Union County ANR Newsletter
March/April 2025

Martin-Gatton College of Agriculture, Food and Environment

Union County
Cooperative Extension Service
1938 US HWY 60W
Morganfield Ky 42437
270-389-1400

What Limits Yield-The Source or the Sink? Does it Matter?

Dr. Dennis Egli, UK Extension Specialist Emeritus

Crop Physiologists often analyze the yield production process in grain crops by dividing the process into two components – the source and the sink. The source is the photosynthetic machinery that supplies the raw materials and energy for plant growth. The sink is the seed that utilizes simple sugars from the source to grow. This simple division helps us understand a very complex system and makes it easier to determine what is limiting yield. If yield is limited by the source (photosynthesis), efforts to increase yield should focus on increasing photosynthesis. If the size of the sink (number of seeds per acre) is limiting, increasing photosynthesis will do no good – the number of seeds must be increased.

Source vs sink seems like a simple system – its either one or the other. Unfortunately, it is not nearly as simple as it seems. Analysis of plant growth and yield production is rarely simple.

Generally speaking, yield is source limited. The size of the sink (seeds per acre) is determined during f lowering and seed set by the supply of simple sugars from photosynthesis (the source). Matching seed number to source activity adjusts the reproductive output of the crop to the productivity of the environment and usually prevents a sink limitation. This adjustment occurs between growth stages R1 (initial bloom) and R5 (beginning seed fill) in soybean and from roughly 10 to 15 days before to 20 days after silking in corn.

High photosynthesis during this period usually results in a large number of seeds and high yield, while low photosynthesis results in fewer seeds and lower yield. The source is in control during this period. The crop can usually tolerate some stress during vegetative growth, but stress that reduces photosynthesis during the critical period will reduce sink size (seed number) and yield.

As promised, there are exceptions to this simple source limitation. If your corn population is too low, there will not be enough flowers on the ear(s) to handle all of the simple sugars from photosynthesis and the crop will be sink limited. The source could support more seeds, but there are not enough f lowers. The number of seeds limits yield.

Soybean is not sink limited during flowering and seed set. The soybean plant is flexible, it responds to the supply of simple sugars from photosynthesis by producing branches with more nodes and more f lowers increasing sink size. Fifty percent flower and small pod abortion in high-yielding soybean crops shows that the potential sink size is much larger than the actual sink size. There is no sink limitation.

Corn is sink limited at low populations because corn lacks the flexibility to increase the number of f lowers to match the supply of simple sugars. Over the years breeders favored single-ear hybrids which reduced corn's flexibility and made it susceptible to sink limitations. Corn producers increase the number of flowers per acre to avoid sink limitations by increasing population. The plant does the adjusting for soybean producers. Corn populations increased steadily since the beginning of the high input era (~1940) to avoid sink limitations as productivity increased. Soybean populations, in comparison, stayed constant and, in recent years, declined, as the plant increased flower number to avoid a sink limitation. This difference is due to the flexibility of the plant or the lack thereof. Most corn producers prize ears that are filled to the tip at maturity.

What Limits Yield-The Source or the Sink? Does it Matter?, Continued;

Completely filled ears (there was no flower or small seed abortion) can indicate high yield or they can indicate a sink limitation (population was too low) with yield left in the field because there were not enough flowers. Unfortunately, there is no uncomplicated way to determine if well-filled ears are good news or bad news. Crops are normally source limited (assuming adequate corn populations) during the critical period for seed number determination, but what about seed filling?

Determining seed number is only the first part of the yield production process – the seeds still have to grow to their mature size. Source sink relationships during seed filling often depend upon changes in the environment. Seed number will be in balance with the capacity of the crop to fill the seeds if the environment doesn't change from the critical period for seed number determination through seed filling. A productive environment that is maintained until maturity will produce large numbers of seeds and fill them to their normal size. What if the environment changes after seed number is fixed? If the environment deteriorates (i.e., (the rains stop, for example, and source activity is reduced), there will not be enough simple sugars to fill the seeds and the seeds will be smaller and yield will be reduced. Sink size was set too large for the deteriorating source during seed filling. In other words, plants don't always get it right because they can't predict the weather.

What if the environment improves after seed number is i.e., rains come after a dry critical peri od)? Now the source is larger than the sink and the capacity of the individual seed to respond to the larger supply of simple sugars will determine what happens to yield. The crop will be sink limited if the seed cannot respond to the increase in the supply from the source. If the crop cannot convert the increase in source activity during seed filling into higher yield, yield will be sink limited. Corn seeds often fall into this category. If the seed can respond to the increase in source activity during seed filling, seeds will be larger, and yield will be increased. Soybean seeds fit into this category; improved conditions during seed filling often result in larger seeds and higher yields (i.e., the crop is source limited). The response to improved environmental conditions during seed filling is always limited by the physical characteristics of the seed and pod. All seeds have a maximum potential size – after all you can't expect to find a golf ball in a soybean pod, so there is a limit to how much yield can be recovered when the environment improves after stress reduces seed number.

But as often happens in life, there is no downside limit – there is no limit to how much stress during seed filling can reduce seed size and yield in both corn and soybean. Thinking about sources and sinks helps us better understand the yield production process. It pro vides us with insights into the response of crop productivity to the environment, the effect of population on crop yield and many other aspects of crop yield. These insights lead to more informed management decisions that ultimately improve the bottom line. "Flix qui potuit rerun cognoscere causes" (Fortunate is he who understands the cause of things) (Virgil, Italian poet, 70 – 19 BC).

March and April Garden Calendar

Kristin Hildabrand, Warren Co Horticulture Extension Agent

March

Apply pre-emergent herbicide for crabgrass control before April 7th for Western Kentucky. A good indicator plant to use for knowing when to apply this product is when the forsythia shrub is blooming.

Perform a soil test and apply lime and fertilizer recommendations based on soil test results.

Gradually harden off vegetable seedlings grown indoors two weeks before planting outdoors. Each day, increase the plant's time outside by a few additional hours and then eventually work up to 24 hours a day for a couple of days to help toughen them.

Prepare the garden soil for planting.

Move transplants of cabbage and kohlrabi to the garden on March 15th for western Kentucky and March 25th for central Kentucky.

Start seeds outdoors of beets, carrots, collards, kale, mustard, peas, spinach, early potato seed pieces, radishes, turnips, green onions, and endive on March 15th for western Kentucky and March 25th for central Kentucky.

KENTUCKY-TENNESSEE COWMANS KIND BULL SALE

Saturday, March 15, 2025
Sale starts at 12 pm

KY-TN LIVESTOCK MARKET - 9169 RUSSELLVILLE RD GUTHRIE, KY

Martin-Gatton College of Agriculture, Food and Environment

BULLS ARE:
PI NEGATIVE
GENOMIC TESTED
COST SHARE QUALIFIED

30 BULLS SELL

Upcoming Events

Estate Planning
March 12 at 5:30pm
Union Co Extension Office

Downtown Morganfield Farmer's Market Meeting
March 19 at 5:30pm
Union Co Extension Office
New and Returning Vendors should attend

27th Annual Spring Prayer Gathering for Farmers
April 1, 2025 at 7AM-7:30AM
Union Co Extension Office

Upcoming Events

2025 CPH60 Sale Dates
Apr 24, Aug 14, Dec 4

UKY Wheat Field
May 13,2025
More information to Come

Union County Fair
June 23-28, 2025
Follow their Facebook Page
Union County KY Fair

Union Co Hay Show
June 23, 2025
9AM-11AM Union Co Fairgrounds
More Information to Come

Upcoming Events

Pest Management Field Day
June 26,2025
More information to Come

Union Co Rinse and Return
July 14, 2025
9am-11am Union Co Road Dept

Corn, Soybean & Tobacco Field Day
July 22, 2025
More information to come

March and April Garden Calendar, Continued;

March

Begin trays of tomatoes, eggplant, and peppers indoors on March 15th for Western Kentucky and March 25th for Central Kentucky.

Plant cool-season herbs like dill and parsley. Plant asparagus and rhubarb crowns in the home vegetable garden. Fertilize established plants with 1 lb. 5-10-10 per 100 sq. ft. Dig and divide any 4-year-old rhubarb plants.

Plant cool-season flowers such as pansies, ornamental cabbage, and kale to add spring color to the garden and landscape. These flowers work great in containers, too!

Get the lawn mower ready for the season by sharpening mower blades and performing other needed mower maintenance.

Prune fruit trees in the orchard or backyard to help increase sunlight and airflow potential. Remove clippings from the area and discard them properly.

Incorporate organic matter like compost into garden soil to improve soil structure.

Prune back roses in the garden or landscape.

Repot houseplants if you notice decreased plant growth and the roots running out of the container's drainage holes.

Monitor young fruit and landscape trees for vole damage.

Remove dried plant material from perennial flowers and cut back grasses to stimulate new growth.

April

April is National Garden Month, so celebrate with fun activities for the family! Some ideas may include creating a DIY newspaper pots, making a living Easter basket filled with seasonal flowers, starting seeds on DIY seed tape, or designing and planting a spring salad bowl garden.

Plant trees in the landscape for Arbor Day. For Kentucky this date is the first Friday in April.

If you live in an apartment, garden in containers. Plants ideal for container production are labeled as dwarf, compact or miniature varieties.

Build raised bed gardens if you have poor soil or limited space in the backyard. Raised bed gardens provide better soil, improved soil drainage and often less weed pressure.

Incorporate edible plants such as fruits, flowers, herbs and vegetables into the landscape.

Avoid working wet soil since this practice can damage soil structure and promote soil clodding.

Use the rototiller only when incorporating garden soil amendments like lime, fertilizer and organic material. Decreased amounts of rototilling helps soil microbes.

Plant a succession of spinach, peas, lettuce, cabbage, potatoes and kale every 2 weeks to have a continuous supply of vegetables.

Plant other cool season vegetable transplants like broccoli, cauliflower, collards, lettuce, Chinese cabbage, and Swiss chard outdoors in the spring garden on April 1 for western Kentucky.

Set up supports for peonies, delphiniums and other tall plants

Divide fall blooming perennial flowers in spring when new growth is emerging.

Prune spring flowering trees and shrubs immediately after flowering.

Begin trays of muskmelon, watermelon and squash seeds indoors on April 5th for western Kentucky.

Start seeds outdoors for sweet corn, beets, carrots, mustard, spinach, radishes and lettuce on April 5th for western Kentucky

Be on the lookout for spring garden pests such as cabbageworm, cabbage maggot, squash vine borer, cucumber beetle, seed corn maggot, cutworm, flea beetle and Colorado potato beetle. Contact the local Extension Office for current insect control recommendations in the home garden.

Avoid applying weed and feed products in the home lawn. Even though it seems convenient, fertilizer is not recommended for spring. It is only recommended for fall application.

Celebrate Earth Day on April 22nd by taking a nature walk, recycling items around the home or making a nature craft.

Italian Ryegrass Control Field Tour

Thursday, March 27, 2025
9 a.m. to 11:30 a.m. CDT

Please meet at the Caldwell County Extension Office
1025 U.S. Highway 62 West, Princeton, KY
Sign-in begins at 8:30 a.m. CDT

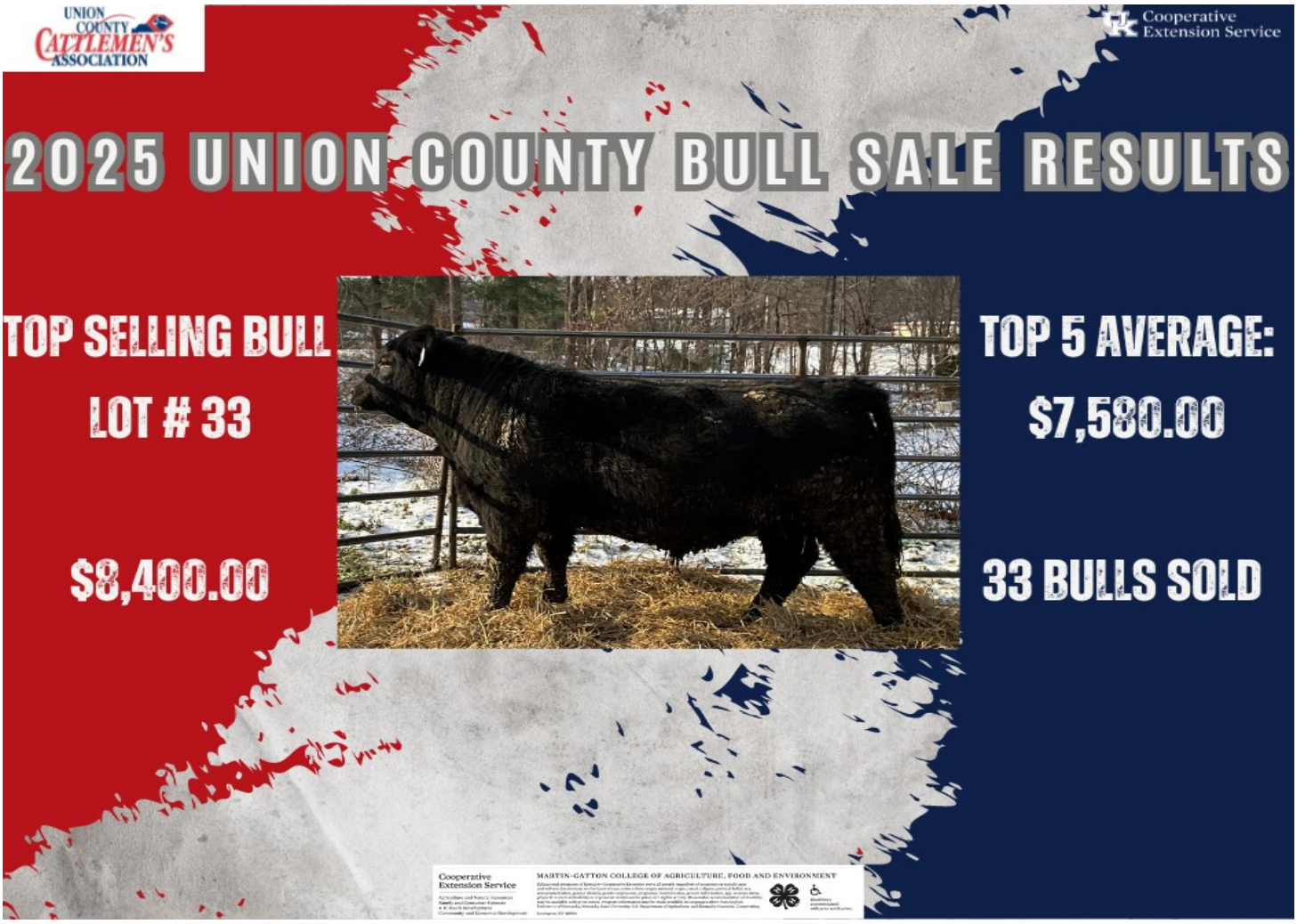
A caravan will proceed to the UKREC in Princeton for plot tours of Italian ryegrass research.

Click link or scan QR Code to register
https://uky.az1.qualtrics.com/jfe/form/SV_2c6KX2NmiqEp1TE

Presented by Dr. Travis Legleiter, UK Extension Associate Professor - Weed Science, this field tour will highlight the options available to Kentucky farmers for maximum control of this problematic weed in the fall and spring prior to corn and soybean planting. For more information about the field tour call (859) 562-2569.

Educational credits available:

CCA: 3 CEUs in IPM;
KY Applicator Credits: 3 CEUs for Category 1A (Ag Plant)



Women In Agriculture

Check out the Union County KY Agriculture Extension Facebook page throughout the month of March to see the Union County Women in Agriculture series. This series will be highlighting women that work in row crops, livestock, horticulture and everything in between.

In 2022, the United States had 1.2 million female producers, accounting for 36% of the country's 3.4 million producers. Female producers were slightly younger, more likely to be a beginning farmer, and more likely to live on the farm they operate than male producers. More than half of all farms (58%) had a female producer. Farms with one or more female producers accounted for 41% of U.S. agriculture sales and 46% of U.S. farmland. National women in ag day is March 21.

The state of Kentucky has 41,882 female producers.

Union County has 138 female producers.

Source: https://www.nass.usda.gov/Publications/AgCensus/2022/index.php

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Agriculture and Natural Resources
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MARTIN-GATTON COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Educational programs of Kentucky Cooperative Extension serve all people regardless of economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, physical or mental disability or reprisal or retaliation for prior civil right activity. Reasonable accommodation of disability may be available with prior notice. Program information may be made available in languages other than English. University of Kentucky, Kentucky State University, U.S. Department of Agriculture, and Kentucky Counties, Cooperating.

Lexington, KY 40506

Disabilities accommodated with prior notification.

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Lexington, KY 40506

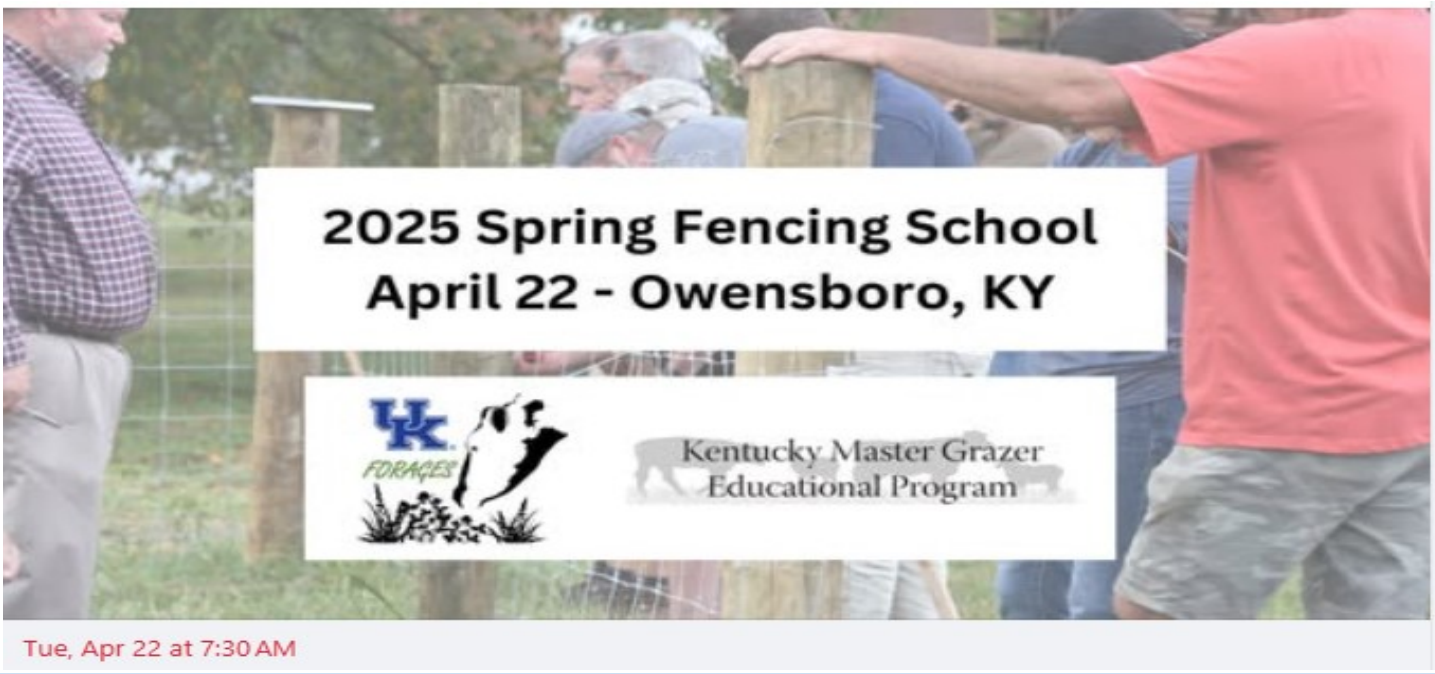
Disabilities accommodated with prior notification.

2025 Spring Fencing School– Owensboro

Join us for our Spring 2025 fencing school, where we will discuss KY fencing laws, fence construction & cost, and build woven and high tensile wire fences. April 22, 2025 from 7:30am-4:30PM 815 Pell St, Lewisport, KY 42351

Cost is $35

https://www.eventbrite.com/e/2025-spring-fencing-school-in-owensboro-tickets-1235042698959?aff=oddtdtcreator&fbclid=IwY2xjawIh4A5leHRuA2FlbQIxMAABHdeFo8IDoc6h7aDbfo6K8iiEZAs1LozDm89wpYKC5pRSrWsu0j5h4uWydg_aem_K8gFCo8diUs4HIoisDA6vA



Broad Leaf Weeds of Kentucky (AGR-207)

J.D. Green, UKY Plant and Soil Sciences


Spiny Amaranth


Buttercup


Cocklebur


Horsenettle


Tall Ironweed


Hemp Dogbane


Poison Hemlock


Marshelder


Common Milkweed


Jimsonweed


Sericea Lespedeza


Maypop Passionflower

Cooperative Extension Service

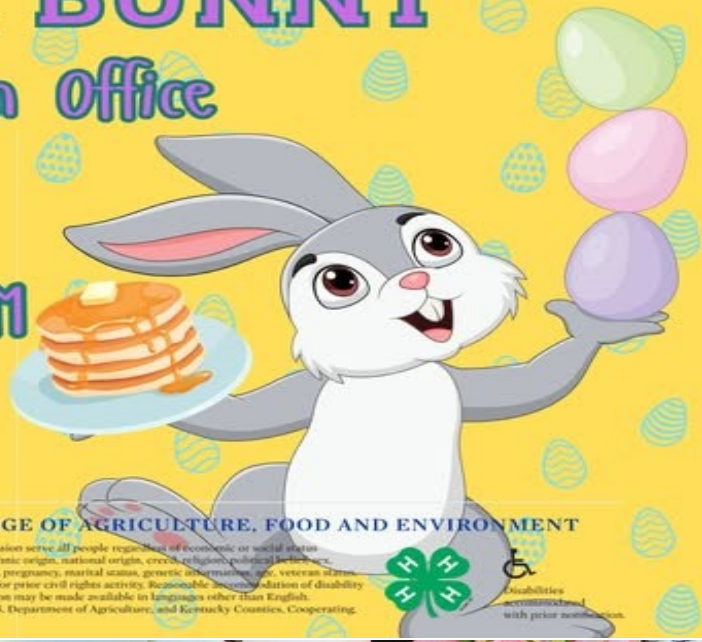
PANCAKES WITH THE EASTER BUNNY

Union County Extension Office

March 29th, 2025

8:00 AM to 10:00 AM

Cost: $5/Person



Cooperative Extension Service

Succulent Workshop

Come learn about succulents and create your own succulent pot

April 8, 2025 at 1:00pm

Union Co Extension Office

(1938 US HWY 60 W, Morganfield, KY)

Cost is $10 due by March 25, 2025
to the Union Co Extension Office

For more information contact
Katie Hughes, ANR Agent
270-389-1400

Broadleaf Weeds of Kentucky Pastures AGR-207, Continued;


Buckhorn Plantain


Perilla Mint


Multiflora Rose


Trumpetcreeper


Canada Thistle


Common Ragweed


Lanceleaf Ragweed


Wild Carrot


Bull Thistle


Musk Thistle


Curly Dock


Chicory

Response of Pasture Weeds to Herbicides and Mowing

Weed Species	Life Cycle[1]	Preferred Time for Herbicide Treatment[2]	2,4-D (various products)	dicamba (Clarity, etc.)	dicamba+ 2,4-D (Weedmaster etc.)	Crossbow	PastureGard	DuraCor	GrazonNext	Chaparral[3]	metsulfuron[3] (MSM60, Patriot, etc.)	Sharpen	MOWING[4]
Amaranth, Spiny (Pigweed)	A	May-July	F/G	F/G	G	G	F/G	G	G	G	G	-	X
Aster spp. (White Heath Aster)	A	July-Sept	F/G	G	G	G	-	-	-	-	F	P	R
Burdock, Common	B	Feb-Mar	G	F	G	G	G	G	G	G	F	P	R
Buttercup spp.	A	Feb-Mar	G	F/G	G	G	F	G	G	G	G	P/F	X
Carrot, Wild (Queen Anne's Lace)	B	May-June	F/G	F/G	F/G	F/G	F	G	G	G	G	P	R
Chickweed, Common	A	Nov or Feb-Mar	P	F/G	G	F	G	G	G	G	G	P/F	X
Chicory	P	Feb-Mar or Aug-Nov	F/G	F/G	G	G	G	G	G	G	F/G	P	R
Clover, White	P	May-Aug	F	G	G	G	G	G	G	G	G	P	X
Cocklebur, Common	A	May-July	G	G	G	G	G	G	G	G	G	G	R
Dandelion	P	Oct-Nov or Mar-Apr	G	G	G	G	F/G	G	G	G	G	P	X
Deadnettle, Purple	A	Feb-Mar	P	F/G	G	F	G	G	G	G	G	-	X
Dock, Curly or Broadleaf	P	Feb-Apr	P/F	F	F/G	G	F/G	G	G	G	G	P	X
Dogbane, Hemp	P	May-Aug	P/F	F	F	G	G	P/F	P/F	P/F	P	P	S
Garlic, Wild	P	Nov or Mar-Apr	F	F	F	F	P	F	F	F/G	G	P	X
Goldenrod spp.	P	June-Aug	F	F/G	F/G	G	F	F	F/G	F/G	P	P	S
Hemlock, Poison	B	Nov or Mar-Apr	F/G	F/G	F/G	F/G	P	F/G	F/G	-	F	P	R
Henbit	A	Feb-Mar	P	F/G	G	F	F/G	G	G	G	G	-	X
Horsenettle	P	July-Aug	P	P/F	F	F	P/F	G	G	F/G	F	P	X
Ironweed, Tall	P	June-Aug	P	F	F	G	G	G	G	G	P	P	S
Jimsonweed	A	May-July	F	G	G	G	-	G	G	G	-	-	R
Lespedeza, Sericea	P	June-July	P	P/F	P/F	G	G	P/F	P/F	F/G	F/G	P	X
Marshelder (Sumpweed)	A	May-July	F/G	F/G	G	G	F	G	G	G	F	-	R
Milkweed, Common	P	July-Sept	P	F	P/F	F	P/F	P/F	P/F	P/F	P	P	S
Mint, Perilla	A	May-July	F	F	F/G	G	F/G	G	G	G	-	-	S
Multiflora Rose	P	Apr-June or Sept	P	P	F	G	G	F	F	F/G	G	P	X
Passionflower, Maypop	P	May-July	P	P	P	P/F	F	P	P	P	-	P	X
Plantain, Broadleaf or Buckhorn	P	Oct-Nov or Mar-Apr	F/G	F	F/G	G	F	G	F/G	F/G	F/G	P	X

Broadleaf Weeds of Kentucky Pastures AGR-207, Continued;

Weed Species	Life Cycle[1]	Preferred Time for Herbicide Treatment[2]	2,4-D (various products)	dicamba (Clarity, etc.)	dicamba+ 2,4-D (Weedmaster etc.)	Crossbow	PastureGard	DuraCor	GrazonNext	Chaparral[3]	metsulfuron[3] (MSM60, Patriot, etc.)	Sharpen	MOWING[4]
Pokeweed, Common	P	May-July	F	F/G	F/G	F/G	P	F/G	F/G	F	P	P	S
Ragweed,Common	A	May-July	F/G	G	G	G	G	G	G	G	P	G	R
Ragweed, Lanceleaf	A	May-July	F/G	G	G	G	-	G	G	-	P	-	R
Sida, Arrowleaf	A	May-July	P	P	P	-	-	F	F	F	-	-	R
Sneezeweed, Bitter	A	May-July	F/G	F/G	G	G	G	G	G	G	-	-	R
Sorrel, Red (Sheep Sorrel)	P	Sept-Nov or Mar	P	F	F/G	F/G	F	-	-	F/G	F/G	P	X
Spurge, Nodding	A	June-July	P	P	P	P/F	-	P/F	P/F	G	G	-	R
Thistle, Bull	B	Oct-Nov or Feb-Mar	G	G	G	G	F/G	G	G	G	F/G	P	R
Thistle, Canada	P	Prebud or Oct-Nov	P	P/F	F	F	P/F	G	G	G	F	p	S
Thistle, Musk	B	Oct-Nov or Feb-Mar	G	G	G	G	F/G	G	G	G	F/G	P	R
Thistle, Plumeless	B	Oct-Nov or Feb-Mar	G	G	G	G	F/G	G	G	G	F/G	P	R
Tickclover (Desmodium spp.)	P	June-Aug	P	-	F	F/G	F/G	F/G	F/G	-	-	P	R
Trumpetcreeper	P	Aug-Sept	P	P	P/F	F	F	P	P	-	P	P	X

Control: **G** = Good or Excellent; **F** = Fair (suppression or partial control); **P** = Poor; **–** = No Information

[1] Life Cycle: **A** = Annuals; **P** = Perennials; **B** = Biennials

[2] The preferred time for herbicide treatment will depend on environmental conditions and other factors.

[3] May cause temporary yellowing, stunting and seedhead suppression of tall fescue (consult label). Metsulfuron is an active ingredient in several products (e.g. Chaparral, MSM60, Patriot, Purestand).

[4] Mowing: **R** = Timely mowing reduces top growth and seed production; **S** = Suppression of top growth; **X** = Not very effective

Note: This table should be used only as a guide for comparing the relative effectiveness of herbicides to a particular weed. The herbicide may perform better or worse than indicated in the table depending on the species, weed size, time of application, and/or extreme weather conditions. Consult herbicide label for weed height or growth stage and product amount. Read and follow all label directions and precautions before herbicide application.

Adapted from *Weed Management in Grass Pastures, Hayfields, and Other Farmstead Sites* (AGR-172; revised 3-2021). Available at http://ww2.ca.uky.edu/agcomm/pubs/agr/agr172/agr172.pdf.

Listing of pesticide products implies no endorsement by the University of Kentucky or its representatives. Criticism of products not listed is neither implied nor intended.

2025 Corn Fungicide Efficacy Table has been updated

UK's corn fungicide efficacy table has been updated. In a year of tight margins, this guide will help you make the most effective and economic choices for your corn crop.

https://cropprotectionnetwork.org/publications/fungicide-efficacy-for-control-of-corn-diseases

Cooperative Extension Service

KENTUCKY DERBY FLOWER WORKSHOP

April 28, 2025 at 5:30pm
Union County Extension Office
1938 US HWY 60W, Morganfield, KY
Cost $15.00

Come have fun planting a flower container.
All materials needed will be supplied.
Since it's Kentucky Derby Week you can wear your derby hat!

Payment due by April 21, 2025 to the Union County Extension Office
For more information contact:
Katie Hughes, Union Co ANR Agent
270-389-1400

Cooperative Extension Service

MOTHER'S DAY SUNDAE FLOWER ARRANGEMENT WORKSHOP

MAY 5, 2025
5:30PM
UNION COUNTY EXTENSION OFFICE
1938 US HWY 60W MORGANFIELD KY
COST $10.00

HAVE FUN WITH YOUR LITTLE AND CREATE A SUNDAE FRESH FLOWER ARRANGEMENT!
THIS CLASS WILL BE FOR ADULT/KID AND YOU CAN TAKE THE ARRANGEMENT AFTER THE CLASS.

PAYMENT DUE APRIL 28, 2025 TO THE UNION CO EXTENSION OFFICE
FOR MORE INFORMATION CONTACT:
KATIE HUGHES, UNION CO ANR AGENT
270-389-1400

Cooperative Extension Service
MARTIN-GATTON COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Grain Profitability Outlook 2025

Dr. Greg Halich, UK Ag Eco Associate Extension Specialist

Grain prices have continued dropping this last year, and this follows a more dramatic drop from the previous year. Current prices for 2025 new-crop delivery are around $4.35/bu for corn, $10.35/bu for soybeans (2/20/25). This is a decrease of around $.10/bu for corn and $1.00/bu for soybeans compared to what these prices were two years ago (see Figure 1). It is a total decrease of around $.80/bu for corn and $2.50/bu for soybeans compared to what these prices were two years ago.

Figure 1. November 2025 Soybean Futures (2/20/2025)

Fertilizer prices came down steadily the previous two years but have remained largely unchanged in the last year. Fuel prices dropped about $.35/gallon and are currently around $2.90/gallon. But overall, there are not a lot of input price decreases to counteract commodity price drops. This article will evaluate the overall effect of all the combined changes, and estimates the expected profitability for the 2025 crop.

Costs for an efficient western Kentucky grain farm are estimated in Table 1 on soil that averages 175 bushels corn and 56 bushels soybeans per acre. Machinery and labor costs include depreciation and overhead costs, as well as an opportunity cost for operator labor. Fuel costs are based on $2.90/gallon on-farm diesel and 40 mile one-way trucking to the elevator. Fertilizer prices are assumed $.46/unit for N, $.61/unit for P, and $.38/unit for K.

Corn and soybean prices used in this analysis are based on forward contracting prices as of 2/20/25 for an average of fall and winter delivery: $10.50/bu for soybeans and $4.50/bu for corn. Table 2 shows the expected gross return (does not include land rent) given the costs in Table 1 and expected commodity prices and yields.

The expected gross profit for this productivity soil is $117/acre for corn and $180/acre for soybeans. Assuming a 50-50 rotation the average gross return would be $148/acre. Net return would be calculated by subtracting out the land rent. In western Kentucky, much of the ground with this type of productivity is being rented for $175-225/acre. *As an example, if we use a $200 land rent, the net return (return to management and risk) for a 50-50 rotation would be a –$52/acre.*

Table 1. Project Costs (per acre) Western Kentucky 2025

Inputs	Corn (175 bu)	Soybeans (56 bu)
Seed	$110	$65
Nitrogen	$87	$0
P, K, and Lime	$76	$57
Pesticides	$85	$70
Total Inputs	$358	$192
Machinery and Labor	$192	$143
Other:		
Drying/Storage	$40	$7
Crop Insurance	$25	$20
Misc.	$30	$30
Land Rent	Variable	Variable
Operating Interest	$25	$15
Total Other	$121	$72
Total Costs	$671	$408

Table 2. Summary Gross Return West Kentucky 2025 (per acre)

Yield and Price	Corn	Soybeans
Expected Yield (rotation)	175	56
Expected Price	$4.50	$10.50
Grain Revenue	$788	$588
Government Payments	$0	$0
Crop Insurance Payments	$0	$0
Total Revenue	$788	$588
Total Costs (Less Land Rent)	$671	$408
Gross Return (Less Land Rent)	$117	$180

*Note: Does not include land rent. Subtract land rent to get net revenue.

Grain Profitability Outlook 2025, Continued;

Table 3 shows a summary of the estimated gross returns for various soil productivities. Think of these yields as the long-run expected yields for a particular farm, not year-to-year variability. Costs are adjusted to account for different expected yields. The biggest change in costs is for trucking which adjusts on a 1-1 basis, but other costs such as fertilizer are adjusted at a lower rate. Looking at Table 3, it is easy to see how quickly gross profitability changes with expected yield.

Table 3. West Kentucky Gross Returns 2025 (per acre) Base Cost Scenario
$10.50/bu Soybeans, $4.50/bu Corn, $.46-N, $.61-P, $38-K

Corn Yield (bu)	Soybean Yield (bu)	Gross Return Corn	Gross Return Soybeans	Gross Return Rotation
150	49	$29	$115	$72
175	56	$117	$180	$148
200	62	$204	$236	$220
225	68	$292	$292	$292

Note: Subtract land rent to get Net Return.

Note: Central Kentucky has a higher cost structure due to their use of urea as the primary nitrogen source and longer trucking distances to key markets on average. Thus gross returns in this region are likely to be $10-50 per acre lower than those show in Table 3.

The base scenario assumed equipment costs have been kept under control resulting in a depreciation/overhead cost of $75/acre for corn and $65/acre for soybeans. It also assumed a moderate use of fertilizer and other inputs. There are many grain farms that will have a higher structure for one or both costs. Table 4 shows the gross returns adjusted for a $50/acre increased cost structure. Note that even at higher productivity levels, profitability will be challenging here with this cost structure.

Table 4. West Kentucky Gross Returns 2025 (per acre) $50 Increased Cost Scenario
$10.50/bu Soybeans, $4.50/bu Corn, $.46-N, $.61-P, $38-K

Corn Yield (bu)	Soybean Yield (bu)	Gross Return Corn	Gross Return Soybeans	Gross Return Rotation
150	49	-$21	$65	$22
175	56	$67	$130	$98
200	62	$154	$186	$170
225	68	$242	$242	$242

Note: Subtract land rent to get Net Return.

American Relief Act of 2025 may provide some cushion here. Technically, it will be for the 2024 crop but payments but payments will be in 2025. Current estimates per planted acre (not base-acres) will be $43 for corn, $30 for soybeans, and $31 for wheat. The ARC program should provide good downside protection this year based on revenue in the counties I have looked at. You can estimate the protection the ARC or PLC programs will provide by using the tool detailed in the *ARC-PLC Decision Tool Instructions and Example* article.

Don't believe my numbers? I appreciate skepticism. Here is a link to corn-soybean budgets so that you can come up with your own estimates: https://agecon.ca.uky.edu/extension/publications-budgets-decision-aids

ARC vs PLC Decision for 2025

Dr. Grant Gardner and Dr. Will Snell, UKY Ag Eco Extension Specialists

Slumping row crop prices have induced greater attention among grain farmers regarding farm bill safety net programs. Congress will be considering a new farm bill once again in 2025, following extensions in 2023 and 2024 of the 2018 farm bill. Eligibility and funding levels for nutrition programs relative to farm program support will steer much of the debate. Within, the farm programs, discussion will evolve around the level of reference (support) prices, base acres, and other payment parameters which ultimately will determine safety net program provisions for crops beyond the 2025 crop year. The farm bill extension passed last December continues the basic structure of the safety net programs established in the 2014 and 2018 farm bills for eligible crops for the upcoming crop year.

The current farm bill provides two programs to provide income support for specified row crops -- the Agricultural Risk Coverage (ARC) and the Price Loss Coverage (PLC) programs. The ARC program provides payments when actual crop revenues fall below a specified guaranteed level, while the PLC program provides payments when the national average market price (or the national average loan rate if higher) for a given covered commodity falls below a specified effective reference price for that commodity. Producers will be required to make an election of ARC vs PLC for 2025 farm bill crops (primarily corn, soybeans, and wheat in Kentucky) at their local Farm Service Agency (FSA) office or they can apply online by the April 15, 2025 deadline. If producers do not submit their election by April 15th, their 2024 election remains in effect. For specific enrollment details on these programs for 2025, click here.

This purpose of this article is to provide some insights and tools that producers can utilize in making their ARC versus PLC decision for their 2025 crops. Several Universities including Kansas State, the University of Illinois, and Texas A&M offer decision tools to aid in the ARC/PLC discussion and are linked at the end of this article. Each tool offers a different user-interface and its own advantages and disadvantages; however, each one can aid in the decision-making process.

In recent history, Kentucky producers have likely chosen Agricultural Risk Coverage at the County level (ARC-CO) for corn and soybeans. The added protection for low yields in combination with higher commodity prices made PLC unlikely to trigger, and thus, ARC-CO provided the most protection. The current decision for the 2025/2026 marketing year still points to ARC-CO being the best for beans; however, the lower price environment creates trade-offs for corn and wheat.

In general, ARC still offers the most protection to deep losses due to its protection over falling yields as well as price; however, PLC may cover more shallow losses due to price loss alone. To put this simply, PLC could result in higher payments should county yields be average or above and prices drop where ARC will offer higher payments if county yields fall below average. The April 15th decision date throws another wrench as we have more time (compared to our usual March 15th deadline) to collect information and estimate the season average price. We will know more about potential season average prices, particularly for corn after the release of the Prospective Planting report on March 31st as well as the potential impacts of tariffs. In general, current results point to ARC-CO enrollment which offers more protection over yield losses; however, if prices drop drastically between now and April 15th it may be beneficial to change to PLC enrollment option near the deadline.

Our colleague, Greg Halich provides a specific example utilizing the University of Illinois tool in his article *ARC-PLC Decision Tool Instructions and Example*. You can develop your own farm program payment scenarios by clicking on the Decision Tools Links below:

Kansas State

University of Illinois

Texas A&M

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UNION COUNTY EXTENSION OFFICE

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1

2


3


4

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- All supplies (boards, brushes, paint, etc.)
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- Paint colors can be decided day of event
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MARTIN-GATTON COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Lexington, KY 40506

2024 Union County Yield Contest Results

Conventional Wheat

Farm/Producer	Variety	Yield, bu/a
Camron, Clay and Mark Wells	AgriMaxx 525	98.97

No-Tillage Wheat

Farm/Producer	Variety	Yield, bu/a
Genesis Grain Farms	AgriMaxx 525	122.76
Jonathan Hagan	Revere Reagan	89.77

Full Season Soybean

Farm/Producer	Variety	Yield, bu/a
Greenwell Acres	Channel 3823-RXF	122.20
Wells Bros Farms	Asgrow AG33XF3	102.18
Wells Bros Farms	Asgrow AG33XF3	97.13

Double Crop Soybean

Farm/Producer	Variety	Yield, bu/a
Wells Bros Farms	Asgrow AG44XF4	77.52
Hendrickson Farms	Pioneer	75.41
Hendrickson Farms	Pioneer	72.44
Hendrickson Farms	Pioneer	61.73

Yellow Corn

Farm/Producer	Variety	Yield, bu/a
Greenwell Acres	Channel 215-70TRERIB	305.94
White Farms	Channel 214-78DGVT2P	298.87
Bickett Farms	Dekalb DKC114-99RIB	297.74
Jonathan Hagan	Dekalb DKC65-95RIB	293.96
Hendrickson Farms	Channel 214-78DGVT2P	291.91
Hendrickson Farms	Channel 214-78DGVT2P	284.74

***Yellow Boxes State/Area Winner**

*** Blue Boxes State Record/Winner**

Pictures are from Grain Day Awards 1-21-25

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