EcoServe – Organic hay fields as resource for pollinators

Beate Strandberg
Senior scientist

EcoServe – Ecosytem Functions and Services of Biodiversity in Grasslands

› 3 year project (2011-2013)
› Financed by GUDP under the Ministry of Food, Agriculture and Fisheries
› Project partners:
       AU (Agroecology, Bioscience),
       UCPH (Food Science, Food and Resource Economics, Biology, Natural History Museum),
       Naturmælk, and
       Meyers Madhus

Organic hay fields as resource for pollinators

› **Main objective**

To investigate the potential improvements for wild pollinators by establishment of organic grasslands with a large proportion of selected herbs beneficial for pollinators

› **Expected results**

Significant results on pollinators and food resources for pollinators in organic grasslands and especially hay fields.

Recommendations on species composition and cutting regimes for organic hayfields in order to improve the ecological services with special focus on pollination.

Background – status for wild pollinators

› Bumblebees – 29 species   12 species (41.3 %)
› Solitary bees – 238 species   status unknown
› Hover flies – 267 species   82 species (30.7%)
› Butterflies - 77 species   43 species (55.8%)
› Moth – 66 species   23 species (34.8%)

The Danish Red List, Dupont & Madsen (2010), Calabuig (2000)

Background – grassland as a potential

› Including beneficial herbs into grassland seed mixtures significantly increases pollinator species richness
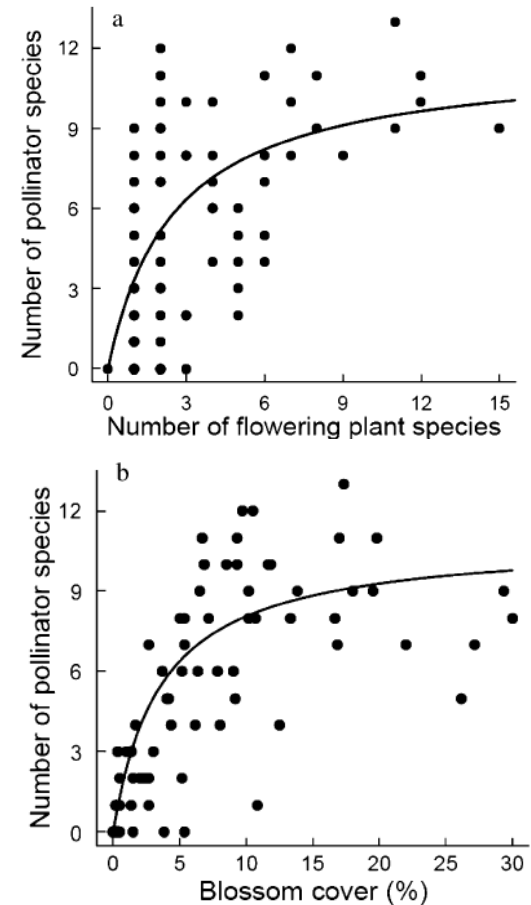
> (Albrecht et al. 2007, Potts et al. 2009)

› Floral abundances and species richness were good indicators for pollinator species richness and abundances

> (Potts et al. 2009, Batáry et al. 2010)
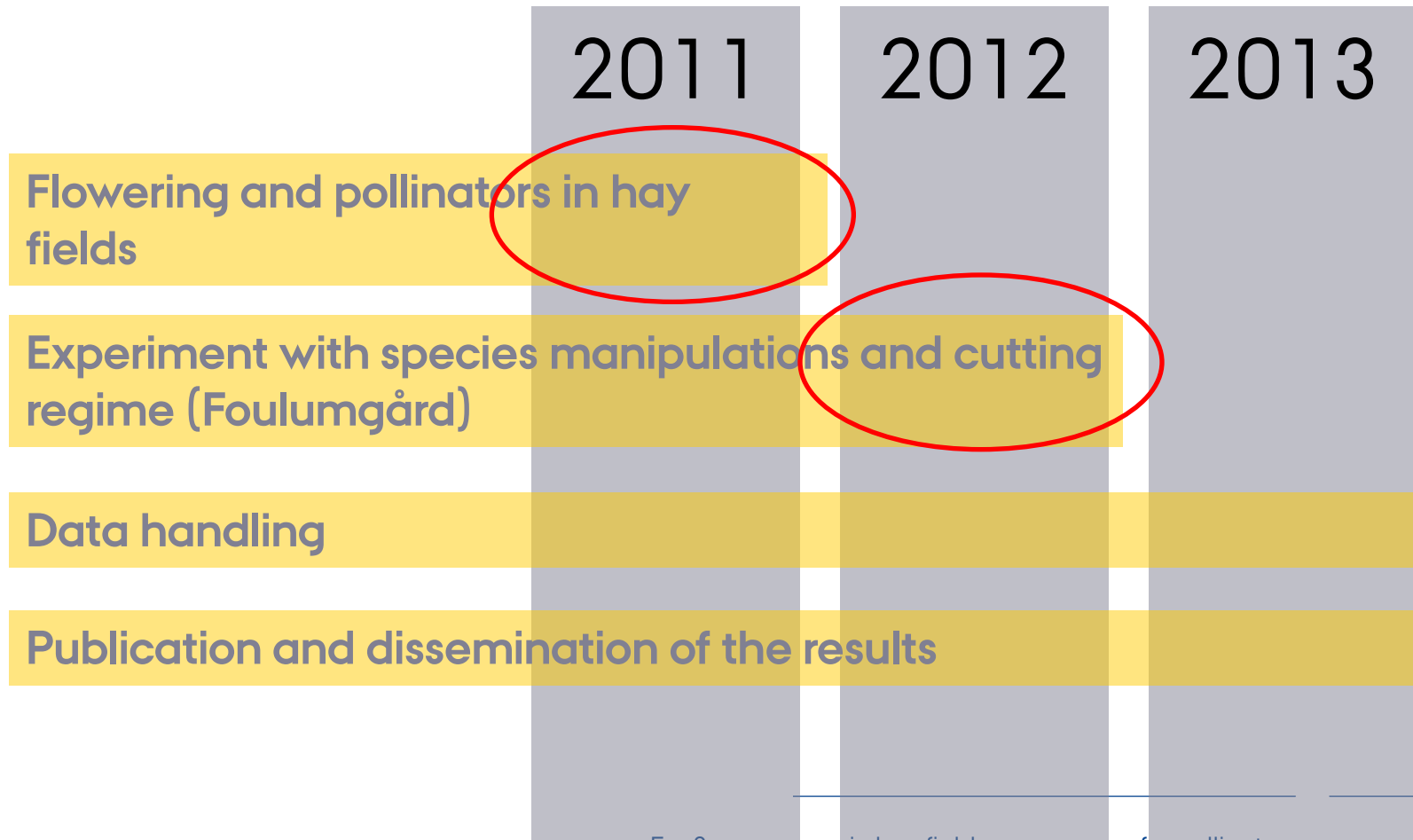
Background – grassland as a potential
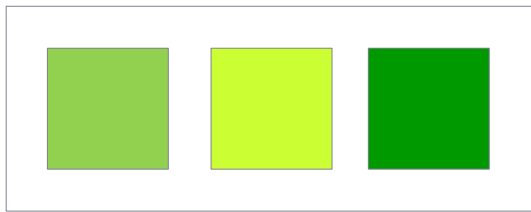

The Jena experiment

Ebeling et al. (2008)

WP - Activities

	2011	2012	2013
Flowering and pollinators in hay fields	●		
Experiment with species manipulations and cutting regime (Foulumgård)		●	
Data handling			
Publication and dissemination of the results			

Flowering and pollinators in hay fields

Young (2-3 years) hay field

Old (5-6 years) hay field

Old (< 10 years) hay field

Flowering and pollinators in hay fields

Data collected in each field

› Transect walks (1x 10 m)
› Flower visiting bees, butterflies and hover flies are identified and counted
› Number of flowers per m^2 is counted using a 1-5 scale, where 1= no flowers and 5 > 50 flowers per m^2

› 20 transect
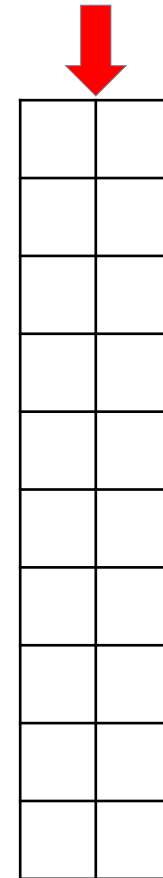
The Foulumgård experiment

› Effect of sowing beneficial herbs on flower resources and pollinators

› Importance of cutting (number and timing of the cuttings)

The Foulumgård experiment
Herbs in seed mixtures

› Standard grassland seed mix (grass, white and red clover)

› *Taraxacum vulgaris, Lamium purpureum, Phacelia tanacetifolia, Lotus corniculatus, Melilotus album, Borago officinals, Knautia arvensis, Cichorium intybus*

› *Lamium album, Calendula officinalis, Plantago lanceolata, Achillea millefolium, Sanguisorba minor, Onobrychis viciifolia, Foeniculum vulgare, Carum carvi, Allium schoenoprasum*

Forsøg A

Blandinger:

						col1	col2	col3	
									10,5 m
				1	4	1	2	gent 1
				2	6	8	7	
1	Standard			3	1	4	11	
2	Cikorie	+	Standard	4	11	3	4	
3	L. vejbred	+	Standard	5	10	10	3	
4	Kommen	+	Standard	6	9	11	1	
5	Bibernelle	+	Kællingetand	7	2	12	6	
6	Bibernelle	+	Lucerne	8	5	2	8	
7	Bibernelle	+	Rødkløver	9	13	13	12	
8	Hjulkrone	+	Kællingetand	10	7	7	10	
9	Hjulkrone	+	Lucerne	11	8	5	5	
10	Hjulkrone	+	Rødkløver	12	12	6	13	
11	Mælkebøtte	+	Kællingetand	13	3	9	9	
12	Mælkebøtte	+	Lucerne	14	4	7	8	gent 2
13	Mælkebøtte	+	Rødkløver	15	8	1	11	
				16	3	13	4	
				17	12	11	7	
				18	10	5	2	
				19	13	3	12	
				20	11	8	6	
				21	6	9	9	
				22	9	4	3	
				23	2	2	10	
				24	1	10	5	
				25	7	6	13	
				26	5	12	1	
				27	9	8	7	gent 3

Standard:
alm. rajgræs + hvidkløver + rødkløver

Forsøg B

Store parceller (6x9m)
1 Standardblanding (græs, hvidkløver, rødkløver)
2 Alle arter
3 Cikorie
4 Kællingetand
5 Stenkløver
6 Rød tvetand
7 Blåhat
8 Mælkebøtte
9 Hjulkrone
10 Honningurt

Små parceller (1,5x9 m) dog 2 parceller i 11 og 12
11 Vejbred
12 Kommen
13 Bibernelle
14 Esparsette
15 Døvnælde
16 Morgenfrue
17 Fennikel
18 Røllike
19 Purløg

Gent 1

#			
1	14 espar	13 Biber	8
2	18 røllike	9	Mælke-
3	12	Hjulkrone	bøtte
4	Kommen		
5	10		7
6	Honning	3	Blåhat
7	urt	Cikorie	
8			
9	11		6
10	vedbred	2	Rød
11	4	Alle	tvetand
12	Kællinge		
13	tand		17 fennik
14		1	5
15	15 døvnæ	ST	sten-
16	16 m frue		kløver
17	19 purløg		

12 m
gent 2

#			
1	14 espar	10	15 døvnæl
2	19 purløg	Honning	5
3	4	urt	sten-
4	Kællinge		kløver
5	tand	18 røllike	
6		9	7
7	17 fennik	Hjulkrone	Blåhat
8	8		
9	Mælke-		
10	bøtte	1	12
11		ST	Kommen

The Foulumgård experiment

The Foulumgård experiment

› Select cutting regimes

› Decide on sampling strategy