

# Actual Cases of synergies created between plant breeding and conservation of genetic resources: the case of Japan and Argentina

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Presentation borrowed by SAKATA

# Germplasm research by private companies

～ Examples and future directions in Sakata ～

2021 Outsourcing project to promote the conservation and use of overseas genetic resources in response to climate change

2021.11.30 Sakata Plant Research Division Eijiro Nakata

## Summary of this announcement

1. Establishment and mission of the Office of Genetic Resources specificity and access model of breeding development
2. Argentina Horticultural Development Program  
(JICA: 1999–2004)
3. Proposal of the Joint Exploration and Evaluation Program for New Appreciation Crops participation and Results of Sakata in the Program
4. Introduction of Genetic Resources and Results in Indonesia

# 1. Establishment and Mission of the Office of Genetic Resources

(Genetic Resources Laboratory: GRL)

2000: Established as an organization to actively introduce genetic resources in the context of the CBD coming into effect and the growing awareness of the right to genetic resources

Purpose: To develop introduction and access for the use of genetic resources rather than a gene bank for the purpose of conservation

# Study of Access Model Considering Specificity of Breeding Development

**Since the results of breeding are a combination, the variety which is the result is also a genetic resource.**

- Breeding has unlimited possibilities for variety development due to the difference of the materials to be combined. It is not the case that the results converge on a specific drug by screening from the lead compound, as in the case of pharmaceuticals, and the results are obtained, but the results expand as the product is crossed with other materials.
- The produced variety also becomes a genetic resource and circulates.
- As an example, the wheat variety Very, released by CIMMYT\* in 1977, consists of 51 varieties from 26 countries crossed 3170
- Accumulation of many genetic resources is important

( A discussion on the conservation of biodiversity and the distribution of benefits

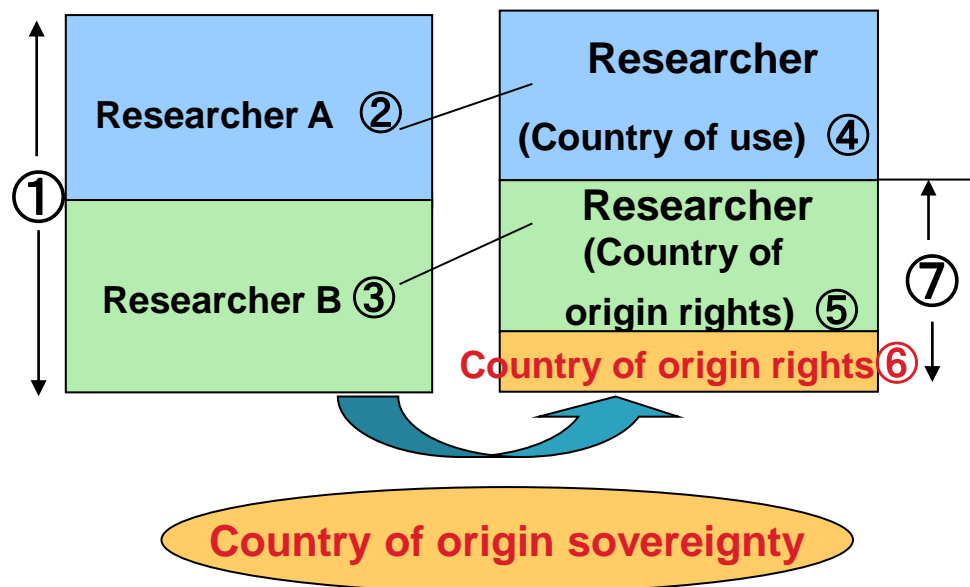
arising from its utilization: Mr. Akio Yamamoto)

\* International Maize and Wheat Improvement Center

# Concept of profit sharing in joint development of seeds and seedlings

## General joint development

General joint development Joint development in CBD



- ① : Substantial value of joint research results is determined by market evaluation
- ② : Share of researcher A's results in regular joint research
- ③ : Share of researcher B's results in regular joint research
- ④ : Share of researcher in country of use in joint research in CBD
- ⑤ : Share of researcher in country of origin in joint research in CBD
- ⑥ : Define country of origin rights (with reference to ITPGR criteria)
- ⑦ : Total benefit sharing to country of origin

## 2. Argentine Horticulture

### Development Plan JICA (1999—2004)

#### Land of Argentina

With an area of more than 3500 km from north to south and an area of 2,766,890km<sup>2</sup> (8 times larger than Japan), it is the second largest country in South America after Brazil.



#### Climate and climate that vary greatly from region to region

「East is the Prairie」 「West is the Andes」  
「South is desert」 「North is rainforest」



#### Large natural diversity and a treasure trove of genetic resources

Currently, about 9,400 plant species have been identified (5,500 in Japan).



# I. Search and Collection of Useful Floricultural Materials

Search technology was developed, and about 2000 materials and information were collected through 40 searches.

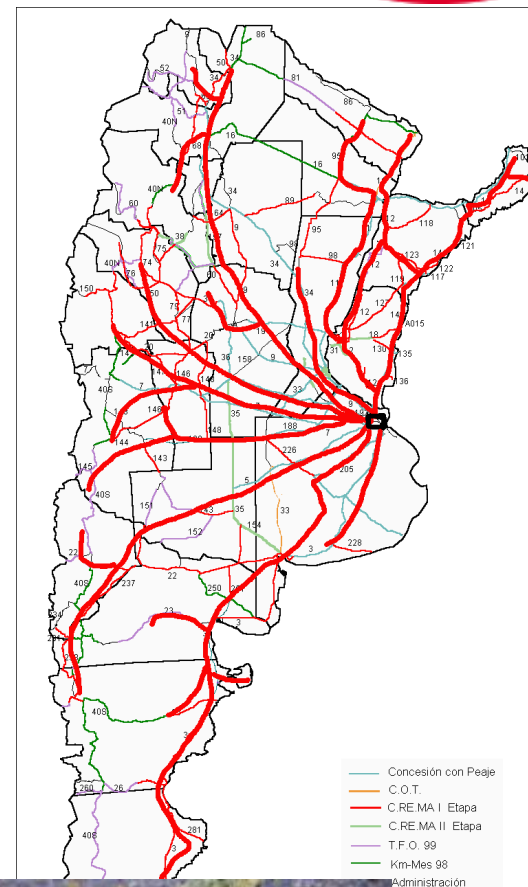
I-1 Search and collection of flower and plant materials

I-2 Characterization of flower and plant materials

I-3-(1) Evaluation of flower and plant materials

I-3-(2) Characterization of flower and plant materials

I-4 Preservation of useful flower and plant genetic resources





## **II. establishment of appropriate floriculture breeding technologies based on the theory of plant breeding under the Argentine climate**

**II-1. Development of Technology for Improvement of Flowering Characteristics  
by Crossbreeding**

**II-2. Development of Technology for Early Flowering by Crossbreeding**

**II-3. Development of Environmentally Resistant Cultivars by Crossbreeding**

**II-4. Breeding Technology Using Polyploids**

**II-5. Breeding Technology Using Mutagenesis**

## **III. development of practical proliferation technologies**

**III-1. improvement of general proliferation technologies**

**III-2. development of proliferation technologies using tissue culture**

# Field trial in INTA



*Portulaca* (6)  
*Scoparia* (11)  
*Glandularia* (12)  
*Stemodia* (1)  
*Mimulus* (1)  
*Mecardonia* (1)  
*Bacopa* (1)  
*Thymophylla* (1)  
*Eupatorium* (1)  
*Asteraceae* (1)  
*Nierembergia* (8)  
*Calibrachoa* (4)





# Pot cultivation test in the field



Mt. Blanc



Luna INTA-JICA



Triploide



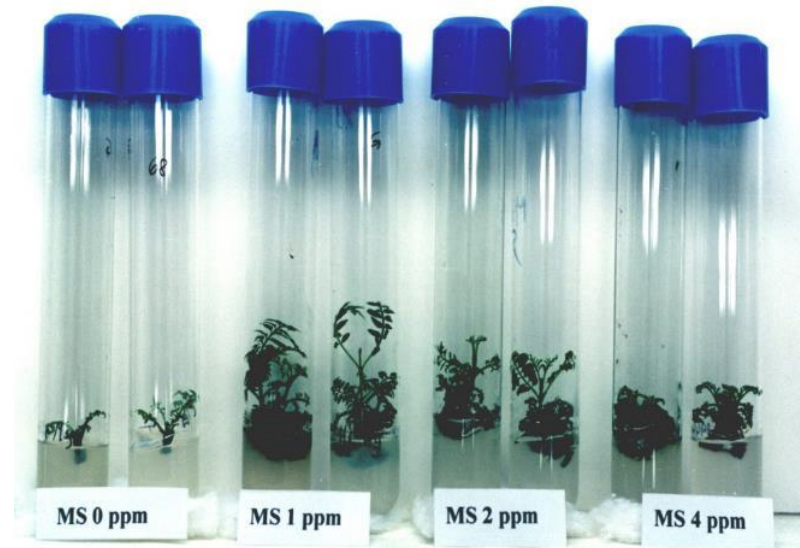
Estrella INTA-JICA



## Examples of technology transfer



Cuttings of *Tabebuia*



*In vitro* multiplication of *Jacaranda*.

Example of variety development:

‘Victoria INTA-JICA’

(Variety registered in Argentina)



‘Victoria INTA-JICA’

### 3. 『Proposal of the Joint Exploration and Evaluation Program for New Appreciation Crops Participation and Results of Sakata Seed in the Program』

Joint Exploration and Evaluation Program for the Development of  
New Appreciation Plants

CEEP

Cooperative Expedition and Evaluation Program  
For New Ornamental Plants

Introduction Program of Cultivars and Collected Materials  
RWWT

Regional, World Wide Testing Program



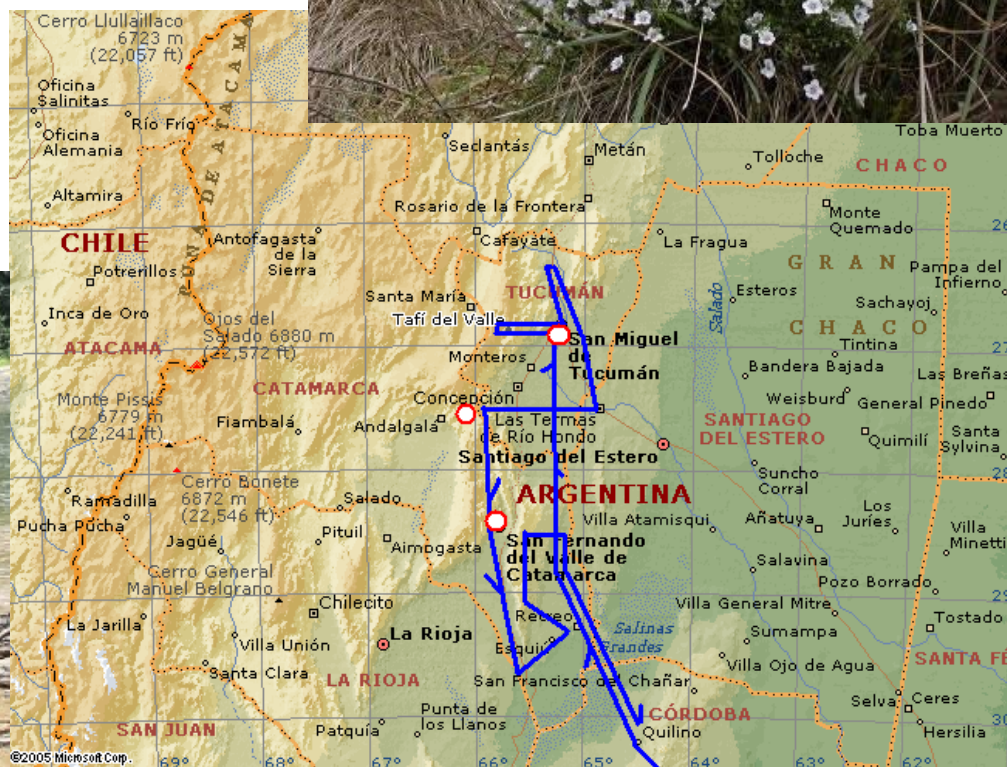


# Linking INTA and Sakata with CEEP

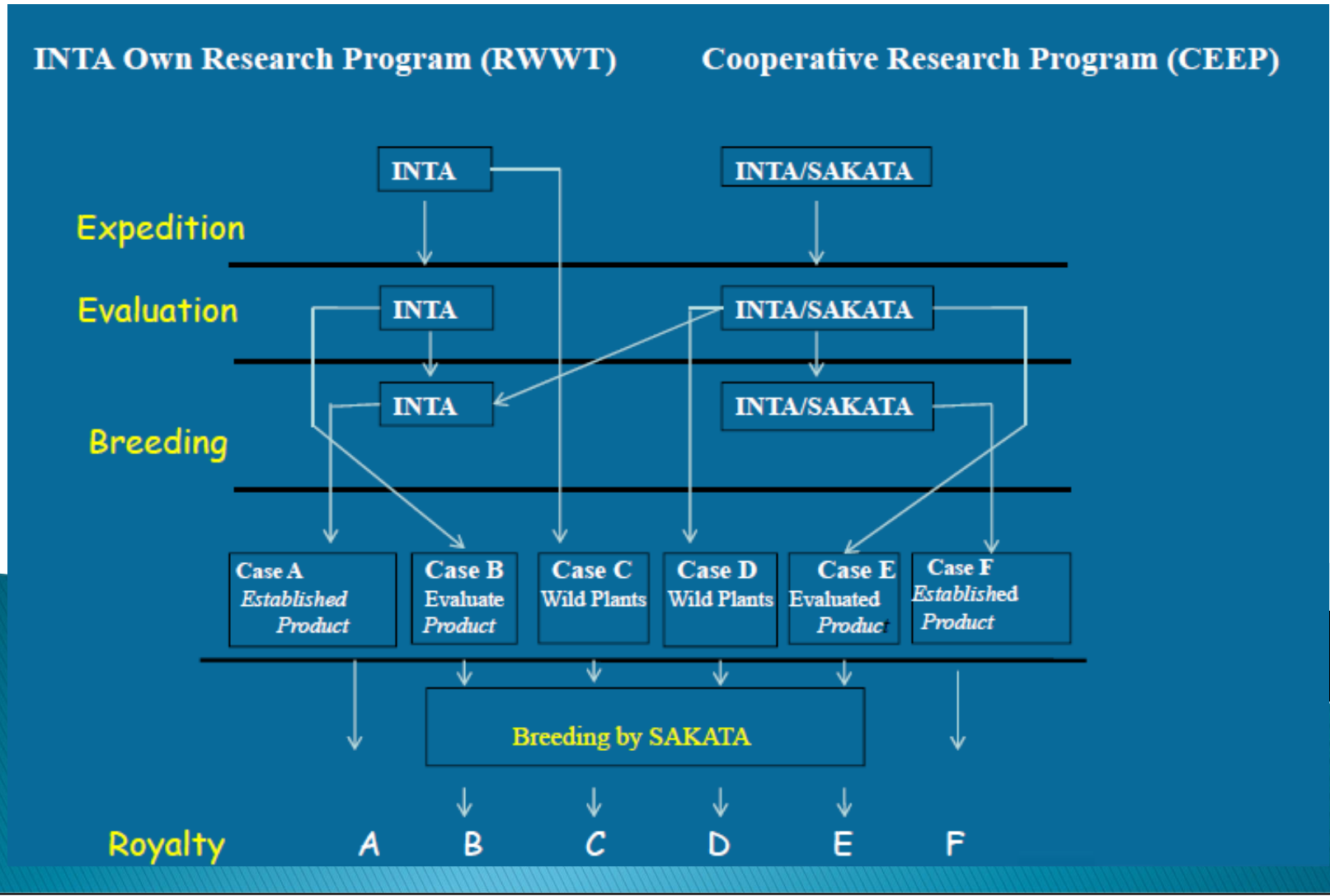
## Joint Expedition

Free exploration to  
resource-rich  
countries

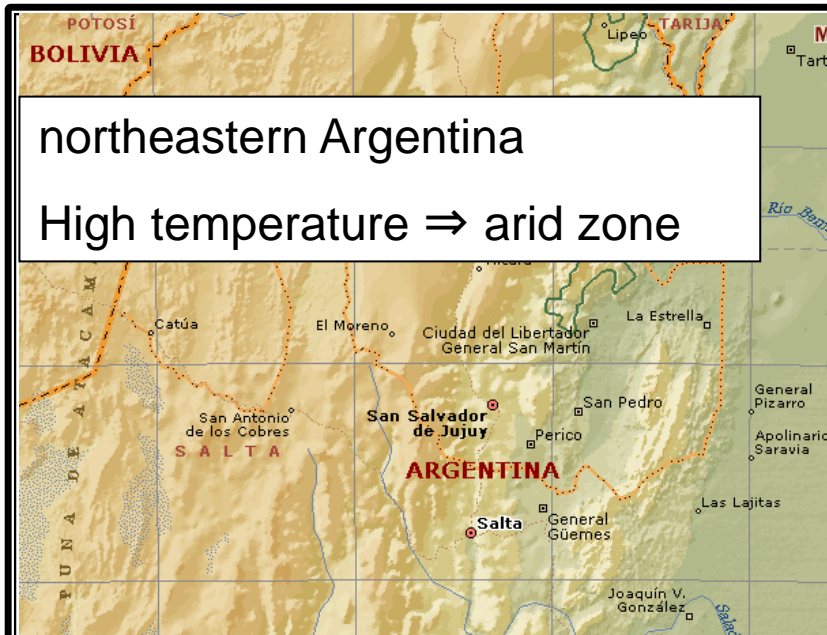
Target collection of  
promising materials  
with participation of  
user staff



Profit sharing ratio for commercialization of results obtained from CEEP is set for each assumed case







northeastern Argentina

High temperature  $\Rightarrow$  arid zone



**MAFF**



Argentina Central  
Humid Pampa Zone



**MAFF**



# CEEP development case

## Joint evaluation





# Joint Evaluation Joint Evaluation

## Example: Buenos Aires



**MAFF**



# Joint evaluation

## FIELD TRIAL 2005-6 SAKATA

Date of Transplant	19/Oct./2005
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PARCEL N°	SPECIES	ACCESSIONS	Initial N° of Plant	N° of Plant Dec.27	Plant height (cm) Dec.27	Plant*/Parcel wide(cm) Dec.27	Flowering Dec.27	N° of Plant March 23	Plant height (cm) March 23	Parcel wide (cm) March 23	Flowering March 23
15	<i>Mecardonia tenella</i>	ale 5	12	12	8	37*	++	5	8	70	+
16	<i>Mecardonia tenella</i>	2.1.11.1	12	12	8	39*	+	8	8	90	—
17	<i>Mecardonia tenella</i>	2.3.1.2	12	12	10	34*	++	12	9	70	+
18	<i>Mecardonia tenella</i>	3.1.5.3	12	12	5	70	+	7	7	110	—
19	<i>Mecardonia tenella</i>	3.1.5.6	12	12	5	30*	—	6	7	85	—
20	<i>Mecardonia tenella</i>	3.1.5.7	12	12	5	40*	+	9	6	85	—
21	<i>Mecardonia flagellaris</i>	2.7.11.2	12	12	10	13*	—	10	17	35*	—
22	<i>Mecardonia flagellaris</i>	2.3.10.1	12	12	11	20*	++	9	13	27*	+
23	<i>Mecardonia flagellaris</i>	2.6.4.1	12	12	8	80	+	12	17	120	+
24	<i>Mecardonia flagellaris</i>	3.2.4.1	12	12	19	90	++	10	16	120	—
25	<i>Mecardonia flagellaris</i>	4.3.6.1	12	12	12	99	+	12	15	160	+
26	<i>Mecardonia flagellaris</i>	5.3.1.1	12	12	14	20*	+	10	16	40*	+
27	<i>Mecardonia tenella</i>	5.2.1.2	12	12	8	40*	++	12	7	70	+
28	<i>Bacopa monnieri</i>	5.2.1.3	12	12	7	40*	+	12	11	120	+

# Implement royalty payments under the contract



Noticias | Radio | Televisión | Banco de Imágenes | Web Institucional

3 de julio de 2011

## Japón comercializa las plantas Mecardonia

Las primeras plantas de la variedad comercial de Mecardonia, obtenida por el INTA, son vendidas en el país asiático por Sakata Seed Corporation.

花つき苗で植え込み、2か月後には花壇を覆うほどに生長します。春から夏に向けてさらに広がりをみせ、晩秋まで黄色い花が咲き続けます。

こんもりとカーペット状に広がります

植え込み約40cmで植まっています

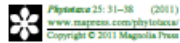
2か月後

[Tweet](#)

Como resultado de un convenio de cooperación entre el INTA y la empresa Sakata Seed Corporation en materia de investigación y desarrollo de plantas ornamentales, se han empezado a comercializar en Japón las primeras plantas de la variedad comercial de *Mecardonia*, obtenida por el INTA.

Por esa primera comercialización de plantas en Japón, el Instituto percibió regalías de la empresa Sakata. Dichos beneficios fueron compartidos con la provincia de Misiones, según lo establece el convenio firmado con el Ministerio de Ecología, Recursos Naturales Renovables y Turismo de esa provincia.

# Discovery and announcement of new species among collected materials



Article



## Two new species of *Calibrachoa* (Solanaceae) from subtropical South America

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### Abstract

We describe and illustrate two new species of *Calibrachoa*, *C. iranguiana* and *C. longistyla*, from the Pampean region in southern South America. *Calibrachoa iranguiana* is characterized by a suite of characters: decumbent stems, viscid vestiture, the leaf midrib with a distinctive lignous callus at the base, purple funnel-shaped corolla, and long stamens with connivent anthers opening at the mouth of the corolla tube. *Calibrachoa longistyla* is best recognized by its whitish corolla with the style apex and stigma exerted above the anthers of the longest stamens. Following the IUCN classification, both species are considered threatened.

**Keywords:** Petuniaceae, Pampean region, IUCN conservation status

### Introduction

*Calibrachoa* Cerv. in La Llave & Lexner (1825: 3) is a subtropical South American genus of Solanaceae closely related to *Rebutia* Luccart, from which most species were separated (Stehdmann et al. 2009).

seeds with straight spon, and seeds with me numbers, n=7 in 96, Watanabe et al.

nanaceae, recognized as, he did not accept genus *Calibrachoa* Watanabe et al. 1996). *Calibrachoa*. Later, A (Ando et al. 2005) the existence of two gary of Solanaceae as part of the clade

## DOS NUEVAS ESPECIES DE *MECARDONIA* (SCROPHULARIACEAE) PARA LA CIENCIA

JULIAN A. GREPPI & JUAN C. HAGIWARA

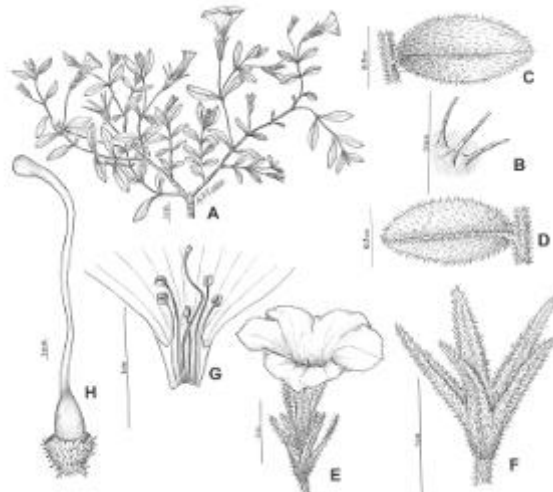
Instituto de Floricultura, INTA, INTA-Castelar, De los Reseros y Las cabañas s/n, 1686, Hurlingham, Buenos Aires, Argentina; jgreppi@enia.inta.gov.ar

**Abstract.** Greppi, J. A. & J. C. Hagiwara, Two new species of *Mecardonia* (Scrophulariaceae) for the science. Two new species of *Mecardonia* have been discovered in Formosa, Chaco and Corrientes in the northeastern Argentina: *M. reneae* and *M. kamogawae*. Are described and illustrated, the taxonomic affinities are discussed and a key to distinguish the species of the genus present in Argentina is included.

**Keywords:** Argentina, *Mecardonia*, Scrophulariaceae, taxonomy.

### INTRODUCCIÓN

*Mecardonia* Ruiz & Pav., es un género americano de Scrophulariaceae cuyos representantes se encuentran distribuidos desde el E de los Estados Unidos de Norteamérica hasta el norte de la Patagonia argentina y Chile central. Constituyendo la región del sur de Brasil, noreste de Argentina y Uruguay, el centro de diversificación del género (Rossow, 1987, 1999; Souza 1997). En 1987, Rossow realizó la revisión taxonómica del género reconociendo 10 especies, siendo también reconocidas éstas por Xifreda (1999). Posteriormente Souza (1997), redujo su número a 7 al realizar distintos





### 第三国研修「中南米の有用天然植物資源の開発と持続的利用」

山本フアン・カルロス 次長

3月12日～23日、国立農牧技術院（INTA）の花弁研究所にて、花卉・観賞植物新品種の開発を目指した、天然植物の遺伝資源の開発と持続的利用に関係する域内人材の技術レベル向上を目的とする、第三国研修「中南米の有用天然植物資源の開発と持続的利用」の第一回のコースが実施されました。

植物遺伝資源の検索と収集、育種技術に関する座学と実習を組み合わせた同コースには、エクアドルから4名、ブラジル、チリから各2名、コスタリカ、ペルーから各1名、外国から計10名、国内から2名参加しました。

本コースでは、中南米地域に多く存在し、花卉・観賞植物として商業化の可能性が高い貴重な植物資源の保全と持続的利用を促進するため、遺伝資源探索・収集、遺伝資源の特徴分析・利用・保全、遺伝資源の伝播及び栽培化等について、域内関係機関の人材レベル・アップを目指しています。

中南米地域には、天然植物資源に富んだ国が多く存在しますが、十分に活用されていないのが実情であり、他方、欧州を中心とする世界の大手種苗会社は、過去30年に亘って戦略的に商業化の可能性が高い品種を探索・育種し、品種登録を行っ



INSTITUTO DE FLORICULTURA



## Results of this project: Argentina

- Sustainable use and conservation of genetic resources and accumulation of relevant information
- Contribution to the design of domestic genetic resource handling systems
- Value added to genetic resources and profit from commercialization
- Global dissemination of domestic breeding results
- New scientific findings, such as the discovery of new species.
- Argentina's Guidance to Neighboring Countries (JICA Third Country Training System)

## Results of this project: Sakata

- Establishment of an access model that takes into account the specificity of the seed industry
- Acquisition of effective materials from diverse environmental conditions in Argentina.
- Release of new varieties and market acquisition
- Priority commercialization of results produced by resource-rich countries

# Conclusion

- ▶ Cooperation between a provider and a user of genetic resources allows the provider of genetic resources with:
  - discovery of their own valuable resources, the conservation of it,
  - knowledge transfer of how to develop new varieties,
  - receive royalties over the years of marketing those new varieties
- ▶ To make this happen, a country can create a good accessing scheme under the CBD, that protects the right of the provider of resources and have a clear accessing scheme for the user
- ▶ Importantly, by protecting the innovation arising from the genetic resource under a UPOV system, a country could materialize the value of the resource and further receive the benefits arising from the innovation.



Thank you very much  
for your attention.