Från humla till jordgubbe

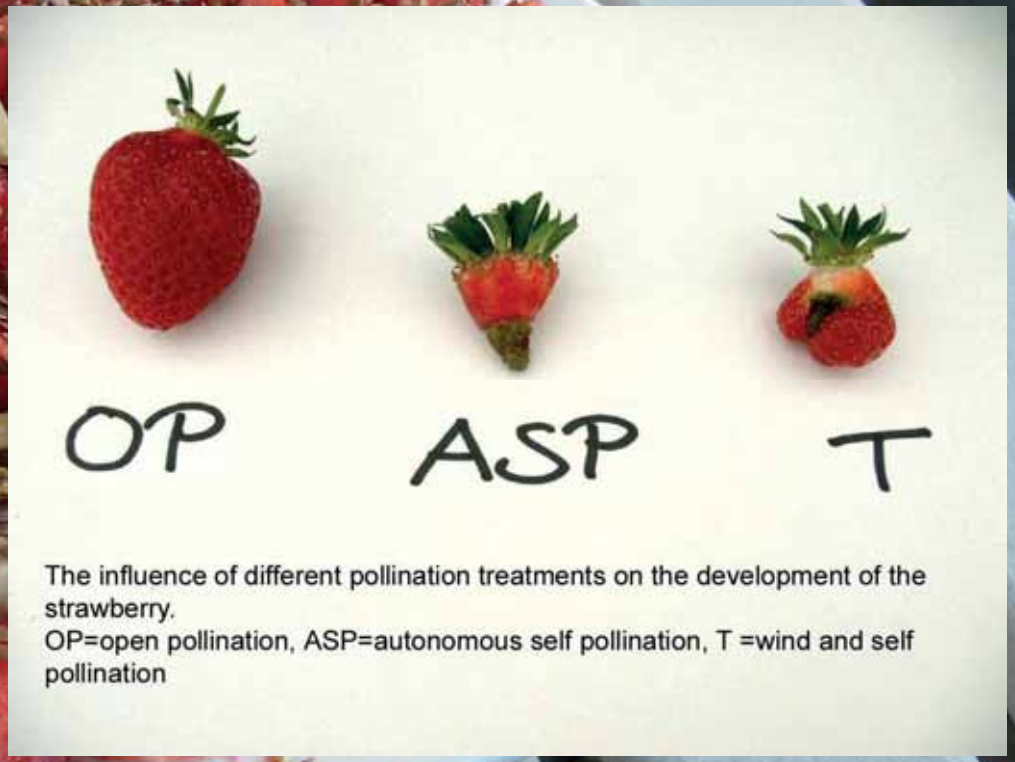
- om pollinerande insekter och deras tjänster

MAJ RUNDLÖF, FORSKARE VID LUNDS UNIVERSITET

Pollinering

= transporten av pollen från den hanliga **ståndaren** till den honliga **pistillen**

Pollinering



The influence of different pollination treatments on the development of the strawberry.
OP=open pollination, ASP=autonomous self pollination, T =wind and self pollination

88 % insektspollinering, 11 % självpollinering, 1 % vind

Photo: Kristin Krewenka (Göttingen, Tyskland)

Ekosystemtjänster

= de tjänster som ekosystemet och dess organismer utför och som vi människor drar nytta av

POLLINERING

ECOSYSTEM SERVICES

Provisioning services
Food, fiber and fuel (8, 9)
Genetic resources (10, 26)
Biochemicals (10)
Freshwater (7, 20)

Cultural services (17)
Spiritual and religious values
Knowledge systems
Education and inspiration
Recreation and aesthetic values
Sense of place

Supporting services
Primary production
Provision of habitat
Nutrient cycling (12)
Soil formation and retention (16, 22, 26)
Production of atmospheric oxygen (13)
Water cycling (7)

Regulating services
Invasion resistance
Herbivory
Pollination
Seed dispersal
Climate regulation
Pest and disease control
Human disease regulation
Storm protection (16)
Erosion control (16, 22, 26)
Water purification (7, 20)

MEA 2005. Millennium Ecosystem Assessment. Ecosystems and human well-being: scenarios. Island Press, Washington, D.C., USA.

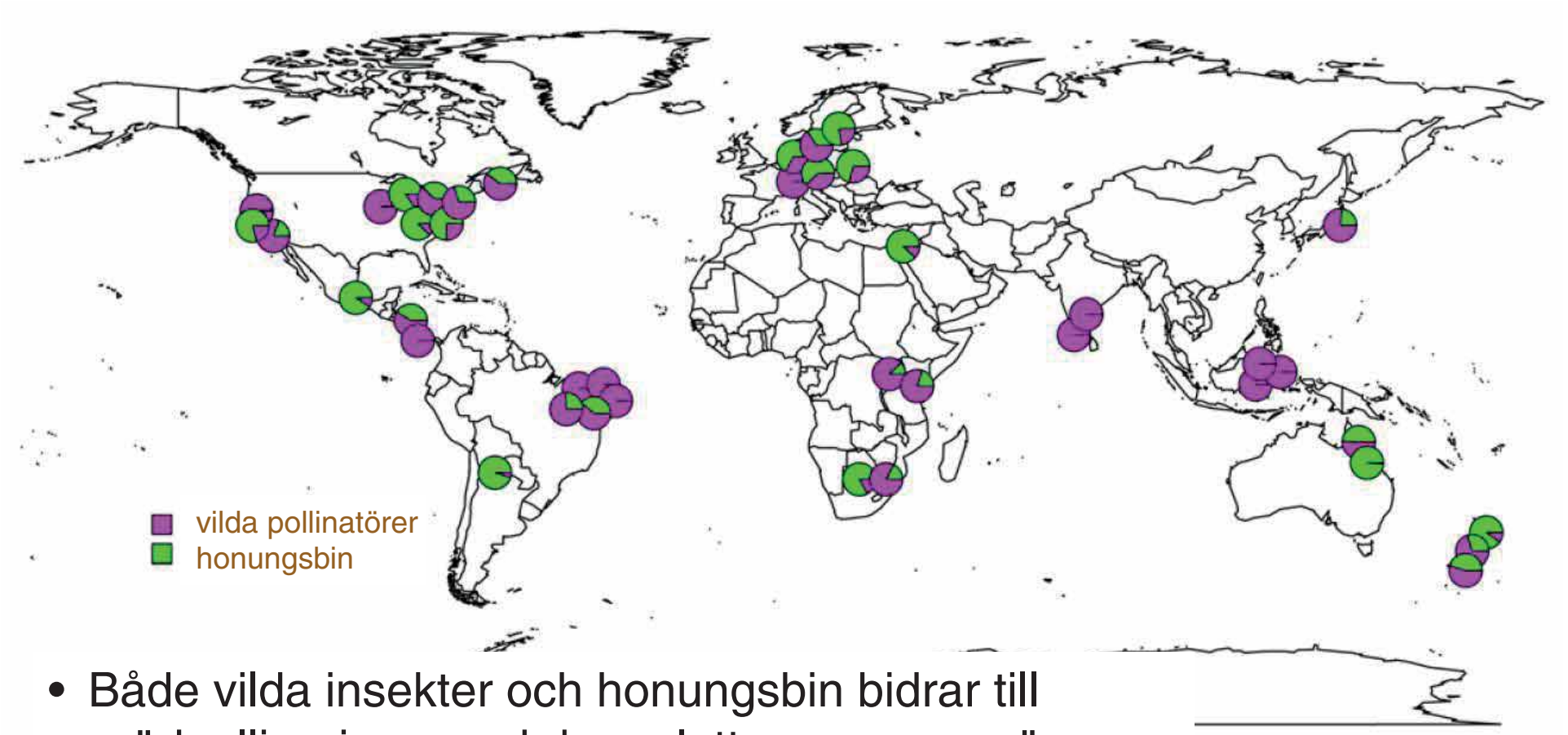
Pollinering

- Minst ¾ av alla odlade och vilda växtarter är helt eller delvis beroende av insektspollinering
- Minst ⅓ av skörden globalt sett kommer från grödor som till någon del pollineras av insekter




Ollerton et al. (2011) Oikos; Klein et al (2007) Proc R Soc B

Vem pollinerar?



- Både vilda insekter och honungsbin bidrar till grödpollineringen och kompletterar snarare än ersätter varandra

Garibaldi et al. (2013) Science

Pollinatörer

Viktigaste:

- bin
- blomflugor

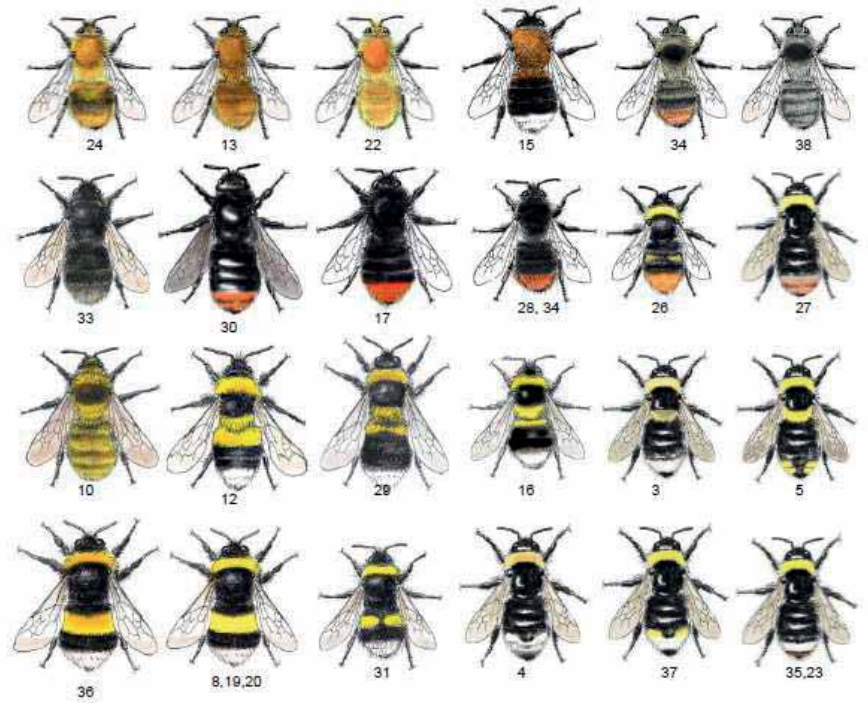
Andra grupper:

- skalbaggar och andra flugor
- fåglar och fladdermöss

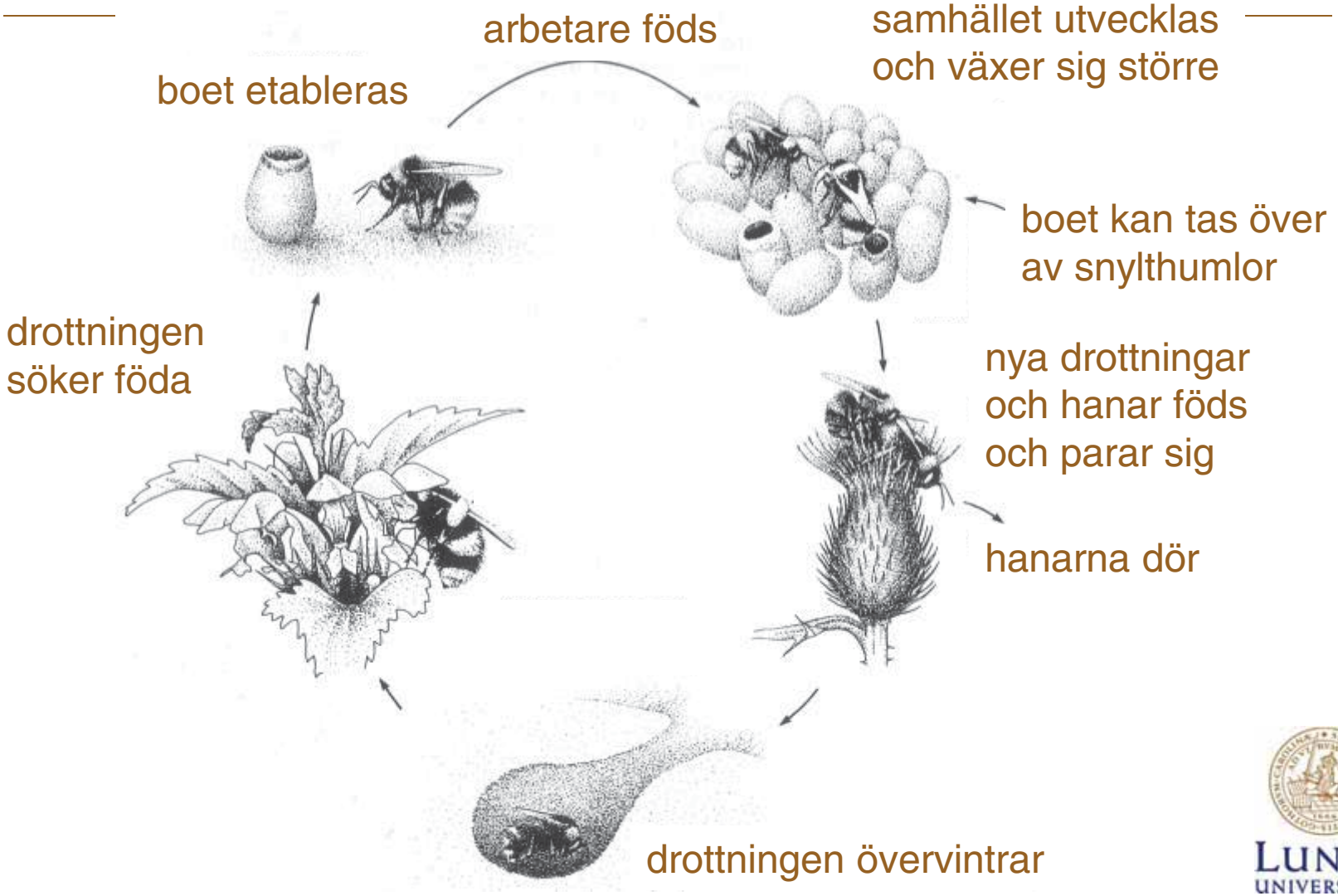
Klein et al (2007) Proc R Soc B

Pollinatörer – bin

- I världen:
  - bin (20-25 000 kända arter)
  - humlor (över 250 arter) → är också bin!
  - honungsbin (7 arter)
- I Sverige:
  - honungsbin (1 art)
  - humlor (nästan 40 arter)
  - solitärbin (ca 250 arter)



Humlans år



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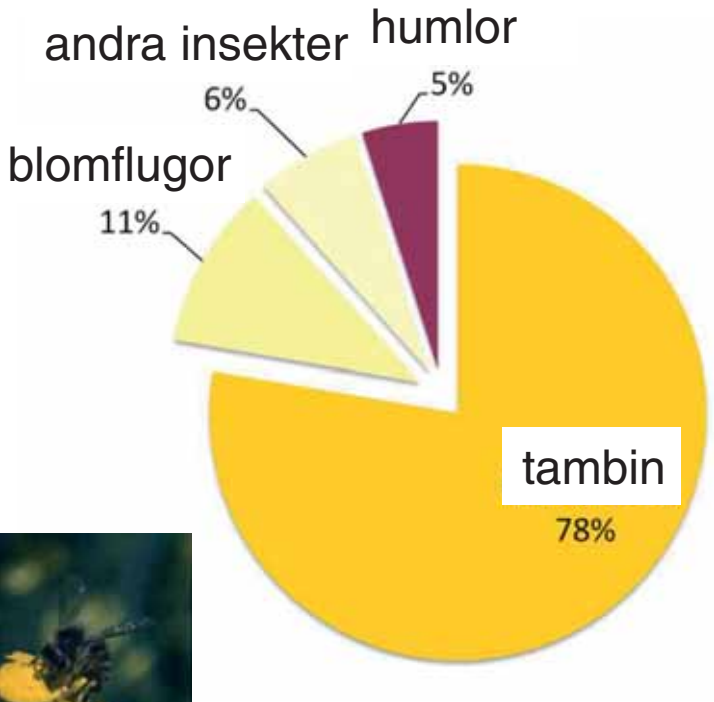
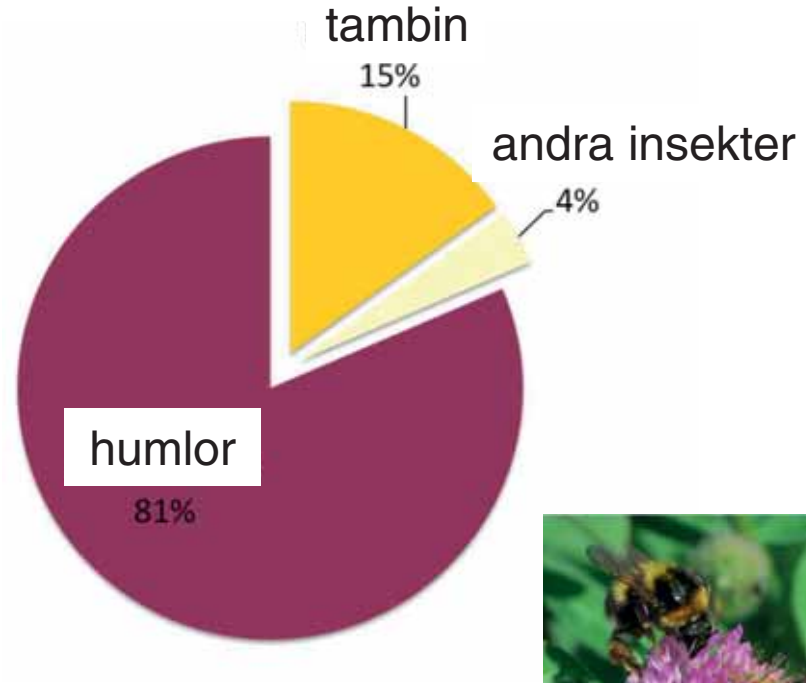
Prys-Jones & Corbet (1991) Bumblebees. Cambridge University Press.

Olika pollinatörer för olika grödor

Vårraps

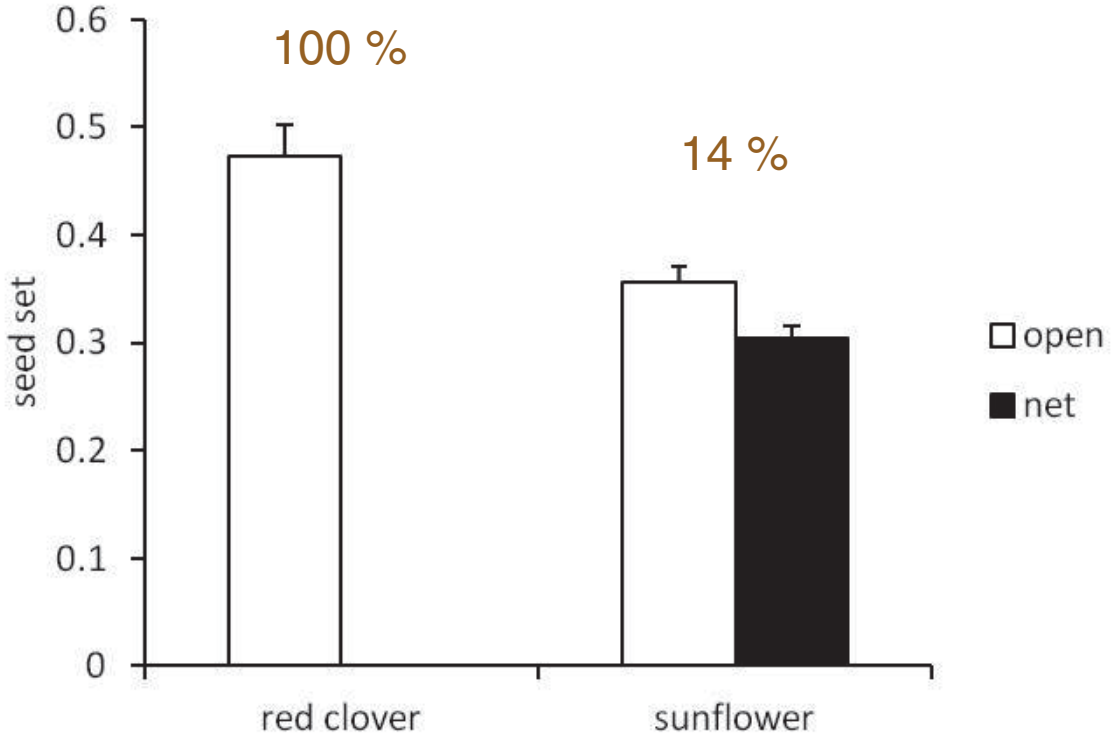


Rödklöver



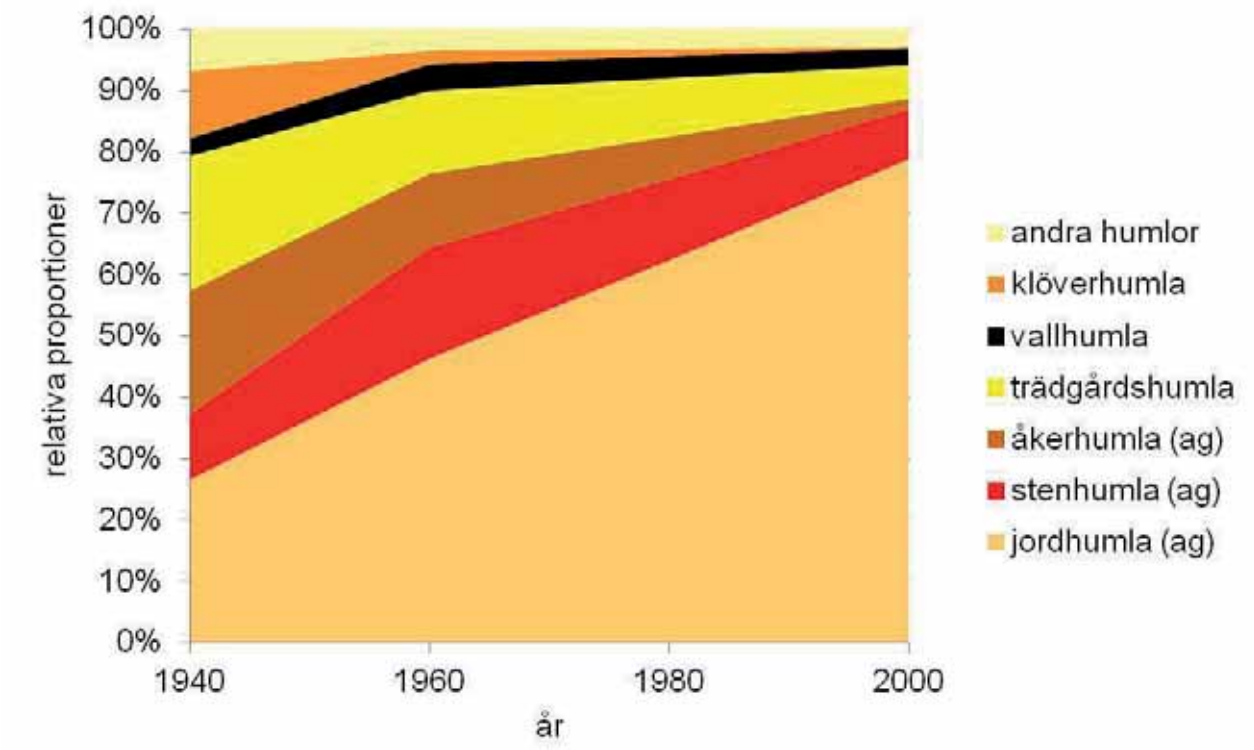
Bommarco, Marini & Vaissière (2012) Oecologia; Bommarco, Lundin, Smith & Rundlöf (2012) Proc R Soc B

Olika beroende av insektspollinering



Rundlöf, Reidinger, Renner, Holzschuh, Steffan-Dewenter & Bommarco (2013) STEP

Hur går det för pollinatörerna?



Vinnare:

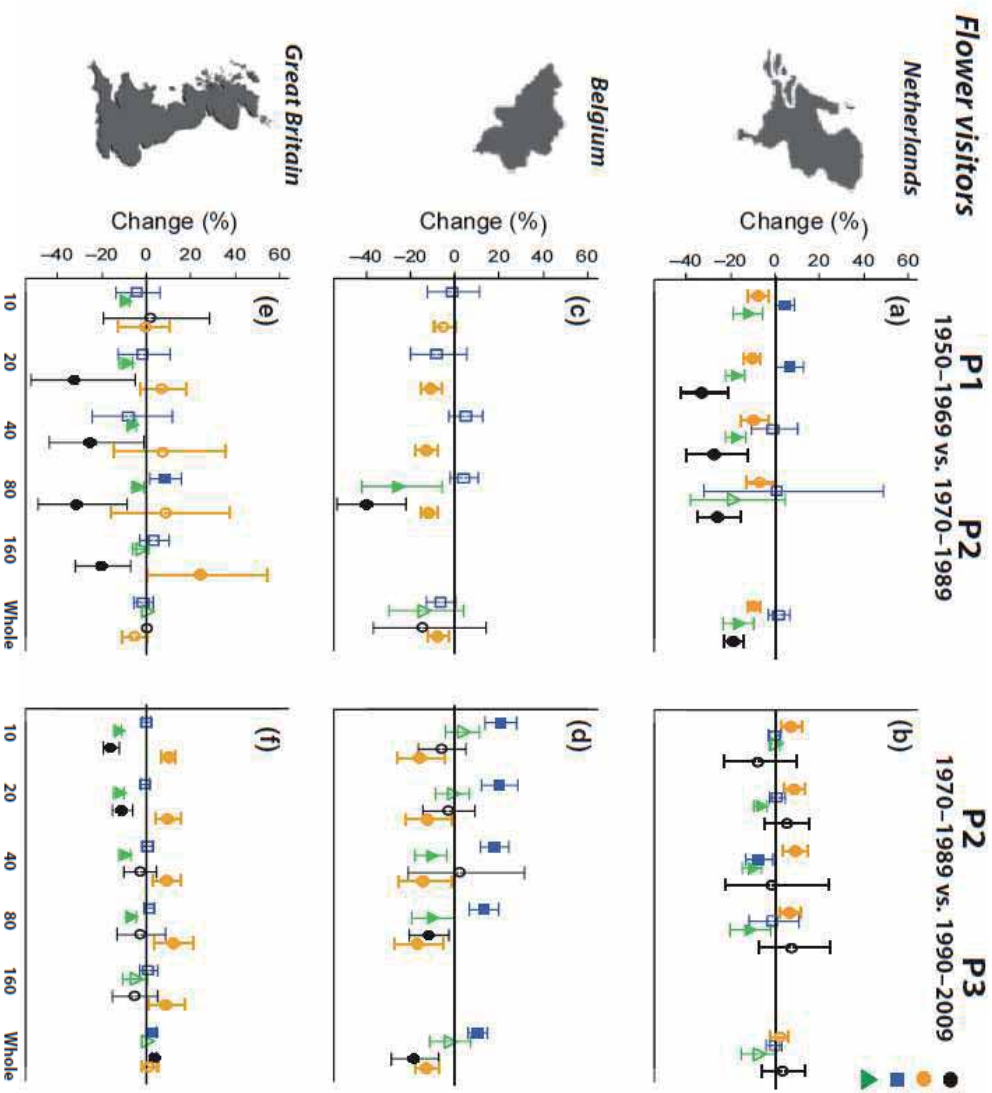
Jordhumlor och Stenhumla

Förlorare:

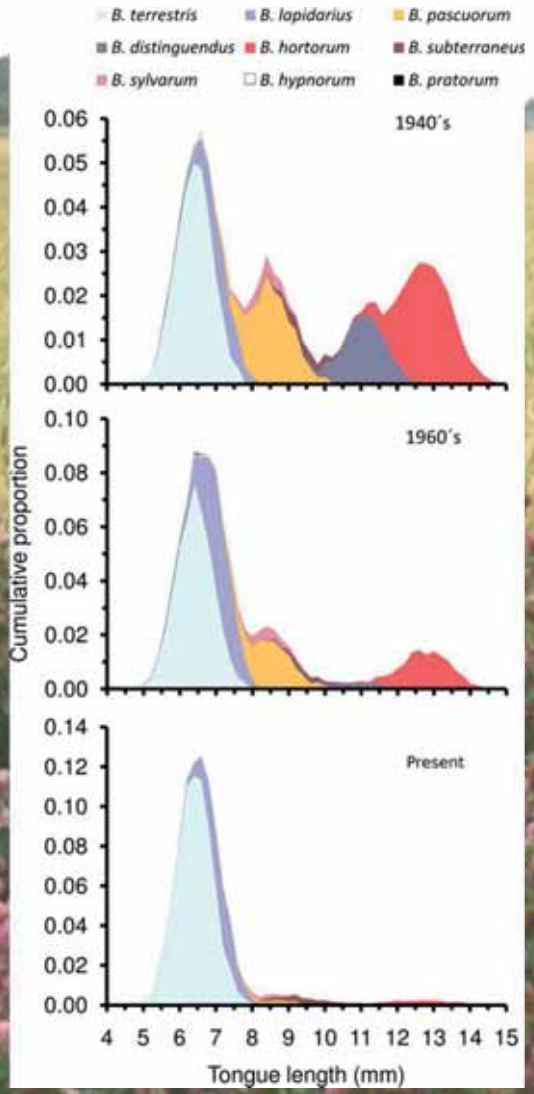
Åkerhumla, Trädgårds-humla och Klöverhumla

Bommarco, Lundin, Smith & Rundlöf (2012) Proc R Soc B

Carvalheiro et al (2013) Ecol Letters



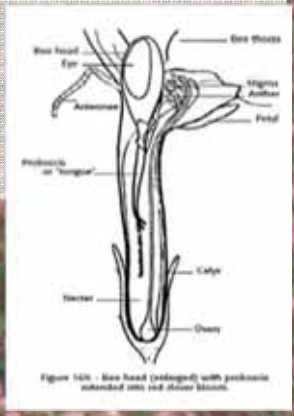
Förändring i funktionell sammansättning



<u>Rödklöverns blompipslängd:</u>
8-9 mm (beroende på sort)

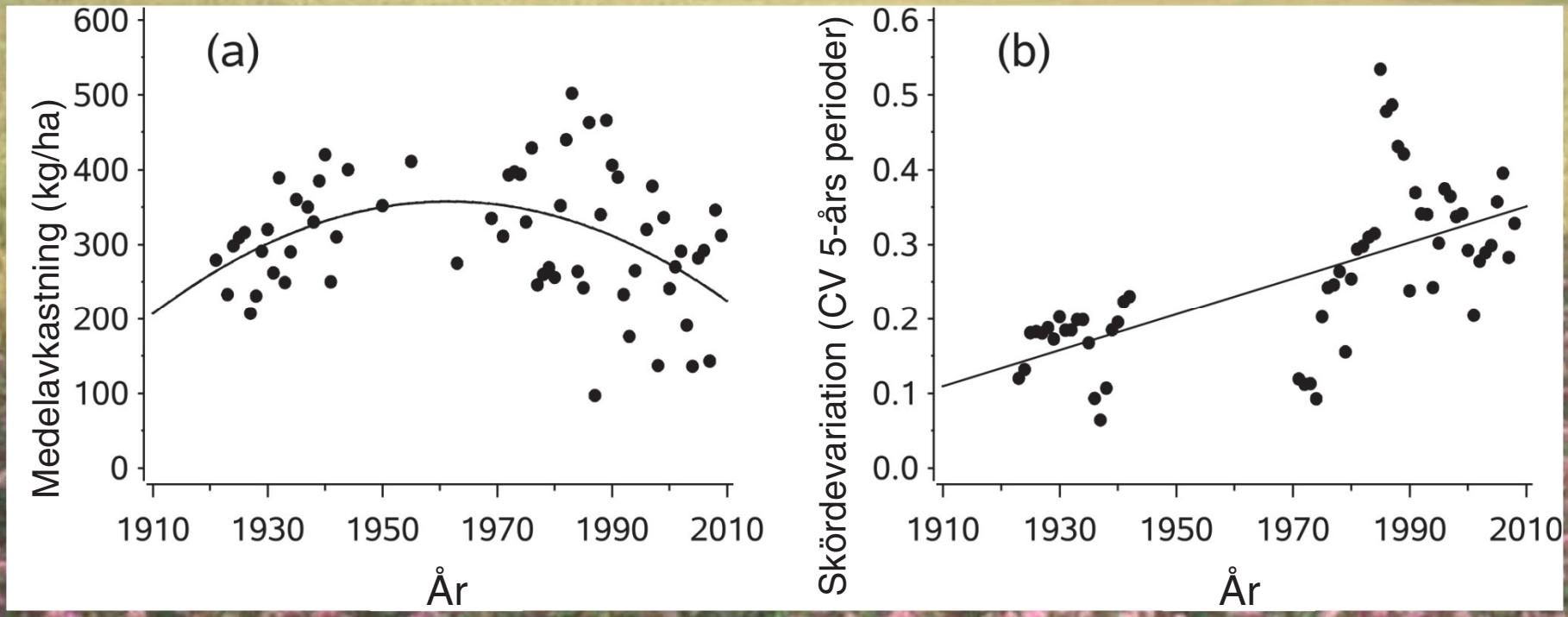
<u>Pollinatörernas tunglängd:</u>
Honungsbin 4-5 mm

Humlor 5-15 mm
(beroende på art)



Bommarco, Lundin, Smith & Rundlöf (2012) Proc R Soc B

Vikande och mer variabla klöverskördar



Bommarco, Lundin, Smith & Rundlöf (2012) Proc R Soc B

Pollineringskris?

NEWS OF THE WEEK

ECOLOGY

Pollinator Diversity Declining in Europe

Several studies have suggested that particular pollinating insects might be in trouble—the domesticated honeybee in the United States, for example—but there has been little evidence for a large-scale problem. That is about to change: On page 351, a team led by Jacobus Biesmeijer and William Kunin of the University of Leeds, U.K., report a significant decline in pollinator diversity across the U.K. and the Netherlands since 1980. "They're going down, absolutely," says ecologist Jane Memmott of the University of Bristol, U.K. The study found that insect-pollinated plants in the two countries have also run into trouble, but the authors and others acknowledge that it's difficult to prove that the loss of pollinating only a few species of plants—were particularly hard hit. They experienced greater declines in distribution than less choosy pollinators in both countries. "Many of the rare species are now so rare that they will probably go extinct [in these regions] in the next decades," Biesmeijer predicts. The declines are probably due to destruction of habitat or agricultural changes; the team is analyzing the ALARM database for clues.

Rarer. In Britain and the Netherlands, wild bees, such as *Andrena gravida* (above), are declining.

To see whether plants have been affected on a national scale by declines in pollinator diversity, Biesmeijer and his colleagues pored over botanical atlases. In the U.K., 75 wild plants that need insects for pollination had declined in distribution, whereas 30 that are pollinated by wind or water increased overall. In the Netherlands, where just the bees have declined, only bee-pollinated plants lost ground. "It seems too cozy to be coincidence," says Kunin.

Biesmeijer and Kunin suspect that there is a causal relationship between the pollinator and plant declines, although it's not clear which is driving the trend. Ecologist Jahoury Ghazoul of the Swiss Federal Institute of Technology in Zurich is skeptical that recent pollinator declines have affected plant populations; he thinks it's more likely that human disturbances, for example, favor weedy, wind-pollinated plants. Others fear that the loss of bees and other pollinators will have a clear agricultural impact. Says pollination ecologist Juliet Osborne of Rothamsted Research in Harpenden, U.K., "There is an economic reason to be worried."

–ERIK STOKSTAD

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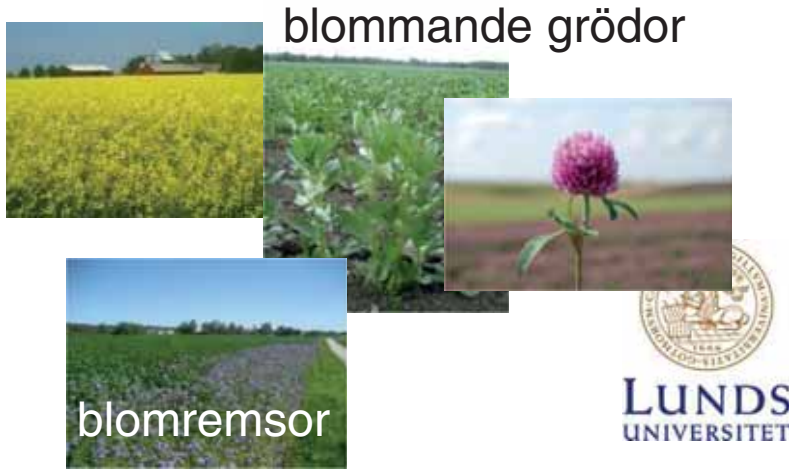
Vad behöver pollinatörer?

- Vilda bin behöver **boplatser**, alla bin behöver blommor:
- **nektar** som flygbränsle till de vuxna individerna
- **pollen** som föda till larverna

- Permanenta födosöksmiljöer – **lite** mat, men under **lång** tid
- Boplatser

- Tillfälliga födosöksmiljöer – **mycket** mat, men under **kort** tid



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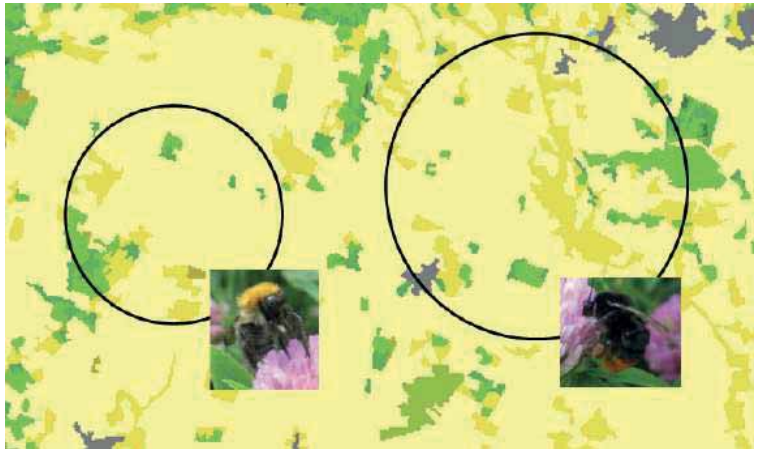
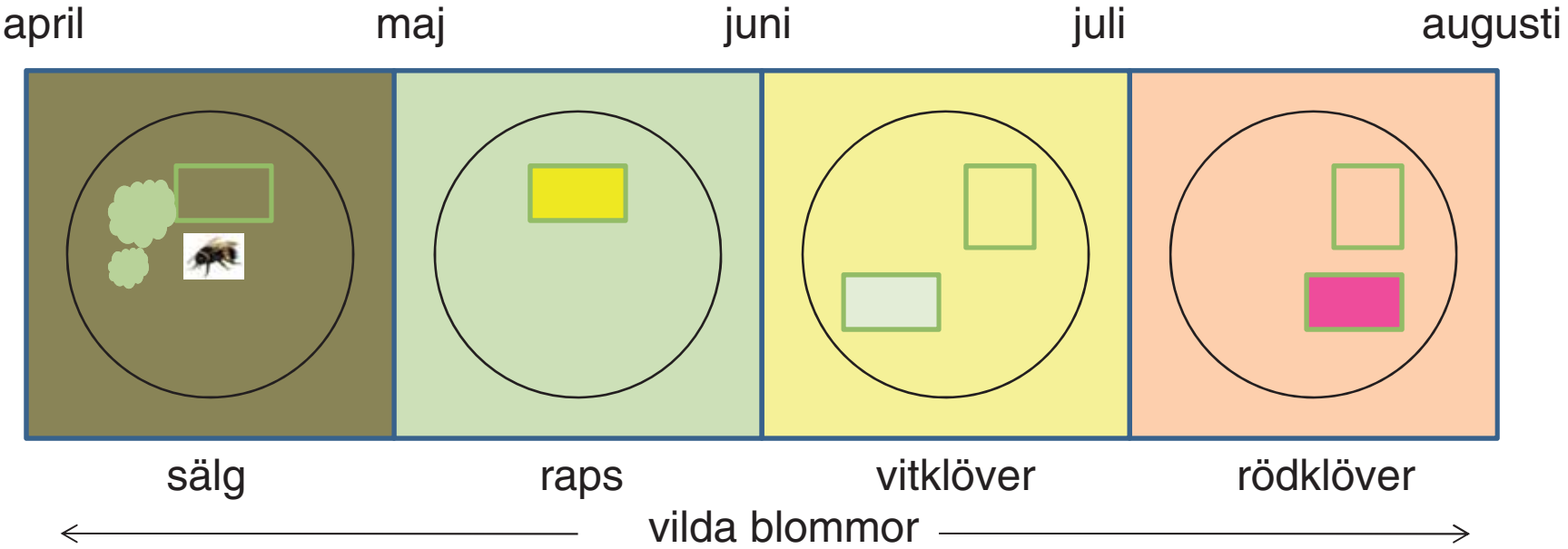
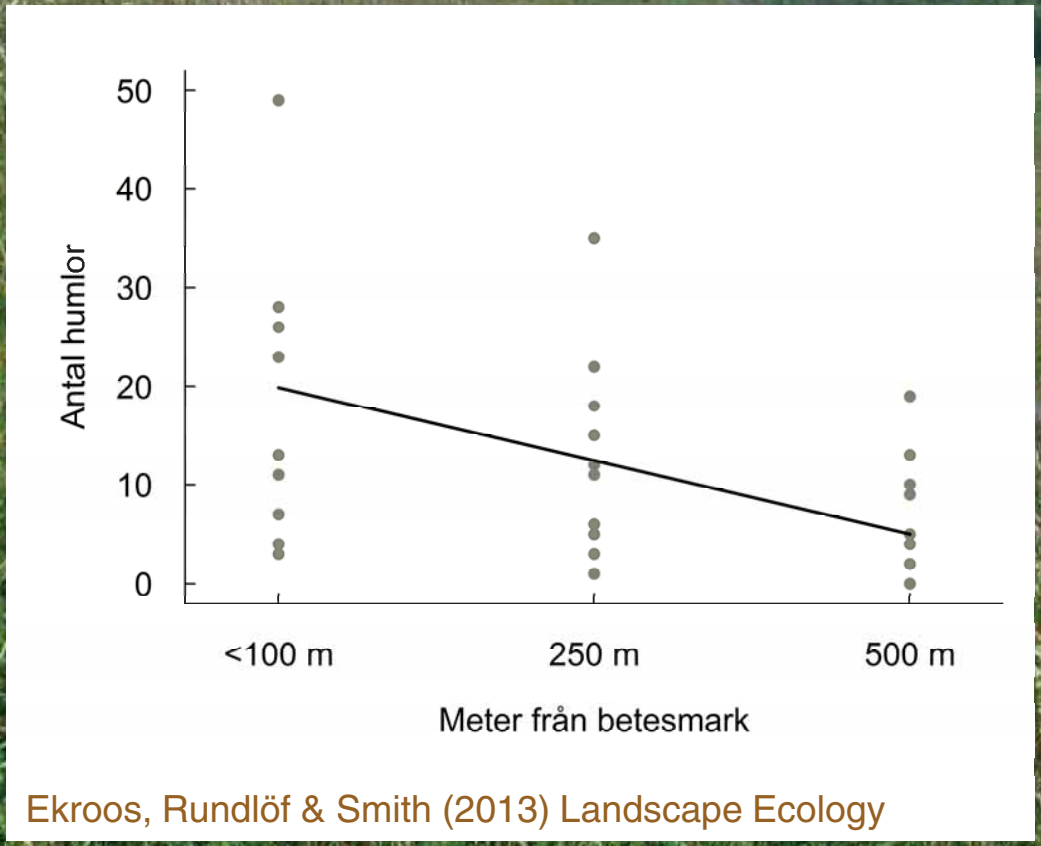
Vad behöver pollinatörer?



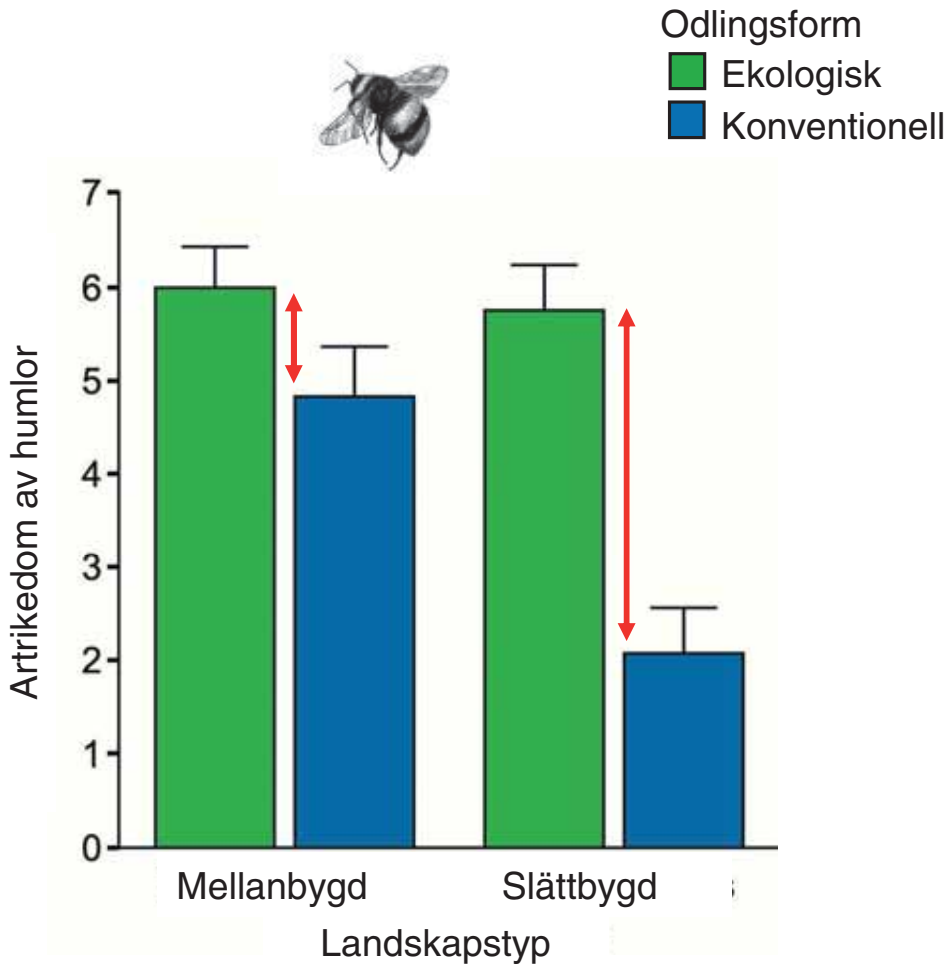


Naturbetesmarker som källor



Ekroos, Rundlöf & Smith (2013) Landscape Ecology

Varierande landskap och mindre växtskyddsmedel



Rundlöf, Nilsson & Smith (2008) Biological Conservation

Blomremsor för humlor och bin

Rödklöverfröodling för humlor

Vad kan vi göra?

- Lantbrukaren
  - Mer naturliga miljöer som boplatser (betesmarker, skogsbryn, småbiotoper)
  - Blomrika miljöer för födosök (blommande grödor, kantzoner, ängar)
- Trädgårdsägaren
  - Mycket blommor (helst inhemska) med olika blomningstid, färg och form
  - Material för boplats och övervintring; ihåliga pinnar, mossa, sandfläckar, biholkar


Foto: Åke Rudoff

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Tack för uppmärksamheten!
Några frågor?

maj.rundlof@biol.lu.se


Henrik Smith


Riccardo Bommarco


Ola Lundin


Helena Hanson


Johan Ekroos


Sören Eriksson


Georg Andersson

Finansiärer

SEVENTH FRAMEWORK PROGRAMME

formas
Forskningsrådet Formas
Formas främjar framstående forskning för hållbar utveckling

Stiftelsen Lantbruksforskning

Jordbruks verket

med flera...