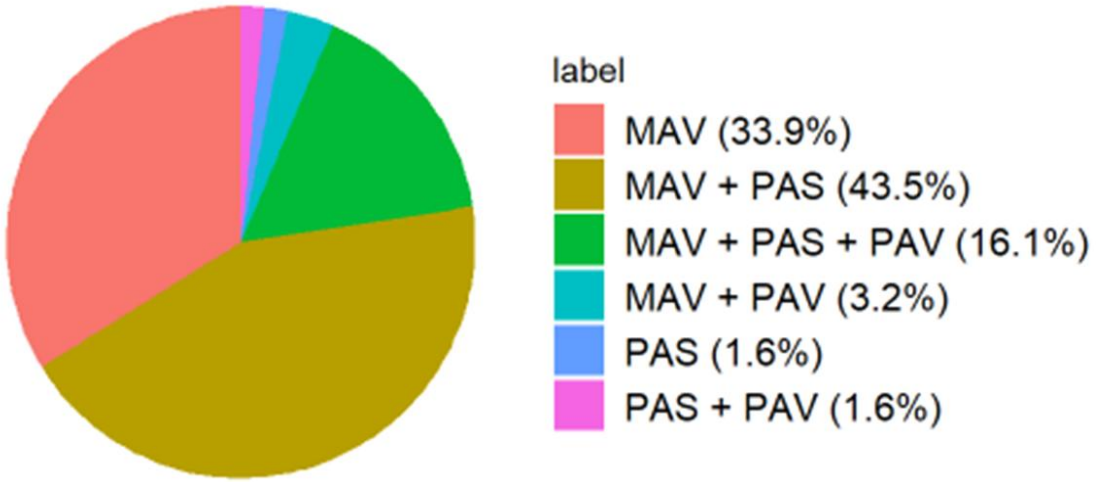
Validating the use of tolerant winter barley varieties to manage BYDV in Ireland

Teagasc Crops Forum 2026

Barley Yellow Dwarf Virus (BYDV) in Ireland

- BYDV is transmitted by aphids
- 3 species are present in Ireland
- **Question: are tolerant genetics effective against prevalent strains in Ireland?**
- In 2026, 83% of the winter barley seed area under certification in Ireland had tolerance or resistance to BYDV



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BYDV genetics

- Tolerance or resistance can target the aphid vectors or the virus itself

- Aphid targeted mechanisms:
  - **antixenosis** - reduces host plant attractiveness to aphids
  - **antibiosis** traits - reduce aphid survival or reproduction

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BYDV genetics

- BYDV **tolerance**
    - limited reduction in host plant fitness is observed in relation to viral load
- BYDV **resistance**
    - where virus replication or accumulation is limited with a host plant
- 3 BYDV tolerant genes
    - Ryd1 (low effectiveness, no longer used),
    - Ryd2, Ryd3 (used alone and in combination)
- Ryd4 resistance gene
    - Identified in *Hordeum bulbosum*

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Varieties included

- **Susceptible:** Belfry, Cassia, Tardis
- **Tolerant:** Buzzard, Caiman, Catapult, Caprice, Carpenter, Ferris, Harrier, Integral, Joyau, Littoral, Molly, Orcade, Organa, Raffela

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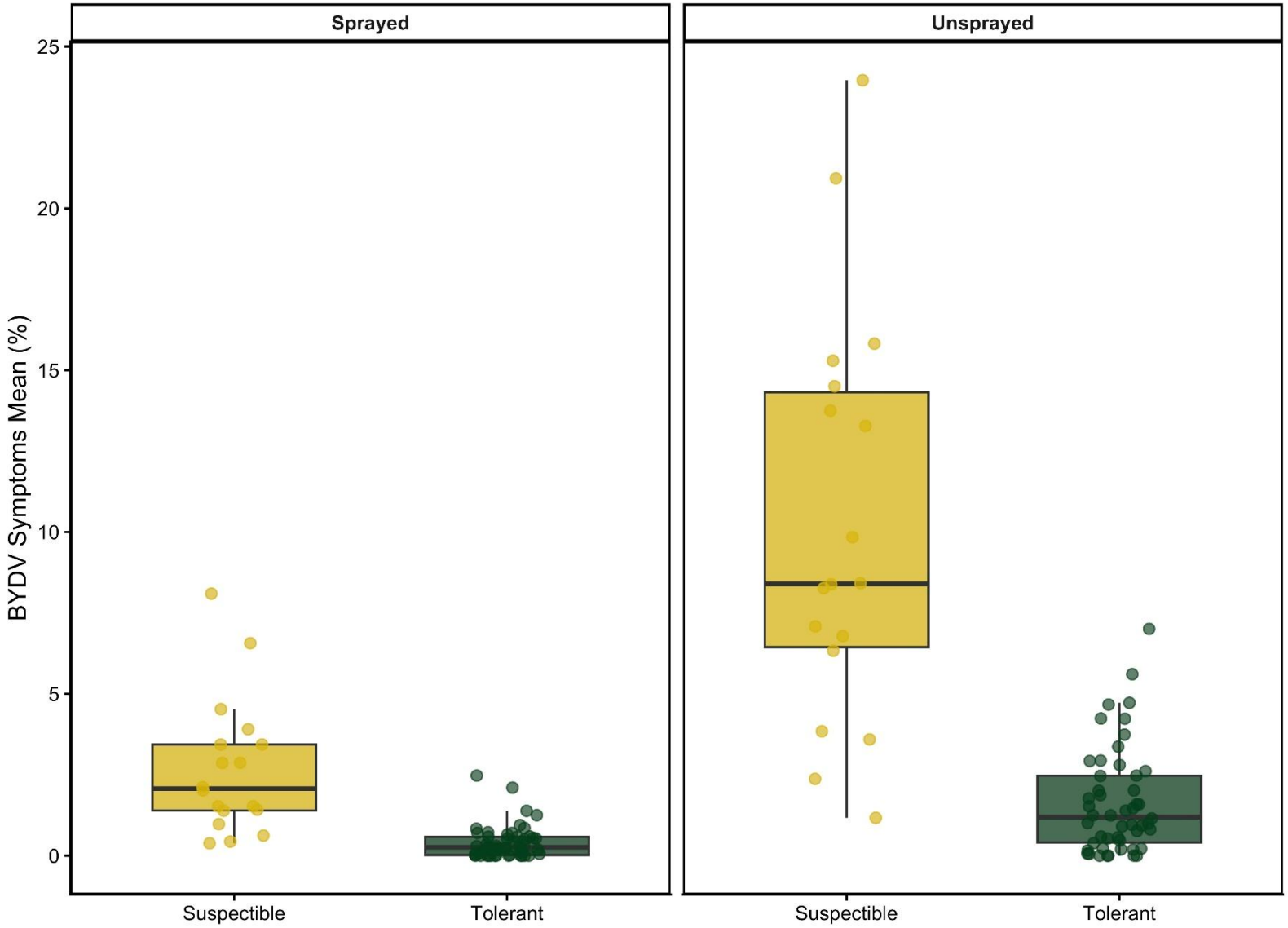
Tolerant Cultivars Get BYDV Symptoms



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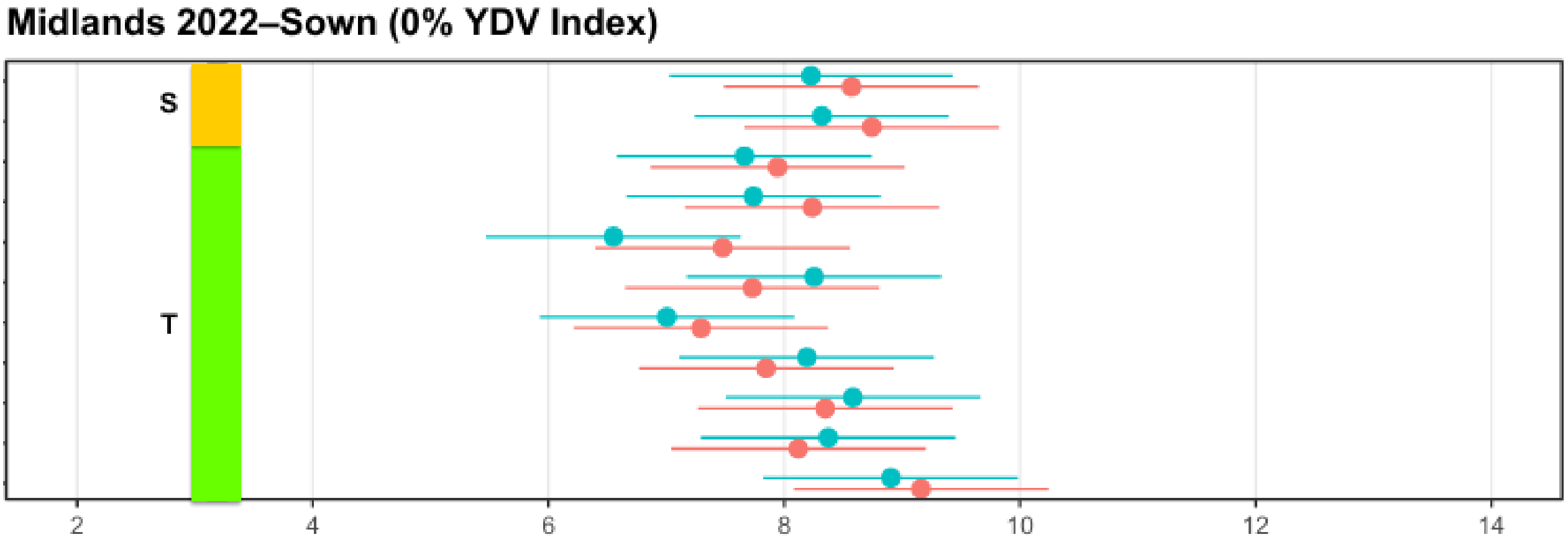
Low Pressure



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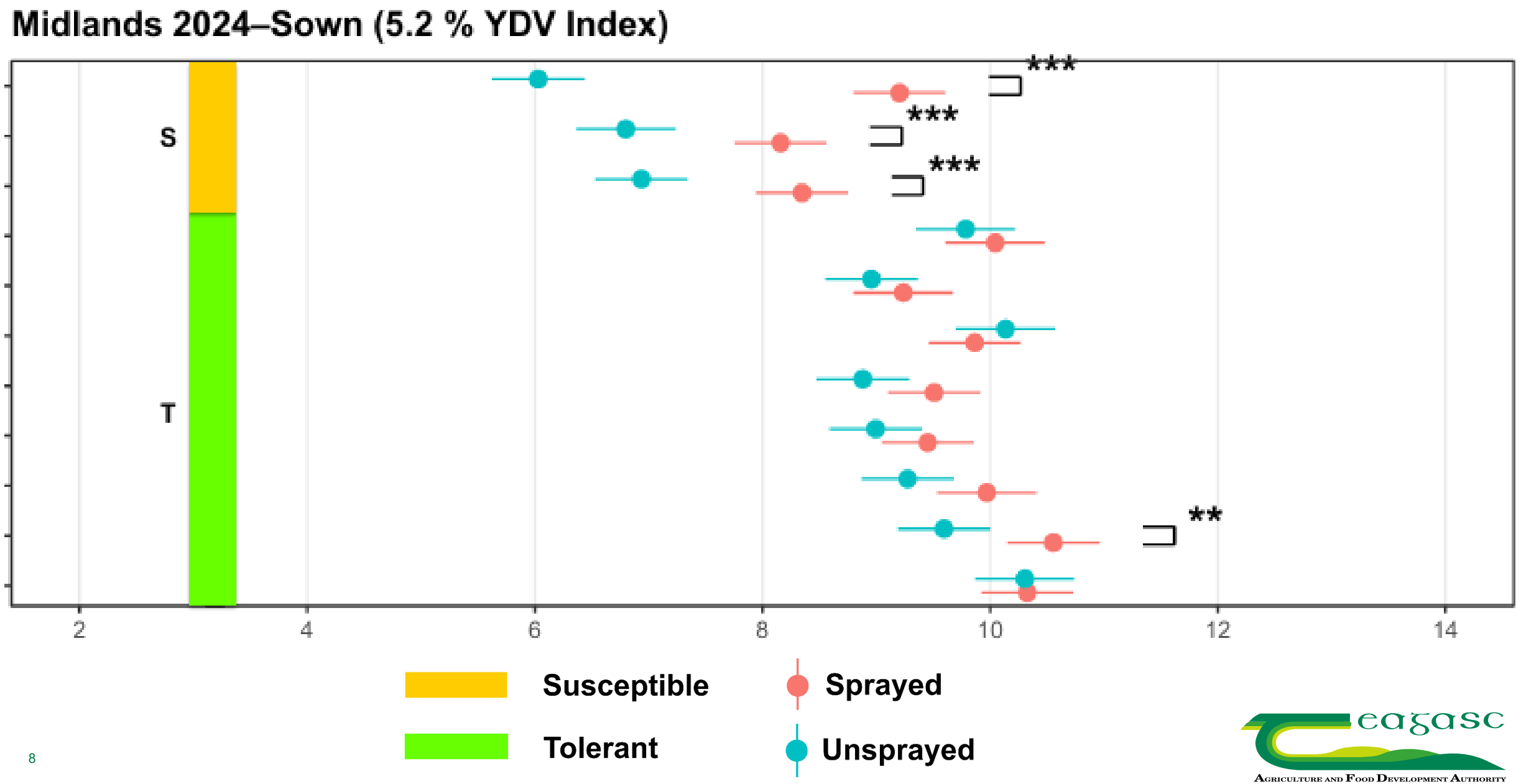
Medium Pressure



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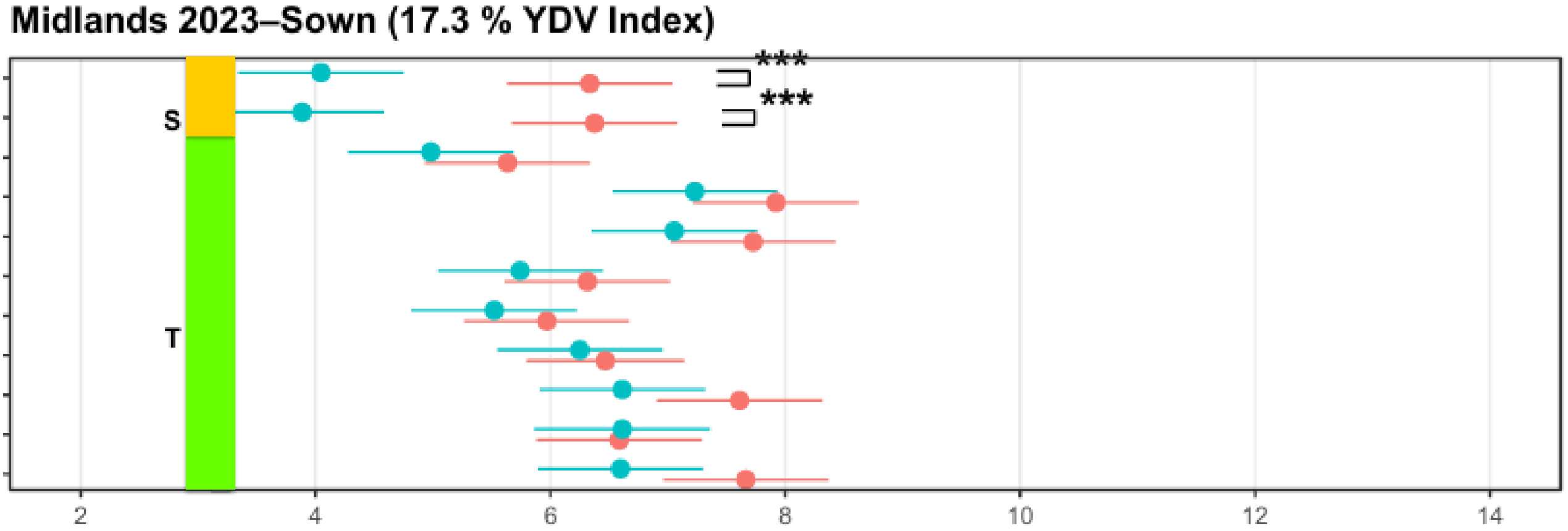
High Pressure



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Tolerant Varieties are Risk Reducers

- Average BYDV across years ranged from ~0-17%
- Tolerant varieties reduce BYDV symptoms and associated yield loss
- Significant yield loss in susceptible varieties in 4 out of 6 trials
- Significant yield loss in tolerant varieties in 2 out of 6 trials (one variety)

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Tolerant Varieties are Risk Reducers

- Tolerant cultivars still get BYDV symptoms
- Susceptible cultivars have significant yield penalty when left unsprayed
- Tolerant varieties less likely to have yield penalty
- **Risk reducers not risk eliminators**
- IPM essential to protect genetics

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