

PHEROMONES MATING DISRUPTION

BACK TO THE FUTURE

Vittorio Veronelli

CBC Europe Srl – BIOGARD Div.



Early research in Pheromones



Jean-Henry Fabre
first records
insect chemical
communication



1879



Bruno Götz
hypothesis on
Mating Disruption
of Grape moths



1940



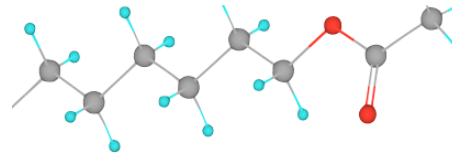
Adolf Butenandt
identifies
Bombykol
From *B. mori*



1959



P. Karlson &
M. Luscher
Suggested
Pheromone

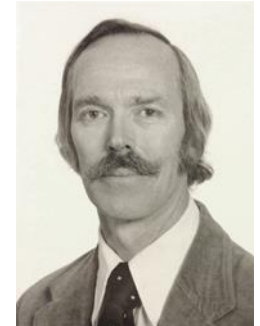


1959



Morton Beroza
Suggested
Mating
Disruption

1960



Harry Shorey
conducts first MD
field trial (*T. ni*)



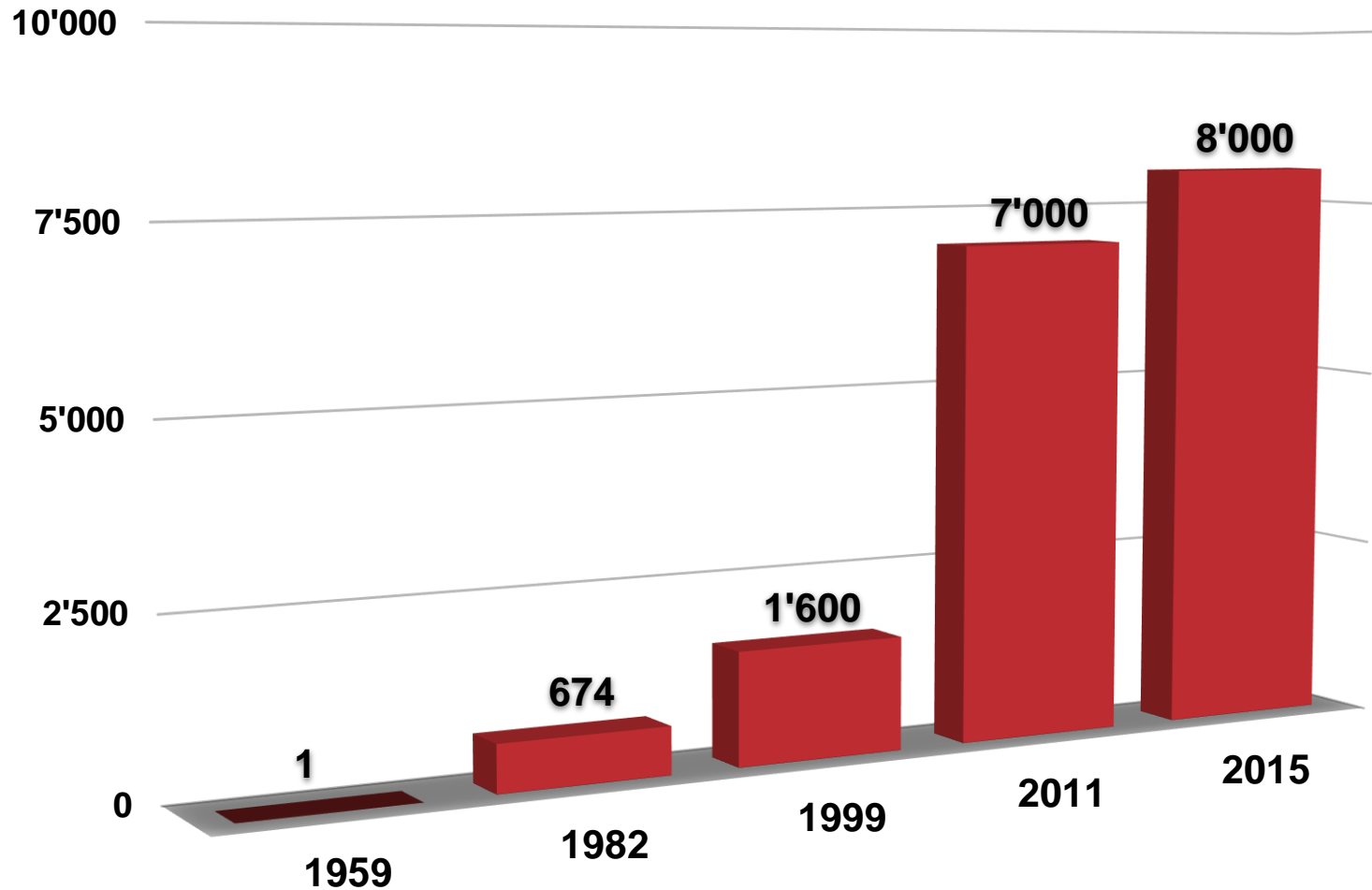
1967



1870s  1930

1990

Pheromones identified to date



Pherobase > 8,000 Pheromones & Semiochemicals

Early Mating Disruption research



Harry Shorey
field trial
Trichoplusia ni



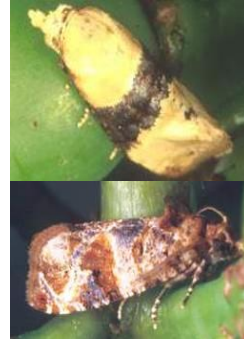
1967



P. gossypiella
first registered
in USA



1978



Grape moths
trials
In Europe



1983



ROPE apple
field trials
in USA



1986



Tom Baker
MSTRS trials
in USA



1996



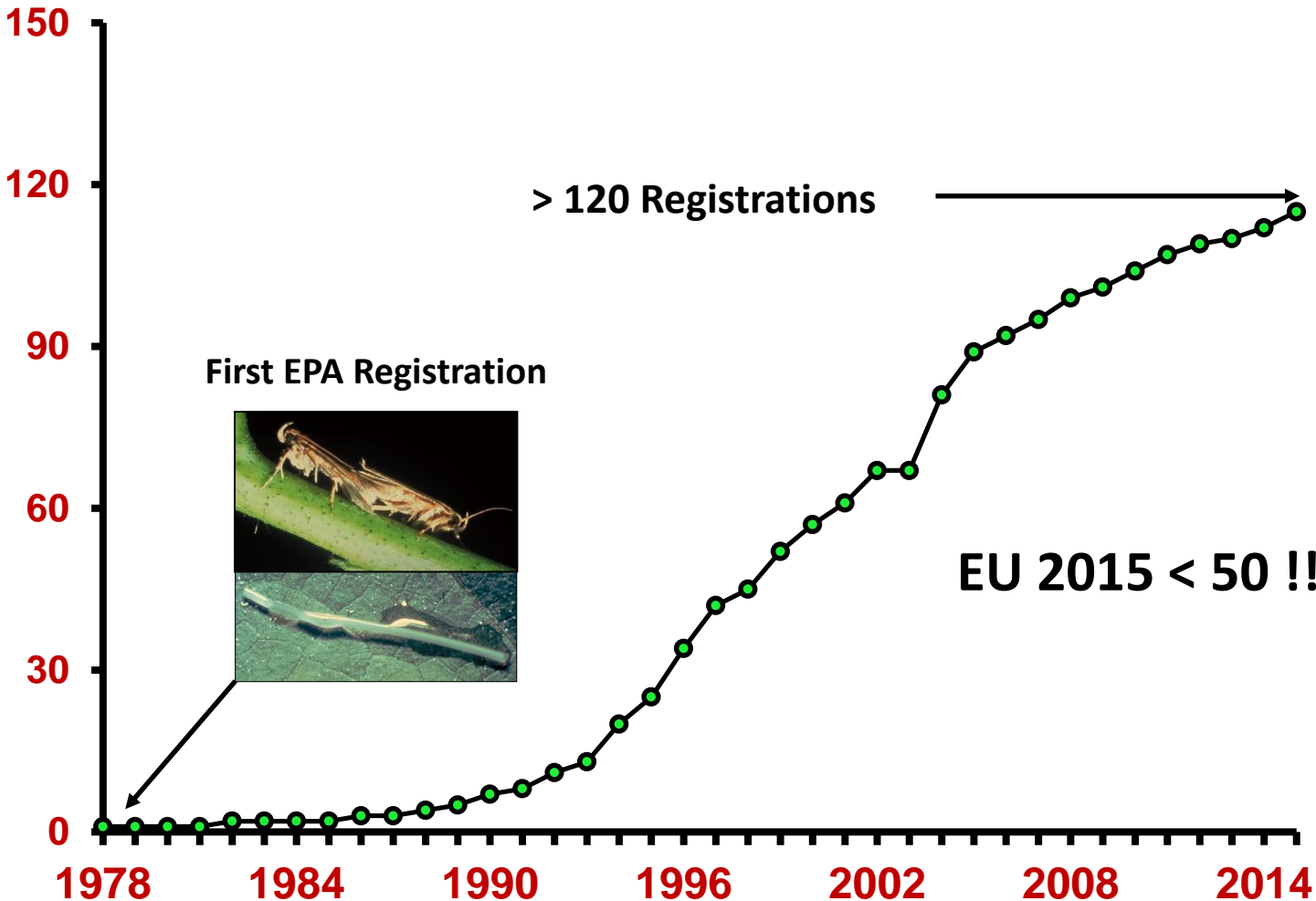
1960 —————> 1999



NEW PHEROMONES

USA time to registration
4-6 months
Free Experimental use up to 200 Ha

EU time to registration
3-5 years
Free Experimental use not available



Almost 40 Years Passed!!

Almost 40 years ago....



*First EPA Registration – 1978
P. gossypiella on Cotton*



Dr. Jack Jenkins
young entomologist
mixing pheromone
fibers to be
deployed by air;
later he became
president of Pacific
Biocontrol Corp.

**Thanks Jack
for your great
contribution!**

biological First.

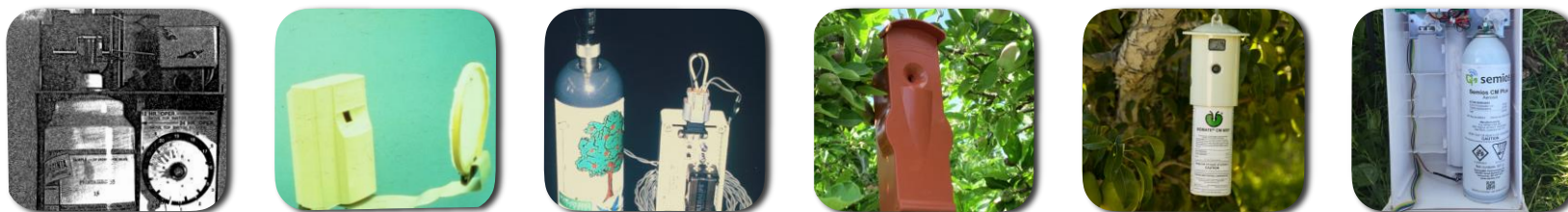
A history of application technologies

1978 - 2016

- Reservoir and Meso Dispensers



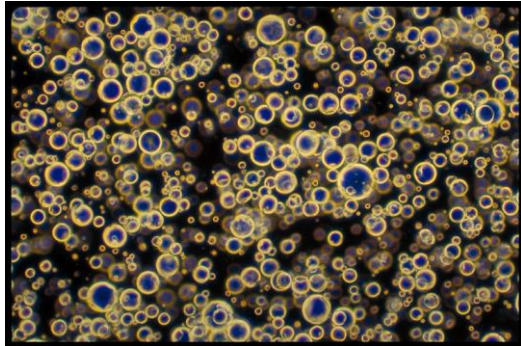
- Aerosol Dispensers



- Sprayable and Female Equivalent Dispensers

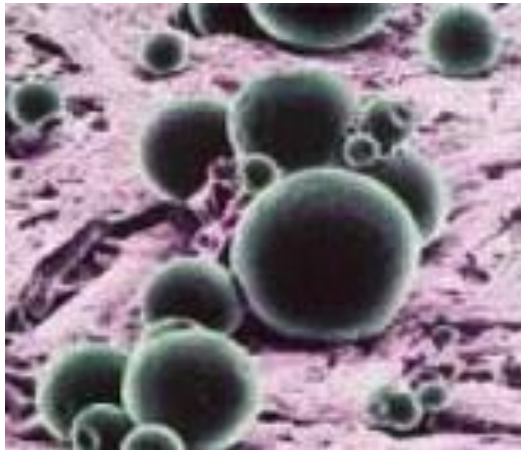


Application by sprayable formulations



Release = Passive and Very Low

- ❖ Millions of capsules per ha
- ❖ Mechanical application
- ❖ Longevity - Very Short
- ❖ Need multiple applications



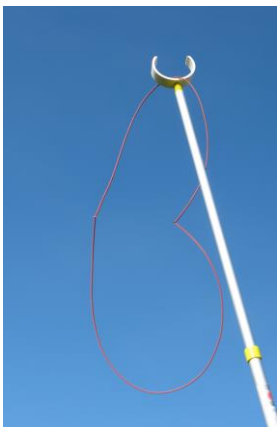
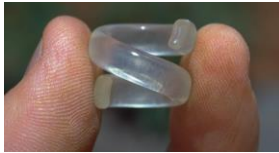
Application by female equivalent formulations



Release = Low, Passive

- ❖ 2.000 - 10.000 dispensers/ha
- ❖ Mechanical or Manual application
- ❖ Longevity – Short
- ❖ Matrix type not zero order
- ❖ Need 2-4 applications

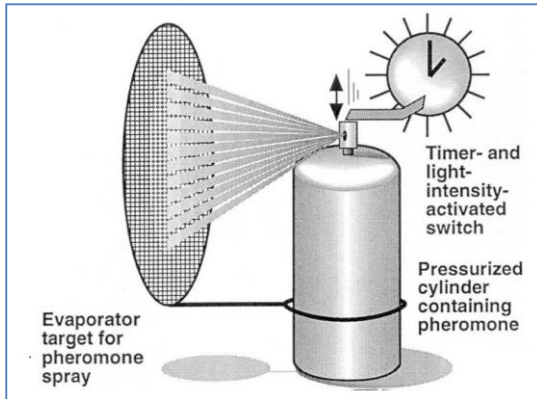
Application by reservoir passive formulations



Release = High, Passive, Physics

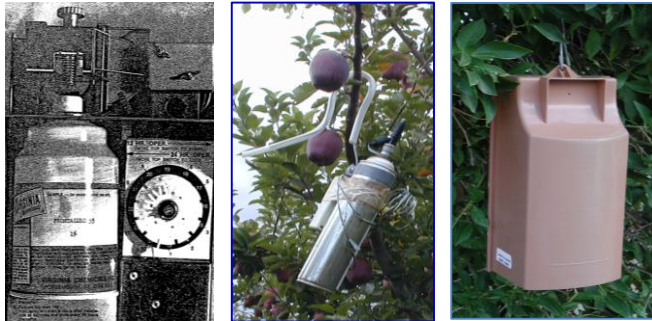
- ❖ **100 – 1.000 dispenser/ha**
- ❖ **Hand or mechanical application**
- ❖ **Longevity - Season Long**
- ❖ **Usually covers all generations**
- ❖ **Different performances**

Application by reservoir aerosol formulations



Release = Very High, Active, Program

- ❖ 2 to 5 per dispensers per ha
- ❖ Hand application
- ❖ Covers all generations
- ❖ Longevity - Season Long
- ❖ Side effects to manage



World use of Mating Disruption 2016



Vine	330.000 ha
Forestry	250.000 ha
Pome	230.000 ha
Stone	120.000 ha
Nuts	80.000 ha
Vegetables	15.000 ha
Total	~1.025.000 ha

Share by formulations technologies



Passive Reservoir	560.000 ha	54%
Sprayable	280.000 ha	28%
Active Reservoir	165.000 ha	16%
Female like	20.000 ha	2%
Total	~1.025.000 ha	

• Reservoir and Meso Dispensers



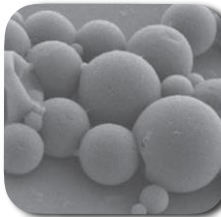
- ❖ Flexible to dose - competitive
- ❖ Highest reliability (depending on technology)
- ❖ Longer application time – can be mechanized
- ❖ Multiple insect control (up to 7) – also different orders

• Aerosol Dispensers



- ❖ Programmed release
- ❖ Must consider pest biology
- ❖ Shorter application time after initial set-up
- ❖ Best with high density foliage and large areas

• Sprayable Dispensers



- ❖ Typically forestry
- ❖ For univoltine pest
- ❖ Injury tolerance important
- ❖ Short life/Low release – must fit to pest



CUTTING EDGE TECHNOLOGY

A I R

A I R



EVAPORATION SPEED = PERMEATION SPEED = EVAPORATION SPEED

CAPILLARY SHAPE
 constantly wet the whole surface
 slim shape less affected by wind

EXTRUSION PROCESS
 highest precision of wall thickness
 guarantee of precise filling

MULTIPLE POLYMERS
 to fit physical-chemical properties
 of pheromone compounds for best
 release performances

PHYSICAL DEPENDENT
 Designed with physical laws,
 highest reliability and repeatability

PHEROMONE



ShinEtsu
PHEROMONES

First ever two insect order dispenser

Vine Mealy Bug *Planococcus ficus* + *Lobesia botrana* European Grape Berry Moth



ISONET LPF
TWIN DISPENSERS
VMB+EGBM



biological First.

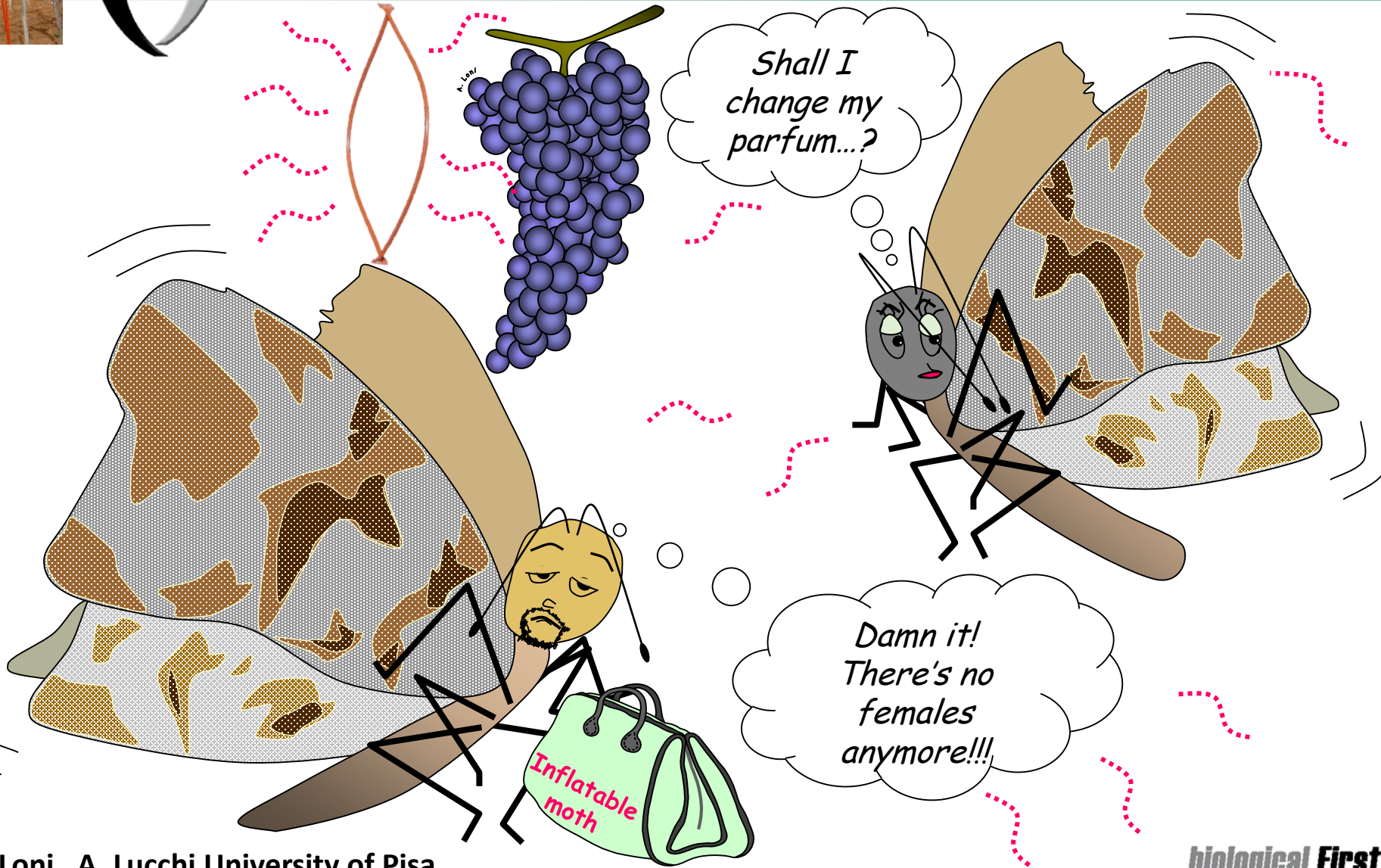


*Pheromone today
is a mature industry
offering reliable,
high efficacy, safe
and lasting pest
control solutions
to growers worldwide*



*50 years
have passed
since the first
field trials by
Henry Shorey*

Well maybe not all are happy...



A. Loni , A. Lucchi University of Pisa

biological First.

Pheromones for Mating Disruption



Looks Great!



**TO BE
CONTINUED...→**