Ohio State University – Crop Observation and Recommendation Network

C.O.R.N. Newsletter March 6, 2007 – March 20, 2007

Soybean Inoculation Pays - Jim Beuerlein

Twelve years of evaluating soybean inoculation products consisting of 70 field trials and over 9000 research plots indicate that inoculating soybeans is a very profitable practice in Ohio. The average yield increase over the twelve years of testing in producer fields has returned a profit of over 300 percent. Field trials have been conducted using a corn/soybean crop rotation in fields with good soil pH and fertility, good surface and subsoil drainage, little disease pressure and high yield potential. Following are the tests results for the past six years:

Year	# Treatments	Check Yield	Inoculation Treatment Yield	Inoculation Yield Range
2001	14	56.4	58.5	58.1-59.4
2002	16	49.6	49.2	49.1-50.6
2003	17	50.0	51.5	50.5-52.6
2004	20	59.8	62.6	61.6-63.7
2005	19	55.2	56.9	55.7-58.6
2006	24	53.5	55.1	53.5-56.9
Averages		54.0	55.7	55.0-57.0

The average yield increase over the untreated check during the past six years was **1.7 Bu/ac** which is a value of about $12.00 per acre and 300% greater than the cost of inoculation. The most productive products produced a profit of $18.00 per acre. For more information on soybean inoculation go to: www.agcrops.osu.edu.

Fungicide Treated Soybean Seed Makes More Yield - Jim Beuerlein

Soybean diseases in Ohio have increased in number and severity over the past 10 years so that today, the loss of productivity from disease averages over $35,000,000 per year. The loss due to disease is greater than from any other factor except weather. The increase in soybean disease is due primarily to short crop rotations or no crop rotation and will be five to eight bushels per acre per year in many fields. During most years, several diseases are present but some are not recognized due to low levels of infection. By the time symptoms of a particular disease appear, the yield loss has already reached seven to ten percent. In many fields there is significant yield loss to disease even though no symptoms are evident.

In the past, we have relied on varieties' disease resistance and tolerance to provide disease control. Many of the Phytophthora control genes are no longer effective because the pathogens have evolved and can overcome the genes' defense mechanism. During the past ten years, we have relied more and more on fungicide seed treatments to improve soybean stands and increase the general health of soybean root systems following planting. During the past six years we have field-tested many of the seed treatment fungicides commonly used. All the tests were conducted in fields with very low disease pressure and no observable disease in the untreated check plots. Following are the results of thirty-six field trials evaluating the benefit of treating soybean seed with fungicides.

Year	# Treatments	Check Yield	Avg with Fungicide	Fungicide Yield Range
2001	10	56.9	58.6	57.8-60.6
2002	8	49.7	49.9	48.5-50.4
2003	9	49.7	53.1	50.1-53.8
2004	8	60.6	62.8	62.0-65.8
2005	8	56.5	56.5	55.1-57.8
2006	8	54.5	56.1	54.5-57.6
Average		54.7	56.2	54.7-57.7

Although all the test sites had a low potential for the development of root rot disease, there were yield increases when the seed was treated with fungicide. The average yield increase over the untreated check was **1.5 Bu/ac** which is a value of about $10.50 per acre and 250% greater than the cost of seed treatment. Because many soybean fields in Ohio have a high potential for disease, and large yield losses, the routine use of seed treatment fungicides on soybeans is warranted and highly profitable. For more information on Fungicide seed treatment go to: http://agcrops.osu.edu.

Adjusting Soybean Seeding Rates To Maximize Profit - Jim Beuerlein, Edwin Lentz

The cost per unit of soybean seed has been increasing steadily for ten years and will continue to do so as new traits are added to varieties. Because seed cost is a major production expense, it is important to use no more than necessary to produce the most profitable crop. The most profitable soybean seeding rate is determined by many factors including variety characteristics, soil productivity factors, cultural practices, weather during the growing season and finally, the interaction of the components of those major factors. In the final analysis, the plant population at harvest is the important factor, and is typically 60-80 percent of the seeding rate. Percent germination and emergence, loss to disease, and die-off due to plant competition determine the harvest population.

The most profitable plant population is a function of plant size, and the smaller the plants, the greater the number needed to maximize yield. For example, we need 30,000 corn plants, or 150,000 soybean plants or 1,500,000 wheat plants per acre for good yields. Therefore, the bigger the plant the fewer we need, and that rule also works for plant size within the soybean crop. A rule-of-thumb is: best yields are produced with about 100,000 plants 40 inches tall, or about 130,000 plants 30 inches tall, or about 170,000 plants that are 20 inches tall. The typical seeding rates needed to produce those populations are 125,000, 175,000 and 235,000 respectively.

Following are some factors that allow a reduction in seeding rate or require an increase in seeding rate for soybeans grown in 7.5-inch rows and starting with a seeding rate of 200,000 seeds per acre:

Reduce the seeding rate by:	If:
75000	Plants are normally 40” tall at harvest
25000	Plants are normally 30” tall at harvest
20000	The soil has more than 2.5 % organic matter
20000	The seed has a fungicide treatment
20000	Tillage was used to prepare a seed bed
20000	Planting full season variety early
20000	The soil drainage is excessive (inadequate water)
15000	The soil drainage is very good (get more growth)
15000	Soil has a high water supplying capacity

If multiple factors apply, use the one allowing the lowest seeding rate.

Increase the seeding rate by:	If:
50000	Planting the last half of June
35000	Plants normally are only 20” tall at harvest
25000	Planting the first half of June
25000	The soil has less than 2.0 % organic matter
25000	The soil has low fertility level
25000	Planting an early maturity variety
20000	The soil drainage is very poor
20000	Fields prone to soil crusting

If multiple factors apply, use the one allowing the highest seeding rate.