

# PHEROMONES!

*Present  
& Future*



*Vittorio Veronelli - CBC (EUROPE) Ltd.  
1st Annual Biocontrol Industry Meeting  
Lucerne – 23rd 24th October 2006*

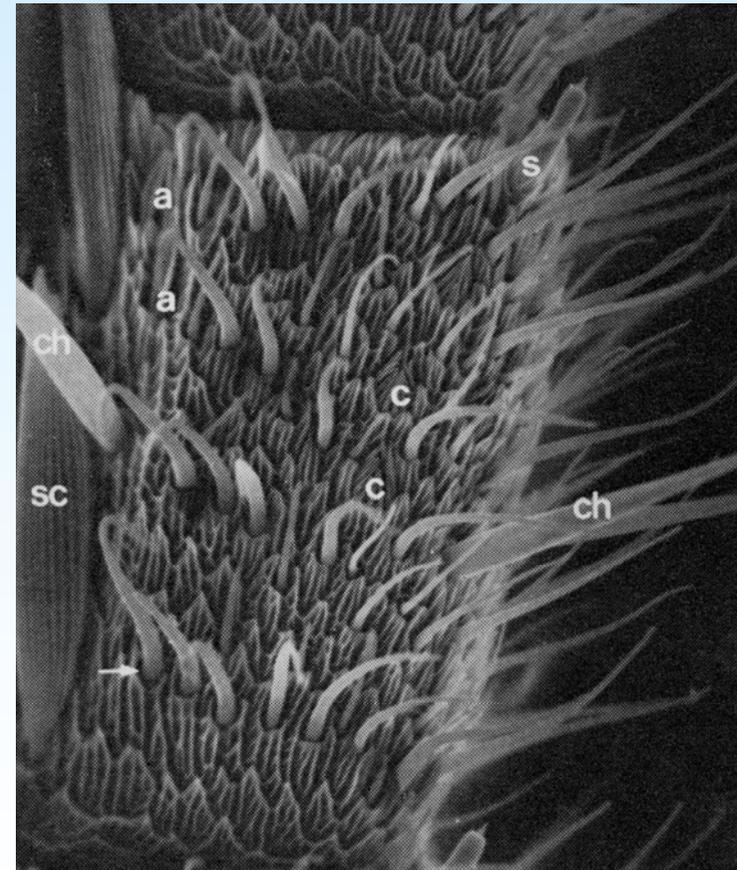
# PHEROMONES

Pheromone = Pheroin (transport) + Hormone (stimulate)

*Many living kinds use them to communicate between individuals of the same species or with others.*

*Lepidoptera sexual pheromones help females to attract males of the same species for mating when their eggs are ready to be fertilized.*

*Males detect pheromones scents in the air through the special organs of their antennas called "sensilla"*

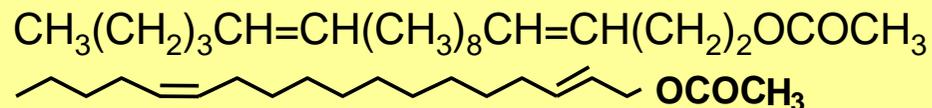


# LEPIDOPTERA SEX PHEROMONES

## Straight Chained Lepidopteran Pheromones

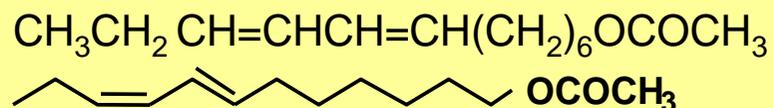
*Synanthedon tipuliformis* **Currant moth**

E2,Z13-octadecadienyl acetate



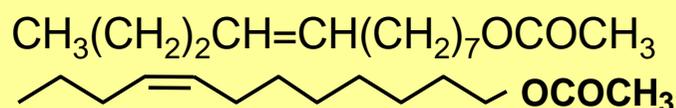
*Lobesia botrana* **Grape vine moth**

E7,Z9-dodecadienyl acetate



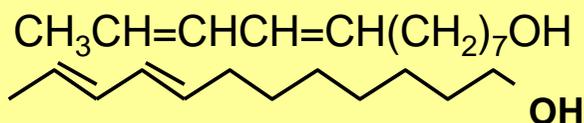
*Grapholita molesta* **Oriental fruit moth**

Z-8-dodecenyl acetate



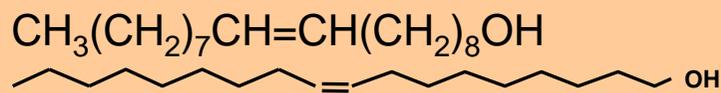
*Cydia pomonella* **Codling moth**

E8,E10-dodecadienol

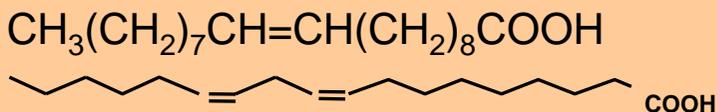


## Fatty Acids

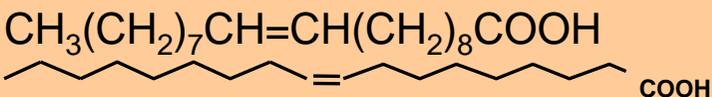
Oleyl alcohol  
Z9-octadecenol



Linoleic acid  
Z,Z-9,12-octadecadienoic acid



Oleic acid  
Z9-octadecenoic acid



# POPULAR USE OF PHEROMONES

## Mating Disruption

Lepidoptera moths  
in fruits, vines, cotton, vegetable  
and forest

## Monitoring

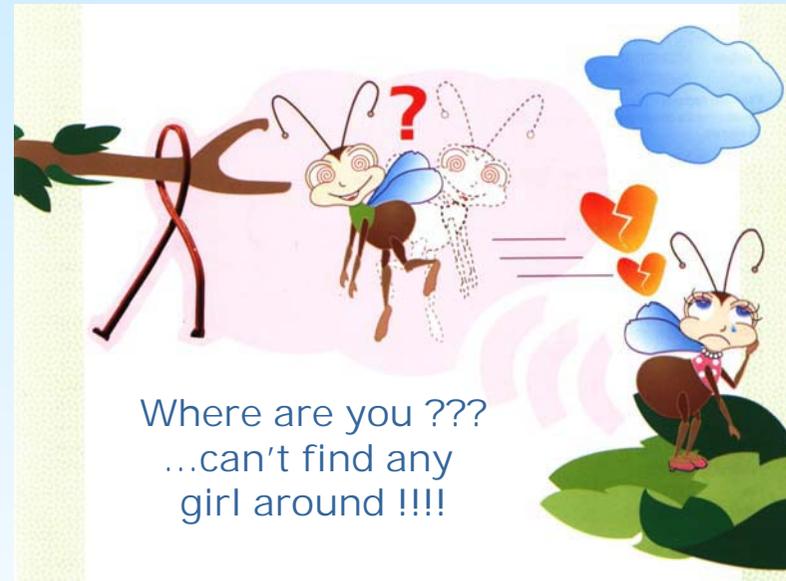
Lepidoptera moths  
in fruits, vines, vegetable, cotton,  
maize, forest, stores...  
Coleoptera bugs in fruits, forest, stores...

## Mass Trapping

Coleoptera in fruits, forest, stores...  
Lepidoptera moths in fruits, forest

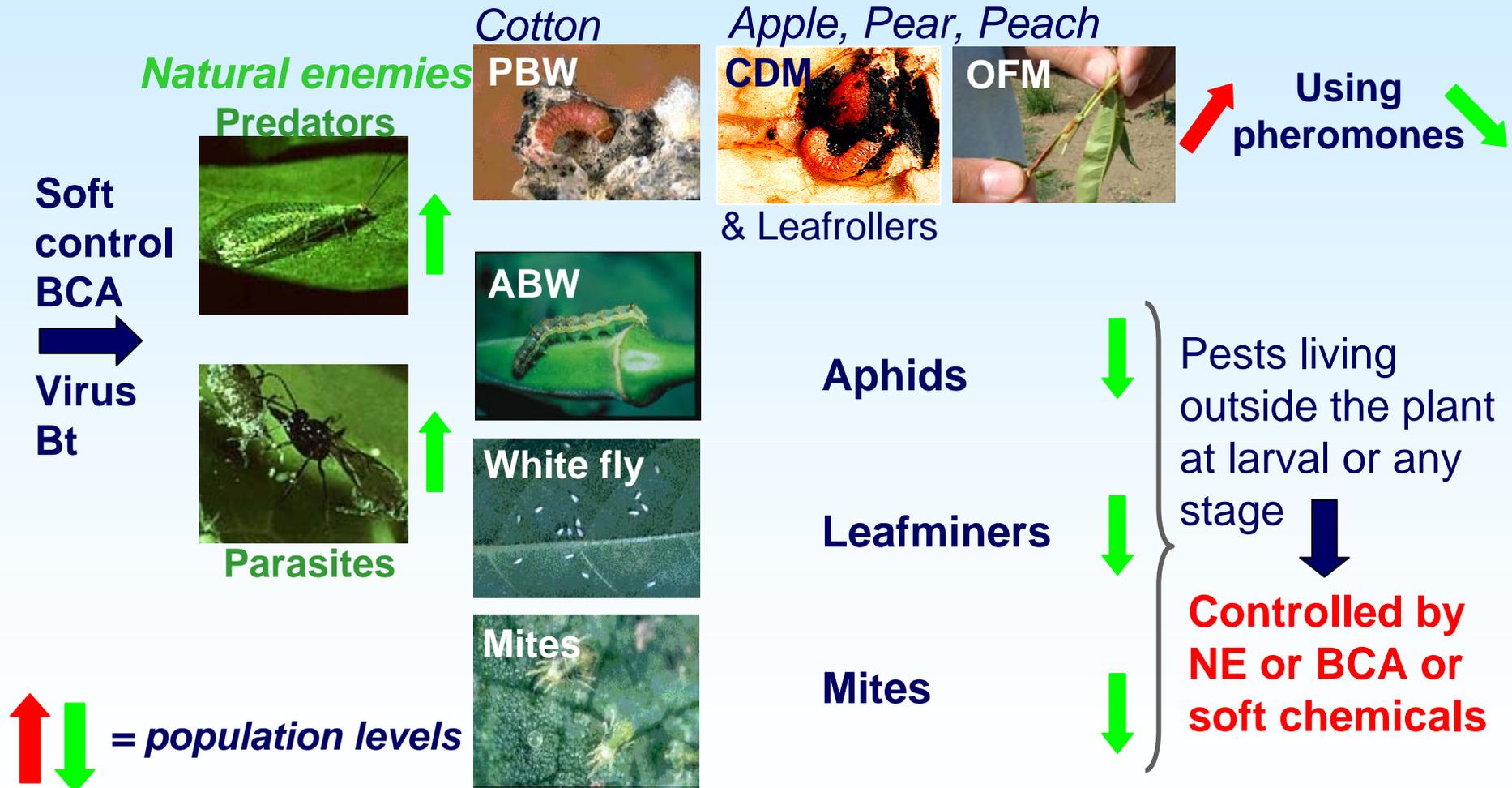
## Attract & Kill

Lepidoptera moth in various crops



# SYNTHETIC PHEROMONES IN IPM

MD SYNERGY WITH SEVERAL BIOCONTROL AGENTS



# *PHEROMONES NEED KNOWLEDGE & STRATEGY*

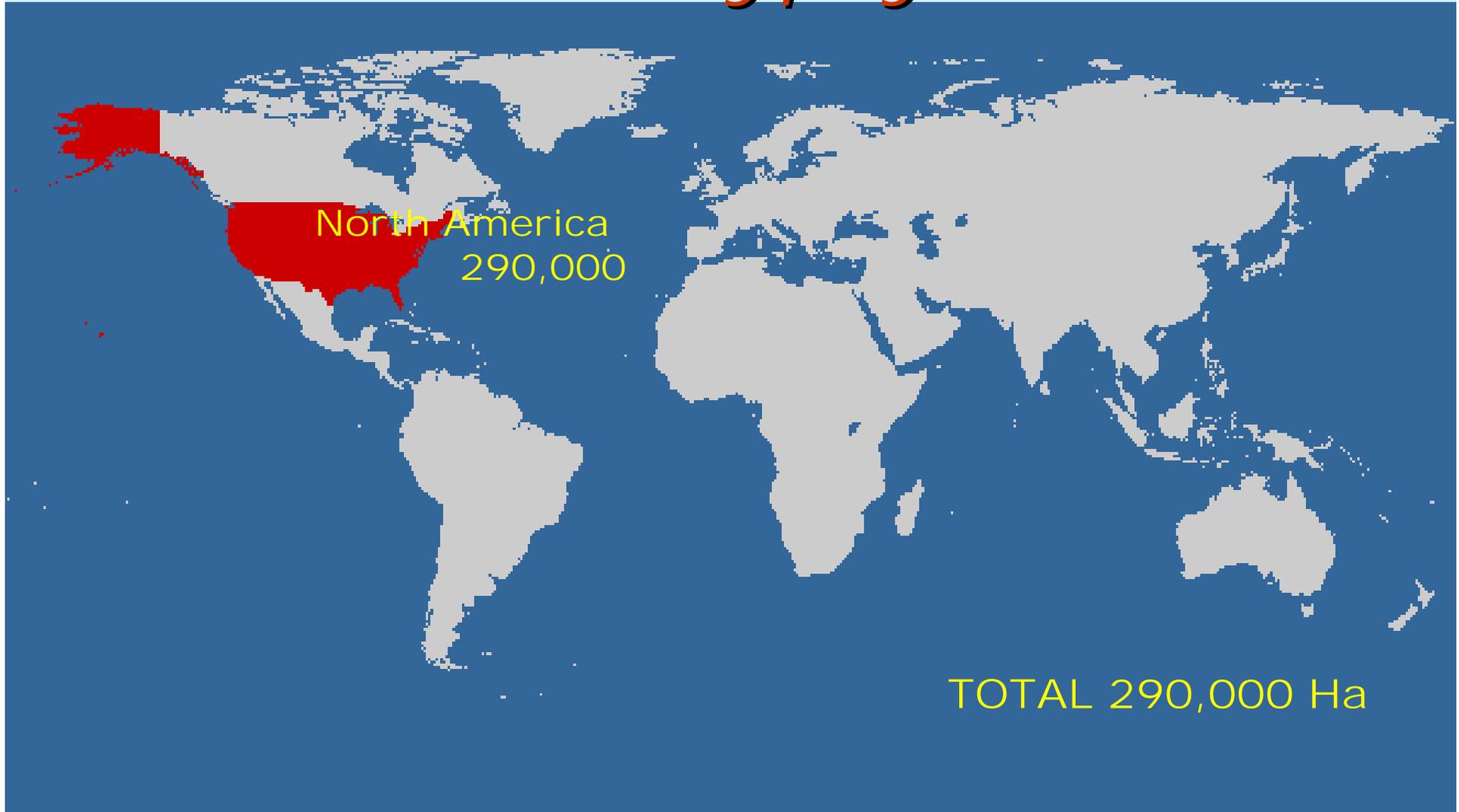
- Species specific (no side effects but only single control)
- Volatile (very low persistence, need to keep releasing)
- Wide areas & group use (enhance efficacy, reduce cost)
- Non harmful (don't kill any, not even the target)
- Pest biology and behavior (key factors to know)
- Population density (affect efficacy, need support)
- Preventive approach (forecast rather than chase)

# *PHEROMONES NEED TECHNOLOGY & ACCURACY*

FOR STABLE EFFICACY MD REQUIRES:

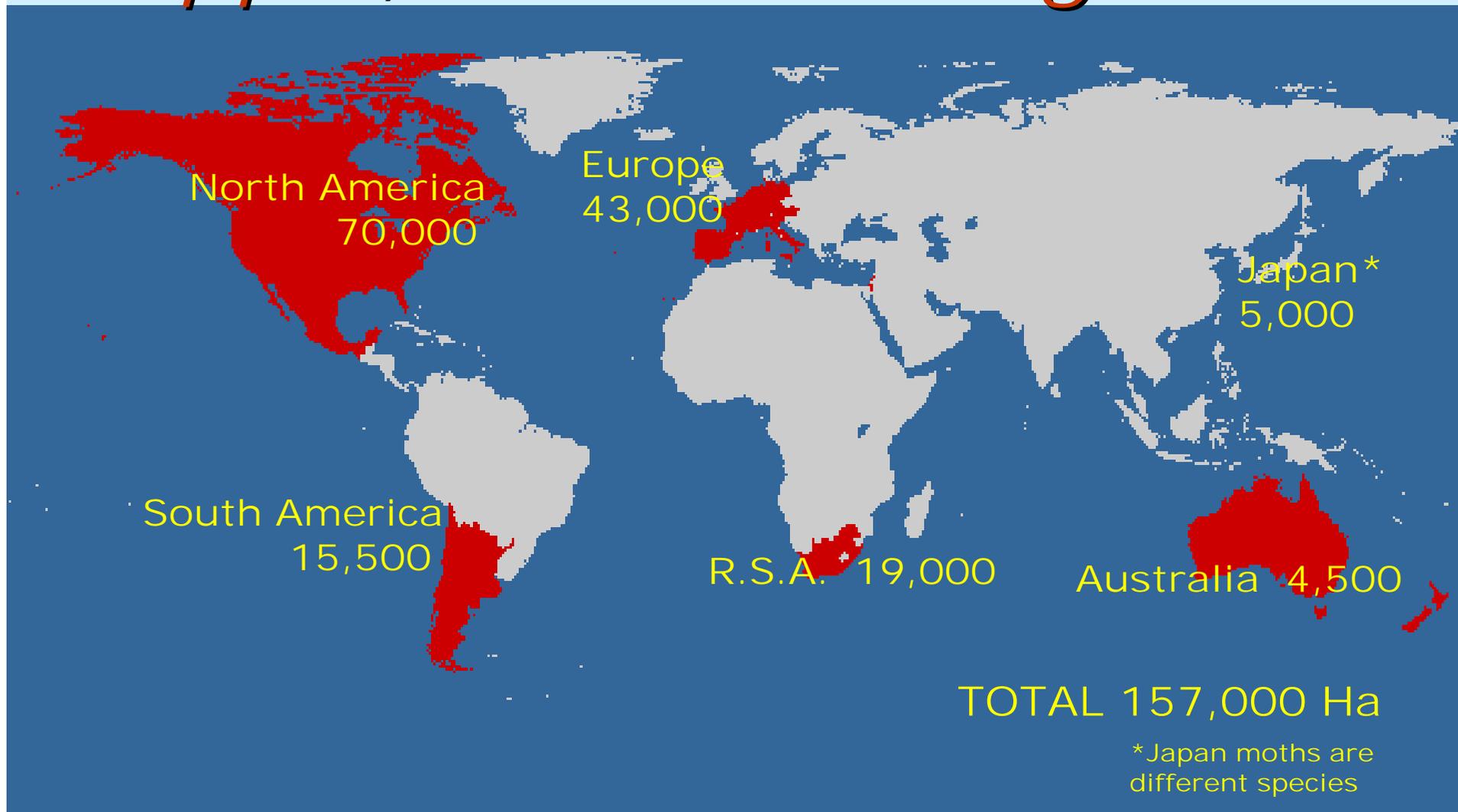
- To have good and reliable dispenser system
- To maintain the necessary pheromone concentration in field
- To apply the dispensers at the correct timing
- To have an effective utilization of natural enemies and not to use strong chemicals

# *MD Worldwide Forest – Gypsy moth*



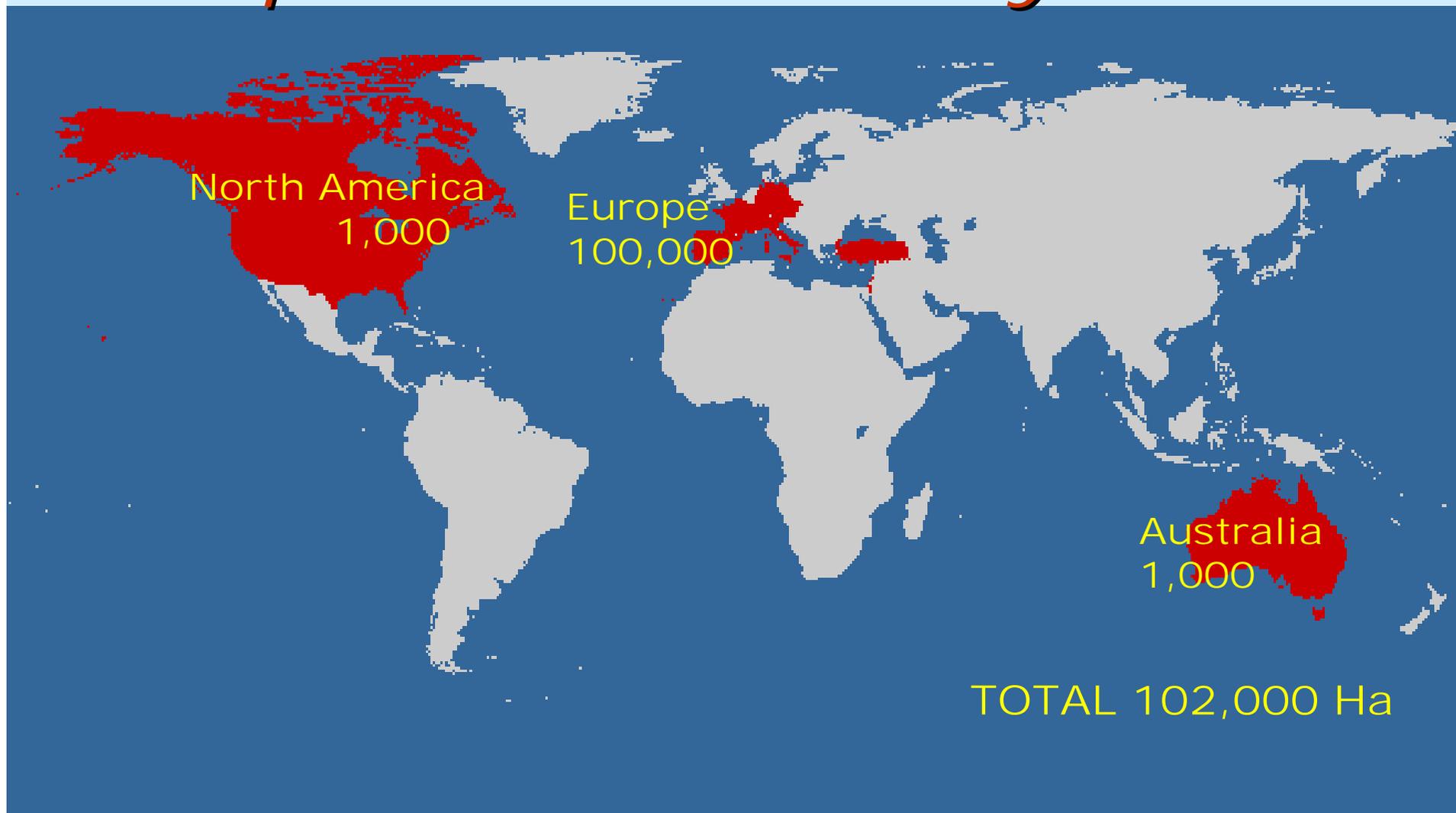
# *MD Worldwide*

## *Apple, Pear – Codling moth*

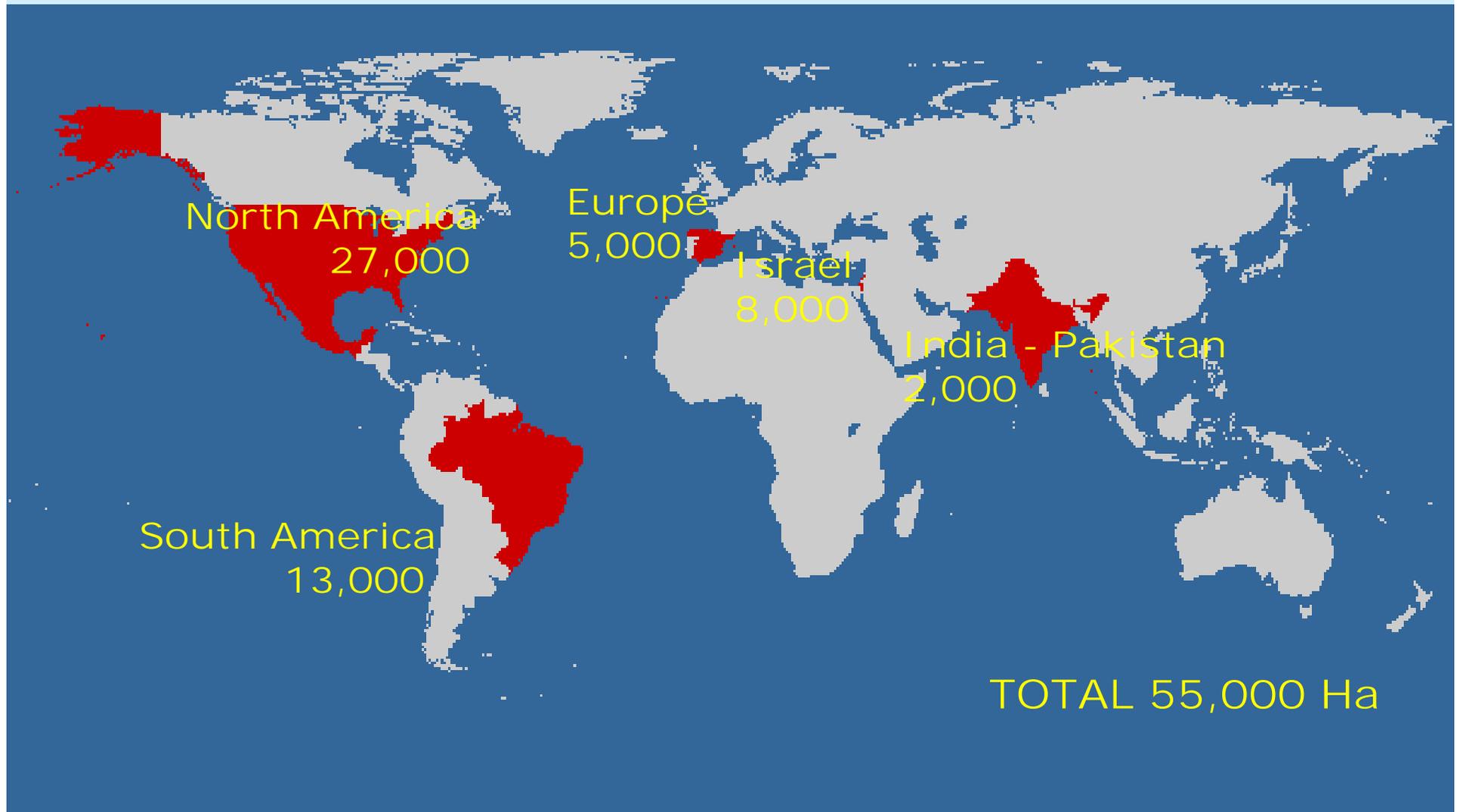


# *MD Worldwide*

## *Grape – Vine & Berry moths*

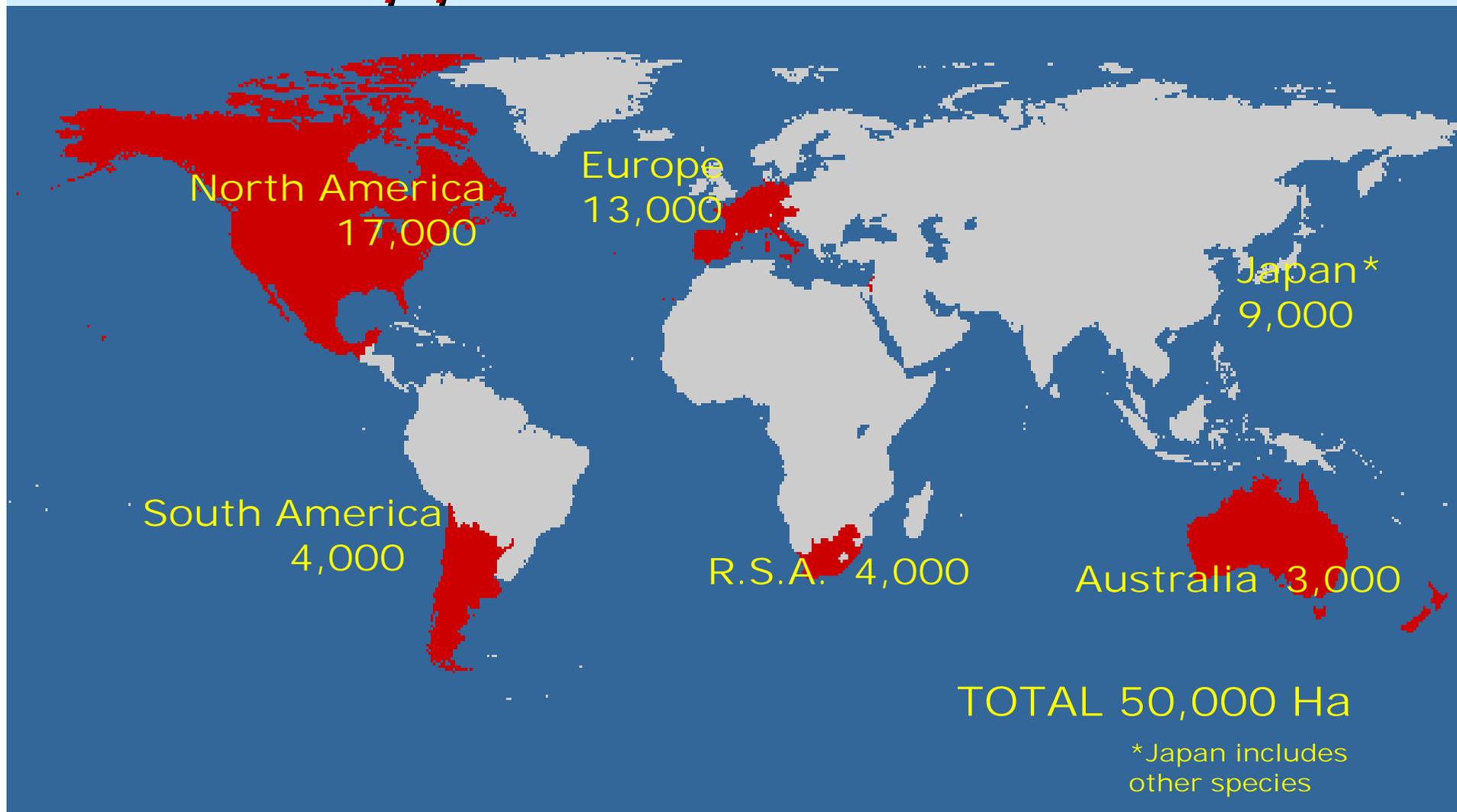


# *MD Worldwide Cotton – Pink Bollworm*



# *MD Worldwide*

## *Peach, Apple – Oriental Fruit moth*



# WORLDWIDE USE OF SYNTHETIC PHEROMONES



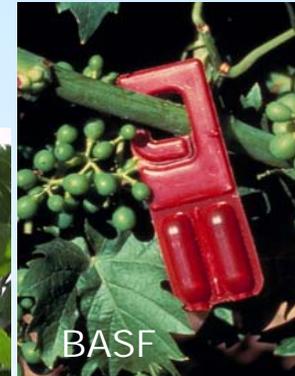
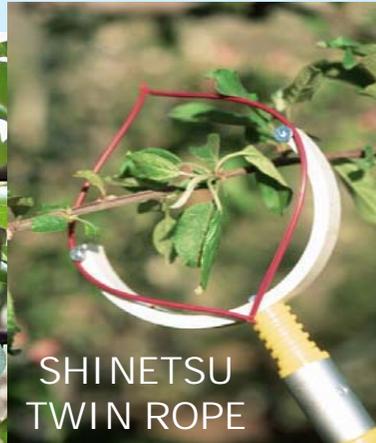
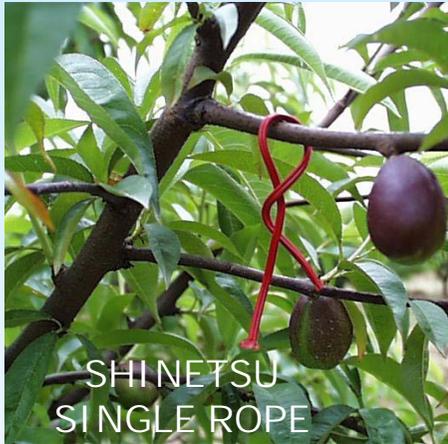
NEARLY 300,000 Ha OF FORESTS  
NEARLY 400,000 Ha OF CROPS

# *PHEROMONES TODAY*

- More than 40 species single dispensers available with various release technologies:  
hand applied reservoir is the most popular, however matrix type, emulsions, tapes, microencapsulated and powders are also there.
- Double species hand applied dispensers already available in several combinations, very popular for fruits and vines.
- Biodegradable hand applied dispensers are also available for single and double species, but still have limited field life not exceeding 90 days.
- Several successful products using Mass Trapping strategy especially for Coleoptera species

# LEPIDOPTERA MATING DISRUPTION

various dispensing and releasing systems



# ***PHEROMONES TOMORROW***

Mating Disruption - Mass Trapping - Trail Disruption  
of pests from other insects orders such as:

Coleoptera (Sugarcane wireworm,  
*Melanototus okinawensis*, MD)

Hemiptera (Stink bugs, *Plautia stali*,  
*Glaucia subpuctatus*, MT)

Heteroptera (Rice leaf bug,  
*Thrigonotylus caelestialium*, MD)

Hemiptera (Vine mealybug,  
*Planococcus ficus*, MD)

Hymenoptera (*Argentine ant*,  
*Linepithema humile*, TD)



# *PHEROMONES TOMORROW*

Over 25 years of experience allow faster development of many new products for single Lepidoptera species

Multiple Lepidoptera species hand applied dispensers for up to 7 insect pests combined.

Longer life sprayable for large areas such as forest, cotton, maize, and for specific use on vegetables and fruits



A key issue for these developments is the support of regulators to reach fast track authorizations at reasonable costs within very short time, industry is ten years ahead the present regulations

*THANKS FOR YOUR KIND ATTENTION!*

