Selecting Hybrids Wisely

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Corn is a GMO!

- Genetic modification of corn has been occurring for thousands of years.
  - Center of origin = Mexico, central America
  - Earliest plant breeders = women
  - Genetic modification the old-fashioned way:
    Hard work!
  - Now, genetic modification is possible using fancier tools than ever before.
    - Including the transfer of genes from other living species into corn.

First of all, let's admit that...

- Perfect hybrids do not exist!
  - Else there wouldn't be so many hybrids for sale in the marketplace
  - Corn's genetic yield potential is great!
    - Physiological est's as high as 600 bu/ac
    - Francis Childs, IA, 500+ bu/ac
  - Harvested yield is influenced by many factors
    - Disease, insects, weeds, fertility, your management, soils, weather
    - Genetics interacts with most of these factors

How to choose hybrids wisely?

- Commercial advertising?
  - Radio, TV, magazines, newspapers
- Sales literature?
  - Sales pitches from seed dealer?
- Testimonials?
- Comparative yield performance data
  - My personal favorite

Yield performance data

- Many possible sources:
  - Seed company summaries
  - Yield contest summaries
  - County test plots
  - Your test plots
  - University trials

Seed company summaries

- Number of test locations can be quite large (a strong advantage)
- Comparisons with competitor hybrids often limited in number (no surprise)
- Tend to favor their hybrids over competitors (no surprise)

- Are probably the best information source for that particular company's hybrids (makes sense)
- Side-by-side comparisons commonly used technique (has limitations)
Yield contest summaries
- Farmers “win” with a particular hybrid and set of management practices.
- Such contests are not meant for comparative hybrid performance.
- How often a hybrid is associated with winning contest yields can be influenced by how actively the seed company promotes the hybrid among contestants.

County test plots
- The number of test locations is usually limited to a small no. within the county.
- Hybrid entries are often chosen by local sales reps.
- Hybrid entries are often not repeated more than one year.
- Number of companies represented can range from few to many.

Your test plots
- Number of test locations = 1
- Number of hybrid entries often limited
- Hybrids entered into test are some combination of your choices and seed rep’s recommendations
- Perception of value to testing on YOUR soils using YOUR management practices

University trials
- No vested interest in which hybrids win
- No. of locations typically fewer than those in seed co. trials, but more than county trials.
- No. of companies in trial is typically quite large
  - No. of hybrids per company per zone usually small
  - Hybrids entered into trials are usually the choice of the seed company
- Multi-year hybrid data are usually available
  - Purdue Variety Trials: http://www.agy.purdue.edu/ext/variety.htm

Bottom line?
- There is no single method that is easy or perfect for selecting corn hybrids that will perform consistently well in your farming operation.
- Choosing hybrids wisely requires a lot of searching for yield data and a lot of homework “massaging” the data to make sense out of it.

Dumb hybrid decision-making
- Simply because it’s cheap.
- Simply because it’s new.
- Simply because it’s biotech.
- Simply because it’s the one the company has the most bags of in the warehouse.
- Simply because it’s genetically different from the other one you bought.
- Simply because you trust the seed rep.
Smart hybrid decision-making

- Look for hybrids that yield consistently well across a diverse set of conditions, especially weather and disease.
  - That is to say, you are looking for hybrids with high yield and low G x E.

What is G x E ????

- Genotype by Environment
  - Describes the common fact that hybrids (genotypes) often respond (or interact) differently to different environments
    - Soils,
    - Diseases,
    - Insects,
    - Fertility,
  - and especially weather

G x E illustrated…

- Four hypothetical hybrids
- Which hybrid would you want?
- Hybrids often respond differently to yield influencing factors.

Another G x E example …

- Purdue Univ. Hybrid Performance Trials, 1999-2000
- Central locations
- 35 hybrids in common, 1999-2000
- Hybrids of interest to me!
- #34 in 1999
- #7 in 2000
- #2 in 1999
- #33 in 2000
- If zero G x E

Identifying G x E …

- Identifying high yielding hybrids with low G x E requires data, data and more data from many environments summarized in a way that is easy to interpret.
  - Do not place HIGH priority on hybrid performance on your farm.
  - Performance in 1 environment does not predict the future accurately.

Locations vs. years …

- You and I don’t have time to test hybrids for 10 years to determine their stability to weather patterns.
  - Multiple locations can be substituted for multiple years to achieve the same goal.
  - Multiple test locations will also increase the diversity of pest situations encountered by the hybrids in the trial.
So, you see …

- Seed companies benefit greatly from all of those on-farm hybrid trials that you all participate in.
  - Hundreds of test plots per year.
  - Hundreds of weather patterns per year.
  - Hundreds of disease situations per year.
- If you concentrate primarily on your farm’s results, you miss out on these benefits!

Your challenge …

- Obtain hybrid performance data from multiple test locations.
  - Esp. datasets with large groups of hybrids in common across multiple locations.
  - Emphasize locations within your latitude or hybrid ‘adaptation zone’, but don’t be hesitant to use data outside of your ‘zone’.

Think outside the box…

- e.g., If in central Indiana, okay to use nearest central OH or IL data. If in northern Indiana, okay to use southern MI data.
- Links to other university variety testing programs can be found at:
  North Central Crop Evaluation Committee: http://www.ksu.edu/kscpt/nccec/

Identify consistent performers

- Several selection criteria to consider …
  - Consistently within the upper group of hybrids as determined by a trial’s L.S.D. value.
  - Consistently within 5 to 10% of the maximum yield in a trial.
  - Consistently greater than 5% above the average yield of a trial.

The latter two are also options for trials where statistical analyses are not conducted.

Prepared with Performance Charts, Nicotex, Mediavision by Infra, Adobe PhotoShop, ArcMedia by Infra.
You can be more liberal…

Avoid …

- Single location-Single year trials
  - Not enough data to predict stability of hybrid performance across a range of growing conditions.
  - This is why you should not place a lot of faith in the ability of your own on-farm testing to predict a hybrid’s yielding ability in the future.

Avoid …

- Hybrids without documented comparative yield performance data over multiple locations
  - Don’t buy on advertising or price alone!
- “Percent wins against the competition”
  - The “competition” is often a “bunch” of unidentified hybrids that could be “dogs” for all you know.
  - What you need to know is the “percent wins” against the BEST of the competition!

Avoid …

- Side-by-side comparisons, unless they are between pairs of hybrids you’ve already identified as being top yielders.
  - In other words, just because my hybrid outyields your hybrid in 12,089 side-by-side comparisons across 10 states, does not mean that either hybrid is the best performer in the marketplace!

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Hybrid Selection Strategy:

- Eliminate hybrids with weaknesses for specific traits important to your farming operation.
  - e.g., gray leaf spot tolerance, root & stalk strength, emergence vigor, etc.
  - Info about hybrid characteristics can be found on many seed company Web sites.

Purdue Corn Performance Trials, Central Zone, Medium Maturity Hybrids, 2001-2002 (28 hybrids in common both years)

90 % of max yld or greater:

2001 Hybrid:Max Ratio

2002 Hybrid:Max Ratio

Hybrid:Max Ratio = Indiv hybrid yld divided by max yld in trial

Links to Seed Company Web Sites:
http://www.agry.purdue.edu/links/national/commercial-ag.htm

Specialty Trait Hybrids…

- Often more complex to evaluate than normal hybrids. You need to know…
  - Performance compared to other hybrids with similar trait, if others exist.
  - Grain yield, output trait “yield” or quality, and other important characteristics.
  - Finding comparative data in public or private trial reports may be difficult.

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Also should determine…

- Performance compared to the best “normal” hybrids in the marketplace.
  - Yield & other important characteristics relative to economics of adopting specialty trait versus “normal” no. 2 yellow dent hybrids.
  - Comparison to “normal” version of same hybrid not as important.
  - Finding comparative data in public or private trial reports may be difficult.

Comparing Specialty Hybrids w/ Normal Hybrids:

- Compare the best specialty hybrids in a trial with the best normal hybrids.
  - University trials work well for this, assuming that companies enter the best hybrids of these traits in the trials.
  - This strategy is useful for comparing...
    - Bt vs. non-Bt hybrids
    - RR vs. non-RR hybrids
    - Waxy vs. normal starch hybrids

Example of Best vs. Best Strategy:

Yield Comparisons of Top 5 non-Bt and Bt Hybrids
Purdue Corn Performance Trials, 1999

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Average yield difference for Bt hybrids = 2.0%

Yield Comparisons of Top 5 non-Bt and Bt Hybrids
Purdue Corn Performance Trials, 2000

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Average yield difference for Bt hybrids = 7.1%

Yield Comparisons of Top 5 non-Bt and Bt Hybrids
Purdue Corn Performance Trials, 2002

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Average yield difference for Bt hybrids = 5.1%

In Conclusion:

Wise hybrid selection…

- Requires a lot of research & homework.
- Can be challenging because multiple location performance data are often difficult to obtain.
- Can be challenging because performance data often require further analysis & scrutiny.
- Can improve net profits due to higher and more consistent hybrid yields on your farm.