

# The changing clubroot threat and sustainable management options in the UK

- Developing sustainable management methods for clubroot (AHDB Levy Board Project RD-2140027105) SRUC and ADAS



# Changing threats - Clubroot

- Clubroot continues to be major issue commercially
- Warm autumns / close rotations making issue worse
- Reports of poor control with resistant varieties continue
- Conflict between short term profit and long term sustainability





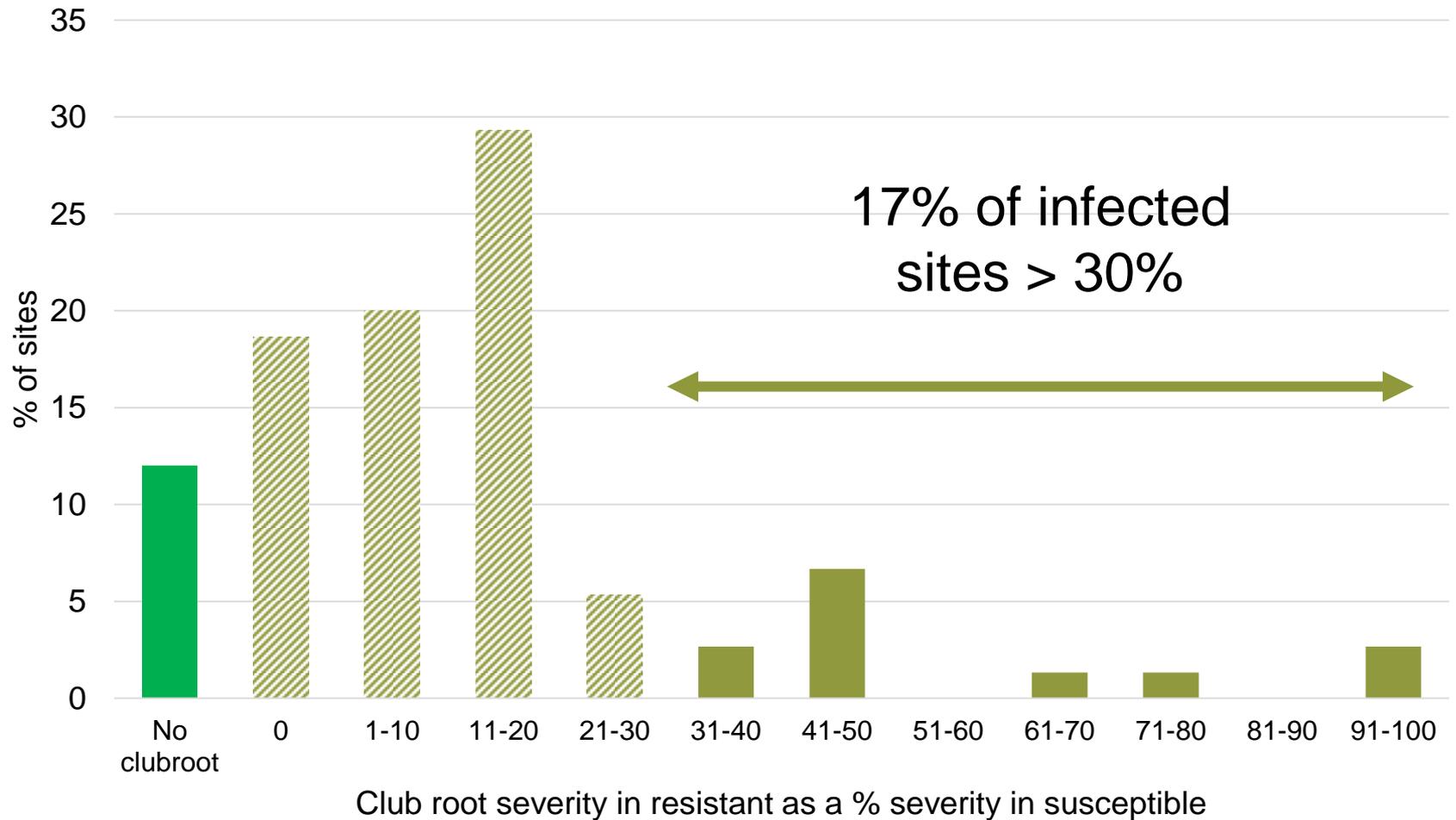
Current control largely based on the use of resistant varieties as seen here.

# How widespread are resistance breaking strains?

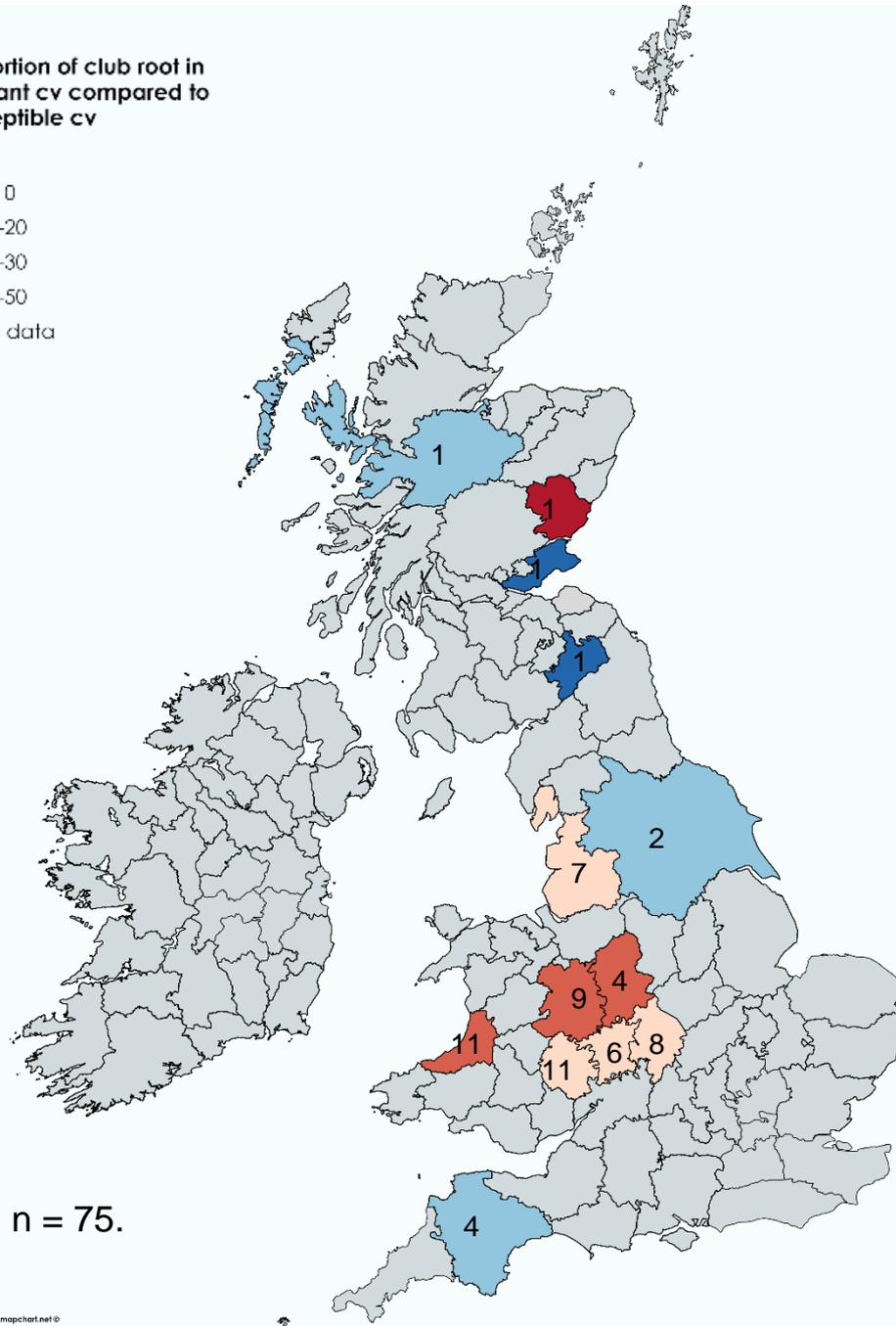
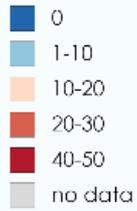
- ~75 commercial fields sampled
- WOSR varieties Mentor and Tolkin (supplied from LSPB) and a Chinese cabbage control tested in bioassays
  - Soils tested for +/- of Mendel virulence



# Mendel resistance breaking strains



Proportion of club root in resistant cv compared to susceptible cv

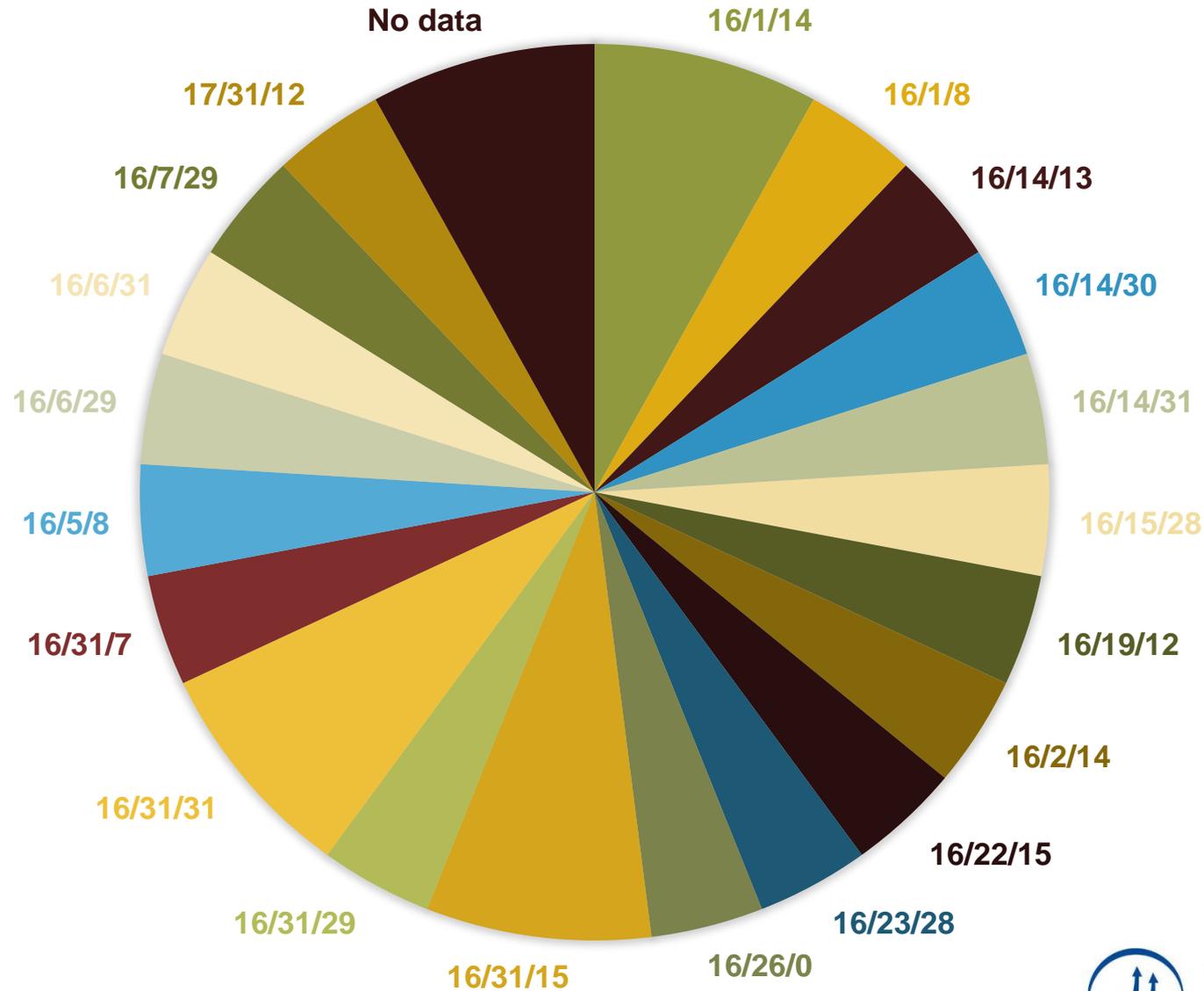


Tolkin bioassay all years, n = 75.

# How diverse is UK clubroot population? Pathotype determination



# Pathotypes in the UK

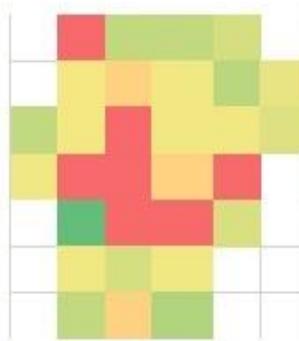


# Field mapping has potential to target treatments and help with decision making

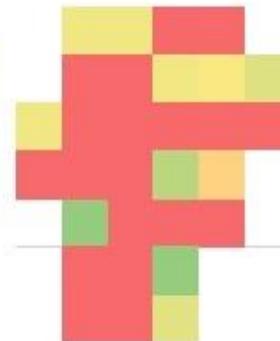
A)



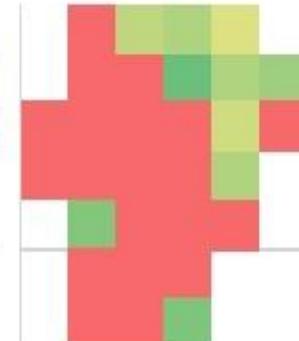
B) Dec



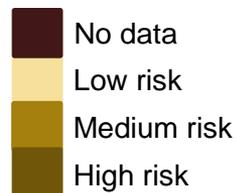
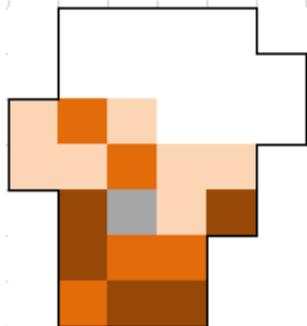
Apr



Jun



C)



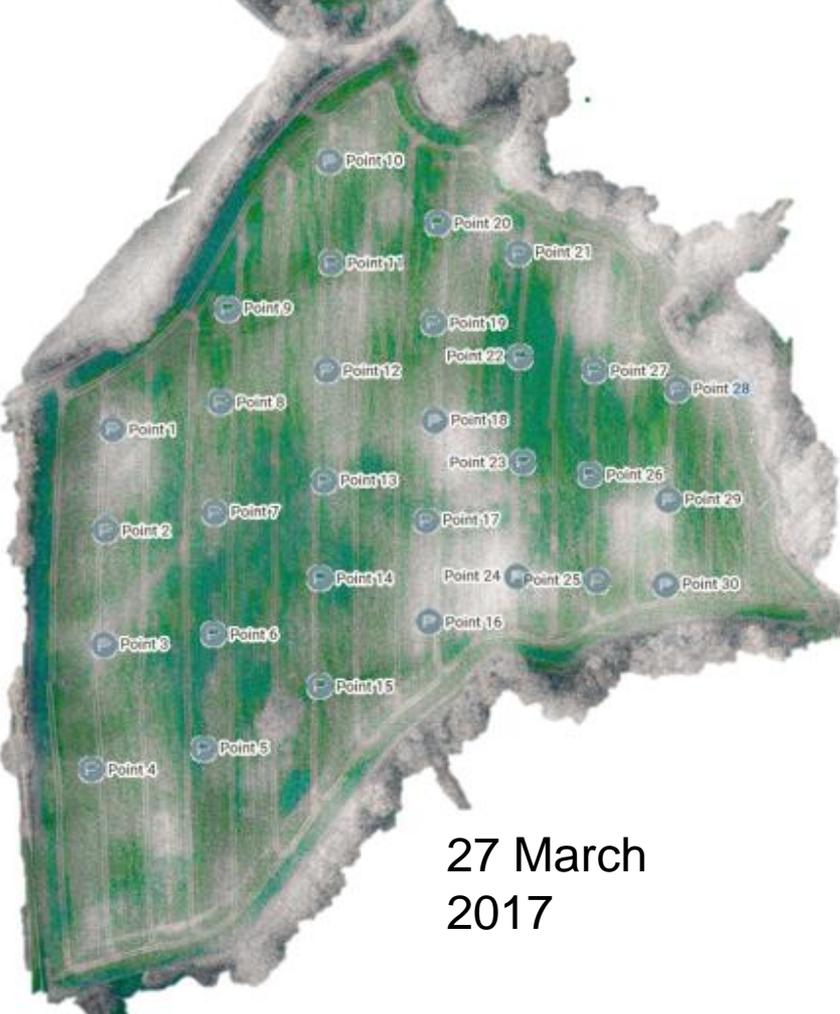
A) Aerial photography of Bridgenorth field and its 30 sampling points

B) Clubroot severity distribution at different sampling time

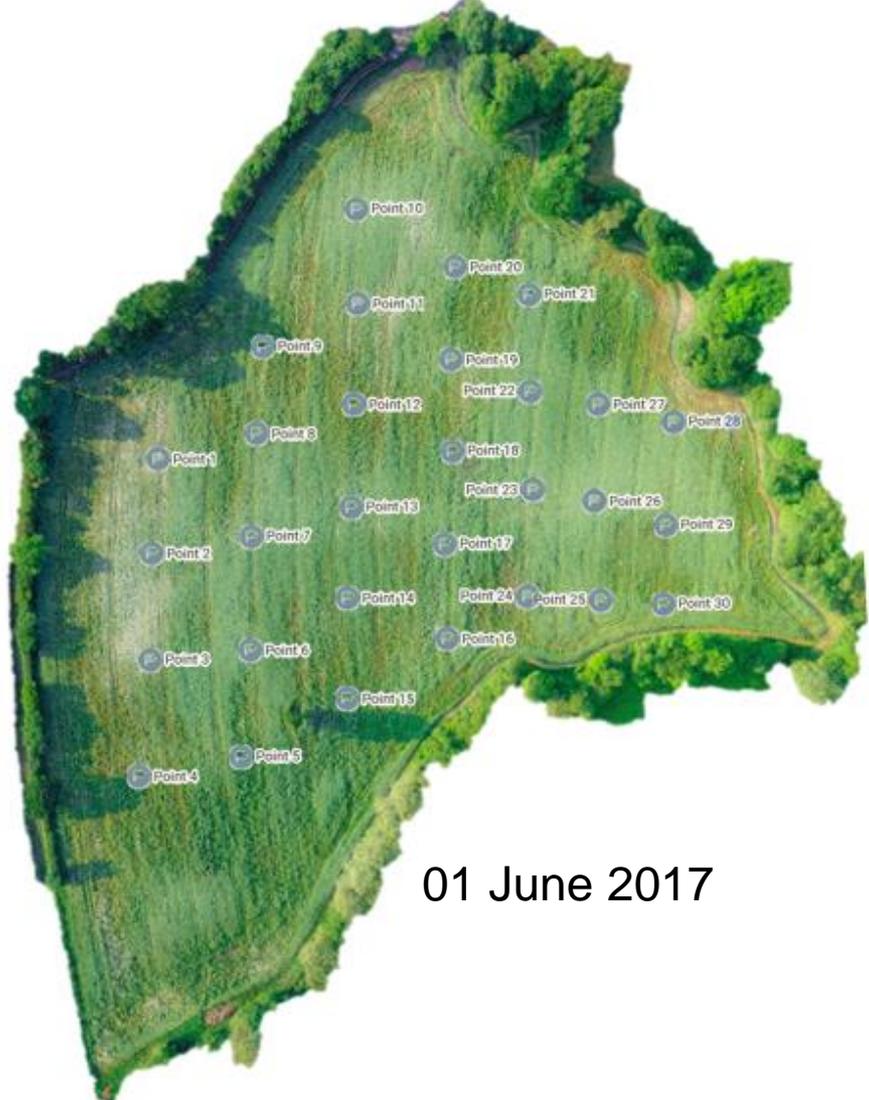
C) Clubroot presence assessed by qPCR. Low risk: below  $1.10^3$  spores.g soil<sup>-1</sup>, Medium risk: between  $1.10^3$  and  $1.10^5$  spores.g soil<sup>-1</sup>, High risk: above  $1.10^5$  spores.g soil<sup>-1</sup>



# Pencombe field aerial images



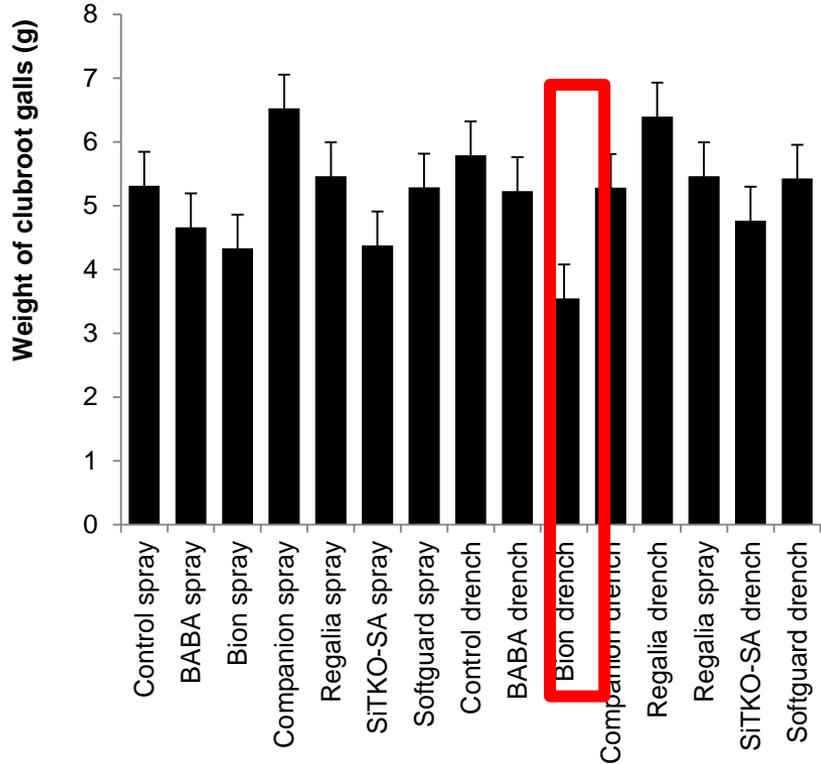
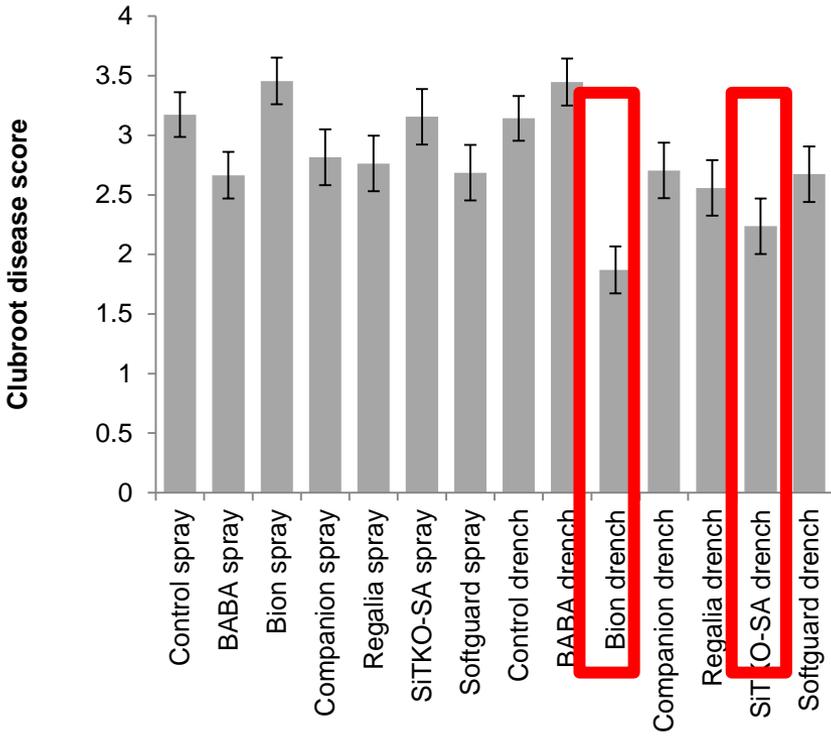
27 March  
2017



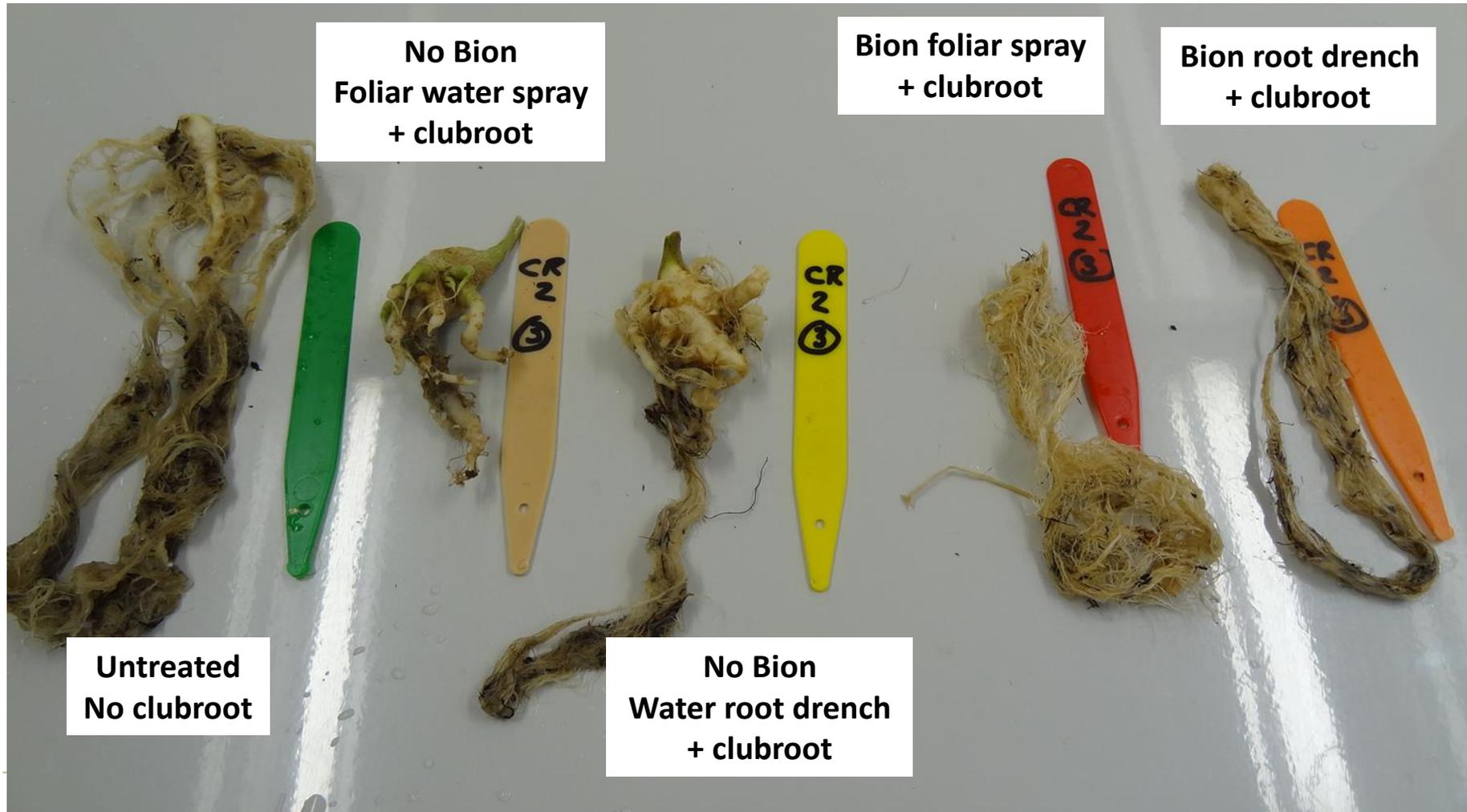
01 June 2017

# Novel control methods?

## Elicitors as foliar spray or drench



# Bion effect on clubroot galling



# Clubroot – summary

- Clubroot in the UK is extremely variable – this gives potential for rapid adaptation
- Mendel breaking strains are present throughout the UK (only 18% of infected sites had no symptoms on Mendal).
- UK advice is that deploying a resistant variety should not be the first / only recourse in an identified infected field or it will be eroded rapidly as a tool for that field
- Alternative non-susceptible crops are the most sustainable long term method of control

# Clubroot – key messages

- Keep accurate crop records of clubroot occurrence, location and intensity and note where varietal resistance has been deployed in fields to aid long term planning and help prevent spread
- Where resistant varieties are used monitor the crop carefully and assess the levels of clubroot present. If levels of infection start to increase change strategy
- Buying certified seed ensures that susceptible plant numbers are minimised in a resistant variety seed batch. Do not home save resistant varieties.
- Manage volunteers and susceptible weeds within and between oilseed rape crops. Allowing weed growth will allow clubroot populations to bulk up so manage weeds as early as possible in the season
- Be mindful of other susceptible crop choices when planning rotations – spring rape is susceptible and cover crop mixes often contain susceptible species
- Long term planning should be based on the long term profitability of a field and not on a single season's predicted margin.