Betting The Farm On Racehorse Hybrids

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Hybrid Stability

• What is it?

• Matching Hybrids to Conditions?
  ✓ “Fix / Flex”
  ✓ “Offensive / Defensive”
  ✓ “Racehorse / Workhorse”
Objectives

- Do racehorse hybrids exist?
- How risky are they?
- Should farmers buy them?
Hybrid stability - Corn Breeders Definition

slope = 1 is a stable hybrid shows a "minimum of interaction" with the environment (Eberhart and Russell)
What is a racehorse hybrid?

- **Racehorse**: slope > 1
- **Stable**: slope = 1
- **Workhorse**: slope < 1

Environmental Index

Hybrid Grain Yield

Low Yields

High Yields
Ideally, we want above average hybrids ... (Can we always operate above the line?)

- **Ideal Workhorse**
  - slope < 1
  - intercept > 0

- **Ideal Racehorse**
  - slope > 1
  - intercept > 0

Hybrid Grain Yield vs. Environmental Index

Low Yields

High Yields

High

Low
Data Sets For Stability Analysis

- **Minnesota Corn Grower Hybrid Strip Tests**
  - ✓ 2002 and 2003
  - ✓ 1 to 6 locations per county
  - ✓ 200 hybrids tested
  - ✓ Non-replicated at a location
  - ✓ Chose the high, average, and low yielding hybrids grown at 7 or more locations

- **Missouri 2003 Central Tests**
  - ✓ Top 10, average 10, and lowest 10 hybrids
  - ✓ 5 locations

- **Wide Area Tests (WI, IL, MI, NE, KS, IA, & PA)**
  - ✓ Highest 12 and Lowest 11 Hybrids
  - ✓ 30 to 380 Environments; 1997 - 2001
Materials and Methods

• Used SELECT data base which is comprised of University corn hybrid trial data.
  ✓ Total hybrids = 17,890
  ✓ Total replicate means = 147,648
  ✓ Total plots = ~500,000 (442,944 to 590,592)

• Chose hybrids grown in 7 or more environments
  ✓ Hybrids = 2563
  ✓ Total replicate means = 51,397
    ❑ Used 76% of original data set
All data derived from University trials

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<th>First Year</th>
<th>Last Year</th>
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Yields of Hybrid Groups For A Range of Yield Levels
Minnesota Corn Growers County Plots 2002

- High Group $b = 0.94$, 182 bu/a
- Avg Group $b = 0.74$, 174 bu/a
- Low Group $b = 0.98$, 166 bu/a

Deviation of Location Avg From All Locs Avg

Yield (bu/a)
Yields of Hybrid Groups For A Range of Yield Levels
Central Missouri Corn Tests, 2003

- High 10 Group $b=0.99$ 179 bu/a
- Avg Group $b=1.0$ 163 bu/a
- Low Group $b=0.97$ 150 bu/a
Seven States Four Years 30 - 380 Locations

Yield (Bu/A) vs. Environmental Index (Bu/A)

High Group: $b=0.99$, 174 Bu/A

Low Group: $b=0.89$, 152 Bu/A
**Should a farmer grow a racehorse hybrid?**

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<th>N</th>
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<td>Bu/ A</td>
<td>Bu/ A</td>
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Conclusions

- **Racehorse, Stable and Workhorse hybrids exist.**
  - Racehorse hybrids = 6% of hybrids tested
  - Stable hybrids = 86% of hybrids tested
  - Workhorse hybrids = 8% of hybrids tested

- **Racehorse hybrids are riskier than Stable or Workhorse hybrids.**
  - Racehorse range = 138 bu/A
  - Stable range = 95 bu/A
  - Workhorse range = 82 bu/A
  - In an “average” environment Racehorse and Stable hybrids are 8 and 5 bu/A better than Workhorse hybrids.

- **“Ideal” racehorse and workhorse hybrids rarely exist.**
Recommendations

• “A Good Yielding Hybrid is a Good Yielding Hybrid - Regardless of Environment. Choose Good Ones.”

• Use multi-environment average data
  ✓ Begin with trials in zone(s) nearest you
  ✓ Compare hybrids with similar maturities
  ✓ Use many years and locations

• Evaluate consistency of performance
  ✓ Check performance in other zones and locations
  ✓ Check other reliable unbiased trials
  ✓ Be wary of inconsistent performance.

You are taking a tremendous gamble if basing your hybrid selection decisions on 1 or 2 local test plots
The End of the Row - Questions?
Thanks for your attention!