Profitable culturing of currants by pheromone-based control of insect pests – presentation of the project and results so far

SLF (Swedish farmers' foundation for agricultural research)
2 907 000 SEK, 2021-2023

Stiftelsen Lantbruksforskning

Project group

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Christer Löfstedt , Lund
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Reference group

Mark Brady, LU/SLU economist
Rikard Johansson, grower n. Sw.
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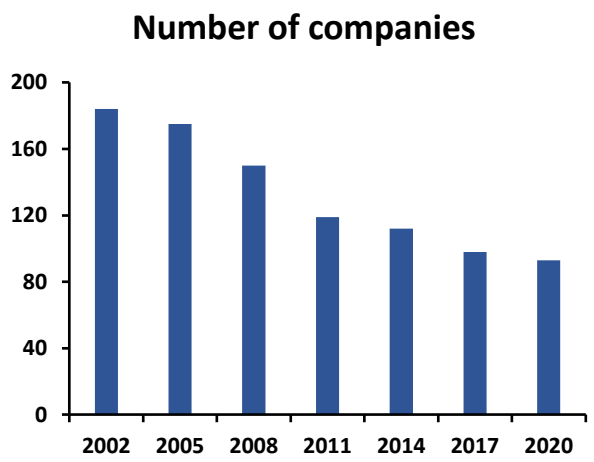
Erik Robertsson, grower n. Sw.
Elisabeth Öberg, advisor n. Sw.

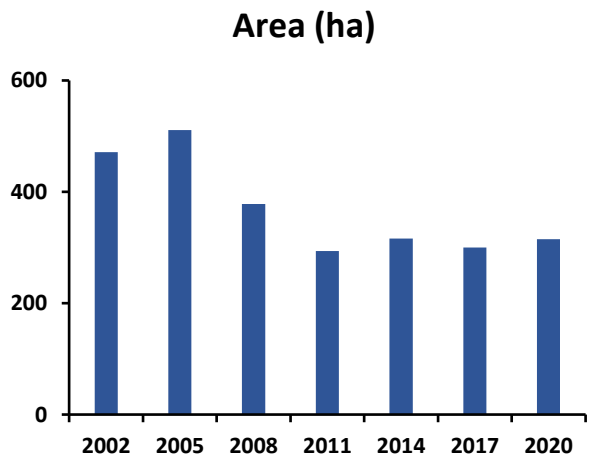
Background – what is the problem?

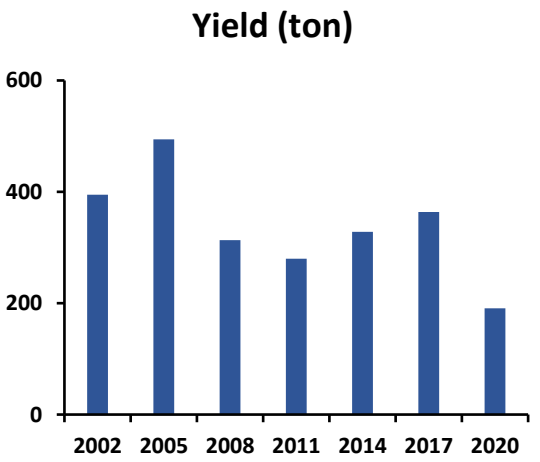
About 3000 ha of currants in the Nordic countries, but:

1. The area has decreased during the last 10-20 years, in particular in Sweden
2. Fewer producers
3. Fluctuating and declining yield

Examples from Sweden:







Background – what is the problem?

Some reasons:

1. Reduced market, e.g. closedown of local juice factory in northern Sweden
2. Fewer pesticides available ➞ Many growers turned to organic production
3. Competition from imported berries, partly produced under different regulations
4. **More harm due to insect damage, e.g., three moth species with hidden lifestyle** (larvae feeding inside buds and stems)

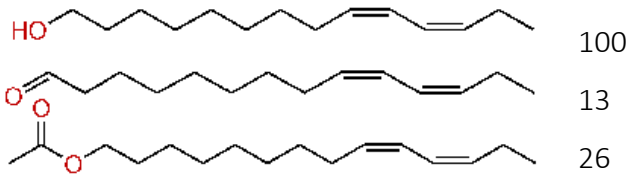
The targets

Currant shoot borer

(vinbärsknoppmal)

Lampronia capitella

Prodoxidae



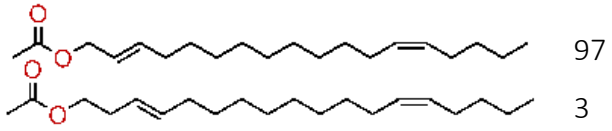
Löfstedt et al. 2004

Currant clearwing

(vinbärsglasving)

Synanthedon tipuliformis

Sesiidae



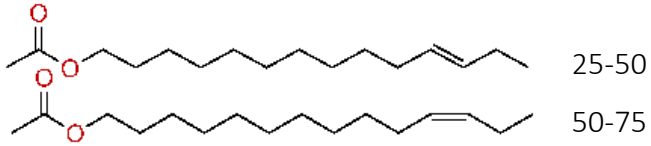
Priesner et al. 1986

Currant bud moth

(mindre vinbärsbrunmal)

Euhyponomeutoides albithoracellus

Yponomeutidae



Svensson et al. in press

Profitable culturing of currants by pheromone-based control of insect pests

General goal:

To provide currant growers in the Nordic countries an effective and sustainable method to control the three pest insects so that damages are economically acceptable.

The road (challenges):

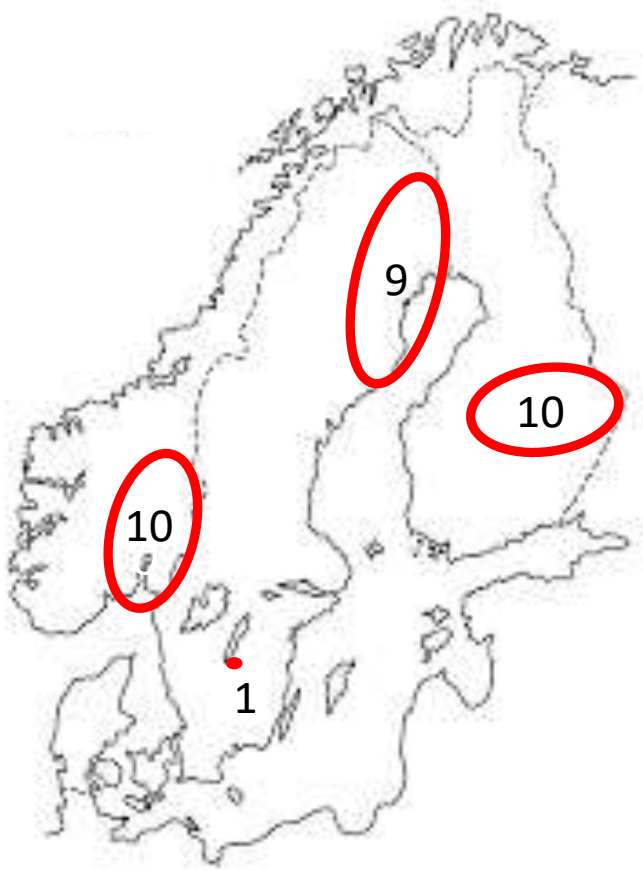
→ Show that this is biologically possible (reduced populations and damage)

Show that this is economically sustainable (cheap enough chemicals, give sufficient profit)

Start registration within EU (hope for a simplified procedure, company willing to collaborate and willing to invest)

Methods in short

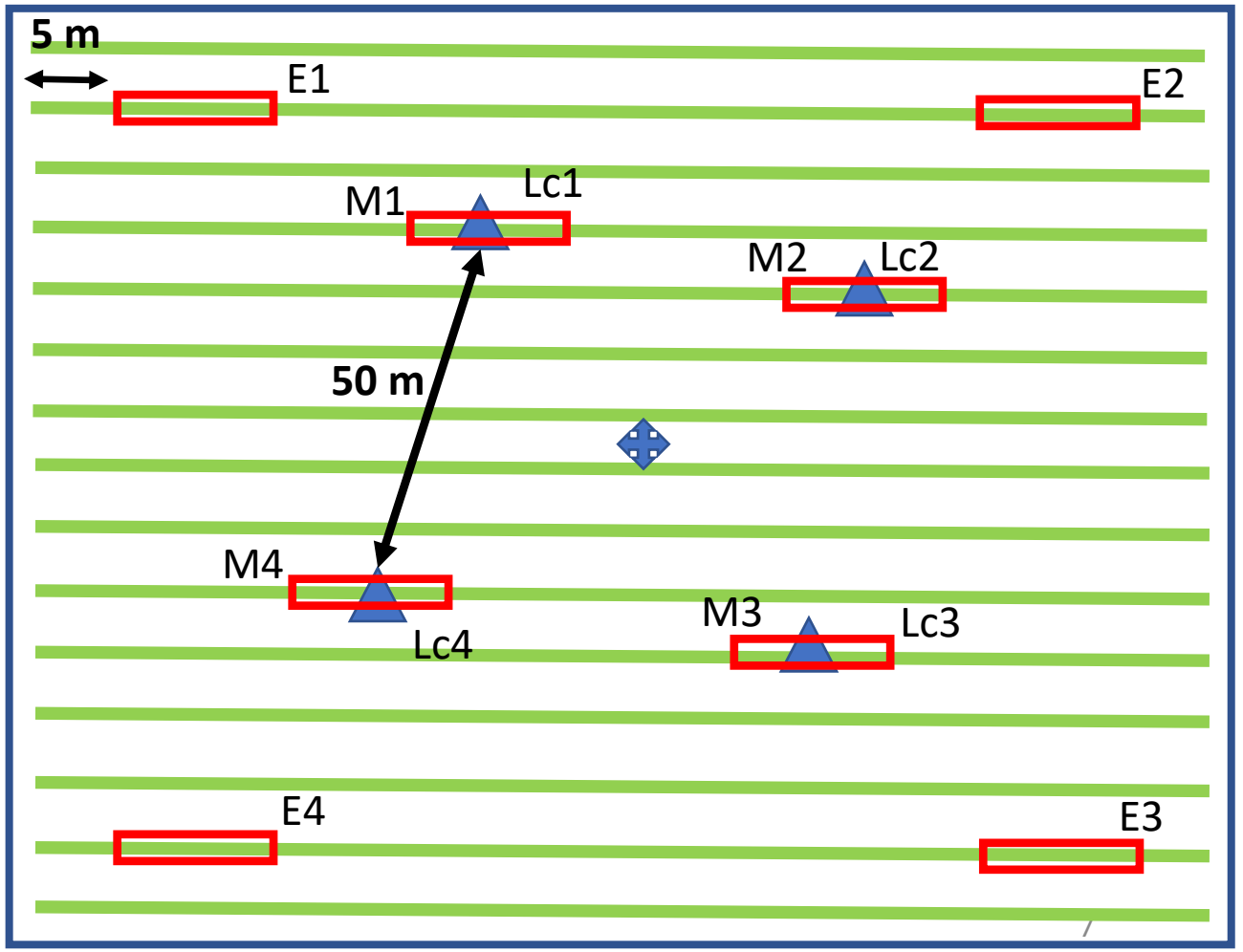
30 suitable fields identified in 2021



Methods in short

30 suitable fields identified in 2021

Damage estimates in spring 2021-2024



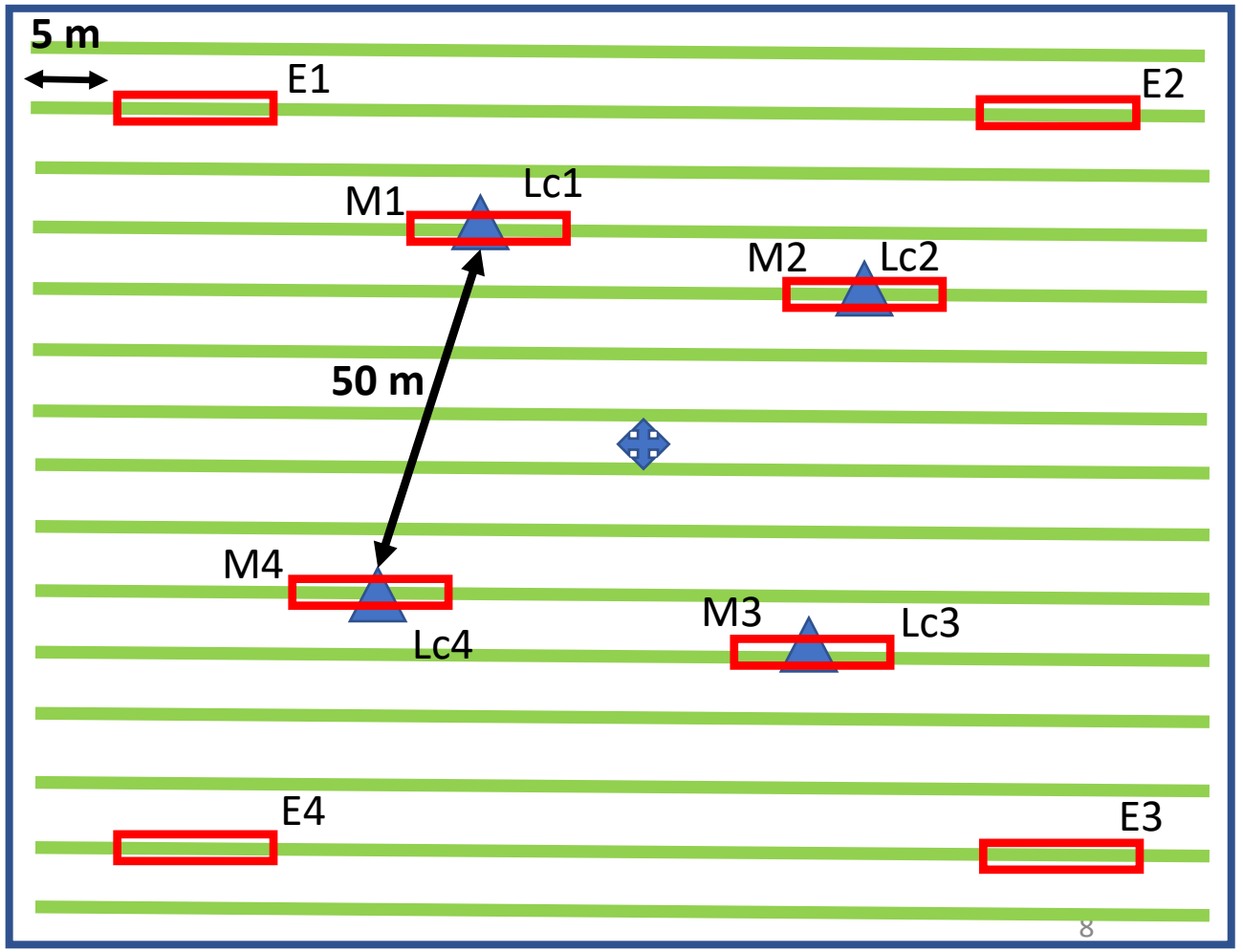
Methods in short

30 suitable fields identified in 2021

Damage estimates in spring 2021-2024

Pheromone traps, 4 per species 2021-2024

presence
phenology
abundance



Methods in short

30 suitable fields identified in 2021

Damage estimates in spring

Pheromone traps, 4 per species 2021-2024

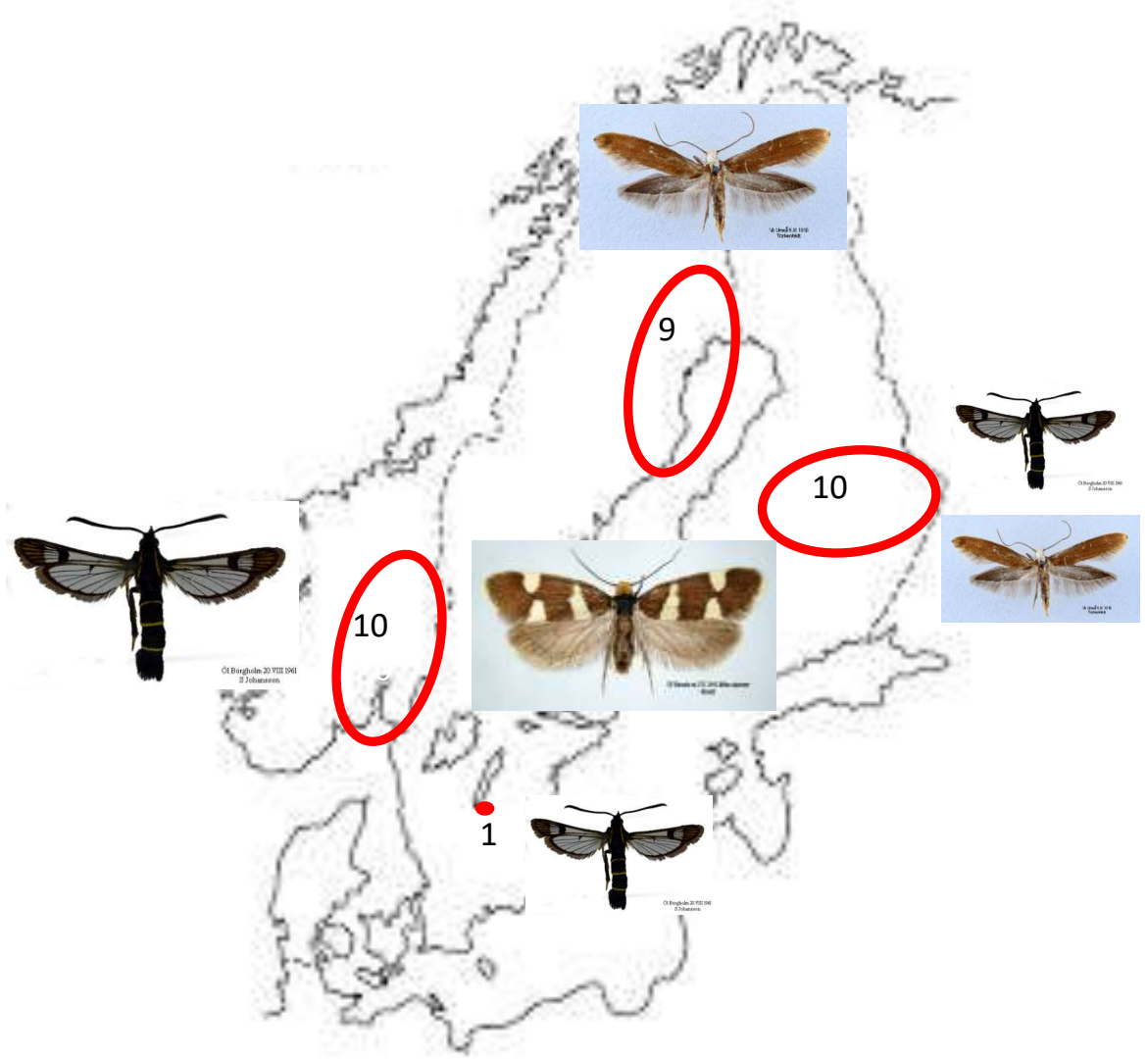
- presence
- phenology
- abundance

Mating disruption in some fields 2022 and 2023

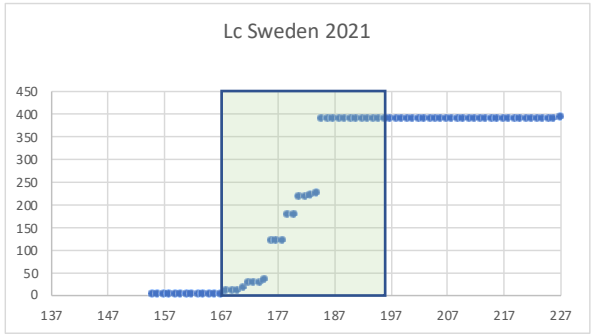
- **300 release points/ha**

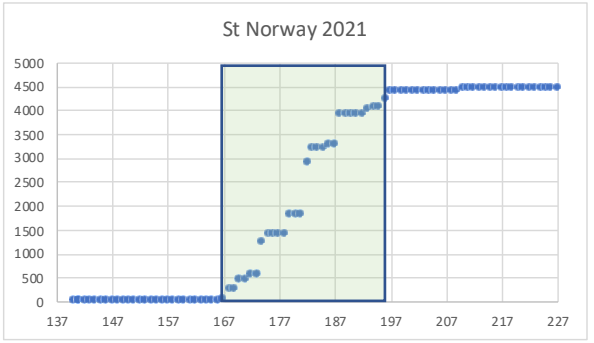
Results - presence

New finding



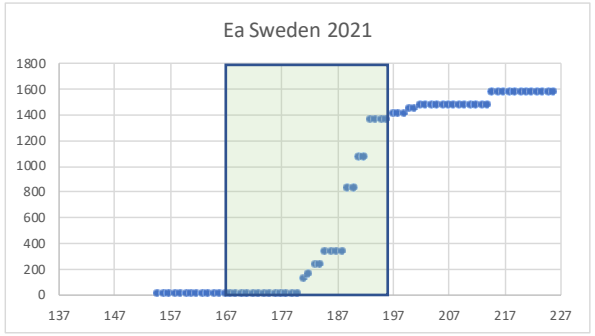
Results – phenology 2021

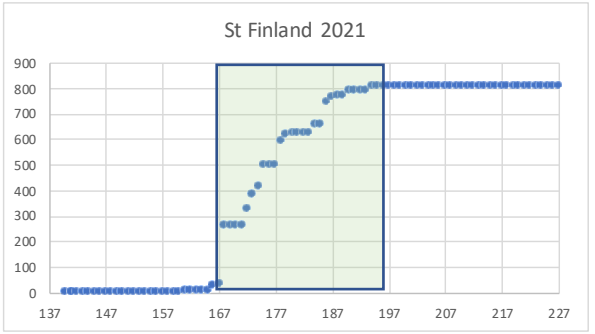


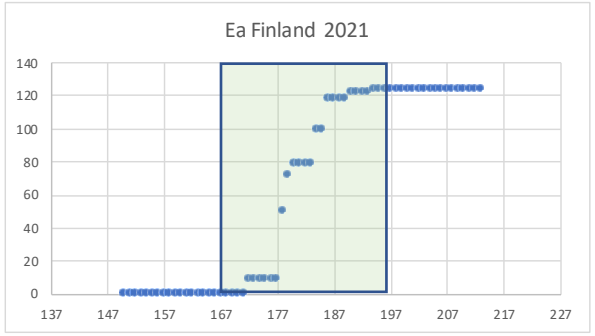


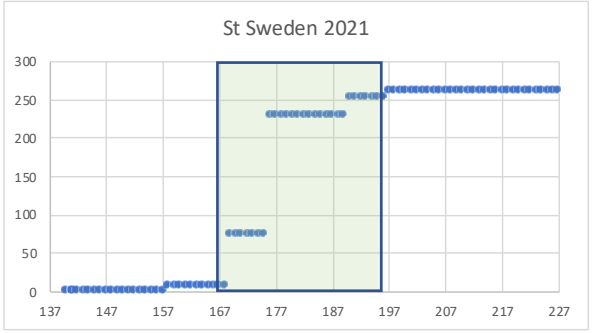
June 16-July 15

Cumulative catch (different scales)



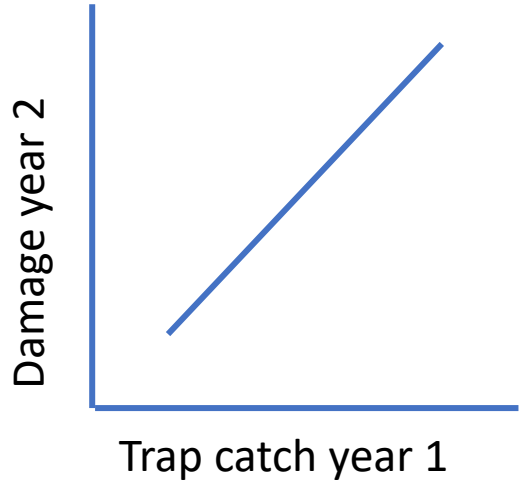






Julian day

Results – correlations, predictions



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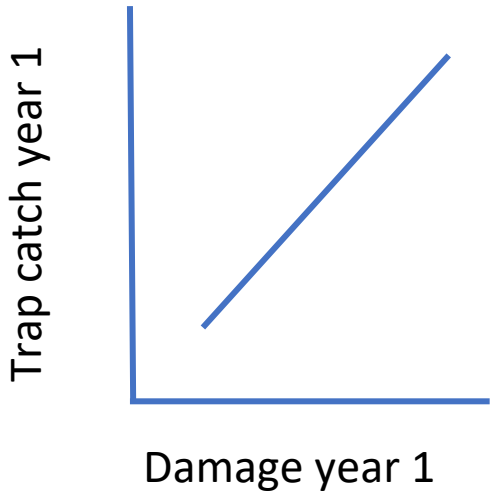
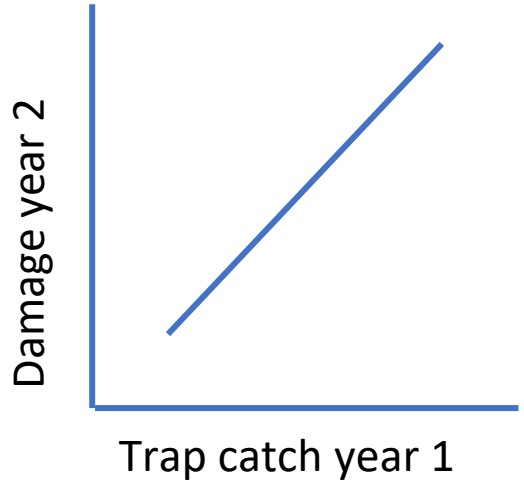
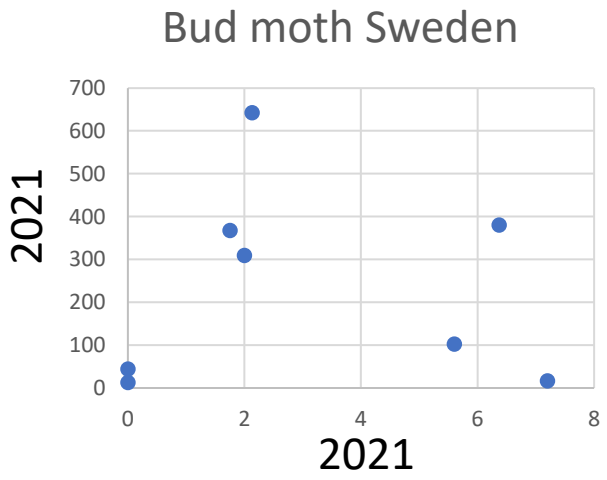
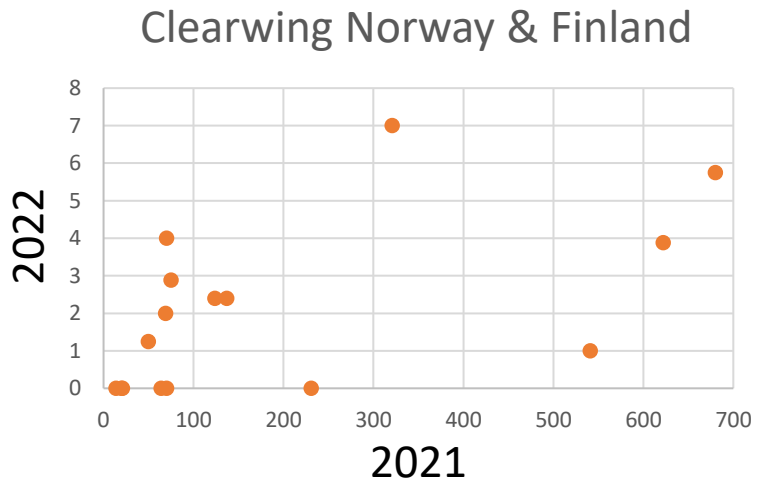


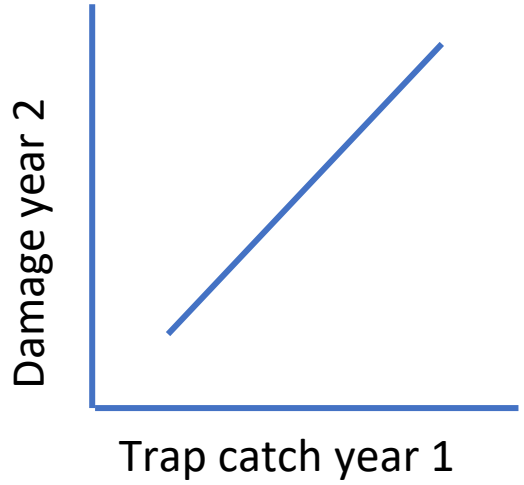


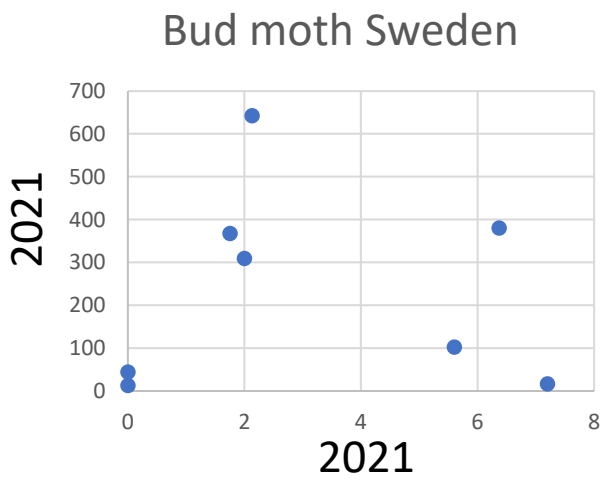


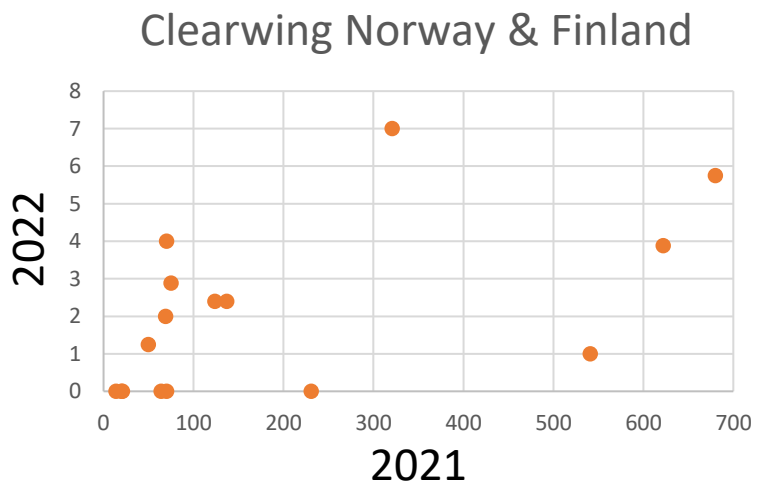


Results – correlations, predictions

Usually damage due to several species

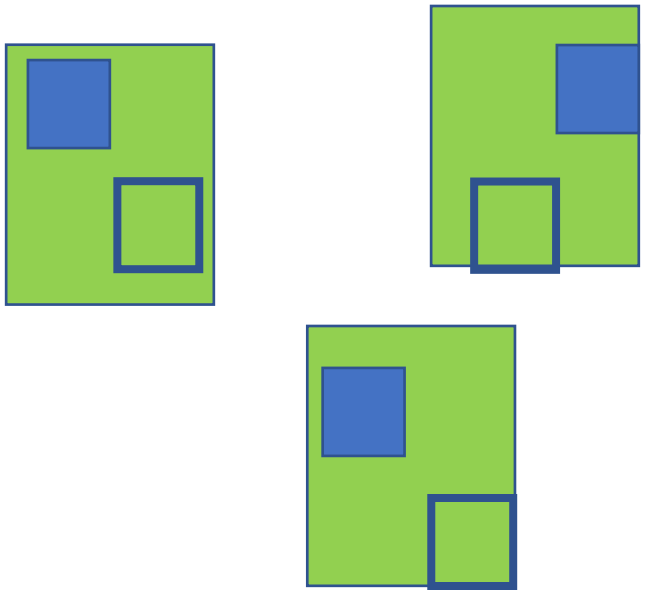






Methods – mating disruption

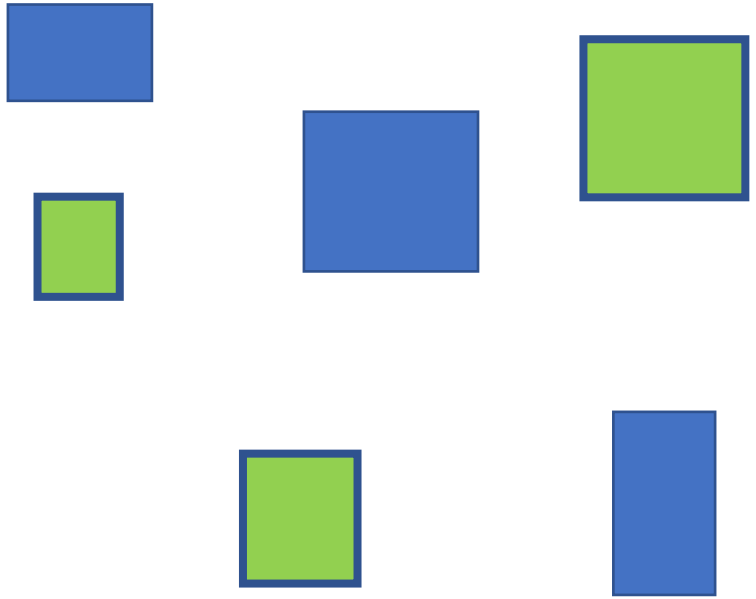
Parts of fields
+ similarity
- immigration



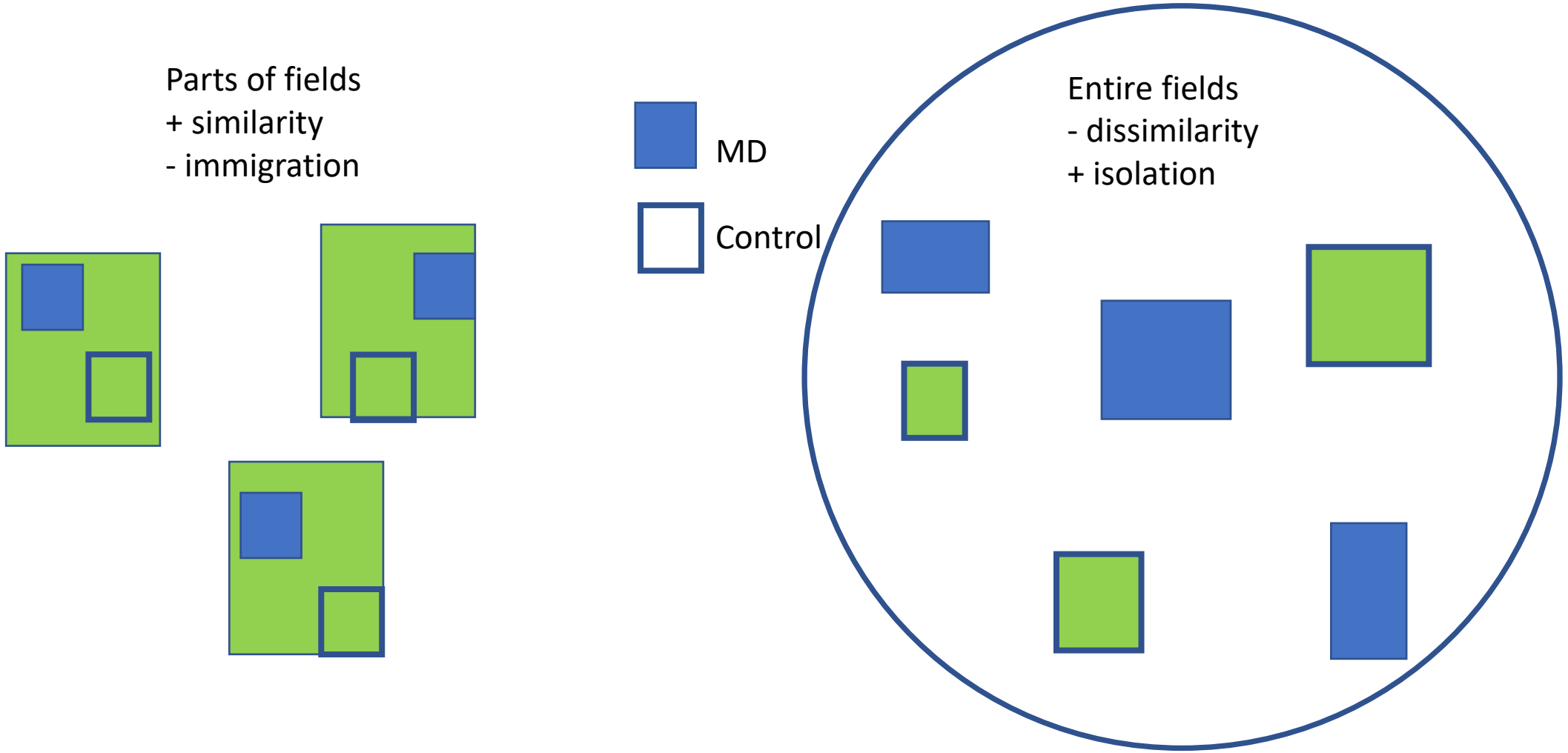
MD

Control

Entire fields
- dissimilarity
+ isolation



Methods – mating disruption



Methods – mating disruption evaluation

During MD:

- Close to zero trap catch within treated area (trap shutdown)
  (If males don't find the traps they don't find the females)

The year after MD:

- Less damage than the year before and less damage than in untreated fields
  However, several species involved

- Lower trap catch than the year before and lower catch than in untreated fields

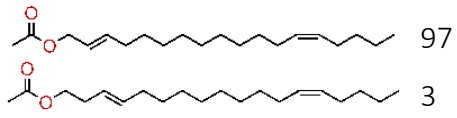
- Higher yield than the year before and higher than in untreated fields
  However, several species involved

Results – mating disruption, clearwing

Currant clearwing

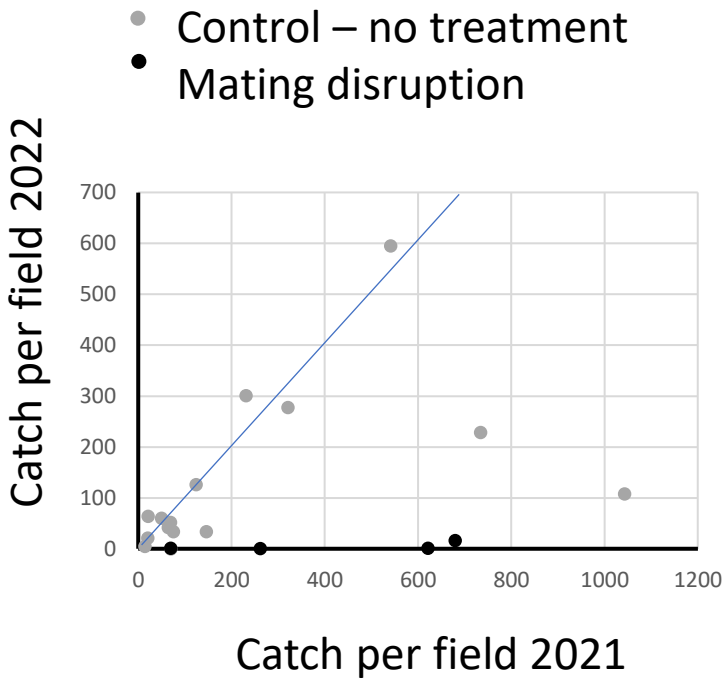
Synanthedon tipuliformis

Sesiidae



CBC/Shin-Etsu rope
300/ha
24.9 g/ha
37 (Sweden) - 45 (Italy*)
mg/ha/day (field)

* Grassi et al. 2002

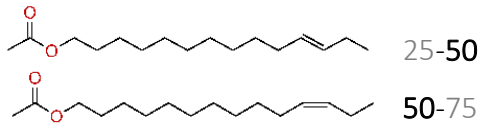


Results – mating disruption, bud moth

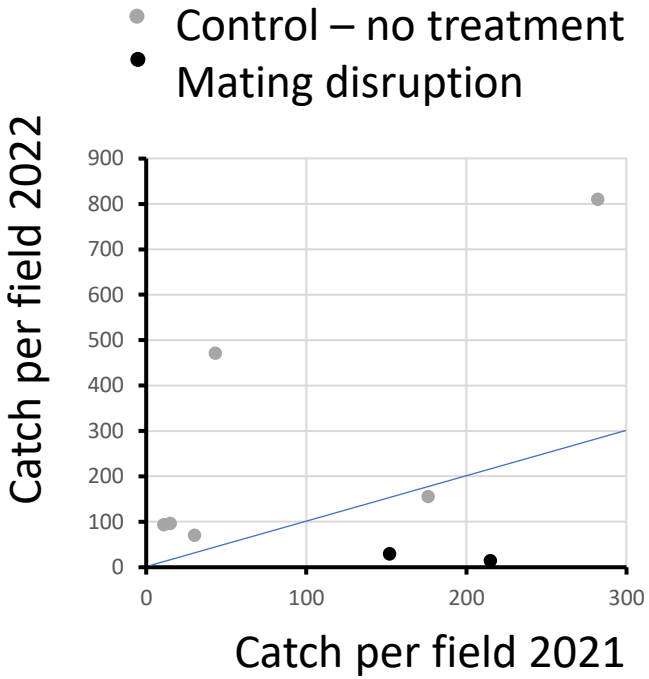
Currant bud moth

Euhyponomeutoides albithoracellus

Yponomeutidae



Pherobank, Bedoukian
Homemade double zip-bag
300/ha
15 g/ha
140-400 mg/ha/day (lab)

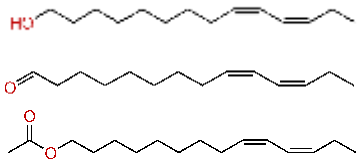


Results – mating disruption, shoot borer

Currant shoot borer

Lampronia capitella

Prodoxidae



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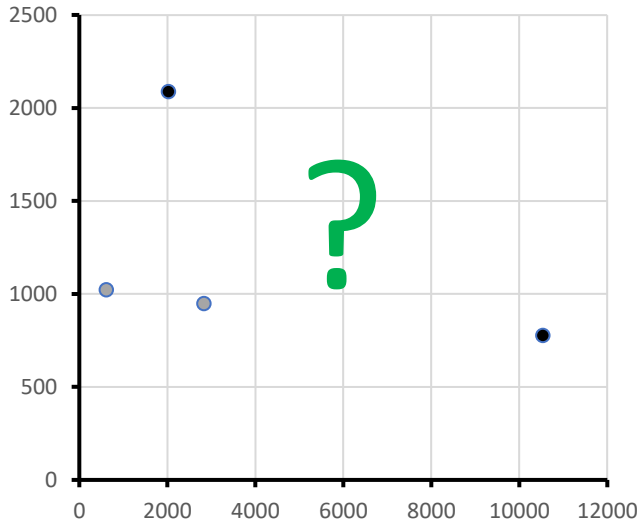
Pherobank
Homemade double zip-bag
300/ha
15 g/ha
140-400 mg/ha/day (lab)

- Control – no treatment
- Mating disruption



Plans for 2023

Collect data on damage, phenology & abundance (trap catches) and yield

Evaluate the MD 2022 mainly by trap catches

Perform MD in new areas: Shoot borer: 2 SE, 1 NO, 2 FIN
Bud moth: 2 SE, 3 FIN
Clearwing: 1 NO, 3 FIN

Secure additional funding for 2024 to enable evaluation of MD 2023

Perform cost/benefit analysis if a biological effect (reduced populations) can be proven

The End

Thank you!