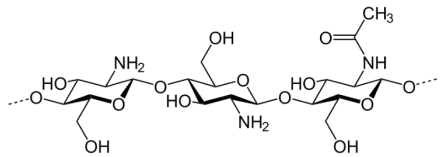


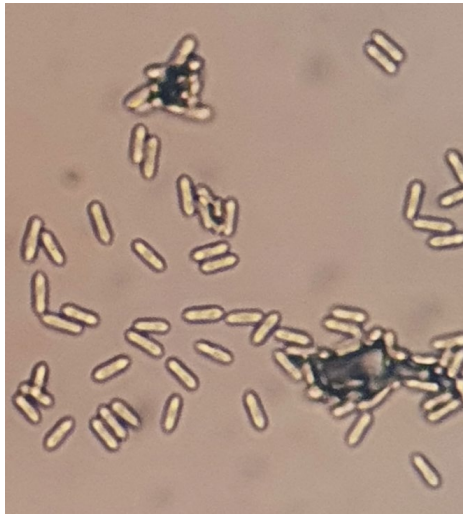

# Biologische Schädlingsbekämpfung mit Mikroorganismen und natürlichen Extrakten

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# Bodeninsekten

# Maikäferverbreitung

**3 year cycle:**

**Urner flight, 2018**

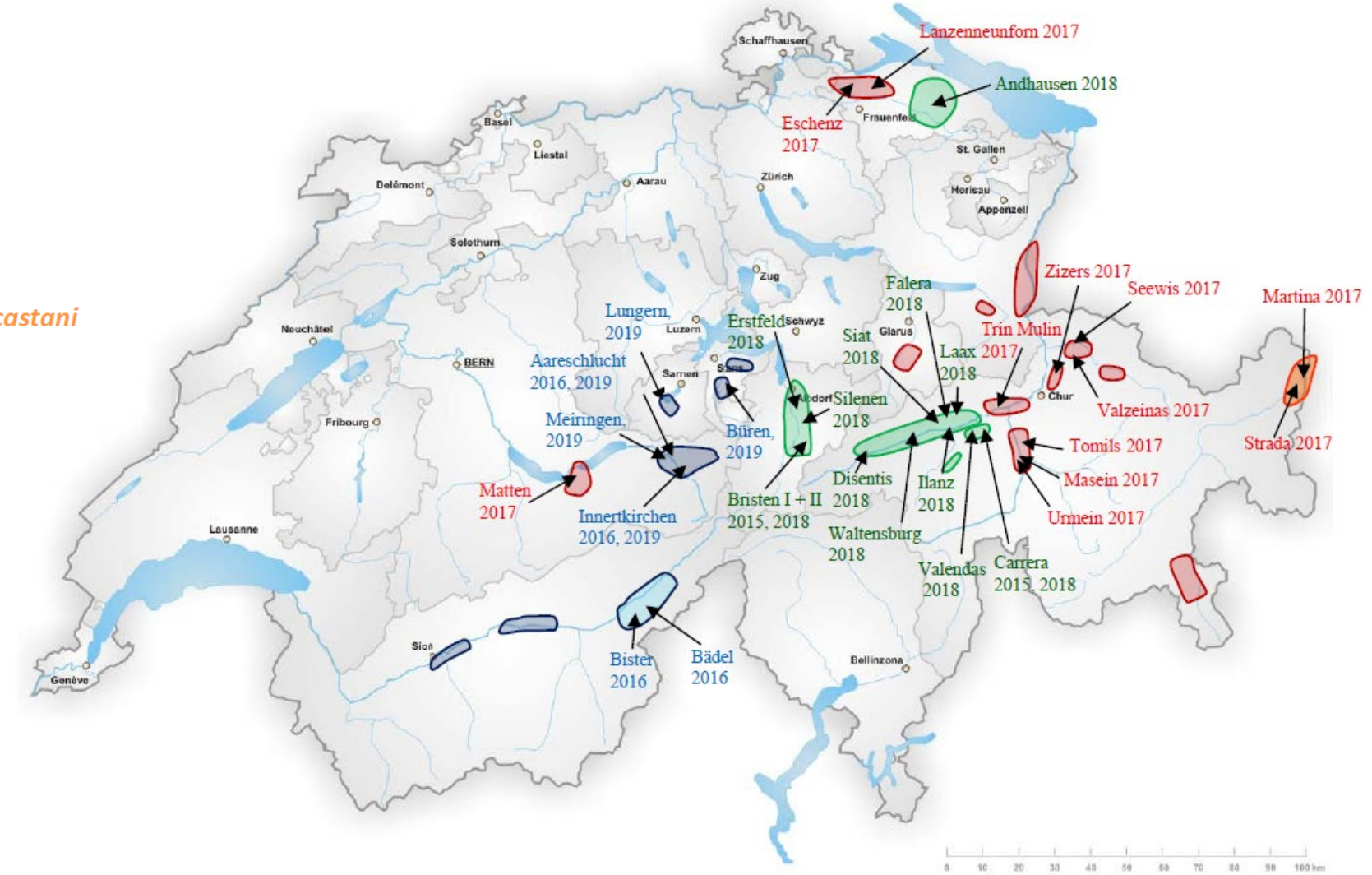
**Basler flight, 2019**

**Berner flight, 2017**

**Berner flight, 2017 mixed with *M. hippocastani***

**4 year cycle:**

**Flight 2016**

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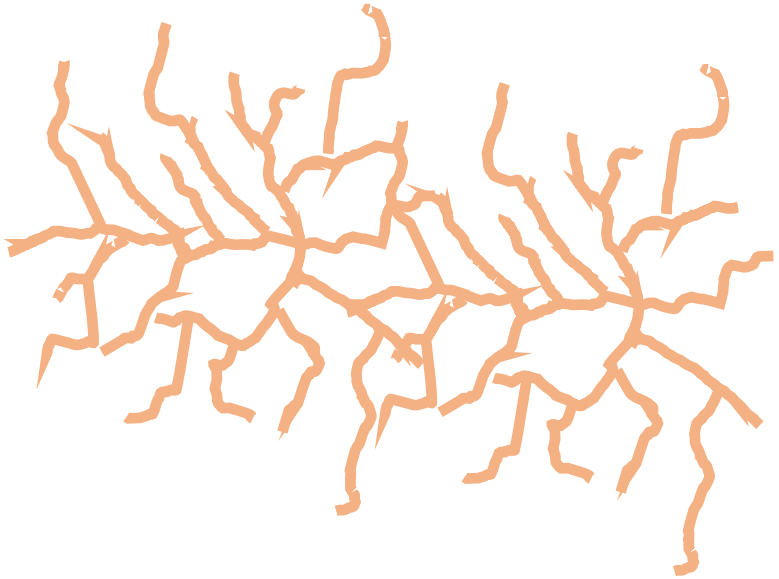
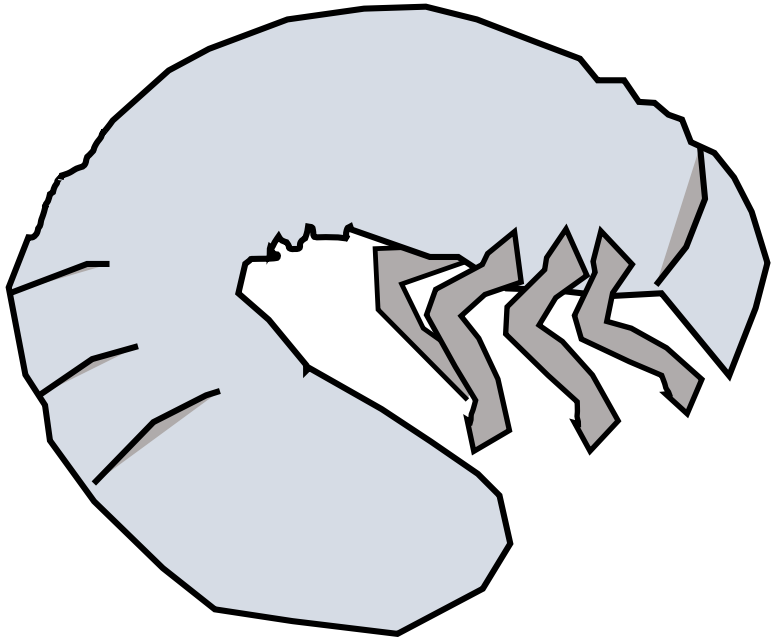
# Biocontrol: Pilze zur Insektenbekämpfung

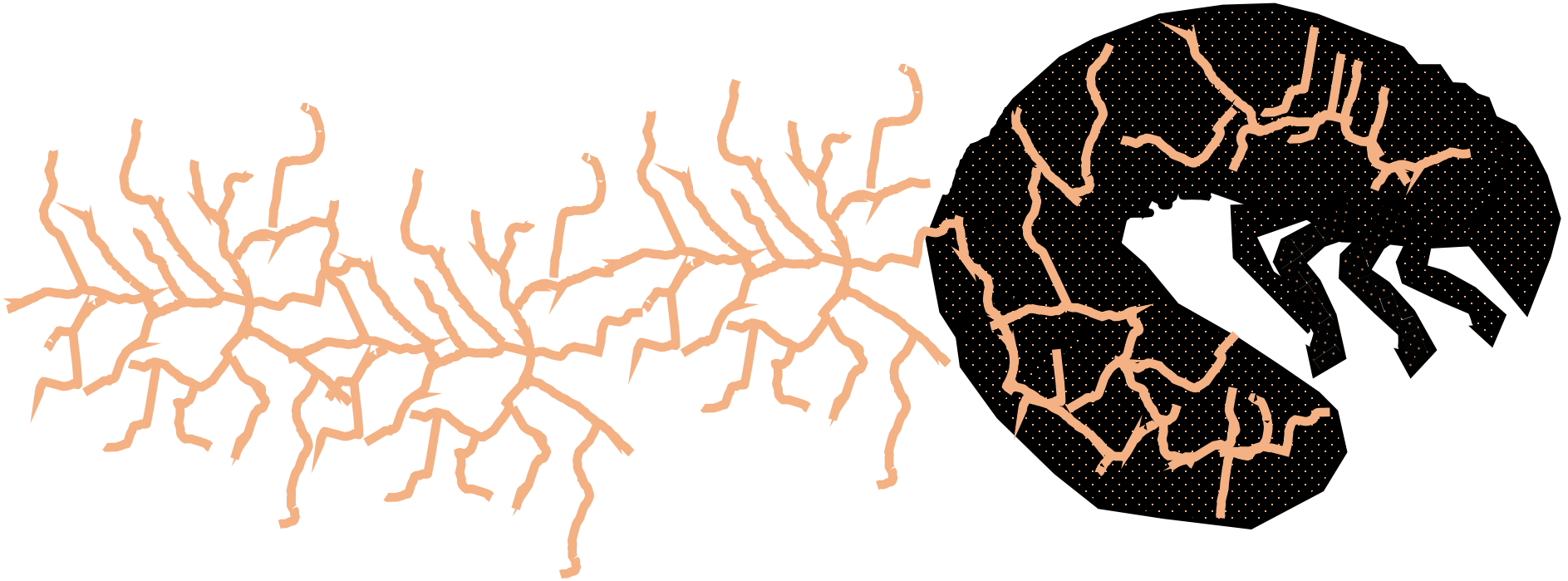


*Beauveria brognartii*



Maikäfer (*Melolontha melolontha*)

# Biocontrol: Pilze zur Insektenbekämpfung



*Beauveria brognartii*

Maikäfer (*Melolontha melolontha*)

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# Biocontrol: Pilze zur Insektenbekämpfung

GranMet (*Metarizhium anisopliae*) gegen Junikäfer
Melocont (*Beauveria brognartii*) gegen Maikäfer

Fortschreitender Befall eines Feldmaikäfer-Engerlings mit *Beauveria brongniartii*
Photos © G. Grabenweger, Agroscope

Pilze ➡ Insekten ➡ Pflanze

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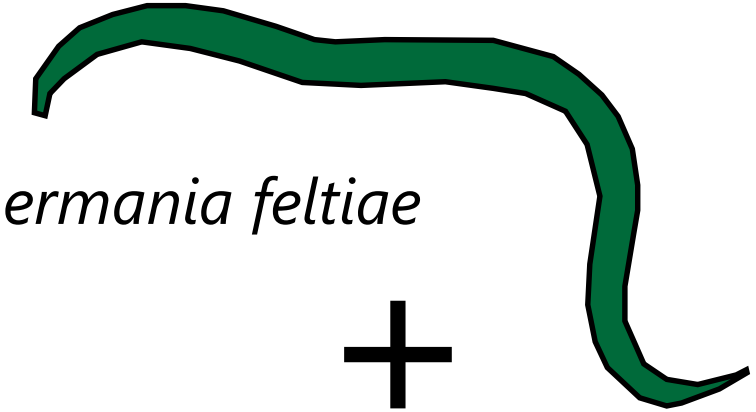
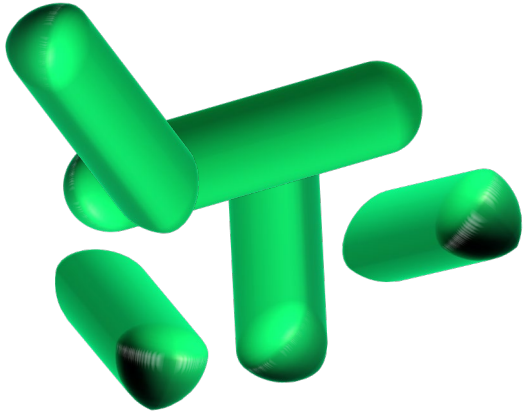
# Biocontrol: Nematoden zur Insektenbekämpfung

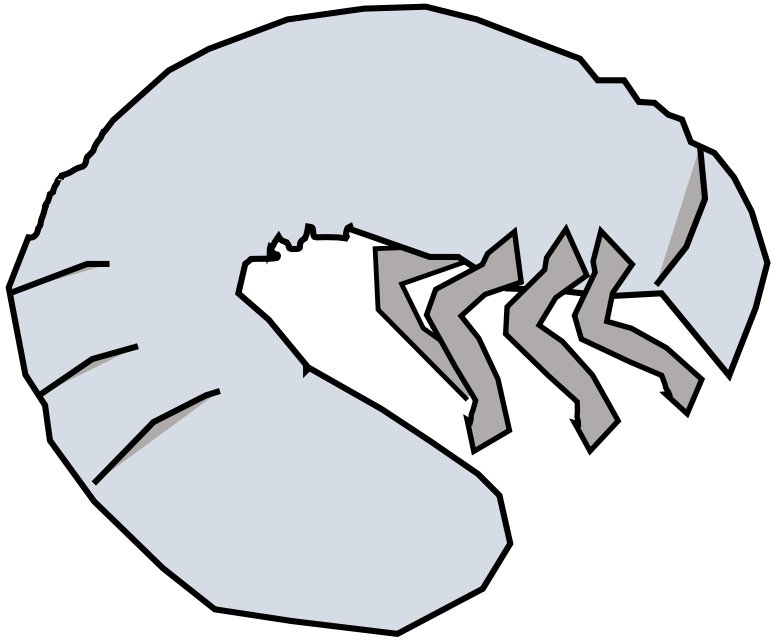


*Steinermania feltiae*

+



*Photorabdus luminescens*



Gartenlaubkäfer (*Phyllopertha horticola*)

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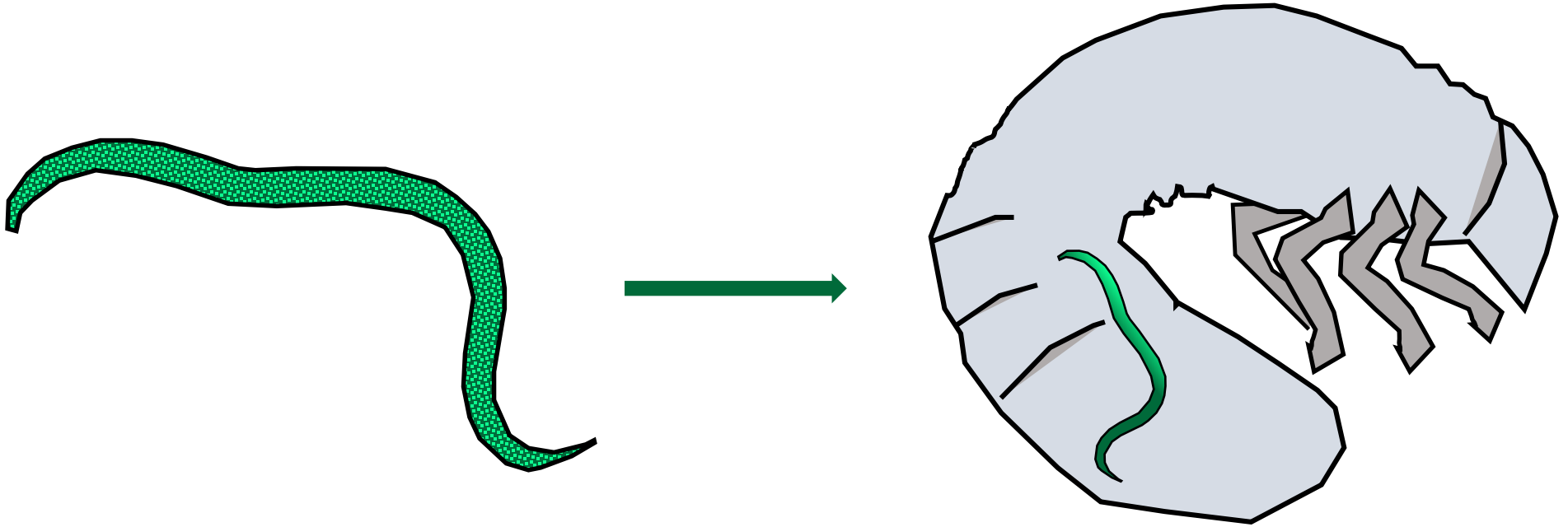
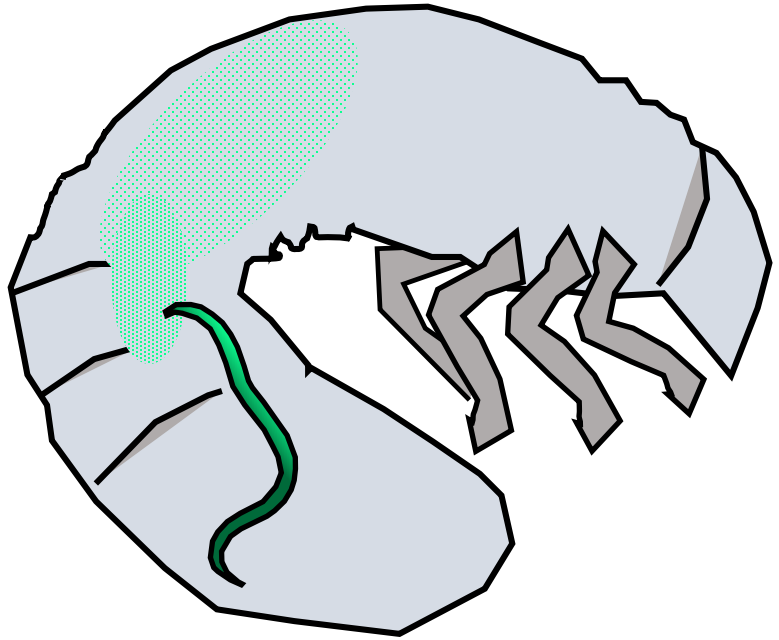
# Biocontrol: Nematoden zur Insektenbekämpfung



# Biocontrol: Nematoden zur Insektenbekämpfung



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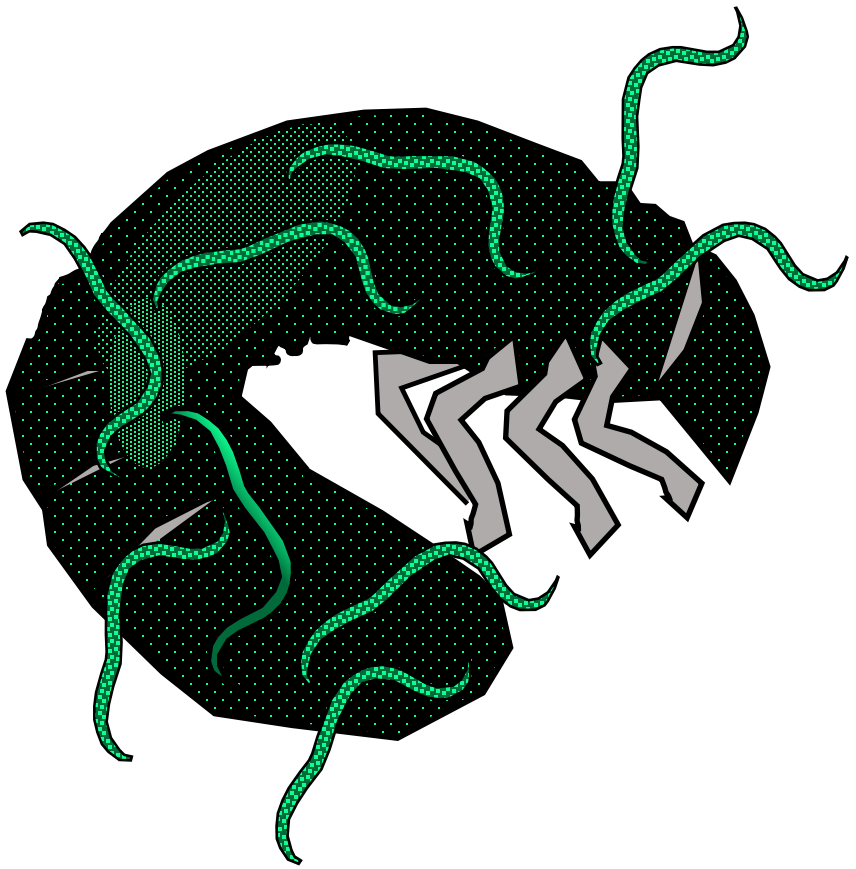
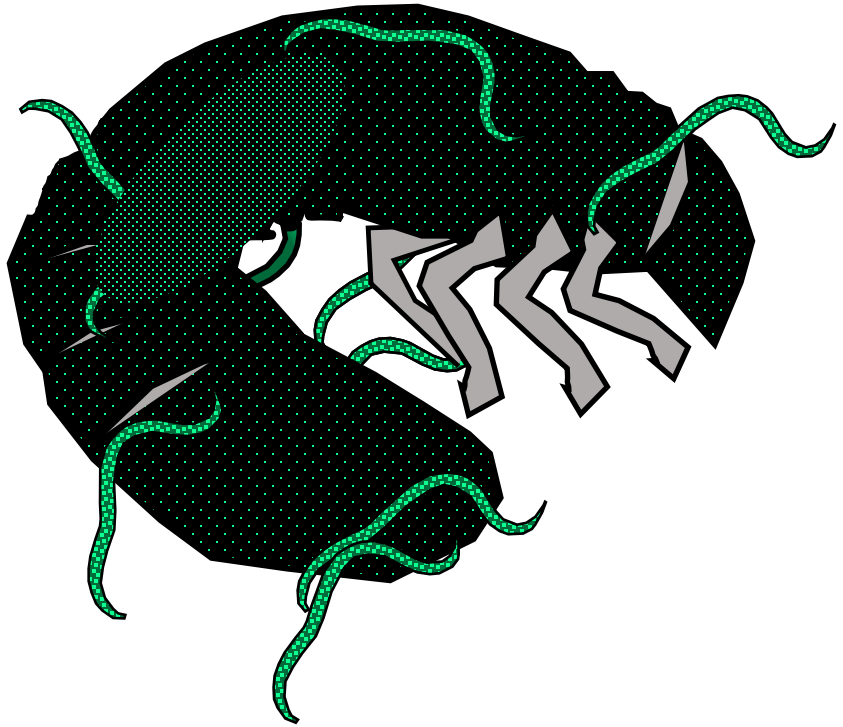
# Biocontrol: Nematoden zur Insektenbekämpfung



# Biocontrol: Nematoden zur Insektenbekämpfung

Drei Nematodenarten gegen sieben Schädlinge.

Nematoden ➡ Bakterien ➡ Insekten ➡ Pflanze

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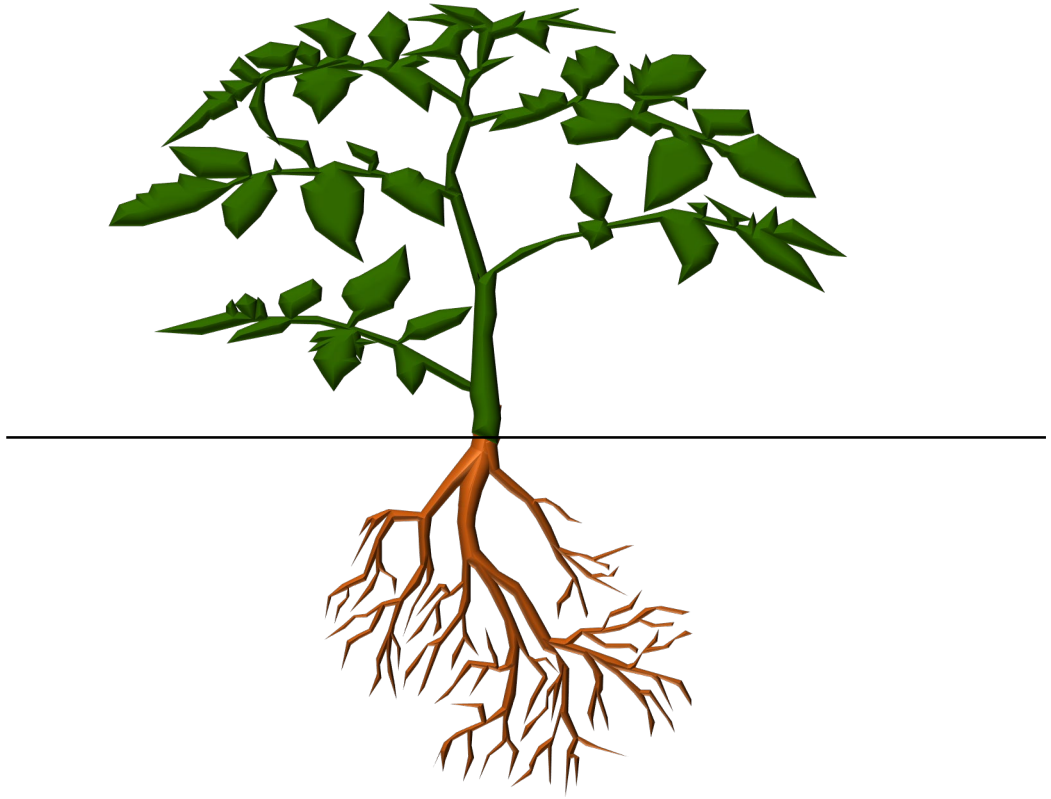
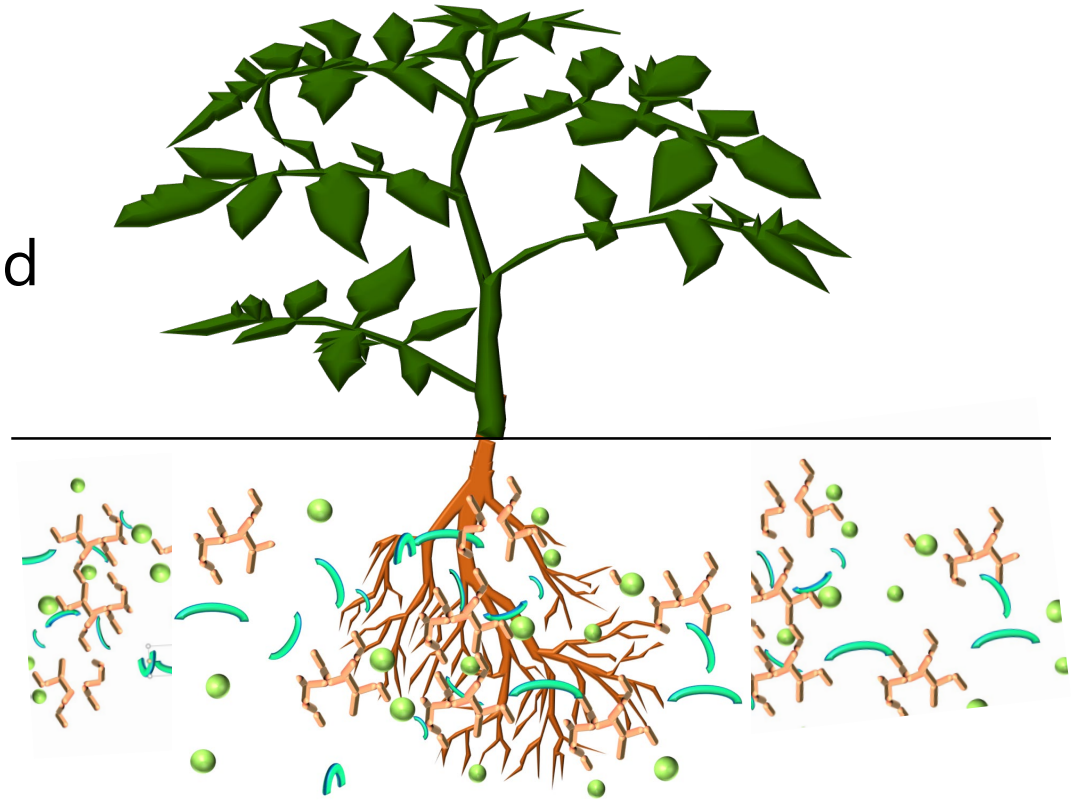
# Pflanzenschutz neu gedacht: Wurzelflora



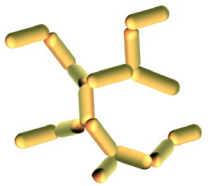
# Pflanzenschutz neu gedacht: Wurzelflora

- Nährstoffaufnahme
- Stresstoleranz
- Wachstumsfördernd
- Krankheitsvorbeugend
- Ertrag
- Qualität
- Kaliber



*Pseudomonas fluorescens*

*Bacillus sp.*



*Trichoderma sp.*

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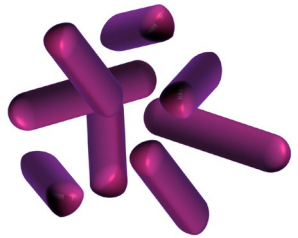
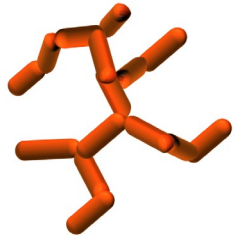
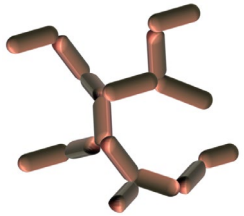
# Pflanzenschutz neu gedacht: Wurzelflora



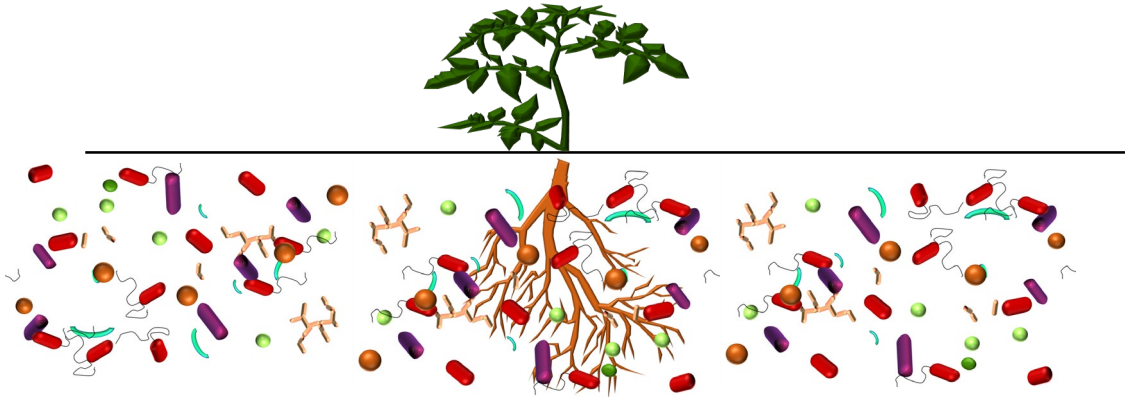
Streptomyces



Fusarium

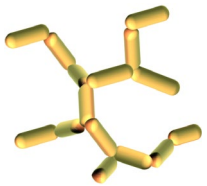


Sclerotinia



*Pseudomonas fluorescens*

*Bacillus sp.*



*Trichoderma sp.*

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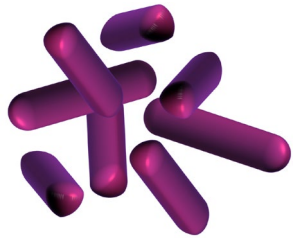
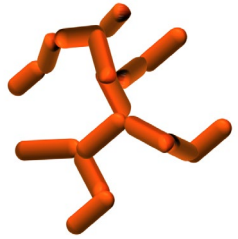
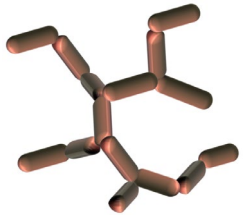
# Pflanzenschutz neu gedacht: Wurzelflora



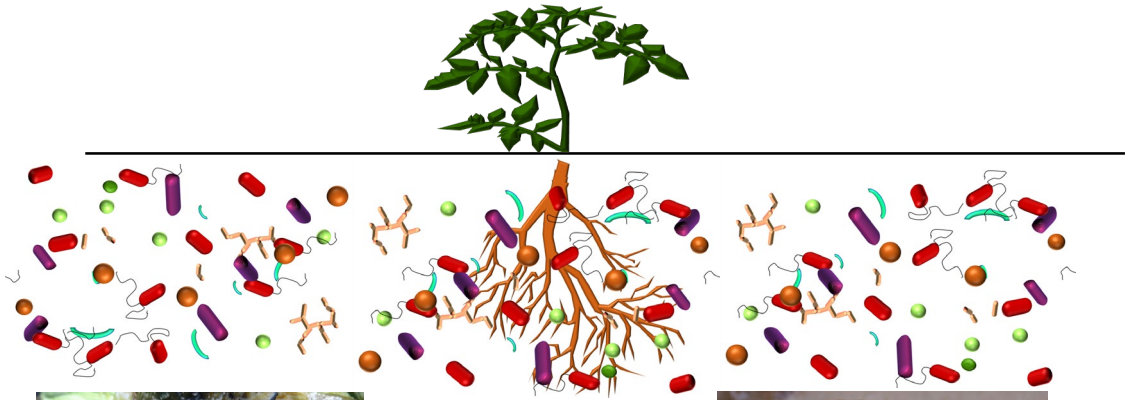
Streptomyces

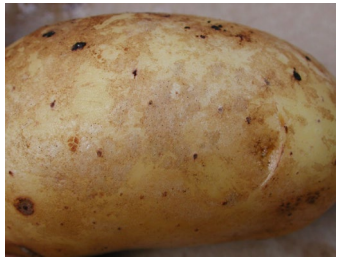


Fusarium



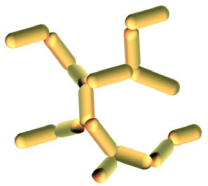
Sclerotinia





*Pseudomonas fluorescens*

*Bacillus sp.*



*Trichoderma sp.*

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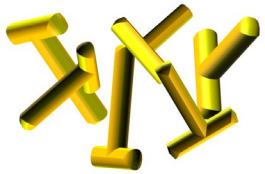
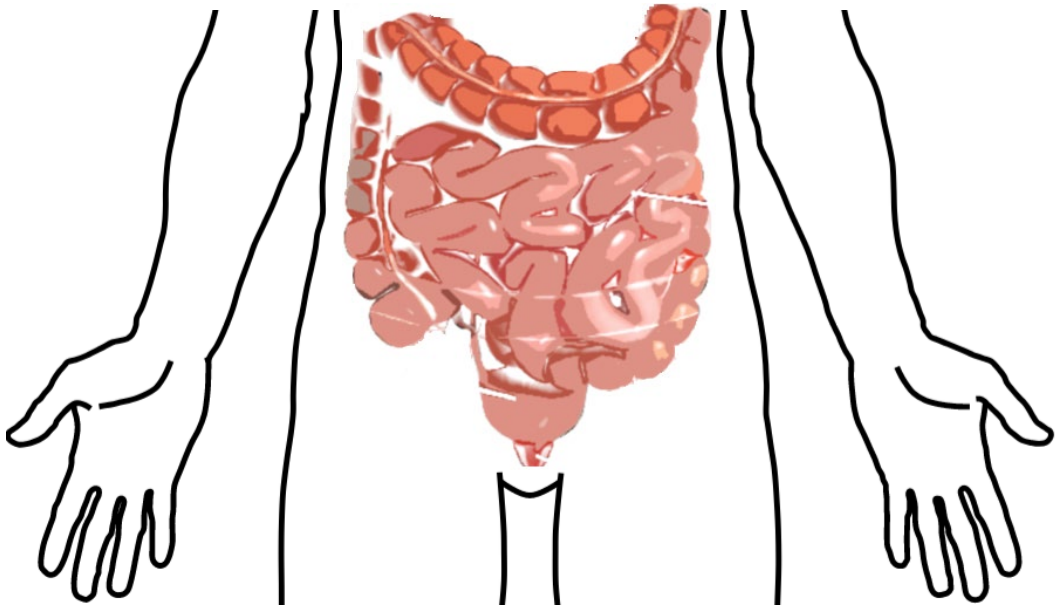
# Die Darmflora

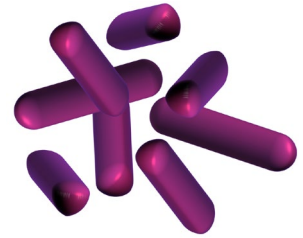
Lactococcus

Lactobacillus

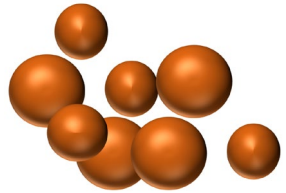


Bifidobakterien





Staphylcoccus



Colibacter

Clostridium

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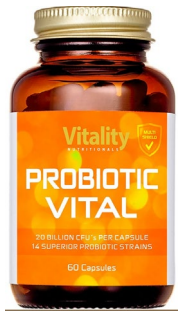
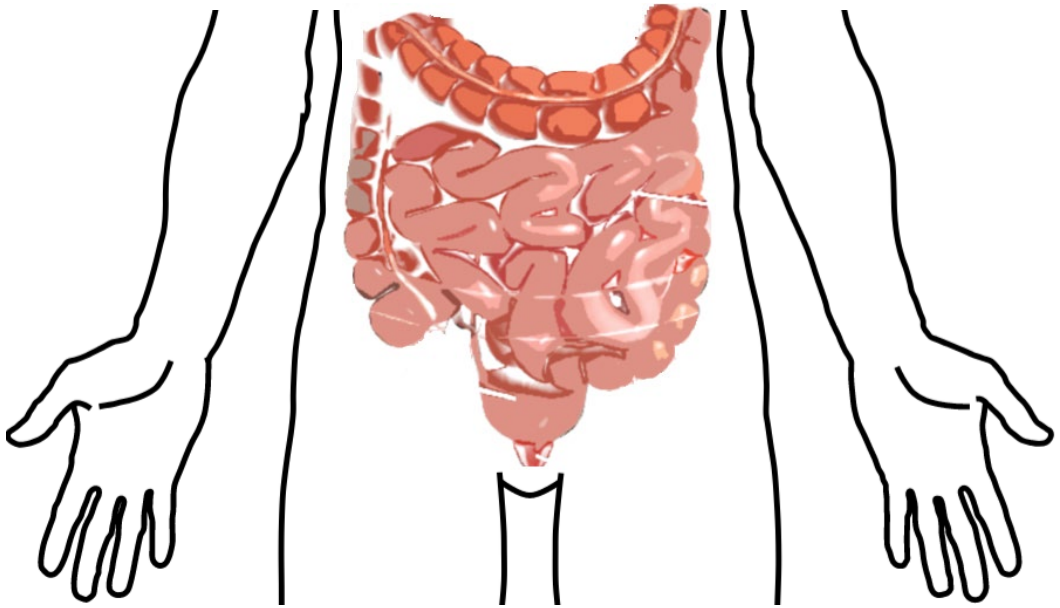
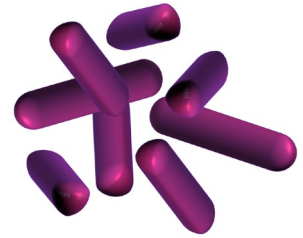
# Die Darmflora

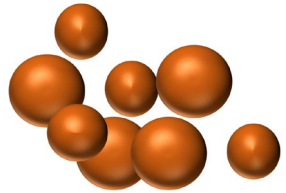






Staphylcoccus



Colibacter

Clostridium

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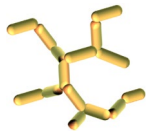
# Gesunde Wurzelflora

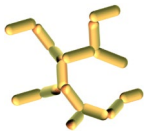

## Cérès



*Trichoderma harzianum*

*Pseudomonas fluorescens*


## Fongibacter



*Trichoderma harzianum*

*Bacillus methylotrophicus*


## Hélès

*Bacillus methylotrophicus*

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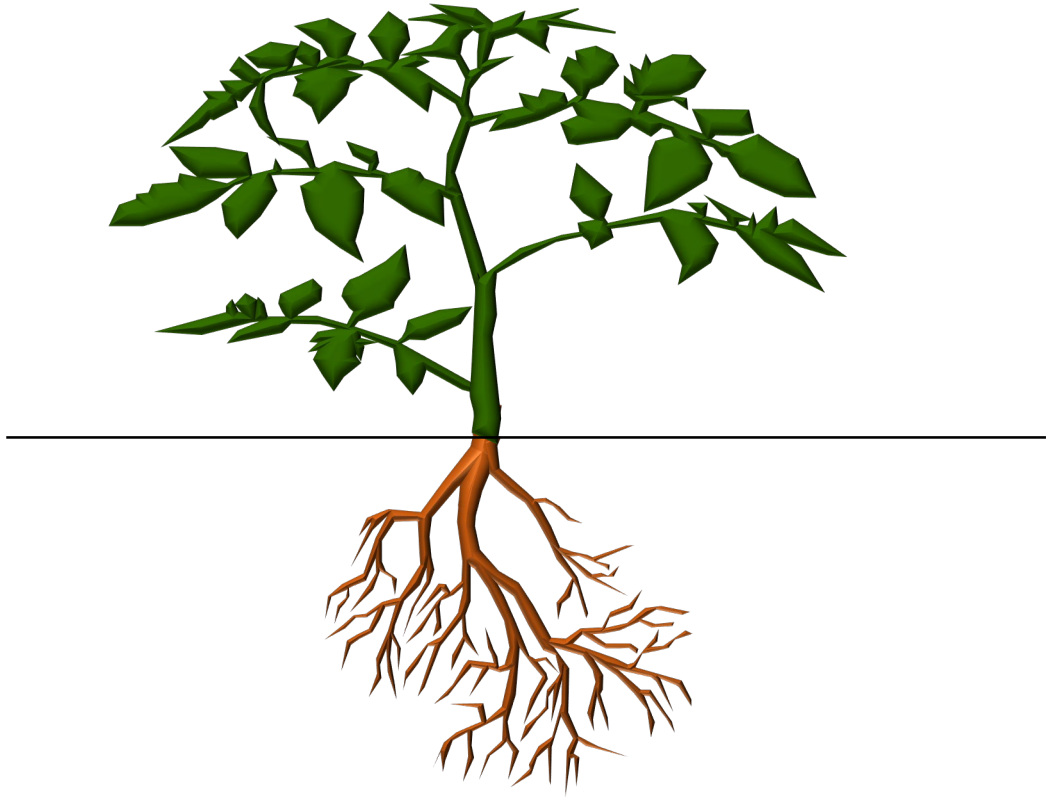
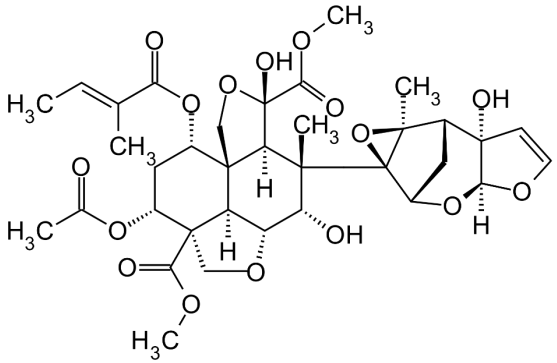
# Pflanzenschutz neu gedacht: Stimulatoren der Abwehrkräfte

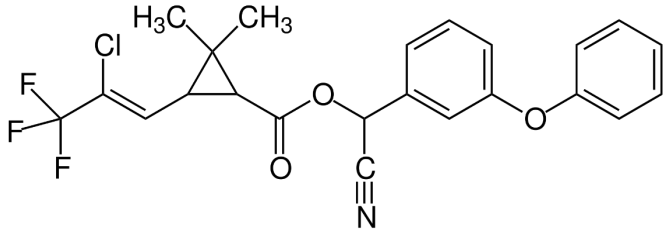


# Klassischer Pflanzenschutz

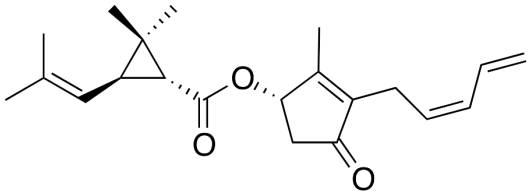
## Kontaktpestizide



Azadirachtin (Bio)



Cyhalotrin



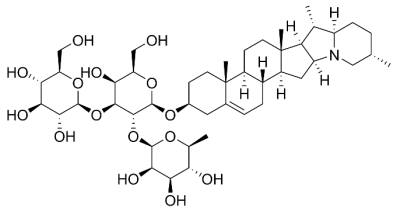
Pyrethrin 1 (Bio)

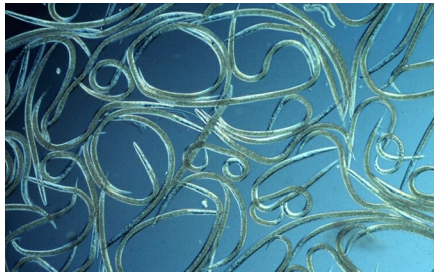
☒ **Unspezifisch**

☒ **Nicht schonend**

# Pflanzen haben ein Immunsystem

- Physische Abwehrsysteme
- Biochemische Abwehrsysteme
- Freundschaft (Nützlinge)
- …..



# Wie erkennen Pflanzen ihre Feinde?

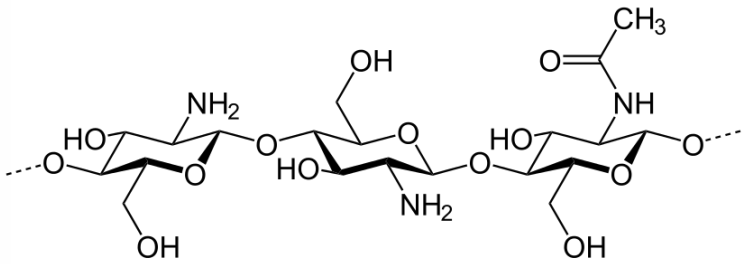
# Wie erkennen Pflanzen ihre Feinde?

Warnsignale:

PAMPs = pathogen associated molecular patterns

Schädling ➡ PAMP ➡ Pflanze ➡ Abwehr

# «Impfung» von Pflanzen


CARAPAX enthält den PAMP Chitosan. Chitosan ist Bestandteil von Pilzzellwänden und Insektenpanzer.

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# Erstellung von innovativen Bio-Spritzplänen


SALICOR
Korbweidenrindenextrakt


ARVENTO
Schachtelhalmextrakt

## Mischung von Immunstimulatoren zur Kupferreduktion im Weinbau

Pflanzenschutzberaterteam Versuchsparzelle Valeyres, Waadt, 2020

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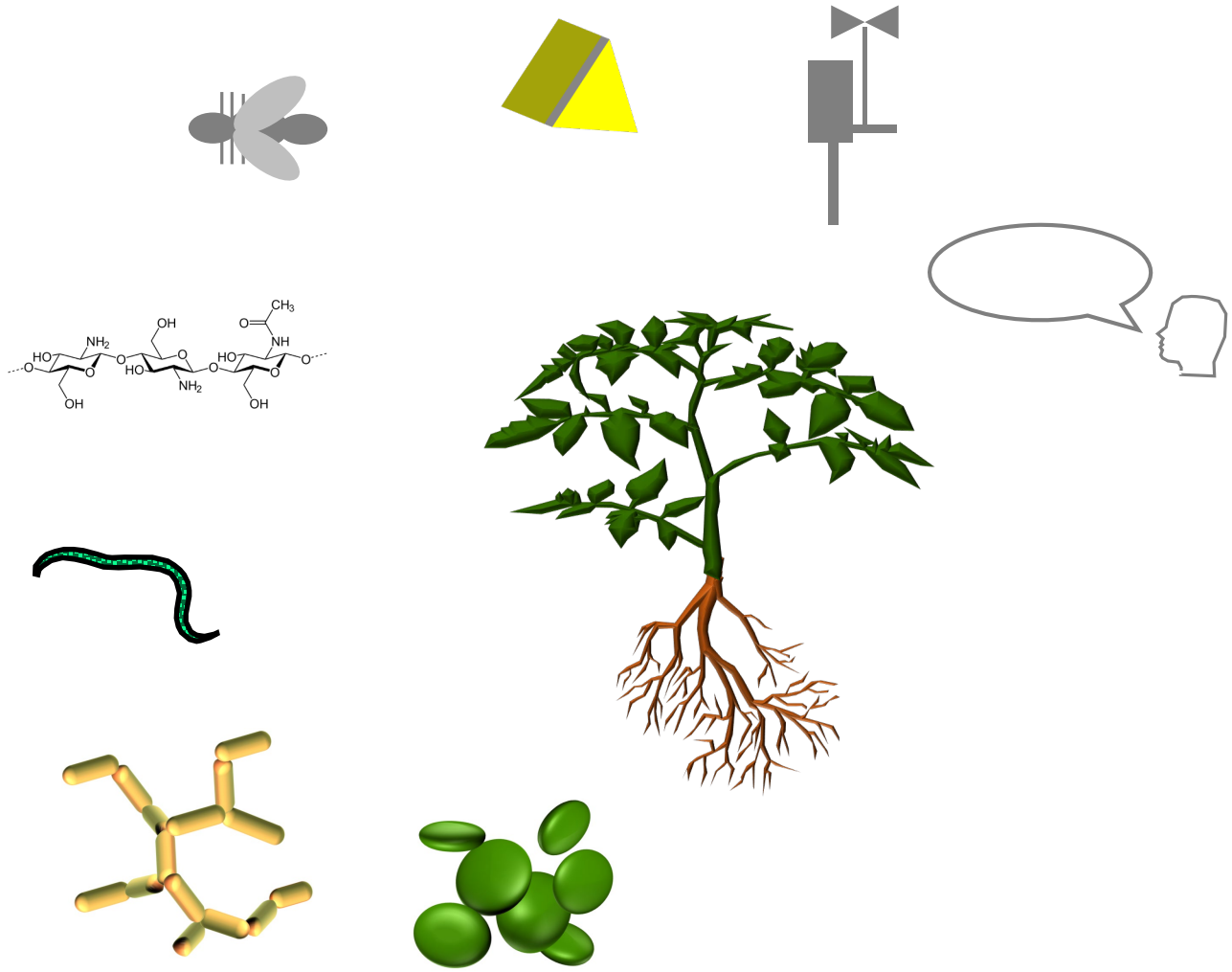
# Integrierter Pflanzenschutz



- **Nachhaltigkeit**
- **Qualität**
- **Ertrag**
- **Gesundheit**

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Herzlichen Dank für Ihre Aufmerksamkeit