Research and Development in Addressing the Challenges in Market Expansion of Malaysian Fruits

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INTRODUCTION

The Malaysian Fruit Industry:

- Hectrage > 300,000 ha. - Peninsular Malaysia
- Estimated Production: 1.8 milllion MT/ year
- The fruit industry has high potential to expand and meet local and export demand
- Fruit export is estimated to reach > RM 500 million/year

Research priorities are on 7 fruit types that are important for export and local consumption:

- pineapple, papaya, melon, starfruit, banana, jackfruit and durian






- These fruits are also included in The Malaysian Economic Transformation programme: EPP 7- 'Upgrading capabilities to produce fruit and vegetables for premium markets'

Scenario and Issues

- **Emerging disease eg Papaya Bacteria Dieback(PBD)**
  - Reduced export from USD 30 million/year to <USD 10 million
  - Papaya become a scarce commodity for the locals too
- **The Banana Blood disease and fusarium wilt has resulted in low banana production**

Scenario and Issues :

Production

- Lack of quality planting materials
- High input and labour cost
- Some fruits are prone to fruit fly attack and need to be individually wrapped

Scenario and Issues : Post harvest and Quarantine protocols

- losses is rather high , most fruits are easily perishable
- Lack of post harvest handling and storage facilities
- Lack of knowledge and awareness on post harvest handling
- Quarantine protocols need to be developed for most of the export fruits to meet requirements of importing countries

Research development and strategies for market expansion

- **Research focus on 4 programmes:**
  - » Breeding for yield , quality improvement, disease resistant and improved storage life
  - » Production technology to optimize inputs and maximize productivity
  - » Pest and disease management
  - » Post harvest handling and quarantine protocol nt
  - » Presentation: Papaya , pineapple, starfruit, jackfruit and durian

From Farm To Table

Production

In-field handling

Handling of produce

Packaging & storage

Marketing & distribution

Consumption

Eksotika II Papaya

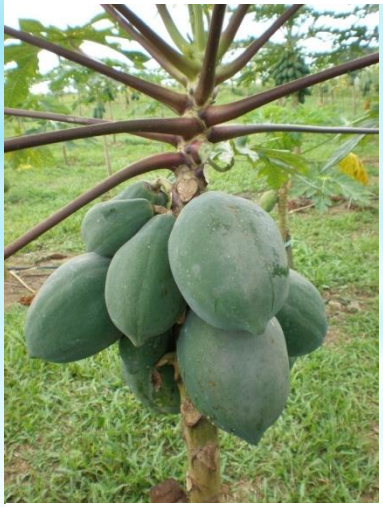
- A cross between Eksotika (Line 20) and Line 19
- Better TSS, flesh colour, appearance
- Work on better storage life is on-going

Papaya Breeding for varieties resistant to PBD

- 2 varieties resistant to PBD identified

Glimmer

MARDI Purple lady



Female plant

Hermaphrodite plant

Pineapple

Josapine

- Fresh consumption

Maspine

- Fresh and processing

Potential varieties in the pipe line

- Josa base line

Josa x 53-116(6)

Josa x 53-116(1)

Golden Starfruit

- **Export of golden starfruit to Europe for future market expansion**
  - Potential new variety- Golden starfruit, Reddish orange variety
  - Use of pre-harvest Calcium

Production Technology - Papaya

Induced Systemic Resistance

- Plant Growth Promoting Rhizobacterial (PGPR) induced resistance against PBD
- Eight PGPRs were found effective against PBD.
- All the selected PGPRs demonstrated dual role, as disease suppressor and plant's growth promoter.
- ISR seedlings (Eksotika II) were tested on field and so far no disease incidence was observed .

Bad impact of Papaya Dieback on 10 months old papaya trees cultivated using non-ISR seedlings

Papaya Dieback Disease- free 13 months old papaya trees cultivated using ISR seedlings

MICROCUTTING TECHNIQUE + ISR

ROOTING OF PAPAYA CUTTING

CUTTING IN CHAMBER

CUTTING + ISR

ELITE HERMAPHRODITE PAPAYA (CUTTING AT FIELD)

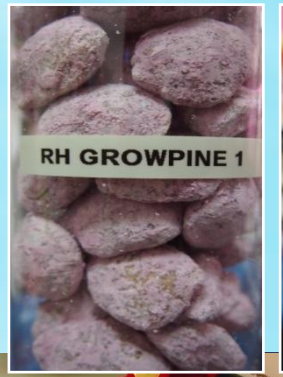
ELITE HERMAPHRODITE MOTHER PLANT (MASS PROPAGATION)

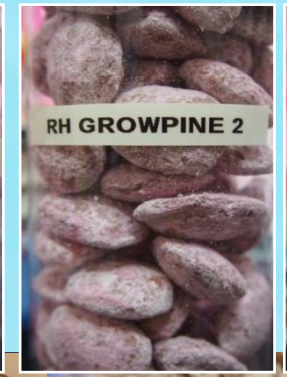
Juvenile cuttings

ELITE HERMAPHRODITE PAPAYA PLANTING MATERIALS

Production Technology - Pineapple

- **GROWPINE dan mass propagation from crown leaf budding technique**





Production Technology - Starfruit

- Netted structure
- Calsium to improve firmness

Production Technology
- Durian

- **Rootstock resistant to Phytopthora identified**
  - Mass propagation of clonal rootstock

Horticulture Research Centre

Postharvest R&D Areas

- Maturity indices & harvesting
- Extension of storage life (Low T and CA/MA)
- Minimal processing
- Postharvest treatments
- Suitable packinghouse operations
- Handling & transportation
- Insect disinfestation and quarantine protocol

Development of Maturity indices

Preconditioning on pineapple

- Step-wise temperature reduction before storage at 5°C

- **Preconditioning on N36**
  - 3-4 weeks longer than commercial storage
  - Quality well maintained
  - No chilling injury symptom

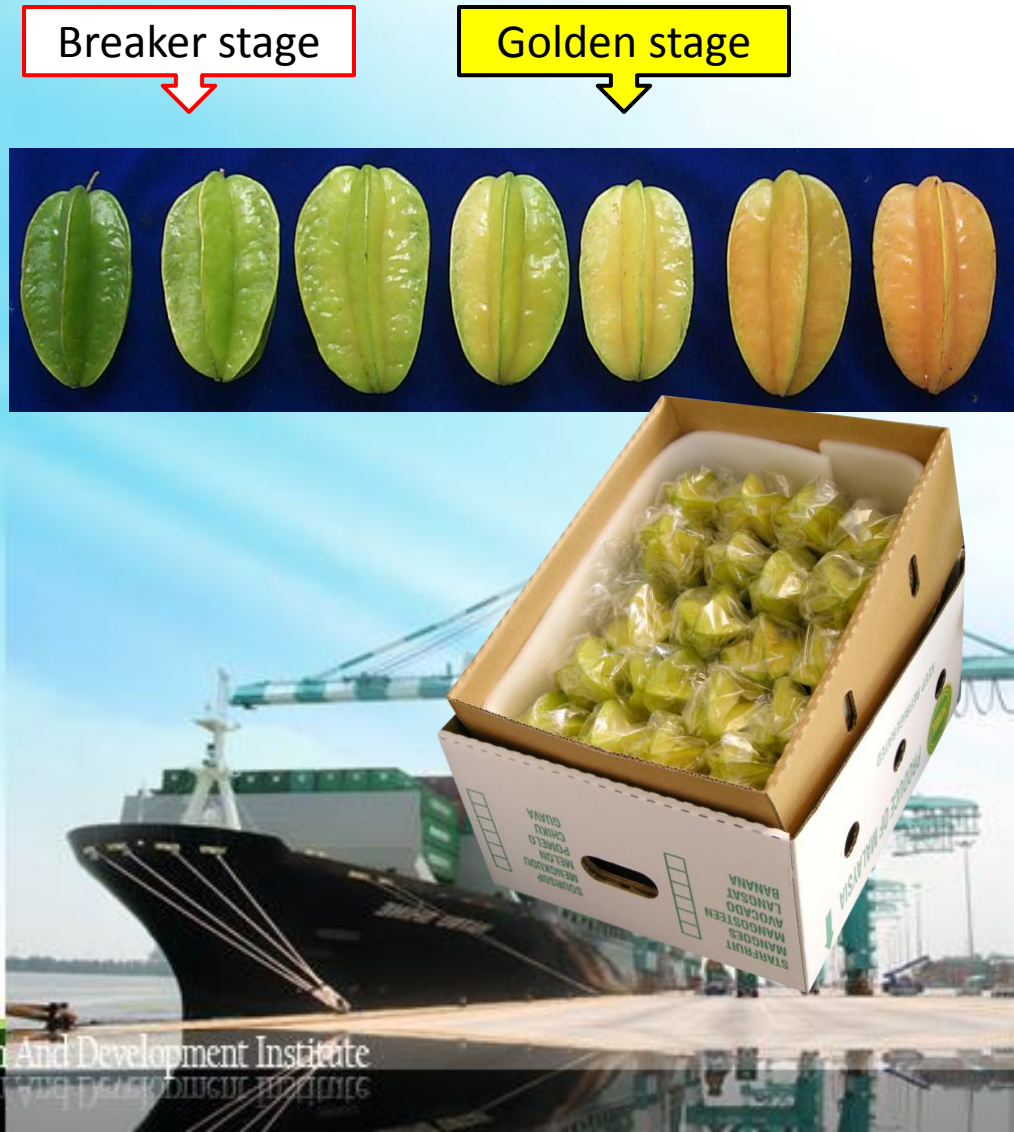
Step-wise temperature reduction before storage at 5ºC

- **Preconditioning on Josapine**
  - 4-5 weeks at 5ºC
  - (> 1 week than normal)

Golden Star fruit for Export

Golden stage star fruit

- Better taste and more attractive.
- Very good for fresh consumption, in addition to garnishing and drinks.
- Can still be stored up to 8 weeks at 8ºC through application of MAP technique
- Increase the demand of star fruit for export.



Trial Shipments

Produce	Destination
Banana	Hong Kong, Japan,UAE,Denmark
Papaya	Hong Kong Saudi Arabia, UAE
Pineapple	Saudi Arabia, United Kingdom, Germany
Starfruit	Hong Kong , Belgium
Melon	Hong Kong

Shipping Technology

Berangan banana to UAE

Pineapple to United Kingdom

Mixed load fruits to Dubai , UAE (2006)

Mixed load fruits to NETHERLANDS (2008)

Pomelo

Starfruit B10 (Colour index 2)

Starfruit B10 (Colour Index 4)

N36 pineapple

Josapine pineapple

Technology for Fresh-cut fruits has been developed for:

- Jackfruit
- Pineapple
- Durian
- Pomelo
- Melon
- Mandarin
- Mangosteen
- Sapota
- Mixed fruits

Trial Shipments MP Fruits

Produce	Destination
Pineapple	Netherlands, Perth, Dubai, Singapore
Jack fruit	Zurich, Rotterdam, Amsterdam, Belgium, Dubai, Singapore
Durian	Hong Kong, Singapore

Fresh-cut jackfruit to DUBAI

Fresh-cut pineapple to PERTH

Fresh-cut jackfruit to Europe

- Zurich
- Amsterdam
- Rotterdam

- Belgium

Postharvest mechanization

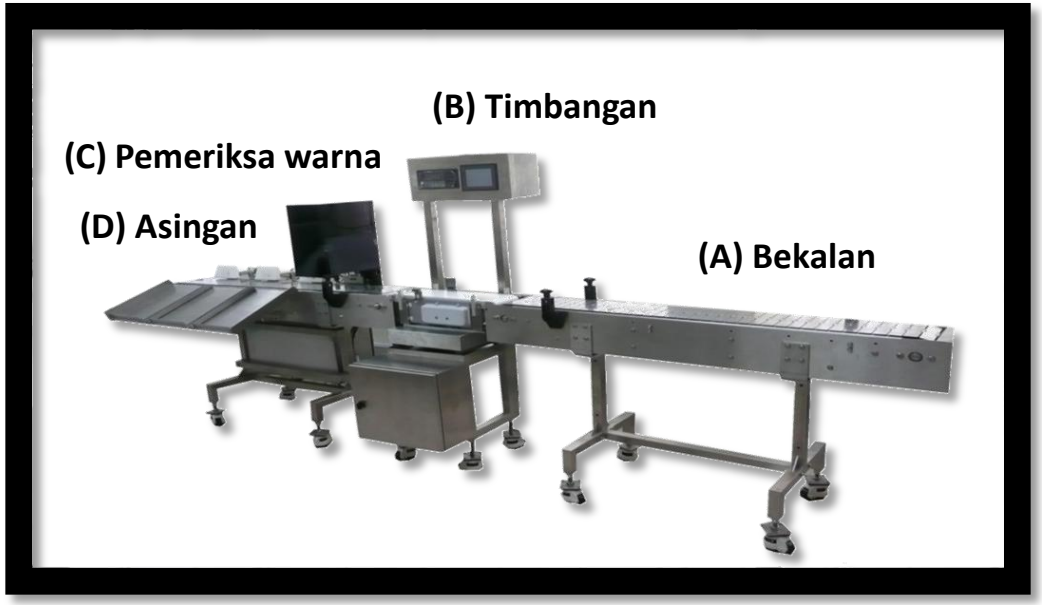
Non-destructive technique for quality evaluation (NDT)

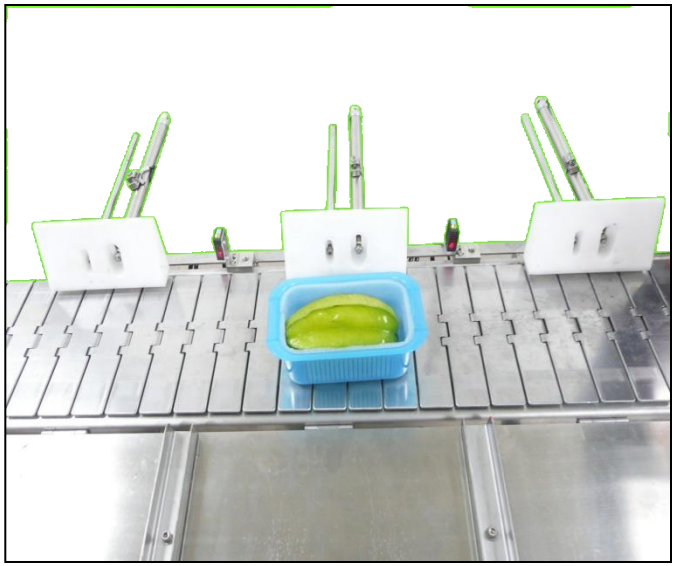
Determining maturity stages, sweetness and internal disorder (flesh/tissue cracking) of watermelon

- acoustic and Piezoelectric Transducer (PZT) sensor

Mechanization inputs for minimally processed pineapple

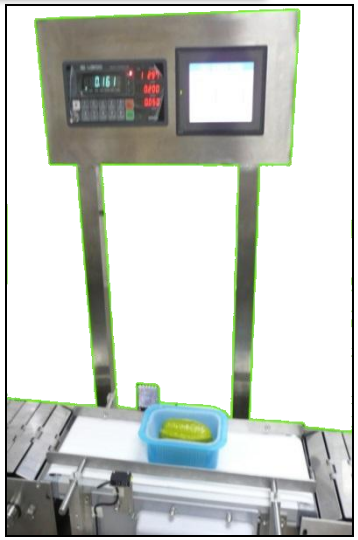
Fruit Grading System





Fruit grading system

- Determine size and maturity stages
- Accuracy : 98% and 100% for size and maturity respectively



Mechanized durian opener

Quarantine protocol

- **Research:**
  - Development of disinfestation protocol using Hot Water Treatment (HWT) on papaya

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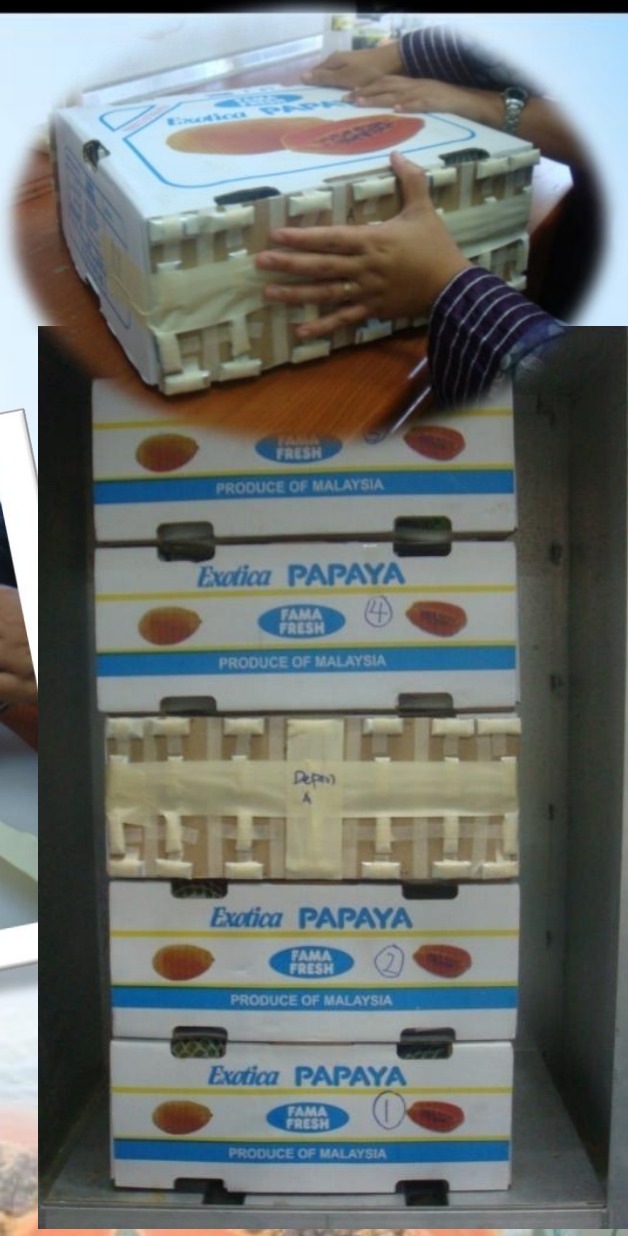
Quarantine protocol

* Development of disinfestation protocol using Vapor Heat Treatment (VHT) on papaya and mango

Quarantine protocol

* Development of disinfestation protocol using irradiation on papaya



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CONCLUSION

- **Research and Innovation has played important role in developing and supporting the Malaysian fruit export industry**
  - **Future research main focus is to address pressing issues related to:**
    - Expansion of production area and increase productivity with lower input cost
    - Expansion of export market and also capturing markets that we have lost and ensure there is enough supply for local consumption

CONCLUSION

- It is important to enhance cooperation and coordinate efforts among researchers and users of technology at national and regional level in order to maximize the use of resources and to ensure that whatever technology developed or generated would be beneficial to all the parties involved including growers, traders and consumers

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Thank You

Peminpin Agro Teknologi

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