BEEFARM - Wild bees and pollination on organic farms

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Wild bees are under pressure in most industrialized countries, but especially in Denmark because…

DK is the world champion in arable (disturbed) land

- 65% of the land area is in agriculture
- 54% of all land area is in rotation
- Intensive land use, even on organic farms

➢ Results are threatened biodiversity in general, and threatened ecological services such as pollination

➢ Farmers are the main decision makers regarding pollinator conditions in DK

➢ Many organic farmers see protection and enhancement of biodiversity as a special responsibility

➢ Collaboration with organic red clover seed growers and apple growers

➢ ***Helping farmers "think like wild bees"***

DDOland 2002

How can we assist farmers in improving their farms? How to make complex knowledge operational?

Wild bees depend on the available resources in habitats for **nesting, foraging and hibernation** within a limited spatial range.

The challenge: >250 species of wild bees with different **mobility** and ressource demands

Standard protocols for assessment of bee resources are scarce, and most of these are developed for **scientific use**.

Scientific models linking land use to food and nesting resources to wild bee abundance and diversity can explain - but is difficult to use to act from

Typically we give general advice ”more is better” or very specific actions: bee hotels etc .

Here, we want to assist the farmer in identifying ”rooms for improvement” on his specific farm

The hypothesis: *It is possible to develop a robust tool for farmers to assess resources for wild bees on their farms so they can act*

Farmer-assessed resources for wild bees

- Food quantity ”how much?”
- Food spatial distribution ”where? ”
- Food continuity ”any food gaps during season?”
- (Food quality)
- Nesting opportunies ”how many and where?”

?

More bees

Better pollination

Researcher-assessed resources for wild bees

- Same + additional habitats (”what are the farmers missing?”)
- Additional level of detail: plant species (= food quality)

More bees?

- Pan traps
- Bee observations in crops

Better pollination?

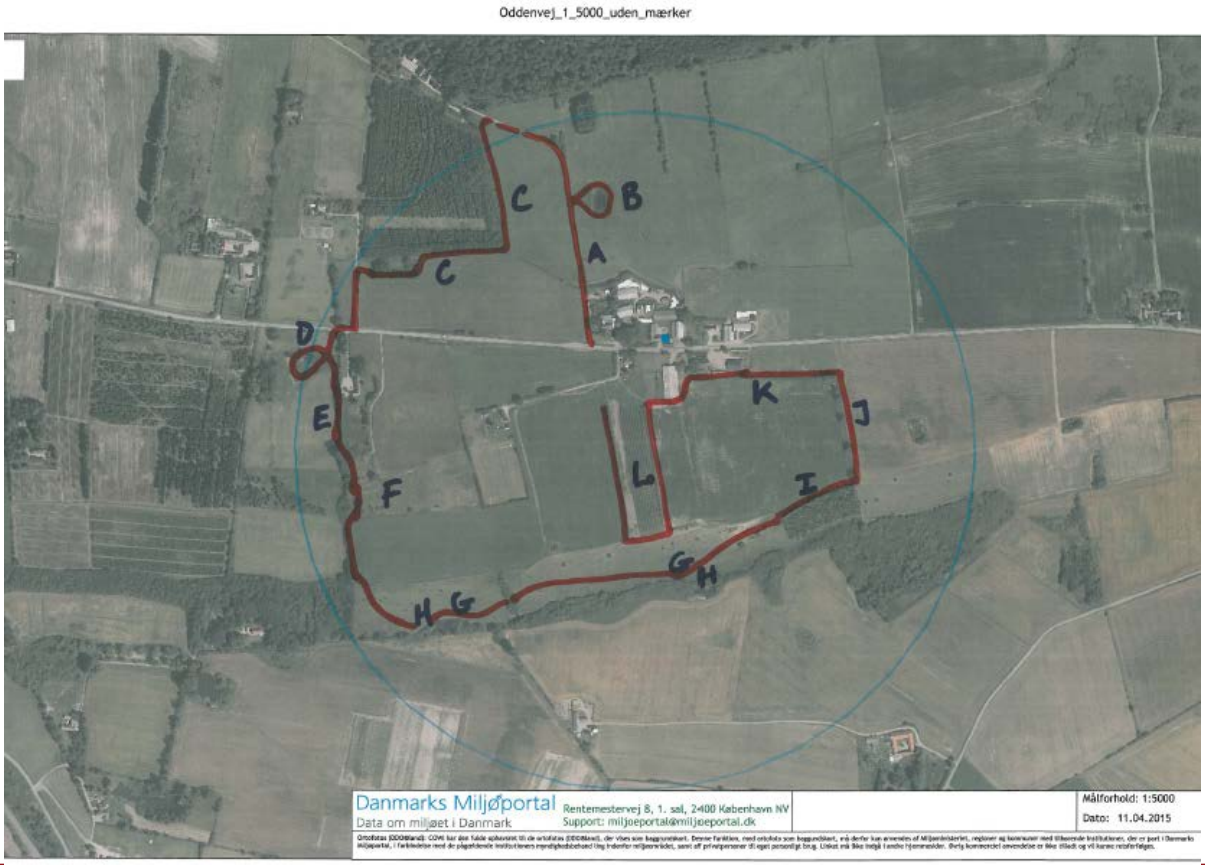
- Fruit set in apple
- Seed set in red clover

1.step in farmer assessment: ”Desktop planning” of walking route

- Based on publicly available land use and nature protection data a route passing ”all habitats which can be expected to offer resources” is drawn
- Step 1 could be done by the advisory service when fully developed

Link to example of land use data source:

http://arealinformation.miljoeportal.dk/distribution/?Project=e1b08adf-e957-42e8-bdcd-3e787d5ec6ed



”A” to ”L” are habitats assumed to offer resources for wild bees, e.g. B=pond, C=forest edge, F=permanent grassland, L=orchard

2. step: Farmers walk the route 3 times: spring, summer and late summer

- Farmers evaluate each habitat (a hedge, a meadow)
- For each habitat a specific assessment sheet is filled out
- Density measures are rough! No plant species
- A new set of assessment sheets are provided for each of the 3 walks

Forest edge

Road verge

Skovbryn – Sommer Bedrift: Lokalitet: C Dato:

Blomstrende buske – Sommer

Hvide blomster (f.eks. hæg, æble, hvidtjørn, hyld)		Mange/en del X Få/ingen

Vejkanter-Sommer

Bedrift: Lokalitet: A Dato: 9-7

Blomstrende træer og buske - Sommer

Hyld		Mange/en del Få/ingen X
Rose		Mange/en del Få/ingen

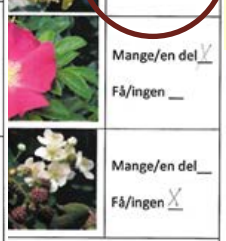
Blomstrende urter - Sommer

Gule blomster (f.eks. mælkebøtte, gul stenkløver, høgeurt, rundbælg, ranunkel, kællingetand)		Mange/en del Få/ingen X
Rød (lilla) og rosa blomster (f.eks. tidsel, rødkløver, katost, engelskgræs)		Mange/en del X Få/ingen
Blå eller violette blomster (f.eks. klokke, blåhat, blåmunke, musevikke, slangehoved, cikorie, ærenpris)		Mange/en del X Få/ingen
Hvide blomster (f.eks. vild kørvel, vild gulerod, hvid okseøje, hvidkløver, bellis)		Mange/en del X Få/ingen

Mange/en del
Få/ingen X

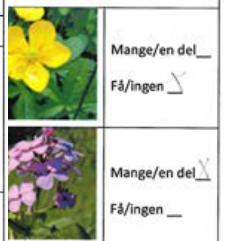
Many/ some

Few/ none



Mange/en del X
Få/ingen

Mange/en del
Få/ingen X



Mange/en del
Få/ingen X

Mange/en del X
Få/ingen

Mange/f.eks.en del
Få/ingen X

Mange/en del
Få/ingen X

Success criteria for the assessment tool: the link between assessed resources (farmer and experts), bee abundance and crop pollination can be established

- 9 Pan traps 0, 100 and 250 m distance
- 3 trapping periods

One example of total no. Solitary bees/trap, but data not yet processed

- Number of pollinators in crops
- Fruit set in apple and seed set in clover

Data not yet processed

What have we learned from the first season?

Challenges

- Finding the balance between data precision and being manageable for farmers: how quick and simple is OK?
- Farmers are busy, but enthusiastic
- Workshop on user friendlyness will show improvements

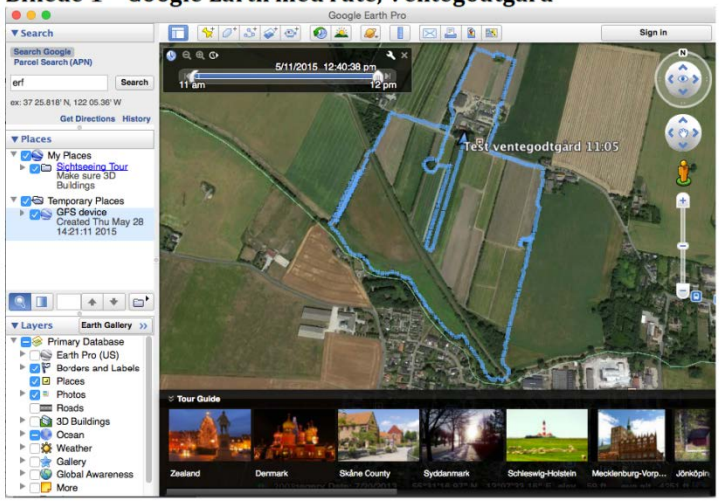
Potentials for farmers

- To be able to document biodiversity enhancement (market differentiation, trust in organics, as part of larger sustainability assessments)
- To professionalize nature management: documented gaps leading to improvement
- Next step: Inclusion of conventional farms with pesticides?

- A new innovative product for the advisory service?

Overcoming the challenge of farmer time use: Use of Go-Pro camera to assess food resources?

Billede 1 – Google Earth med rute, Ventegodtgård



Billede 10 - Vild Kørvel ved Oddenvej D

Billede 9 – Røde eller violette blomster ved Bavnen C

Thank you for your attention