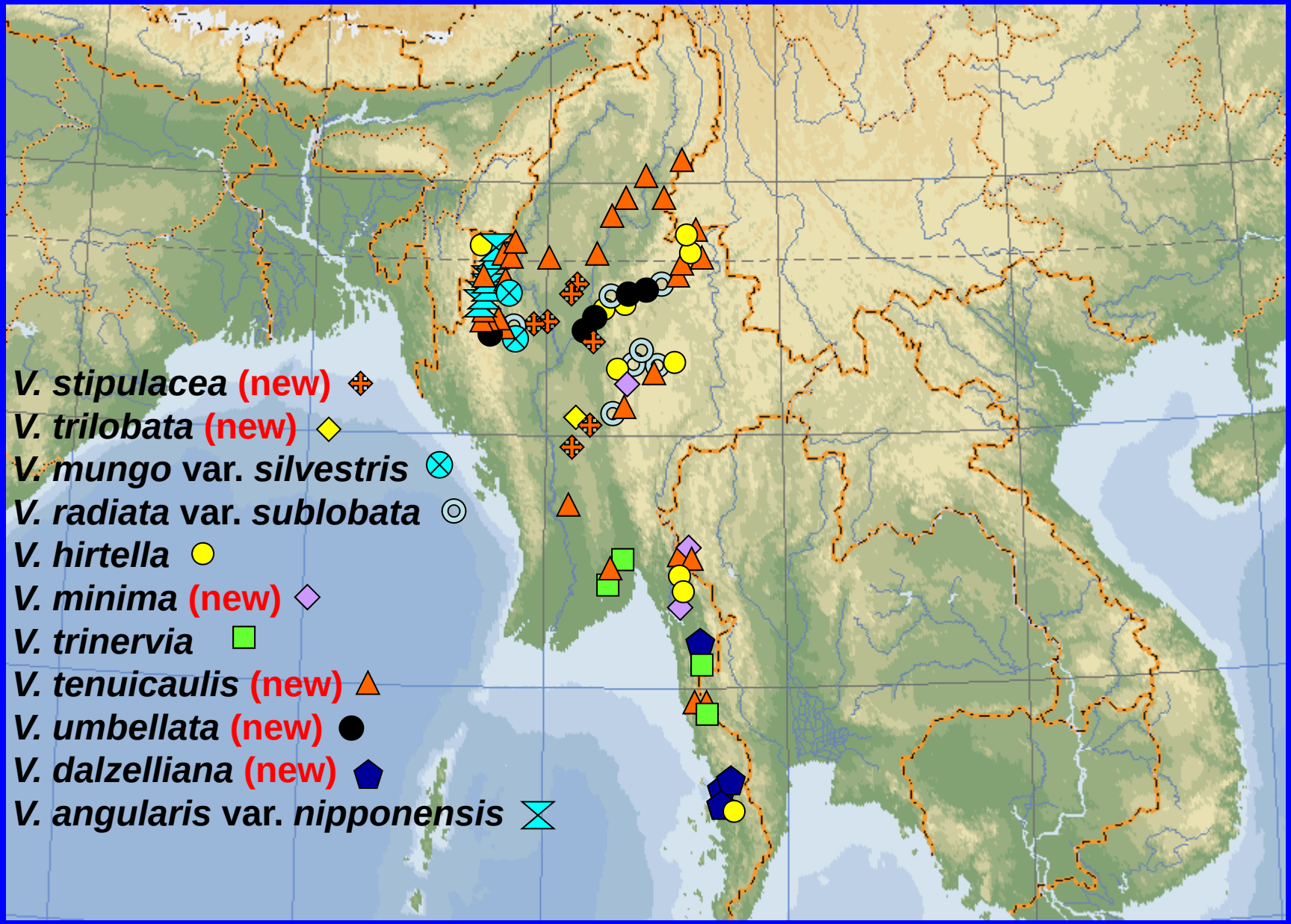

Hà Nội
(Hanoi)
N
Laos
(Vientiane)
Viang Chan
(Rangoon)
Yangon
Khonkhaen
Thailand
Paracel Islands
Vietnam
Krung Thep
(Bangkok)
thailand
Smith Island
Cambodia
Phnum Pénh
(Phnom Penh)
Thành Phố Hồ Chí Minh
(Hồ Chí Minh City)
Ko Samui
Ko Phuket
Pulau Langkawi
Pulau We
© 2006 Europa Technologies
Image © 2006 NASA
Image © 2006 TerraMetrics
Malaysia
Medan
© 2006 Google™
Pointer 13°02'35.49" N 101°29'32.45" E
Streaming 100%
Eye alt 1278.82 mi



4 *Vigna* species growing in 500m

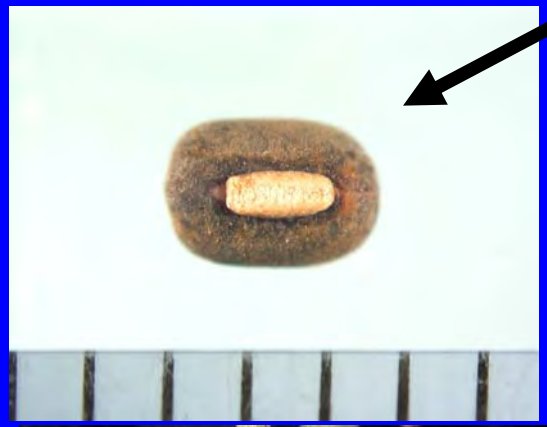
V. hirtella
V. umbellata
V. minima
V. tenuicaulis

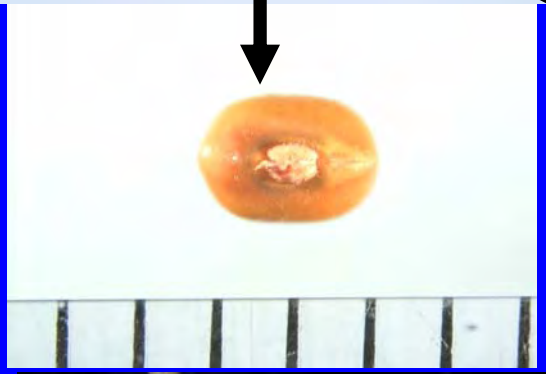
Collection sites of wild *Vigna* in Myanmar (2001, 2002)

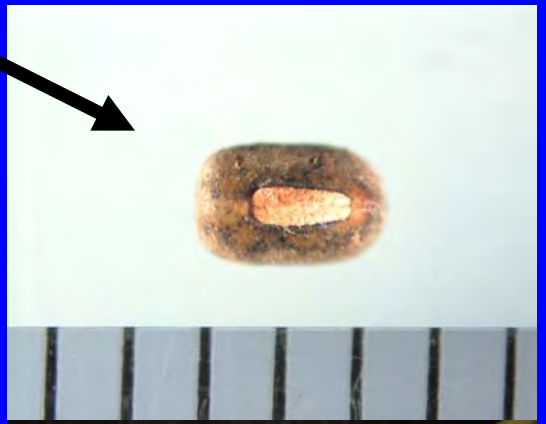


Leaves from the same species?

Three confused species in Sri Lanka

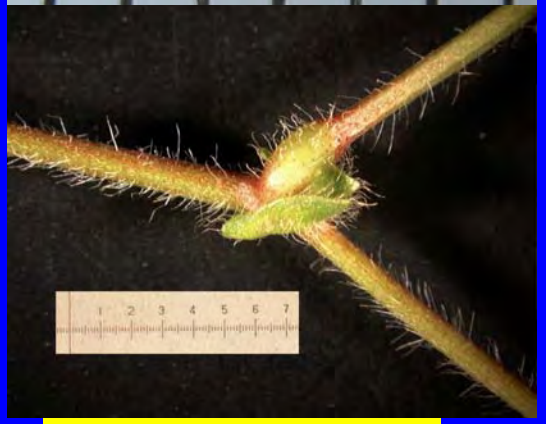




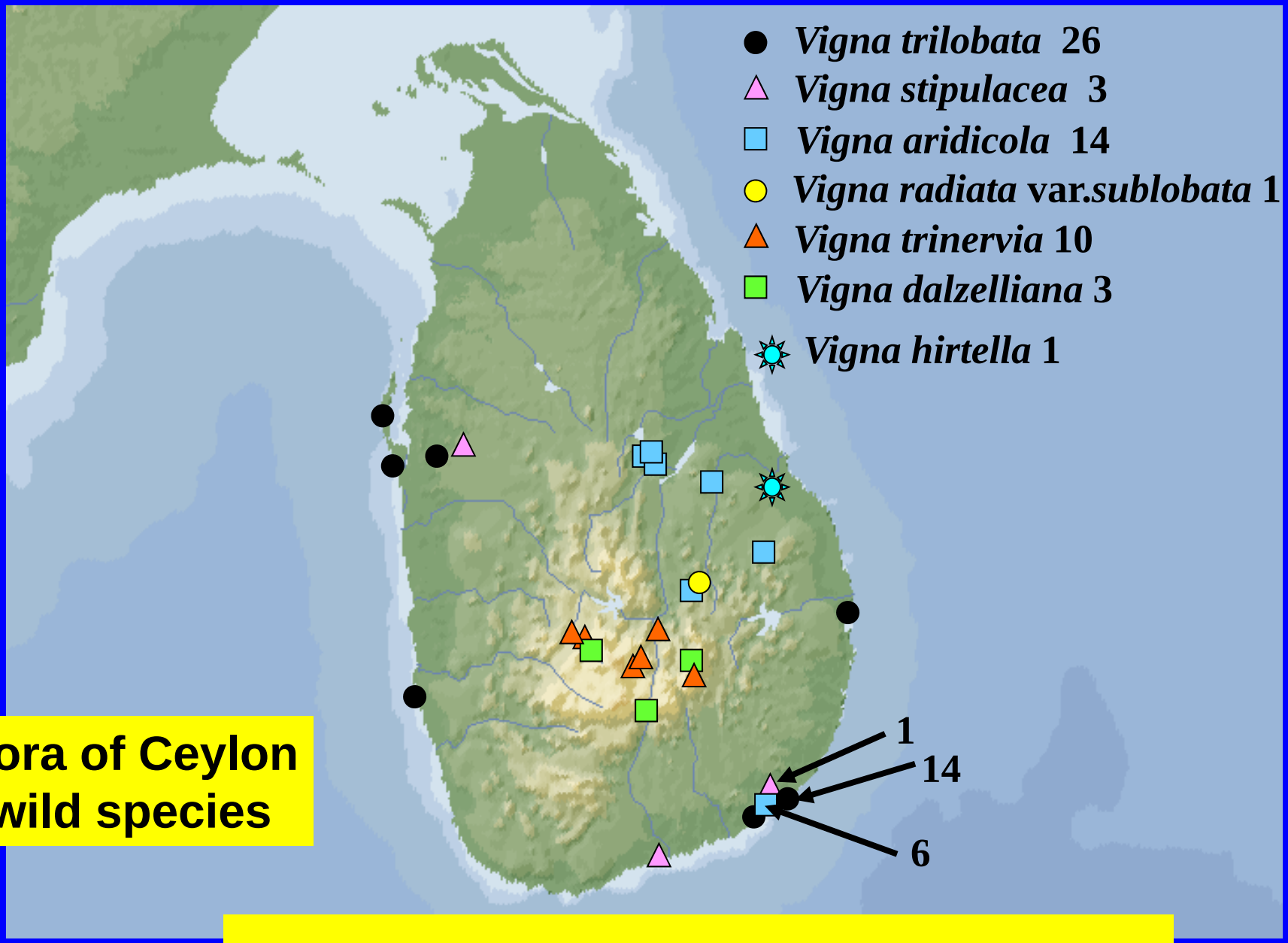


V. stipulacea

V. trilobata



V. aridicola



Flora of Ceylon
2 wild species

The Asian *Vigna* in Sri Lanka

Vigna aridicola

V. aridicola

near Maha Oya, Botticaloa (SL-25)

Sacred Area, Polonnaruwa (SL-22)

The hidden half

100 million tons of nitrogen fertilizer applied to agricultural land annually.

50 million tons of nitrogen fixed by legumes in agriculture annually

Components of the *Vigna angularis* complex in Japan

Population types

Cultivated

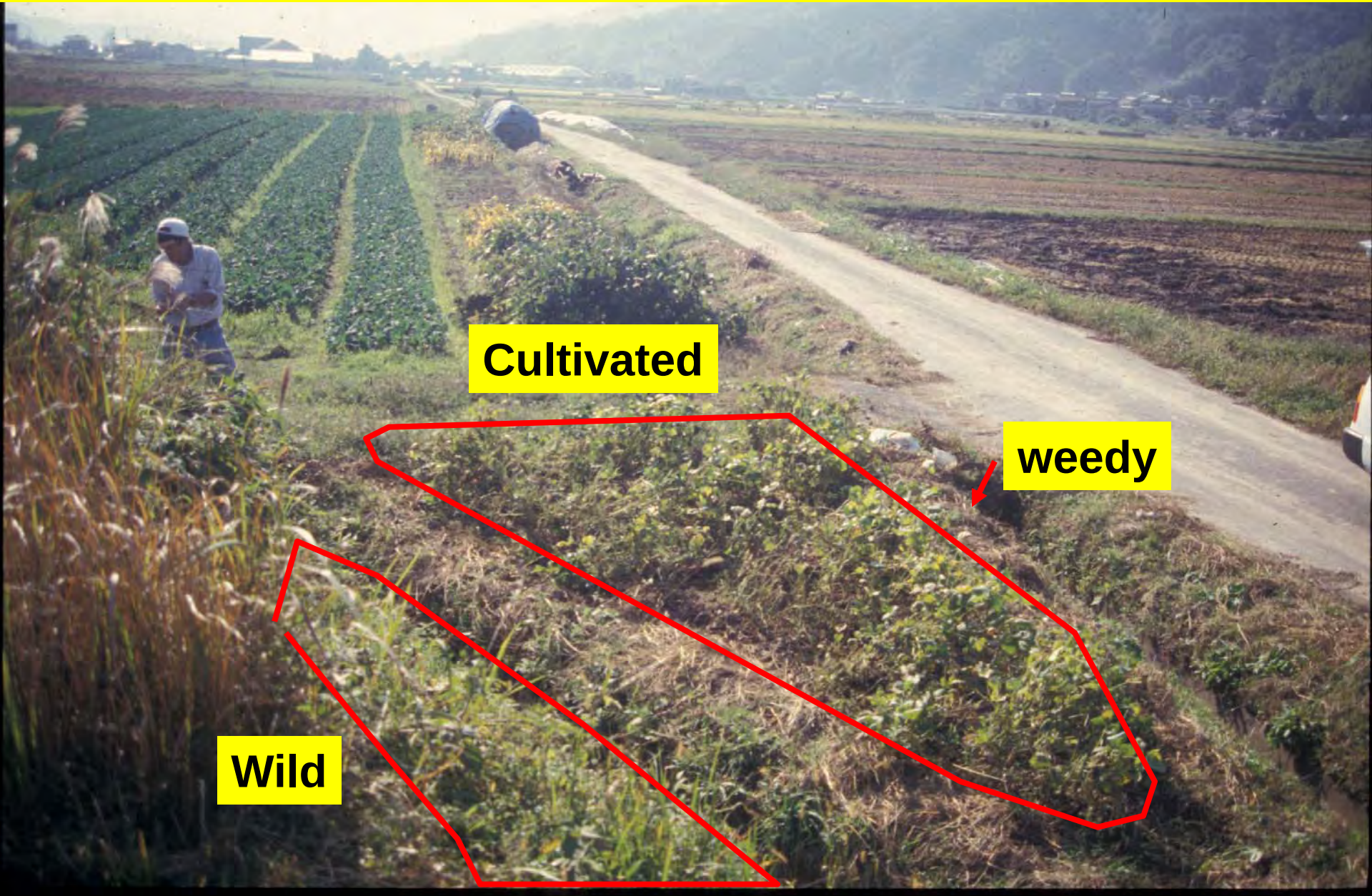
Wild

Weedy

Complex

Hybrid swarms

Complex population in Japan (Tottori prefecture)

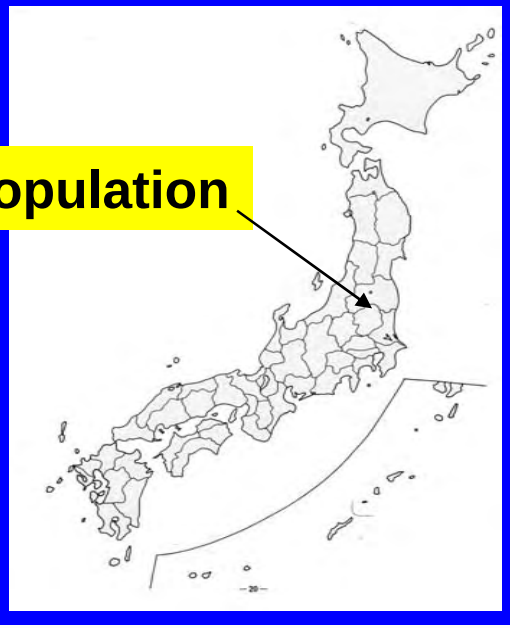


Weedy plant type

Wild plant type

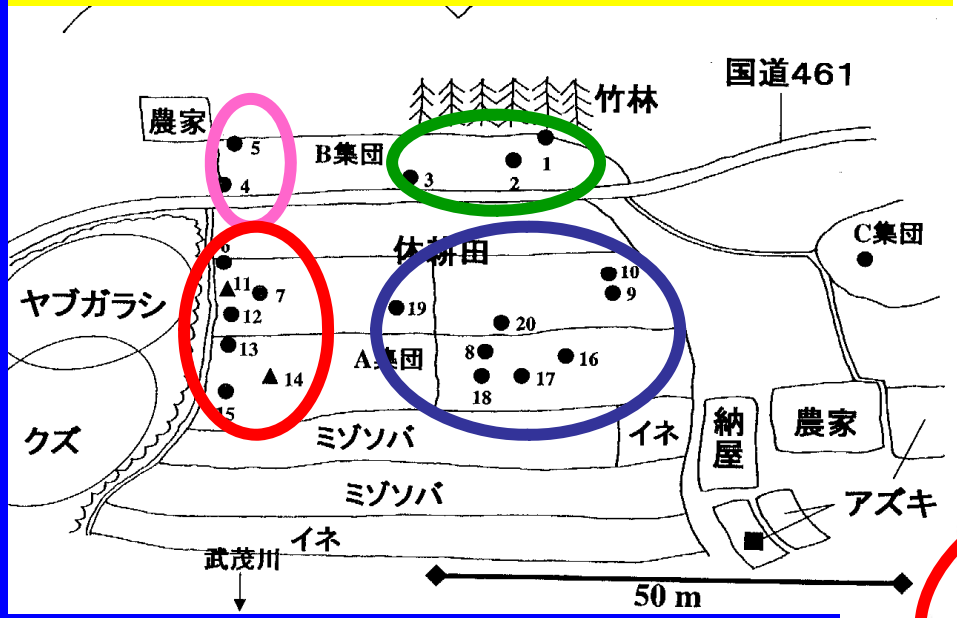
Cultivated

Bato population

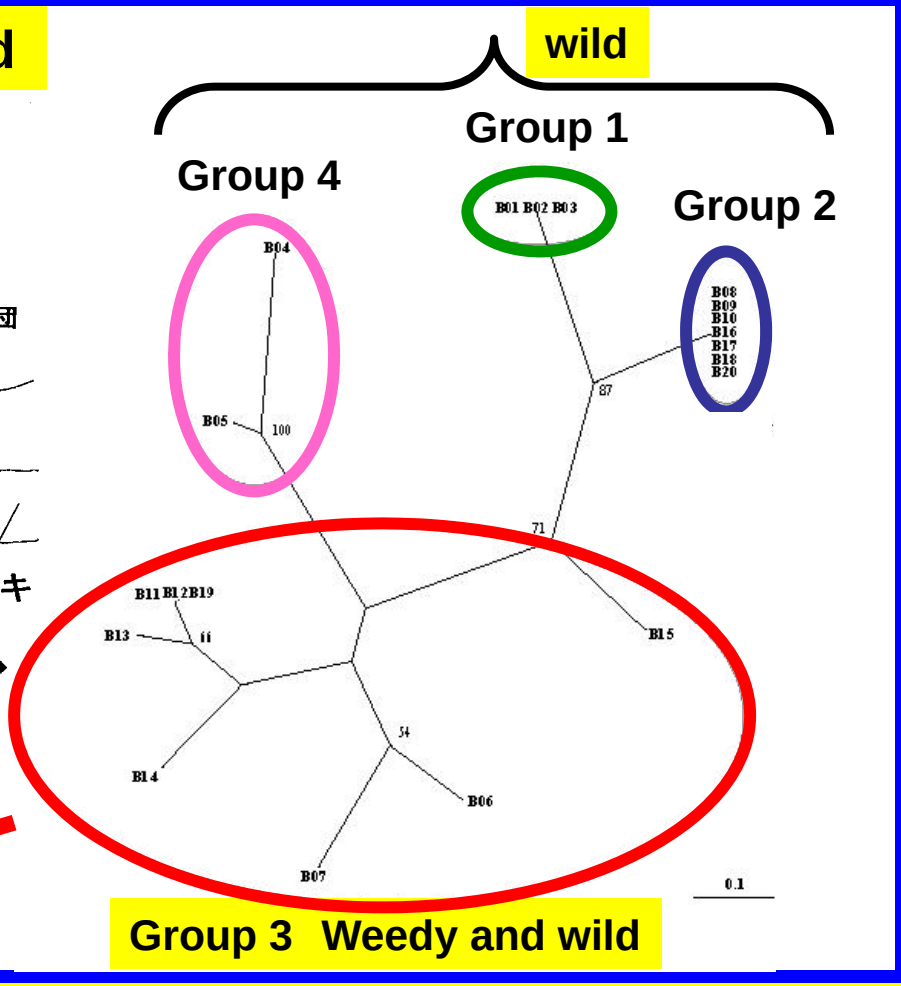


Complex population analysis in Bato, Tochigi

Sample location in abandoned field



Seed and pod color variation in Group 3



Group 3 Weedy and wild

Fine structure of complex population obtained

Seed and pod variation in complex population suggest cultivar gene flow.
However, long term cultivar gene flow could also be detected in wild like individuals by SSR

Some conclusions on the wild side

- The importance of the herbarium
- The importance of precise information
- What is in your back yard maybe more interesting than someone else's
- Expect the unexpected