Ragwort in the Netherlands: Can the problem be solved with help from the soil?

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## Ragwort: always been common in the Netherlands but increasing



## Ragwort can be very abundant in nature areas, but...



# Abundance varies greatly between areas









### Ragwort in 10 natural grasslands on former arable land





5 year old field (1 m height)



25 year old field (0.6 m height)

### Soils are full of seeds: up to 2000 viable seeds vs 20 plants per m<sup>2</sup>



->Seedlings establish poor, and particularly in older fields

## Long-term field experiment: Sown and unsown plots



### Boom-bust pattern strongly reduced by sowing



Ragwort cover (%)





### Individual plant biomass (g) in 2002



### Ragwort decline in the field can be explained by soil sickness





# Soil sickness, probably due to root pathogens (fungi)



### Negative soil effects created by ragwort but also by other plant species



### Soil sickness present in most fields but more intense at high density



### Low density





### High density



## Ragwort is a very poor competitor



# Why does ragwort abundance decline over time?

- Negative soil effects of ragwort on itself (soil sickness)
- Negative soil effects of other species on ragwort
- Positive soil effect of ragwort on other plant species (help the enemy)
- Ragwort is a poor competitor, even worse in own soil



Start of nature restoration

# Ragwort populations maintained due to soil disturbance



### How can we deal with the ragwort problem?



### Phase I: Increase (action)

- Close vegetation
  - (Sowing, species selection)
- Soil inoculation (?)
- Remove ragwort plants (?)
- Avoid soil disturbance

### Phase II: Decline (leave it)

- Soil sickness
- Avoid soil disturbance

### Phase III: "Normal" density

- Native species
- Important in ecosystems
- Avoid soil disturbance

### Control ragwort with aboveground insects?



Phase II/III



Stemboring/ Flower feeding moths!

# **Recommendations:**

- 1) A closed and dense vegetation and avoidance of soil disturbance are the most important measures to control ragwort
- 2) After an initial peak, the cover of ragwort in nature areas will decline and, in absence of disturbance, the plant will be marginalized in about 15 years.
- 3) Ragwort is a native plant that belongs in our nature areas but it has grown out of proportion and should be reduced.