2024 Michigan Wheat Field Day
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Cropping Systems Agronomy
MICHIGAN STATE UNIVERSITY
MICHIGAN WHEAT PROGRAM
Project GREEEN

Wheat Agronomy- Setting up a high yield potential

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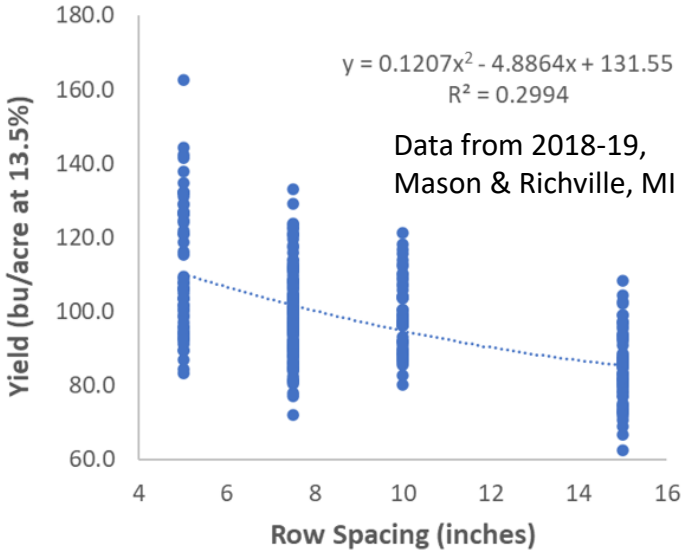
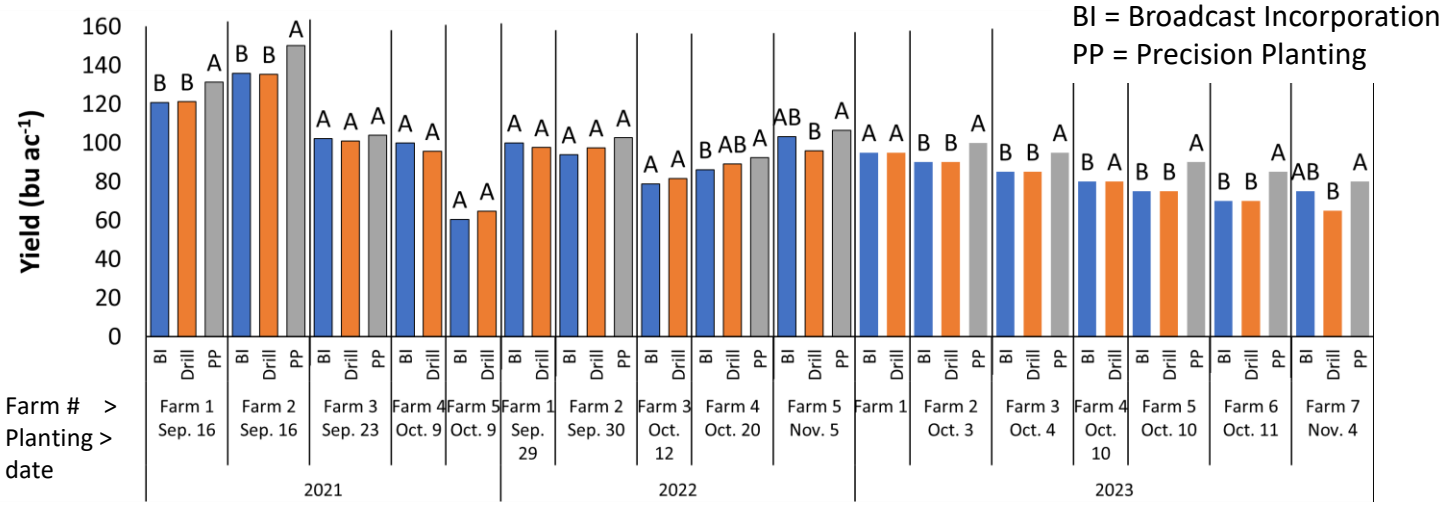
- **Overall goal**: design a canopy that can maximize light interception, light use efficiency, and conversion to grain.
- Systems approach to achieve this goal by combining variety (genetics) with management.
- Optimal **planting time** is critical in setting up a high yield potential. When to start? Soon after hessian fly free date (as a rule of thumb), around mid-Sept in the thumb of MI.
- Magnitude of yield penalty with late planting depends on weather. Typically, ≤10% yield loss when planted by 1st week of Oct., ≤20% loss till mid-Oct, and ≥20% loss afterwards.
- **Optimal seeding rate:** lowest for Sept plantings (≤1.0 m/ac) and increased as planting was delayed to early/mid Oct. (1.2 – 1.4 m/ac) and after mid-Oct (≥1.6 m/ac).

- Number of days for field work (in Sept.-Oct.) are declining over time in Michigan.
- High-speed **planting methods,** such as broadcast incorporation, may offer a viable solution for achieving timely planting.
- On the other hand, our work from small plot research found yield benefit from use of precision planter and narrow row spacing.
- Recent on-farm trials showed higher seeding depth variability in broadcast versus drill. Precision planting had lowest depth variability at all sites.
- However, our recent research showed <2% impact of **seeding depth** on yield.

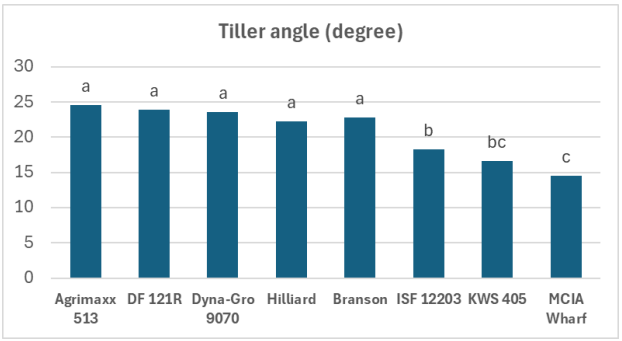




- 8 - 33% yield increase with precision planter (5”rows) over grain drill/air seeder at 7 of 11 sites.
- No consistent yield difference between broadcast and drill at all 17 site-years.
- Highest effective tillers in precision planting and broadcast, lowest in drill.
- Increase in seeding rate in broadcast did not impact yield.

- **Winter wheat varieties** differ genetically in **canopy architecture**. Most current varieties in Michigan are droopy type. Tiller angle estimation is the best way to quantify canopy types.
- **Droopy varieties** had wider tiller angle and intercepted greater light than erect types.
- **Erect varieties** had narrower tiller angle and had greater light use efficiency after canopy closure.
- Under high yield environments (e.g., narrow rows, high inputs, early planting), shading of lower canopy can be a limiting factor. So, use of erect varieties can be beneficial.
- However, interception of light is critical for lower yield environments, and droopy canopies would be more beneficial than erect ones.
- Ongoing work is testing varietal canopies under narrow and wide rows using precision planter vs drill, & **multi-crop** planting equipment options.

Variety with Erect (left), droopy (right) canopy.



Monosem **5'' + Erect**
(e.g., KWS 405)

Drill **7.5" + Erect**
(e.g., MCIA Wharf)

Drill **15" + Droopy**
(e.g., Dyna-Gro 9070)

Key messages: (for more info: visit agronomy.msu.edu, click extension/small grains)

- **Timely planting** is crucial in achieving high yields and profits, **faster planting technologies** can help plant early.
- Potential for **reduction in seeding rate** without limiting yield. Test using replicated strips in your field (20-30% lower than your seed rate).
- **Narrow row spacing** and **improved seed placement** can lead to increased crop uniformity, grain yield, and quality.
- Match **canopy type** of wheat variety to your production system.
- High yield environments (narrow rows, high input)- use varieties with erect canopies.