Discussion topics :-

1) Borneo as a biodiversity hotspot

2) Kelulut of Borneo?

3) Current issues

5) Conservation strategies

Kelulut around the world
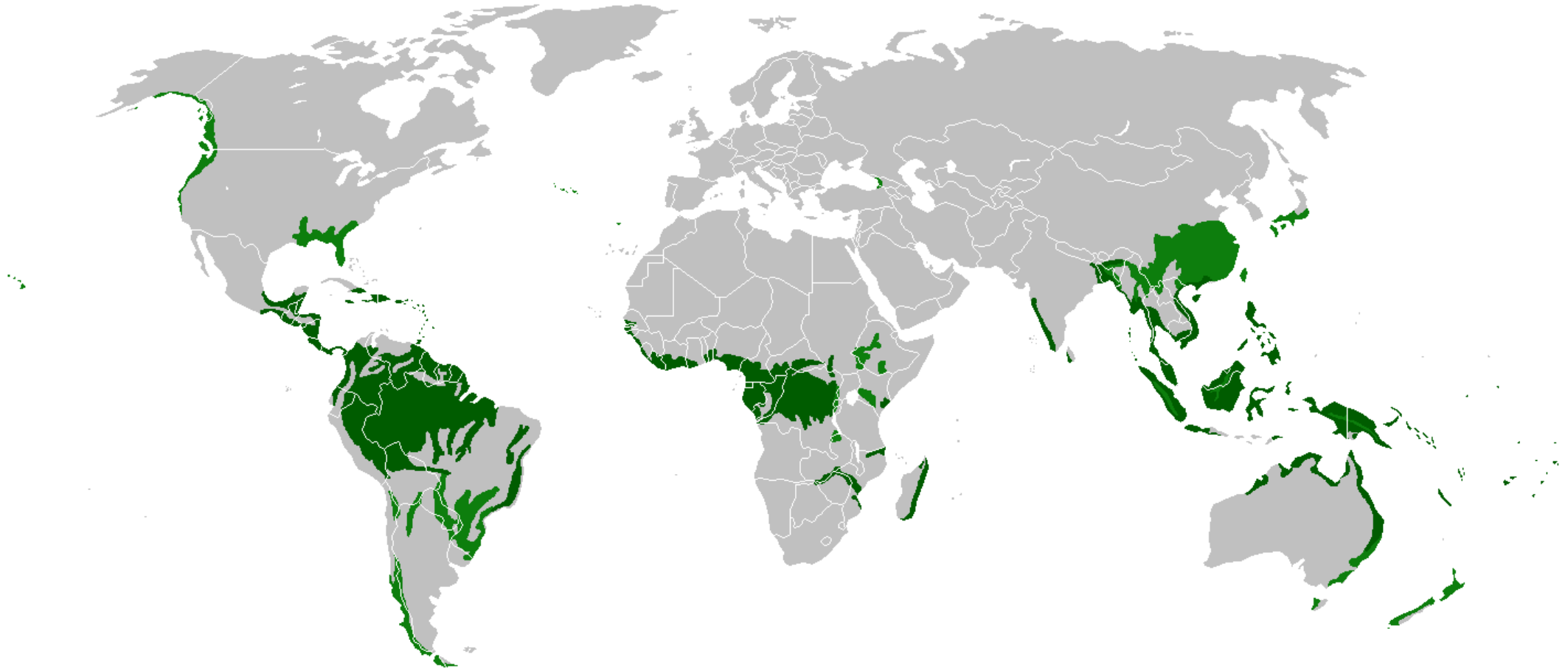
Kelulut are found in Tropical and subtropical areas
(South America, Africa, South East Asia, Australia)

Borneo – the third largest island in the world

Borneo biodiversity

Borneo - a megabiodiversity hostpot

▶ 15,000 species of flowering plants with 3,000 species of trees

▶ Dipterocarp trees hold the greatest insect diversity on Borneo

▶ As many as 1,000 species can be found in just 1 tree.

Kelulut Indo-Malaya

8 Genera, 77 species

1. *Geniotrigona* -   2 sp
2. *Wallacetrigona* -   1 sp
3. *Heterotrigona* -   11sp
4. *Homotrigona* -   11sp
5. *Lepidotrigona* -   12 sp
6. *Lisotrigona* -   4 sp
7. *Pariotrigona* -   1 sp
8. *Tetragonula* -   35 sp

Kelulut, Agriculture, Environment, Health and lifestyle

▶ Efficient pollinator

▶ A good bio-indicator – environmental changes

▶ Kelulut honey – good health and lifestyle

▶ A source of infome for bee keepers

Ekspedisi Kelulut
(15 series)

The objectives!

- *Kelulut mapping – live specimen*
- *Spread awareness on pure honey and the adverse effect of adulterated honey.*
- *Encourage sustainable meliponiculture*

First Borneo kelulut Expedition 3-8 April 2016

Second Borneo kelulut Expedition 11-15 January 2017

Wallacetrigona (Geniotrigona) incisa

Geniotrigona lacteifasciata

Kelulut of Borneo

Homotrigona (Odontotrigona) haematoptera

Tetragonula (Tetragonilla) rufibasalis

Tetragonula melanocephala

Tetragonula sirindhornae

Kelulut of Borneo

Sundatrigona moorei

Crematogaster ant – a simbion

Homotrigona lutea

Tetragonula sarawakensis (Schwarz, 1937)

- ✓ An emerging industry
- ✓ An infant stage
- ✓ Small and medium scale
- ✓ A profitable activity and could supplement income
- ✓ Contribute to agriculture
- ✓ Sustainable environment

Kelulut – another good commodity?

Small scale, hobby or a commercial endeavor that give good return and profit.

Isues and challenges

Adulterated honey

Unsustainable meliponiculture

Non-regulated honey price

Standard and regulation

invasive species

Pest and diseases

R&D dan inovasi

Kelulut and natural habitat

- ✓ **Lost of natural habitat**
- ✓ **Lost of forest resources**
- ✓ **Development – encroachment (industry / commercial)**
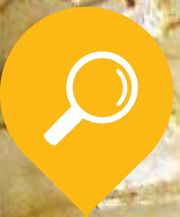
Commercial honey

Pure honey

Adulterated honey

Fake/sintetic

Domestication of stingless bee

From their natural habitat – artificial hive for domestication
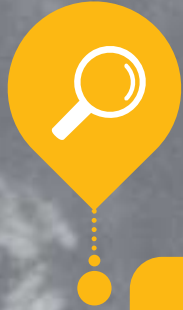
Pricing of Kelulut honey

1) Un-regulated
2) Highly dependand on local demands
3) Manipulation /undercute
4) Lack of coordination from agencies/NGOs

Good to Great.

BSF larvae from different stages /life cycle

Haptoncus luteolus

Pollen beetle Haptoncus luteolus (top) dan Adult beetle (down)
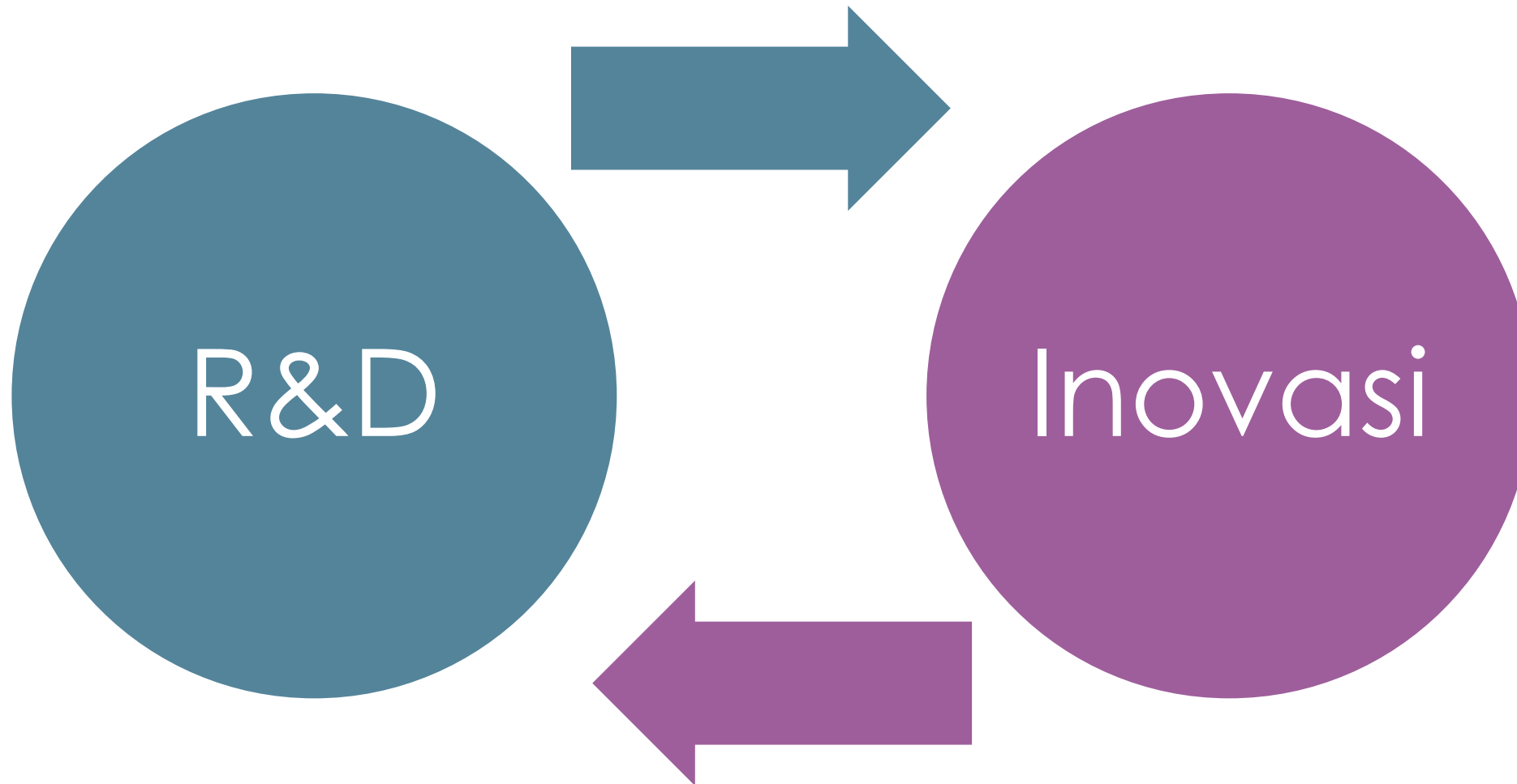
Globalization of kelulut honey

Note !
- Storage, packaging, quality, standard, marketing – Malaysian products

Kelulut industry

- Sustainable industry
- Continues income
- Globalisation kelulut products
- Support from many parties/agencies/industries

How

Collaboration, cooperation multi-agencies

Long and short term strategies
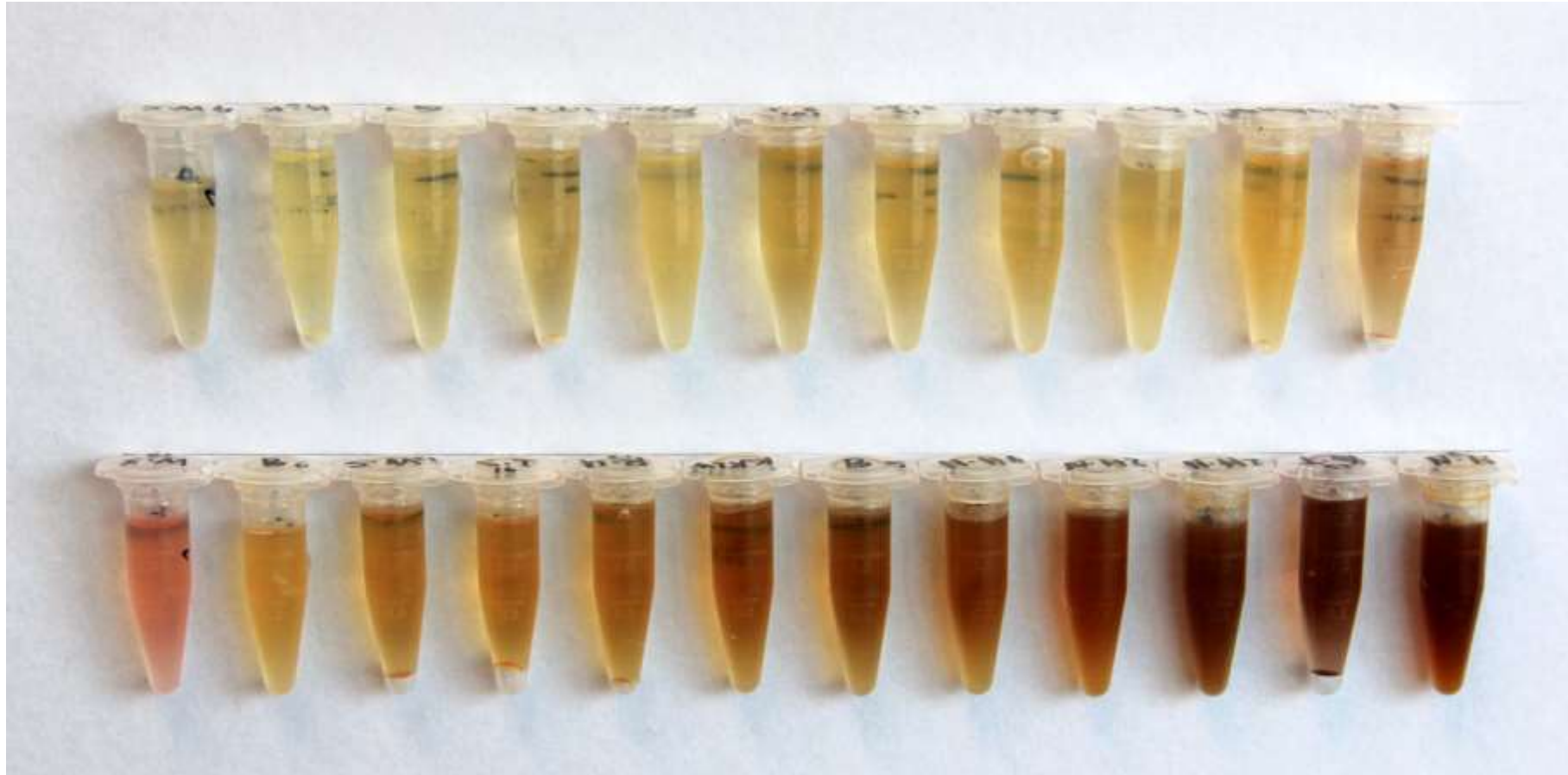
One stop center for information sharing

International networking

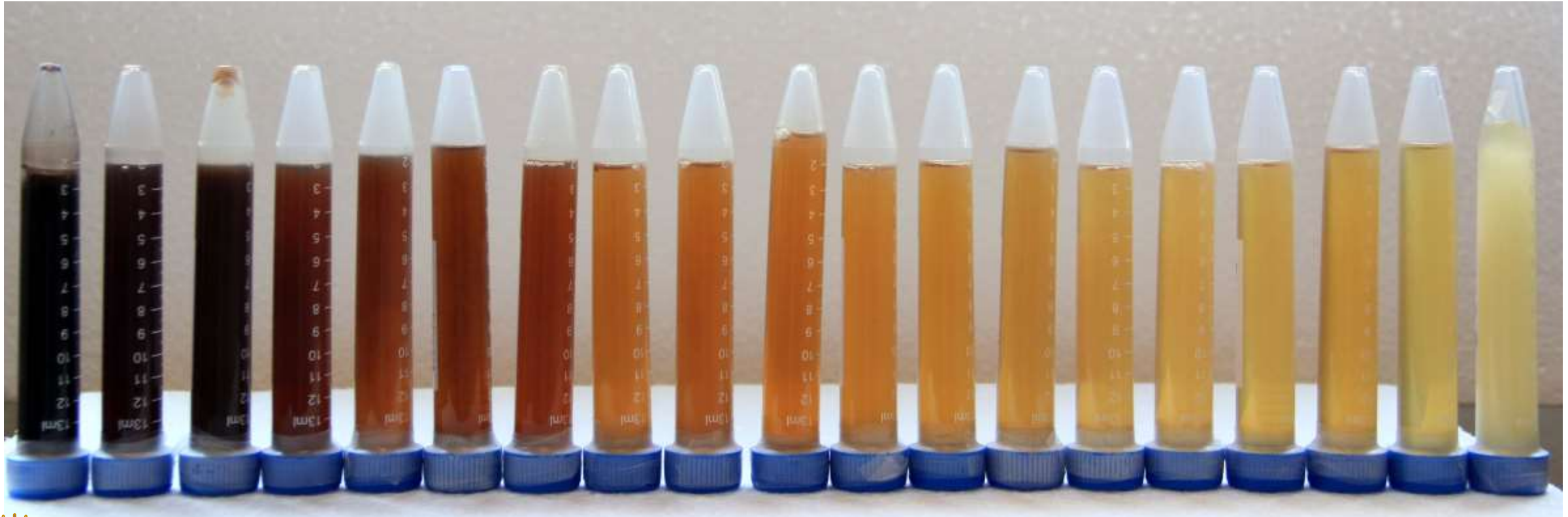Product diversification

Collection center

Innovation

Kelulut honey – a wide spectrum of colors

Fact !

Color of honey is determined by resin source, nectar, ash content/minerals

Colours – uniques character for kelulut honey

💡 **Fakta !**
flavonoid (antioxidant) is higher in darker honey

Kelulut honey – colorful!

The best ways to get pure honey

Trusted beekeepers

Do your own beekeeping

Conservation strategies

1 **Education through awareness campaign**

2 **Workshops, seminar, conferences**

3 **Repository for kelulut**

4 *Strict law and regulation*

REPOSITORI KELULUT
Indo-Malaya Sekayu
INDO-MALAYAN Stingless Bee Repository Sekayu
Shamsul Bahri Abd Razak
Mokhtar Ishak

Kembara Kelulut
Semenanjung Malaysia
"Diari pencarian kelulut merungkai persoalan dan kemelut"
SHAMSUL BAHRI ABD RAZAK

Thank you