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Corn & Soybean News

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Weed Control is Protecting Crop Yield Potential

Weeds are one of the most important factors that can impact crop yields and require action to effectively control each year. In times of high commodity prices and with increasing crop yield potentials it becomes even more critical to obtain maximum economic returns by protecting crop yield from potential losses caused by weeds interfering with crop production. For example, in soybean when yield loss is 5% or less and with soybean priced at $9.00 per bushel potential economic losses are estimated to be less than $30.00 per acre (Table 1). A 2 to 3 bu/A loss may not be economically feasible to protect. At $16.00 per bushel, projected economic loss would be $30.00 to $50.00 per acre. On the other hand, if weeds cause a 10% yield loss or more when soybean are at $16.00 per bushel the economic loss can exceed more than $60.00 per acre. As illustrated in Table 1 a 15% yield loss with a given yield potential of 60 bu/A could result in nearly $144.00 per acre loss.

Table 1. Estimated economic losses relative to weed control effectiveness in soybean.

Yield Potential (bu/A)	% Yield Loss	Crop Loss (bu/A)	Crop Value ($/Bu)	Economic Loss ($/A)
40	5%	2	$9.00	$18.00
40	5%	2	$16.00	$32.00
60	5%	3	$9.00	$27.00
60	5%	3	$16.00	$48.00
40	10%	4	$16.00	$64.00
60	10%	6	$16.00	$96.00
40	15%	6	$16.00	$96.00
60	15%	9	$16.00	$144.00

Similarly, in corn when yield loss is 5% or less and corn is valued at $3.00 per bushel the estimated economic loss is no more than $30.00 per acre (Table 2). However, at a 200 bu/A yield potential and $7.00 per bushel corn prices, the economic cost at 5% yield loss could be $70.00 per acre. Furthermore, when yield potential is at 200 bu/A and yield loss caused by weeds exceed 10 to 15% the economic loss could be $140.00 and $210.00 per acre, respectively, when corn prices are at $7.00 per bushel. Thus, with higher commodity prices the return on your investment for obtaining good weed control becomes more critical to protect against economic losses in soybean and corn production.

Table 2. Estimated economic losses relative to weed control effectiveness in corn.

Yield Potential (bu/A)	% Yield Loss	Crop Loss (bu/A)	Crop Value ($/Bu)	Economic Loss ($/A)
150	5%	7.5	$3.00	$22.50
150	5%	7.5	$7.00	$52.50
200	5%	10	$3.00	$30.00
200	5%	10	$7.00	$70.00
150	10%	15	$7.00	$105.00
200	10%	20	$7.00	$140.00
150	15%	22.5	$7.00	$157.50
200	15%	30	$7.00	$210.00

Developing a weed control strategy this season to protect yield may be more challenging since some of the key herbicide products needed for effective weed control are expected to be less available due to limited supply. It will require additional management skills to develop an effective plan. Below are a few key considerations as you develop your strategies.

Know Your Weeds

Be familiar with some of the key weeds that can effect soybean and corn production. For example, weeds such as giant ragweed can be very competitive at very low populations; moderate to high populations of weedy grasses can also reduce crop yield. Other weeds such as Palmer amaranth, waterhemp, and marestail are resistant to key herbicide modes of action and can affect crop yields if left uncontrolled. Some weeds such as the annual morningglories and other vines may not only impact crop yield, but also interfere with crop harvest.

Develop a Robust Plan

Most effective weed control programs in corn and soybean utilize a preemergence/postemergence [PRE/POST] combination of treatments. Preemergence treatments consist of soil residual herbicides applied at or before planting followed by targeted postemergence applications. The overall strategy is to develop a program that makes use of herbicide treatments that provide active ingredients with at least two, if not three or four, different sites of action to target key weeds, particularly difficult to control weeds such as Palmer amaranth and waterhemp. Relying on just one herbicide active ingredient (site of action) and total postemergence treatments has led to some of the herbicide-resistant weeds we now encounter. For many soil residual herbicides to be effective it is important to apply before weeds germinate from seed. Thus, most are applied at planting or before crop emergence, but in some cases additional residuals applied in combination with a postemergence treatment may be justified. To pick the best soil residual herbicide products it is helpful to know the spectrum of weeds that exist in individual fields.

Timeliness of Foliar Applications

Whether applying foliar burndown herbicides or in-season postemergence treatments, timing the application is critically important. The purpose of foliar preplant herbicide applications is to "burndown" the existing vegetation to start with a clean seedbed. Knowing that glyphosate availability is limited this season, heavier reliance on other herbicides may be needed. It may be more critical to select a combination of products to achieve a clean seedbed. On the other hand, when weedy grasses such as annual ryegrass and little barley are present, glyphosate may be a key component needed to tackle these grasses. Furthermore, for in-season postemergence applications the size of the weeds matter. Smaller, actively growing weeds are easier to control than larger more mature plants. In addition, controlling small weeds also helps protect yield rather than allowing larger weeds to rob crop yields before they are removed (Figure 1).

Basically, this season will require individuals to be more vigilant in their weed control programs to protect crop yields. Field scouting should be a key component of our weed management plans.

Figure 1. Soybean growth and development impacted by weeds.

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Understanding the Value of Animal Manure- Don't Waste a Valuable Waste

Have your manure tested to know its value. Whether you are buying, selling, or using manure generated on your farm, you need to analyze samples that represent what you will spread. This allows the manure to be applied at the appropriate rate for the field.

One way to do this is collect the sample as you are spreading, but you would want to know ahead of time if you buying or selling the manure. The sample should represent what will be applied to the field. Sampling a lagoon is more difficult than a dry manure because many of the nutrients settle out with the solids. It takes many small subsamples thoroughly mixed together to make one good sample to send off to the lab. For example, with a liquid you might want to grab 10 or 15 subsamples of about 1 pint in size and thoroughly mix them in a bucket. Dry manure should include multiple samples from different parts of the pile excluding the crust if stockpiled.

Follow this link or QR code to find useful tools provided by the University Of Kentucky Agricultural Economics Department: https://agecon.ca.uky.edu/budgets#Livestock_Forages

The University of Kentucky Agricultural Economics Department provides several useful spreadsheets (link provided). The Fertilizer Price Calculator allows you to input your price for various types of fertilizer and returns the value per unit of P_2O_5, K_2O, or N. For example, if urea costs \$900/ton, potash costs \$810/ton, and DAP costs \$860/ton then you're paying \$0.98/lb of N, \$0.55/lb of P_2O_5 , and \$0.68/lb of K_2O.

If your manure test returns 42 lb of total N, 21 lb of P_2O_5, and 33 lb of K_2O per 1000 gallons, then based on fertilizer replacement the manure is worth about \$75 per 1000 gallons. If your soil test report does not call for any phosphorus (P) or potassium (K) then that manure is only worth \$40 to you. Remember that you might lose nitrogen (N) value as ammonia gas volatilizing off the soil surface. In addition, you can lose significant amounts of N from Kentucky soils when you apply manure in the fall or winter when crops aren't present or have little need for N.

If your soil tests do not call for phosphorus or potassium, you might be able to sell your manure to a neighbor who has fields that need those nutrients. With current fertilizer prices many farmers are very interested in manure nutrients.

Determine if you need additional nitrogen fertilizer

If you have repeatedly applied manure to a field over the years, or have grown a legume recently (like alfalfa), you might **not** need additional inorganic N fertilizer. That would be a big money saver with current N prices!!

To find out if you need extra N for your corn use the Pre-sidedress Soil Nitrate Test (PSNT). Collect a representative soil sample for each field. Unlike normal soil samples, PSNT samples need to be 12 inches deep and collected when corn plants are about 12 inches tall. To get a representative sample collect 20 soil cores and mix thoroughly in a clean plastic bucket. Then grab about a pint of soil from bucket. You want to air-dry that soil before sending to the lab. Nitrogen in field moist soil will change a lot on the way to the lab. To dry the soil, do not heat the soil, just spread it in a thin layer on a paper plate in front of a fan – set on low, you don't want it all to blow away!

Many labs (including the University of Kentucky) provide PSNT analysis. You can even test the sample yourself with a high-quality testing kit (like the "Nitrachek" kit – beware most home soil test kits aren't very good). We have a lot of confidence that if your PSNT comes back higher than 25 ppm nitrate-N (NO3-N) you don't need to add additional fertilizer N. Talk to your County Agent about the PSNT if you're interested!

High fertilizer prices provide risk and opportunity

Know what you need! Soil test for phosphorus (P), potassium (K) and pH. Apply just what you need. Now is not the time to apply "maintenance" rates or "build" for the future. Stay on top of your lime program though – soil pH is the most important variable in a good crop fertility program.

Know what you are applying! Test your manure and check your spreader to know how much you are putting out. Spending $25 on a manure analysis will usually repay that investment many times over. Now is not the time to skip soil testing either, it is one of the best investments a person can make in their soil fertility program.

If you generate manure and don't need it, use this time of high fertilizer prices to generate extra income by selling manure N, P, K, and organic matter to neighbors. They might even be willing to pay you to apply the product if they don't have a manure spreader.

Additional Resources

AEN-91: Managing Liquid Dairy Manure (uky.edu)

http://www2.ca.uky.edu/agcomm/pubs/agr/agr146/agr146.pdf

http://www2.ca.uky.edu/agcomm/pubs/id/id123/id123.pdf

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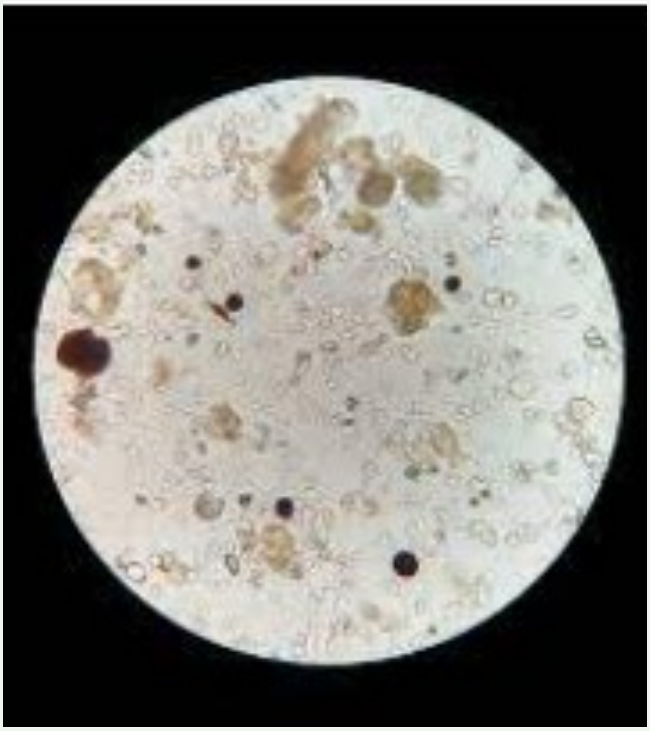
Want to Try One of the New Microbials? Thoughts and Considerations

You're going to try one of the newer microbe products. I'm going to share some considerations so that you get the most information out of your first look at the product you have chosen – I'm not going to try and talk you out of using the product. I am going to propose an on-farm comparison. And I'm going to suggest some additional considerations you might make that give a new product containing living organisms the best possible chance to be of benefit to you.



Soil microbes through the lens of a microscope.

The On-Farm Comparison

Plan your two-treatment (no product versus product) comparison well in advance. This comparison will take time out of your production schedule, so good planning reduces the hassle factor. I recommend you use the split-field approach, where you split each field for the untreated versus treated comparison rather than splitting treatments by applying them to separate whole fields. Whole fields, even those that share a fence row/field boundary, are never the same (different management histories, different proportions of the different soil types in the fields) and can badly confound interpretation of the comparison. If you can, split the field along a line that cuts across the different areas in the field and best captures all the production environments in the field.

In all other ways manage the field the same, as a whole singular unit. I don't care what the product label says, don't change the nitrogen (N) rate, the seeding rate, or the weed control protocol. Changing any other management practice confounds the interpretation of the comparison. If the label indicates that the N rate can be reduced by 40 lb N/acre when you use the product, then drop the N rate by that amount across the whole field (you'll be better able to see the benefit of the product).

When taking samples or data (soil samples, plant tissue samples, root digs, grain yield, etc.), remember that the most similar areas in your comparison lie close to each other, on either side of the dividing line. No field is exactly the same in all of both halves on each side of the split. So don't take data from the whole of each half – take samples/data close to the dividing line, along the whole length, where field/soil conditions are most similar and only your treatments should cause a difference. At harvest, take the yield on each side of the dividing line, along the whole length (actually weigh the grain if you can). A yield monitor can be used to see if there were particular areas/soils where the product did or did not work, but the return on investment to the treatment needs to account for the fact that the product was applied along the entire length of the split.

Additional General Considerations

Some products contain only one organism or one class of organisms with similar requirements. Other products contain a diverse range of organisms. Application methods and timings might differ because of this, so read the label carefully. There is often more than one way to apply these living organism formulations. Always follow label instructions, but either seed treatment or in-furrow application, if among recommended options, will likely optimize crop root - product contact.

Carriers can be dry (e.g., peat or clay) but water-based carrier recommendations are common. Many products are sold in water-based formulations which are further diluted prior to application. The liquid materials used to extend/dilute the microbe product need to be managed so as to minimize any possibility of killing the microbes. Spray water should not be salty or sulfurous. Even when well supported on the microbe product label, don't let one of these living organism materials set very long when mixed with liquid fertilizer (all are salty to some extent) or pesticides. Generally speaking, once the microbe product is mixed with an extender/diluent, it needs to be used soon (that day). Some microbes may be sensitive to certain micronutrients like boron (B), zinc (Zn) or molybdenum (Mo) that are sometimes found with in-furrow or foliar fertilizer formulations, so avoid mixtures that involve these. Always jar test any product mix/formulation that is not well supported on the microbe product label.

When spray applying one of these living microbe products, you can avoid shear forces that might kill a portion of the organisms at the nozzle screen by using lower spray pressures and larger screen sizes. Some microbe product labels recommend soil application, usually to get greater coverage of the growing root system. Time the application according to the label recommendation, especially considering that larger plants will intercept more of the product if a broadcast spray application is made. With a ground/soil applied product use plenty of water. Probably needs to be drenched/watered into, not onto, the soil surface. Sunlight, especially ultraviolet light, is often harmful to microbial organisms. Sunlight warms the surface, raising temperatures and causing water to evaporate. This dries out the surface and desiccates microbes. Ultraviolet light can kill microbes directly, effectively sterilizing the surface. With foliar applied microbe products, read the label carefully – you might be better off making the application later in the afternoon when the ultraviolet light duration between application and evening dark will be shorter. Might give added microbes more time/better conditions to establish on foliage surfaces.

We in production agriculture are going to be working with these new microbe products for the foreseeable future. To better understand their potential to improve soil productivity on our fields and farms we need to evaluate them using 'best practices' for the on-farm research and with general consideration of the needs of these living organisms.

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2022 Upcoming Events

Date	Event
May 10	Wheat Field Day
July 21 or 26	Corn, Soybean & Tobacco Field Day
July 28 (tentative)	High School Crop Scouting Competition

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