



The Thai Tapioca Development Institute

Under the Patronage of HRH
Princess Maha Chakri Sirinthorn

TTDI

www.tapiocathai.org



About TTDI

- Our organization
- Our Mission
- Why Tapioca?
- What we do

Our Helping Hands Through the Years

- Research, Propagate + Distribute
high yield varieties to farmers countrywide
- Control outbreak of Pink cassava mealybug
- Develop World's first Non GMO Waxy Tapioca

Contact Us

ABOUT **TTDI** **our** organization

- **TTDI FOUNDATION**, established in 1992 as an independent non profit organization with initial fund of 600 million baths (U\$ 20 M) only income from interest can be appropriated
- **TTDI at HUAY BONG/SIKEW** with 863 hectares of land for propagation of new high yield varieties and training



TTDI (HUAY BONG)



TTDI

สถาบันพัฒนามันสำปะหลัง
THAI TAPIOCA DEVELOPMENT INSTITUTE

ABOUT TTDI

OUR mission

- To increase productivity through new and better high yield varieties
- To continue research for better varieties.
- To promote research on wider uses of tapioca.
- To Build Mealy Bug Parasitoid Centre
- To provide the public with information and knowledge of tapioca products.
- To develop human resources.



ABOUT TTDI

why tapioca?

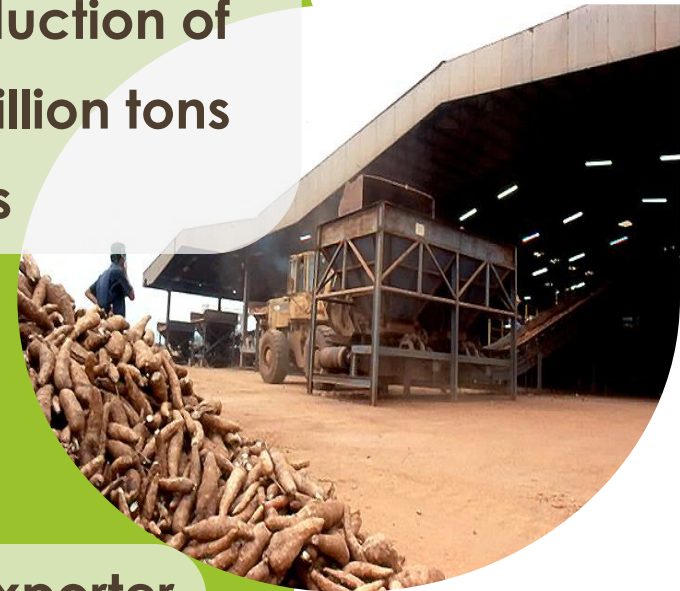
in 2013

2.6 million farmers with
1.2 million hectares of land
in 49 provinces in Thailand

4th Industrial crop
after rice, rubber,
and sugar cane

- production of
28.7 million tons
of roots

World's biggest exporter
Tapioca starch 4 million tons/year
Tapioca chip 5 million tons/year



TAPIOCA INDUSTRIAL PRODUCTS IN EVERYDAY LIFE



ABOUT TTDI

what we do

Promote R&D on Tapioca

- varieties improvement
- production + harvesting technology
- usage of tapioca + starch
(establishment of Starch Research Unit)

Distribute high yield varieties to farmers free of charge



ABOUT TTDI

what we do

- Propagate new high yield Varieties for farmer
- Transfer Technology + Know how
- Develop new high yield varieties : Huay bong 60
: Huay bong 80
- Produce *Anagyrus lopezi* to control the Infestation of Pink cassava mealybug







Functioning parameters of the SIT system

Parameter	Ideal conditions
Immersion time	8 minutes
Frequency	4 times in 24 hours
Volume of medium	1.0 liter in 3.0 liters Erlenmeyer
Temperature	27 Celsius
Luminosity	3500 Lux
Periods of Light	14 hours light, 10 hours darkness
Incubation time	30 days

OUR HELPING HANDS THROUGH THE YEARS

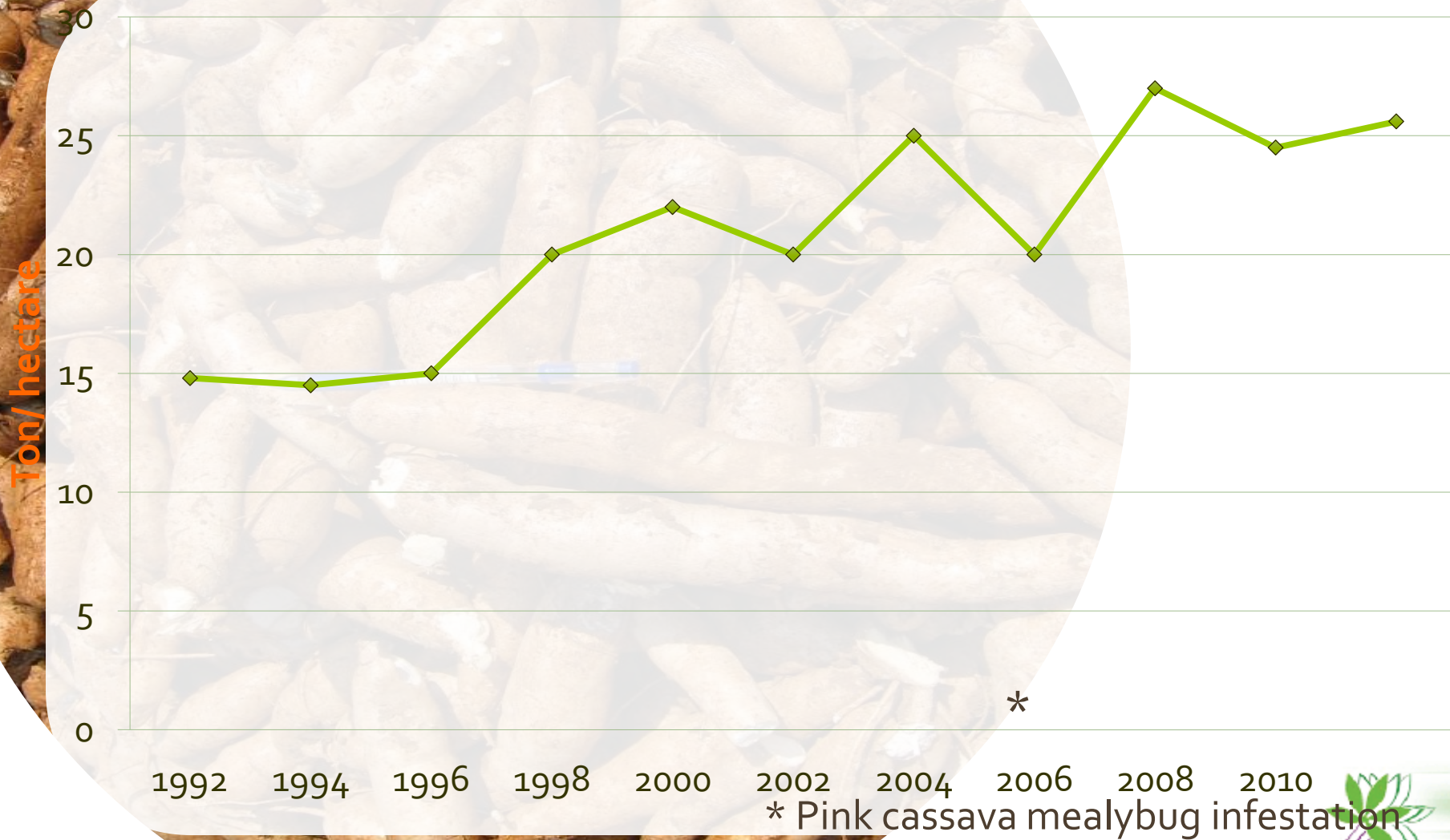
**Research, Propagate and Distribute
new elite high yield varieties to farmers**

- **More than 60 million stalks distributed**
- **30 % increase in yield and root starch content**
- **New high yield varieties now cover
98 % of growing areas**

TAPIOCA VARIETIES IN THAILAND

Year	Variety	Yield (ton/hectare)	Starch content
1970-1982	Rayong 1	20	20%
	Rayong 3	17	23%
1980-1990	Rayong 60	25	22%
		23	24%
1990-2000	Kasetsart 50	34	25%
	Rayong 5	25	22%
2000-2010	Huaybong 60	36	25%
	Rayong 7	39	27%
	Rayong 9	30	24%
	Huaybong 80	34	27%

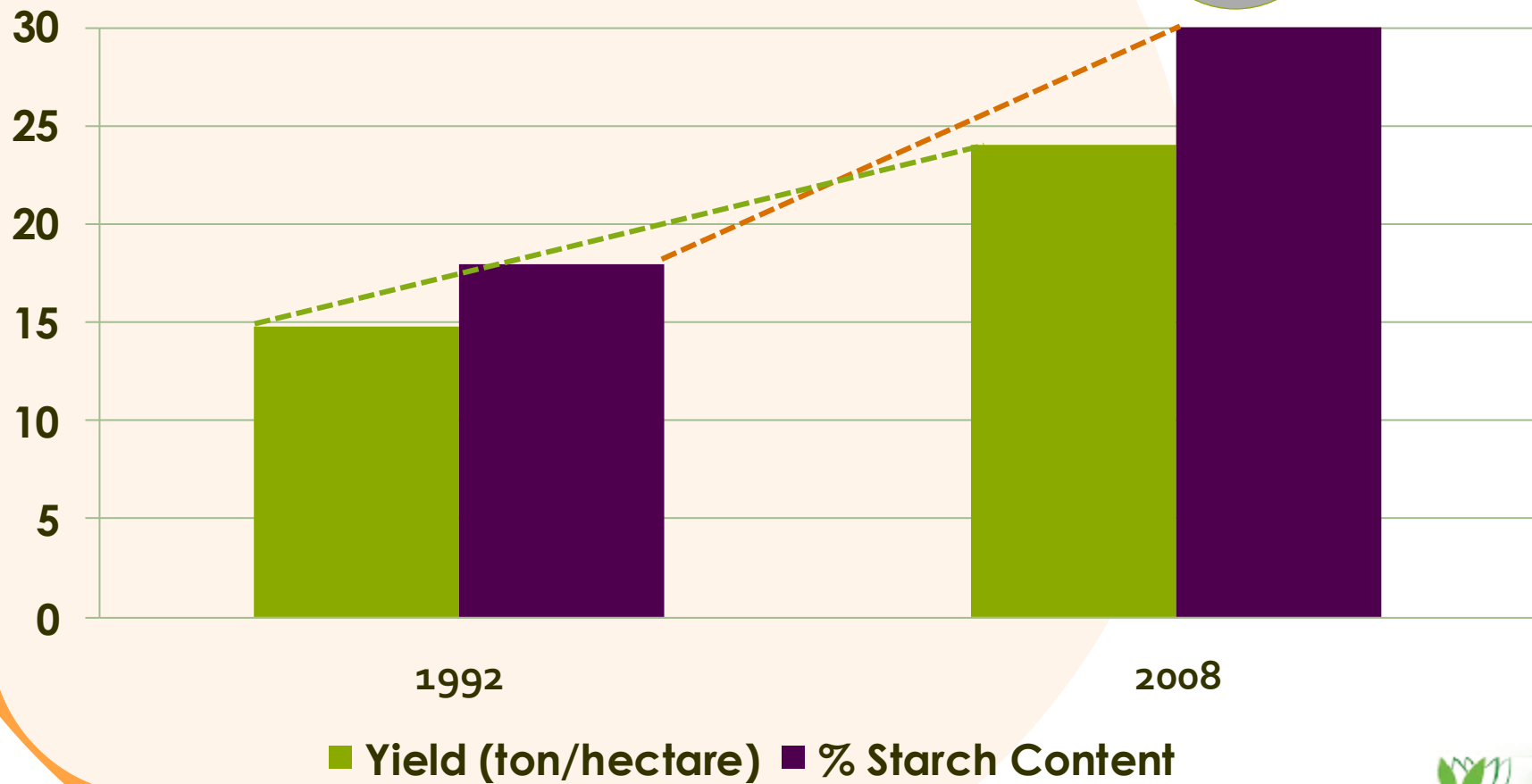
AVERAGE FRESH ROOT YIELD



PRODUCTIVITY INCREASE

Yield and Starch content increase

30 %



OUR HELPING HANDS THROUGH THE YEARS

Control outbreak of Pink cassava mealybug within 2 years

- Innovative mass rearing of *A.lopezi* Parasitoid
- Huay Bong mass rearing facilities regarded as the largest one in the world

PINK CASSAVA MEALYBUG



PINK CASSAVA MEALYBUG (*Phenacoccus manihoti*)

This invader destroys cassava plantations and related industries

Vicious Attack

- One pink cassava mealybug can self reproduce **500** times every **30 days**
- A single mealybug can produce at least **18,000,000** new mealybugs in **90 days**
- Their bodies are covered with a powdery wax layer, protecting them from chemicals and all organisms, except *A.lopezi* wasp



THE HERO: *Anagyrus.lopezi*

Save the Tapioca crop and related industries from huge loss



- Attacks only pink cassava mealybug
- Was introduced in early 70's to West Africa to control pink cassava mealybug, and successfully controlled within 6 years
- 500 pairs of *A.lopezi* were imported in 2009 from Benin and Pink cassava mealybug successfully controlled within 2 years

Biological control of the pink cassava mealybug
in Africa 6th. Oct. 2009 Bangkok, Thailand



Anagyrus lopezi De Santis (Hymenoptera:
Encyrtidae)
(=*Epidinocarsis*, =*Apoanagyrus*)

SUCCESSFUL CONTROL

Distribution of *A.lopezi* (pair)

Province	North Eastern	Eastern	Central	Northern	Total
Year					
2010	260,690	-	-	-	260,690
2011	1,310,030	21,770	30,660	-	1,362,460
2012	1,630,820	56,000	438,500	31,000	2,156,320
JAN-5 AUG 2013	793,700	42,000	84,000	20,000	939,700
Total	3,995,240	119,770	553,160	51,000	4,719,170
%	85%	3%	12%	1%	100%



HUAY BONG MASS REARING FACILITY



Extending longevity at 15°C



OUR HELPING HANDS THROUGH THE YEARS

**Development of World's first
Non-GMO Waxy Tapioca**



THAI WAXY TAPIOCA

2008...

TTDI CIAT entered into agreement to research & develop waxy tapioca

2009...

Planting 16,000 F2 seeds at TTDI-Huaybong

2010-2013

Identification and Selection by Kasetsart University at TTDI-Huaybong

WORLD'S FIRST NON-GMO WAXY CASSAVA VARIETIES







WAXY TAPIOCA STARCH

1. Provide higher paste viscosity, when cooked
2. Provide more stable cooked paste, when stored
3. Provide improved freeze-thaw stability with low water syneresis



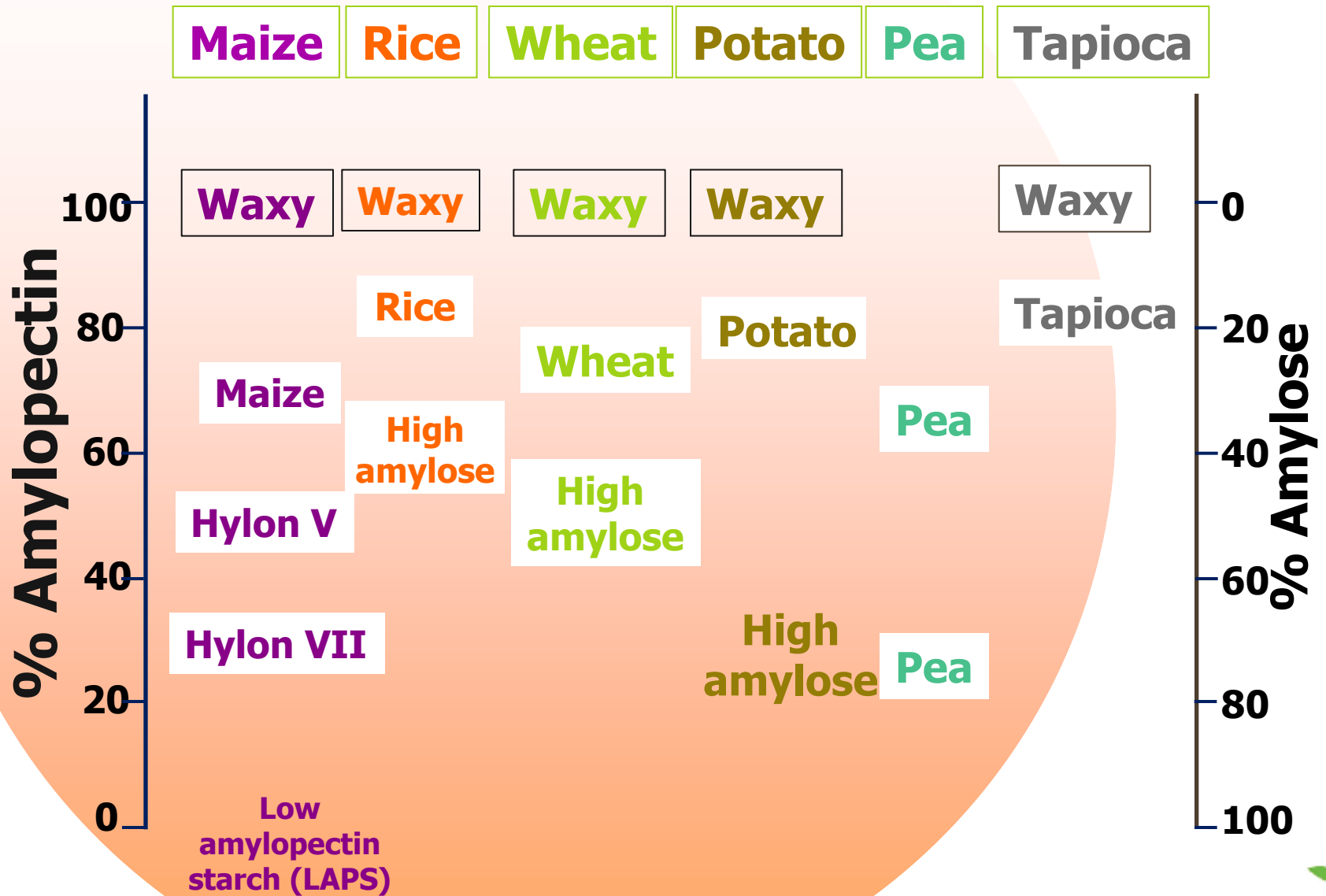
No need for chemical modification (stabilization)



- Clean label for food products
- More environmental friendly process / products
- Less production cost of modified starch for waste treatment



BIODIVERSITY : COMPOSITION OF VARIOUS STARCHES



Second Batch of Waxy lines will be available in 2015



CONTACT US

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THANK YOU

