

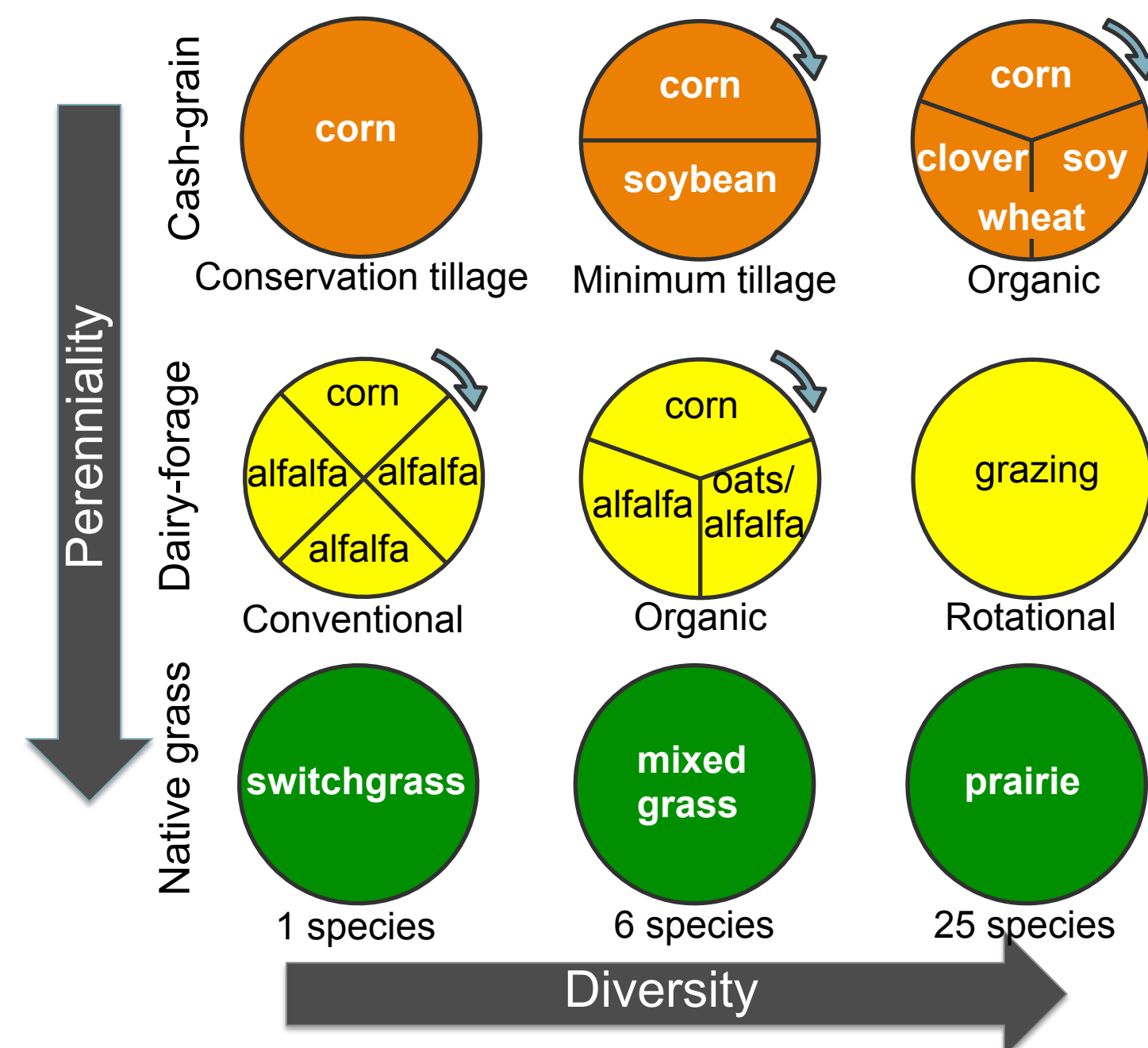


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What is WICST?

- A 25-ha experiment at UW's Arlington Ag Research Station.
- Established by Professor **Josh Posner** (UW-Madison Agronomy) in 1989 to compare productivity, profitability, and environmental responses of cropping systems.
- For 26 years these randomized and replicated plots – big enough to be managed with commercial equipment (plots are 20 x 155 m) – have been managed by a coalition of farmers, extension agents, and scientists.
- Originally designed with 3 cash-grain and 3 dairy-forage cropping systems, the study was expanded for forage and bioenergy to include native grass mixes (1999) and switchgrass (2007).

Replicated & randomized treatments



What have we learned?

Yields

- More than a decade and a half of production data showed that the organic systems produced forage yields equivalent to conventional systems and grain yields that were 90% of conventional grain systems (Posner *et al.*, 2008).
- Long-term yield trends highlighted the production benefits of crop rotation in high stress years, the lack of acceleration in annual yield gains with GMOs, and the rapid improvement in organic yields with improved technologies (Baldock *et al.*, 2014).

Economics

- Economic analysis of net returns and associated risk exposure showed organic- and pasture-based farming systems have been the most profitable at WICST (Chavas *et al.*, 2009).

Environment

- After 20 years of best management practices, every cropping system in the experiment except for the grazed pasture had lost significant amounts of soil organic carbon (Sanford *et al.*, 2012).
- Fluxes of other greenhouse gases such as N₂O appear to be lower in low-input and diverse systems on a per hectare basis, but equivalent per tonne of dry matter (Osterholz *et al.*, 2014).

Literature cited

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- Posner JL *et al.* (2008) Organic and conventional production systems in the WICST: I. Productivity 1990-2002. *Agronomy J* **100**:253–260.
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Big questions for the 21st Century

- What are cumulative effects of management on yields?
- How do we control weeds in organic systems?
- What's the relationship between soil organisms and yields?...Can these organisms be managed?
- Can we manage cropping systems for carbon sequestration?
- Can we close nutrient cycles to reduce losses to the environment?...Can we improve manure management?

