

Pesticides for cocoa: Saviour, interim Solution or Side-track?

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) RPB: Pestic_Paris06: v.1.1



MARS
incorporated

Developing Good Agricultural Practice (GAP) in cocoa

- Many cocoa farmers decide to use pesticides
- ...some of which (especially insecticides) are toxic
- They are often applied highly inefficiently
- The fastest, most obvious way to mitigate this situation is:
 - better selection of control agents
 - more efficient application

Pesticides: the issues

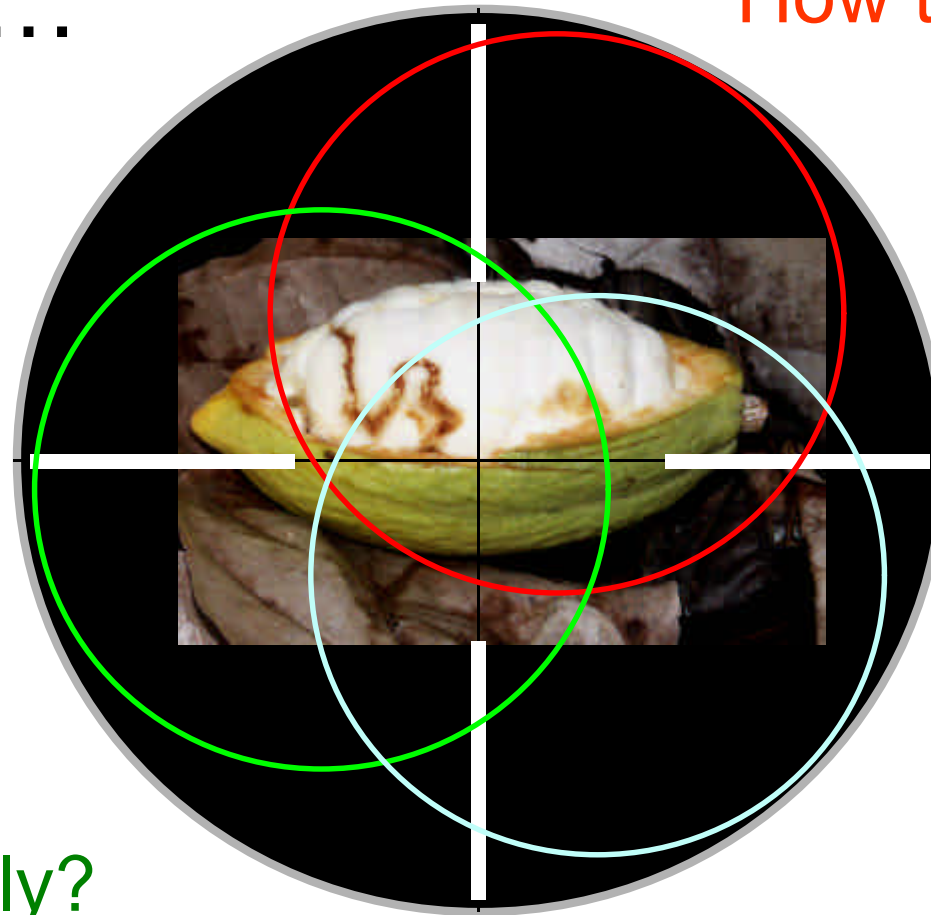
- Residues, MRLs
Withdrawal of traditional compounds under EU/91/414 *etc.*
 - What do we replace them with?
- Application: operator safety
Farmers' skills
(cost effectiveness)
- Environmental concerns (perception and actual impact)



Scientific Approach: Rational Pesticide Use (RPU)

targeting ...

How to spray?



What to apply?

When?

Collaborators: Field sites

Ecuador: INIAP

Moniliophthora (2 spp.)

Brazil: CEPLAC, Almirante

M. perniciosa

Costa Rica: CATIE/CABI

M. roreri

Cameroon: IRAD

P. megakarya

Ghana CRIG ?

Mirids ?

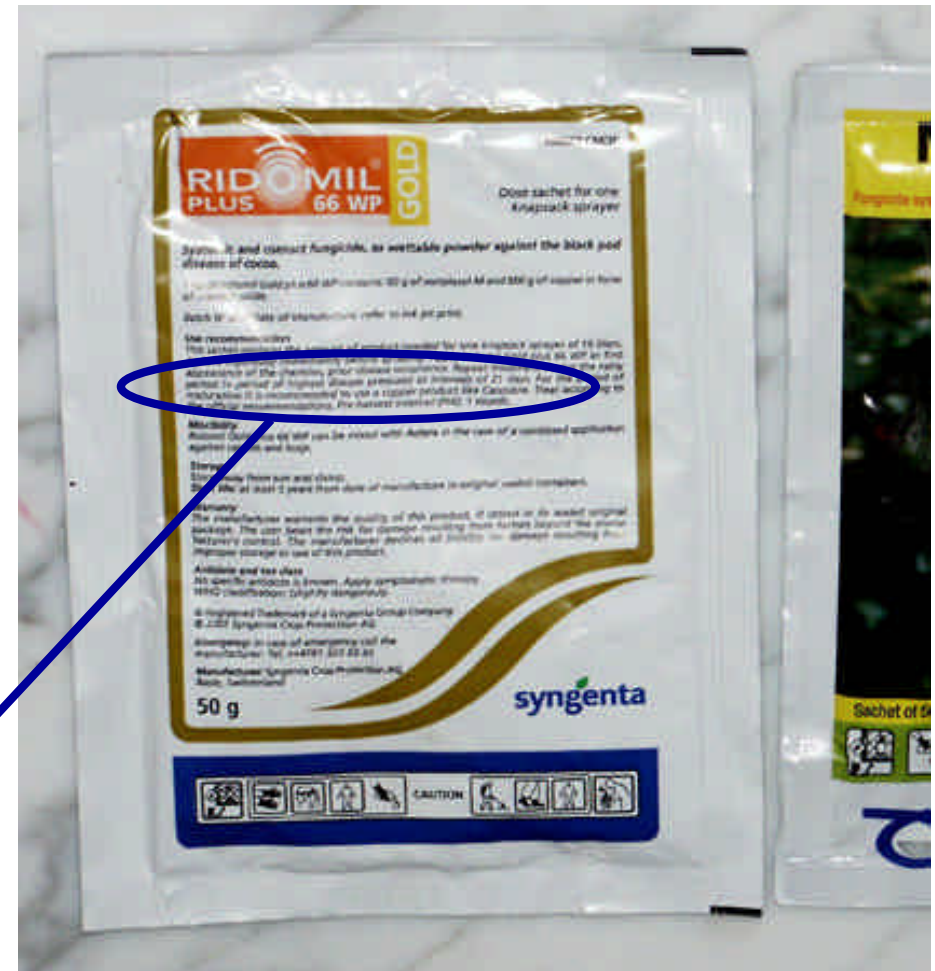
Indonesia: Prima, Sulawesi CPB

BLRS Sumatra CPB + *Helopeltis*



- Developing capacity to improve local production, formulation and application of bio-control agents
- Application and evaluation of chemical control agents

Black pod fungicides: PHIs, residues, costs?



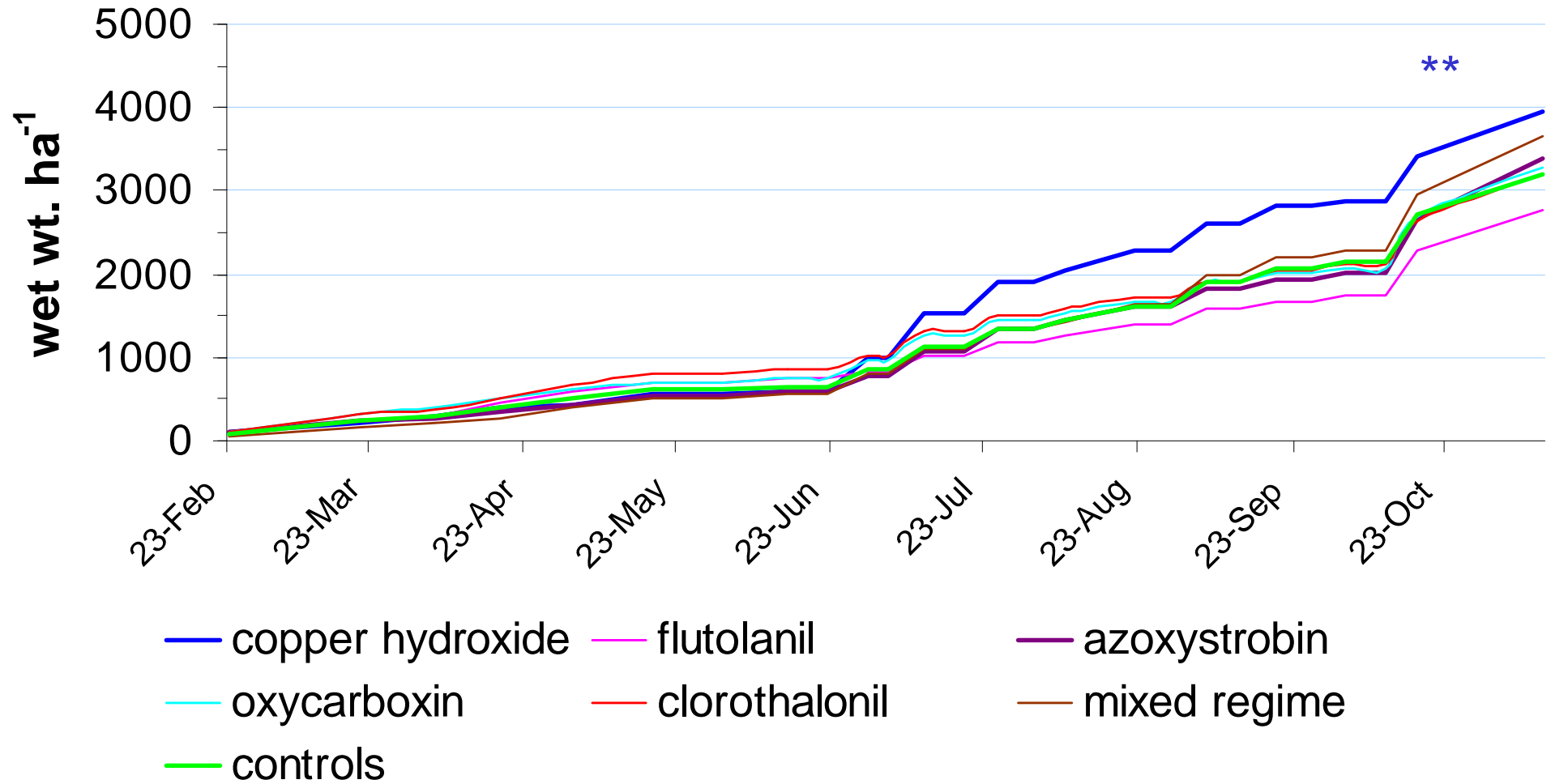
do not use within 30 days of harvest

INIAP 2005 / 06

- Evaluation of chemical and biological agents on *Moniliophthora* diseases
- Active spore traps to improve timing of application?



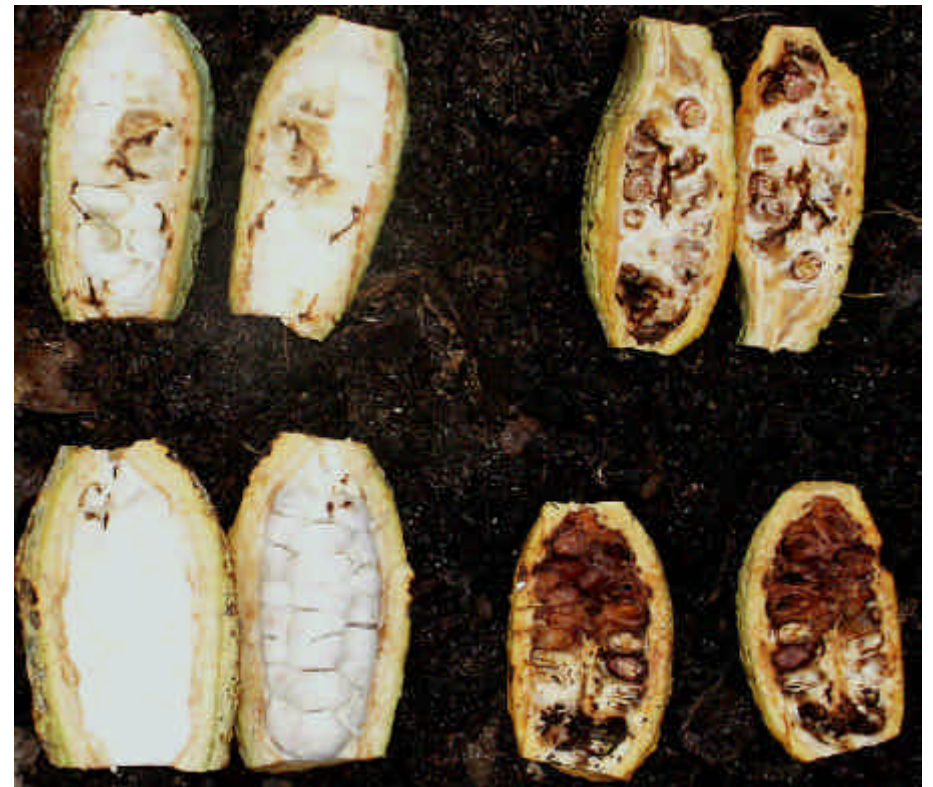
Rio Lindo 2005: wet weight



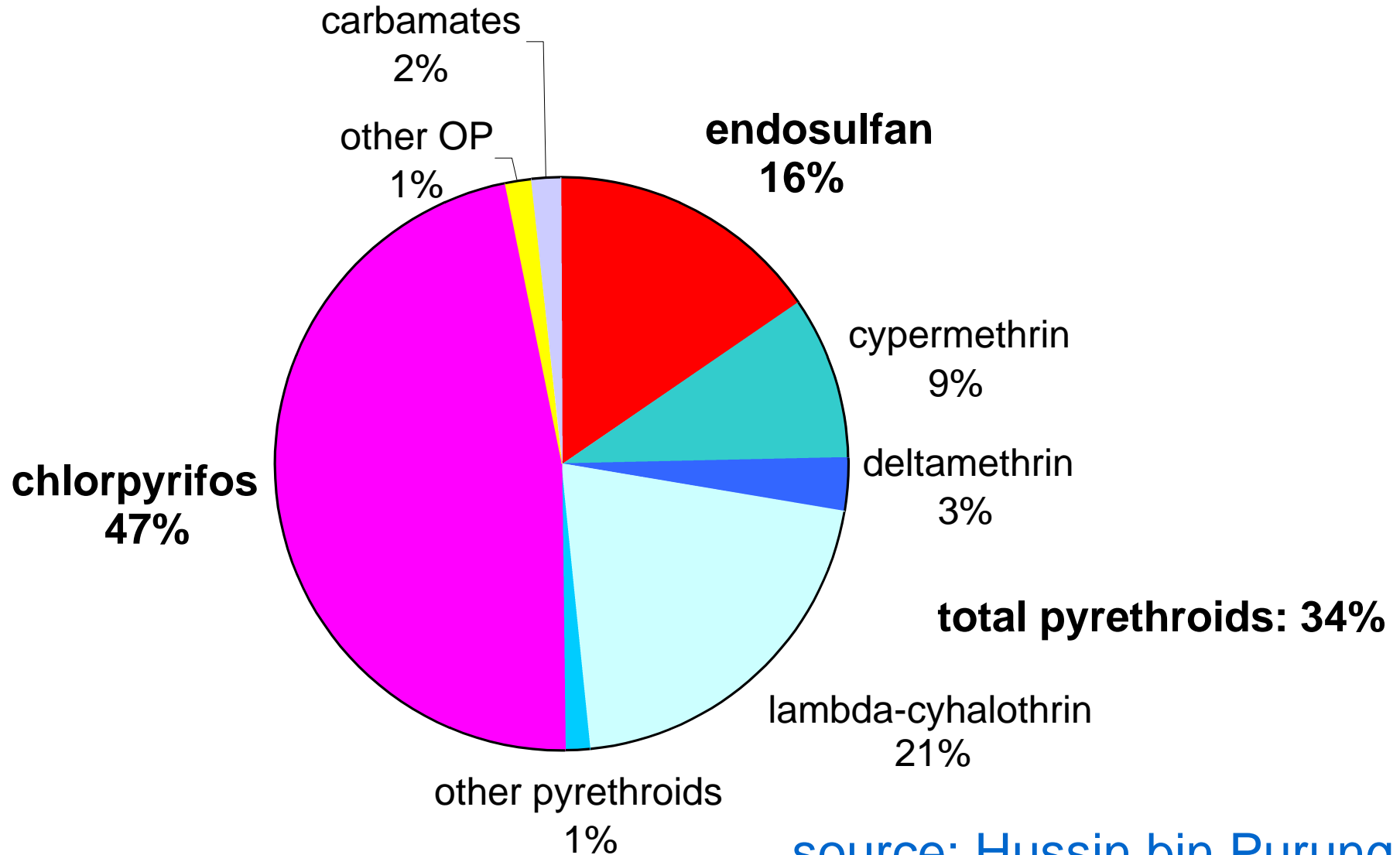
** : copper hydroxide (c.f. controls): increase in dry wt. 283 Kg
 if value = \$377; total costs = \$149 (\$45 fungicides)
 Profit = \$228 / ha (benefit / cost = 2.7)

CPB: the Rational Use of Insecticides

- “pesticides are ineffective at reducing [CPB] infestation”
- 92% of Sulawesi farmers (that spray insecticides for CPB) can't be wrong ...
- ... or can they?



Insecticides that Sulawesi farmers spray



source: Hussin bin Purung

Field trial pre-requisites

- 🍌 Even stand of crop
- 🍌 Very good infrastructure
- 🍌 High pest population

Factorial:

- insecticides x application methods (+ controls)
- 2 stat. blocks (= divisions)

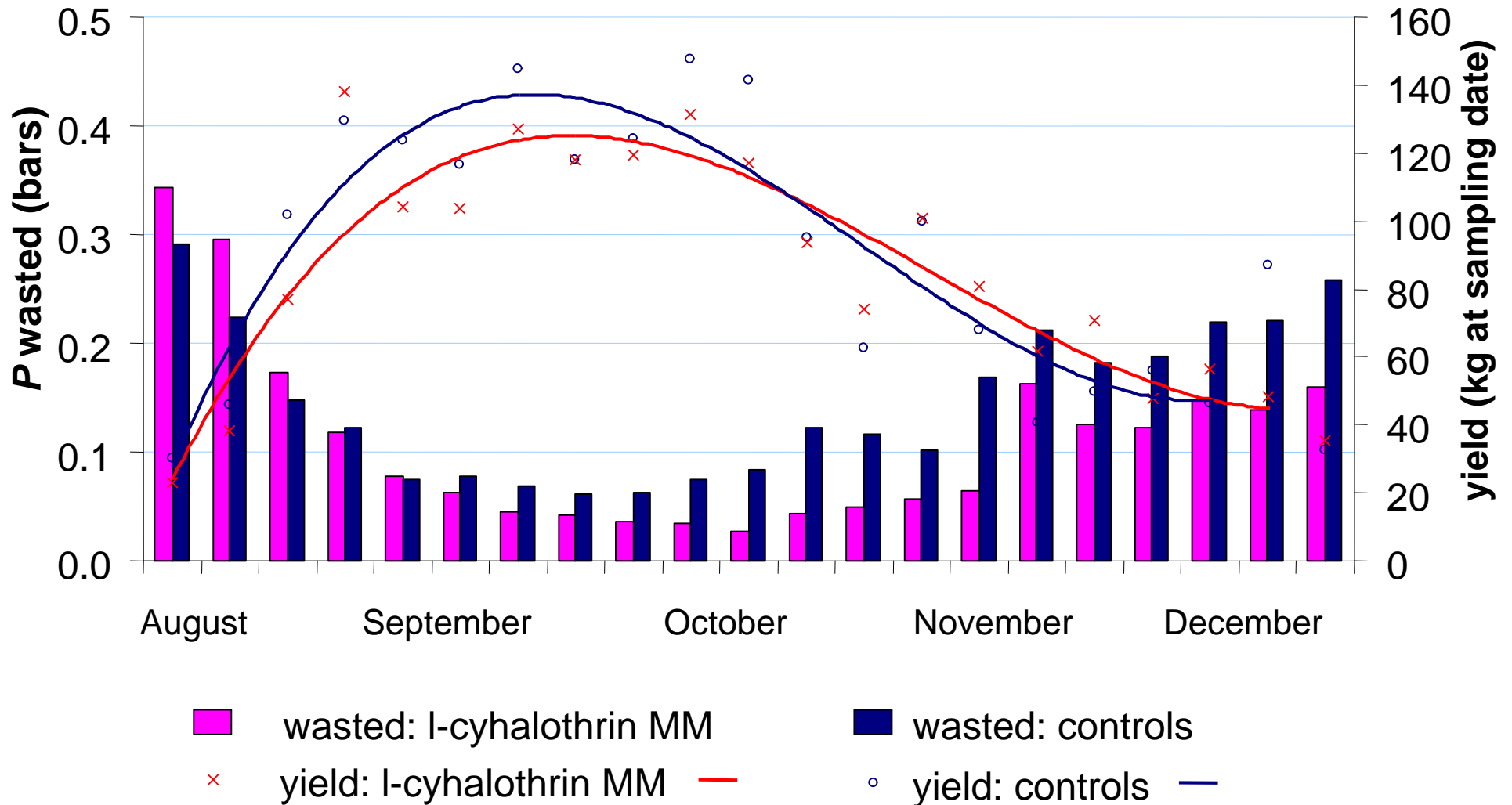


Factorial treatments

- Application:
 - Side-lever knapsack (SK)
 - Motorised mistblower (MM)
- ☀ Insecticides:
 - ☀ lambda-cyhalothrin (Matador)
 - ☀ flufenoxuron (Cascade) “IPM”

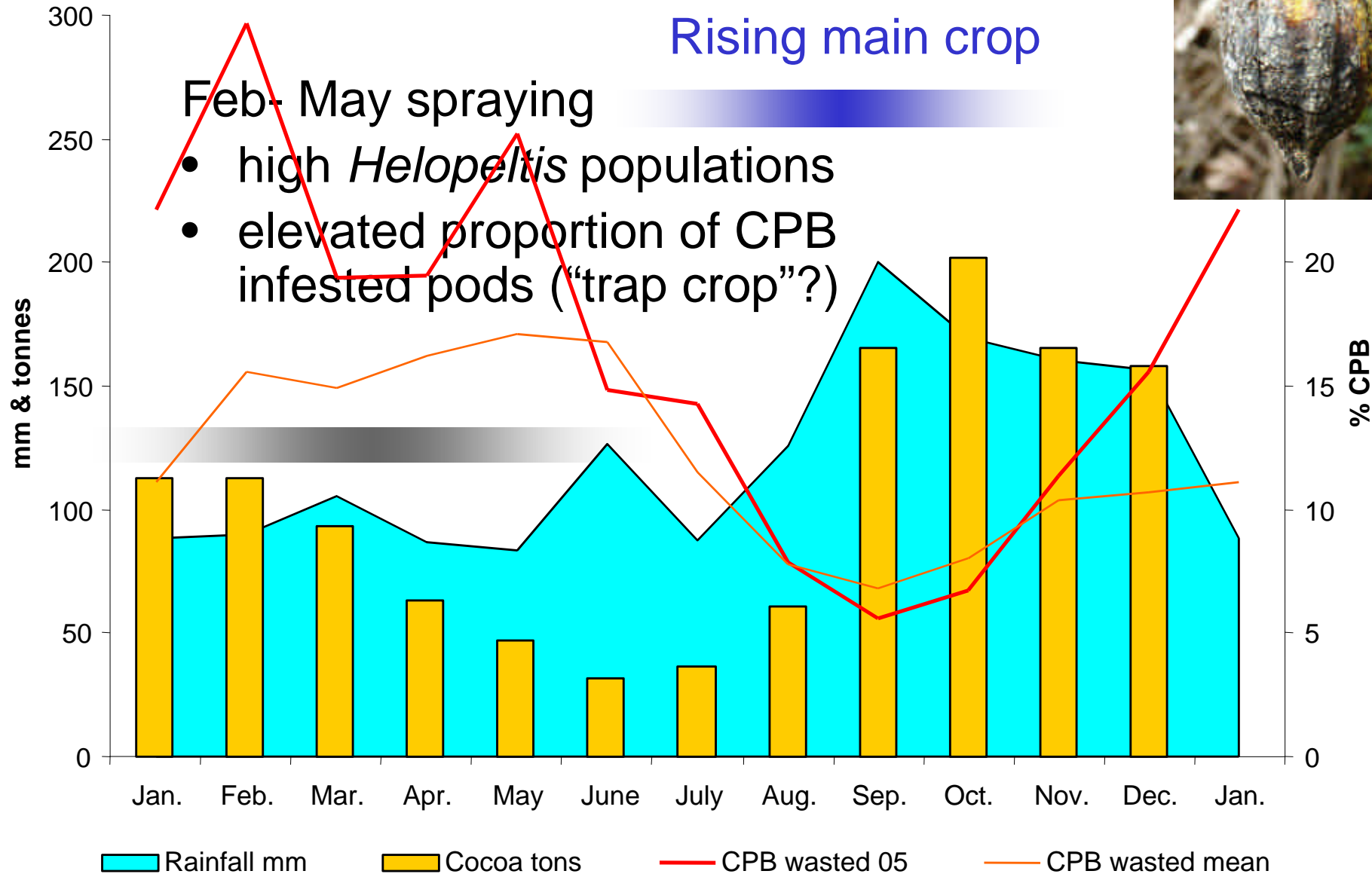


Rambong Sialang: proportion wasted & yield

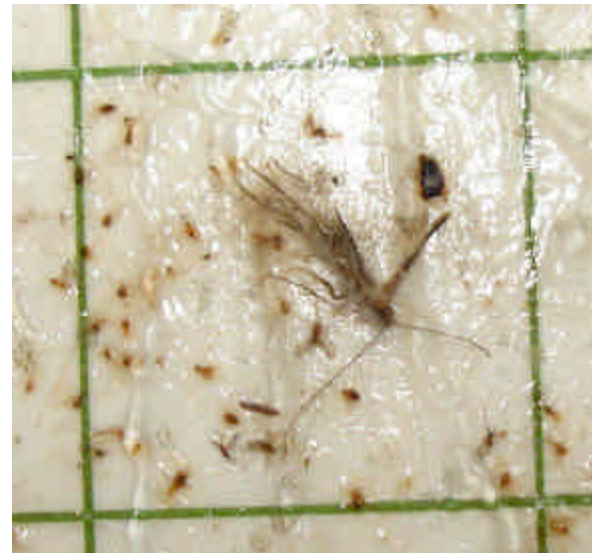


Rain - crop cycle

Rambong Sialang: 10 year means



Monitoring with pheromones



Evaluations at:
Prima (Sulawesi)
BLRS (Sumatra)

Trial design: overview

factorial treatments to provide narrative on the relative efficacy of pesticide intervention strategies (and their cost effectiveness)

Broad spectrum (BS) insecticide Motorised mistblower (MM)	IPM agent: low toxicity & “soft” on NEs * Motorised mistblower	Control 1 (2005) “Toxic standard” - continuous paired sprays (from Mar. 06)
Broad spectrum insecticide Manual (LK) sprayer	IPM agent * Manual (LK) sprayer	Control 2 <u>Always</u> untreated

Pyrethroid

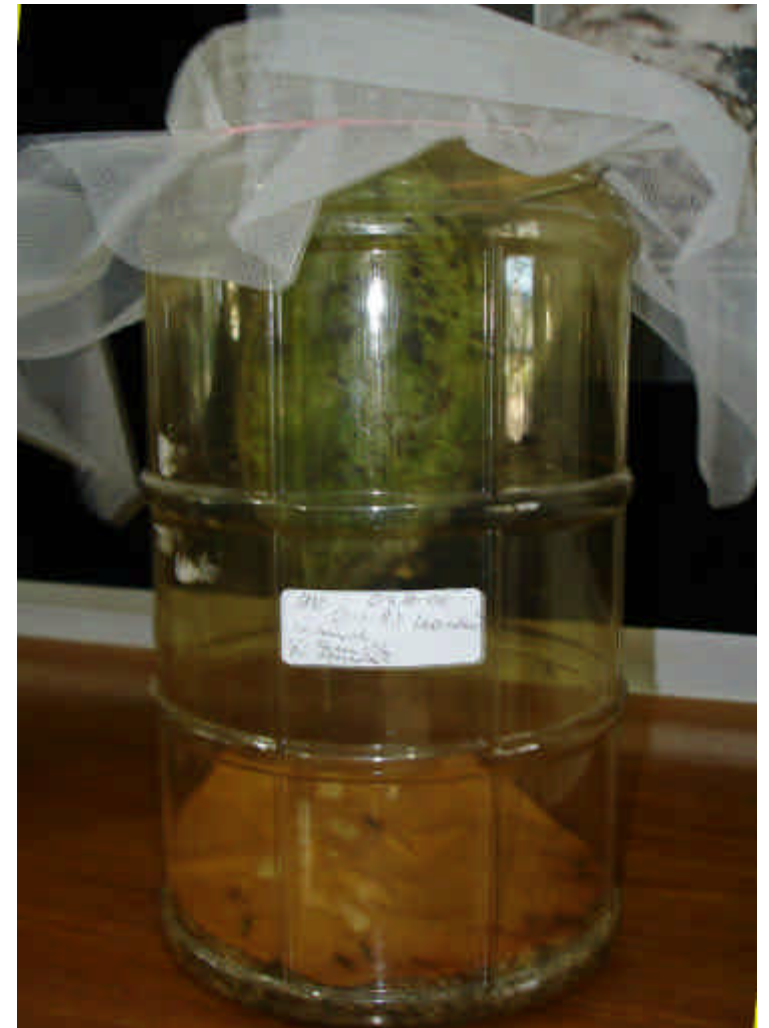
If not IGR (flufenoxuron) then what?

Collaborative Bioassay network



Bioassays: the search for molecules and microbial agents

- Sharing (standardising) techniques:
- Insect rearing
- Application & assessment protocol
- Lab to field?



Conclusions (needs & opportunities)

- There is much to learn about the role of modern pesticides in IPM (“research vacuum” for 20 years).
- Are fungicides/insecticides cost effective in cocoa?
- Insecticides (against mirids, CPB *etc.*): perhaps the greatest priority for operator safety, residues, *etc.*
- Application: some practical research/evaluation needs, but mostly implementation / extension.
- Is application taking place at the right time?
 - monitoring with pheromones for CPB?
 - Active traps / assays for *Moniliophthora* spores
- => identifying effective measures for Good Agricultural Practice