

# Integrated pest management of flea beetles (*Phyllotreta* spp.) in spring oilseed rape (*Brassica napus* L.)

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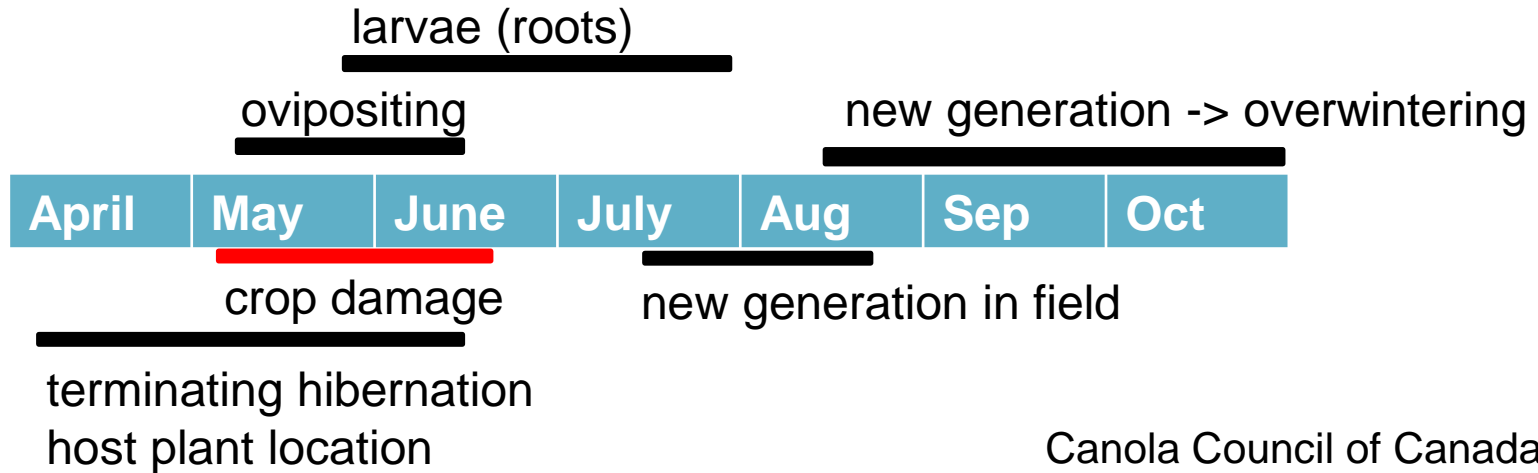
# Background

- *Phyllotreta* spp. flea beetles major pests in spring oilseed rape (SOSR)
- Neonicotinoid seed treatments restricted, lack of alternatives for chemical control



*Phyllotreta* flea beetles on cotyledon  
Photo: Peder Waern,  
Växtskyddscentralernas bildarkiv

# Flea beetle life cycle



*P. atra*

*P. vittula*



*P. undulata*

*P. nigripes*



*P. striolata*



# **Aims for Swedish research project 2014-2016:**

- Assess crop damage caused by *Phyllotreta* spp. flea beetles
- Test increased seeding rates as an alternative option to control or compensate for damage
- Evaluate the effect of seeding date and tillage on flea beetle crop damage



# Field experiments:

- Block experiment replicated on 23 sites 2014-2016
- Three seeding rates, 1x, 2x, (3x)
- With or without neonicotinoid seed treatments
- Seeding date varied naturally across sites
- Measured: Flea beetles, plant density, crop damage to cotyledons, seed yield



# **Warm and dry weather = more flea beetles?**

Year	Flea beetles*	Temp, May	Prec, May
2014		+0.0-1.0 C°	100-150%
2015			
2016			

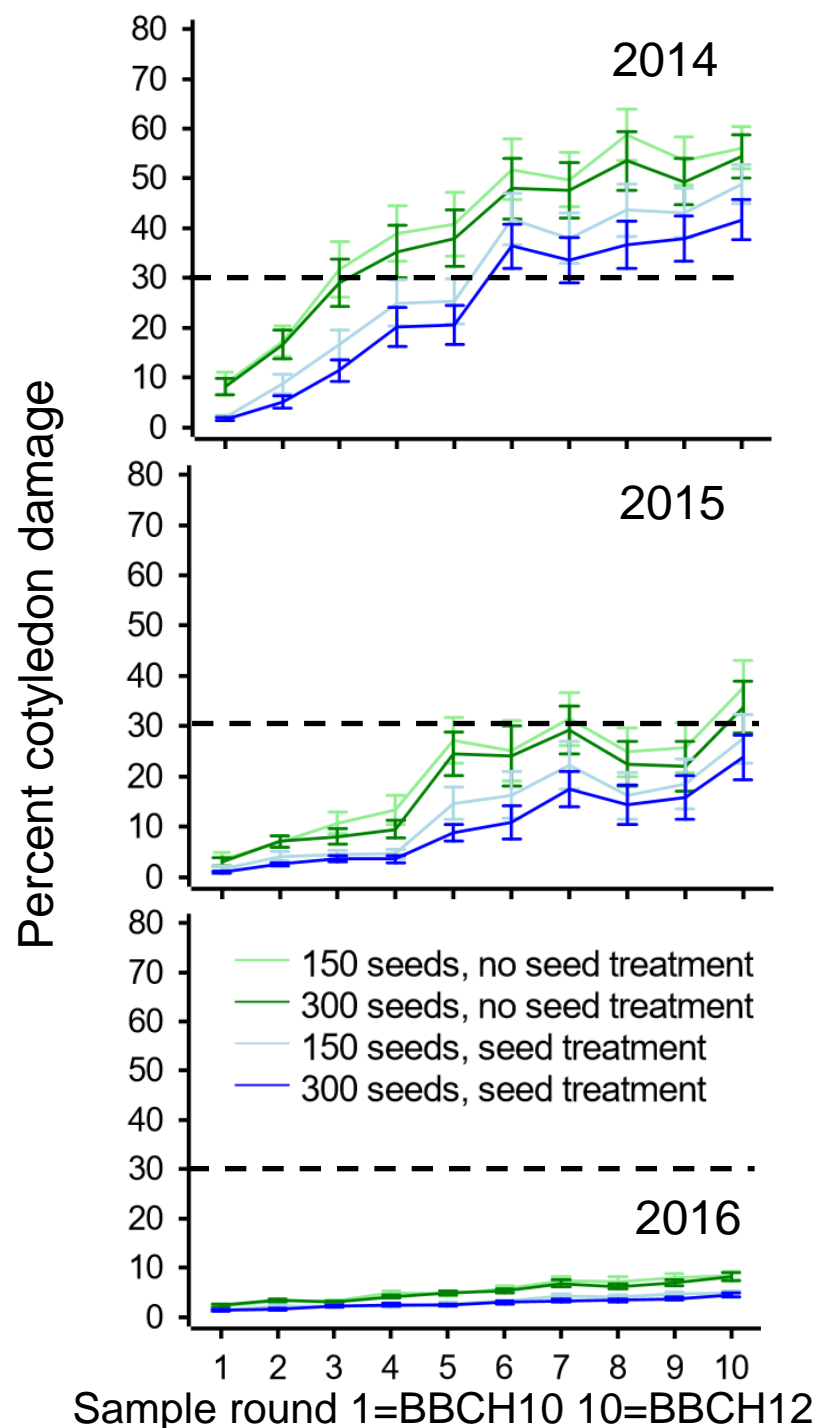
Flea beetle numbers are averages per pitfall trap and day (6-9 sites per year)

Temperature and precipitation are in relation to averages for the study area

# Crop damage

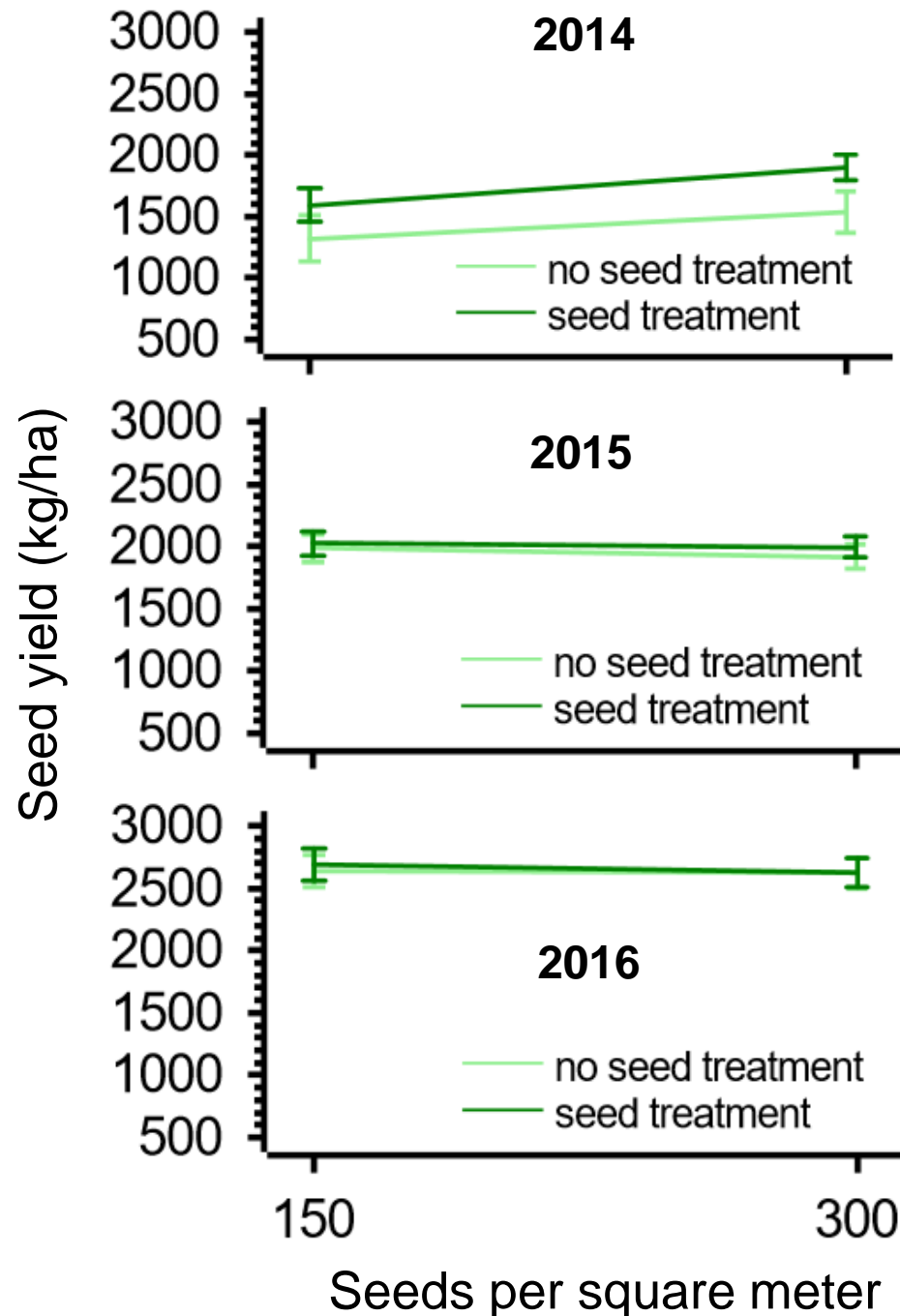
- Large yearly variation
- Lower damage with seed treatment
- Somewhat lower damage with increased seeding rates

Averages from 23 sites.  
Dashed line = economic threshold



# Seed yields

- 2014:  
Seed treatments and increased seeding rates increase yields
- 2015-2016:  
Little / no yield increase from seed treatment or seed rate





# Lower damage with early seeding

**Seeded 24/4  
no seed treatment**



**Seeded 24/4  
seed treatment**



**Seeded 6/5  
no seed treatment**



**Seeded 6/5  
seed treatment**



# Altered tillage regime

- Increased amount of crop residues may decrease flea beetle damage (Dosdall et al. 1999)
- 8 block experiments 2014-2016, conventional compared to reduced tillage
- No significant difference in crop damage
- Contrasts between treatments may be too small



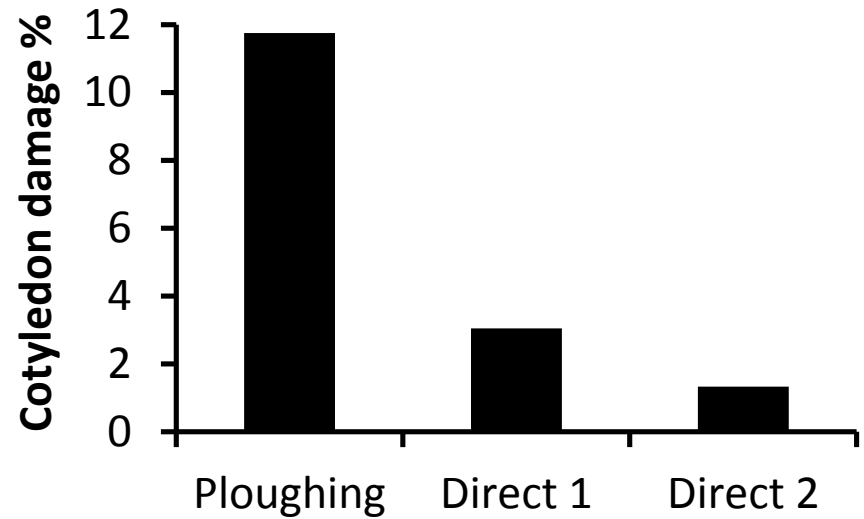
Conventional - mouldboard ploughing



Reduced – shallow disc cultivation



# Pilot study 2016– direct drilling



# Conclusions

- Large yearly variation in flea beetle crop damage and the benefits of seed treatment
- Less crop damage with early seeding
- Increased seeding rate lowers damage somewhat
- Direct drilling promising from a flea beetle perspective
- Better understanding of flea beetle population dynamics needed

# Planned research 2017-2019

- Test the influence of direct drilling on flea beetle crop damage in replicated trials
- Update and verify the economic threshold for *Phyllotreta* flea beetles
- Develop models to predict flea beetle attacks
  - needed for incorporating seed treatments into an IPM program



# **Thank you**

Swedish Seed and Oilseed Growers Association

Swedish Rural Economy and Agricultural Societies

Farmers hosting trials

Swedish Farmers Foundation for Agricultural Research

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