

Unlocking weed seed losses in Regenerative Agriculture for resilient weed management

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INTRODUCTION

- Black-grass (*Alopecurus myosuroides*) and other annual weeds establish large viable seedbanks annually post-harvest.
- Large seedbanks result in inevitable consequences like extreme weed pressure and unsustainable farming systems.
- Low weed seedbanks make weed control **more manageable, efficient**, and less likely to result in **herbicide resistance**.
- Towards this, the current work aims to establish practical management strategies that **minimise seed return** and **promote seed losses**, leading to sustainable **regenerative agriculture**

WHY BLACKGRASS HAS BECOME A MAJOR PROBLEM IN UK?

- Growing herbicide resistance due to intensive herbicide use
- Changes in arable farming (many winter cereals and oil seed rape)
- Shift in tillage systems - conventional to minimum tillage systems
- Early autumn sowing.

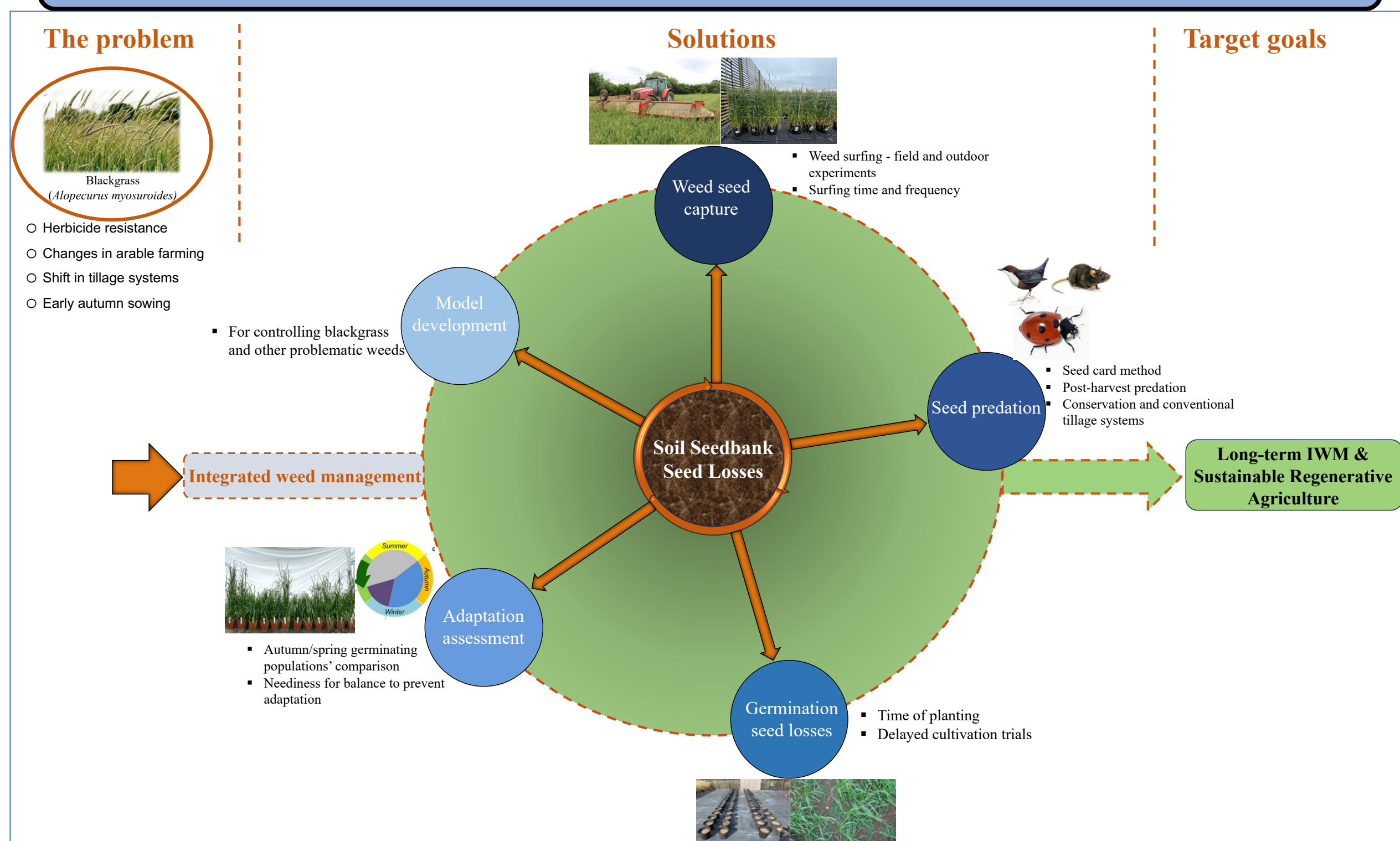
Blackgrass
(*Alopecurus myosuroides*)



Black-grass herbicide resistance distribution



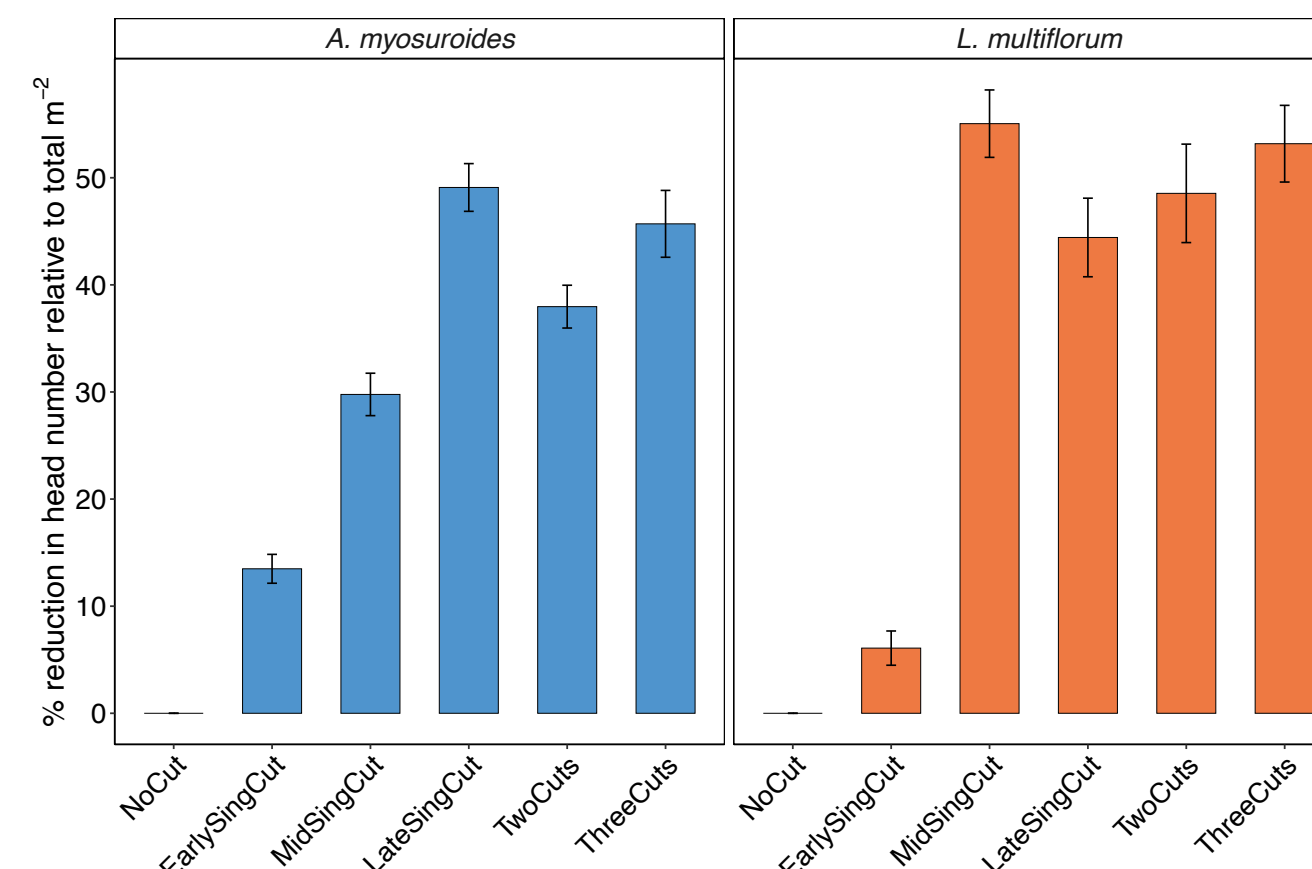
APPROACHES TOWARDS MINIMIZING SEEDBANK



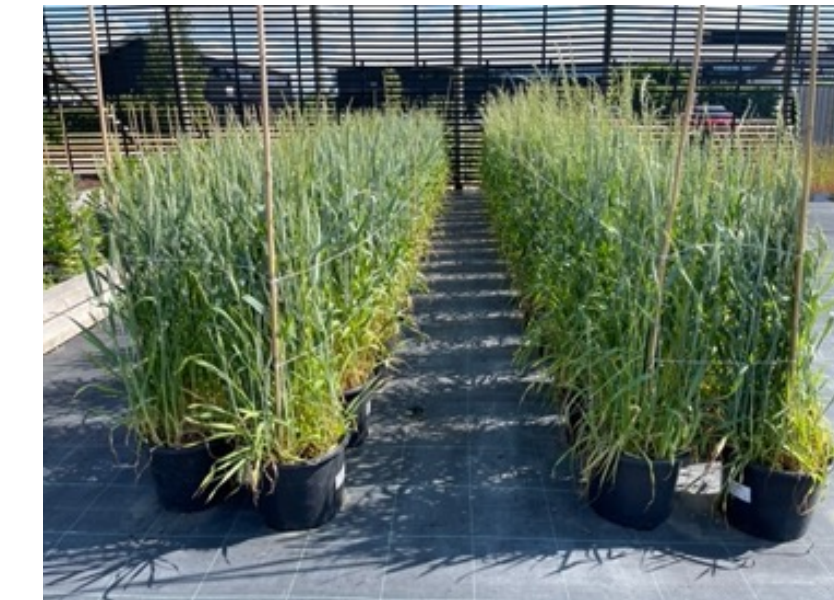
INITIAL RESULTS

1. Effectiveness of weed surfing in spring wheat

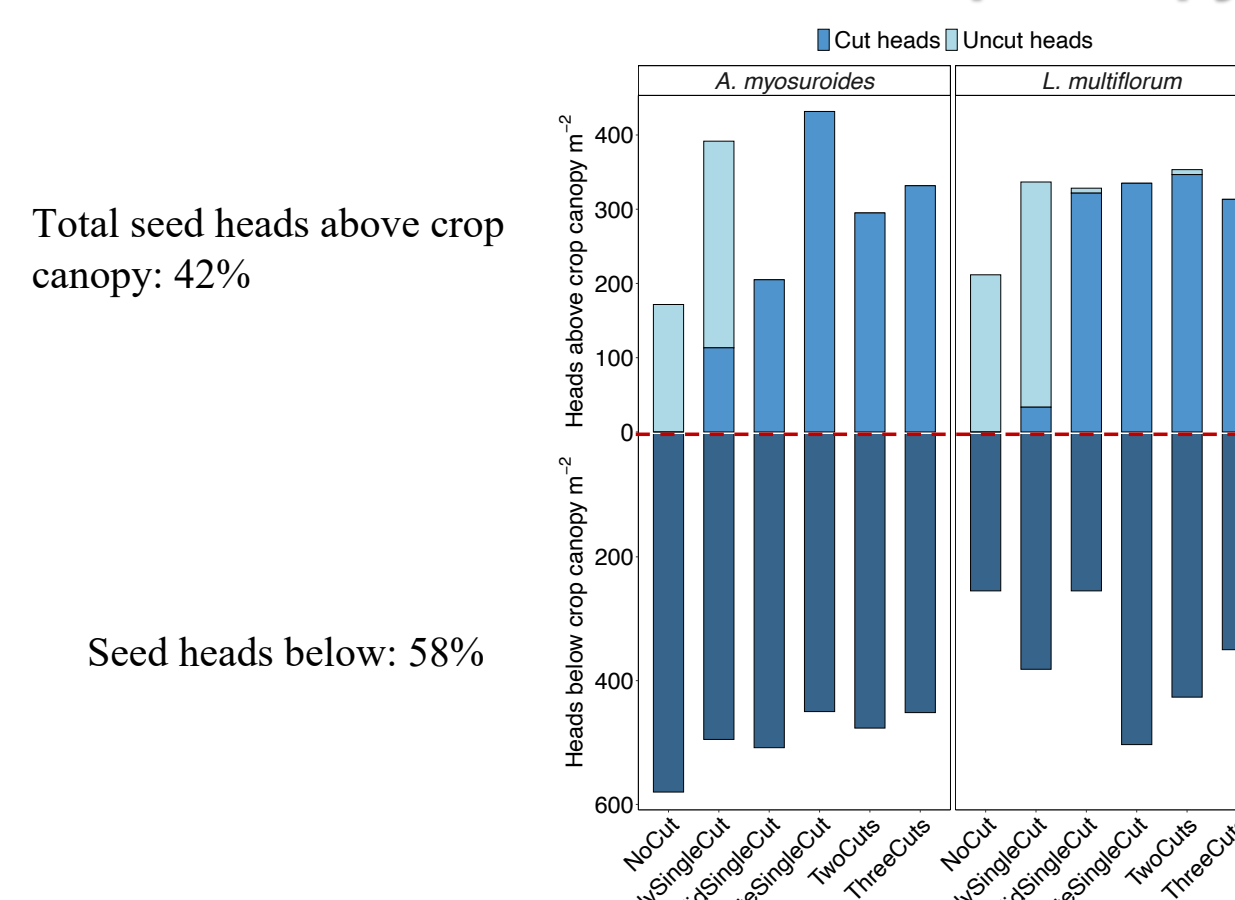
Weed surfing efficacy



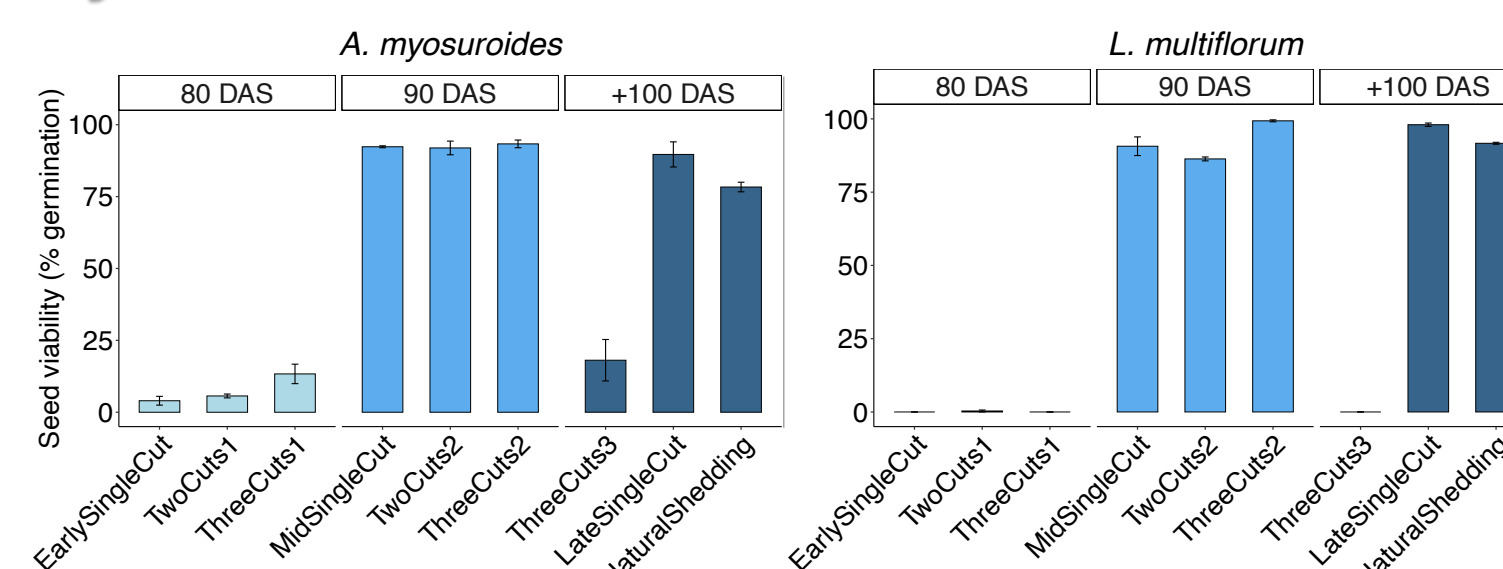
- NoCut:** No cutting (control)
- EarlySingCut:** Early-single cut at 80 days after sowing (DAS) just after flowering
- MidSingCut:** Single cut at mid-reproductive phase (90 DAS)
- LateSingCut:** Cut once just before shedding starts (100 DAS)
- TwoCuts:** Cut twice - early and mid phases
- ThreeCuts:** Cut at early, mid and late reproductive stages



Seed heads above vs. below crop canopy



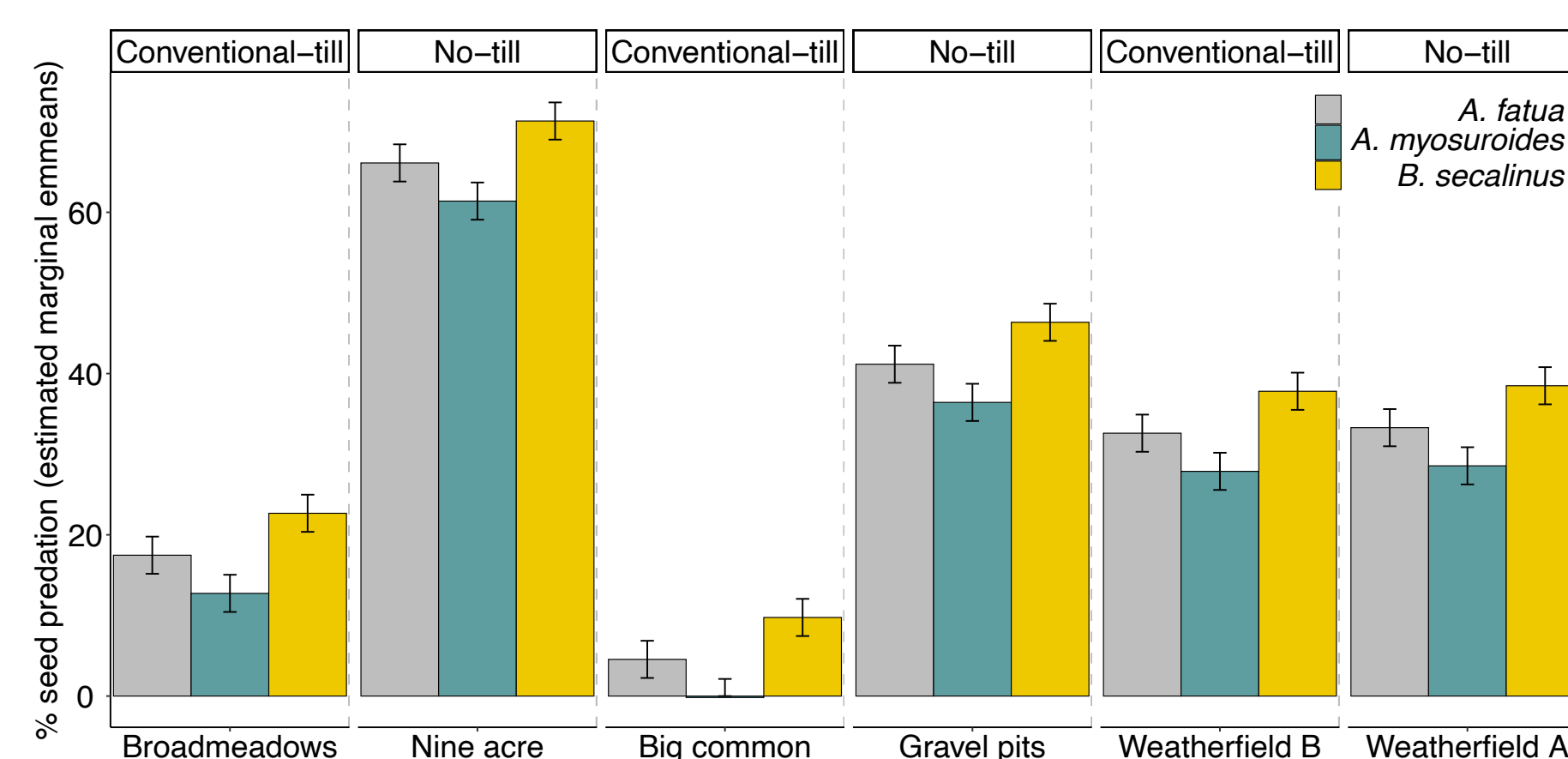
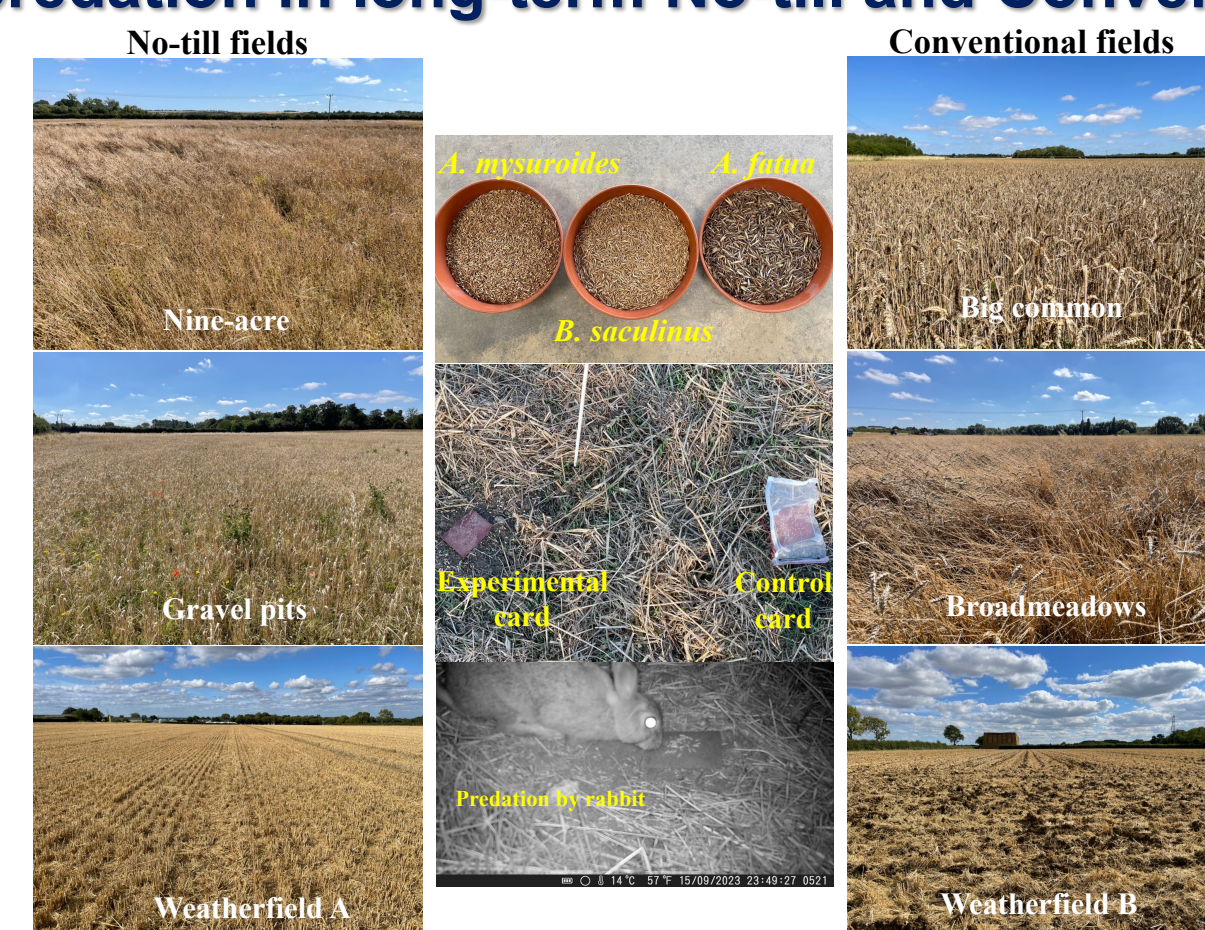
Viability of seed from the cut heads



- 80 DAS – low viability, few heads
- 90 DAS – high viability, many heads and less shedding
- 100 DAS – high viability (less for the 3rd cutting) and more seed shedding



2. Weed seed predation in long-term No-till and Conventional-tillage systems



CONCLUSIONS & IMPLICATIONS

- ✓ Weed surfing three times (80, 90, and 100 DAS), and at the middle (90 DAS) and later stages of the reproductive phase (100 DAS) reduce the total number of heads by about 45 - 55% in both black-grass and Italian ryegrass.
- ✓ No-tillage fields had a significantly higher predation rate than conventionally cultivated fields, indicating the importance of minimum soil disturbance for promoting beneficial predators that can suppress seed populations.
- ✓ These approaches offer durable weed control and support the principles of regenerative agriculture, offering valuable tools for more resilient and sustainable agroecosystems.