

# Organic standards and how to diminish the factors leading to colony losses

1<sup>st</sup> Apimondia Organic Beekeeping Symposium  
Sunny Beach – Bulgaria – 27 August 2010

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President of Apimondia



# In the past

- ▶ **During XIX Century  
Foulbrood in the USA**



- ▶ **Beginning XX Century  
Acarine disease in UK**











**2) A few dead bees  
left in the cells**





**3) Empty beehive**



# Colony Collapse Disorder

Google search results for "Colony Collapse Disorder" (0.13 secondes). Results 1 - 30 sur un total d'environ 457 000.

**Syndrôme d'effondrement des colonies d'abeilles - Wikipédia**  
Le Syndrome d'effondrement des colonies d'abeilles ou CCD (pour l'expression anglaise « **Colony Collapse Disorder** ») est le nom donné à un phénomène d'abord ...  
[fr.wikipedia.org/wiki/Syndrôme\\_d'effondrement\\_des\\_colonies\\_d'abeilles](http://fr.wikipedia.org/wiki/Syndr%C3%89me_d'effondrement_des_colonies_d'abeilles) - 76k - [En cache](#) - [Pages similaires](#)

**Colony collapse disorder - Wikipedia, the free encyclopedia - [Traduire cette page]**  
Colony collapse disorder (or CCD) is a phenomenon in which worker bees from a beehive or European honey bee colony abruptly disappear. ...  
[en.wikipedia.org/wiki/Colony\\_Collapse\\_Disorder](http://en.wikipedia.org/wiki/Colony_Collapse_Disorder) - 216k - [En cache](#) - [Pages similaires](#)

**ARS | Questions and Answers: Colony Collapse Disorder - [Traduire cette page]**  
29 May 2008 ... Discusses the importance of the mysterious bee deaths, theories on its causes, and history of the problem  
[www.ars.usda.gov/is/brief/ccd/](http://www.ars.usda.gov/is/brief/ccd/) - 56k - [En cache](#) - [Pages similaires](#)

**Colony Collapse Disorder A Complex Buzz - [Traduire cette page]**  
2 May 2008 ... Entomologist injects a healthy bee with viruses extracted from bees in colonies showing colony collapse disorder ...  
[www.ars.usda.gov/is/AR/archive/may08/colony0600.htm](http://www.ars.usda.gov/is/AR/archive/may08/colony0600.htm) - 56k - [En cache](#) - [Pages similaires](#)  
[Autres résultats domaine www.ars.usda.gov](#)

**[PDF] Colony Collapse Disorder (CCD) - [Traduire cette page]**  
Format de fichier: PDF/Adobe Acrobat - [Version HTML](#)  
Colony Collapse Disorder (CCD). The following report references Fall Dwindle Disease. This name has been changed to **Colony Collapse Disorder** ...  
[maarec.psu.edu/pressReleases/FallDwindleUpdateG107.pdf](http://maarec.psu.edu/pressReleases/FallDwindleUpdateG107.pdf) - [Pages similaires](#)

MAAREC - Mid-Atlantic Agriculture Research and Extension Consortium - [Traduire cette page](#)

Terminé

Démarrer Microsoft PowerPoint - [ ... ] D:\WEB\images "Colony Collapse Diso... \* Sans titre - Notepad2 13:41

457,000  
pages  
in 2008





# Colony Collapse Disorder

Search results for "colony collapse disorder" on Google. The search results show 1 to 10 results out of a total of 8,620,000 pages. The first result is from Wikipedia, titled "Colony collapse disorder - Wikipedia, the free encyclopedia". The second result is from Wikipedia, titled "Syndrome d'effondrement des colonies d'abeilles - Wikipédia". The third result is from ARS, titled "Questions and Answers: Colony Collapse Disorder". The fourth result is from MAAREC, titled "Colony Collapse Disorder - MAAREC - Mid-Atlantic Apiculture". The fifth result is from the USDA, titled "Le CCD ou Colony Collapse Disorder - Stages et Colonies de ...".

8,620,000  
pages in  
2010!

# BL: Bee Losses

- ▶ Annual bee colony mortality up to 1990:

5 to 10% (15 to 18% in the USA)

- ▶ Current annual bee colony mortality (but not every year and not everywhere):

25 to 40% (32 to 36% in the USA)

- ▶ Possible peaks:

80 to 100% (including USA)

- ▶ Bee farm → - 40%

1,000 colonies = 600 colonies

950 strong colonies  
20 years ago!

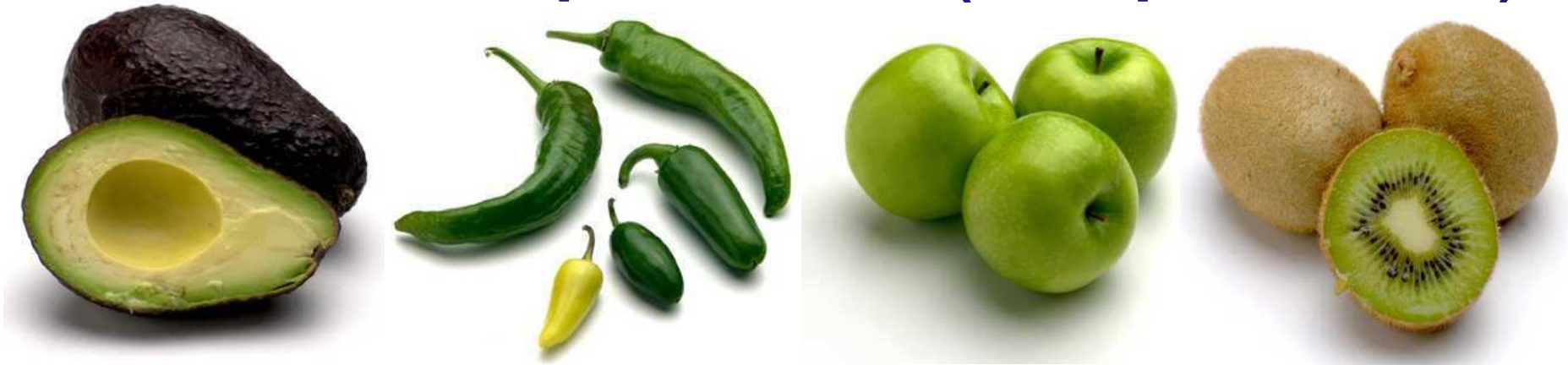
Huge economic impact  
for professional bee farms!





# Other impacts

## ▶ Human food production (less pollination)



## ▶ Biodiversity (less pollination)







# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions
- 7) Other endogenous pollutions
- 8) Climate changes
- 9) Synergism between factors
- 10) Single still unknown factor

# 1) Pesticides

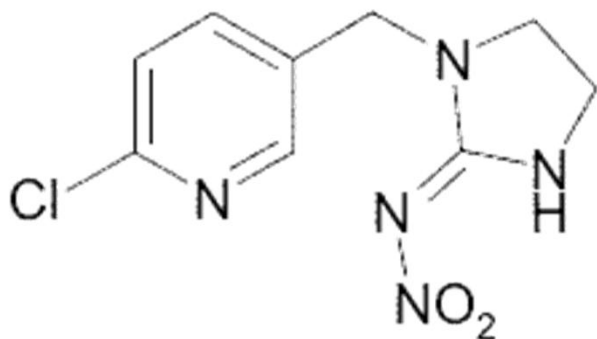
## ▶ 1.1 New generation of pesticides + their metabolites





# 1) Pesticides

## ▶ 1.1 New generation of pesticides + their metabolites

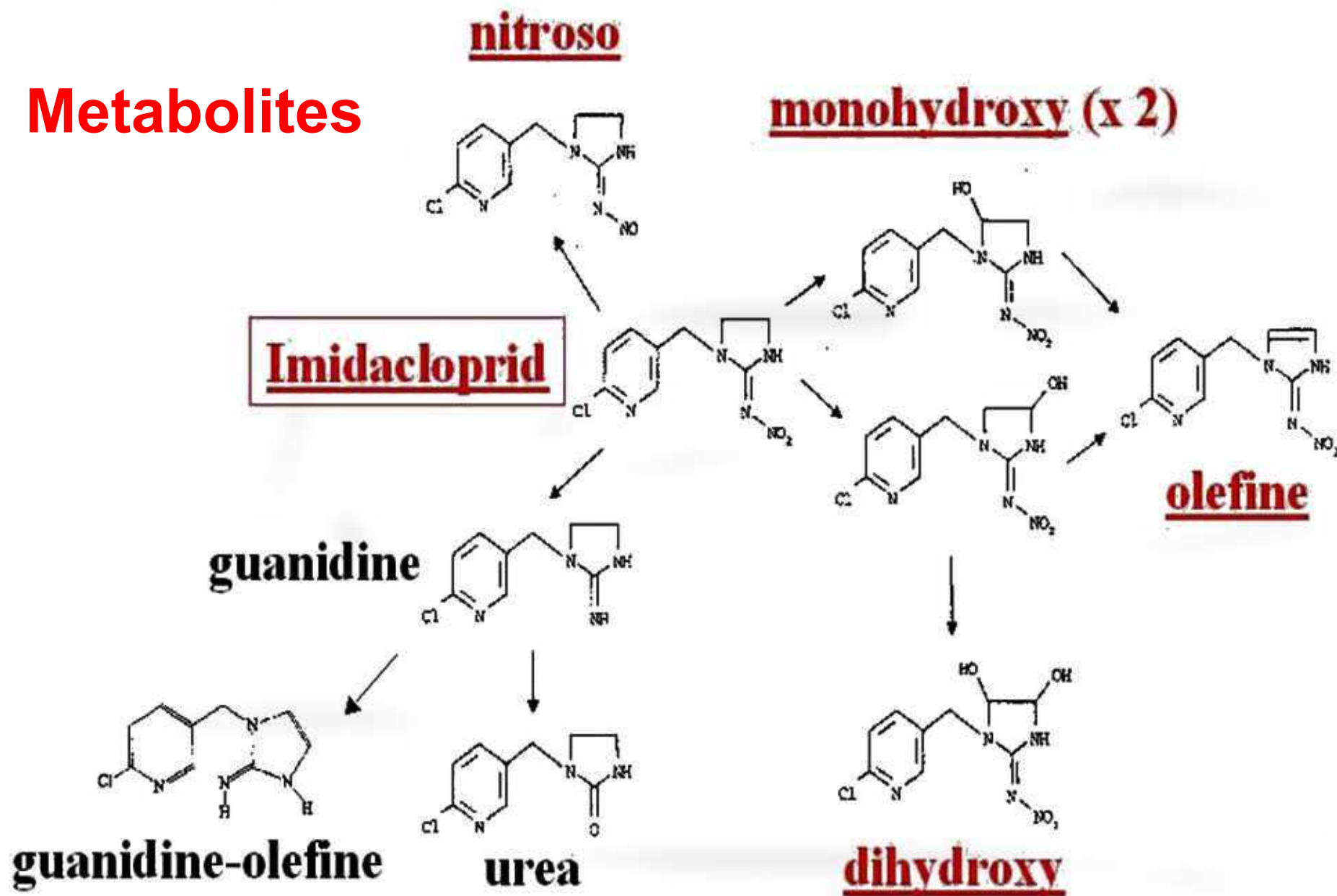


◀ **Imidacloprid**

**Commercial name:**  
**Gaucho<sup>®</sup>, Confidor<sup>®</sup>,...**  
**Company: Bayer<sup>™</sup>**



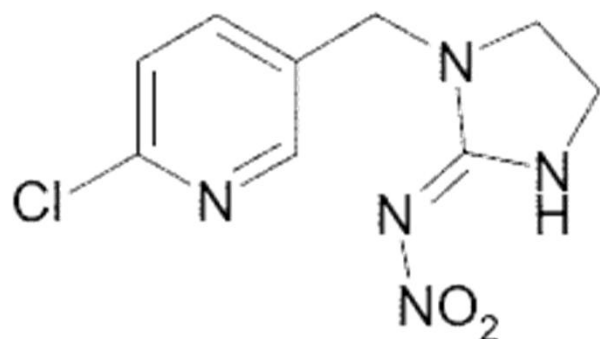
## Metabolites





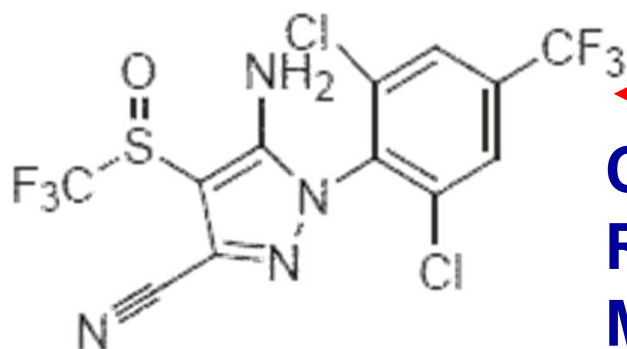
# 1) Pesticides

## ▶ 1.1 New generation of pesticides + their metabolites



### ◀ Imidacloprid

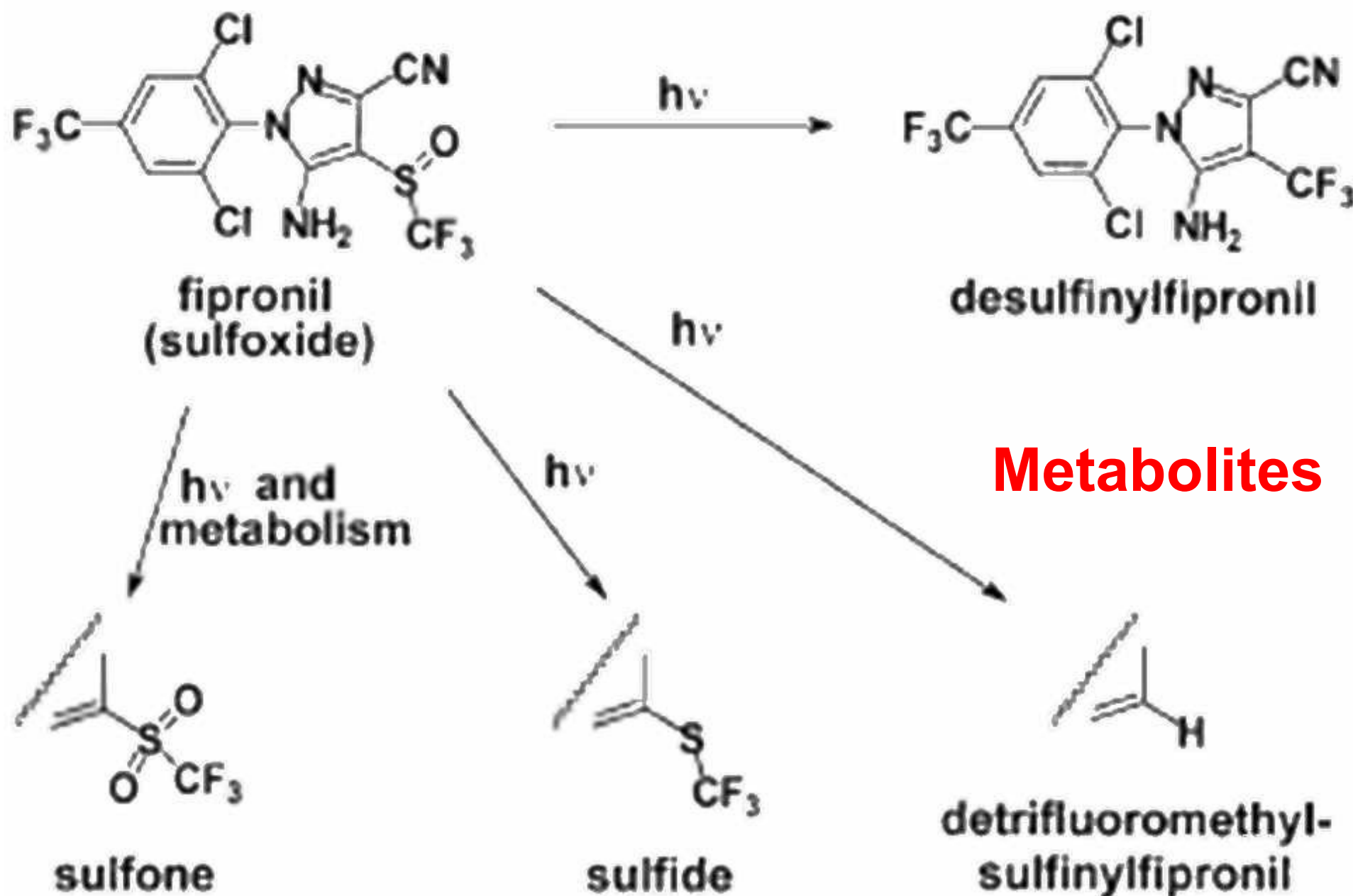
Commercial name:  
**Gaucho<sup>®</sup>, Confidor<sup>®</sup>,...**  
Company: **Bayer<sup>™</sup>**



### ◀ Fipronil

Commercial name:  
**Regent TS<sup>®</sup>, Schuss<sup>®</sup>,  
Metis<sup>®</sup>, Trident<sup>®</sup>,...**  
Company: **BASF<sup>™</sup>**



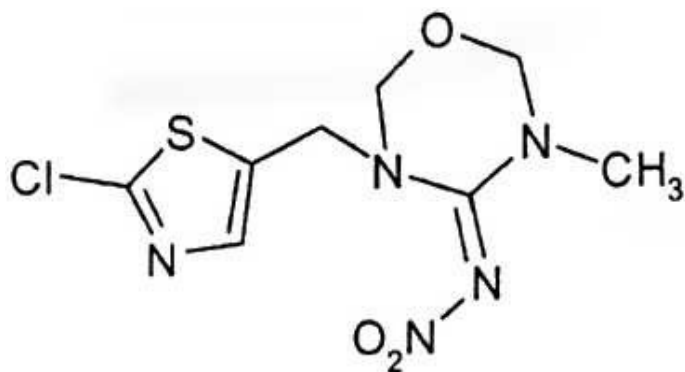




# 1) Pesticides

## ▶ 1.1 New generation of pesticides + their metabolites

### Other neonicotinoids

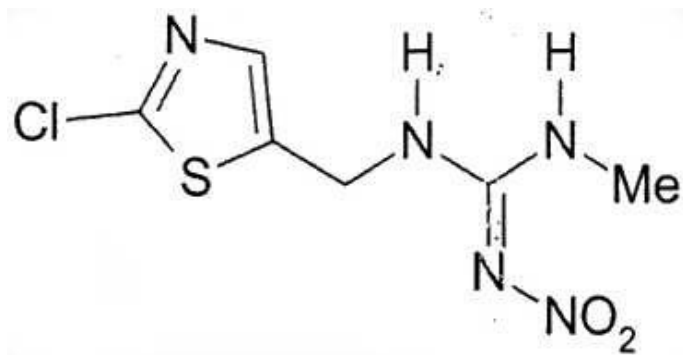


#### ◀ Thiamethoxam

Commercial name:

Cruiser®

Company: Syngenta™



#### ◀ Clothianidine

Commercial name:

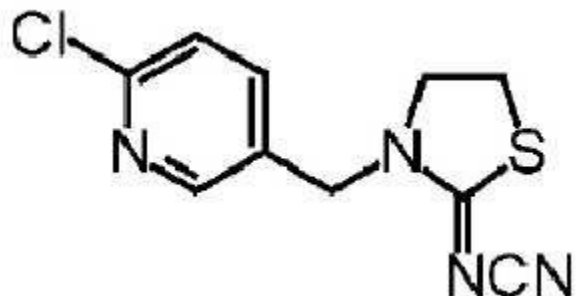
Poncho®

Company: Bayer™

# 1) Pesticides

## ▶ 1.1 New generation of pesticides + their metabolites

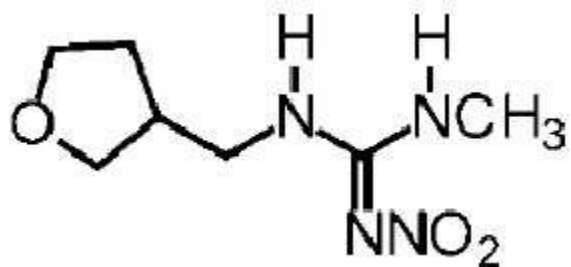
### Other neonicotinoids



◀ **Thiacloprid**  
Commercial name:  
**Calypso®**



◀ **Acetamiprid**  
Commercial name:  
**Supreme®**



◀ **Dinotefuran**  
Commercial name:  
**Safari®**

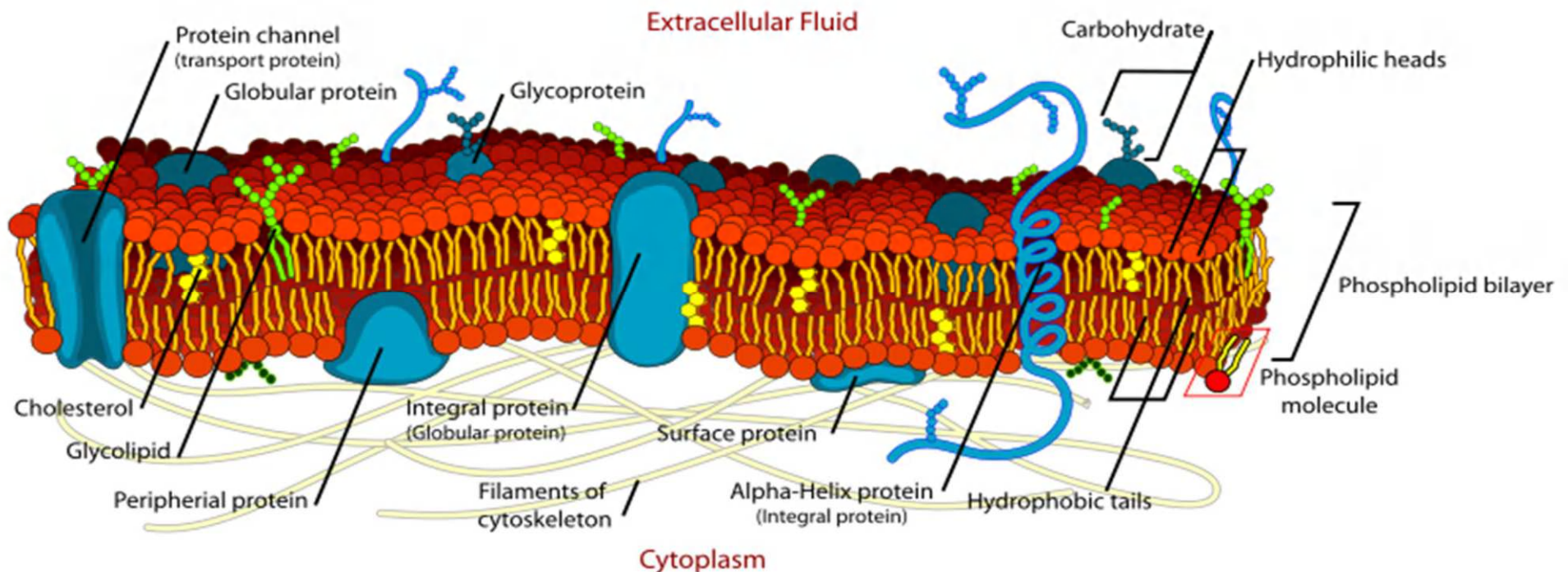


**Toxicity / Bees (LD50 ng/bee) - Dr. JM Bonmatin (CNRS) France**

<b>pesticide</b>	<b>®</b>	<b>utilisation</b>	<b>DL50 ng/ab</b>	<b>Tox/DDT</b>
<b>DDT</b>	Dinocide	<b>insecticide</b>	<b>27 000,0</b>	
<b>amitraze</b>	Apivar	<b>i/acaricide</b>	<b>12 000,0</b>	
<b>coumaphos</b>	Perizin	<b>i/acaricide</b>	<b>3 000,0</b>	
<b>tau-fluvalinate*</b>	Apistan	<b>i/acaricide</b>	<b>2 000,0</b>	
<b>methiocarb</b>	Mesurool	<b>insecticide</b>	<b>230,0</b>	
<b>carbofuran</b>	Curater	<b>insecticide</b>	<b>160,0</b>	
<b>λ-cyhalothrine</b>	Karate	<b>insecticide</b>	<b>38,0</b>	
<b>deltamethrine</b>	Décis	<b>insecticide</b>	<b>10,0</b>	
<b>thiaméthoxam</b>	Cruiser	<b>insecticide</b>	<b>5,0</b>	
<b>fipronil</b>	Regent	<b>insecticide</b>	<b>4,2</b>	
<b>clothianidine</b>	Poncho	<b>insecticide</b>	<b>4,0</b>	
<b>imidaclopride</b>	Gaucho	<b>insecticide</b>	<b>3,7</b>	

# 1) Pesticides

- ▶ 1.1 New generation of pesticides + their metabolites
- ▶ 1.2 Other conventional pesticides + their metabolites



- ▶ Pyrethrins / Pyrethroids, Oxadiazines, Phenyl pyrazoles, Oxadiazines, Phenyl pyrazoles / Cyclodienes, Chloronicotinyls, Nicotine / Spinosad, Organophosphates / Carbamates, Atropine, Macrolactones, etc.



# 1) Pesticides

- ▶ 1.1 New generation of pesticides + their metabolites
- ▶ 1.2 Other conventional pesticides + their metabolites
- ▶ 1.3 The possible synergism between them



## **1) Pesticides**

- ▶ **1.1 New generation of pesticides + their metabolites**
- ▶ **1.2 Other conventional pesticides + their metabolites**
- ▶ **1.3 The possible synergism between them**

**Proved synergy: Deltaméthrine  
+ Bifenthrine reduces the laying of  
eggs (small colony) and increases  
the larvae period (more varroas!)**



## **1) Pesticides**

- ▶ **1.1 New generation of pesticides + their metabolites**
- ▶ **1.2 Other conventional pesticides + their metabolites**
- ▶ **1.3 The possible synergism between them**
- ▶ **1.4 Other sources of intoxication**

**Sugary exudate at the base of the leaves**



# 1) Pesticides

- ▶ 1.1 New generation of pesticides + their metabolites
- ▶ 1.2 Other conventional pesticides + their metabolites
- ▶ 1.3 The possible synergism between them
- ▶ 1.4 Other sources of intoxication

**Contaminated dew and rainwater**

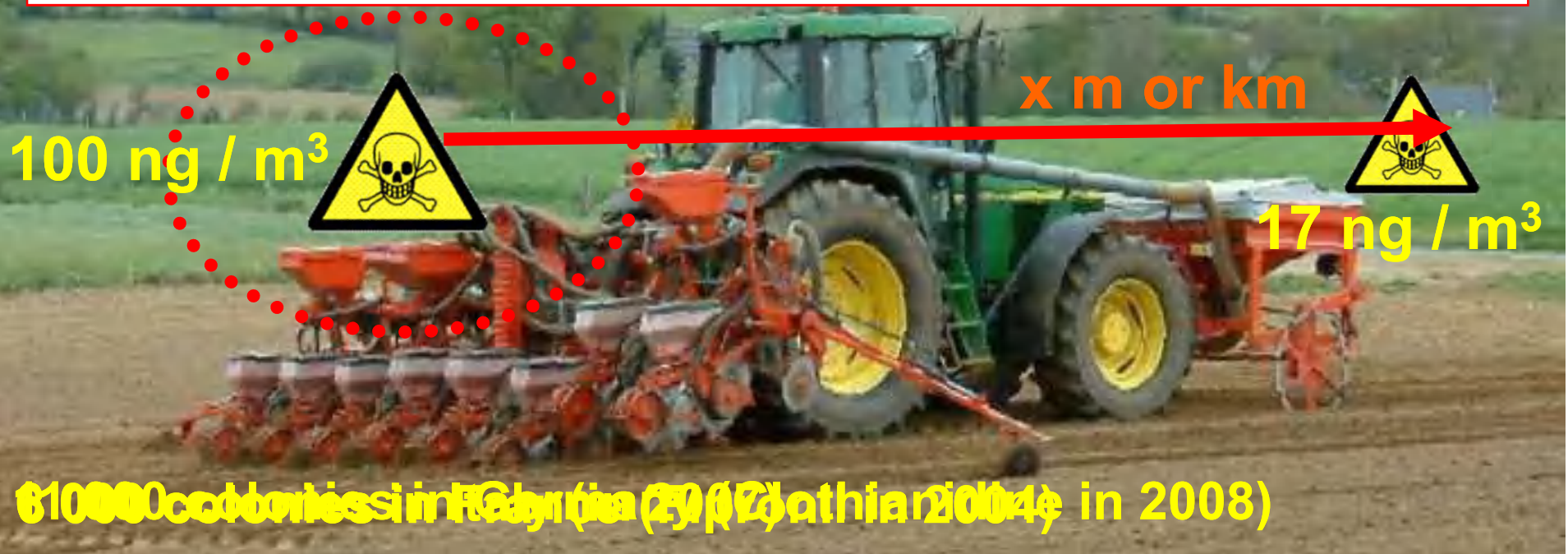




# 1) Pesticides

- ▶ 1.1 New generation of pesticides + their metabolites
- ▶ 1.2 Other conventional pesticides + their metabolites
- ▶ 1.3 The possible synergism between them
- ▶ 1.4 Other sources of intoxication

## Toxic dust behind seeders!



# 1) Pesticides

- ▶ 1.1 New generation of pesticides + their metabolites
- ▶ 1.2 Other conventional pesticides + their metabolites
- ▶ 1.3 The possible synergism between them
- ▶ 1.4 Other sources of intoxication



▶ Year 1  
Treated crops

▶ Year 2  
Untreated  
crops but  
still toxic!



**Soil remanence between two crops**



# 1) Pesticides

- ▶ 1.1 New generation of pesticides + their metabolites
- ▶ 1.2 Other conventional pesticides + their metabolites
- ▶ 1.3 The possible synergism between them
- ▶ 1.4 Other sources of intoxication



**Pollution of runoff water**



# Possible factors

- 1) **Pesticides**
- 2) **Varroas**
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions
- 7) Other endogenous pollutions
- 8) Climate changes
- 9) Synergism between factors
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# Possible factors

- 1) Pesticides
- 2) Varroas



# Possible factors

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# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet

**Monocultures  
+ weedkillers**

► **3.1 Biodiversity: decrease of pollen sources**



**Vicious circle!**









# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
  - ▶ 3.1 Biodiversity: decrease of pollen sources
  - ▶ 3.2 New generation of bee food, notably from corn



Bee metabolism  
impact

Possible traces  
of pesticides



# Possible factors

**1) Pesticides**

**2) Varroas**

**3) Bee diet**

- ▶ **3.1 Biodiversity: decrease of pollen sources**
- ▶ **3.2 New generation of bee food, notably from corn**
- ▶ **3.3 GMO: Genetically Modified Organisms**



# Possible factors

- 1) Pesticides
- 2) Varroas
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# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management

► 4.1 Multiplication of migration = stress of the colonies



Thousands  
of km



several  
times  
/ year



# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
  - ▶ 4.1 Multiplication of migrations = stress of the colonies
  - ▶ 4.2 Social concentration = overgrazing  
+ unhealthy environment



**10 000 beehives on the same  
spot for *Pinus brutea* honeydew!**



**West  
Turkey**



# Rounding-up in the USA before migration on almond trees





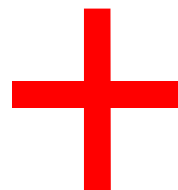
# Rounding-up in Japan before migration via ferry-boat



# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management

- ▶ 4.1 Multiplication of migrations = stress of the colonies
- ▶ 4.2 Social concentration, overgrazing and affected environ.
- ▶ 4.3 Queens and package bees international trade



**A) Biotope  
inadequacy  
B) Disease  
vectors**



# Possible factors

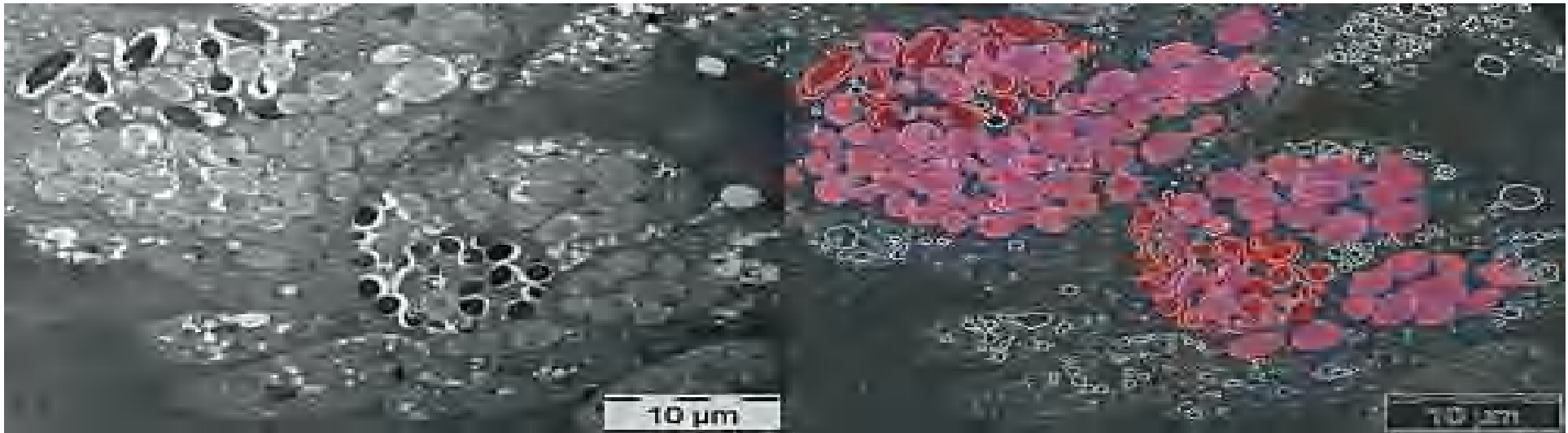
- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
  - ▶ 4.1 Multiplication of migrations = stress of the colonies
  - ▶ 4.2 Social concentration, overgrazing and affected environ.
  - ▶ 4.3 Queens and package bees international trade
  - ▶ 4.4 Repetitive feeding
  - ▶ 4.5 Prophylactic use of antibiotics every year!



# Possible factors

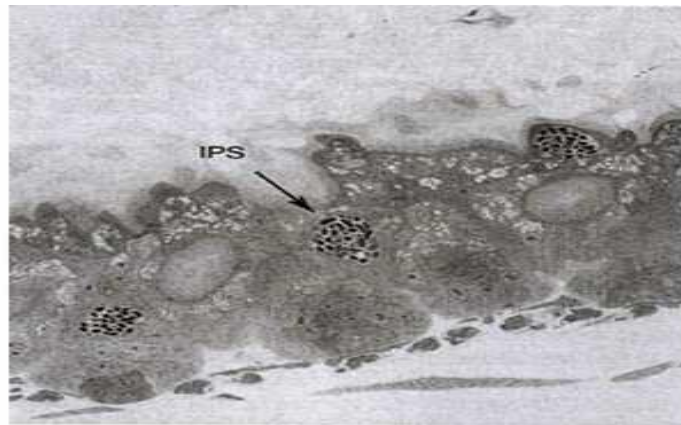
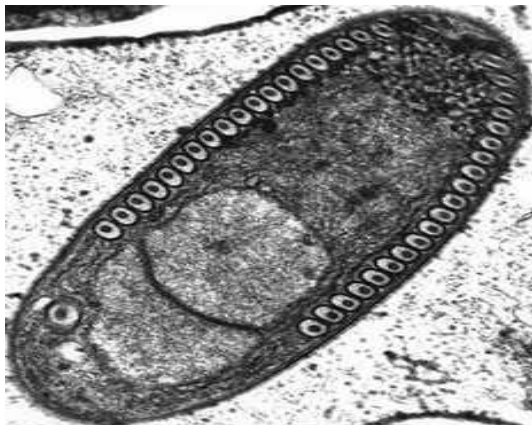
- 1) Pesticides
- 2) Varroas
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# Possible factors



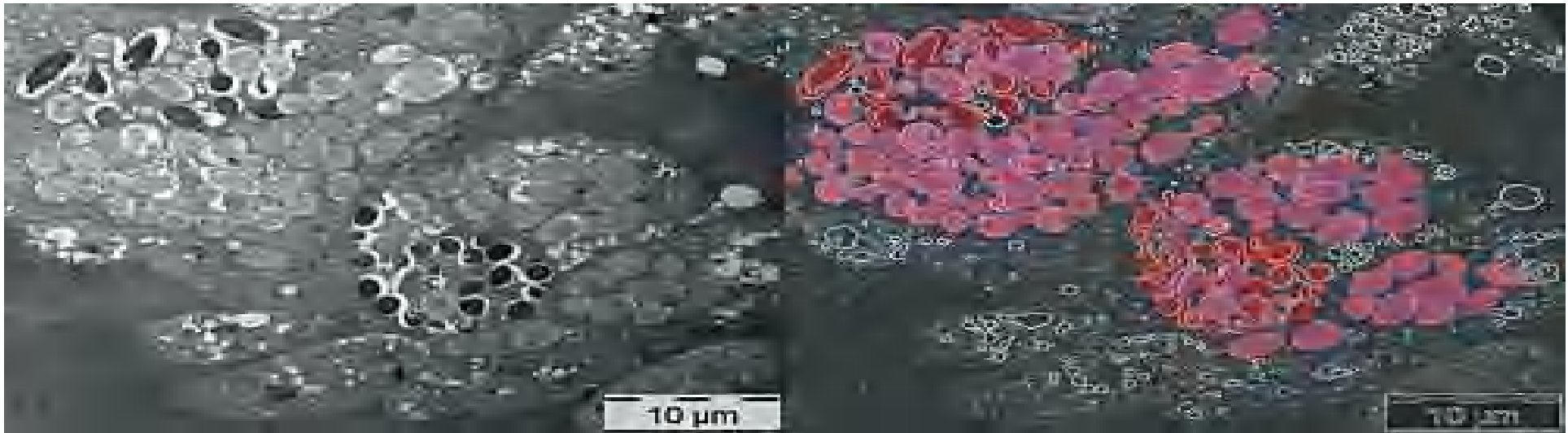
## ► 5.1 *Nosema ceranae*

Opportunistic? / Marker?





# Possible factors



## ► 5.1 *Nosema ceranae*

**Proved synergy: Imidaclopride affects the glucose-oxydase activity (sterilization of the internal environment, included food)**

# Possible factors

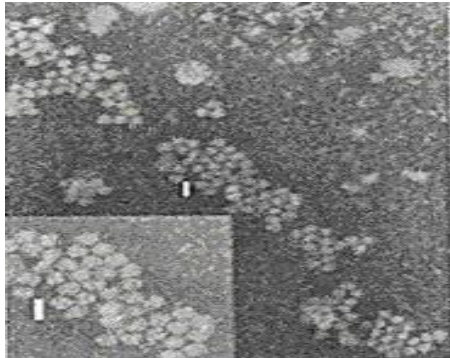
- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism

▶ 5.1 *Nosema ceranae*

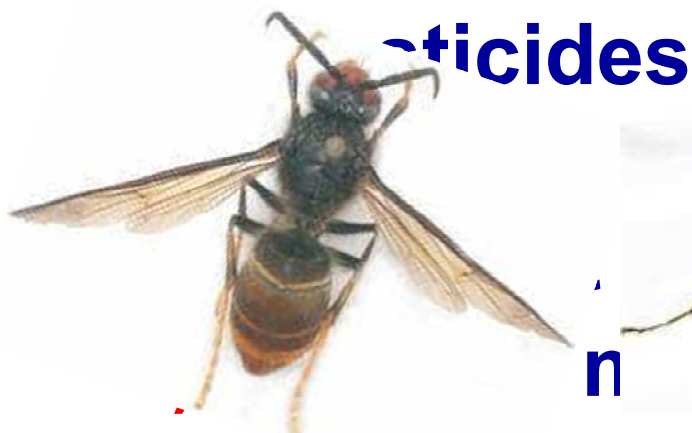
Opportunistic? / Marker?

▶ 5.2 IAPV = Israeli Acute Paralysis Virus

Opportunistic?  
/ Marker?



# Possible factors



pesticides



## 5) Diseases, virosis and parasitism

Asian hornet

▶ 5.1 Nosema ceranae

“Crazy ants” Raspberry

Small beetle

Vespa velutina

Paratrechina longicornis

Aethina tumida

▶ 5.2 IAPV = Israel Acute Paralysis Virus

▶ 5.3 Arrival of new parasites and predators



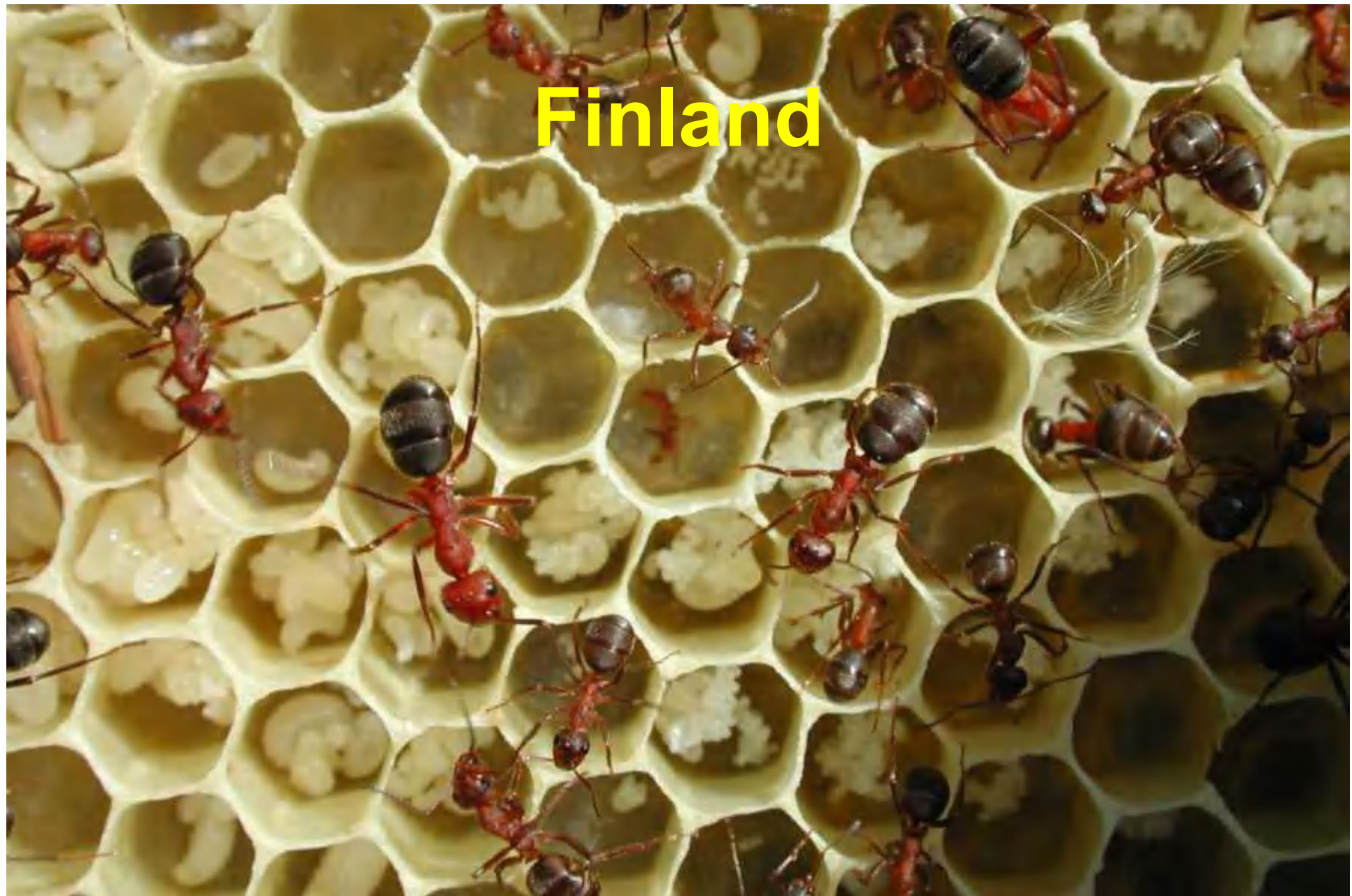
Fly

Senotainia tricuspidis









# Possible factors

- 1) Pesticides
- 2) Varroas
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- 5) Diseases, virosis and parasitism
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# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions
  - ▶ 6.1 Industrial



# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions

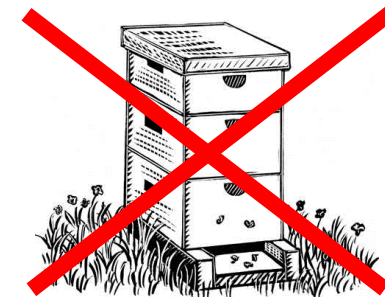
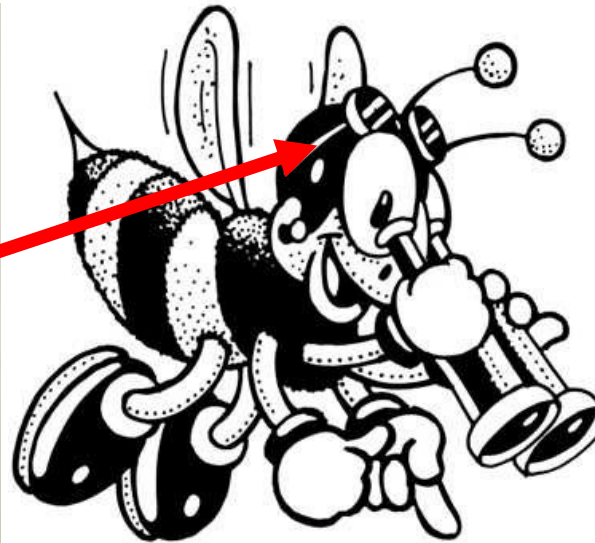
▶ 6.1 Industrial

▶ 6.2 Agricultural (other than on crops)

▶ 6.3 Pollution

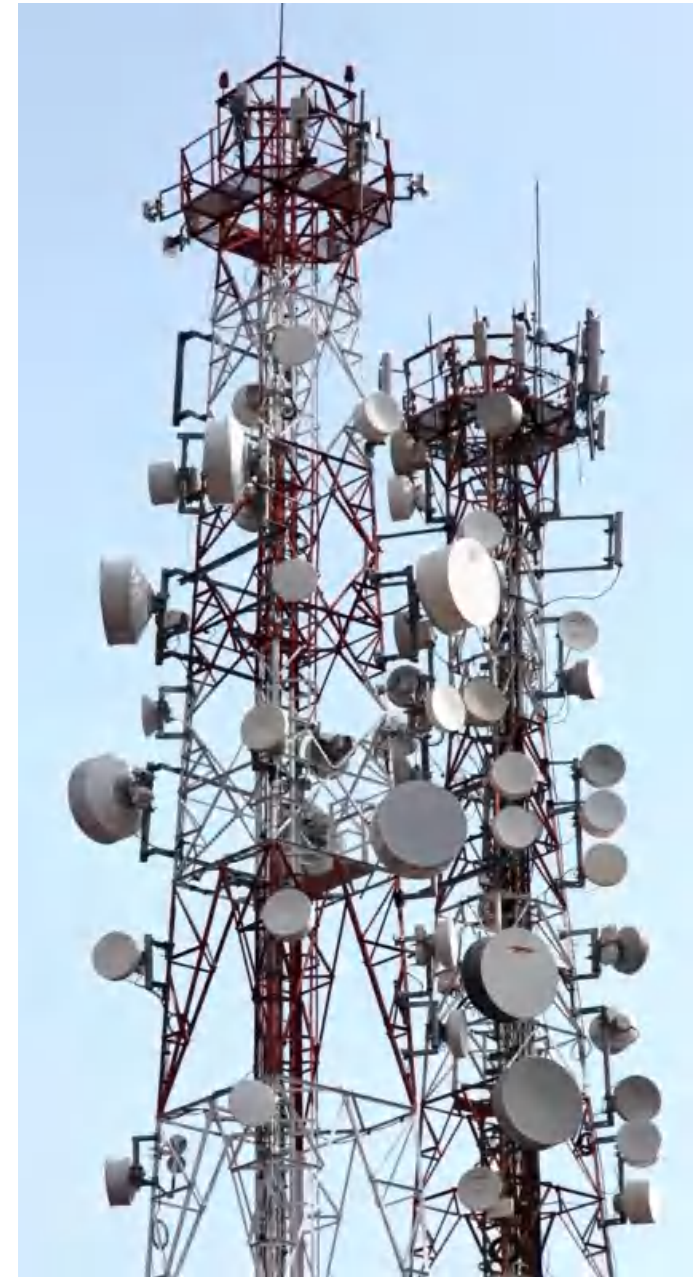
Treatments against *Gasterophilus* on wild grapevine in "Reunion" island





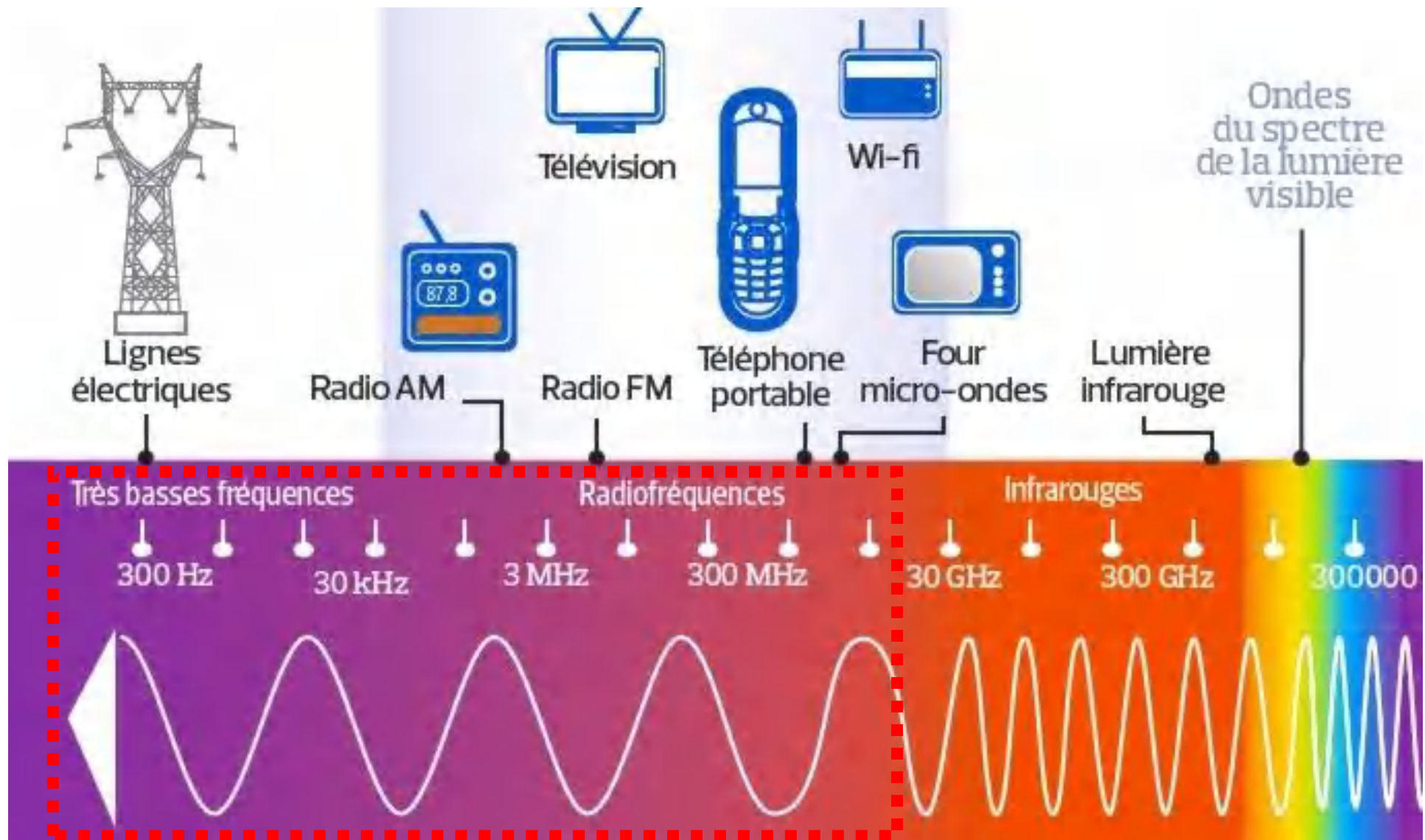
**Controversial subject involving several sources:  
GMS + Edge + UMTS + HDPSA+ Wifi + WiMax + HD TV  
+ meteorological radars + satellites, etc.**













# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions
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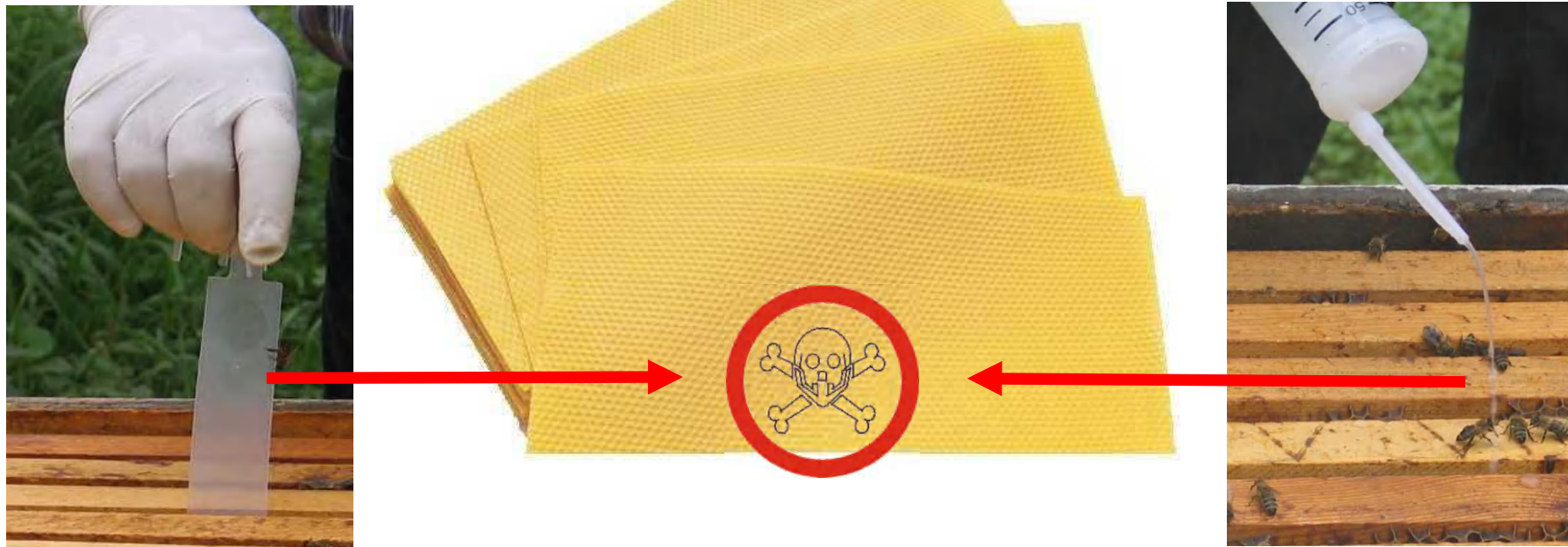
# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions
- 7) Other endogenous pollutions
  - ▶ 7.1 Accumulation varroa treatments in wax + metabolites





**The accumulation of two miticides (tau-fluvalinate + coumaphos) in wax could block the detoxification action of bee enzymes against pesticides**







# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
- 4) Colony management
- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions
- 7) Other endogenous pollutions
  - ▶ 7.1 Accumulation varroa treatments in wax + metabolites
  - ▶ 7.2 Do-it-yourself treatments against bee diseases/parasites





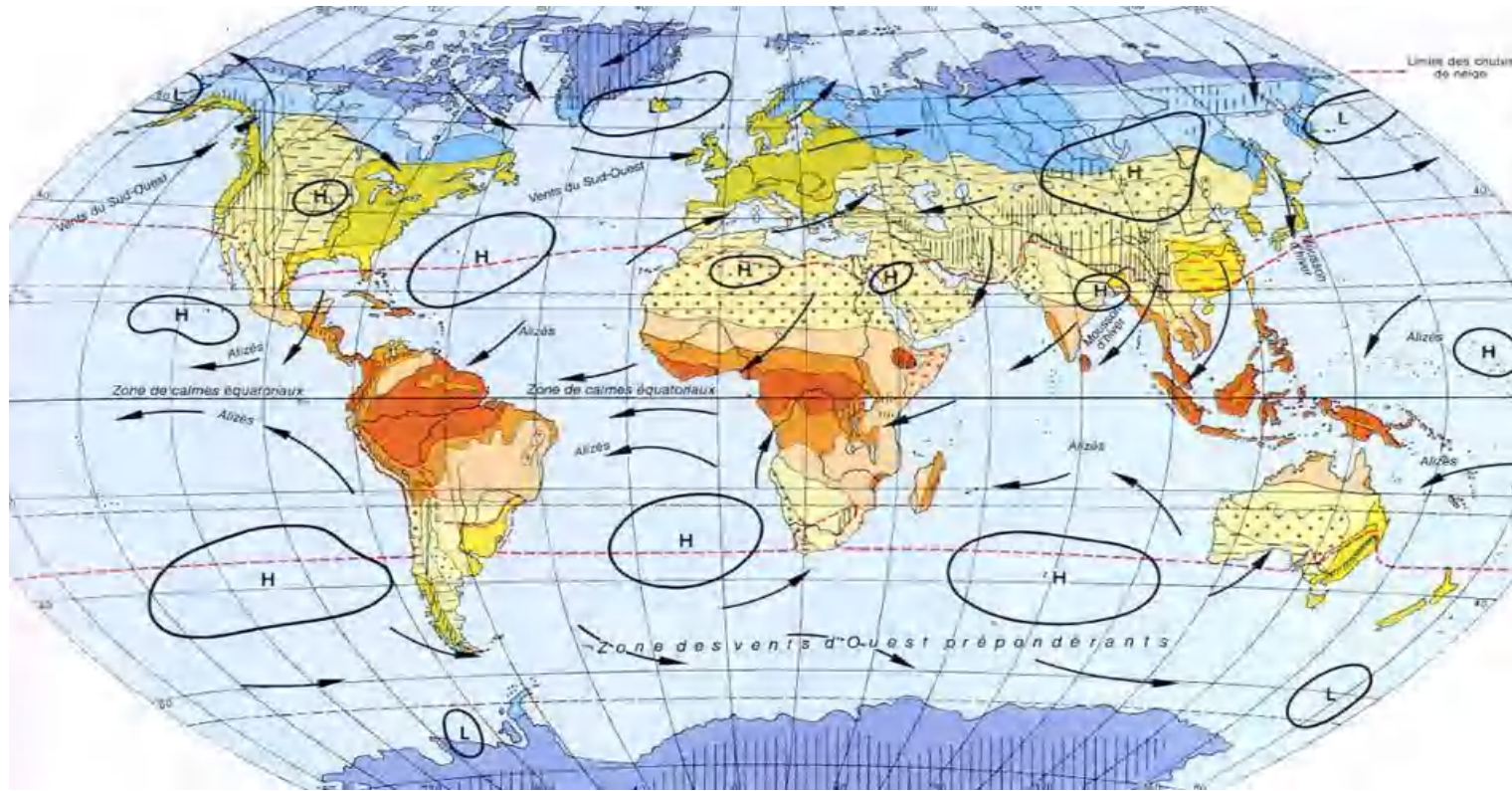
# Possible factors



## ► 7.3 Products to protect wood



# Possible factors



- ➔
- 8) **Climate changes**
  - 9) Synergism between factors
  - 10) Single factor still unknown



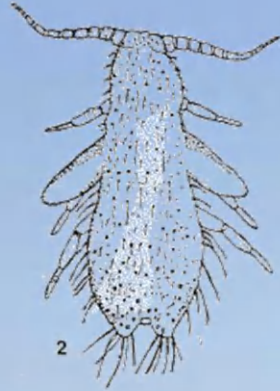


► **8.1 More frequent droughts and fires**



► **8.2 More frequent floods**





## *Marchalina hellenica* Genn.

(Sternorrhyncha: Coccina: Margarodidae)

## *Pinus brutea*

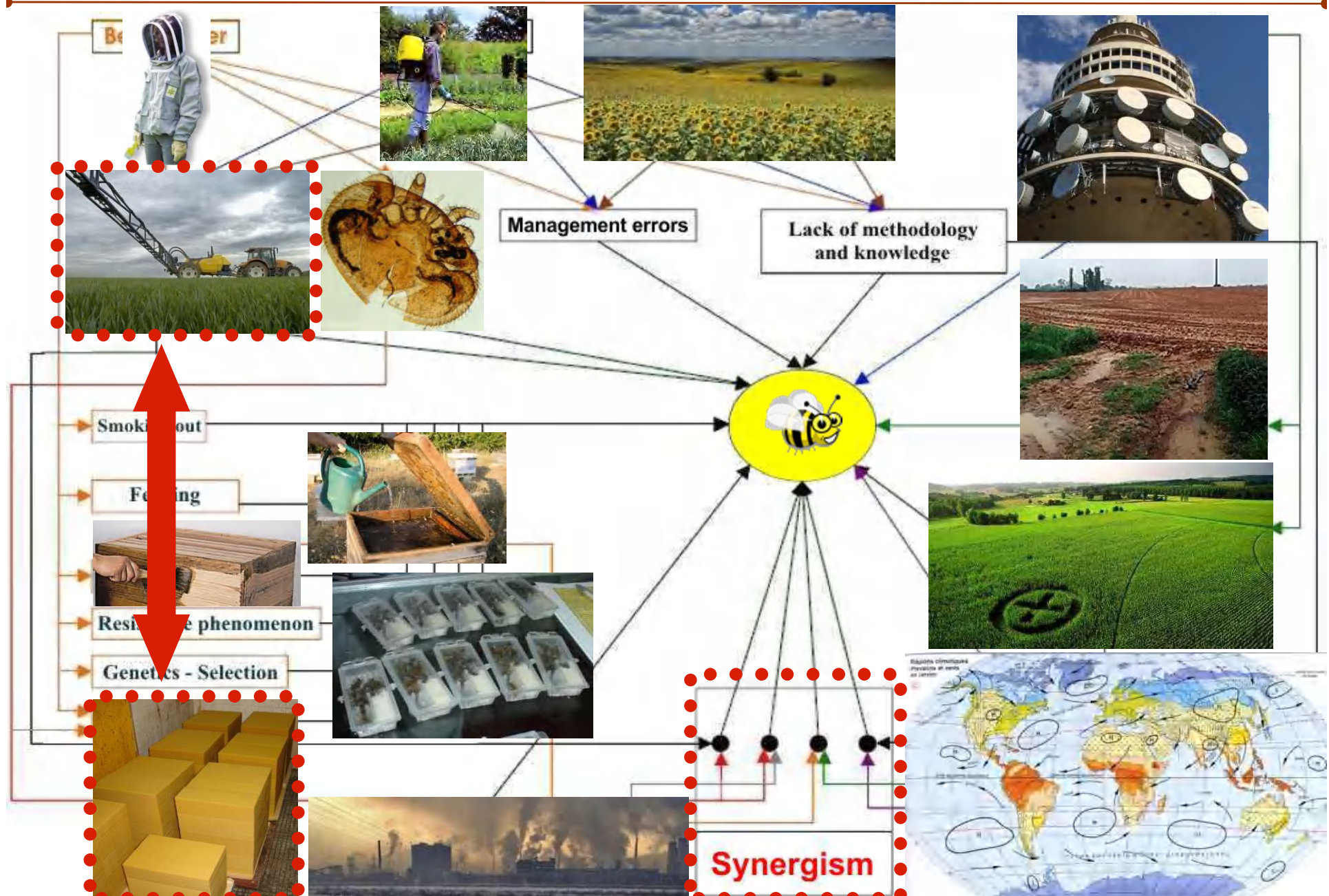


► 8.3 Decrease in aphid population



# Possible factors

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- ➔ 8) Climate changes
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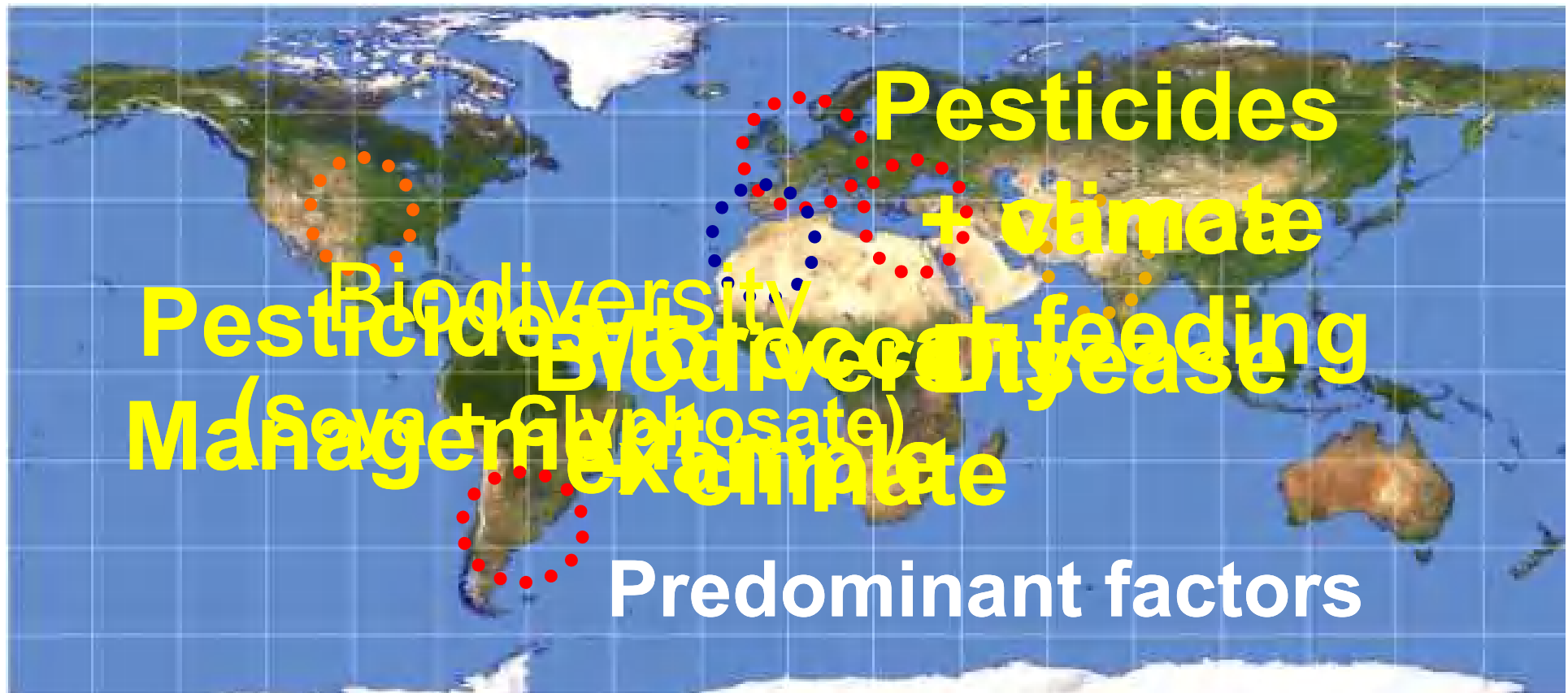








# Different readings depending on the local context



# Possible factors

- 1) Pesticides
- 2) Varroas
- 3) Bee diet
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- 5) Diseases, virosis and parasitism
- 6) Other exogenous pollutions
- 7) Other endogenous pollutions
- 8) Climate changes

# Possible factors

- 1) Varroas
- 3) Bee diet
- 2) Colony management
- 3)
- 8) Climate changes








# Plants pulled up by the shepherds



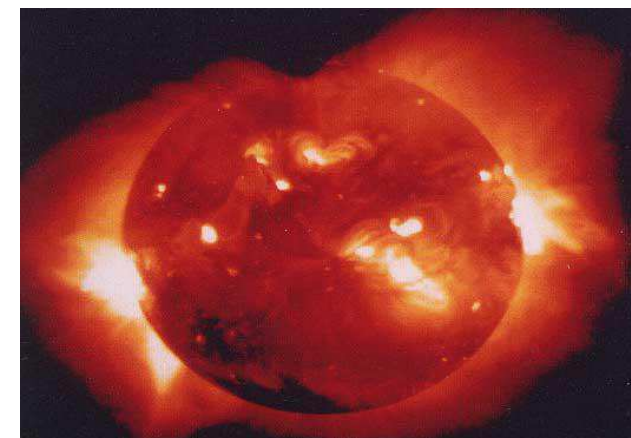
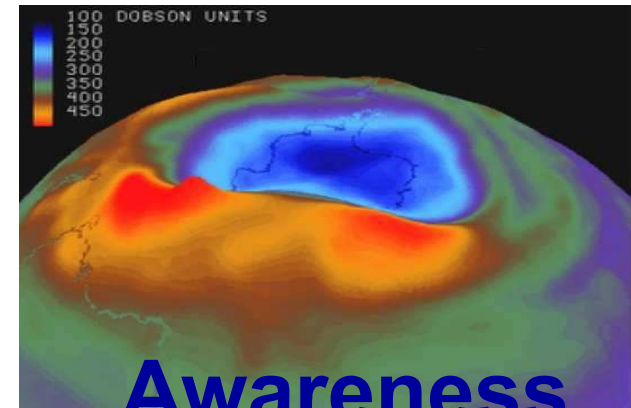
~~Thyme (*Thymus* sp.)  
and Oregano (*Origanum vulgare*)~~




# Possible factors

- 1) Pesticides
  - 2) Varroas
  - 3) Bee diet
  - 4) Colony management
  - 5) Diseases, virosis and parasitism
  - 6) Other exogenous pollutions
  - 7) Other endogenous pollutions
  - 8) Climate changes
  - 9) Synergism between factors
  - 10) Single factor still unknown
- 



- 11) Eccentric factors**
- A) Ozone depletion**
  - B) Plane trails**
  - C) Solar eruptions**
  - D) Apocalypse described by few religious fanatics**



 Keywords	 French pages	 English pages
bee mortality diseases	852 000	123.000
bee mortality pesticides	65 100	113.000
bee mortality varroa	42 500	51.500
bee mortality “climate change”	36 900	43.700
bee mortality biodiversity	287 000	38.500
bee mortality (GMO OR OGM)	10 300	25.000
bee mortality “ <i>Nosema ceranae</i> ”	2 930	16.300
bee mortality stress colonies migration	415	13.700
bee mortality (“Israeli Acute Paralysis Virus” OR IAPV)	1 710	5.900
bee mortality (“queen rearing” OR “queen breeding”)	25 000	1.880
bee mortality “water pollution”	1 990	616
bee mortality (“hertzian pollution” OR electrosmog)	505	491
bee mortality sugar feeding	13 600	430

# To sum up

- ▶ The weakening of bee colonies and the abnormal mortality rate could be due to the result of multiple factors, combined differently according to the biotopes and bee management.

- ▶ The bee's immune system is thereby diminished and beekeepers no longer have room for error!



# Management under Organic Standards

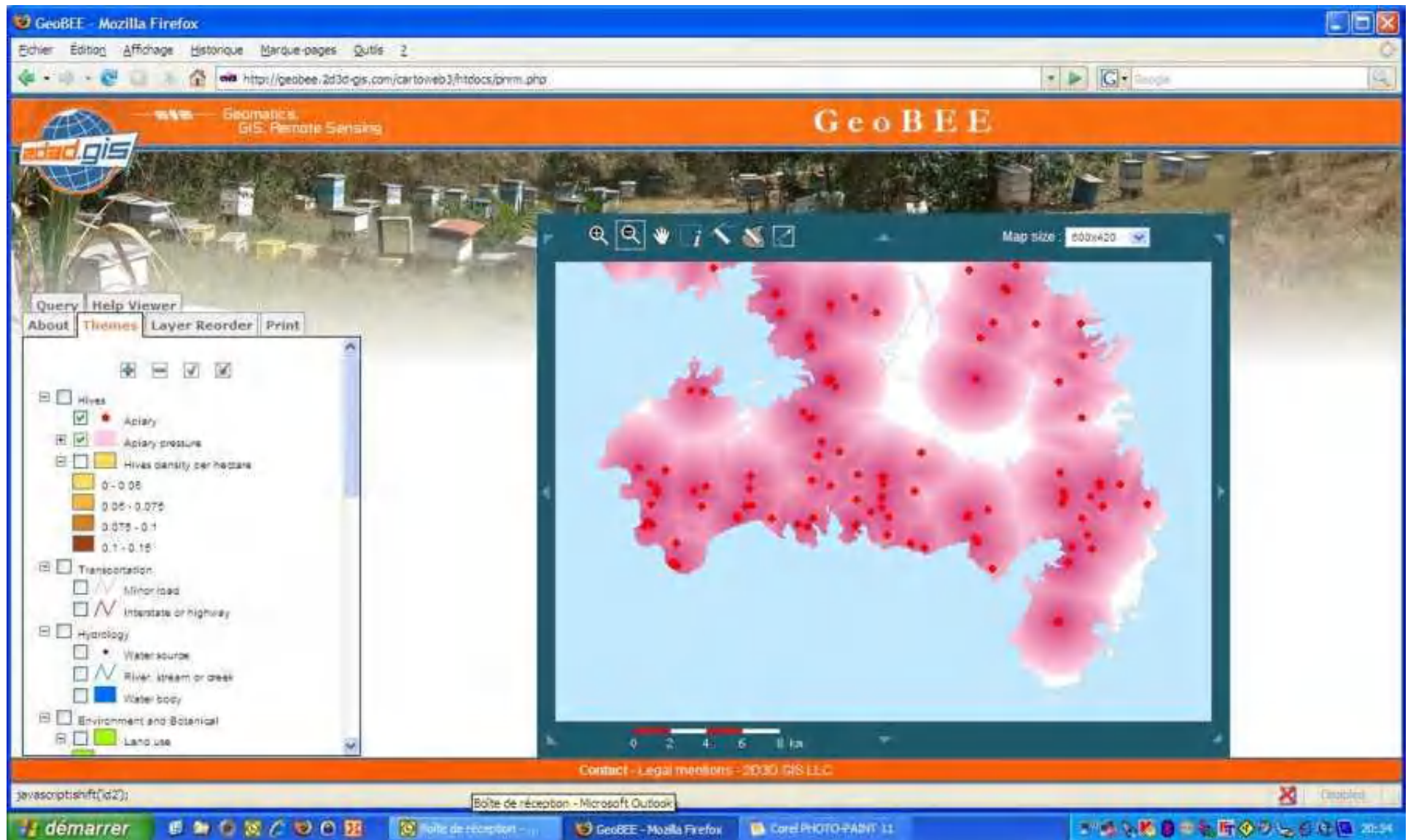
24 points  
To eliminate  
to respect.  
a part  
6 can be  
of possible  
important  
reasons of  
regarding  
Bee Losses?  
Bee Losses?

Belgium (private)	Denmark (state)	Germany (state)
		
Netherlands (state)	Norway (private)	Austria (state)
		
Switzerland (private)	Finland (state)	France (state)
		
Spain (state)	Czech Republic (state)	Sweden (private)
		

# Possible factors

- 1) **[REDACTED]**
- 2) **Varroas**
- 3) **Bee diet**
- 4) **Colony management**
- 5) **Diseases, virosis and parasitism**
- 6) **Other exogenous pollutions**
- 7) **Other endogenous pollutions**
- 8) **Climate changes**

# First: good location of the apiaries!





# Possible factors

- 1) **[REDACTED]**
- 2) **Varroas**
- 3) **[REDACTED]**
- 4) **Colony management**
- 5) **Diseases, virosis and parasitism**
- 6) **Other exogenous pollutions**
- 7) **Other endogenous pollutions**
- 8) **Climate changes**

# Feeding with honey sirup



# Possible factors

- 1) [REDACTED]
- 2) **Varroas**
- 3) [REDACTED]
- 4) [REDACTED]
- 5) **Diseases, virosis and parasitism**
- 6) **Other exogenous pollutions**
- 7) **Other endogenous pollutions**
- 8) **Climate changes**



# Reasonable migrations



# Possible factors

- 1) [REDACTED]
- 2) **Varroas**
- 3) [REDACTED]
- 4) [REDACTED]
- 5) [REDACTED]
- 6) **Other exogenous pollutions**
- 7) **Other endogenous pollutions**
- 8) **Climate changes**



# Biological material sources

## Preference is given to the use of local ecotypes of bees





# Possible factors

- 1) [REDACTED]
- 2) **Varroas**
- 3) [REDACTED]
- 4) [REDACTED]
- 5) [REDACTED]
- 6) [REDACTED]
- 7) **Other endogenous pollutions**
- 8) **Climate changes**

# Again the choice of the location



# Possible factors

- 1) [REDACTED]
- 2) **Varroas**
- 3) [REDACTED]
- 4) [REDACTED]
- 5) [REDACTED]
- 6) [REDACTED]
- 7) [REDACTED]
- 8) **Climate changes**





**Internal recycling or use of org. wax**

# Possible factors

- 1) [REDACTED]
- 2) **Varroas**
- 3) [REDACTED]
- 4) [REDACTED]
- 5) [REDACTED]
- 6) [REDACTED]
- 7) [REDACTED]
- 8) **Climate changes**



The background of the slide is a photograph of a bright sun in a clear blue sky, creating a lens flare effect. In the foreground, there is a green field with a beehive visible on the right side. A large tree is partially visible on the right side of the frame.

**The international beekeeping sector  
is in trouble!**

**We cannot simply count on the  
resilience of our bees...**

**We have to work together to save  
them and all other pollinators  
to help preserve biodiversity.**

**Organic productions (agriculture +  
beekeeping) is **THE** solution!**





**To be(e) or not to be(e)!**

**Thank you**

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gilles@apiservices.com**