

RECENT STATUS OF COFFEE BERRY BORRER IN INDONESIA

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I. INTRODUCTION

COFFEE GROWING IN INDONESIA

- Coffee has been cultivated in Indonesia since 1699 (more than 300 years).
- Indonesia produces Arabica, Robusta and Liberica coffees, which are cultivated by smallholding farmers, government estates and private estates.
- **Smallholding coffee covers 96 % of the total areas.**
- Average productivity of productive areas was about 850 kg/ha (2007).
- The main producing area of Robusta is Southern Sumatra (Bengkulu, South Sumatra and Lampung provinces).
- The main producing area of Arabica is Northern Sumatra (North Sumatra and Aceh Provinces)

ECONOMY OF COFFEE

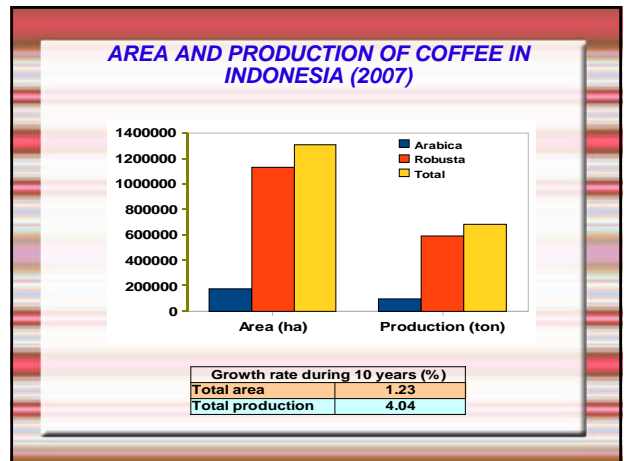
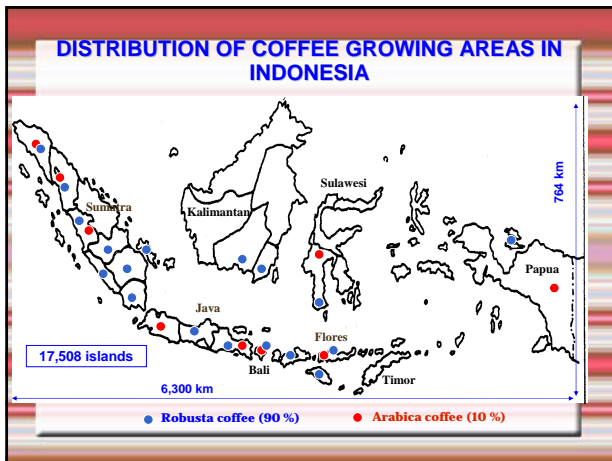
- Coffee is an important commodity for Indonesia, it shares about 0.57 % of the total GNP.
- Farmers involved in coffee cultivation are about 1.9 million households (2006)
- Main export destinations are USA, Japan, Germany, Italy and UK.
- Recent performance of domestic roasting by industries is 130,000 tons, with average growth rate 3.1 % per annum.
- Total domestic consumption is estimated about 200,000 tons (including import, roasting by small roasters and home/traditional roasting).

AGRICULTURAL PRACTICES ON COFFEE (1)

- Arabica coffee is grown at high altitude (> 1.000 m), and Robusta grown at lower one (< 900 m). Liberica is mainly grown at tidal swamp areas.
- Coffee is mostly grown under permanent shade trees in order to maintain micro climate. Legume trees such as *Leucaena*, *Albizia* and *Erythrina* are widely used by coffee farmers.
- Intercropping is common to be applied by coffee farmers in order to obtain additional income and in minimizing farming risk.
- Coffee farmers also hold cattle and/or other animal husbandry to produce organic manure and to improve their income.
- Single stem pruning system are commonly applied by coffee farmers rather than free growth (multiple pruning system).

AGRICULTURAL PRACTICES ON COFFEE (2)

- Application of inorganic fertilizers and pesticides on coffee are very rare (almost none) conducted by coffee farmers.
- Main pests are **coffee berry borer (*Hypothenemus hampei*)** and parasitic nematodes (*Pratylenchus coffeae*, *Radophulus similis* and *Meloidogyne* spp.)
- Main diseases are leaf rust (*Hemileia vastatrix*) and root diseases.



II. CBB PROBLEM IN INDONESIA

CBB IN INDONESIA

- ◆ First noticed in Indonesia was in an estate in West Java in 1909
- ◆ It was found on liberica coffee (*Coffea liberica*).
- ◆ In the beginning of 1919 the whole of West Java was found to be infested by the insect
- ◆ In the end of 1918 the Government Coffee Research Station at Bangelan (East Java) was reported to be infested by the insect too.



INFESTATION LEVEL

- According to Directorate General for Estate Crops high attack of CBB was identified in Flores island which infestation level on Robusta green bean reached up to 21 per cent. For comparison the percentage of holed green bean in East Java was normally less than 5 per cent due to intensive control by sanitation.
- The insect also perform very high infestation (up to 50 % of cherries) on Robusta areas in Southern Sumatra (Lampung, Bengkulu and South Sumatra provinces).
- Data record at the exporter's level in North Sumatra region showed percentage of holed beans of Arabica coffee caused by the insect ranging from 10 to 17 per cent, which must be sorted out as inferior quality.

YIELD LOSS

- Yield losses up to 20.0 % (with a range of 10.0 – 20.0 %).
- National yield losses caused by CBB was estimated minimal 62,500 ton of green coffee equivalent to about 100 million USD per year.
- CBB attack also decreases quality grade.

RECENT PROBLEM ON ARABICA GROWING AREA

- The insect performed significant attack on Arabica coffee growing areas in North Sumatra and Gayo Highland (Aceh) during last 10 years, where the well-known speciality product of Mandheling coffee is originated.
- Total production of Arabica coffee from the two provinces is between 40.000 – 50.000 tons annually representing some 70 % of the total production of Arabica coffee in the country.
- CBB attacks at high level infestation in Arabica coffee growing areas in West Papua (Indonesia). It must be paid highly attention by international community to prevent the insect across the boarder to PNG where still free from the insect.

EFFECT OF CBB ATTACK ON ARABICA COFFEE AT GAYO HIGHLAND OF ACEH (SUMATRA)

Number of beans with one hole per 300 gr

Varieties	Altitude			Average
	Low	Medium	High	
Bergendal	n.a.	n.a.	0.50	0.5
Borbor	40.83	6.67	5.67	17.72
BP 542 A	52.50	9.50	2.00	21.33
C 50	n.a.	2.33	n.a.	2.33
C. Jaluk	7.08	3.33	7.67	6.03
P 88	n.a.	1.83	n.a.	1.83
S 288	1.83	n.a.	n.a.	1.83
S 795	n.a.	7.08	n.a.	7.08
Timtim	15.33	5.00	0.50	6.94
Average	23.52	5.11	3.27	

Notes:
Low (950 – 1,250 m), Medium (1,250 m – 1,400 m), High (> 1,400 m), n.a. (not available).

EFFECT OF CBB ATTACK ON ARABICA COFFEE AT GAYO HIGHLAND OF ACEH (SUMATRA)

Number of beans with more than one holes per 300 gr

Varieties	Altitude			Average
	Low	Medium	High	
Bergendal	n.a.	n.a.	0.50	0.5
Borbor	89.33	1.50	1.17	30.67
BP 542 A	84.00	8.17	2.00	31.39
C 50	n.a.	0.50	n.a.	0.5
C. Jaluk	13.75	6.83	0.17	6.92
P 88	n.a.	0.50	n.a.	0.5
S 288	2.33	n.a.	n.a.	2.33
S 795	n.a.	0.58	n.a.	0.58
Timtim	19.83	2.17	0.00	7.33
Average	41.85	2.89	0.77	

Notes:
Low (950 – 1,250 m), Medium (1,250 m – 1,400 m), High (> 1,400 m), n.a. (not available).

III. PROGRESS ON CONTROL METHODS TO SUPPORT IPM APPLICATION

1. CULTURAL CONTROL

(a). Sanitation

- To decrease insect population
- Suitable for in coffee growing areas having strictly dry season → crop season in short period.
- Conducted by removing damaged berries, all rest berries on the tree and the falling berries after harvesting. Very labour intensive, difficult to be applied at smallholders.
- Very effective in big estates which implement good management practices.
- Suppressing pest infestation significantly, from 40 – 90 % to become 0,5 – 3 %.

(b). Management of coffee and shade trees.

- Avoid dark condition, it is very suitable for CBB development

2. BIOLOGICAL CONTROL (a)

a. Manipulation of indigeneus predators

- Indigenous CBB predators such as swallow birds, ant (*Crematogaster* spp.), and sucking bug (*Dindymus rubiginosus*).
- Swallow bird is very effective for preying adult CBB during flying stage, namely between 4:00 and 6:00 p.m.
- The predators have not been manipulated yet in controlling CBB.

b. Releasing parasitoid

- Indonesia introduced two parasitoids from Africa : *Prorops nasuta* and *Cephalonomia stephanoderis*, so far only *C. stephanoderis* still exist but very difficult for commercial use.
- The parasitoids mainly kill the pupae stage of the CBB.
- The main constraint in mass production of the parasitoids is dependence on availability of the CBB.

2. BIOLOGICAL CONTROL (b)

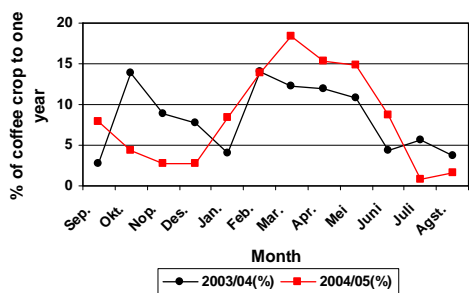
c. Spaying parasite (*Beuveria bassiana* fungus)

- Bb is an entomopathogenic fungus.
- Field trial in South Sulawesi revealed that the fungus control CBB effectively by suppressing infestation up to 74.3 % - 82.1 %.
- Recently ICCRI produces pure spore of Bb for controlling CBB, it only needs 100 g pure spore per application per ha.

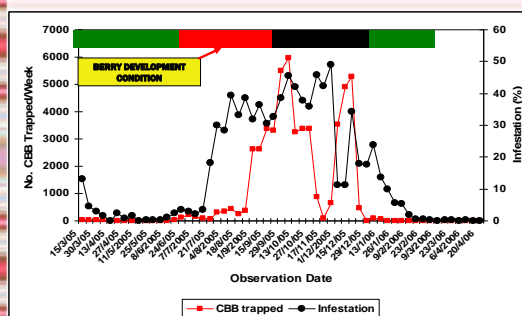
3. USE ATTRACTANT TO TRAP ADULT CBB

- Insect trap could be used as a tool for monitoring and controlling the pests.
- For CBB problem, it can be used for controlling method by applying mass trapping.
- Very specific, mainly catch the CBB insects only.
- Significantly suppress the infestation of CBB and environmentally sound.

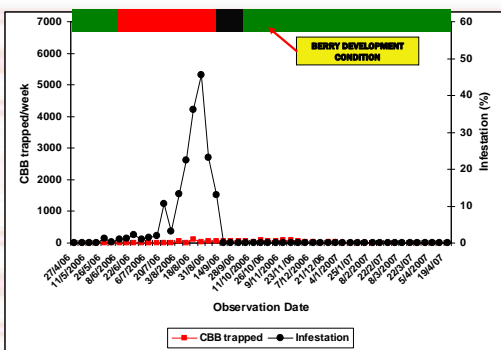
CROP FLUCTUATION OF ARABICA COFFEE IN SIBORONG-BORONG SUBDISTRICT, NORTH TAPANULI (SUMATRA)



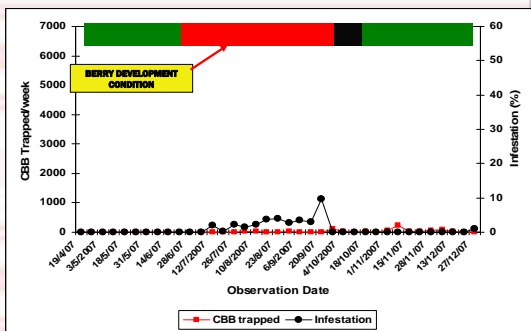
EFFECT OF ATTRACTANT ON CBB TRAPPED AND INFESTATION (HARVESTING YEAR 2005)



EFFECT OF ATTRACTANT ON CBB TRAPPED AND INFESTATION (HARVESTING YEAR 2006)



EFFECT OF ATTRACTANT ON CBB TRAPPED AND INFESTATION (HARVESTING YEAR 2007)



IMPLEMENTATION OF IPM

- IPM application is considered to be the best approach to control CBB in Indonesia.
- A number of IPM components already been developed by ICCRI.
- Social constraint will be a key issue in large scale implementation of IPM at smallholder coffee.
- A study to develop an appropriate model in implementing IPM on CBB should be carried.
- Capacity building is needed at the grower level, especially smallholders.

THANKS YOU