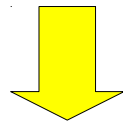


# **Varroa out of control**

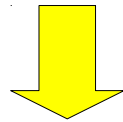
**Pesticides as a single cause for colony collapse disorder and decline of pollination insects**

# cause - effect

pesticides

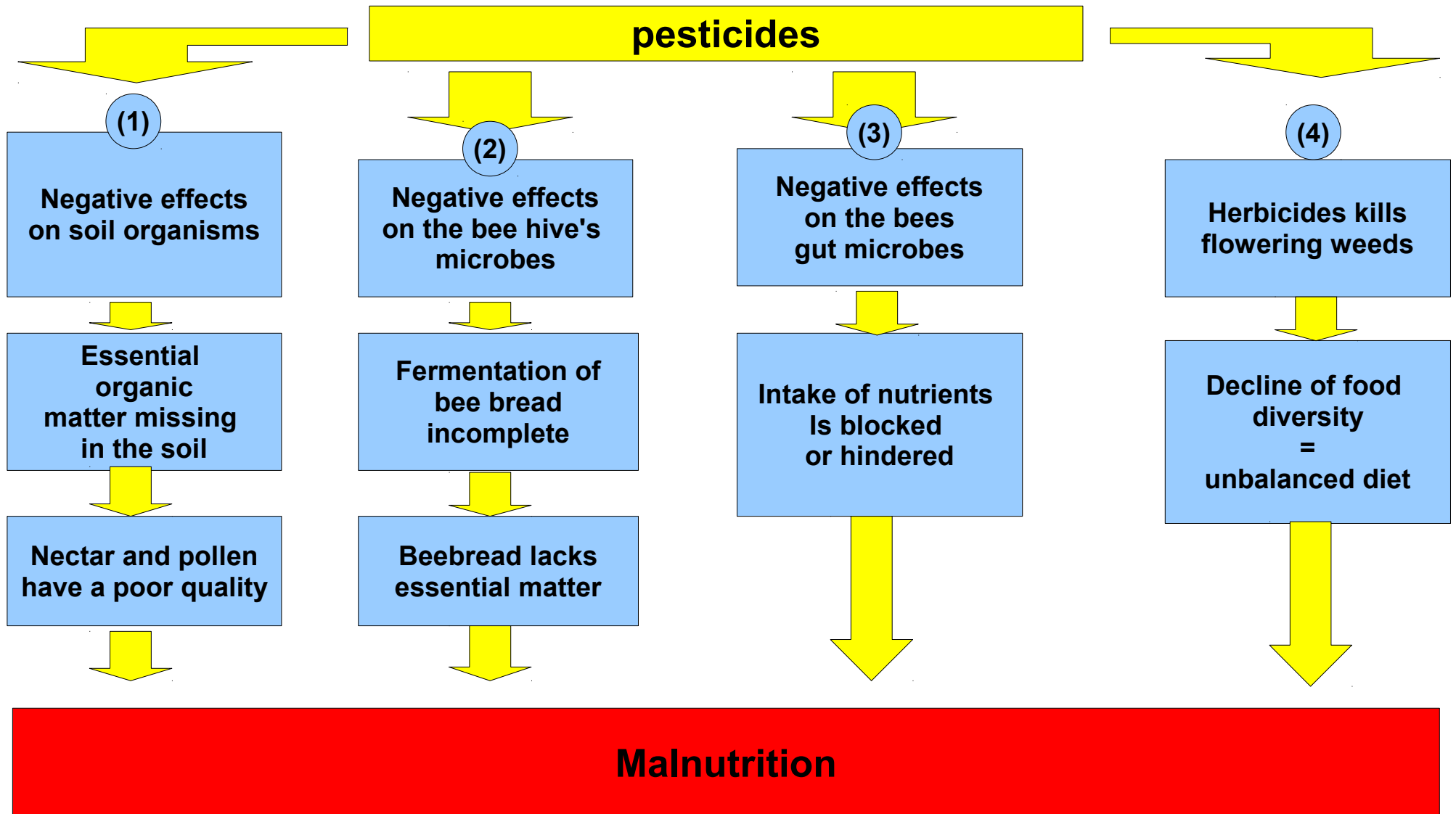


weakening of the immune system



Colony collapse (through varroa, viruses, nosema...)

# Pesticides cause malnutrition



# **(1) Negative effects on soil organisms**

- Soil organisms, which are responsible for the building of organic matter, especially the preforms of organic molecules are disturbed by the pesticide cocktails (as monoculture and of course ploughing does).
- As a result the soil lacks humin acids, fatty acids, pro-proteins – plants growing on such a soil cannot build essential nutrients. The plants are of a poor nutritional quality.
- Nectar and pollen lack essential nutrients – which causes malnutrition.

## **(2) Negative effects on the beehive's microbes**

- Pollen gets fermented by fungi, enzymes, bacteria and other microbes. The result is beebread. So microbes prepare the food for bees.
- During the fermentation the microbes produce enzymes, vitamin k, vitamin b and fatty acids as well as lactic acid.
- Of course fungicides do disturb the work of fungi. Some acaricides used against varroa also are anti-bacterial which especially effects the lactic acid bacteria.
- The disturbance by pesticides prevent a normal fermentation of bee bread. This leads to a deficiency of vitamins and fatty acids and causes digestive problems.
- This leads to malnutrition.

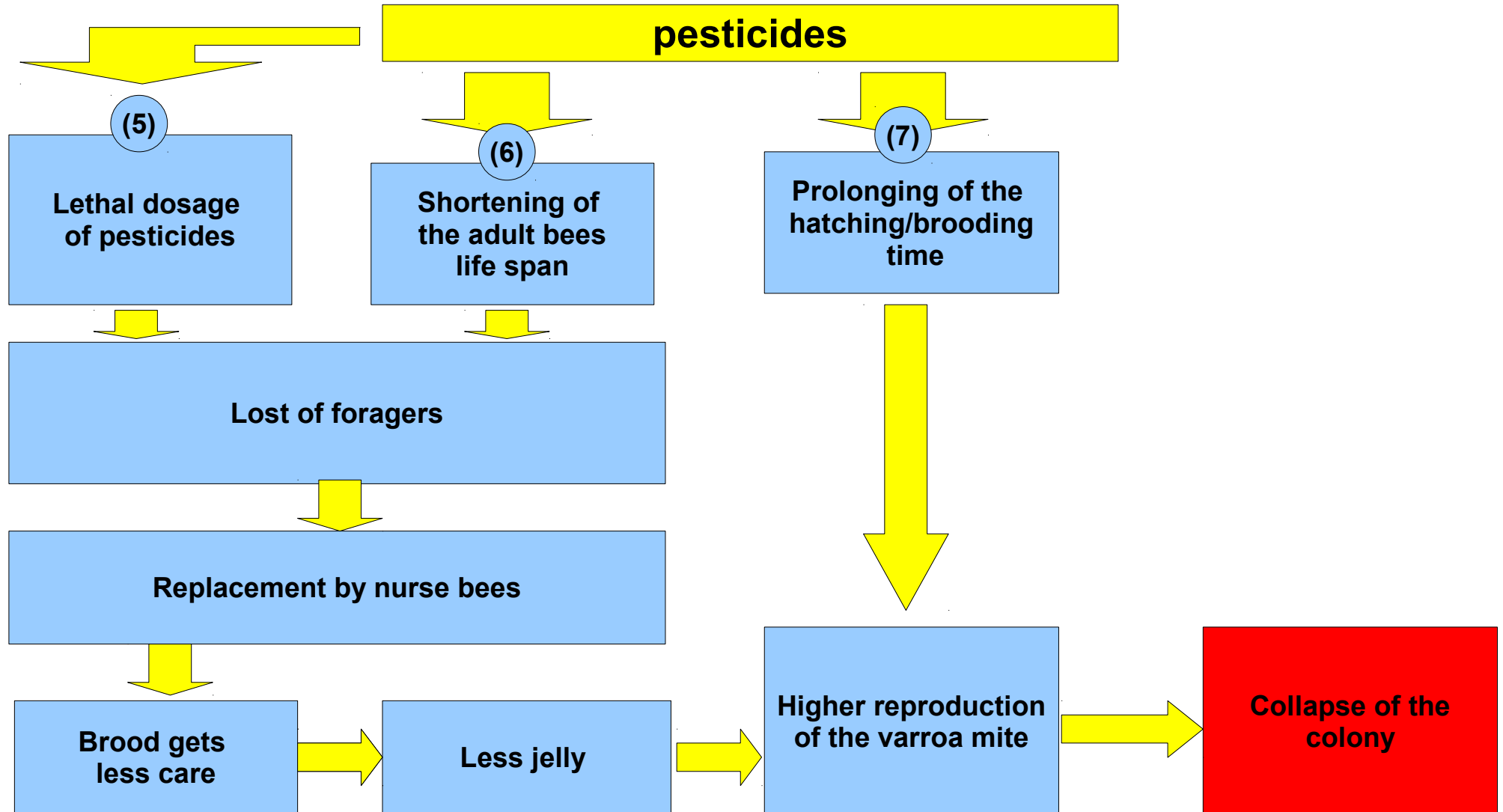
### **(3) Negative effects on the microbes in the bees' guts**

- In the gut and in the glands of the honeybee there live microbes, for example lactic acid bacteria. The honeybee does have species of lactic acid bacteria, which only can be found in honeybees – nowhere else.
- Those prepare food so the nutrients can be digested and taken up into the body of the bee.
- Through anti-bacterial and fungicidal effects pesticide cocktails block out nutrients (anti-nutrient).
- This leads to malnutrition.

## **(4) Herbicides kill flowering weeds**

- Herbicides used in agriculture kill off all the smaller weeds with flowers.
- That leads to a decline of food sources diversity.
- The result is, that the diet is unbalanced.
- Because of the missing weeds, the nectar flow is interrupted – there are huge time gaps between main nectar flows.
- This leads to malnutrition.

# More pesticide effects





## (5) Direct effect of pesticides

- High dosages of insecticides kill off the foragers in the field. This leads to a dramatic loss of foragers
- If the contaminated foragers make it back to the hive, the brood and nurse bees also get effected. This leads to dramatic losses and collapses in and in front of the hive.
- The loss of foragers is replaced with young nurse bees, recruited for foraging.
- The result is, that the brood gets less care and less jelly (food).
- The varroa mite enters the cells before cells get sealed. The mite hides in the jelly where the mite is some sort of paralysed. Not until the jelly is used up by the honeybee larvae, the mite activates again.
- This means, the lower the jelly reserve, the earlier the mite starts to reproduce. The more jelly, the longer the mite is paralysed.
- **If the jelly is low, the mite reproduction gets out of control.**
- **It costs the bees a lot of energy to replace the loss of foragers, next to it the parasitic pressure increases.**

## **(6) Indirect effect of pesticides through shortening the life span of the foragers**

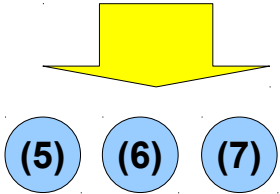
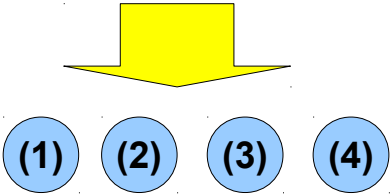
- In several studies it has been found that several pesticides shorten the lifespan of honeybee foragers.
- That means a loss of foragers.
- The loss of foragers is replaced with young nurse bees, recruited for foraging.
- The result is, that the brood gets less care and less jelly (food).
- The varroa mite enters the cells before cells get sealed. The mite hides in the jelly where the mite is some sort of paralysed. Not until the jelly is used up by the honeybee larvae, the mite activates again.
- This means, the lower the jelly reserve, the earlier the mite starts to reproduce. The more jelly, the longer the mite is paralysed.
- **If the jelly is low, the mite reproduction gets out of control.**
- It costs the bees a lot of energy to replace the loss of foragers, next to it the parasitic pressure increases.
- **This also implements problems for the bees turning summer into winterbees.**

## **(7) Indirect effects of pesticides through prolonging hatching time**

- It has been found, that pesticides prolong the time bees need to hatch.
- This significantly increases the varroa mite's chance to reproduce. Because not only that the mite grows up – it gets mated successfully as well.
- **Reproduction of the varroa mite gets out of control.**

# Overview

**Pesticides**



**malnutrition**

**pathogens**

**weakening of the immune system**

**collapse through illnesses (varroa, viruses, nosema)**

# literature (a)

- **Spritzmittel halbieren Artenvielfalt**
  - <http://www.imkerdemo.de/2010/02/spritzmittel-halbieren-artenvielfalt/>
- **Fungizide stören Darmflora des Bien**
  - <http://www.imkerdemo.de/2011/03/900/>
- **Wirkung von Pestizidrückständen im Wachs der Brutwaben**
  - <http://www.imkerdemo.de/2011/03/studie-wirkung-von-pestizidrueckstaenden-im-wachs-der-brutwaben/>
- **Zusammenfassung zur Situation**
  - <http://www.imkerdemo.de/2011/02/bienensterben-zusammenfassung-zur-situation/>
- **Neonicotinoide im Honig**
  - <http://www.imkerdemo.de/2010/07/neonicotinoide-im-honig/>
- **Imidacloprid begünstigt Nosema**
  - <http://www.imkerdemo.de/2010/05/studie-imidacloprid-begunstigt-nosema-bei-honigbienen/>
- **Pestizide im Bienenstock**
  - <http://www.imkerdemo.de/2010/03/hoher-gehalt-an-pflanzenschutzmitteln-und-varroaziden/>

# literature (b)

- **Bienen mit Pflanzenschutzmitteln belastet**
  - <http://www.imkerdemo.de/2010/02/bienen-mit-pflanzenschutzmitteln-belastet/>
- **Imidacloprid stört Sammelverhalten der Honigbienen**
  - <http://www.imkerdemo.de/2009/01/studie-suletale-dosis-imidacloprid-stort-sammelverhalten-der-honigbienen/>
- **Imidacloprid verursacht längere Entwicklungszeiten der Bienenbrut**
  - <http://www.imkerdemo.de/2008/10/aktuelle-studie-imidacloprid-verursacht-langere-entwicklungszeiten-der-brut/>
- **Recherche zu systemischen Insektiziden (Stand: Ende 2008) – mit ausführlichem Literaturverzeichnis**
  - <http://www.imkerdemo.de/hintergrundinformationen/recherche-zu-systemischen-insektiziden/>
- **Varroa und Futtersaft**
  - Noch vor die Brutzelle gedeckelt wird, dringt die Varroa Milbe in die Zelle ein ... Sie wandert darauf am Zellwand hinunter und versenkt sich im Futtersaft der Bienenmade. Im Saft angelangt wird sie bewegungsunfähig und scheint tot. Die Varroa Milbe bleibt solange bewegungslos, bis der ganze Futtersaft von der Bienenmade gefressen wurde. Das dauert ca. 24 bis 30 Stunden. Die meisten Milben erwachen wieder zum Ende des 9. Tages und setzen sich nun auf die Maden, von der sie sich nun ernährt.
  - <http://www.bienenfreunde.ch/default.php?sn=VarroaDev>
  - <http://www.ars.usda.gov/Services/docs.htm?docid=2744&page=14>

# Questions? Contact:

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