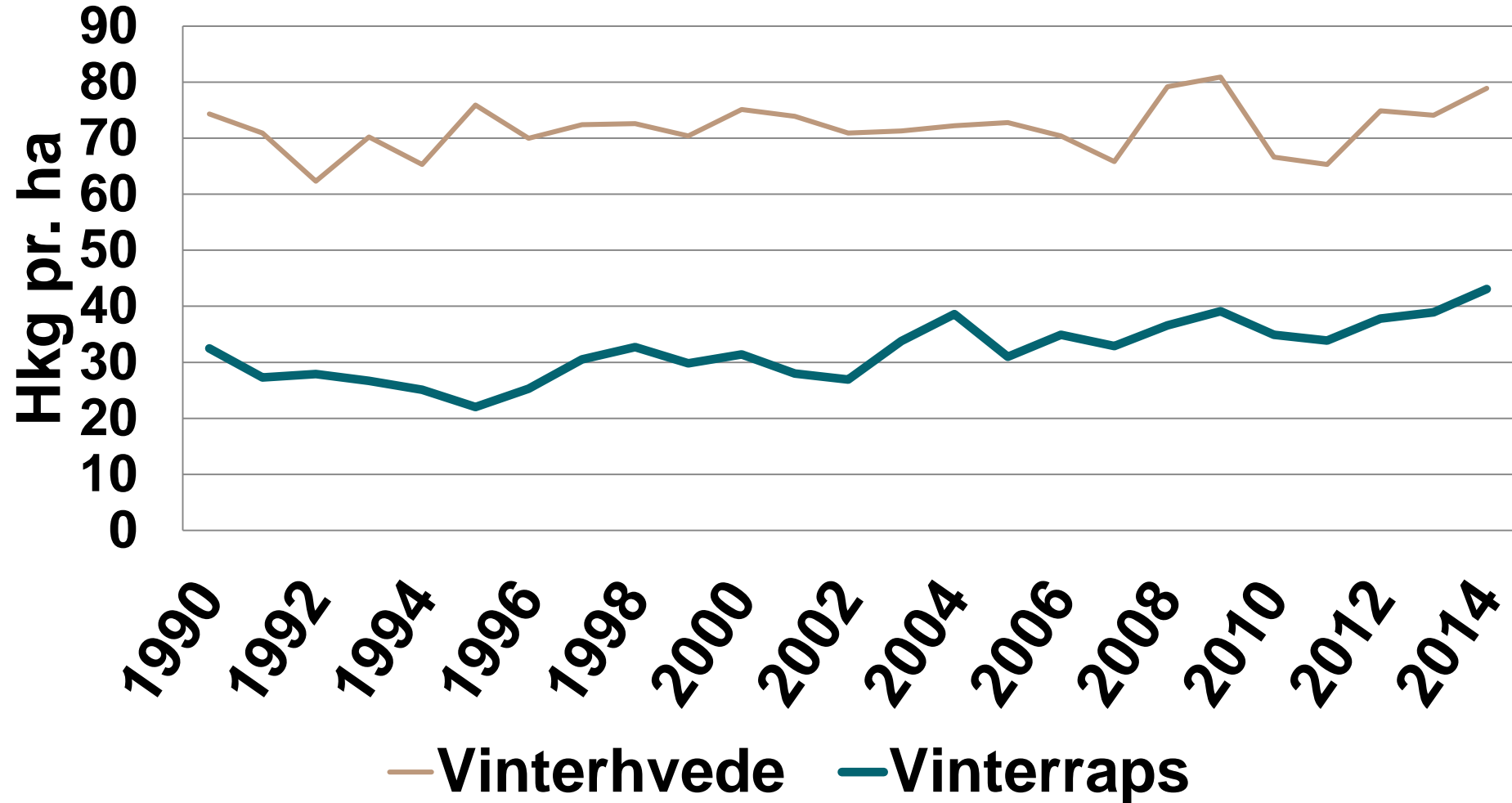


# Clubroot in oilseed rape in Denmark

Marian D. Thorsted and Ghita C. Nielsen, SEGES, Denmark

[mdt@seges.dk](mailto:mdt@seges.dk)

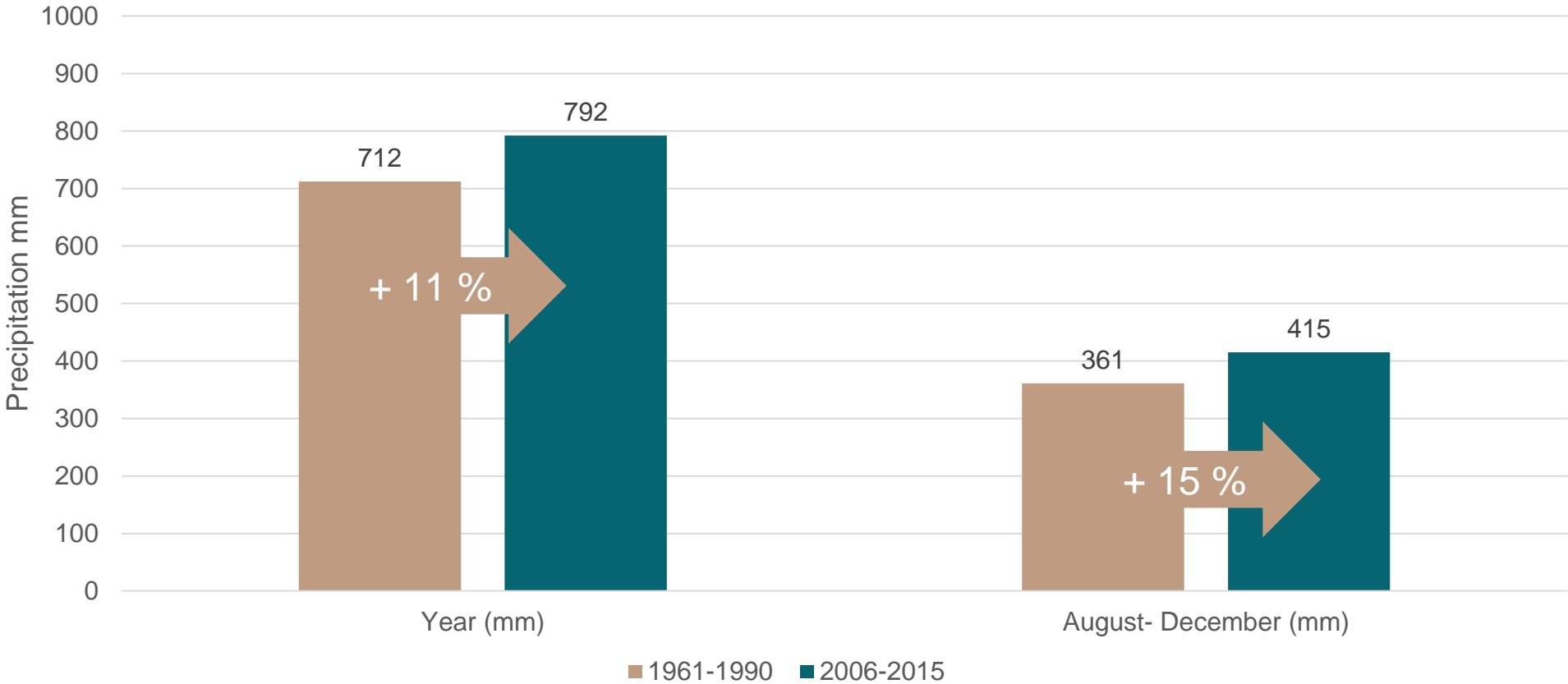
# Danish yields in winter wheat and winther rapeseed, 1990-2014, hkg. per ha



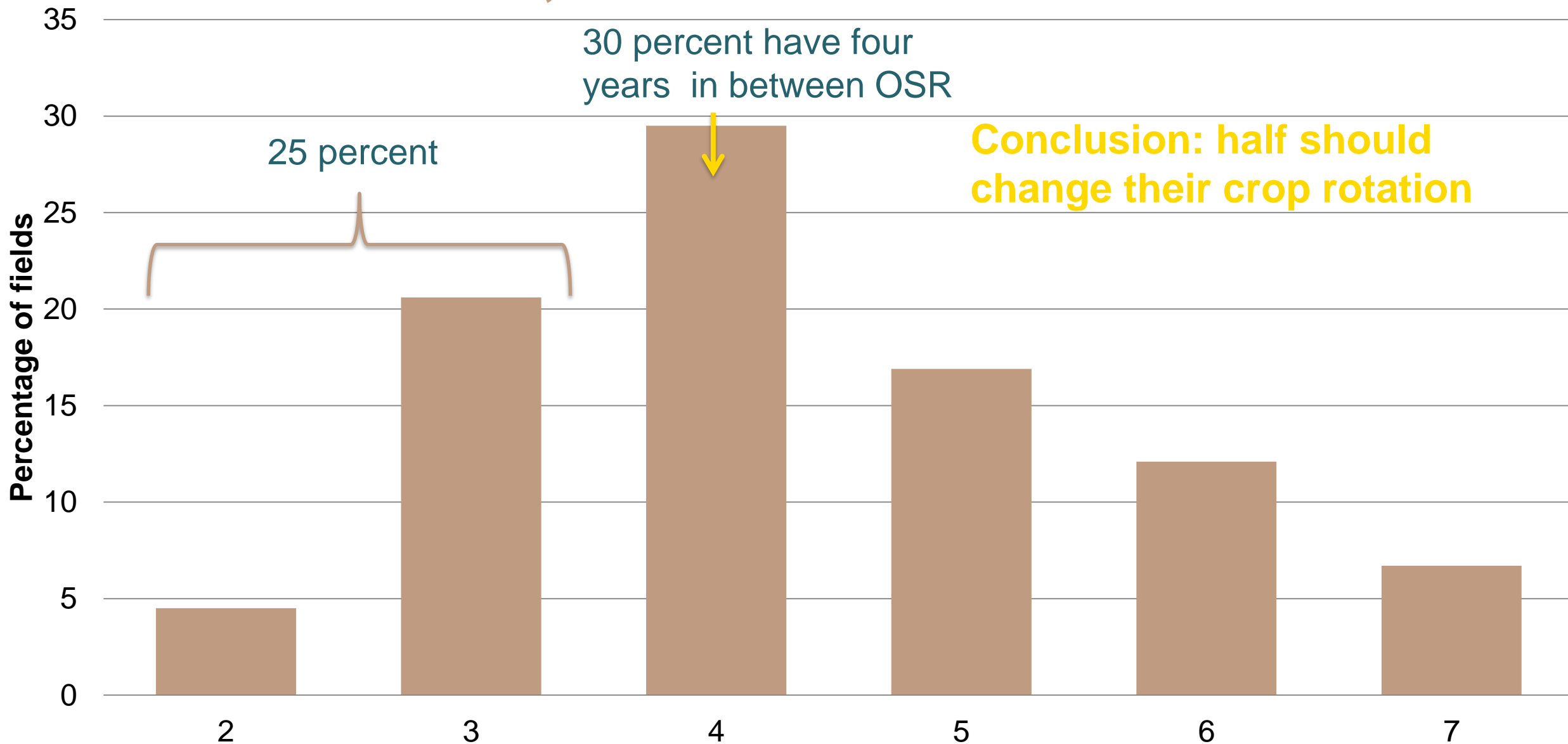
# How widespread is clubroot?

- An increasing problem
- No national monitoring
- A survey in OSR-rotations i southern Denmark in autumn of 2016 showed infection in 57% of 28 fields
- It is expected that clubroot spores are present in one third of the OSR fields in DK, may be more

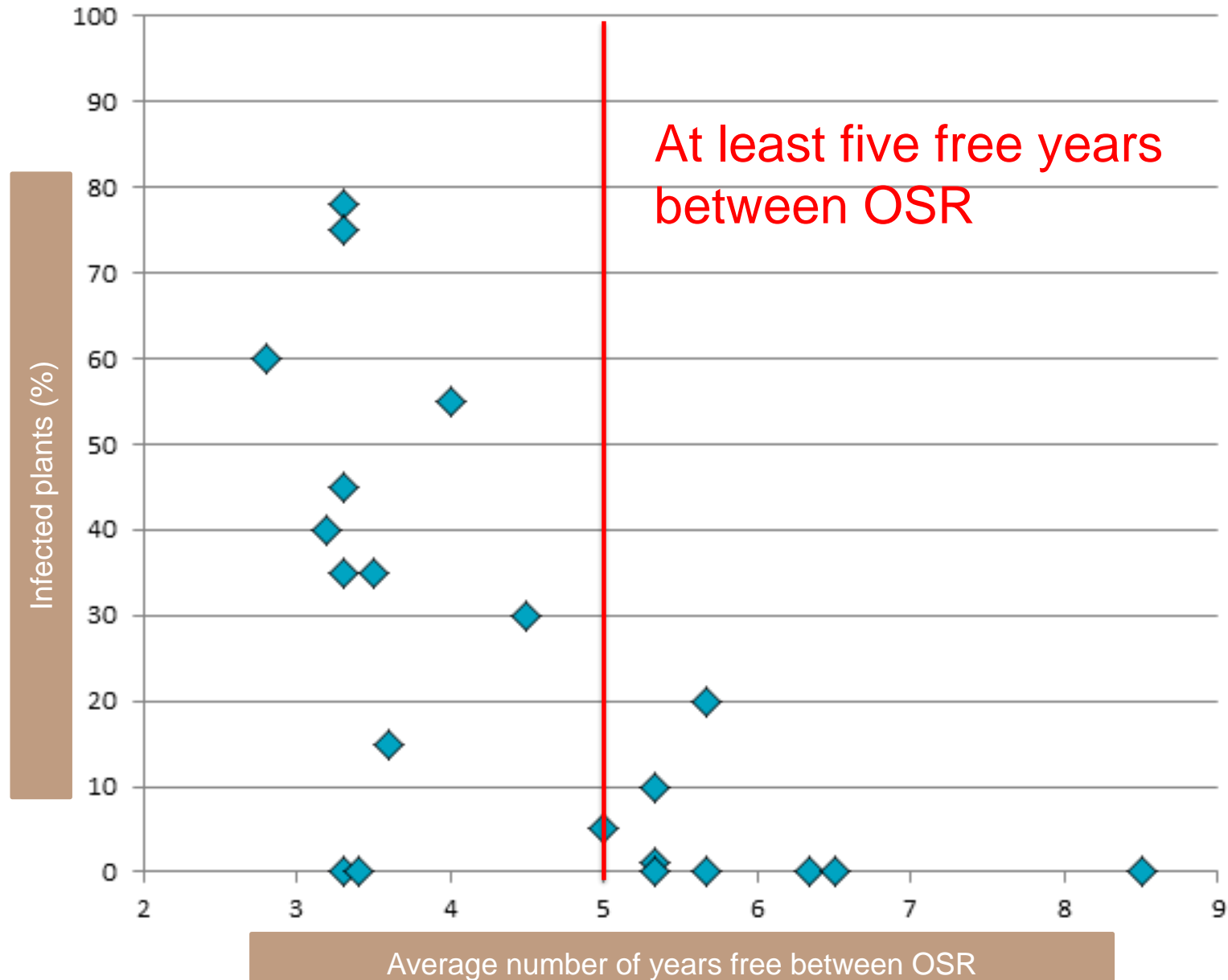
# Precipitation in Denmark



# Number of years in between OSR 10,660 fields



## Crop rotation and clubroot infection



IPM project.  
Sønderjysk  
Landboforening and  
SEGES

# Examination, 1 field with 3 replicates, Agrovi 2014

Degree of infection	Yield loss in percent
No infection	0 (45 hkg/ha)
Moderately affected	23
Strongly affected	68

# Highest yield loss when taproots are infected





# Most often: Many volunteers in OSR stubbles





# September 2017 OSR stubble – clubroot on volunteer plants three weeks after sprouting, clubroot galls may be visible



## Methods to control volunteers in the OSR stubble

- Control with glyphosate early (approx. two weeks after harvest), approx. 360 g/ha until four leaf stage
- In autumn seeded cereals and in winter rye catch crops. 5 g/ha Lexus (flupyrsulfuron). Allowed for last time in Denmark in 2018. Spraying is not allowed in any types of catch crops.
- Harrowing. Not too deep as the decay of weed seeds will drop

# Monitoring in autumn 2017:

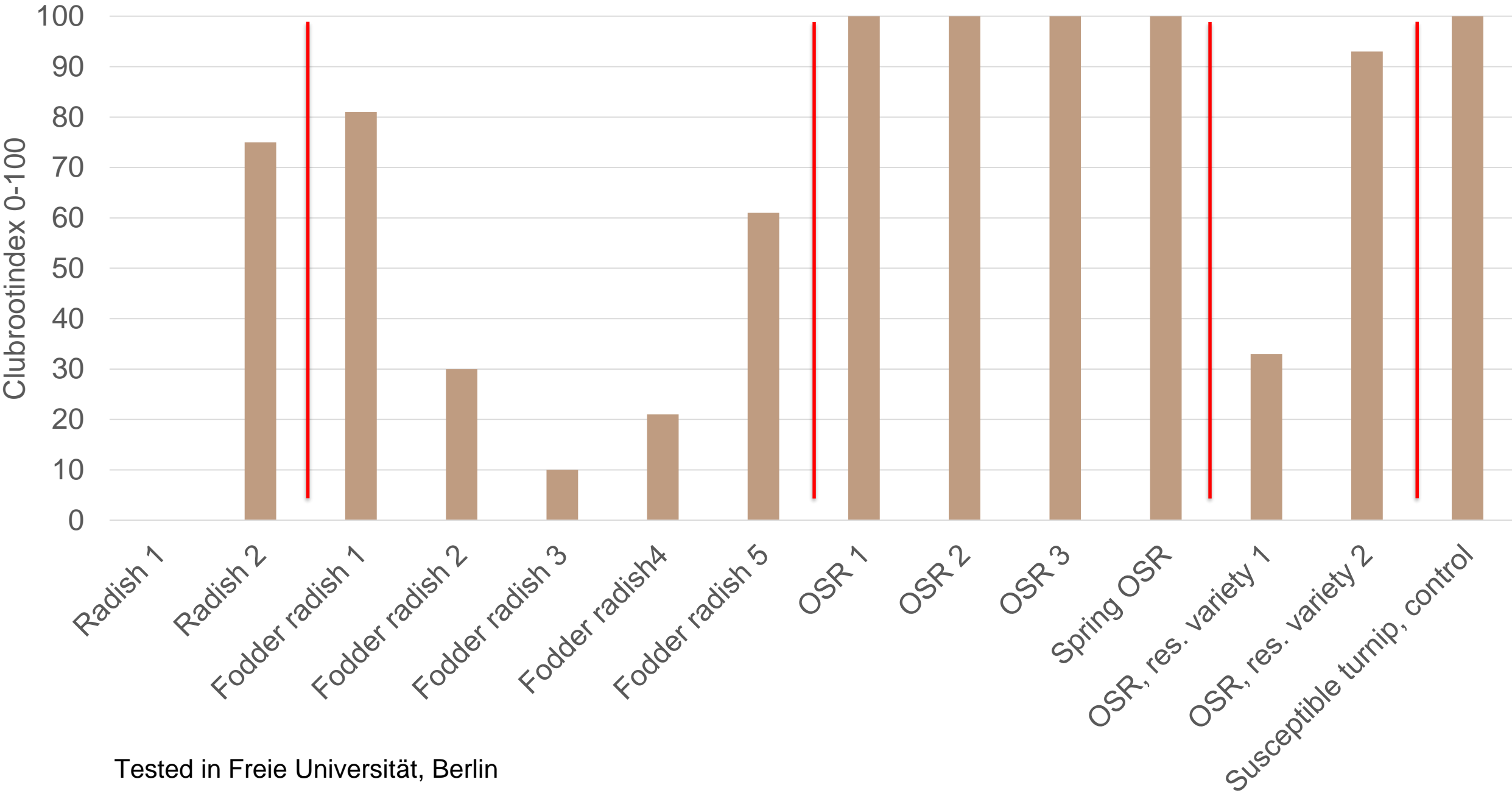
## Fields with fodder radish as catch crops

- 50 fields with fodder radish
- Clubroot infection in 18 percent of the fields
- Relatively weak infections, up to 6 percent plants infected
- OSR volunteer plants in one third of the fields
- Infected fodder radish plants sent to analysis at Freie Universität in Berlin

# Clubroot in fodder radish



# Clubroot from field with fodder radish, 2017 in Sønderborg



Tested in Freie Universität, Berlin





Field with high infection rate of clubroot  
In areas without plants a  
susceptible variety was sown

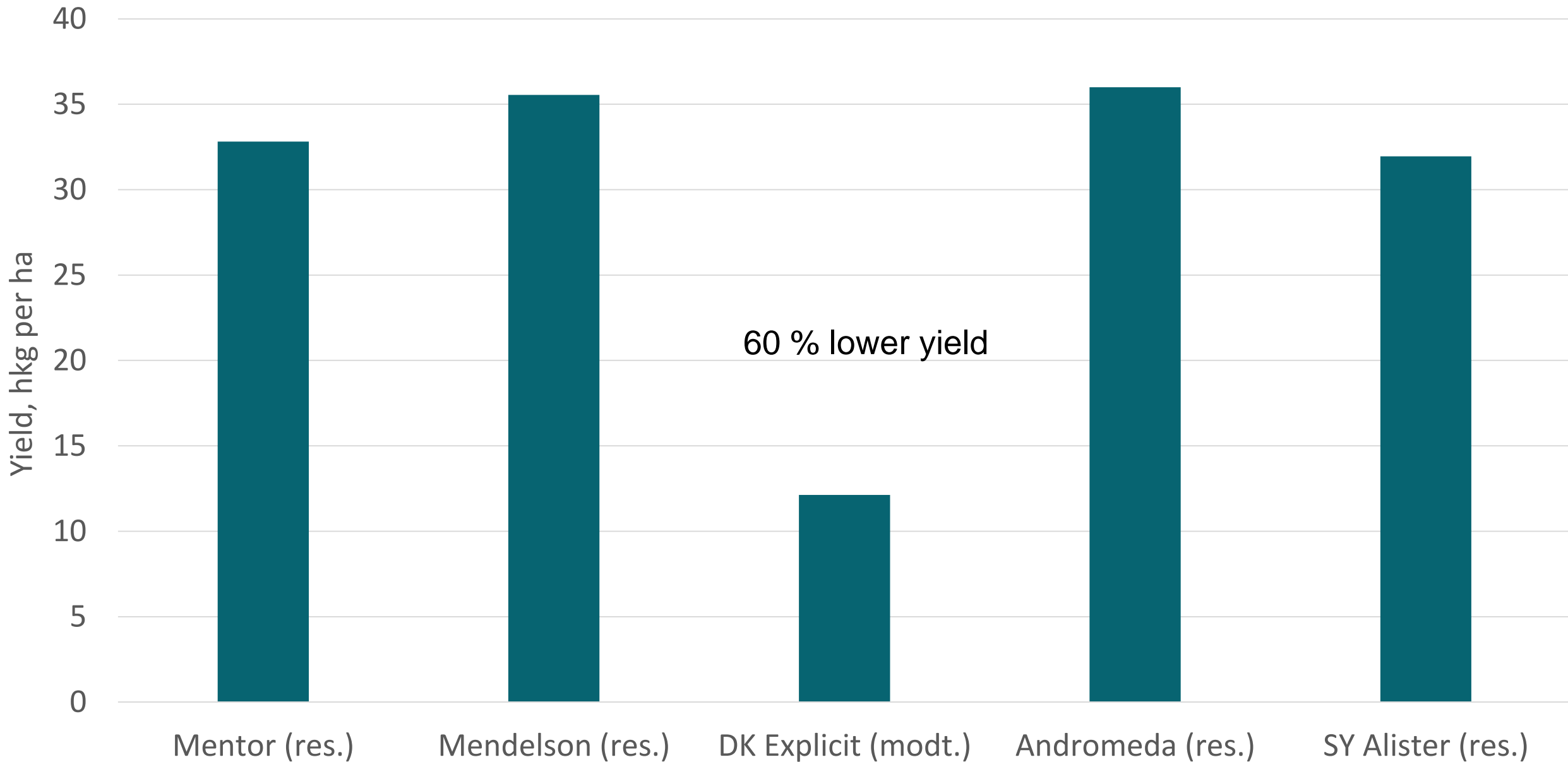
Here was change in  
variety



Photo: Mark Aafjes,  
Sønderjysk Landboforening



# Five varieties in field with clubroot, one trial, LandboNord 2014





# Clubroot patotypes found on nine locations in Denmark

Sample	Location	ECD	Patotype	Decease index on variety Mendel (0-100)
1	Agrovi	16/31/31	P 1	100
2	Østdansk Landboforening	16/31/31	P 1	90
3	LandboSyd	16/31/31	P 1	32
4	Centrovic (Explicit)	16/31/31	P 1	95
5	Centrovic (Quartz)	16/31/31	P 1	90
6	LMO (6A )	17/31/31	P 1	97
7	LMO (7B)	17/31/31	P 1	88
8	LandboNord	16/31/31	P 1	88
9	Sønderjysk Landboforening	16/31/31	P 1	100



## Yield ratios i Danish national trials, five clubroot resistant varieties

Variety	2017	2016	2015
DK Exalte (susceptible)	97	107	107
DK Exception (susceptible)	102	107	104
Alasco	-	(107)	(97)
Archimedes	85	96	-
DK Plantinium	97	-	-
Mentor	92	95	97
SY Alibaba	95	-	-

# Conclusions

- Clubroot is an increasing problem in Denmark
- Rotations with frequent OSR are not recommended
- Use resistant varieties when OSR are grown frequently
- Fodder radish as catch crop is not recommended in rotations where OSR are more frequent than one in four rotations
- Mustard are not recommended in rotations with OSR
- Patotypes that can infect resistant varieties are found in all fields examined (9+1= 10 fields)