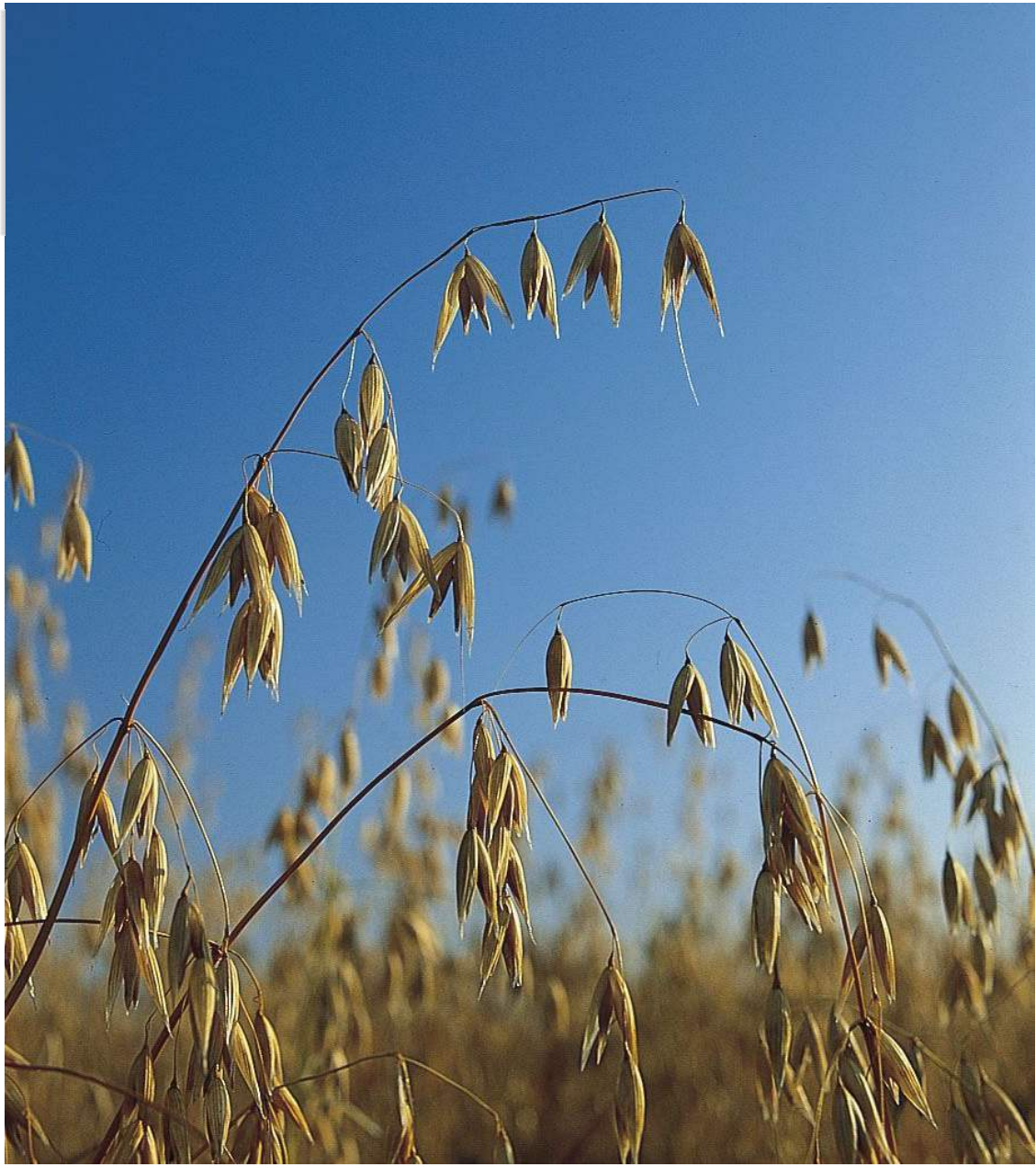
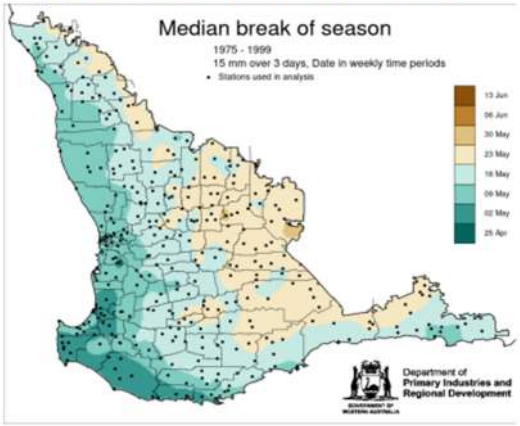
Deep sowing oats - genetic diversity in coleoptile and mesocotyl lengths and field emergence

Angelia Tanu, Allan Rattey, Sarah Rich,
Erik Veneklaas, Andrew Fletcher

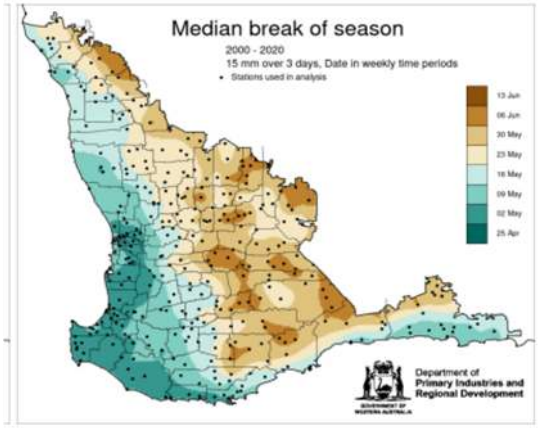


Background

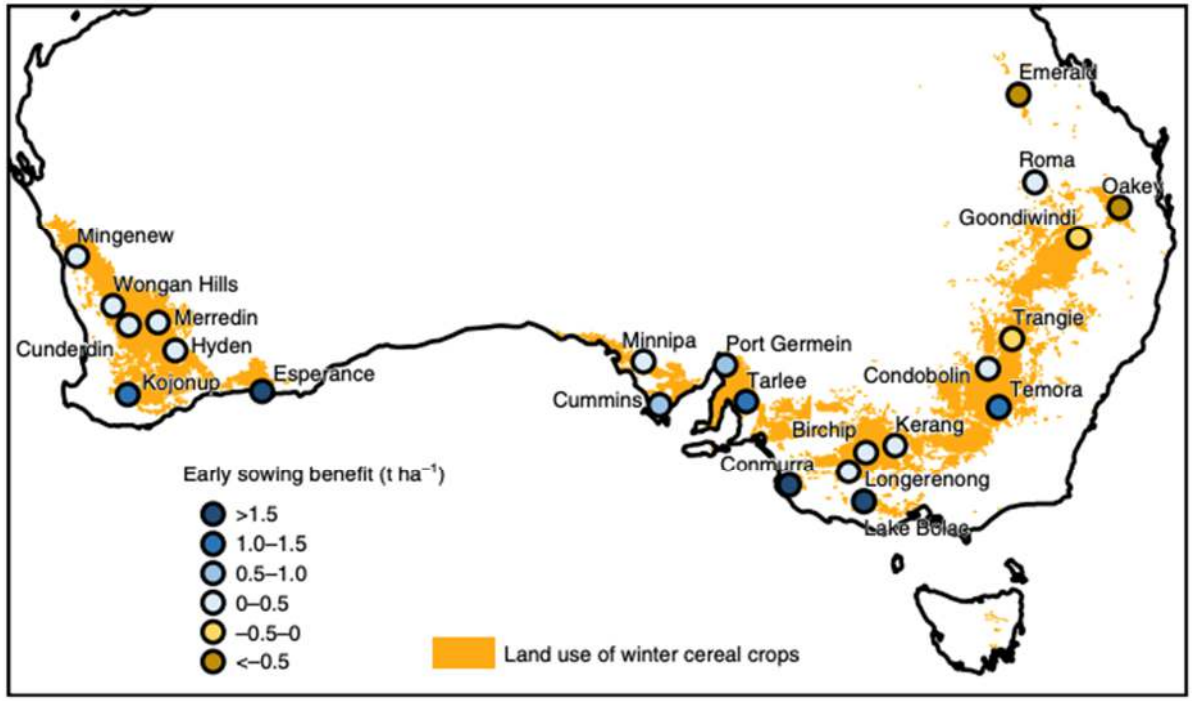
Break of season 1975-1999



Break of season 2000-2020

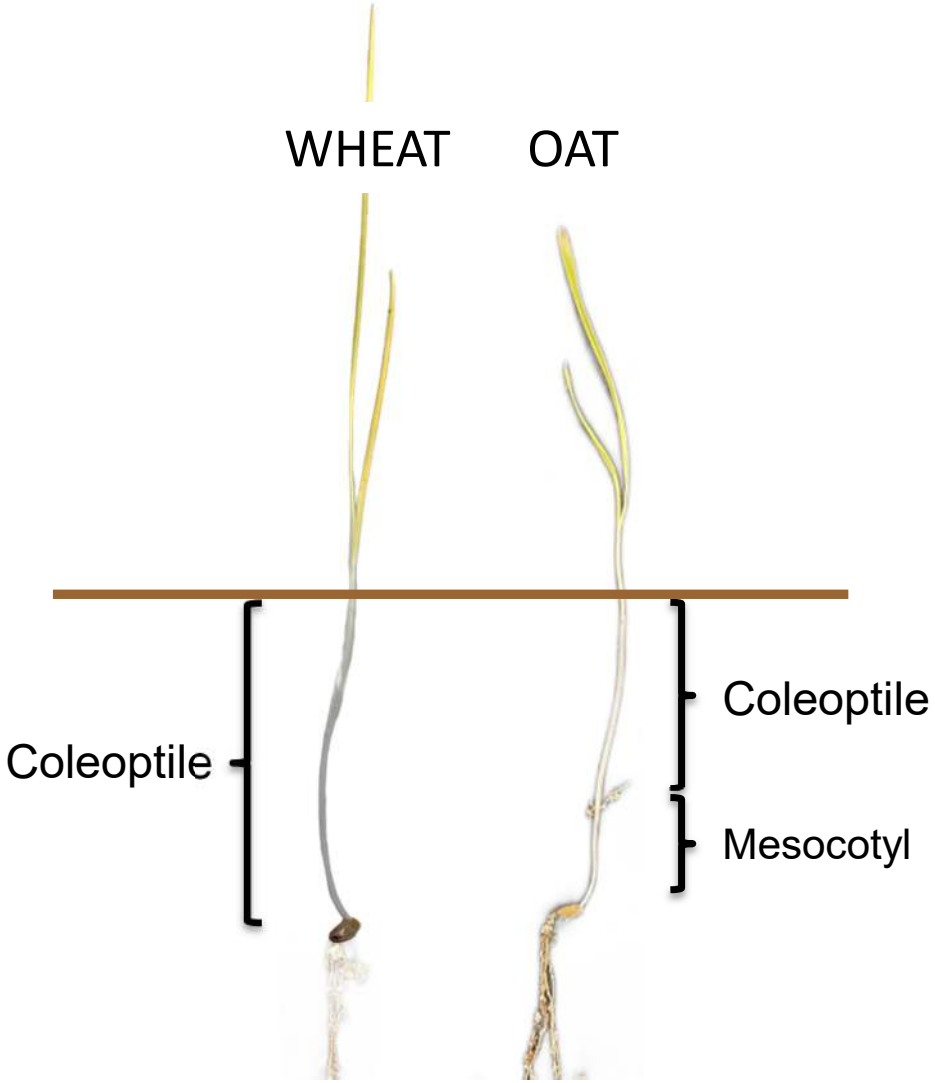


Early Sowing (April) and Deep Sowing (50-120 mm) Benefits in Wheat



Hunt et al., 2019

Why oats?



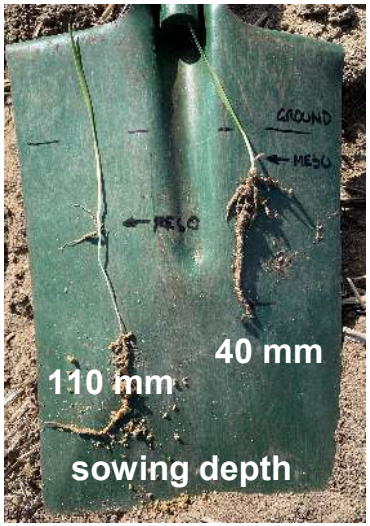
What's a coleoptile?

The coleoptile is a sheath that protects the emerging shoot and helps it push through the soil.

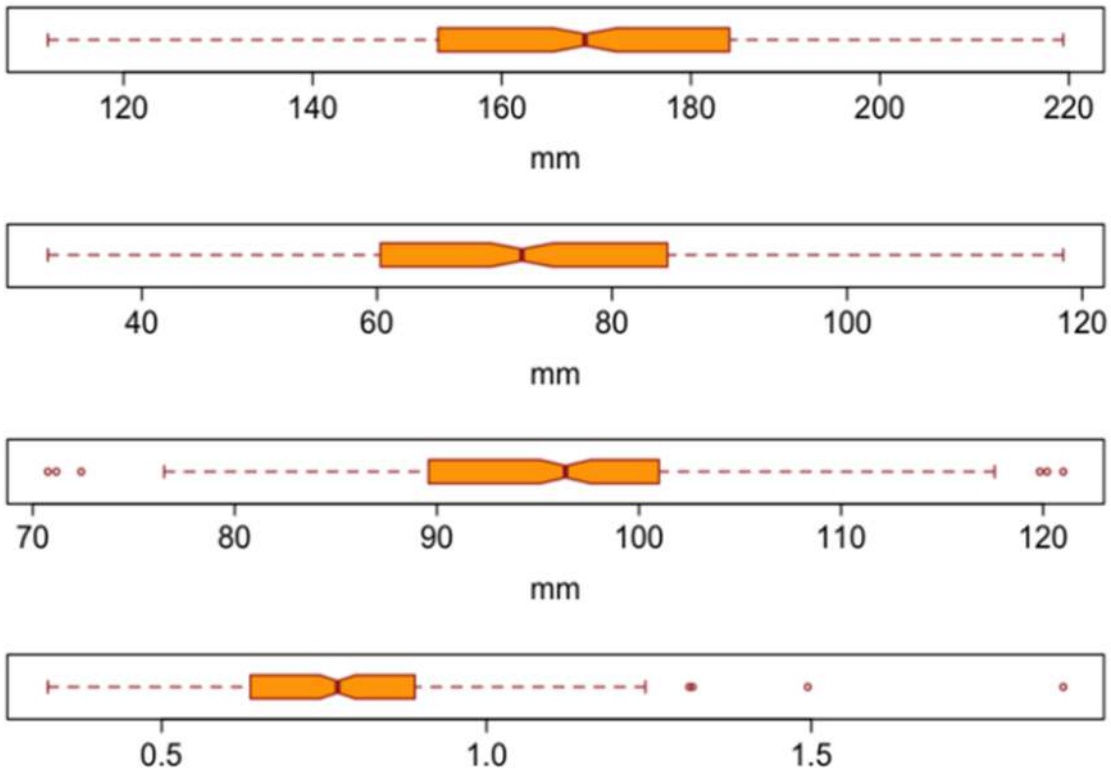
What's a mesocotyl ?

Mesocotyl is the internodal tissue between the coleoptile and the scutella node (on the seed).

Oats have a mesocotyl, wheat and barley do not!



Wide screening – 195 oat lines

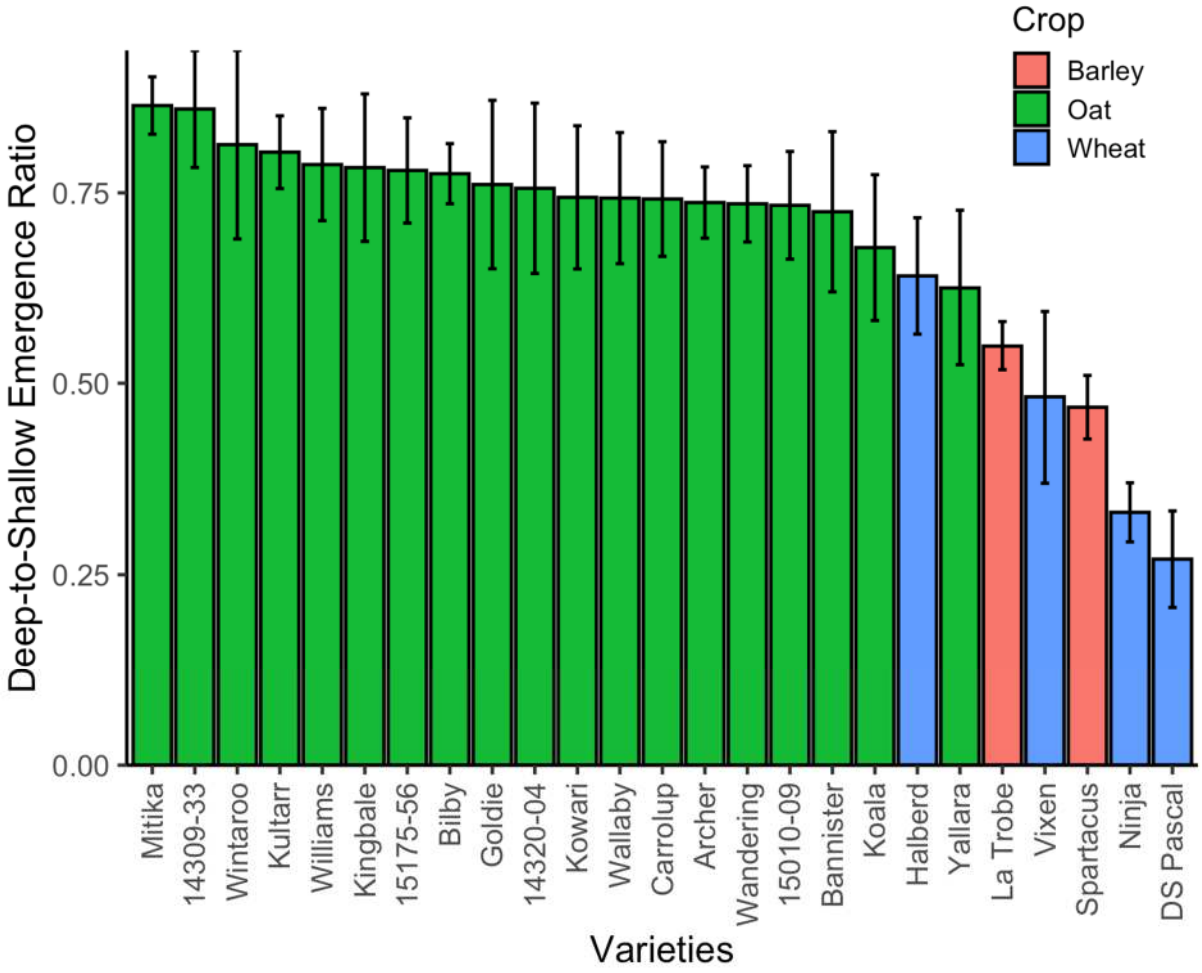


Total length

mesocotyl length

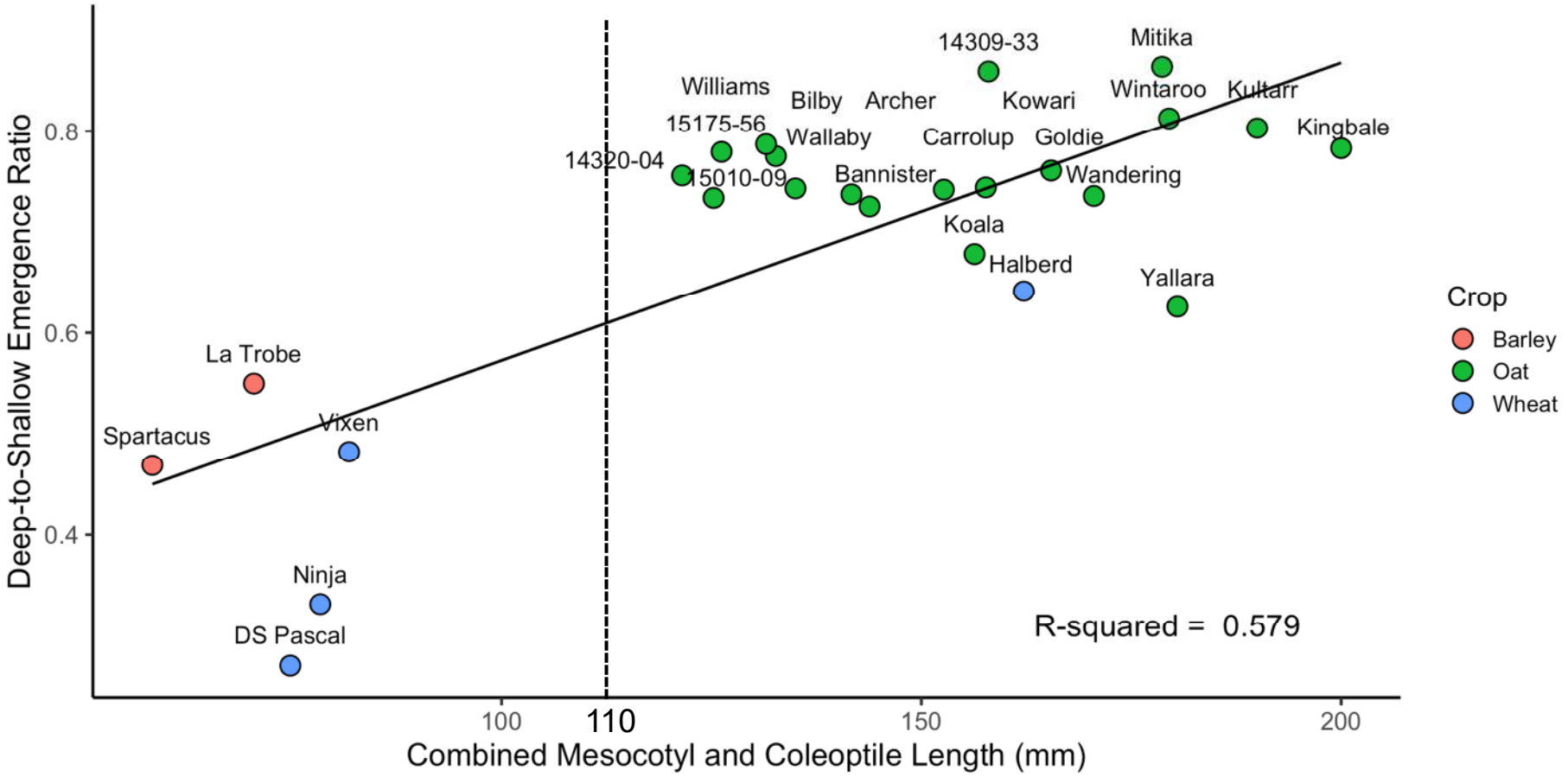
coleoptile length

Field trial results



- Merredin and Kunjin
- Shallow- 40 mm; Deep- 110 mm
- 19 oat varieties,4 wheat, 2 barley
- Emergence count at 2 weeks

Screening VS Field trial results



Conclusion

- Oats have long combined lengths of 112-219 mm
- Significant genetic variation for use in breeding
- Screening data correlates well with field emergence results

Oats are a great early and deep sowing option