



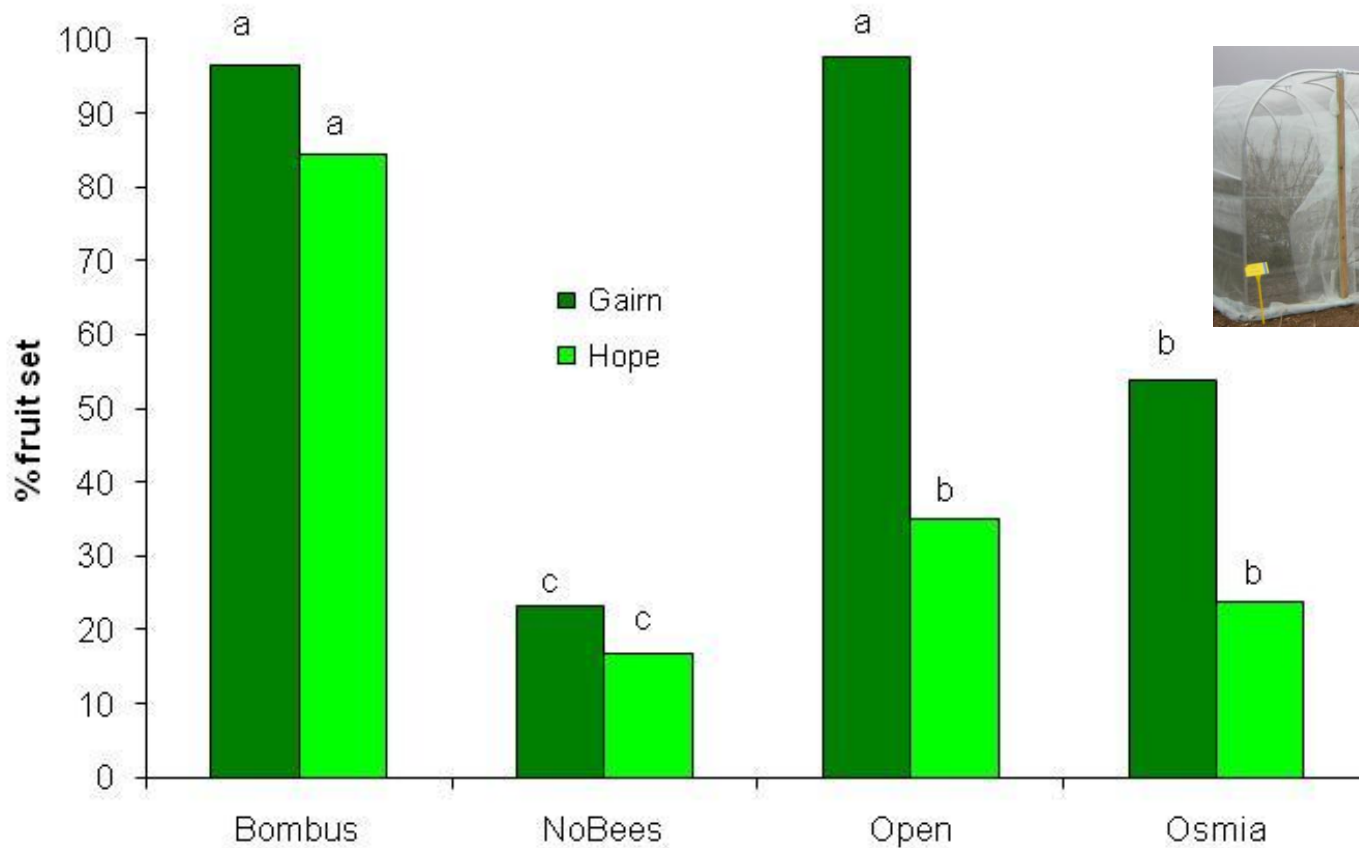
Blackcurrant pollination

Michelle Fountain

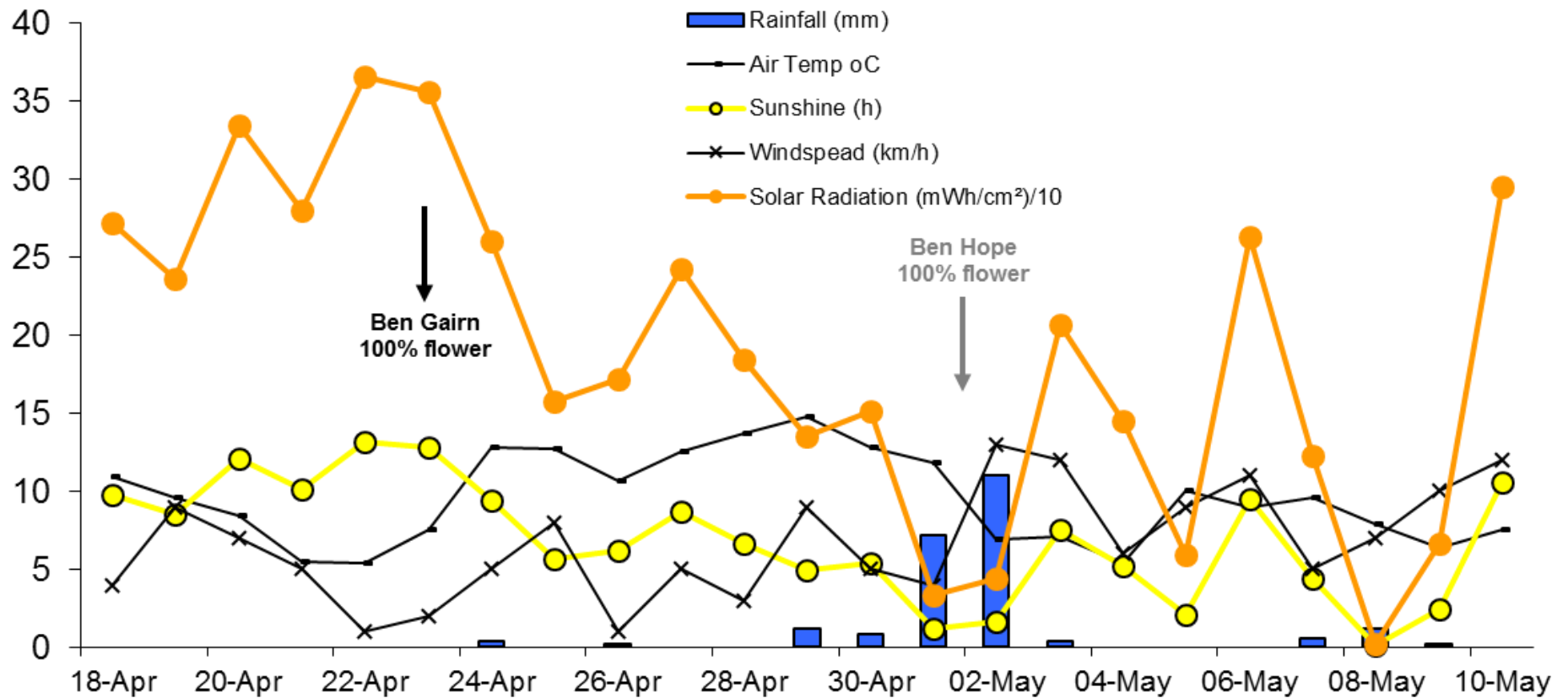


- ◆ Pollinator efficacy
 - Cage
 - Field
- ◆ Vectors of botrytis
- ◆ Species diversity
- ◆ Habitat enhancement
- ◆ Conclusions

Pollinator efficacy: Cage trial



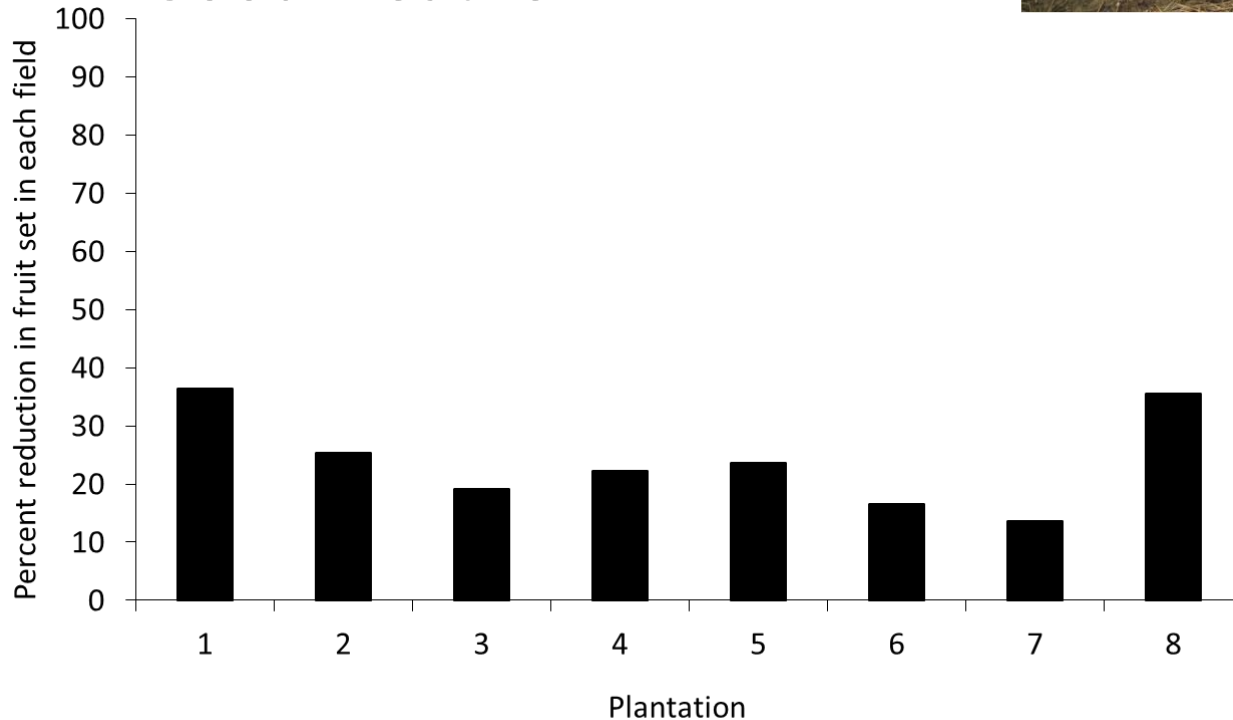
Effects of weather



Pollinator efficacy: Field trial



- ◆ 4 replicate plantations
- ◆ Distances from nests
- ◆ NSD fruit set $P = 0.890$
- ◆ Good weather



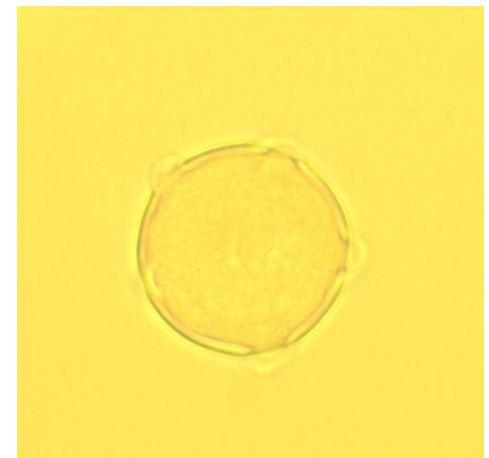
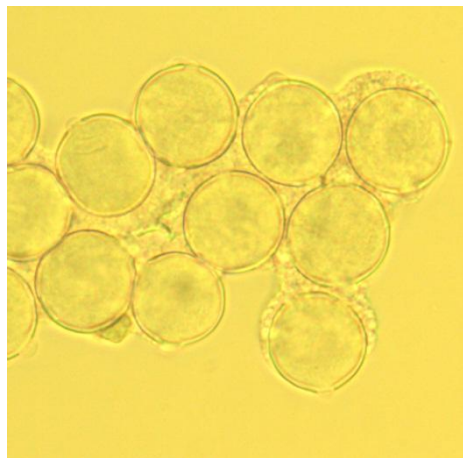
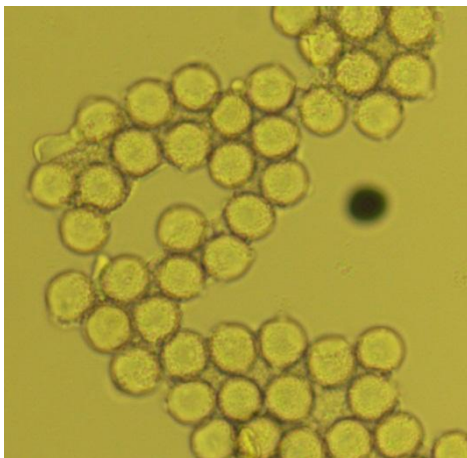
Wild insects
contribute up to
35% fruit set

Pollen on the heads of bees



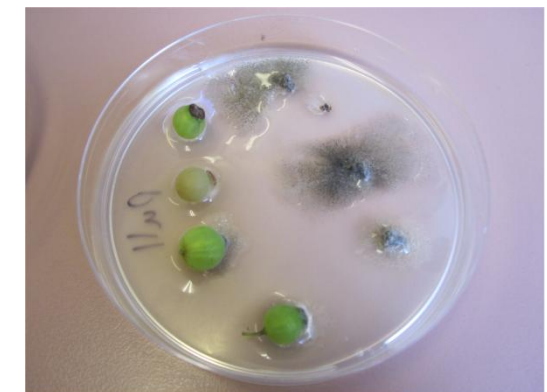
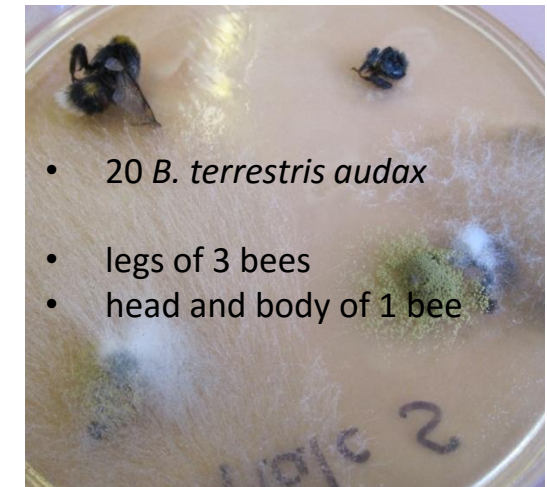
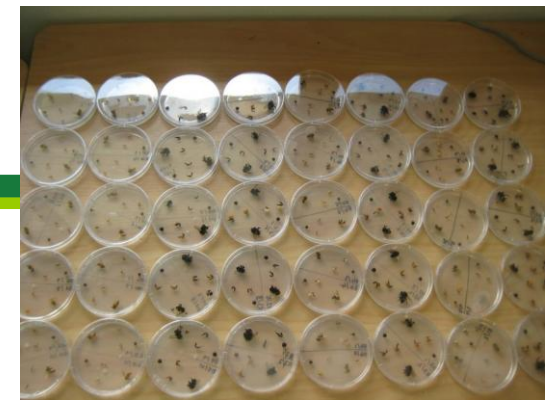
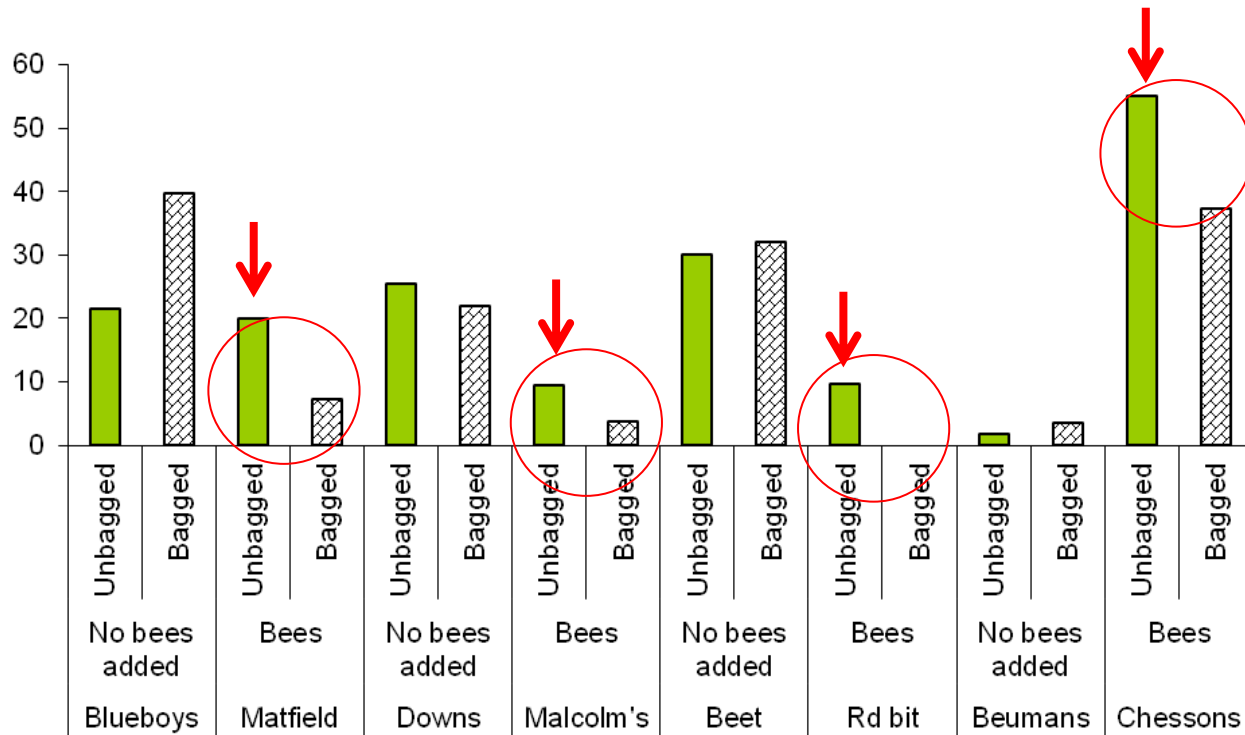
Blackcurrant pollen on heads of *Bombus terrestris audax* and other bees

	% bees with blackcurrant pollen	% of pollen that was blackcurrant
<i>B. terrestris</i>	60	4
Solitary bees	38	18



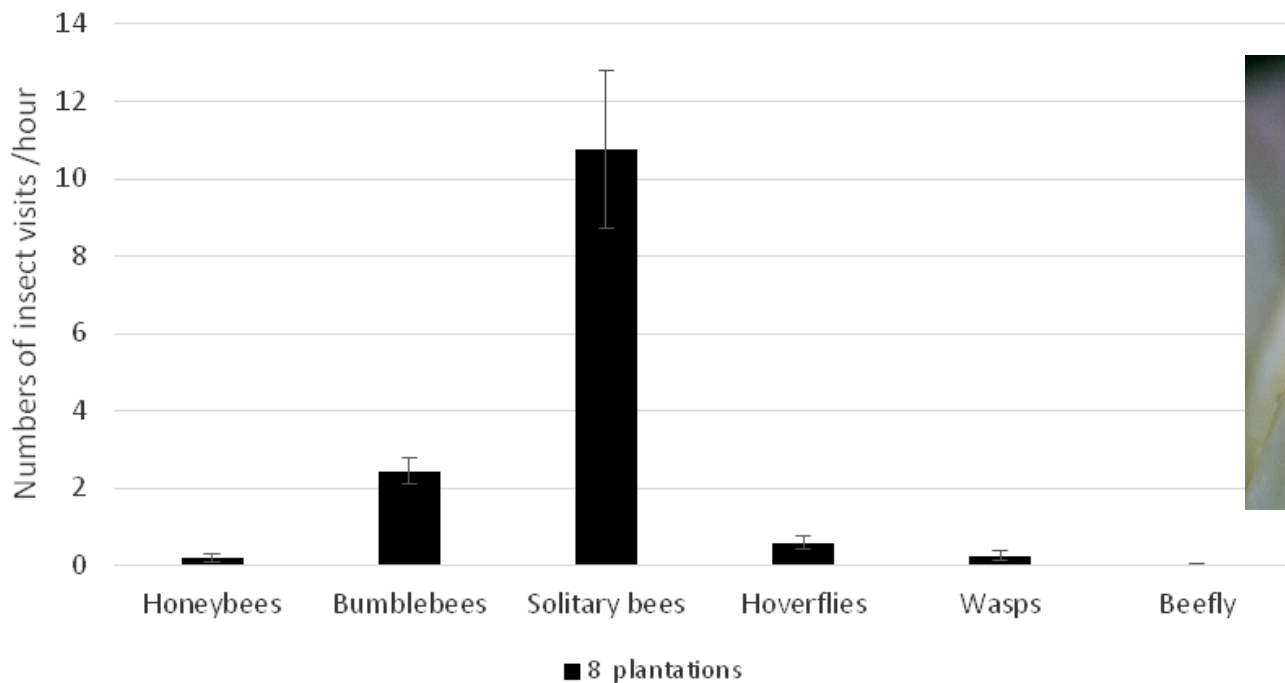
Vectors of botrytis?

- % botrytis infected berries – insect excluded and open flowers
- bagged (no bees)/unbagged (bees) $P = 0.062$

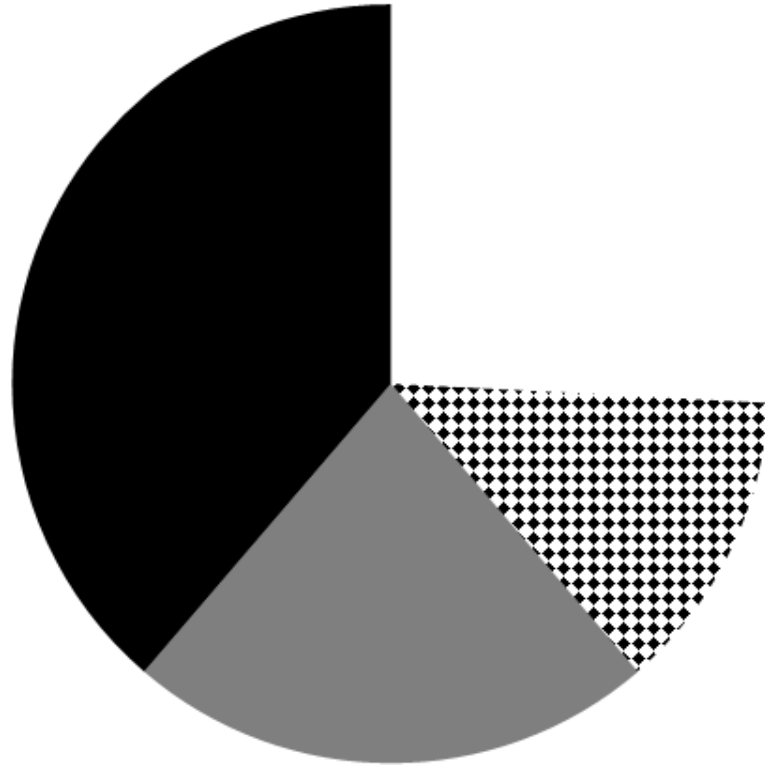


Diversity of foragers

- 40 insects identified to species
- 3 years (15), 10 Apidae, 2 Syrphidae
- Species richness: Farm 6 (7), Farm 7 (9), Farm 8 (7), Farm 9 (8)
- Bumblebees and solitary bees in all fields
- Honeybees of little importance?



Andrena dorsata, *A. haemorrhoa*, *A. flavipes* and *Bombus* (*terrestris/lucorum* and *lapidarius*) dominant



Other

▣ *A. flavipes*

■ *A. haemorrhoa*

■ *A. dorsata*



Photo by Steven Falk
Andrena flavipes female



Andrena dorsata - Nico Vereecken



Andrena haemorrhoa - Nigel Jones



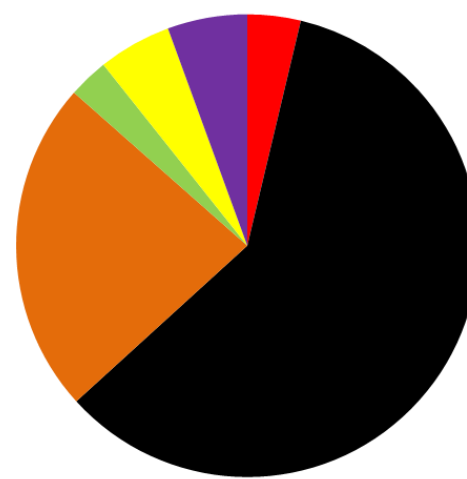
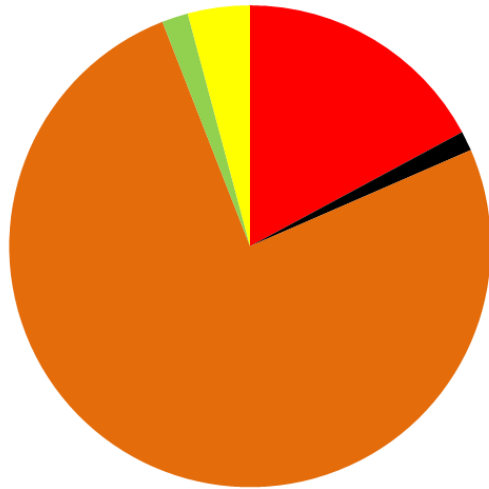
Bombus terrestris/lucorum - Michelle Fountain



Bombus lapidarius - Michelle Fountain

A. flavipes double brooding (spring and summer)

Comparison to other crops

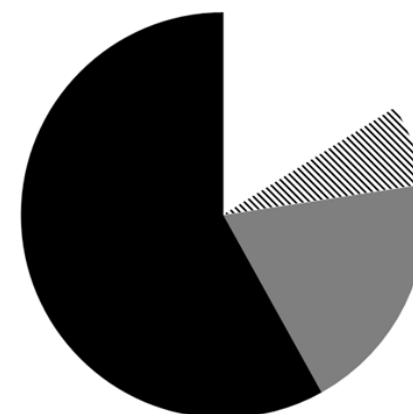
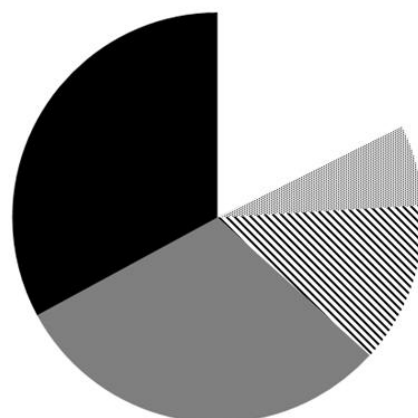
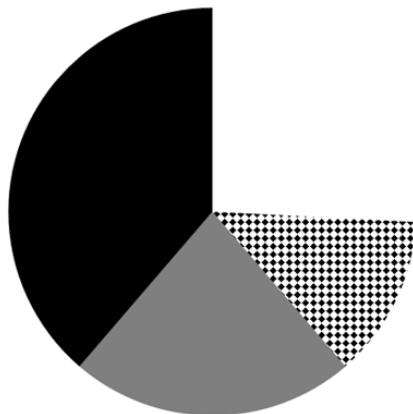


- Bumblebees
- Honeybees
- Solitary bees
- Wasps
- Hoverflies
- Other Flies

Blackcurrant

Apple

Pear

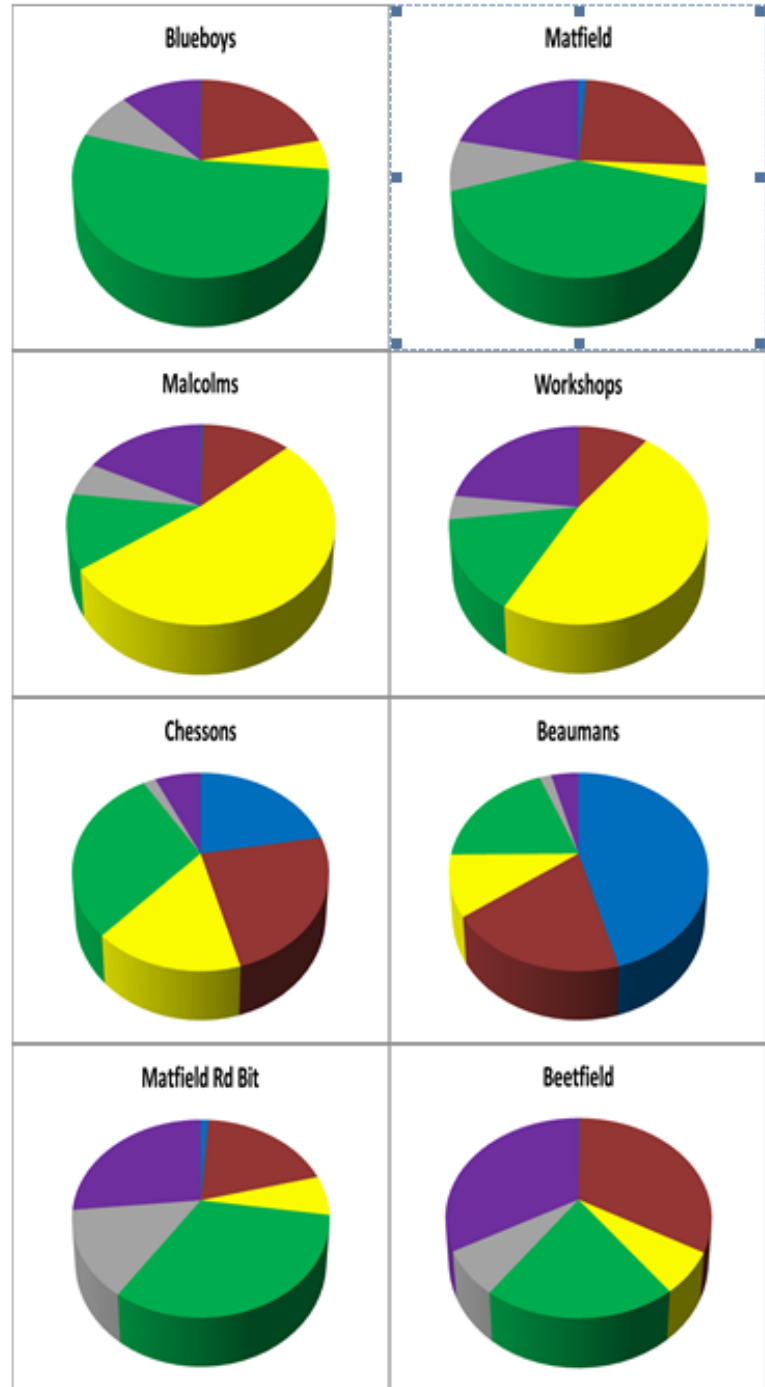


- A. carantonica
- A. nitida
- A. haemorrhhoa
- A. dorsata
- A. flavipes

Habitat assessments



tumuli



■ Freshwater
 ■ Woodland
 ■ Arable
 ■ Grassland
 ■ Urban
 ■ Horticulture

Provisioning out of blackcurrant flower



Species of bee identified between 2010-2012 either foraging on blackcurrant flowers or present in and around the plantations pre and post flowering

Species 2010-2012	Around crop flowering 2012	pre- In crop 2010-11	Around crop post-flowering 2012
Andrena			
<i>A. dorsata</i>	Present	Present	Present
<i>A. flavipes</i>	Present	Present	Present
<i>A. nigroaenea</i>	Present	Present	Present
<i>A. fulva</i>	Present	Present	Present
<i>A. haemorrhhoa</i>	Present	Present	Present
<i>A. nitida</i>	Present	Present	Present
<i>A. helvola</i>	Present	Present	Present
<i>A. carantonica</i>	Present	Present	Present
Bombus			
<i>B. terrestris</i>	Present	Present	Present
<i>B. lapidarius</i>	Present	Present	Present
<i>B. vestali</i>	Present	Present	Present
<i>B. lucorum</i> egg	Present	Present	Present
<i>B. pratorum</i>	Present	Present	Present
<i>B. pascuorum</i>	Present	Present	Present
Other solitary bees			
<i>Lasioglossum malachurum</i>	Present	Present	Present
<i>L. morio</i>	Present	Present	Present
<i>Halictus tumulorum</i>	Present	Present	Present
<i>L. calceatum</i>	Present	Present	Present
<i>Osmia rufa</i>	Present	Present	Present

Conclusions



- Bumblebees are effective pollinators of blackcurrant
- Supplementing with bees in poor weather conditions may improve fruit set
- Wild insects contribute up to 35% blackcurrant fruit set
- Significantly larger berries result from insect pollination
- Berries also have a higher dry matter
- Bees probably contribute to botrytis infection of berries
- Solitary bees are the most frequent visitors to blackcurrant flowers – diversity of bees ~ 8 per plantation
- Local habitat (nest provision and forage) could be improved to boost numbers

Acknowledgements



- Jerry Cross, Angela Berrie, Rob Saunders (GSK)
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- Temporary field assistants
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