Variety Selection

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Summary: Choice of variety is one of the most important decisions a grower can make to maximize yield. NDSU publishes yield and agronomic trait data on those soybean varieties that private companies choose to enter in our Variety Performance Trials. This information is available on the web site: http://www.ag.ndsu.edu/varietytrials/soybean and also published each year in Bulletin A-843, which is titled ‘North Dakota Soybean Performance Testing’. Each year there is soybean performance data collected at sites throughout the state of North Dakota. Yield data should be based on the average of several different locations within the same year and preferably based on data averaged across several years. For example, averaging across both dryland and irrigated sites is a good way to determine the best variety for your farm. This is because a soybean variety that yields well in wet and dry conditions will be the best choice, given that the weather conditions for next year are not predictable.

Selection
Soybean variety selection should be based on maturity, yield, seed quality, lodging, iron-deficiency chlorosis tolerance and disease reaction. Later-maturing varieties tend to yield more than early maturing varieties when evaluated at the same location. After determining a suitable maturity for the farm, comparing yields of varieties that are of similar maturity is important. Although late maturity increases yield potential, later-maturing cultivars are more risky to grow than earlier-maturing varieties because an early fall frost may kill a late-maturing variety before the beans have completely filled in the pods, which will reduce yield greatly.

Some varieties are well adapted to certain types of soil problems, but are low-yielding on other types of soils. For example, a variety might have good tolerance to iron-deficiency chlorosis, which tends to be more of a problem on high-pH soils, but that same variety might not be a good choice on a heavy, Fargo-clay soil with neutral pH. Data is published in the ‘North Dakota Soybean Performance Testing’ bulletin that provides information regarding yield of different company varieties on both iron-deficiency chlorosis (IDC) problem soil sites as well as on a neutral-pH Fargo-clay soil. This enables growers to target specific company varieties to different fields on their farm. A poorly-drained soil may need a variety with phytophthora root rot resistance. A field infested with Soybean Cyst Nematode (SCN) will require a variety that has genetic resistance to SCN. This example shows how different soil types or field problems, require soybean varieties with different traits.

Soybean Maturity
Soybeans respond to day length and heat units, so the actual calendar date a variety will mature is highly influenced by latitude; each variety has a narrow range of north to south adaptation. Soybean yield and quality are affected if a season-ending freeze occurs
before a variety reaches physiological maturity. In 2009, a number of varieties entered at
the Langdon locations were not mature when the killing frost took place and yields
generally were low for those varieties. Dates of maturity are listed in the performance
tables and indicate when varieties were physiologically mature. Usually harvest can
commence approximately seven to 14 days after the soybean crop is physiologically
mature. Relative maturity ratings also are provided for many of the varieties entered in
the trials at various locations. Relative maturity ratings for private varieties were
provided by the companies entering the variety in the trial.

Varieties of maturity groups 00 (double zero), 0 (zero) and 1 are suitable for eastern
North Dakota and northwestern Minnesota. Maturity group 00 is very early and primarily
grown in the northern Red River Valley and the north-central area of North Dakota.
Maturity group 0 is adapted to Traill, Cass, Richland, Barnes, Sargent and Richland
counties and other counties with similar latitudes. Maturity group 1 is primarily suitable
for southern areas. These maturity groups are further subdivided. For example, a 0.1
maturity group is an early group 0 variety and a 0.9 is a late maturity group 0 variety.

The best way to select a high-yielding variety is to use data averaged across several
locations and years. Because weather conditions are unknown in advance, averaging
across several years’ data will identify a variety that likely will yield well across different
weather conditions. Selecting a variety that has performed well in dry and moist
conditions is the best way to pinpoint a variety that does relatively well, regardless of
weather fluctuations.

**Phytophthora**

Phytophthora root rot is the No. 1 disease problem of soybeans in North Dakota.
Phytophthora root rot tends to be more of a problem in the Red River Valley and on
poorly drained, heavy soils, but the disease can cause significant stand reduction and
yield loss in other areas when conditions are favorable. Most varieties have phytophthora
root rot-resistance genes. Each gene for resistance confers resistance to a different race
(or races) of phytophthora. For example, a gene that may confer resistance to Race 3 may
not confer resistance to Race 4, and vice versa. According to a survey of phytophthora
races done by NDSU’s soybean pathologist, Berlin Nelson, Races 3 and 4 are most
common in North Dakota. However, numerous other races are found in the state. Based
on these findings, resistance genes RPS 6 and RPS 1K (commonly called the K gene) are
the most likely genes to provide resistance against the races common in North Dakota.
Although selection of RPS 6 or RPS 1K does not guarantee control, selection of one of
these two resistance genes will maximize the likelihood of some protection against
phytophthora root rot.

**White Mold**

Varieties have genetic differences for tolerance to white mold. Varieties that are less
susceptible to white mold should be grown on fields where white mold has a past history
of causing problems. However, it is difficult for NDSU to screen soybean varieties for
white mold, usually we do not have any data to report on genetic resistance of the
different varieties. The same pathogen causing white mold in soybeans causes white
mold in other crops (dry beans, sunflowers, peas, canola, etc.); therefore, recent white
mold problems in any crop in that field should be noted.
Iron-deficiency Chlorosis
Iron-deficiency chlorosis (IDC) is a major problem in the eastern part of North Dakota. Iron-chlorosis symptoms might be present during the two to seven trifoliolate leaf stages. Plants tend to recover and start to turn green again during the flowering and pod-filling stages. However, IDC during the early vegetative stages can reduce yield severely. Some varieties are more tolerant to IDC than others. For high pH soils with known IDC problems, select an iron chlorosis-tolerant variety of suitable maturity that is high yielding. NDSU provides both visual rating scores for IDC and also yield data of company varieties on sites where IDC is present. The 2001-09 variety IDC scores are posted on Jay Goos’ Web site at www.yellowsoybeans.com.

Soybean Cyst Nematode
The soybean cyst nematode (SCN), *Heterodera glycines*, is a small parasitic roundworm that attacks the roots of soybeans. Soybean cyst nematode has been found and verified in Cass and Richland counties of North Dakota. Unverified reports indicate SCN also has been found in fields in adjacent counties. Soybean cyst nematode causes yield losses in infested fields. Crop rotation and resistance are the most important management practices growers must use to control the disease. Growers may want to consider testing their soils for SCN. If a nematode problem is in the field, only resistant soybean varieties should be planted.