DLF Academy

Undersowing grass in maize

Establishing catch crops in maize
Results of Danish Trials

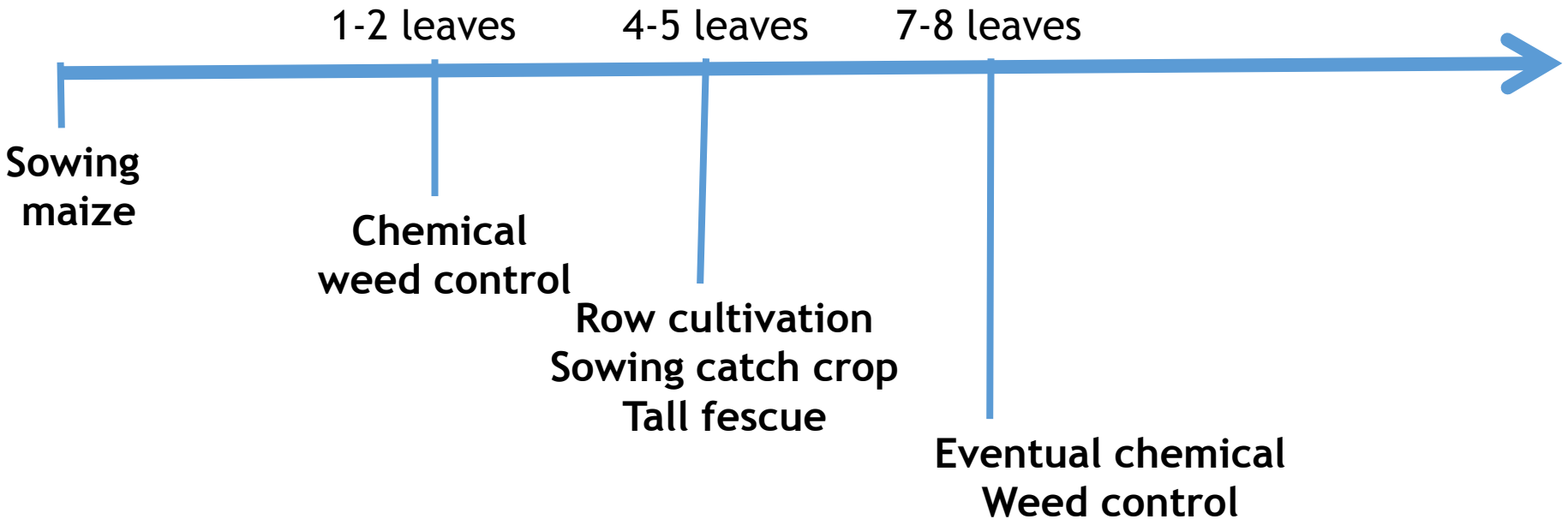
- Supported by the Danish Ministry of Food, Agriculture and Fishery in the GUDP program (”Eftermajs”).

- Aim: ”To develop a new sustainable growing system ensuring reduction in Nitrogen leaching and use of Pesticides”
- Project period: 2012 - 2015
- Aarhus University (research, trials), Thyregod (machinery), DLF (grass and other trial seeds), Limagrain (maize varieties), SEGES (trials, transfer of knowledge)

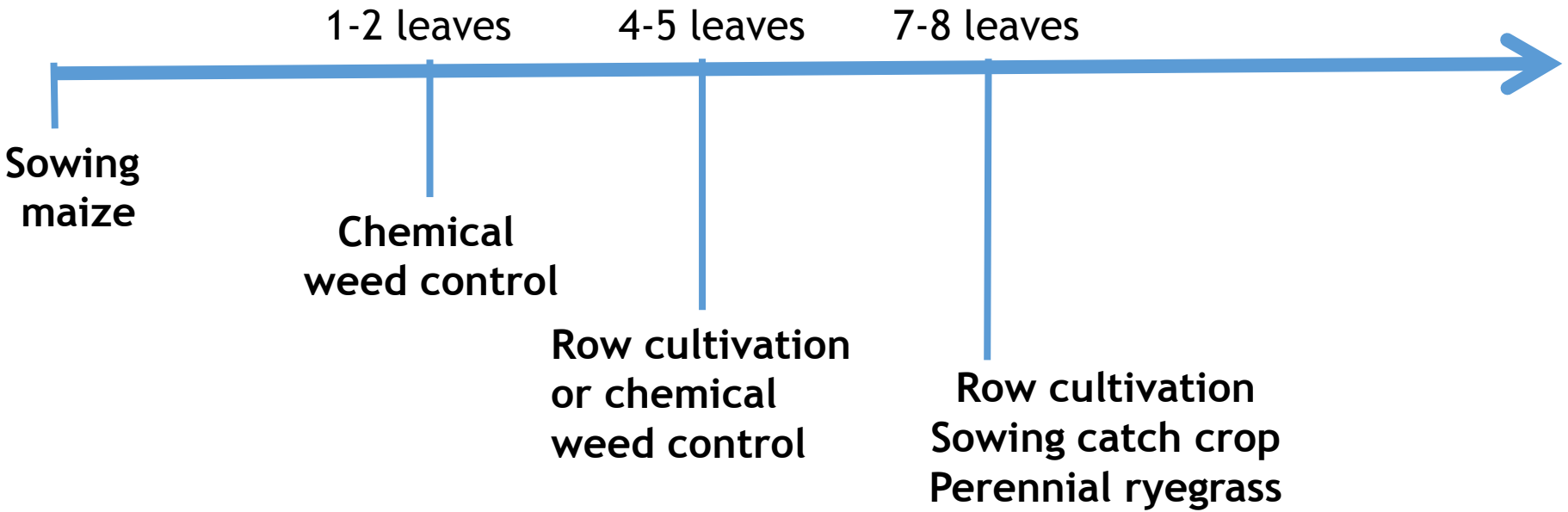
Screening and trials

- Screening
  - 18 catch crops
  - 5 types of maize varieties
  - Sowing technique
  - Sowing time
  - Effect of herbicides on catch crops

Early sowing of catch crops



Late sowing of catch crops




Catch crops, early sowing, June 12th
Perennial ryegrass, late, Foxtrot
Cocksfoot, late Donata
Tall fescue, late Jordane
Photo: Martin Mikkelsen


Catch crops, late sowing, June 28th
Perennial ryegrass,
late Foxtrot
Cocksfoot,
late Donata
Tall fescue,
late Jordane
Photo: Martin Mikkelsen

Three year´s results

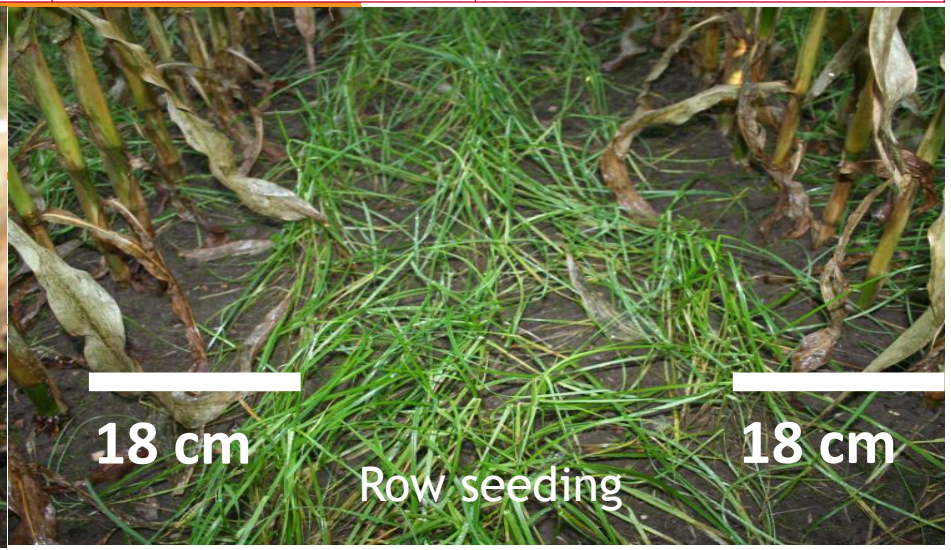
THREE YEAR´S RESULTS 2012-2014 (8 TRIALS)

			Maize yield per ha			Kg N per ha	
Catch crop	**Seeding time**	**Seeding method**	**Ton dry matter**	**DM, relative**	**NEL 20 Crop units**	**Harvested in maize whole crop**	**Harvested in catch crop*, November**
No catch crop			15,10	100	119,8	179	-
Perennial ryegrass, late Jumbo	Early	Row	14,88	99	117,2	171	9,2
Cocksfoot, late Donata	Early	Row	14,79	98	116,6	175	6,2
Tall fescue, late Jordane	Early	Row	15,17	100	121,1	177	6,1
Perennial ryegrass, late Jumbo	Late	Row	14,97	99	118,3	172	5,2
Cocksfoot, late Donata	Late	Row	14,90	99	118,0	176	3,4
Tall fescue, late Jordane	Late	Row	15,40	102	121,7	177	2,8
Cocksfoot, late Donata	Early	Broad-cast	14,84	98	117,3	171	4,5
LSD			*0,38*	2,5	*ns*		

*Above ground

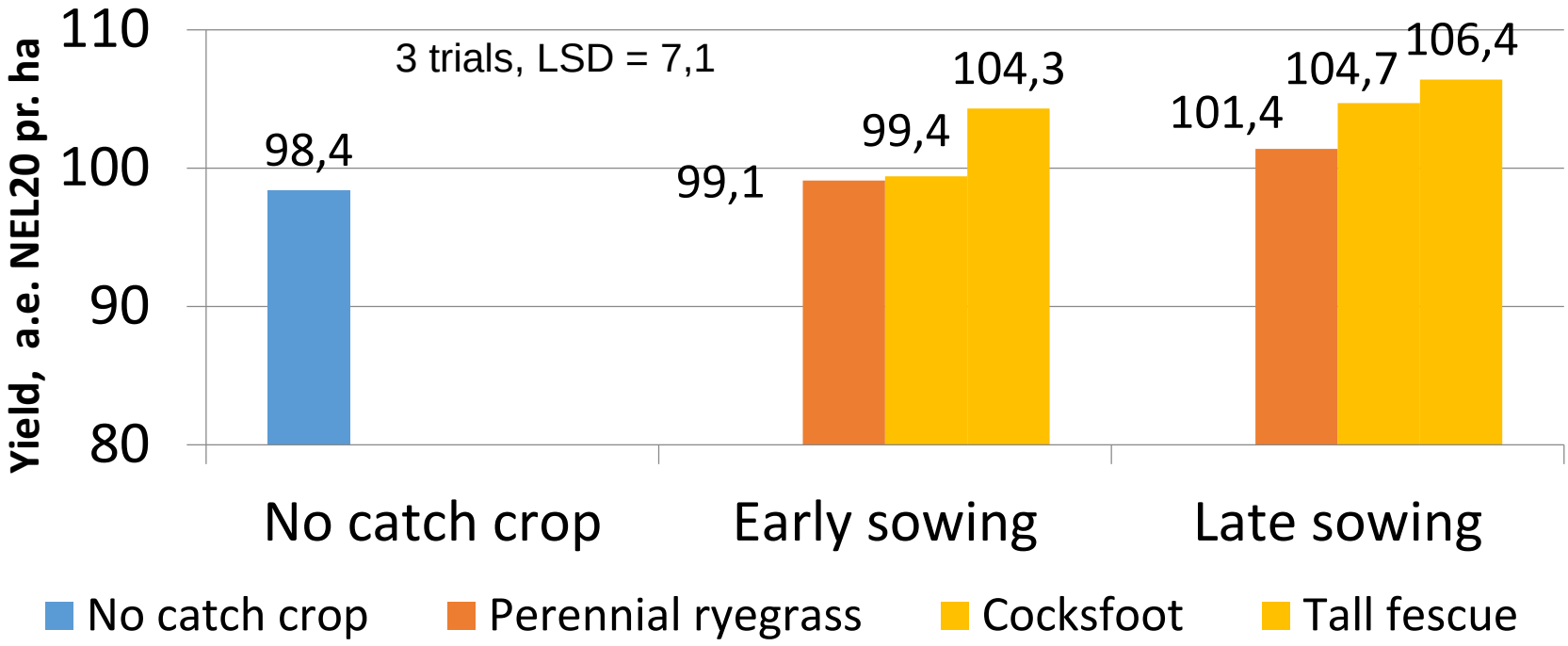
Methods for sowing catch crops
3 trials, 2012

TECHNIQUE FOR SOWING CATCH CROPS - 3 TRIALS, 2012 (wet year)		
	Row seeding	**Broadcast I**
Yield maize, a.e. **NEL**$_{20}$ pr. ha	99,4	97,8
Catch crop, beginning august, % ground cover	16	8



METHODS FOR SOWING CATCH CROPS, 2 DEMOS 2013 (dry year)		
Perennial ryegrass	**% field emergence**	**% ground cover, August**
Broadcast	29	5
Row seeding	45	35

Yield in maize crop 2012
Wet season



Yield in maize crop 2013
Dry season

		% GROUND COVER
2013. 2 trials	**Sowing time**	**Yield, NEL20, a.e. pr. ha**
No catch crop		115,6
Perennial ryegrass	Early[1)]	109,2
Cocksfoot	Early[1)]	111,5
Tall fescue	Early[1)]	110,1
Perennial ryegrass	Late[2)]	113,2
Cocksfoot	Late[2)]	110,8
Tall fescue	Late[2)]	112,9
Chicory	Early[1)]	110,1
LSD		4,7

[1)] 6. og 12. June [2)] 18. og 25. June

Developing seeding equipment

Broadcast at time for row cultivation. Field emergence: 12 %

Row seeding with no depth regulation and packing.
Field emergence: 27 %

Row seeding with disk seeder and regulation of seed depth.
Field emergence: 45 %

3 trials 2014

Catch crops, % ground cover
2 demonstrations, 2012

	% GROUND COVER		
Catch crop	July	August	November
Perennial ryegrass, late (D)	15	35	37
Perennial ryegrass, late (T)	23	53	45
Italian ryegrass (D)	20	50	45
Cocksfoot Donata	6	15	20
Tall fescue Jordane	3	5	9
Festulolium, Fojtan	5	9	26
Timothy Dolina	6	30	35
Rough stalked meadowgrass	4	12	53
Chicory	20	55	25

Catch crops, % ground cover
2 demonstrations 2013

	% GROUND COVER		
Catch crop[1)]	July	August	November
Perennial ryegrass, late 2n	9	25	50
Perennial ryegrass, late 4n	19	40	60
Cocksfoot, Donata	3	10	45
Tall fescue, Jordane	3	5	40
Chicory, Spadona	6	15	40

[1)] Sowing 6/6 and 10/6

May 25th: Chemical weed control
June 10th: Row cultivation and sowing of Tall fescue

May 25th: Chemical weed control
June10th: Row cultivation
June 21st: Row cultivation and sowing of Cocksfoot

Strategy for catch crops in maize, I

A. Moderate weed number

1. Weeds have 1-2 true leaves:
    a. Chemical weed control
2. Second generation weeds have 1-2 true leaves:
    a. Eventually slurry application
    b. Row cultivation and sowing of **tall fescue**
3. Eventually third generation weeds have 1-2 true leaves:
    a. Chemical weed control

Strategy for catch crops in maize, II

B. Infection with difficult weeds – including grass

1. Weeds have 1-2 true leaves:
    a. Chemical weed control
2. Second generation weeds have 1-2 true leaves:
    1. Chemical weed control or row cultivation
    2. Slurry can be applied after spraying or before the coming row cultivation
3. Third generation weeds have 1-2 true leaves:
    1. Row cultivation and sowing of **late perennial ryegrass or cocksfoot**

Strategy for catch crops in maize, III

Danish recommendations

Sowing time	Specie	Kg seed/ha
At 3rd weed control, maize has 7-8 leaves	Late diploid perennial ryegrass	6
At 3rd weed control, maize has 7-8 leaves	Late diploid perennial ryegrass + chicory	5 + 0.5
At 2nd or 3rd weed control, maize has 4-8 leaves	Cocksfoot	4
At 2nd weed control, maize has 4-6 leaves	Tall fescue, forage type	6
At sowing time for maize	Tall fescue, slow growing turf type	6

Strategy for catch crops in maize, IV

- Sowing of catch crops can take place at time of 2nd or 3rd weed control.
  - Tall fescue and cocksfoot are adapted for early sowing.
  - Late heading perennial ryegrass and cocksfoot are adapted for late sowing

- Row seeding gives a fast and good establishment and affects the maize less than broadcasting.

- MaisTer (formasulfurone+iodosulfurone) affects germination and growth of grass sown afterwards

- Callisto (mesotrione) affects germination and growth of broadleaved catch crops sown afterwards