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Cooperating Departments: Agricultural Economics, Biosystems and Agricultural Engineering, Entomology, Plant and Soil Sciences, Plant Pathology
Editor: Chad Lee

In this issue

1. Are Seed Treatments Enough Control on Corn?

Ric Bessin, Extension Entomologist

Well over 90% of field corn seed may have one of several seed treatments pre-applied. The most common treatments are those that are applied at concentrations to control 'secondary' pests of corn, including wireworms, white grub, seedcorn maggot, flea beetles, and seedcorn beetle.

Personally, I don't like the term 'secondary' pest because when these pests are at high levels and occur in a field on a regular basis, they are actually primary pests.

We have two leading seed treatment active ingredients in corn, clothianidin and thiamethoxan. They are combined with fungicides and sold as Poncho and Cruiser and ordered on the seed. Both of these are in the same chemical class and have the same mode of action. Both are systemic and are rapidly absorbed by the seed as it imbibes water during germination and later through the roots. Once inside the seedling they move throughout the plant providing insect protection above and below ground. While these seed treatments are similar in many ways there are also some subtle differences that can affect performance.

The differences that I'm aware of include substantial differences in solubility in water and some difference in the spectrum of insects that they manage. Each of these come in two loading rates on the seed, a 0.25 mg active ingredient per kernel and a 1.25 mg active ingredient per kernel. The higher rate is primarily intended for the corn rootworm market, and the lower rate for secondary pests. Research at UK and other

- **If a seed insecticide treatment is used, it will be sufficient for most fields.**
- **New traits and new chemistry do not replace the need for scouting and targeting pests.**

universities has shown that these seed treatments are able to prevent stand loss and can help to maintain more uniform vigor during early growth stages in fields where secondary soil insect pests are present.

Now the question I ask is, are these seed treatments providing the level of control that we need? That is a difficult question to answer as it depends on the level of particular pests in a given field. In the vast majority of fields, the secondary pest rate is sufficient to control light to moderate levels of soil insect (excluding corn rootworm). However, there are certain fields where secondary pests are found at very high levels and the secondary rates are not providing enough control. Our research has shown that moving to higher rates of these seed treatments when there is a history of high levels of secondary pests improved control as measured by improved stands. In a few problematic fields, growers have also combined seed treatments with low rates of soil applied insecticides with some success.

These seed treatments are usually found on Bt corn, CB or RW, or on stacked hybrids. So these hybrids could have protection from corn borers (European and southwestern), corn rootworms, fall armyworm, black cutworm, and those pests listed at secondary pests.

Can we walk away from these fields and let the seed treatments and biotech traits manage all of the insect pests for us? These have been excellent tools in Kentucky, but I don't think we should forget about insect pests during the season. First, while corn prices remain strong, input prices have increased dramatically as well. It would be a huge mistake to let an insect pest get out of control. The other reason is that we can see insect pest levels on some occasions that can overwhelm control tactics. So my recommendation would be to use seed treatments and biotech traits as needed based on field history, planting dates, and other factors that may predispose fields to higher risk, but do not discontinue to regularly monitor fields for performance and insect pests. With high investments and possibly higher returns on corn, it would be too expensive to make a mistake by letting a pest problem get out of control.

The future of seed treatments looks quite promising with additional active ingredients to control other pests such as nematodes or even to relive stress and improve vigor in certain situations.

2. Seed-Treatment Fungicides in Corn

Paul Vincelli, Extension Plant Pathologist

Pythium species are fungal-like organisms commonly found in agricultural soils. They are the primary cause of seed rot and seedling damping off in corn in Kentucky, and they are typically most active in cool, wet soils.

- **Different seed fungicides target different Pythium species.**
- **For fields with a history of seedling disease, a combination of fungicides might be needed.**

The wet spring of 2008 could favor Pythium species. The increased use of conservation tillage also increases pressure from Pythium seed and seedling diseases, since residue-protected soil does not dry out as quickly as plowed soil. The importance of effective fungicidal treatment of corn seed has increased because of these two trends.

A recent study (1) by plant pathologists at The Ohio State University closely examined the Pythium organisms associated with seed and seedling problems in corn and soybean in Ohio. This article focuses on their findings for corn, which are summarized as follows:

1. The most common species isolated from diseased corn seeds and seedlings were *Pythium sylvaticum* and *Pythium dissotocum*. Less common were *Pythium torulosum*, *Pythium irregulare* and *Pythium inflatum*. One interesting find was that *Pythium ultimum*, the organism that typically has been regarded far and away as the Number 1 Pythium in corn, was infrequent in their surveys. Perhaps changes in cultural practices account for this shift; perhaps something else is at work; but either way, it is interesting how *P. ultimum* is so far down the list now.

2. Of the five most common Pythiums found in diseased corn seeds and seedlings, none were highly aggressive on corn. Two were moderately aggressive: *P. sylvaticum* and *P. irregulare*. These two species were relatively sensitive to the seed-treatment fungicides mefenoxam and captan but insensitive to the QoI fungicides azoxystrobin and trifloxystrobin.

3. *P. dissotocum, P. torulosum*, and *P. inflatum* were slightly aggressive on corn seeds and seedlings. Based on their results, less than complete control of *P. dissotocum* and *P. inflatum* would be provided by mefenoxam, trifloxystrobin, or captan. *P. torulosum* would be difficult to control completely with mefenoxam or captan.

4. *Pythium graminicola* was isolated less commonly than the five listed above, but it was aggressive on corn and insensitive to both mefenoxam and trifloxystrobin.

Significance
These results suggest that a diversity of *Pythium* organisms are responsible for seed and seedling disease in corn under current production practices. Significantly, these Pythiums are not all controlled by a single fungicide used for seed treatment. Because of this diversity, improving drainage and planting when soil temperatures exceed 50°F remain important cultural practices for minimizing seed and seedling diseases in corn. For fields and farms with a history of seed-establishment problems in cool, wet soils, consider using a mixture of seed-treatment fungicides to assure the best chance of success in stand establishment.

1. Broders, K. D., Lipps, P. E., Paul, P. A., and Dorrance, A. E. 2007. Characterization of *Pythium* spp. associated with corn and soybean seed and seedling disease in Ohio. Plant Dis. 91:727-735.

3. Preplant Applications of N, P & K

Lloyd Murdock and Greg Schwab, Extension Soil Specialists

- **More frequent soil tests are justified.**
- **Adjust your program according to these tests.**

The prices of fertilizer inputs have increased greatly the last couple of years. Fortunately, the prices of commodities have also. With both price increases, the fertilizer recommendations remain the same. However, efficiency of fertilizer use, to maintain high yields, becomes a primary objective at this point.

Below are a few basic points that might help with this.

1. **Rethink your program.** If you have not changed your fertilizer program in the last several years and are relying on post management practices, that seemed to work during previous times, now is the time to rethink what you are doing. It

could pay handsomely for you.

2. **Soil Test More Often** – Soil testing at least every second year will help you know what level of nutrients you have in the soil and better refine your fertilizer needs.

3. **Operate in the Medium Soil Test Range** for P and K (as per U.K., AGR-1 guide) – A soil test of P of 35 to 45 lbs/ac and K of 200 to 250 lbs/ac using Mehlich III extractant means you have enough of these nutrients in the soil to grow a crop this year. Maintenance rates of P_2O_5 and K_2O are all that is needed. When you are above the medium soil test range, you can stop adding fertilizer until you get down into this range. If you are below the medium soil test range, the only way to conserve of fertilizer additions is with the use of row fertilizers

4. **Row Fertilizers** – When you are in the low range of P or K soil test, the fertilizer can be banded beside the row and improve the efficiency of use. Fertilizer rates can be reduced by 1/3 to ½ of that recommended for broadcast treatments.

5. **Maintain a Proper pH** – The best pH for most crops is between 6.2 and 7. When in this range, fertilizers are used more efficiently. Phosphorus can be as much as 20-25% more available in this pH range as opposed to a pH in the 5's.

6. **Manures are an excellent source** of fertilizers and are usually much cheaper than commercial fertilizers. Good distribution and nutrient testing are the keys to the use of manures as fertilizers. They will usually build P levels and maintain K levels when used. The N availability is somewhat unpredictable but good estimates can be made for the conditions under which the manure was used.

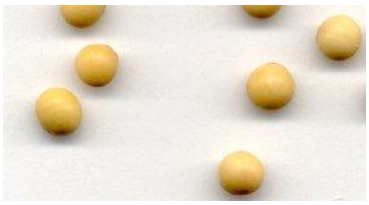
7. **K fertilizer timing** is important on crops when the vegetation is the harvested crop such as silage, hay or straw. The plant will take up more K than is needed for production if it is available for uptake. This is called luxury consumption. If vegetation is going to be removed, then K fertilizer should be applied before each crop. For example, if wheat straw is to be harvested, then K fertilizer should be applied before wheat and again before double crop soybeans. If growing alfalfa, K should be applied after the 1st harvest and again after the 3rd harvest.

8. **Nitrogen rates** for grain cannot be changed with the present economics. However, sidedressing some of the N on poorly or somewhat poorly drained soils will improve nitrogen efficiency and rates can be reduced by 35 lbs of N per acre from preplant recommendations.

4. Soybean Seed Quality

Chad Lee, Extension Agronomist

- **Soybean seed quality is poor this year.**



As many of you already know, soybean seed quality is questionable this year. Some soybean seed is being sold with standard germination below 80%. This is not an ideal situation and most companies would prefer to not sell seed with this low of a germination percentage. However, the tight supply demands that the seed be sold.

Cindy Finneseth in Regulatory Services has an excellent summary in their last newsletter: http://www.rs.uky.edu/other/newsletters/2008_1stQ.pdf

- **Adjust your drills and planters to the standard germination on the seed tag.**

The combination of poor seed quality and tight supplies means that getting the first planting of soybeans established is critical.

Jim Herbek and I have been recommending lower seeding rates. Maximum soybean yield is often accomplished with a final stand of 100,000 plants per acre in full season soybeans.

Please look at the seed tag for the standard germination and make adjustments to your seeding rates as necessary. If standard germination was 80%, then a minimal seeding rate of 125,000 seeds per acre would be needed to get a final stand of 100,000 plants per acre. If standard germination was 70%, then a seeding rate of 143,000 seeds per acre is needed.

Poor seed quality and cool wet conditions at the time of planting are a terrible mix. Under these conditions, plant stand is often reduced even with good quality seed. Planting in these conditions should be avoided, but if you must, then you may need to increase seeding rates by another 20 to 30,000 seeds per acre.

With the poor soybean seed quality, we anticipate many questions about re-planting soybeans. We have seen very little, if any yield loss at populations near 75,000 plants per acre in 15-inch rows for full season soybeans. We may be hesitant to recommend a re-plant until populations drop below 50,000 plants per acre.

In a highly scientific study (my opinion), soybeans at the unifoliate or first trifoliolate stage will look terrible at stands less than 150,000 plants per acre. So, it is very possible that you will look at a field of soybeans and be convinced that it needs replanting. Please, take a stand count to see what the numbers actually are.

See AGR-188 for guidelines on determining soybean stands.
http://www.ca.uky.edu/agc/pubs/agr/agr188/agr188.pdf

The soybean seed quality may be poor, but we still have full potential to get maximum yield.

5. Corn and Soybean Budgets, 2008

Greg Halich, Extension Ag Economist

- **Updated budgets are now available.**
- **You can adjust the budget for your own operation depending on the detail of your records.**

Updated corn and soybean budgets are now available for the 2008 planting season. One major modification from previous budgets is that the user has the option of estimating machinery related costs (fuel, labor, repairs, depreciation, and overhead) based on the publication "Custom Machinery Rates Applicable to Kentucky (2008)" (http://www.uky.edu/Ag/AgEcon/pubs/ext_aec/2008-01.pdf).

Rates for all major crop operations are calculated from published rates in five nearby states after adjusting for changes in fuel price, labor rates, and machinery costs from the time of the respective survey's. These custom rates are used in the budgets to approximate the costs of crop operations necessary for no-till corn, conventional tillage corn, and no-till soybean production.

The user can modify these machinery-related costs with options for adjusting the fuel price, labor rates (hired and operator), and grain trucking distances. The user can also adjust the final rates up or down by a specified percentage. For instance, a grain farmer in an area with relatively small fields might increase rates by 15% due to smaller equipment size and less efficient field operations. Alternatively, a very large grain farmer in western Kentucky working with more efficient equipment may decrease rates by 10% to approximate machinery-related costs.

The user also has the option of estimating these machinery-related costs using the traditional budgeting method. For operators with detailed records, this may be the best approach.

2008 Budget Example and Major Assumptions Used (per acre):

- 150 bushel corn yield and 48 bushel soybean yield.
- Elevator prices of $4.75 for corn and $11.00 for soybeans.
- $20 direct government payment.
- Custom machinery rates used to approximate all machinery-related costs including trucking. These result in a total cost (fuel, repairs, labor, depreciation, and overhead) of $89 for no-till corn, $109 for conventional-tillage corn, and $64 for no-till soybeans.
- Seed cost $54 corn and $35 soybeans.
- Herbicide cost $30 no-till corn, $22 conventional corn, $20 no-till soybeans.
- 60 lbs P and K for corn and 40 lbs P and K for soybeans at $0.70 and $0.50 per unit for P and K respectively.
- Drying costs $30 for corn (3 pts removed per bushel and $2.50/gallon LP).
- $25 crop insurance premium.
- $175 cash rent.
- 8% operating interest.

Using the assumptions in this example, net returns above variable costs and all specified costs are $204 and $159 for no-till corn, $201 and $147 for conventional tillage corn, and $187 and $151 for no-till soybeans.

These budgets can be found at
http://www.uky.edu/Ag/AgEcon/pubs/ext_other/2008CornSoybeanBudgets.xls
and should also be available at your county cooperative extension office.

6. Corn Planting Date, It may not be too Late

Chad Lee, Plant and Soil Sciences

Many farmers are very nervous about the late start they are getting with corn planting this season. The good news, which almost no one will believe, is that we still have time.

- **There is still time to plant corn and get good yields.**
- **U.K. data suggests that the ideal planting time is later than most people think.**

In fact, the rain may have pushed us into the ideal planting window. Research over a six-year period at Princeton, Kentucky suggests that the ideal planting date for corn is about the third week of April. About 30 years of research at Lexington indicates that the ideal planting date is about the first week of May. For any given year, the ideal date could be a little earlier or later, but on average over the years, these have been the best dates to plant corn.

The ideal planting date for your part of the state will be adjusted one way or the other.

For example, those in far western Kentucky have an ideal planting date that probably is closer to the second week of April.

Almost every farmer will tell us that their best fields are usually their earliest-planted fields. Early planted fields are likely fields that have good drainage, warm up a little quicker and are probably very productive at almost any planting date. There are some years when early planting may provide an advantage by avoiding a dry spell or being planted and established before a week of heavy rains.

The point is that there is still time to get very good corn yields…whether you believe it or not!!

7. Mark your Calendars

Plant and Soil Sciences Field Day, Spindletop Farm, Lexington, KY
Thursday, June 12, 2008

All Commodity Field Day, Robinson Station, Quicksand, KY
Thursday, September 25, 2008

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