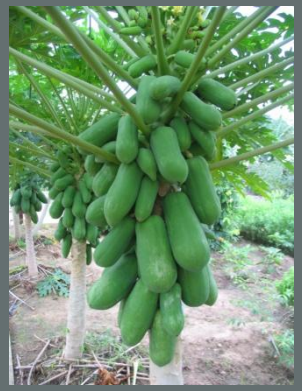
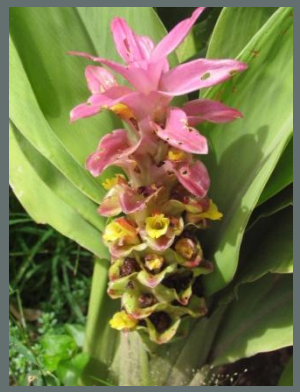


# TRVC Introduction

# CHAMNONG SOMKUL

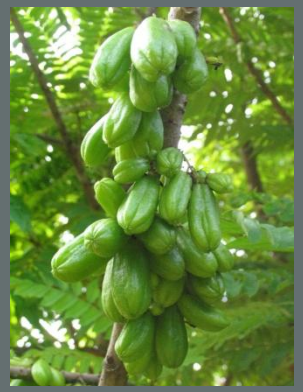


**Address: rdicnsk@ku.ac.th** Phone **: 064-2469551**

# TROPICAL VEGETABLE RESEARCH CENTER

## Department of Horticulture,

## Faculty of Agriculture at Kamphaeng Saen



**KASETSART UNIVERSITY KAMPHAENG SAEN NAKHON PATHOM**

**KASETSART UNIVERSITY**

**Faculty of Agriculture at Kamphaeng Saen**

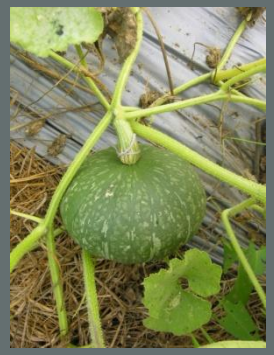
**Department of Horticulture**

**Tropical Vegetable Research Center**

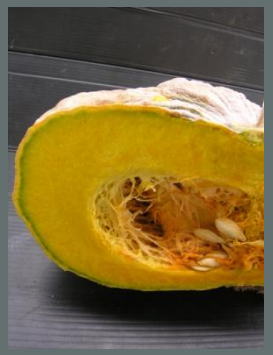
Since 1989

**World Vegetable Center**

TOP/AVRDC Since 1982



# TVRC MISSION



-Tropical Vegetable Germplasm Gene bank

-Conduct Research and Development of vegetable crops and production Systems

-Coordinates and provides facilities for training course with AVRDC as well as teaching support with lecturers, scientists and students

-Provides good quality vegetable seeds to the farmers

- Transfer technology of vegetable research

# TVRC ACTIVITY

# 1.Germplasm Conservation

# 2.Breeding Program

Improved  Pepper CVMV Varieties Resistance

Pumpkin OP Selection Line

Improved Pepper Anthracnose

Varieties Resistance

Snake gourd OP Selection Line

# 3.Outreach

# 4.Training

# 5.Seed Distributors

## Available varieties released

**Tomato Seedathip #4**

- Heat tolerance
- High Yield

**Cherry Tomato154**

**Pepper TVRC 365**

**Hot pepper TVRC758**

OP High Yield

TVRC 651

TVRC 500

Wax gourd TVRC 026

Winged bean TVRC 070

Sweet basil TVC 175

Sacred basil TVRC059

**Vegetable Soybean**

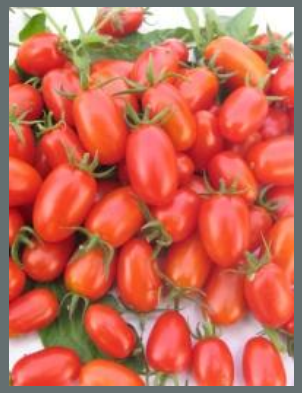
**KPS 292**

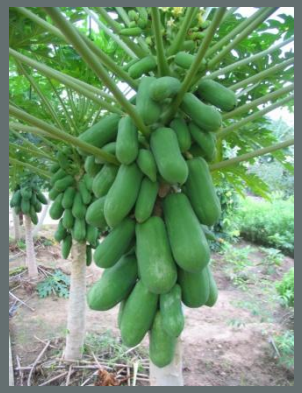
# PAPAYA

# Roselle

# Kasetsart Exhibition Fair 2016

# Kasetsart Exhibition Fair 2016





# Conservation of Plant Genetic Resources

# Vegetable Seed Generation and Quality Preservation

# Conservation For

- Prevent a lost of species
- Maintain food for human
- Improve a new variety
- Evaluate disease resistance
- Evaluate insect resistance
- ????????????????

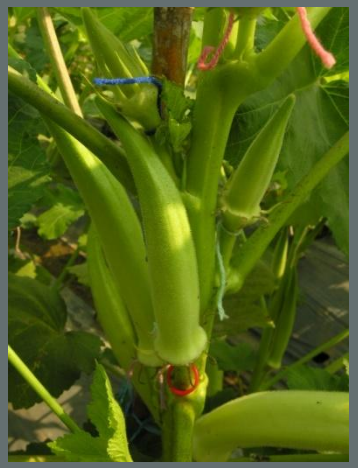
# Why Multiplication Regeneration Conservation Necessary

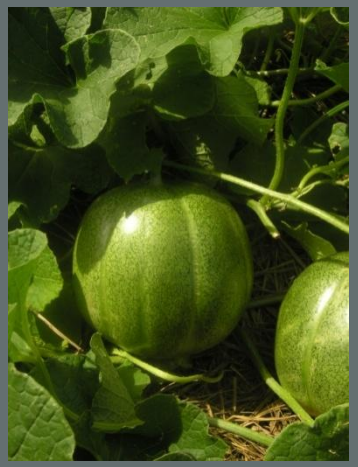
- Few seeds in stocks
- Poor quality
- Low viability
- Special requirements/ High demand
- Safety duplication

# Conservation Elements

- Supporter (Government)
- Responsible Agencies
- Office and Staff
- Experimental field/Nursery
- Processing /Drying/Packing Area
- Cool room storage

# TVRC 33 Crops Conservation





# Pepper

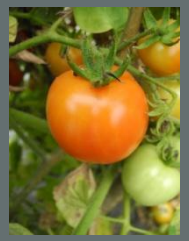
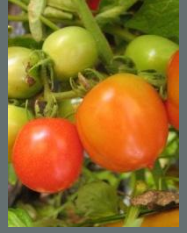
## Capsicum sp.

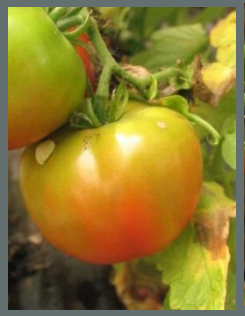
# Eggplant

## Solanum sp.

# Tomato

*Lycopersicon esculentum*

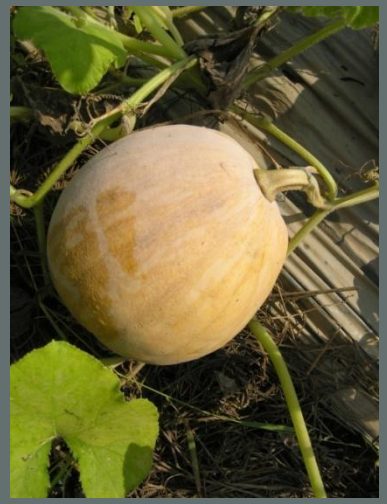





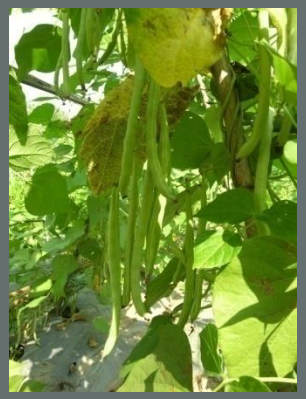
# **Bottle gourd** *Lagenaria siceraria* Standl.

# **Bitter gourd** Momordica charantia L.

# **Pumpkin** Cucurbita moschata Decne.



# Snap bean *Phaseolus vulgaris L.*



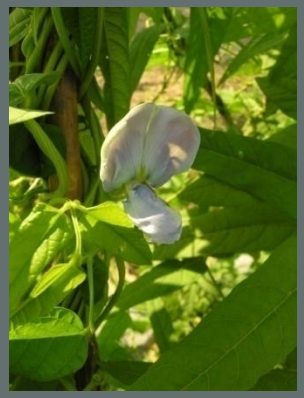
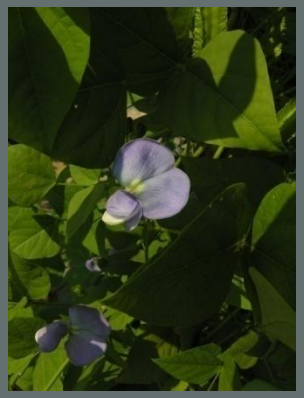
# Okra Abelmoschus esculentus (L.) Moench

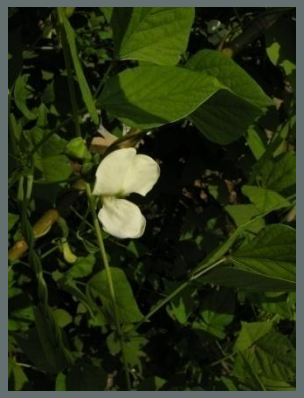
# Snake gourd Trichosanthes cucumerina Linn.

# Smooth loofah *Luffa cylindrica (L.) M.Roem.*

# Thai Melon Cucumis melo Linn

# Winged bean *Psophocarpus tetragonolobus* (Linn) DC.

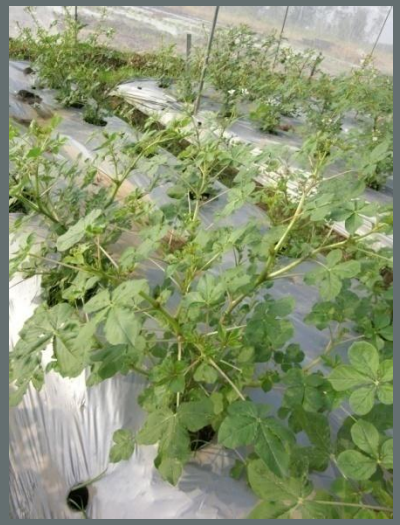



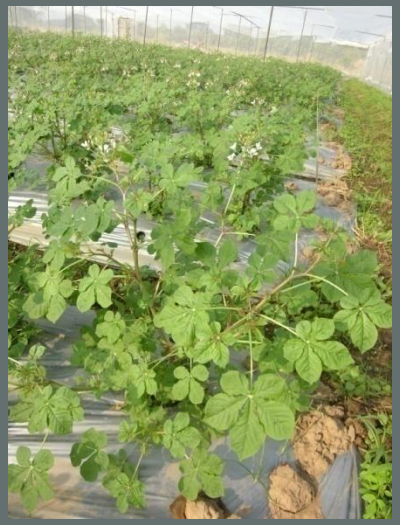


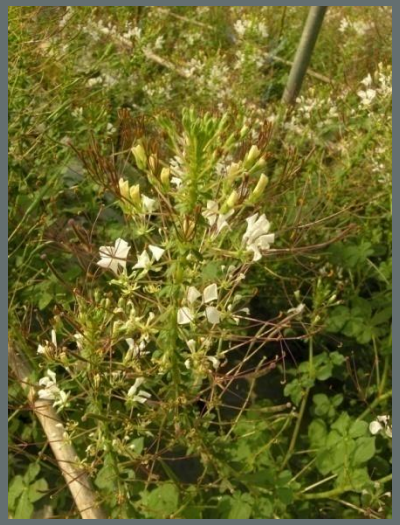
# Ceylon spinach Basella alba Linn.

# Amaranth *Amaranthus lividus*

# Wild spider flower Cleome gynandra Linn.







# Cock wood tree Sesbania grandiflora Desv.

# *Ocimum sp.*

Sacred basil

Ocimum sanctum L.

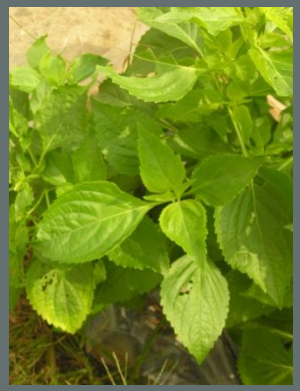
Sweet basil

Ocimum basilicum L.

# *Ocimum sp.*

Hoary basil

Ocimum basilicum L.f. var. citratum Back.



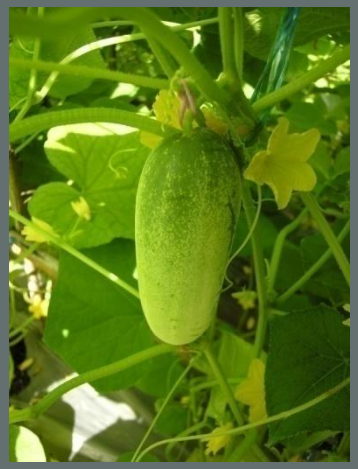
Shrubby basil Ocimum gratissimum L.

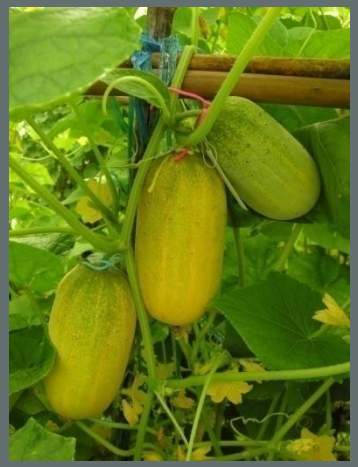
# Toothache plant, Para cress

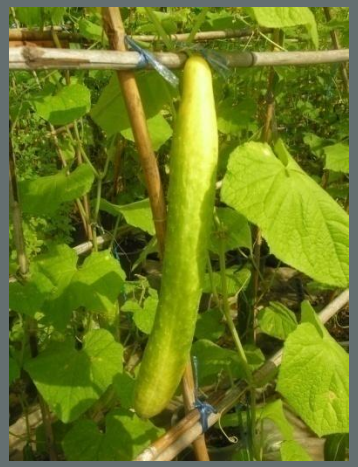
Spilanthes acmella L. Murr.

# Cucumber

## Cucumis sativus  Linn.







# Anged loofah

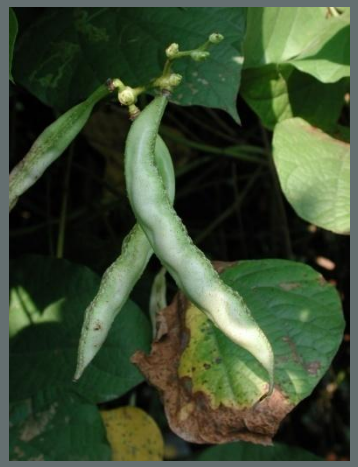
Luffa acutangula Roxb.

# Blue pea

## Clitoria ternatea L.

# Lablab bean

## Lablab purpureus (L.) Sweet Dolichos lablab L.

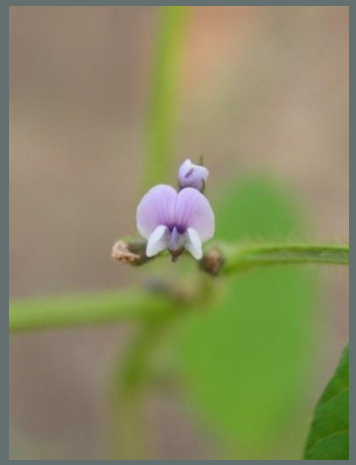


# Yard long ban

## Vigna unguiculata  subsp. sesquipedalis

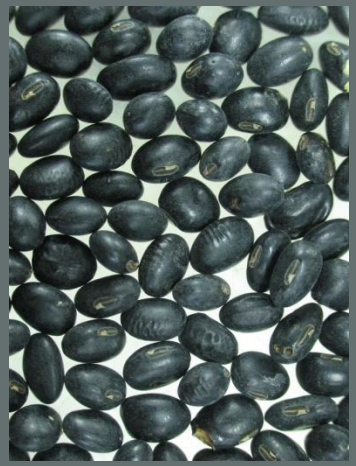
# Vegetable Soybean

## Glycine max (L.) Merrill



# Soybean

## Glycine max L.



# Mung bean

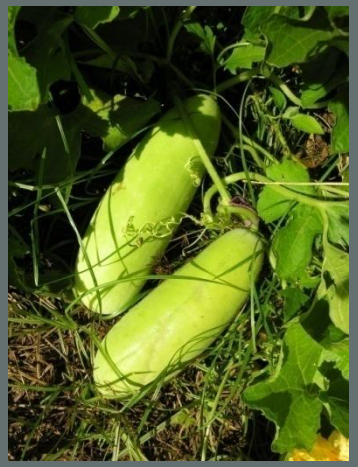
## *Vigna radiata* L.

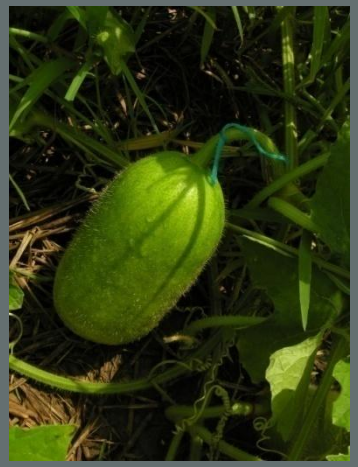
# Ivy gourd

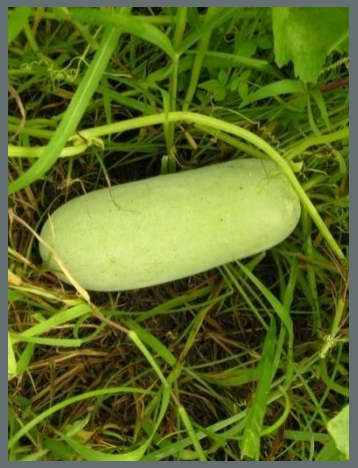
## Coccinia grandis (L.) Voigt

# Wax gourd

## Benincasa hispida  Cogn.





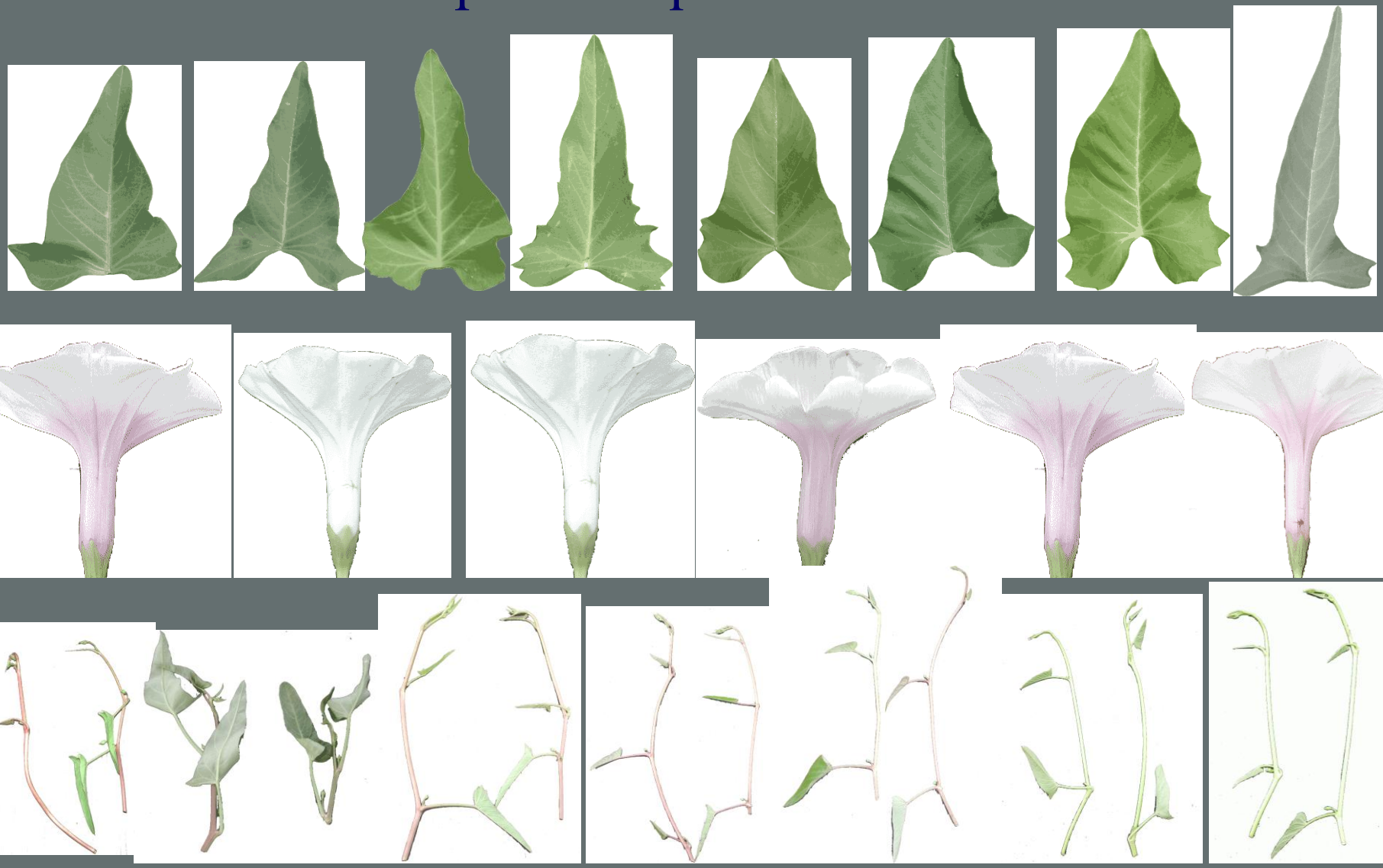


# Roselle

## Hibiscus sabdariffa L.

# Water Convolvulus

## Ipomea aquatica Forsk.



# Stink Weed

## *Eryngium foetidum* Linn.

# Dill

## Anethum graveolens Linn.

# Jute

## Corchorus capsularis L

# Vegetable Seed Quality for Conservation

- Highly viable and vigorous
- Genetically pure
- Physically purity
- Uniform size of desired type
- Seed health: free from disease, insect pests
- SMC 6-8 % and High germination
- Seeds Storage under temperature and humidity control.

# PGR Facilities

# Experimental Field

**Soil**

- Structure
- Texture
- pH
- EC

**Water**

- Surface Water
- EC
- pH

# Nursery for Seedling

Plastic Roofing

Peat Moss

Seedling tray

Seedling

# Processing Building

-Extract/clean

-Drying room

-Packing room

Storage room

# Pre-Drying Zone

Shelf

Sun light protection

Shading

# Drying Room

**20 $^{0}$C and 20 % RH** **6-8 % SMC**

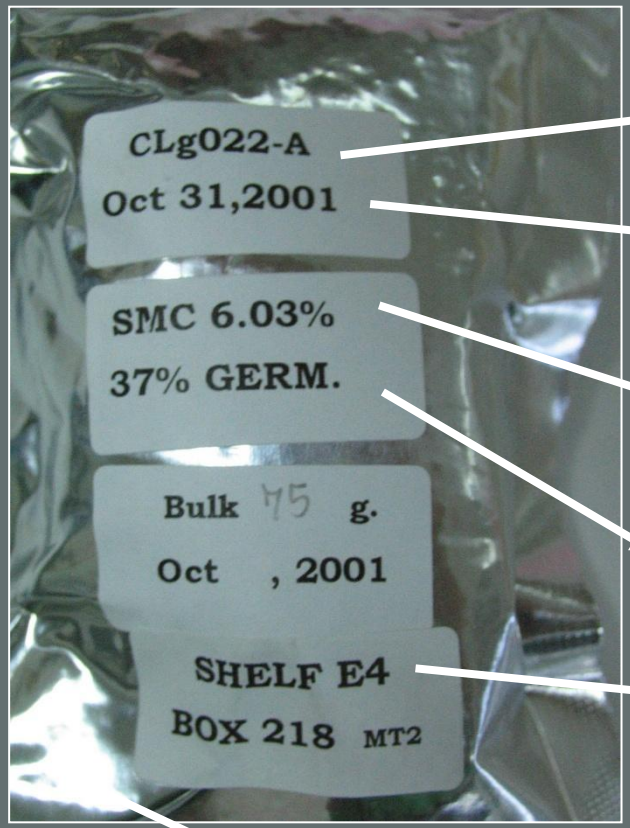
# Packing Room

**Control: Temp. : 25 $^{0}$C and 40-45 % RH**

# Seed Storage Room

**MT 5 $^{0}$C / 40-45 % RH For Germplasm**

**ST 10 $^{0}$C / 40-45 % RH For Research/Distribute**




**Accession**

**Date of packing**

Seed moisture content

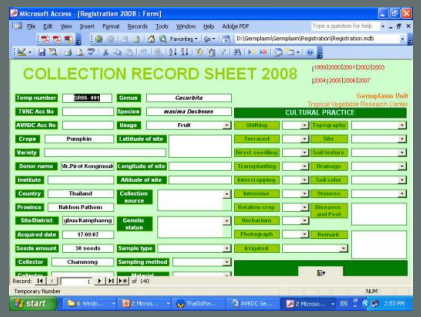
**% Germination**

Shelf and box number

**Laminated Aluminum Foil**

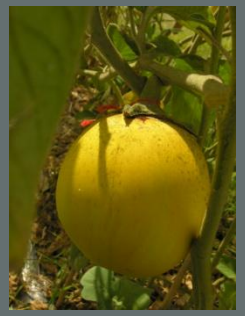
# Operating Procedures

1. Survey and Collection
2. Seed Registration
3. Characterization and Multiplication
4. Seed Processing
5. Seed Storage
6. Regeneration
7. Database
8. Exchange and Distribution



# Survey and collection

1. Survey and collection plan.
2. Prepare materials ,equipment and **collection record sheet.**
3. Explore, collect, collection record and seed process.
4. Check Collection number
5. Provide collection record sheet and seeds to gene bank.



# Collection Record Sheet

TEMPORARY NUMBER_____ OTHERS NUMBER_____ACCESSION____

COLLECTION NUMBER (ลำดับตัวอย่าง)_ COLLECTOR (ผู้เก็บ)_____

CROPS COLLECTION (พืชที่เก็บ)_____ SEED AMOUNT (ปริมาณเมล็ด)_____

VARIETY/LOCAL NAME (พันธุ์/)_____ SCIENTIFIC NAME (ชื่อวิทยาศาสตร์)___

COLLECTION DATE (วันเก็บ)_____ GROWER NAME (ผู้ปลูก)_____

DONOR NAME (ผู้ให้)_____ ADDRESS (ที่อยู่)_____

SUB DISTRICT (ตำบล)_____ DISTRICT (อำเภอ)_____

PROVINCE (จังหวัด)_____ COUNTRY (ประเทศ)_____

INSTITUTE (สถาบัน)_____ USAGE (การใช้ประโยชน์)_____

LATITUDE (เส้นรุ้ง)_____ LONGITUDE (เส้นแวง)_____

**COLLECTION SOURCE** (แหล่งที่เก็บรวบรวมข้อมูล)

☐(1.) Farmland ☐(2.) Backyard/home garden ☐ (3.) Farm store/threshing place

☐(4.) Village market ☐(5.) Commercial seed shop (name _____) ☐(6.) Agriculture institute

☐(7.) Boarding field ☐(8.) Natural vegetation/wild ☐(9.) Others (specify)_

**GENETIC STATUS** (สถานภาพทางพันธุกรรม)

☐(1.) Wild ☐(2.) Weedy ☐(3.) Primitive cultivar/landrace

☐(4.) Improved OP cultivar ☐(5.) Hybrid cultivar ☐(6.) Others (specify)_____

**SAMPLE TYPE** (ประเภทของตัวอย่างที่เก็บ)

☐(1.) Single plant ☐(2.) Pure line/clone ☐(3.) Mixture/population (clone/pure line)

☐(4.) Open-pollinated ☐(5.) Others (specify)_____

**MATERIAL** (ส่วนที่เก็บรวบรวม)

(1.) Seed ☐(2.) Fruit ☐(3.) Pod ☐(4.) Others _____

**PHOTOGRAPY** (ภาพถ่าย) ☐(1.) Yes ☐(2.) No.

**TOPOGRAPHY** (ภูมิประเทศ)

☐(1.) Swamp ☐(2.) Flood plain ☐(3.) Level plain ☐(4.) Undulating

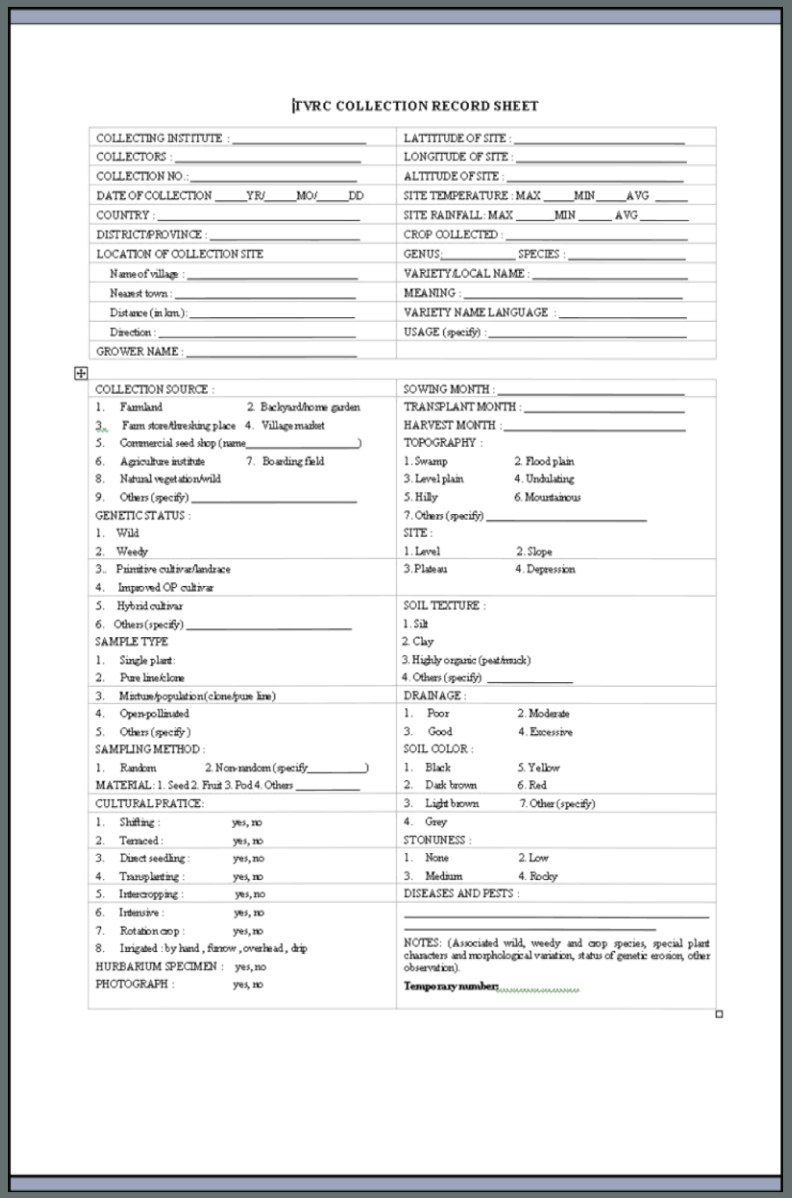
☐(5.) Hilly ☐(6.) Mountainous ☐(7.) Others (specify)_____

**SOIL TEXTURE** (เนื้อดิน)

(1.) Silt ☐ (2.) Clay ☐ (3.) Highly Organic ☐ (4.)Others (specify)_____

**REMARK (หมายเหตุ)**_____

# Collection Record Sheet



IFVRC COLLECTION RECORD SHEET

| | |
|---|---|
| COLLECTING INSTITUTE : _____ | LATITUDE OF SITE : _____ |
| COLLECTORS : _____ | LONGITUDE OF SITE : _____ |
| COLLECTION NO : _____ | ALTITUDE OF SITE : _____ |
| DATE OF COLLECTION ____YR/____MO/____DD | SITE TEMPERATURE : MAX ____MIN____AVG ____ |
| COUNTRY : _____ | SITE RAINFALL: MAX _____MIN _____ AVG _____ |
| DISTRICT/PROVINCE : _____ | CROP COLLECTED : _____ |
| LOCATION OF COLLECTION SITE | GENUS_____ SPECIES : _____ |
| Name of village : _____ | VARIETY/LOCAL NAME : _____ |
| Nearest town : _____ | MEANING : _____ |
| Distance (in km): _____ | VARIETY NAME LANGUAGE : _____ |
| Direction : _____ | USAGE (specify) : _____ |
| GROWER NAME : _____ | |

| | |
|---|---|
| COLLECTION SOURCE : | SOWING MONTH : _____ |
| 1. Farmland 2. Backyard/home garden | TRANSPLANT MONTH : _____ |
| 3. Farm store/threshing place 4. Village market | HARVEST MONTH : _____ |
| 5. Commercial seed shop (name_____) | TOPOGRAPHY : |
| 6. Agriculture institute 7. Boarding field | 1. Swamp 2. Flood plain |
| 8. Natural vegetation/wild | 3. Level plain 4. Undulating |
| 9. Others (specify) _____ | 5. Hilly 6. Mountainous |
| GENETIC STATUS : | 7. Others (specify) _____ |
| 1. Wild | SITE : |
| 2. Weedy | 1. Level 2. Slope |
| 3. Primitive cultivar/landrace | 3. Plateau 4. Depression |
| 4. Improved OP cultivar | |
| 5. Hybrid cultivar | SOIL TEXTURE : |
| 6. Others (specify) _____ | 1. Silt |
| SAMPLE TYPE | 2. Clay |
| 1. Single plant: | 3. Highly organic (peat/muck) |
| 2. Pure line/clone | 4. Others (specify) _____ |
| 3. Mixture/population (clone/pure line) | DRAINAGE : |
| 4. Open-pollinated | 1. Poor 2. Moderate |
| 5. Others (specify) | 3. Good 4. Excessive |
| SAMPLING METHOD : | SOIL COLOR : |
| 1. Random 2. Non-random (specify_____) | 1. Black 5. Yellow |
| MATERIAL: 1. Seed 2. Fruit 3. Pod 4. Others _____ | 2. Dark brown 6. Red |
| CULTURAL PRATICE: | 3. Light brown 7. Other (specify) |
| 1. Shifting : yes, no | 4. Grey |
| 2. Terraced : yes, no | STONUNESS : |
| 3. Direct seedling : yes, no | 1. None 2. Low |
| 4. Transplanting : yes, no | 3. Medium 4. Rocky |
| 5. Intercropping : yes, no | DISEASES AND PESTS : |
| 6. Intensive : yes, no | _____ |
| 7. Rotation crop : yes, no | _____ |
| 8. Irrigated : by hand , furrow , overhead , drip | NOTES: (Associated wild, weedy and crop species, special plant characters and morphological variation, status of genetic erosion, other observation). |
| HURBARIUM SPECIMEN : yes, no | **Temporary number:** |
| PHOTOGRAPH : yes, no | |

Ant10-026

Cat10-026

Collection Number

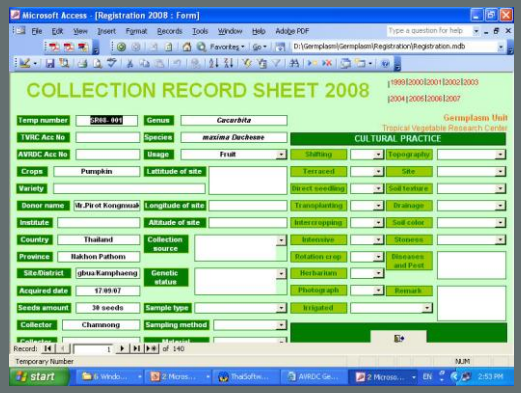
Ant /Cat =Collector

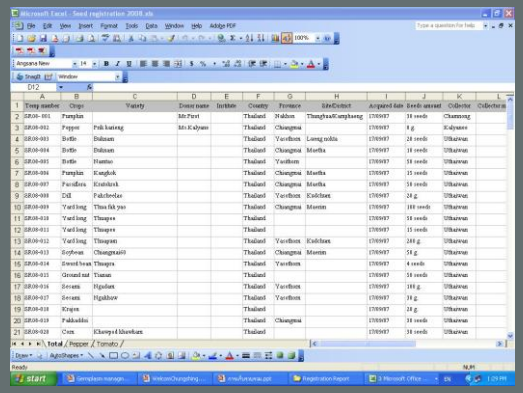
10 =Year 2010

026 =Number of collected

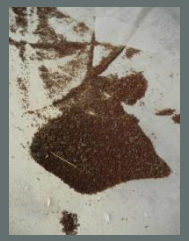
# Seed Registration

1. Create registration file.
2. Receive collection record sheet and seeds.
3. Recheck the collection number.
3. Provide temporary number on the envelope and record sheet.
4. Fill in the register file.
5.Seed process and storage.



# Seed process



SR10-037

SR16-0005

Temporary number

**Laminated Aluminum Foil**

**SR10-037**

SR = Seed registration

10 = Year (2010)

037= Number of collected

**Seed process = Extract, Clean, Dry, Package, and Storage for Characterization and Multiplication**

# Word for Understand

Collection number = Assign during collection

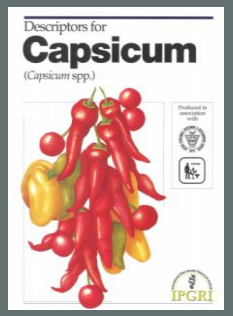
Temporary number= Assign during registration

Accession number =Assign before packing

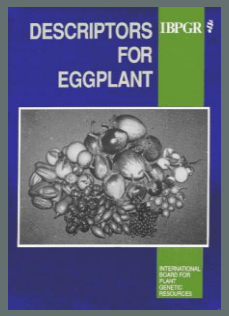
# Registration File

| Temp number | TVRC Acc | AVRDC Acc | Collector number | Collector | Crops collection | Variety | Scientific name |
|---|---|---|---|---|---|---|---|
| SR15-0001 | | | CH15-0001 | Chamnong | Pepper | Scorpien | Capsicum chinese |
| SR15-0002 | | | Waraporn15-001 | Waraporn | Pumpkin | | Cucurbita sp. |
| SR15-0003 | | | CH15-0002 | Chamnong | Mucuna | Thua Mamui | Mucuna pruriens |
| SR15-0004 | | | CH15-0003 | Chamnong | Mucuna | Thua Krok | Mucuna pruriens |
| SR15-0005 | | | CH15-0004 | Chamnong | Mucuna | Thua Mamui | Mucuna pruriens |
| SR15-0006 | | | | Yupa Sittikraipong | Pepper | Prik Krarhueng Phu Thap Boek | Capsicum frutescens Linn. |
| SR15-0007 | | | | Yupa Sittikraipong | Ginseng | Som Koalhee | Panax ginseng |
| SR15-0008 | | | CH15-0005 | Chamnong | Pepper | Prik Cheepha | Capsicum annuum |
| SR15-0009 | | | CH15-0006 | Chamnong | Pumpkin | Fakthong Yipun | Cucurbita sp. |
| SR15-0010 | | | | Chamnong | Winged bean | Thua Phu | Psophocarpus tetragonolobus (L.)DC. |
| SR15-0011 | | | CH15-0007 | Chamnong | Sweet basil | Horapha | Ocimum basilicum L. |
| SR15-0012 | | | CH15-0008 | Chamnong | Sacred basil | Kra Proa Khaew | Ocimum sanctum L. |
| SR15-0013 | | | CH15-0009 | Chamnong | Sacred basil | Kra Proa Khaew Bai Yai | Ocimum sanctum L. |
| SR15-0014 | | | CH15-0010 | Chamnong | Okra | Kra Jiab Khaew 5 Lhiem | Abelmochus esculentus L. Moench. |
| SR15-0015 | | | CH15-0012 | Chamnong | Fame Flower | Som Thai | Talinum paniculatum Gaertn. |

# Characterization and Multiplication




1. Planting plan ( season, no of plant, seed yield)
2. Create descriptor
3. Create table record sheet
4. Planting and crop management
5. Self pollintion
6. Physiological maturity harvesting
7. Data record (seedling, vegetative, flower, fruit and seeds)
8. Photo taking



# Planting plan

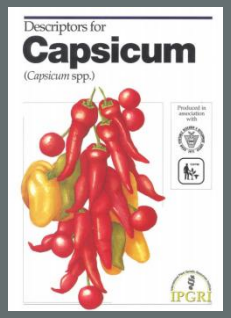
Season

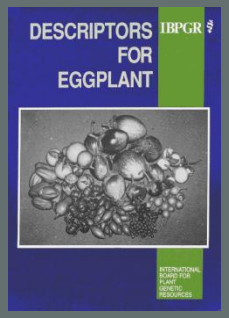
- -Land preparation
- -Crop management
- -Pollination
- -Seed quality
- -Extract and seed drying method

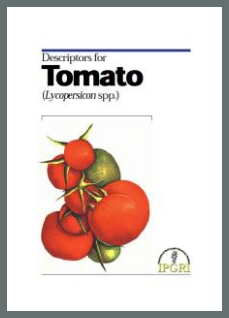
No. of plant

- -Genetic integrity
- -Seed yield

# Create descriptor and Table record sheet



**Pepper Seedling Data**

Recorded when the terminal bud is 1 - 2 mm in size

1. Days to germinate (DAS): Number of days from sowing to germination.

2. Hypocotyl color: - white - green - purple
   -1/2 purple from the base
   -1/4 purple from the base - others

3. Hypocotyl pubescence: - sparse - intermediate - dense - others

4. Cotyledonous leaf color: - light green - green - dark green - light purple
   - purple - dark purple - variegated หลากสี
   - yellow - others

5. Cotyledonous leaf shape: - deltoid - ovate - lanceolate -elong- deltoid

# Planting and crop management

Seedling

Land preparation

Transplanting

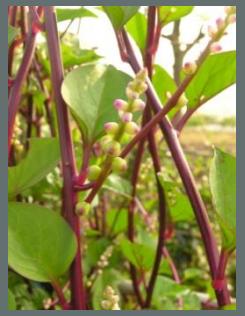
Net/sticking out

Pesticide control

Fertilizer

# Self pollination

Net Control

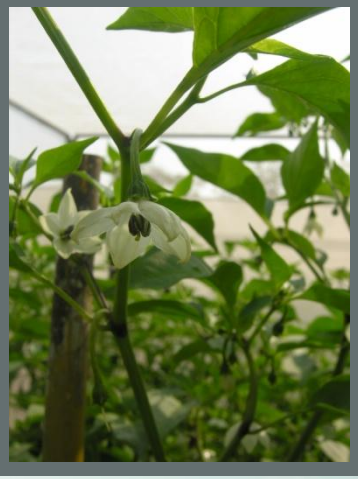


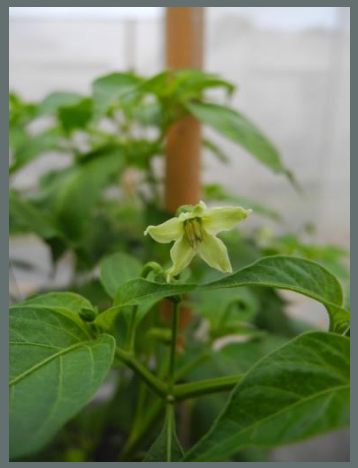
Open Field

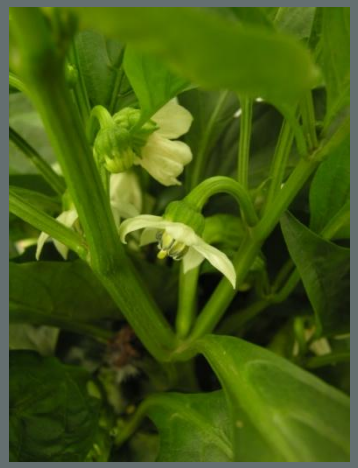
Hand Pollination

# Pepper self-pollination

Complete







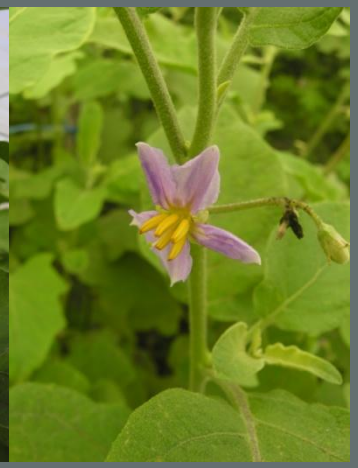
Flower

Nylon net Cage

# Eggplant self-pollination

Nylon net Cage

Complete flower



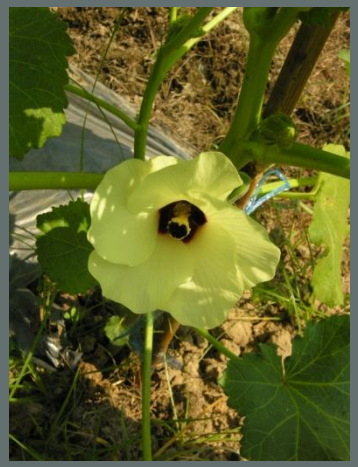
Pollen Collected

Pollination and mark

# Okra self-pollination

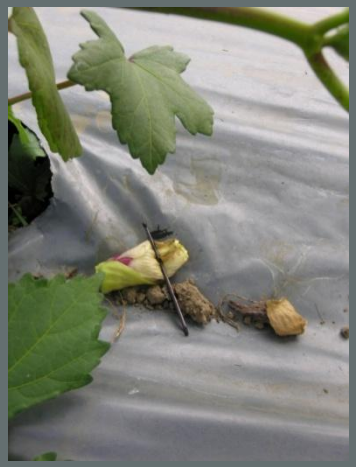
Open field

Complete



Lady clip, mark

2 days



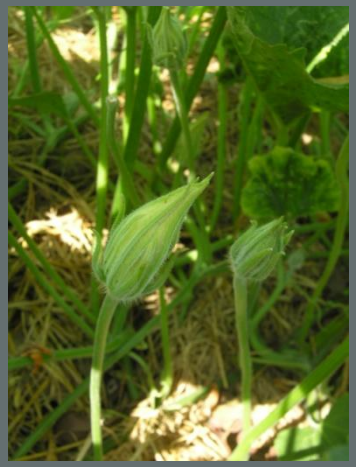
Paper bag

Pod dry and harvested

# Pumpkin self-pollination

Open field

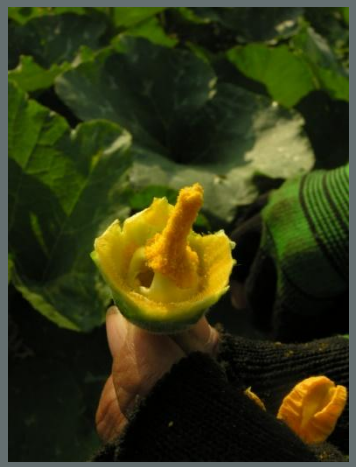
Monoecious flower



Lady clip

Ratio 3:1

Pollen



Pollination

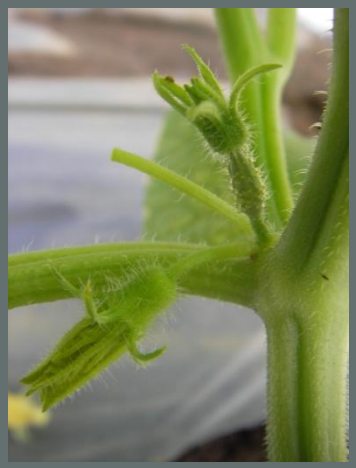
Mark

# Cucumber self-pollination

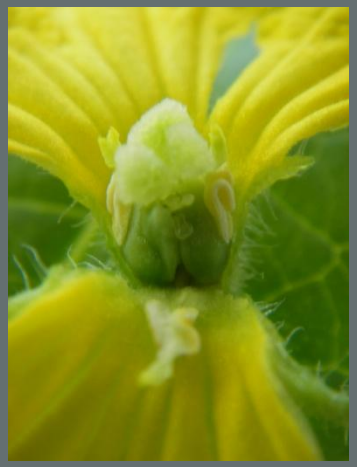
Nylon net Cage/Open field

Female

Male



Stigma



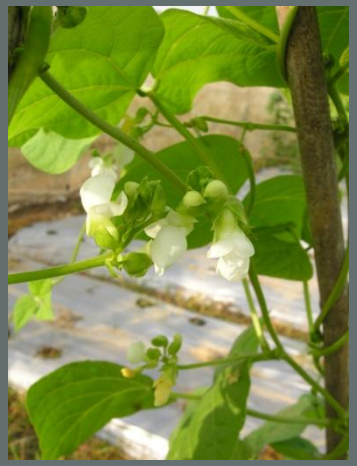
Pollen Collected

Pollination and mark

# Snap bean self-pollination

Open field

Complete flower and pollination before flowering



Pod setting and pod dry

# Space between Accession

# Pollination behavior of some vegetable crops

| Crop | Species | Pollinate type | Pollination mechanism | Method used |
|---|---|---|---|---|
| Amaranth | Amaranthus spp. | CP | Wind | Isolation 1000 m; bagging; net cage |
| Beet | Beta vulgaris | CP | Wind | Isolation 2000 m |
| Black gram | Vigna mungo | SP | | |
| Bottle gourd | Lagenaria siceraria | CP, monoecious | Insects | Bagging & hand pollination; net c. |
| Brown mustard | Brassica juncea | Mainly SP; 4-14% CP | Insects | Isolation 1000 m; bagging; net cage |
| Cabbage | Brassica oleracea var. capitata | CP | Insects | Isolation 1000 m;<br>Net cage w/ pollinator |
| Carrot | Daucus carota | CP; protandrous | Insects | Isolation 1000 m;<br>Net cage w/ pollinator |
| Cauliflower | Brassica oleracea var. botrytis | Mainly CP | Insects | Isolation 1000 m; bagging; net cage |
| Chickpea | Cicer arietinum | SP | | |
| Common bean | Phaseolus vulgaris | Mainly SP | Insects | Isolation 100 m; bagging; net cage |

# Pollination behavior of some vegetable crops 2

| Crop | Species | Pollinate. type | Pollination mechanism | Method used |
|---|---|---|---|---|
| Cowpea | Vigna unguiculata | Mainly SP | | |
| Cucumber | Cucumis sativus | CP; monoecious | Insects | Isolation 1000 m; bagging & hand pollination; net cage |
| Eggplant | Solanum melongena | Partial SP; 0-8% nat. outcrossing (AVRDC) | Insects | Net cage; supple-mentary hand pollination |
| Endive | Cichorium endiva | SP | | Isolation 600 m |
| Faba bean | Vicia faba | Mainly SP; 4-8% outcrossing | Insects | Isolation 1000 m; bagging; net cage |
| Grass pea | Lathyrus sativus | SP; significant levels of CP | | Bagging; Net cage |
| Hyacinth bean | Dolichos lablab | Partially CP; | Insects | Isolation 500 m; |
| Lentil | Lens culinaris | SP | | |
| Lettuce | Lactuca sativa | Mainly SP; 1-6% outcrossing | Insects | Isolation 100 m; bagging; net cage |

# Pollination behavior of some vegetable crops 3

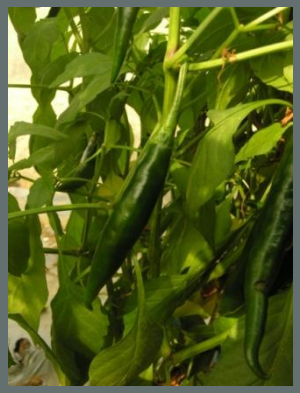
| Crop | Species | Pollinate. type | Pollination mechanism | Method used |
|---|---|---|---|---|
| Radish | Raphanus sativus | CP; self-incompatible | Insects | Isolation 600 m; net cage w/ pollinator |
| Safflower | Carthamus tinctorius | SP | | |
| Sesame | Sesamum indicum | Mainly SP; up to 5% CP | Insects | |
| Soybean | Glycine max | SP | | |
| Spinach | Spinacea oleracea | CP; dioecious | Wind | Isolation 2000 m; net cage |
| Sword bean | Canavalia gladiata | Mainly SP | | Isolation 100 m |
| Tomato | Solanum lycopersicum | Normally SP; some species self-incompatible | | Isolation 50 m; net cage w/ suppl. pollination, if necessary |
| Watermelon | Citrullus lanatus | CP; monoecious | Insects | Isolation 1000 m; bagging & hand pollination; net cage |

# Pollination behavior of some vegetable crops 4

| Crop | Species | Pollinate. type | Pollination mechanism | Method used |
|---|---|---|---|---|
| Lima bean | Phaseolus lunatus | Mainly SP; up to 18% outcrossing | Insects | Isolation; net cage |
| Melon | Cucumis melo | CP | Insects | Isolation 1000 m |
| Mungbean | Vigna radiata | SP | | |
| Okra | Abelmoschus esculentus | Partial SP; out-crossing 4-19% | Insects | Isolation 500 m; bagging; net cage |
| Onion | Allium cepa | Mainly CP; protandrous | Insects | Isolation 600 m; net cage w/ pollinator |
| Garden pea | Pisum sativum | Mainly SP | | Isolation 100 m |
| Chili, sweet pepper | Capsicum annuum | Often CP | Insects | Isolation 500 m; bagging; net cage |
| Pigeonpea | Cajanus cajan | Normally SP; nat. outcrossing 5-40% | Insects | Isolation 500 m; bagging, net cage |
| Pumpkin | Cucurbita moschata | CP; monoecious | Insects | Isolation 1000 m; bagging & hand pollination; net cage |

# Physiological maturity harvesting

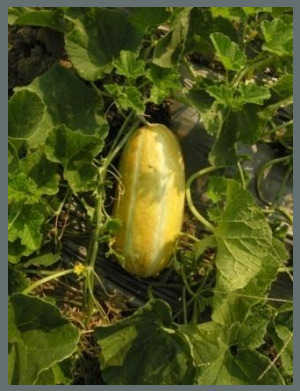
Okra



Pepper

Snap bean

Pumpkin



Melon

# Data record

## (seedling, vegetative, flower, fruit and seeds)

**Eggplant Characterization and Multiplication 2016**

| Accession | Leaf blade width(cm) | Leaf blade lobing | Leaf blade tip angle | Leaf prickles | Leaf hairs | Leaf blade color | Petiole length (mm) |
|---|---|---|---|---|---|---|---|
| SM201 | wide (>15 cm) | intermediate | intermediate (75 $^0$) | none | very few | green | long (50 mm) |
| SM202 | wide (>15 cm) | intermediate | obtuse (110 $^0$) | none | very few | greenish violet | long (50 mm) |
| SM202A | wide (>15 cm) | intermediate | obtuse (110 $^0$) | none | very few | greenish violet | long (50 mm) |
| SM204 | wide (>15 cm) | strong | acute (45 $^0$) | none | very few | dark brown | very long (>100 mm) |
| SM205 | intermediate (10-14 cm) | intermediate | intermediate (75 $^0$) | none | very few | violet | very long (>100 mm) |
| SM205A | intermediate (10-14 cm) | intermediate | intermediate (75 $^0$) | none | very few | violet | very long (>100 mm) |
| SM205B | intermediate (10-14 cm) | intermediate | intermediate (75 $^0$) | none | very few | violet | very long (>100 mm) |
| SM206 | intermediate (10-14 cm) | intermediate | intermediate (75 $^0$) | none | very few | green | long (50 mm) |

# Photo taking

Okra

Pepper

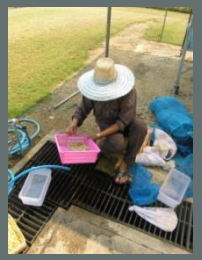
Tomato

# Seed Processing

1.Physiological maturity harvesting

2. Seed processing.

3. Seed moisture content and germination testing.



# Physiological maturity : Pod dry

Okra

Snap bean

Wing bean

**Hand extract**

Wing bean

Yard long bean

# Physiological maturity : Fruit color change

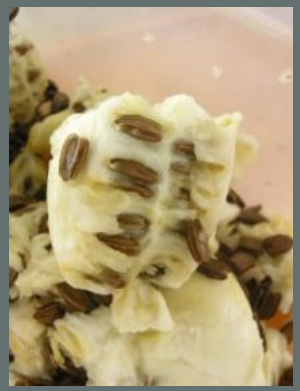
Hand extract

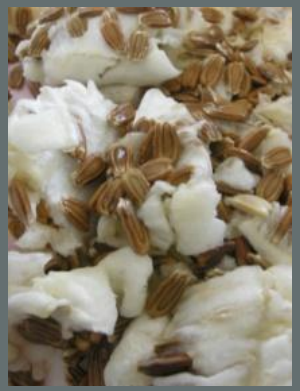
Machine extract and washing

Pepper

# Hand extract and washing

Pumpkin





Bottle gourd

# Hand extract, fermentation and washing

Melon

Wax gourd

# Sun dry under shade

# Drying room

**Temp.20 $^{0}$C and 20 % RH** **6-8 % SMC**

# Seed moisture content and Germination testing

## Seed Moisture Content

% SMC= loss of weight*100

Initail weight

### Oven Method

High constant temperature

130 $^{o}$C , 1 hr. for Rice, Wheat, Pea

Maize, Pigeon pea

Low constant temperature

103 $^{o}$ C , 17 hr. for Soybean,

Mustard, Pepper, Eggplant,

### Electric Heating Element

# Germination testing

Sand

Between paper

Top of paper

# Affects of seed moisture content

- 5-8 % Safe in closed container
- 8-9 % Insects also destroy.
- 12 % Fungus and insect destroy
- 18-20 Heat accumulation
- <40 % Start germination

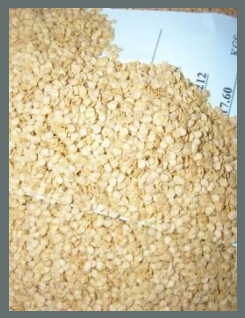
**(Thai Seed Trade Association, 2010)**

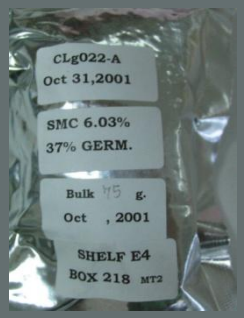
# Seed Storage

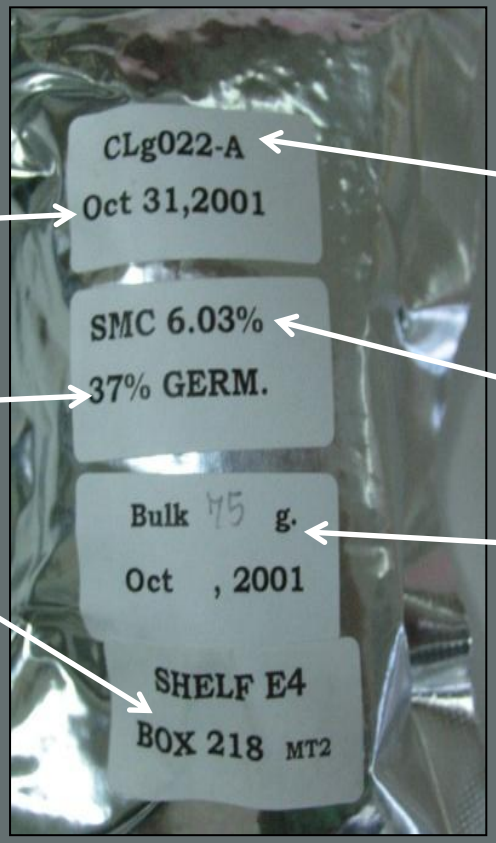
## Highly viable and vigorous

# General recommendations to maximize seed longevity

- Store seeds at low temperatures (-18 $^{o}$C)
- Store seeds at lowest possible SMC
- Make sure seeds are pathogen-free before storage
- Protect seeds from pathogens during storage
- Store seeds in dark








Packing date

Accession

% Germination

% Seed moisture content

Shelf and box number

Seed weight

# Laminated Aluminum Foil packets

Vacuum Seal

# Cool Room Storage

Short-term room storage

Temp 10 °C,40-45%RH

Medium-term room storage

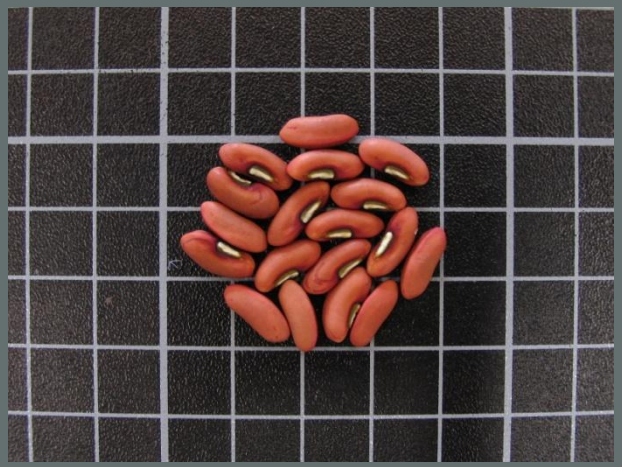
Temp 0 - 5 °C,40-45%RH

Long-term room storage

Temp -18 °C,40-45%RH

# Regeneration

Few seeds or Germination  lower than 60 %



**Duplicate**

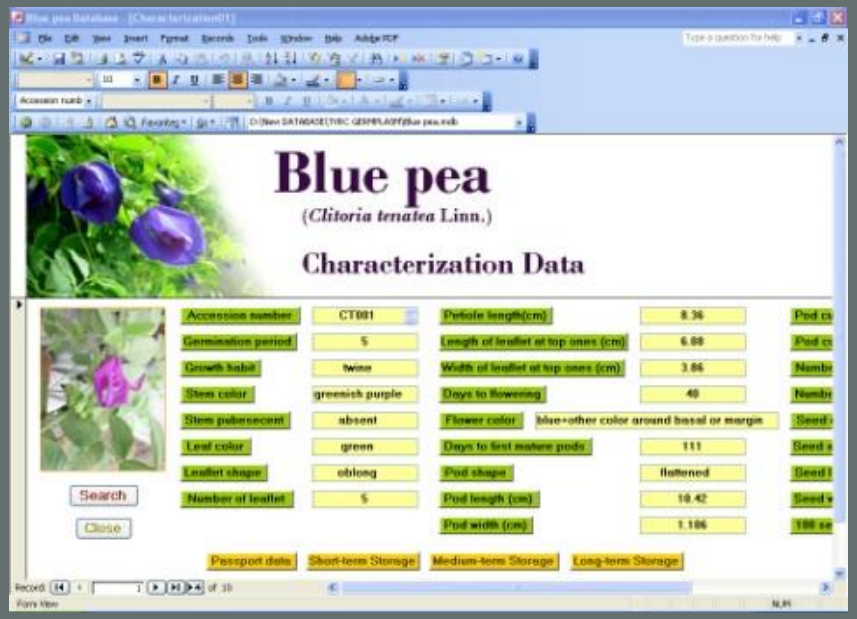
**Characterization**

**And**

**Multiplication**

# Database

Passport data, Characterization data and Photo



# CLg 001

| | |
|---|---|
| **Seed source:** | Muaeng District/  Srakaew Province |
| **Collection Date:** | August24, 2000 |
| **Days to germination DAS:** | 7 |
| **Cotyledon color:** | green |
| **Leaf color:** | green |
| **Stem Color:** | dark purple |
| **Plant height (cm):** | 81 |
| **Leaf length (cm):** | 8.89 |
| **Leaf width (cm):** | 13.52 |
| **Days to 50% flowering DAS:** | 60 |
| **Flower color:** | white |
| **Pod length (cm):** | 7.37 |
| **Days to maturity pod harvest DAS:** | 92 |
| **Number of seeds per pod:** | 35 |
| **1,000 seeds weight (g):** | 1.13 |
| **Seeds yield per plant (g):** | 29.21 |
| **Comment:** | Heat tolerant, high yield |

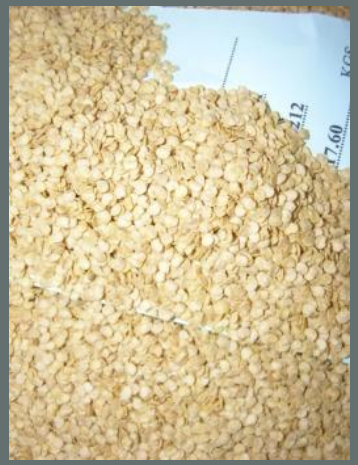
**CA 001**

| | |
|---|---|
| **Seed source:** | Muaeng district, /Nakhon Sawan Province /Thailand |
| **Collection Date:** | 20/02/1992 |
| **Scientific name:** | Capsicum frutescence |
| **Days to germination:** | 5 |
| **Hypocotyls color:** | 1/2 purple from the base |
| **Leaf color:** | green |
| **Leaf shape:** | lanceolate |
| **Stem Color:** | purple |
| **Plant growth habit**: | erect |
| **Plant height/width (cm):** | 63.00/100 |
| **Leaf length (cm):** | 9.00 |
| **Leaf width (cm):** | 3.93 |
| **Days to 50% flowering:** | 85 days after sowing |
| **Flower color:** | white |
| **Fruit shape:** | elongate |
| **Fruit weight (g):** | 2.67 |
| **Fruit length (cm):** | 6.47 |
| **Fruit width (cm):** | 0.83 |
| **Fruit wall thickness (mm):** | 0.82 |
| **Fruit pedicel length (cm.):** | 5.02 |
| **Days to maturity fruit harvest DAS:** | 110 |
| **Number of seeds per fruit:** | 50 |
| **1,000 seeds weight (g):** | 4.3 |
| **Seeds yield per plant (g):** | 4.4 |
| **Varietal mixture condition:** | slight |
| Comment | high yield |

# Exchange and Distribution

Seed Request Form

Material Transfer Agreement



**SEED REQUEST FORM**

**Tropical Vegetable Research Center**

Kasetsart University Kamphaeng Saen Campus Nakhon

Pathom 73140

**Please enter collections requested:**

| No. | Crops | Acc.no./Variety | Amount | No. | Crops | Acc.no./Variety | Amount |
|---|---|---|---|---|---|---|---|
| 1 | | | | 11 | | | |
| 2 | | | | 12 | | | |
| 3 | | | | 13 | | | |
| 4 | | | | 14 | | | |
| 5 | | | | 15 | | | |
| 6 | | | | 16 | | | |
| 7 | | | | 17 | | | |
| 8 | | | | 18 | | | |
| 9 | | | | 19 | | | |
| 10 | | | | 20 | | | |

Use of materials

☐ Research/ Project title:.....

☐ Others:.....

GOOD

SEEDS

GOOD

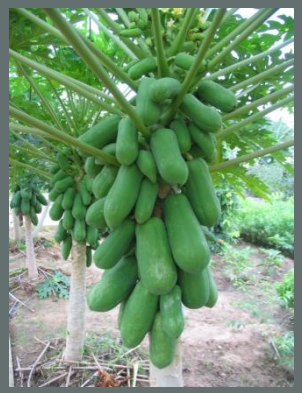
GERM.

GOOD

QUALITY

GOOD

YIELD



# Visiting

## TVRC Germplasm Facilities

# Seedling Practice

# Materials/Method

-Peat moss

-Seedling tray

-Vegetable seed

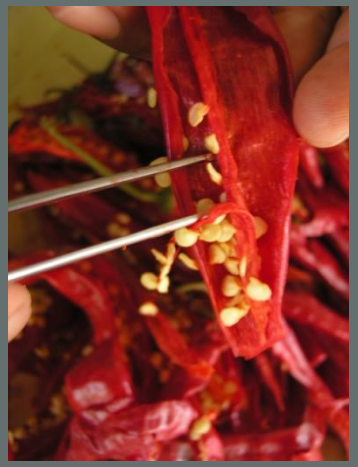
-Plastic tag and pencil

# Seed Process Practice

## Pepper Extract

Forceps

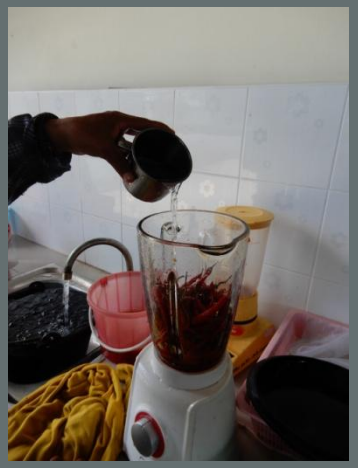
Hand



Drying room

# Pepper Extract

Machine



Drying room

# Okra Extract

## Hand

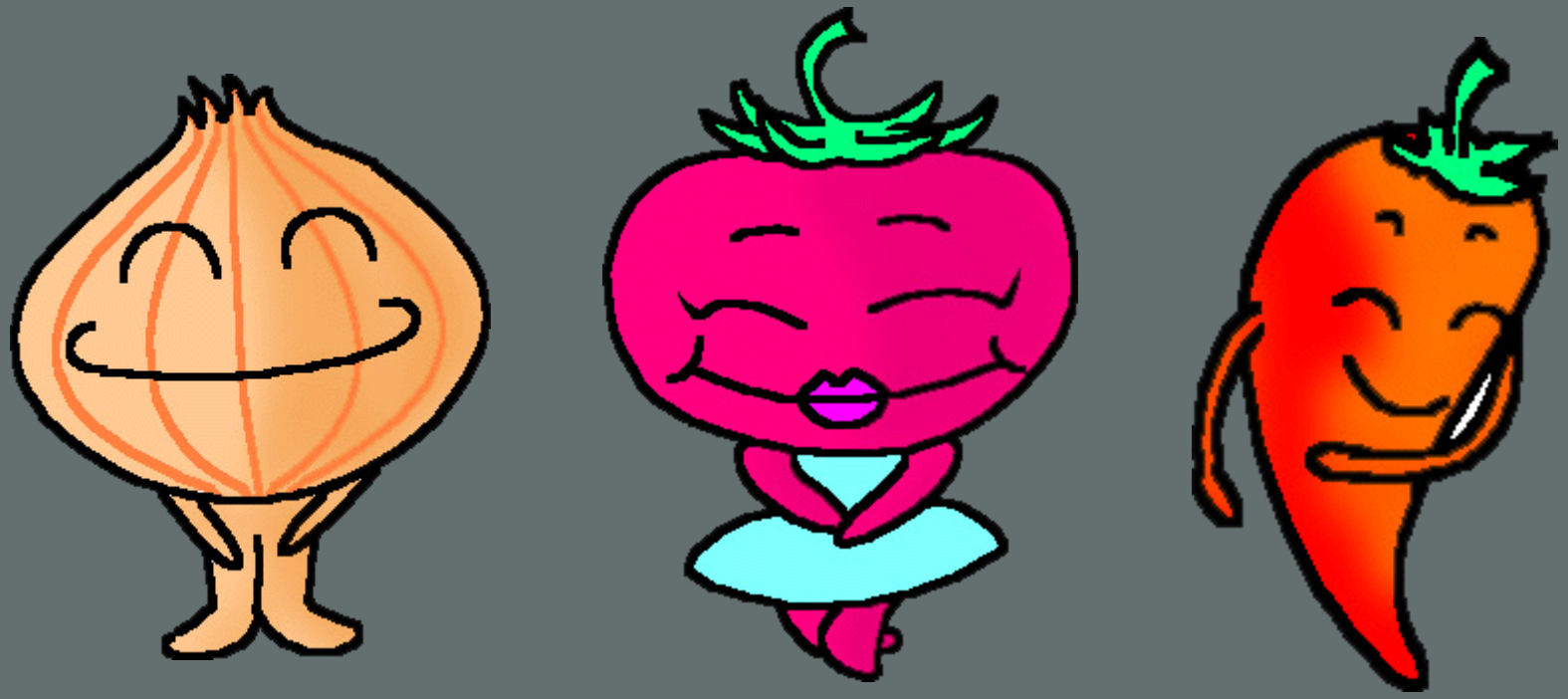
Drying room

# Wax gourd Extract

Fermentation

Washing

Drying room



# ขอบคุณครับ

# THANK YOU