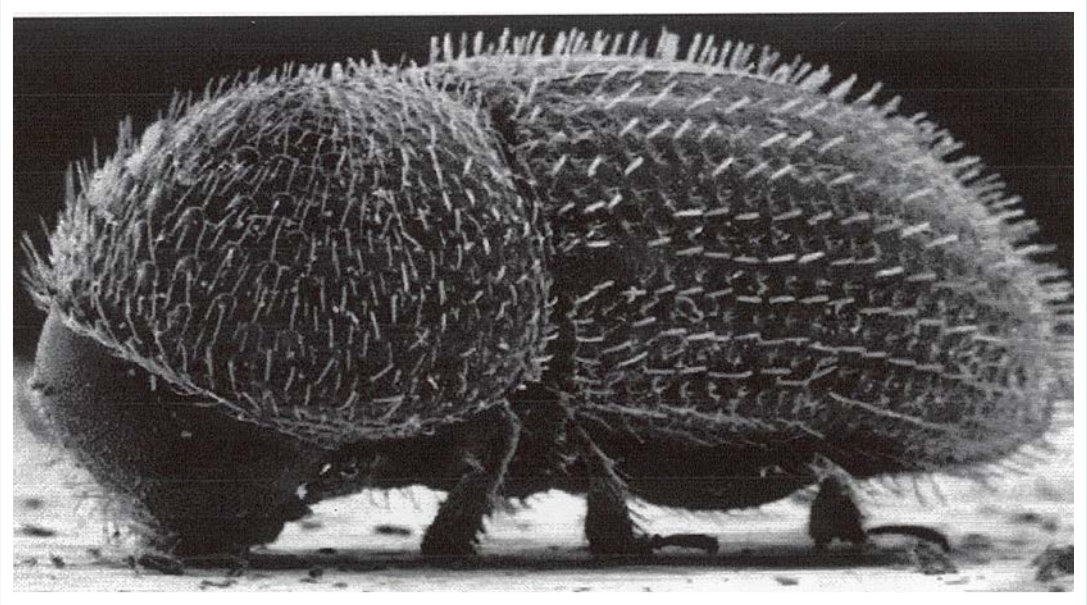
INTEGRATED PEST MANAGEMENT OF CBB

(*Hypothenemus hampei* Ferr. 1867)



Ing. Juan Carlos Araya Vega.

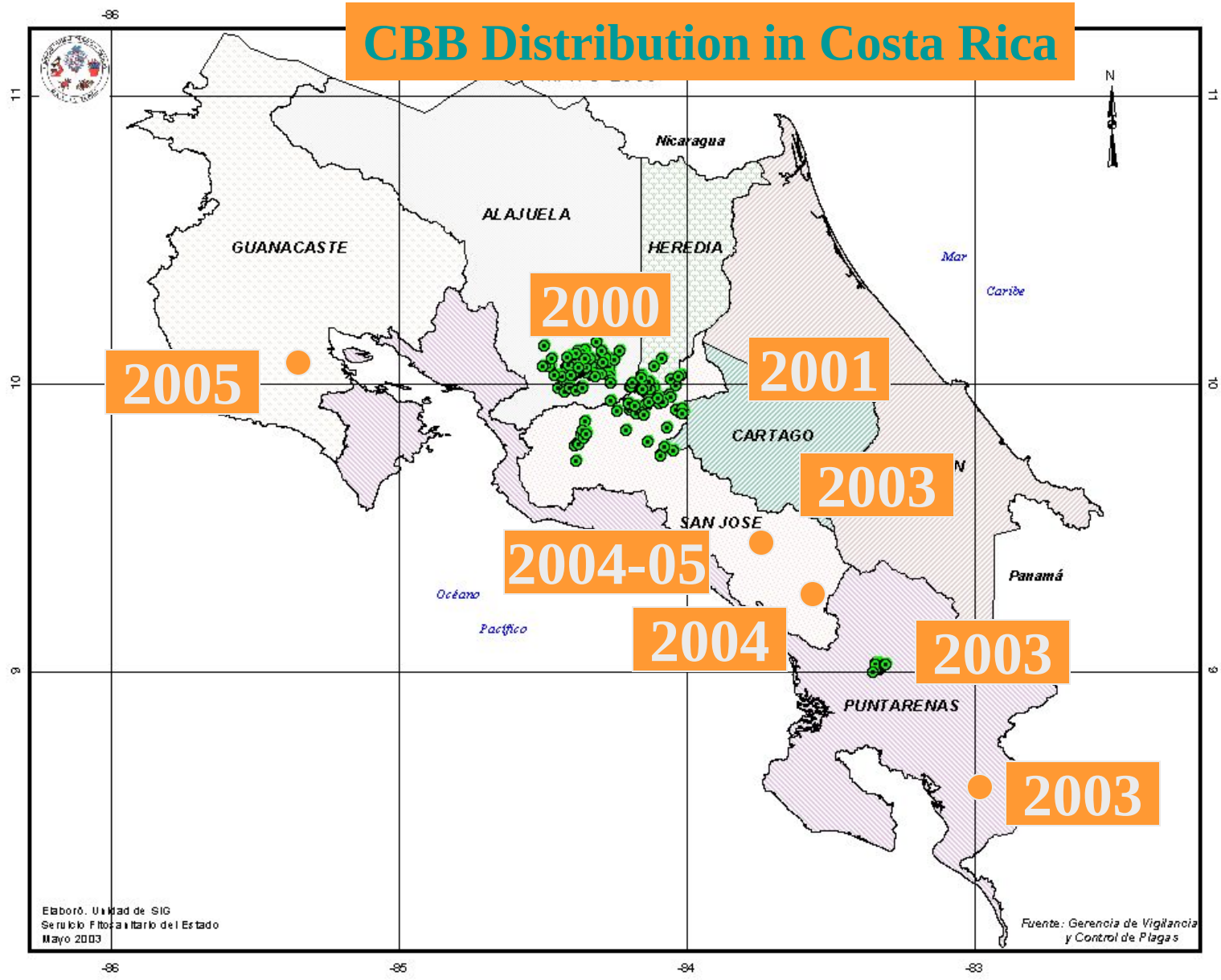
Translated 2010 by PePe Miranda

May, 2007.

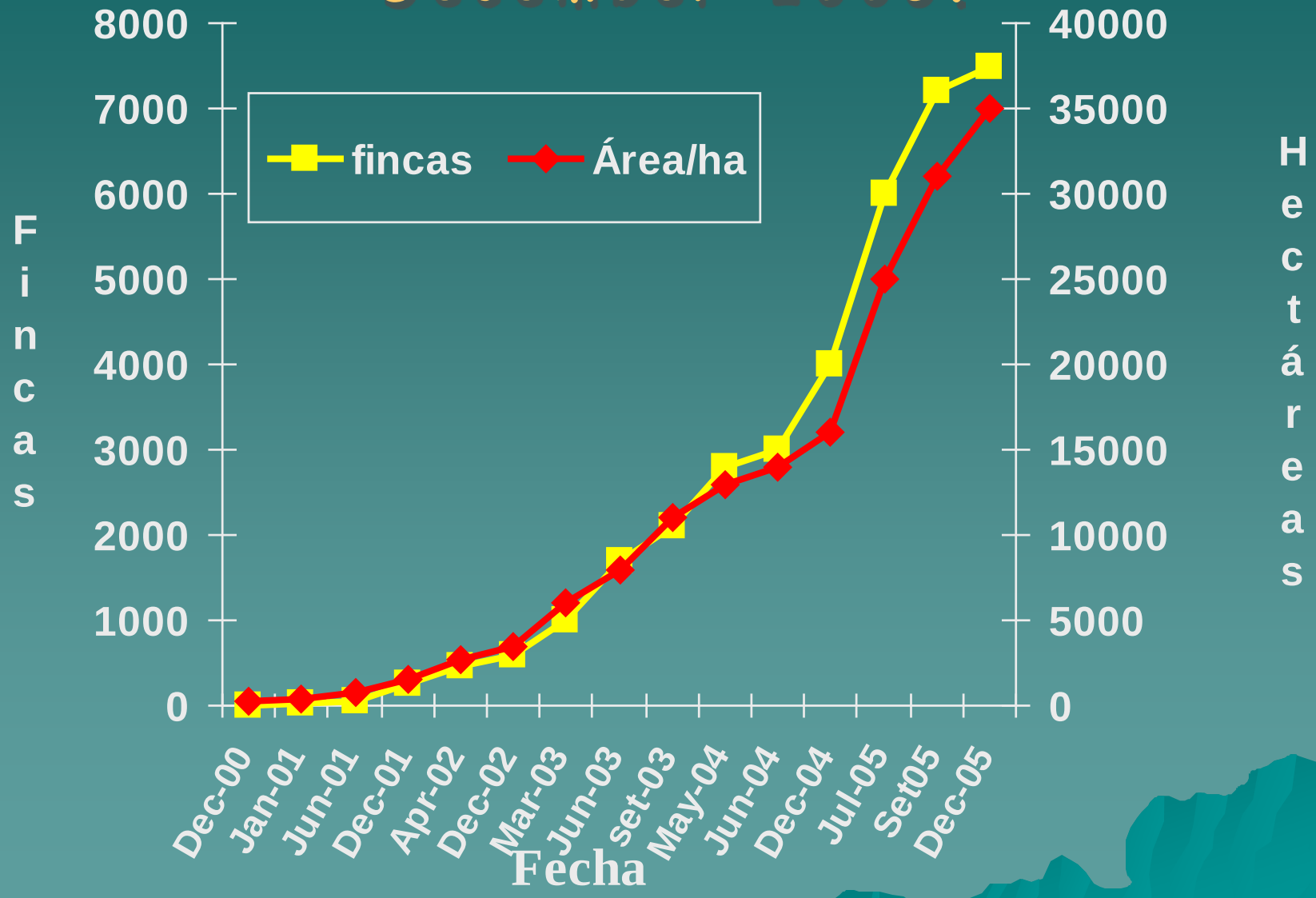
Control

- CBB Biology & attack
- IPM
  - Cultural Practices
  - Ethological
  - Biological
  - Chemical

CBB Distribution in Costa Rica



Number of farms and area with CBB . December 2005.



GENERAL ASPECTS

- Very small insect, with fast reproduction and high adaptation to different climates.
- Most important Plage for Coffee in the World.
- It can bring loss of more than 50%.
- It will elevate production cost and processing

DISCRIPTION

- Coleoptera: Curculionidae (Scolytinae)
- Color black
- Size: aproximate 2 mm
- **The Female penetrate the fruits and deposit from 60 to 75 eggs**
- **The temperature is very important for the development of these plague.**

LIFE CYCLE

Larvae

Pupae

Adult

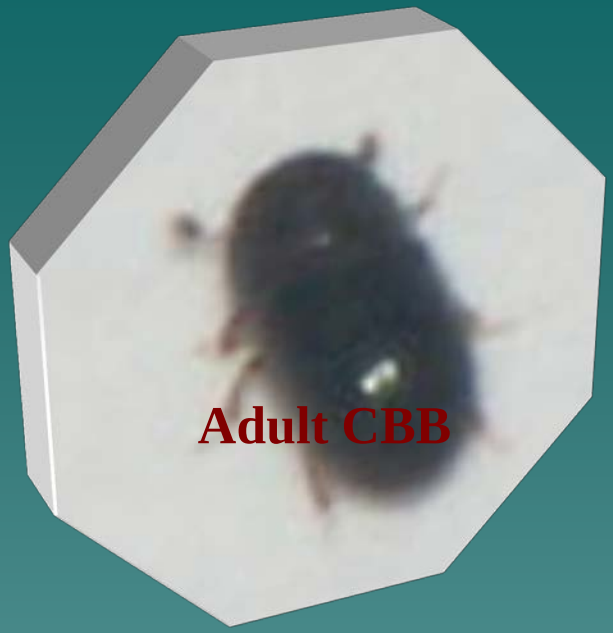
Eggs

Temperature Effect

	Temperture (° f)	
Stage	**66.2**	**82.4**
Egg	16,4 days	4,6 days
Larva	40,8 days	11,1 days
Pupa	19,1 days	4,5 days
Young Adults	8,5 days	4,5 days
Total	**85,0 días**	**28,0 días**

Infestation

- Start from 40-50 days after blooming or flowering
- The penetration will be by the bottom or belly bottom of the fruit
- Racings will be attack any where
  Larvae will developed inside of the fruit and together with the adults will cause the damage



Adult CBB

CBB on a bean

Eggs

CBB penetrating

IT WILL CAUSE THE FOLLOWING DAMAGE

- Early falling of fruits (5-24%)
- Loss of harvest convertion(2-25%)
- Loss of quality cup
- Increased in production cost and processing
- Contamination risk of microorganisms

Keep track of flower or blooming















Integrated Pest Management

Chemical Control

Insecticide

Biological Control

Application *Beauveria bassiana*

Ethological Control

Installation of traps after stripping & pruning (monitoring)

Cultural Control

Pruning, shoot selection, shade control, weed control, fertilization Program

Stripping, Stripping, Sanitation, Sanitation

1

Stripping sanitation

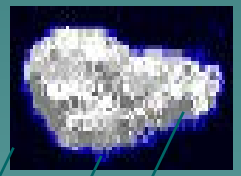
Collect Infested Cherry

Before they fall

Irregular flower

Rain fall

Rain fall



Stripping sanitation

JAN FEB MAR APR MAY JUN JUL AUG SET OCT NOV DEC

THE INFESTED BEANS

- **Will be removed from the field and destryed ASAP**
- **In plastic bags 4ml.**

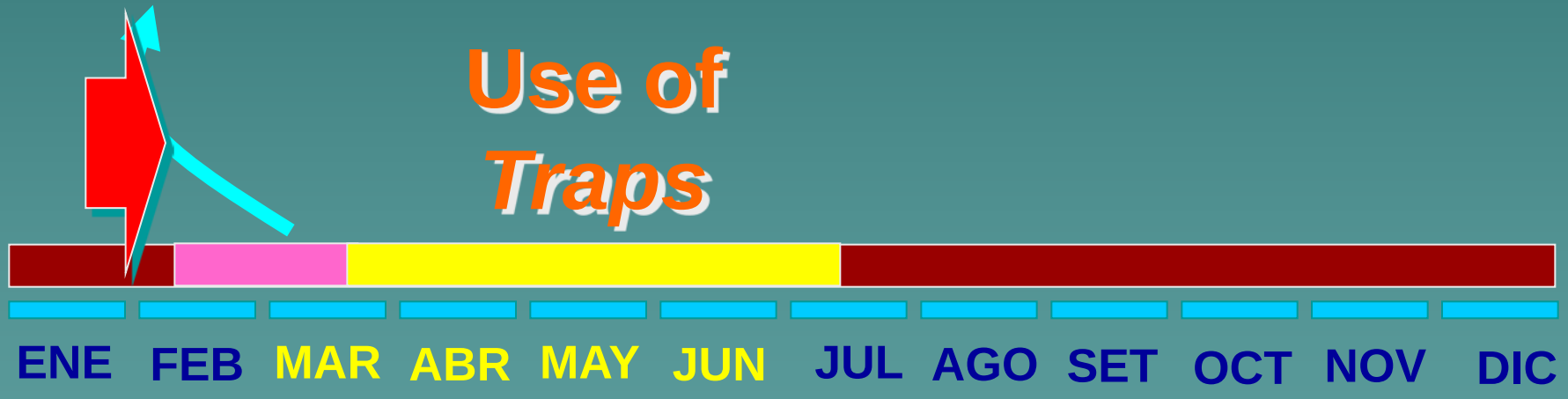
ETHOLOGIC CONTROL

3

Traps

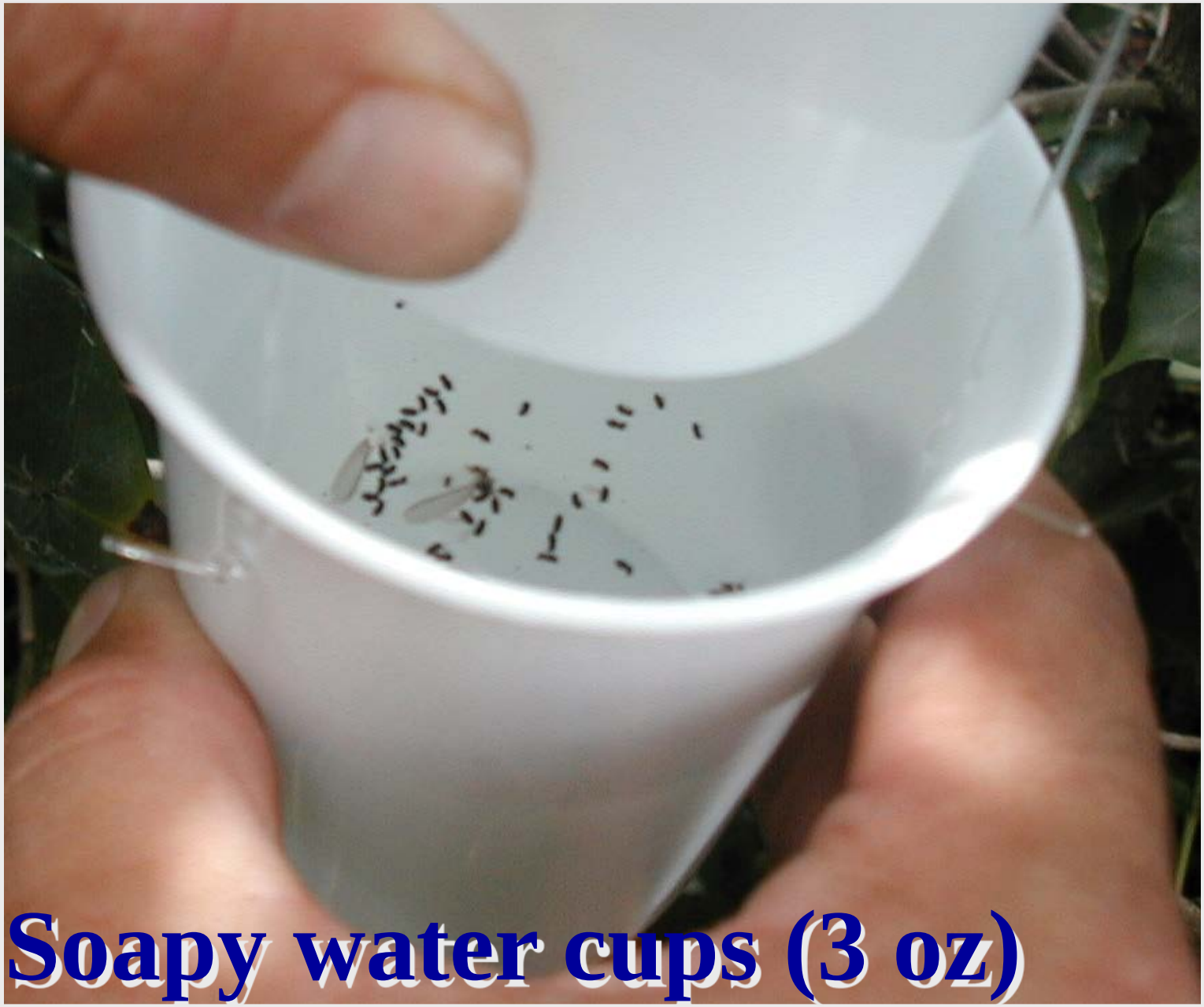
PLACE THEM AFTER PRUNING

Pruning



5 traps per acre

Clean traps every 2 weeks



Soapy water cups (3 oz)

BIOLOGICAL CONTROL

4

Beauveria bassiana

FUNGUS *Beauveria bassiana*

Fungus with white mycelium
Kill CBB in 3 to 9 days
It is present naturally
Affecting in climatic condition

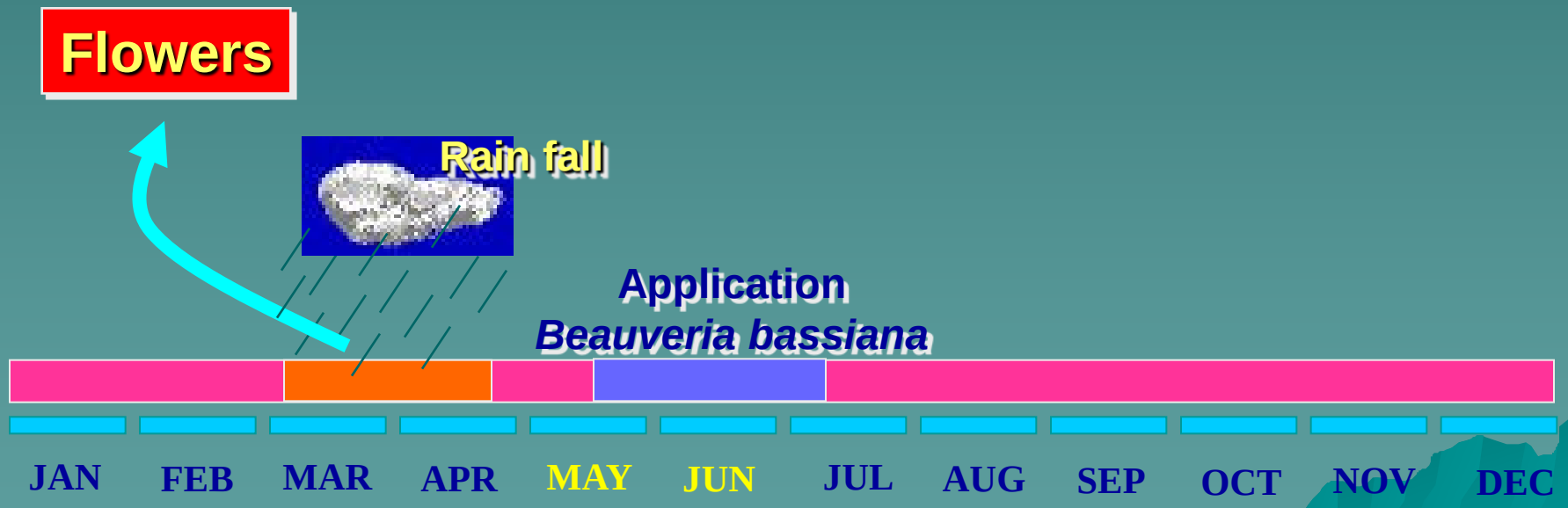
PERIOD TO KILL CBB: 3 to 6 days at 100 % and 9 days with 70 to 80 %

NATURAL CONTROL

Beauveria bassiana

Application Time

2.5 months After the principal flower

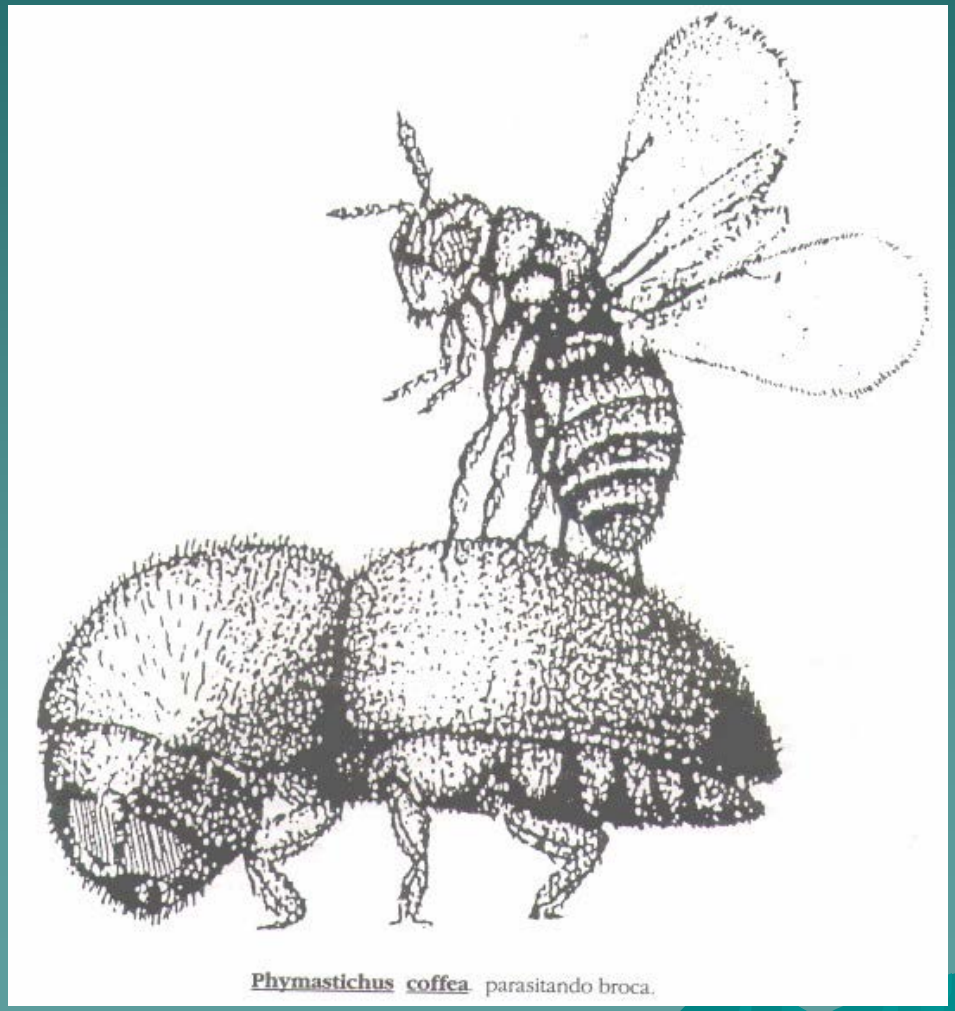


HOW TO APPLY IT?

BOTANIGARD ES
MYCOTROL
B. bassiana

1 Quart per acre

PARASITOID & DEPREDATORS ESPECIPHICS FOR CBB



Phymastichus coffea parasitando broca.

5

PARASITOIDES CARACTERISTICS

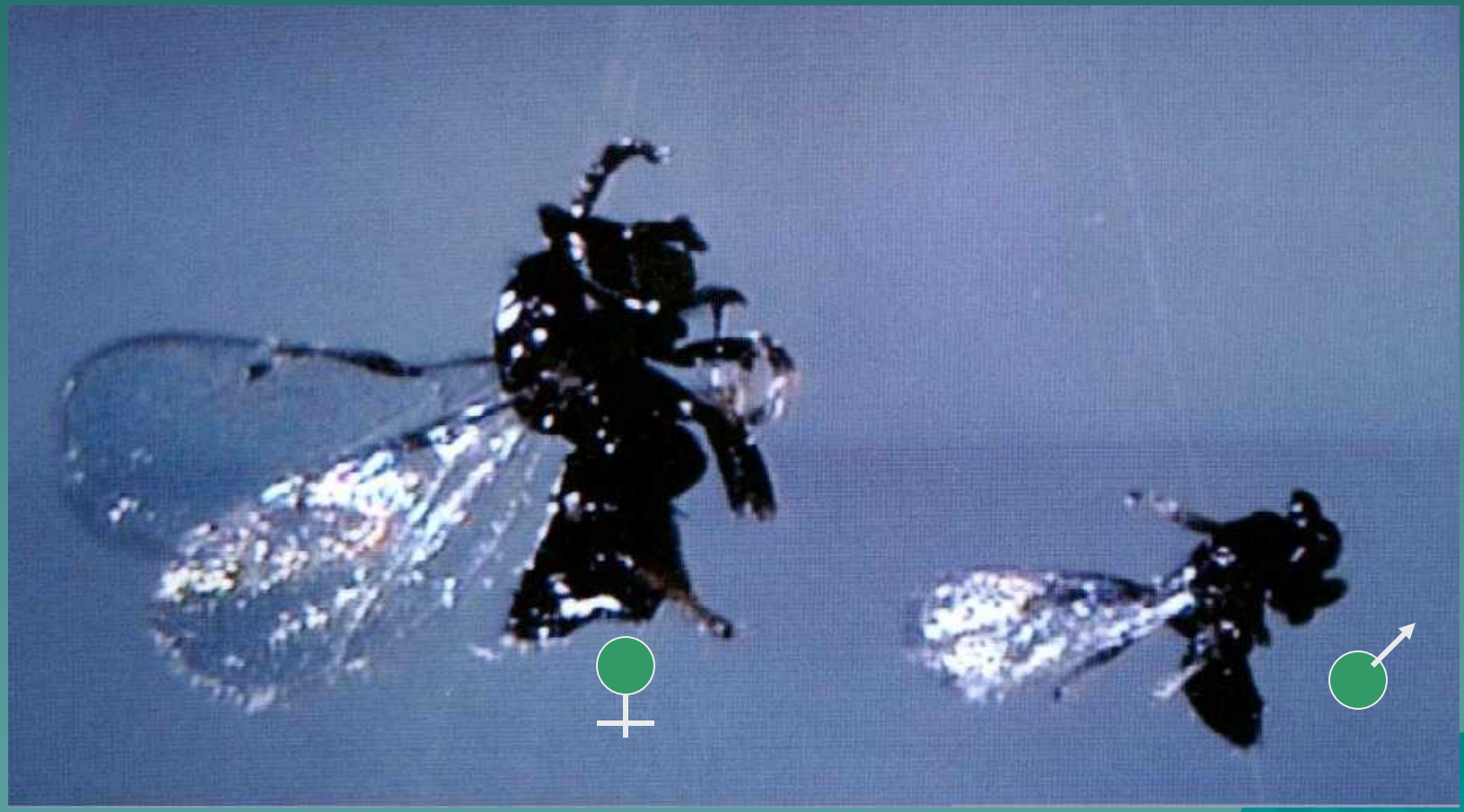
Insect	Life Cicle	Actio n	Caracteristics
Prorops nasuta	17-33 days Dependin g of temperature	Parasit to larvaes & pupas Deposit eggs, larvaes & adults	Female deposit one egg into larvies
Cephalonomia stephanoderis	18 days 25 ° C	Simillar to *P. nasuta*	Similar to P. nasuta
Phymastichus coffea	20-25 days 25,6 ° C	Parasit adults CBB	Deposit 1 or 2 eggs in CBB borrreing

Cephalonomia stephanoderis
Female & Male

Prorops nasuta
Looking for a host (Pupa)

Prorops nasuta
CBB Larvae

Phymastichus coffea
Female & Male



Phymastichus coffea Female Infesting a CBB

Larvaes *P. nasuta* parasiting CBB larvaes

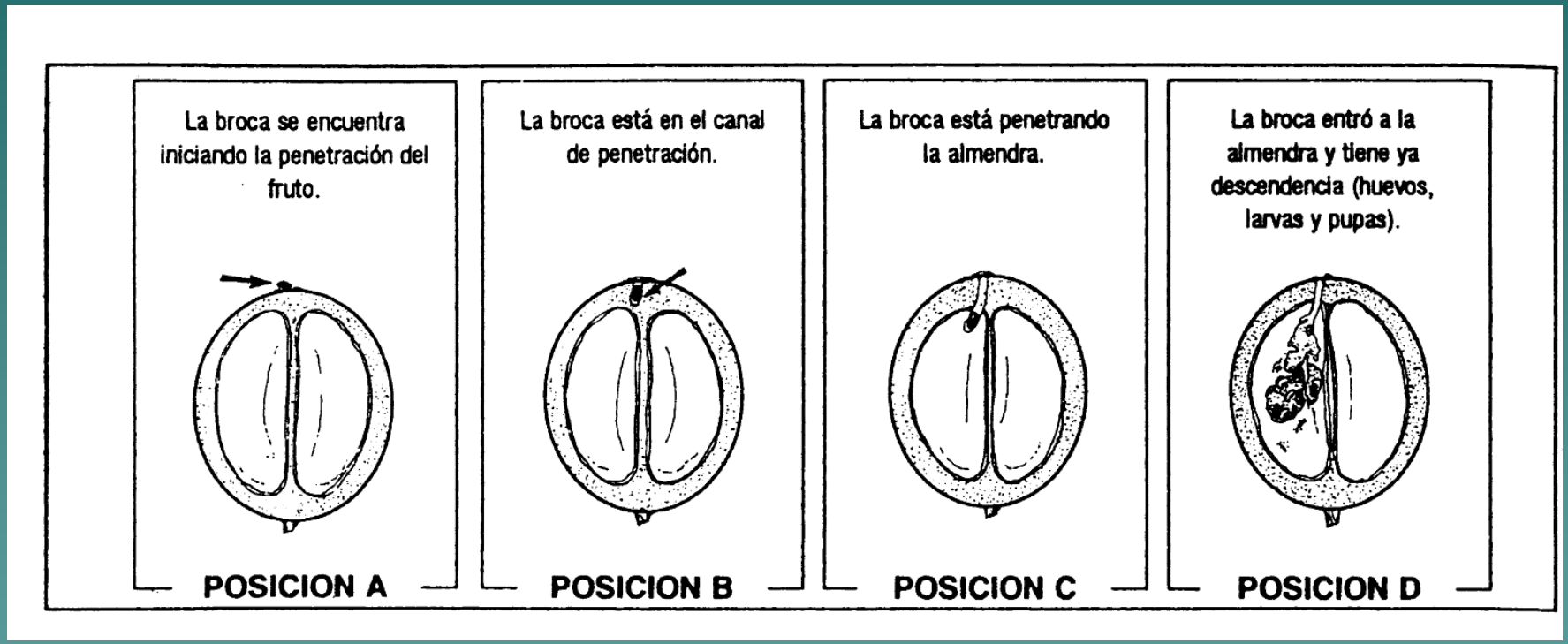
P. coffea parasiting a female CBB

Adult *P. coffea* emerging from a dead CBB

Chemical CONTROL


6

Application of Insecticide or *B. bassiana*



April-Jun

In position D control will be invane

INSECTICIDE CHARACTERISTICS

Product	Family	Ribbon	Toxicology	Action
Endosulfan	Organo clorade	Yellow	Moderate Dangeruous	Contact & ingestion
Clorpiripho s	Organo phosforai d	Yellow	Moderate Dangerous	Contact & ingestion
Fipronil	Pirazol	Yellow	Moderate Dangerous	Contact

These may not be approved for use in Hawaii!

Chemical Control Convertion

Product	Comercial	Rate Ha	Cost (¢)	Cost ¢/Ha
Endosulfan	Thiodan 35 CE	1,5 L	4 500 /L	**6 750**
Clorpirifos	Lorsban 48 CE	2,0 L	5 400 /L	**10 800**
Fipronil	Regent 20 SC	0,3 L	8 000 /100 cc	**24 000**

Application with 600 L/Ha

Negatives Aspects from Endosulphan

- Highly toxic (according to many Researchers)
- Create Resistence
- No antidote avaliable
- Ecologic Unvalance
- Intoxications

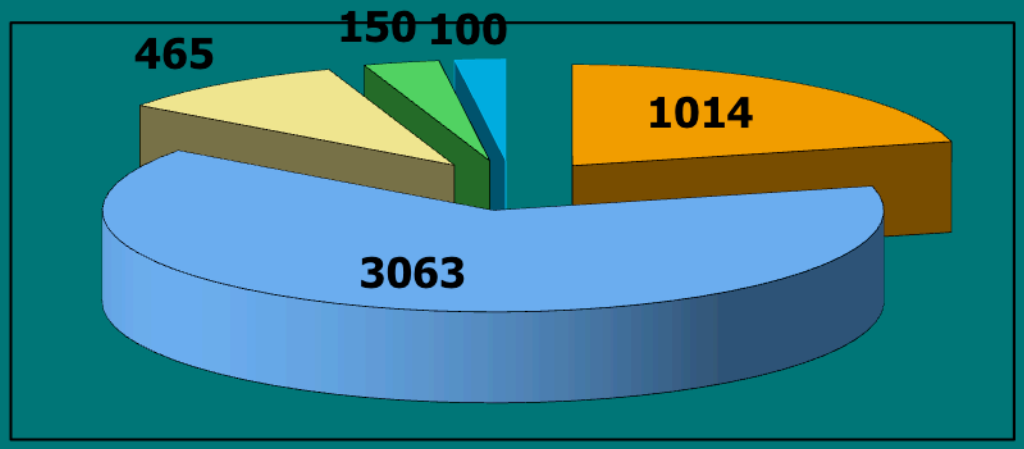
Field Monitoring

- Divide farm in even fields.
- Take 20 samples (one lateral) in 20 fields.
- Count total of green fruits and infested green beansfor each field for each field.
- Calculate Infestation percentage:
- % Infestation = infested/total X 100
- Locate fields with higher attac.
- Apply the most practical control measurement

CONTROL Investment

CBB Management COSTS
¢/fanega (40 Fan/Ha)

Updated in May, 2005



Collection: 3 Fan/Ha (If not done with Re-collection recolección)
Re-collection Sanitation: if there are more than 5 fruits per tree
Source: ICAFE, Region Pérez Zeledón

MANAGEMENT OF CBB
(40 Fan/Ha)

¢1 264/Fan: Collection & Re-collection during Harvesting

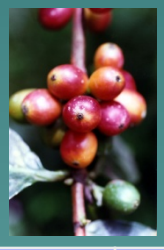
¢4 327/Fan: Re-collection(sanitation) during Harvest.

¢4 792/Fan: With out Sanitation & Recollection during Harvest.

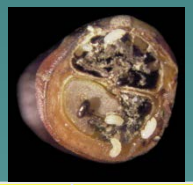
CBB Fluctuation in population during a year

CBB cycle related to the Coffe prodduction Cycle

CBB inside fruits



CBB resting in fruits remaining on the ground & trees



Sporadics rain falls: originin pics of CBB migration

Infestation of New Harvest

Nov.	Dic.	Jan	Feb.	Mar.	Ap.	Ma.	Jun	Jul.	Ag.	Sept.	Oct.

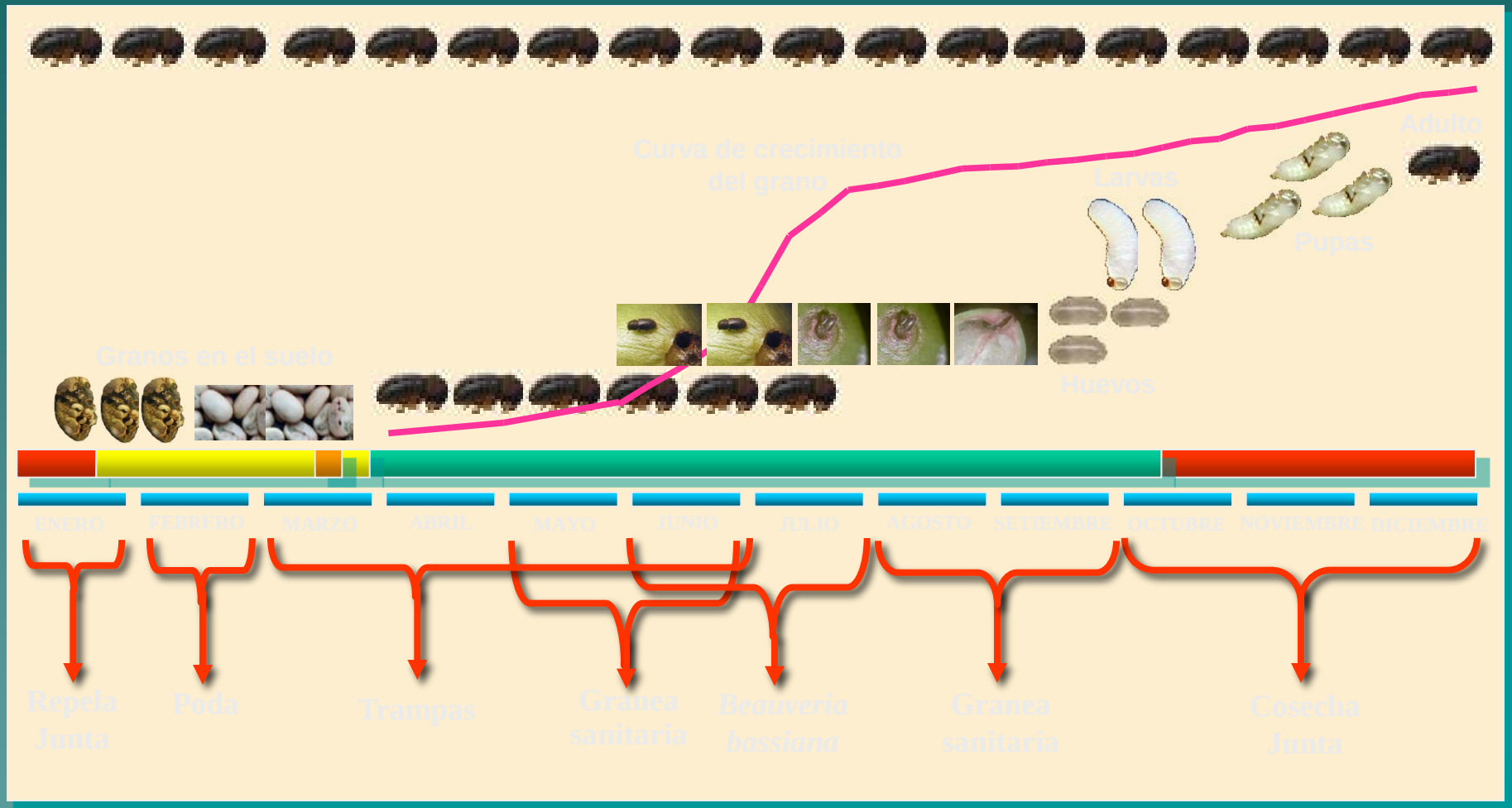
Flower

Preflower &new tissue development

Fruit Development

Information from: Hernández (2004)

PRACTICES TO MANANAGE CBB



Coffee resting or dormant | Flowering | Bean development | Harvest

CBB Behaivor

Wet Mill Adjustment

CAFÉ DE COSTA RICA
El Auténtico Sabor del Café®

Icafe
Instituto del Café de Costa Rica

RECOMENDACIÓN DEL TRATAMIENTO DEL CAFÉ BROCADO
MAXIMOS CUARTILLOS A REBAJAR DE ACUERDO AL NÚMERO DE FRUTOS BROCADOS QUE FLOTAN

Número de frutos brocados que flotan	CAJUELAS QUE ENTREGA EL PRODUCTOR																		
	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-100
1	0	0	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
2	0	0	0	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5
3	1	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	13	13	14	15
4 a 6	1	2	4	5	6	8	9	10	11	13	14	15	16	18	19	20	21	23	24	25
7	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
8 a 10	2	5	7	9	11	13	16	18	20	23	25	27	30	31	34	36	38	41	43	45
11 a 12	4	8	11	15	19	23	26	30	34	38	41	45	49	52	56	60	64	67	71	75
13 a 15	4	8	13	17	21	25	30	34	38	42	47	51	55	60	64	68	72	77	81	85
16 a 19	5	11	16	22	28	33	38	44	49	55	60	66	71	77	82	88	93	99	104	110
≥ 20	7	15	22	30	37	45	52	60	67	75	82	90	97	105	112	120	127	135	142	150

Ex: if the farmer deliver 56 to 60 cajuelas and on the test 4 to 6 full beens are infested; they will deduct 15 quarts (3.75 cajuelas)
This table is disingned to put in practice in floters on 250 mililiters (one quart of liter)