

Extension Agronomy

eUpdate

08/25/2017

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Steve Watson -- The Fourth Musketeer or the Fifth Beatle?

(Editor's note: Steve Watson, Agronomy eUpdate editor, will be retiring on Sept. 1. A retirement reception will be held for Steve on Thursday, Aug. 31 at 10 a.m. in Throckmorton 2002. Until then, his email address remains <u>swatson@ksu.edu</u>. The new eUpdate editor is Kathy Gehl, <u>kgehl@ksu.edu</u>)



Steve Watson

More than 650 eUpdate issues ago Dan Devlin (former Environmental Quality Specialist), Steve Watson, and I discussed the idea of an electronic newsletter for extension personnel, producers, and industry people across the state. There had been intermittent newsletters and quarterly newsletters from the Agronomy Department, but there had not been a consistent departmental newsletter in more than 50 years. We also had Agronomy Research Briefs, which were one-page summaries of applied research. These were sent to county agricultural extension agents to be used in their county newsletters. They also were inconsistent, but they served as the germ for an electronic newsletter -- the Agronomy eUpdate.

Steve Watson has been the editor-in-chief and driving force behind the eUpdates since its inception. Steve, a Kansas boy, had a good knowledge and understanding of our agricultural systems, plus he had publishing and journalistic experience from previous agricultural jobs -- one included being managing editor of Kansas Farmer magazine. We needed someone who could shepherd the various authors through completion of their articles or write the articles for the authors after interviewing them. Each week the eUpdate had to contain articles that were not only pertinent and timely, but also anticipated what readers would be needing soon. (No alternative facts or fake news here!) Steve was the one to carry the load each and every week.

I don't recall Steve ever making presentations to farmers at meetings or doing many of the things extension specialists do. But that didn't make him any less important to Extension Agronomy's mission. In fact, his presence and activities have been vital. Thus, that would make him our D'Artagnan, the Fourth Musketeer; or Brian Epstein or Billy Preston, the Fifth Beatle -- a key member of the team.

Here we are 12 years after our first discussion about creating this newsletter; the eUpdates are better than ever and Steve has decided to hang up his cleats. So, I want to say thank you to Steve for all he has done for the department and Kansas producers. Good luck and enjoy your retirement.

Jim Shroyer, Former Extension Wheat Specialist & Ext Agronomy Program Leader, Professor Emeritus jshroyer@ksu.edu

2. Winter canola planting considerations

Winter canola cultivars exist today that make production possible across much of Kansas. When a winter hardy cultivar is planted at the optimum time, canola can survive the extremes of Kansas climate.



The winter canola planting window arrives for Kansas by late August or the first week of September. Now is the time to make decisions to ensure a successful start to the 2017-2018 growing season. Here are some key points to consider as you decide whether winter canola can be a profitable crop for your farm.

Where will winter canola grow in Kansas?

• The most common production areas are central and south central Kansas under dryland conditions, and southwest Kansas under irrigated conditions. In recent years, canola production has expanded north of the I-70 corridor, into north central and northwest Kansas, and into southeast Kansas.

Is insurance available and what are the plant-by dates?

- Insurance is available for canola in all counties adjacent to and south of I-70.
- Yield and revenue protection are available in the following counties: Barber, Gray (irrigated only), Harper, Kingman, and Sumner.
- Coverage in other counties is available by individual written agreement (yield protection

only) if certain criteria are met, including records for at least the three most recent years of production history for canola or a similar crop.

- August 31 is the sales closing date for canola crop insurance.
- To qualify for full benefits of the coverage, including replant payment if necessary, canola needs to be planted between August 25 and September 25 in southwest Kansas; between September 10 and October 10 in Barber, Harper, and Sumner counties; and between September 1 and September 30 in Kingman County and all other eligible counties.
- We have been working with the Risk Management Agency to expand written agreement coverage north of I-70. Special considerations may be made if you contact your insurance agent and a winter canola specialist.

Variety Selection

- Variety selection should be based on the following traits: winter hardiness, yield, oil content, disease resistance, maturity, lodging susceptibility, and shatter tolerance.
- Producers have the option of selecting either open pollinated varieties or hybrids.
- The majority of the varieties grown in the southern Great Plains are open pollinated. These varieties have been consistent for winter survival and yield.
- More hybrids are being grown each year. Hybrids tend to have larger seed size, vigorous fall growth, and high yield potential under optimum growing conditions.
- Herbicide resistance options include Roundup Ready and Clearfield.
- Varieties with tolerance to carryover of sulfonylurea (SU) herbicides applied to a previous crop (e.g. Finesse, Glean, Maverick) can be planted in the fall to avoid the long plant-back restrictions these herbicides have for canola.
- Consider selecting two or more varieties with differing relative maturities to spread out harvest and reduce risk.

Site Selection

- Although canola grows over a wide range of soil textures, well-drained, medium-textured soils are best. Soils where water stands for several days or those prone to waterlogging are poor choices.
- The soil pH should be between 5.5 and 7.0. Soil pH correction with lime could be a potential solution for growing canola in soil with low pH (less than 5.5).
- Be mindful when planting canola following crops like sunflower, soybean, alfalfa, or cotton. These crops share similar diseases with canola. Planting canola continuously is not recommended and it is not insurable. Plant canola after grass crops such as wheat or corn because these crops do not share diseases with canola.
- Canola will perform best when adequate time is allowed after the preceding crop to allow for soil moisture recharge and weed control, and where there is adequate time to get the canola planted early enough to help the plants survive over winter.
- Fields with heavy winter broadleaf weed pressure should be avoided if possible. If planting where heavy broadleaf weed pressure exists, consider planting a Roundup Ready cultivar.
- Make sure you are aware of the herbicide history of potential sites. Winter canola cultivars are sensitive to SU and triazine herbicide carryover, and these products have long plant back restrictions (often 18 months or greater).

Seedbed Preparation

- Weeds must be controlled chemically, mechanically, or with a combination of both methods prior to planting because canola seedlings are not competitive with weeds.
- Open-pollinated varieties typically range from 100,000 to 125,000 seeds per pound and hybrids range from 70,000 to 100,000 seeds per pound. Because of its small seed size, a properly prepared seedbed is critical for successful canola establishment.
- A level, firm seedbed with adequate moisture is preferred. A seedbed with many large clumps results in poor seed placement and seed-soil contact. An overworked seedbed may be depleted of moisture and will crust easily, potentially inhibiting emergence. In addition, this could promote deep placement of the seed.
- No-till planting is an option, and some long-term no-till producers have produced canola successfully. With proper settings, no-till planting usually results in adequate stands. However, maintaining stands over the winter can be difficult with low disturbance in heavy residue cover. This problem has been overcome by burning surface residue immediately before planting or by using a more aggressive drill setup that removes residue from the seed row. Research in south central Kansas indicates that even with good winter survival, no-till canola yields under heavy residue are significantly lower than where residue has been burned or where tillage has been performed. No-till producers should ensure that drills are properly set and consider using a drill setup that creates a more disturbed seed row. Using a high-disturbance opener (such as a coulter, residue manager, or hoe-type opener) in no-till can improve winter survival and result in yields comparable to those obtained in tilled fields.
- If using tillage, perform the most aggressive tillage as early as possible, with each succeeding tillage operation being shallower than the last. Incorporate fertilizer and herbicide with the last tillage operation. Some producers perform one aggressive tillage operation as early as possible and then control newly emerged weeds chemically. Planting into this "stale" seedbed works quite well.

Seeding Date, Rate, Depth and Row Spacing

- The general rule is to plant canola six weeks before the average date of the first killing frost (28 degree F) in central and south central Kansas, or eight to ten weeks for southwest Kansas. This allows adequate time for canopy development and root growth to improve winter survival. Planting too late will result in small plants with insufficient reserves to maximize winter survival. Planting too early may result in excessive growth that can deplete soil moisture and nutrient reserves. Excessive growth may also elevate the growing point or crown, increasing the chance of winterkill. This can be a problem when heavy residue is left in the seed row without management.
- In northern Kansas, winter canola should be planted by September 15 and in central Kansas winter canola should be planted by September 25. In far south central Kansas (Barber, Harper, and Sumner counties), winter canola should be planted by October 1. In southwest Kansas, winter canola should be planted by September 10 to avoid problems with winterkill.
- The most recent 3-month outlook from NOAA projects equal chances for near-normal precipitation for most of the state and temperatures to be above normal.
- Winter canola will compensate for a poor plant stand; however, it is important to obtain as uniform a stand as possible to facilitate optimum plant development, winter survival, weed control, and uniform plant maturity. A seeding rate of 3.5 to 5 pounds per acre (approximately 350,000 to 500,000 seeds per acre at a 100,000 seeds per lb seed size) is recommended for open-pollinated varieties in narrow row spacing. Because of the higher seed costs of hybrids, it is recommended to plant them on a pure live seed basis. The recommended seeding rate is 250,000 to 300,000 pure live seeds per acre in narrow rows.

- More producers are experimenting with canola planted in 30-inch rows. Producers are able to obtain more accurate depth control, precision seed metering, and residue removal from the seed row with row crop planters. As a general rule, yields may be reduced by 10% going from 15 inches to 30 inches under dryland conditions. However, producers are able to reduce their seeding rate to 1.5 to 3.0 lb per acre (about 135,000 to 270,000 pure live seeds per acre at a 90,000 seed per lb seed weight). Planting an open-pollinated variety or hybrid with prolific branching will also increase the profitability of canola planted in 30-inch rows.
- It is important to check drill calibration. Some drills may require a speed reduction kit to obtain the optimum rate without damaging seed. Some producers planting on 7.5-inch spacing will plug every other row unit and plant on 15-inch spacing so the drill does not have to be slowed as much.
- Seed placement is critical for successful germination, emergence, and stand establishment. Best germination occurs with seed placed ½ to 1 inch deep. Under drier conditions, canola may be planted deeper (not greater than 1.5 inches), but delayed emergence and reduced vigor may occur. Soil crusting following a heavy rain can result in a poor stand. Canola emergence can be greatly reduced when using a deep furrow opener followed by a heavy rain prior to emergence, since soil can fill in the furrow, resulting in a deeper than intended seeding depth.
- To ensure proper seeding depth, producers must plant slower than when planting wheat (preferably 5 mph or slower). Finally, it is important to check seeding depth in each field.
- Rows spaced between 6 and 15 inches are preferable for rapid canopy closure and weed control. Yields are similar with row spacings in this range. Narrower rows may also promote rapid canopy closure (more efficient light interception) and reduce shattering prior to harvest.
- Plant-to-plant uniformity at emergence is critical for optimum plant development, overwintering, and improved weed control.

Plant Nutrition and Soil Fertility

• Soil testing, including a profile sample for nitrogen (N) and sulfur (S), is an important tool in determining fertilizer needs. If you have questions, contact your local Extension office. All nutrient applications should be made based on soil test recommendations. Canola fertility recommendation programs can be found at:

http://www.agronomy.ksu.edu/soiltesting/

- Fertility needs are similar to winter wheat; however, canola needs slightly higher levels of N and S.
- Applying high rates of fertilizer in-row at planting is not recommended because canola is sensitive to ammonia and salt damage ("phytotoxic effect"). However, new research by Oklahoma State indicates that a low rate of DAP or MAP (30 to 40 lb/acre of product) is beneficial and not detrimental to yield. The best management practice for banding fertilizer should separate the fertilizer from the seed by two inches to avoid direct contact. Preplant broadcast application is also acceptable.
- Lime: Apply lime so that pH is in the range of 5.5-7.0 and early enough so the lime has time to react.
- Phosphorus (P) and Potassium (K): No added P is required if the P soil test is above 30 ppm. Soil K levels are generally adequate in much of Kansas but deficiencies are increasing. Additional K should be applied if soil test levels are less than 125 ppm.
- Sulfur: Canola requires more S than wheat because of its high content of sulfur-containing

proteins. Sulfur deficiencies are most common on coarse-textured and low-organic-matter soils. Sulfur can be applied at any time from preplant until the canola plant breaks dormancy in late winter. Apply S based on the soil test recommendation. Sulfate-sulfur (SO₄-S) soil tests should be above 10 ppm or fertilizer should be applied. If no soil test is available, an application of 20 lb/acre S is recommended.

• Nitrogen: Pre-plant N applications must be carefully balanced, as too little or too much fallapplied N may negatively affect winter survival. One-third to one-half of total N (based on expected yield) should be fall-applied. At least 35 lb/acre but no more than 80 lb/acre of actual N is the general rule for fall applications. Winter survival, plant vigor, and yield potential all can decrease without applying fall N.

Weed Management

- A clean seedbed is critical to establishing winter canola. Small canola seedlings compete poorly with established weeds. However, once a good stand and canopy are established, canola suppresses and outcompetes most winter annual weeds.
- No matter what herbicide program you use, the most important thing to remember is to control weeds early in the fall.
- Trifluralin and ethalfluralin are effective at controlling many common problem winter annual weeds pre-plant, but each requires mechanical incorporation.
- Grass herbicides such as Select EC, Assure II, and Poast are labeled for cool-season grass control in canola.
- Roundup Ready (glyphosate tolerant) canola varieties are available, providing excellent control of many problem weeds. Glyphosate is not labeled for application once the plant has bolted after dormancy.
- Clearfield canola varieties are available and provide another herbicide resistance option for controlling winter annual grasses.
- Before applying any herbicides, care must be taken to ensure there are no traces of problem herbicides, such as sulfonylurea herbicides, in the sprayer equipment.

Insect Management

- An insecticide seed treatment is highly recommended for control of green peach aphids and turnip aphids through fall and early winter.
- Monitor canola stands for the following fall insect pests: grasshoppers, diamondback moth larvae, flea beetles, aphids, and root maggots. Several products are labeled and provide good to excellent control.

Disease Management

• The best control of canola diseases is achieved through careful rotation. Canola should not be planted on the same field more than once every three years and should never be planted continuously.

• Blackleg (*Leptosphaeria maculans*) is the most serious disease threat to canola. Maintaining proper rotation intervals, planting disease-free seed, and using fungicide seed treatments are important management practices to slow the spread of blackleg.

For further information, see the *Great Plains Canola Production Handbook*, at your local Extension office, or: <u>http://www.ksre.ksu.edu/bookstore/pubs/mf2734.pdf</u>

Also see *Canola Growth and Development*, available on the web at: <u>https://www.bookstore.ksre.ksu.edu/pubs/MF3236.pdf</u>

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3. Fungicide seed treatments for wheat

Fungicide seed treatments are becoming an important part of wheat production in Kansas. Seed treatments may help with wheat stand establishment in certain situations, and greatly reduce the risk of problems with seed borne diseases such as common bunt, loose smut or flag smut.

Seed production fields are a top priority for fungicide seed treatments. These fields have a high value and investments in seed treatments here help prevent the introduction and development of seed borne diseases on your farm Due to the high value of the seed produced, even small yield increases can justify the use of seed treatments.

For grain production fields, seed treatment economics are less certain. Conditions favoring use of standard seed treatments in grain production fields include: 1) high yield potential fields, 2) seed saved from fields with even low levels of loose smut, common bunt, or Fusarium head blight last year, 3) field sown at low planting rates, or 5) planting under poor germination conditions, especially very early or late planting.

If planting late or into heavy residue, it's probably a good idea to use a fungicide seed treatment, even on seed that has high test weight and good germination. Planting wheat late into cool wet soils often delays emergence, and reduces the tillering capacity of wheat seedlings. Plants with reduced tillering capacity may not be able to compensate for stand loss and maintain yield potential like earlier planted wheat.

There are many different seed treatments available for wheat. Although most seed treatment ingredients are fungicides, some will also contain insecticides. Each ingredient targets slightly different disease causing fungi or insect pests. Many commercial formulations are complementary combinations of ingredients that provide a broader spectrum of protection.

As mentioned earlier, the most important use of seed treatments is for the control of seed-borne diseases such as smuts and bunts. Loose smut control requires a systemic fungicide like tebuconazole or difenoconazole. Common bunt, sometimes called, "stinking smut", can be controlled, very effectively, with most commercial treatments. Some regions of the state have struggled with these diseases in recent years. If you are planning to keep seed that is known to have or been exposed to common bunt, it is critical to use a fungicide seed treatment to avoid problems in the future. Loads of grain contaminated with common bunt or often rejected at the point of delivery.



Figure 1. Loose smut on wheat. Photo by Erick DeWolf, K-State Research and Extension



Figure 2. The brown colored head is mature wheat with symptoms of common bunt. Photo by Erick DeWolf, K-State Research and Extension

Most seed treatments do at least a good job of controlling seed rots and seedling blights. Scab and black point are two seed-borne diseases that can reduce seed germination. If a seed lot has either of these, it should be cleaned to remove all light test weight seeds and then tested for germination rate. If the germination rate is low (less than 90%), a seed treatment could help increase the germination rate.

Some seed treatments also offer limited control of fall-season foliar diseases. Tebuconazole and difenoconazole provide some protection against fall infections of powdery mildew, leaf rust, and Stagonospora nodorum leaf blotch. A seed treatment will not prevent the disease from becoming reestablished in the spring, and foliar fungicide applications may still be required. Producers must balance the possible benefits against the cost and the possibility of having leftover treated seed. Leftover treated seed can be avoided by using hopper box treatments or other on-farm application equipment. If seed is treated on-farm, pay close attention to thorough coverage of the seed. Incomplete coverage can reduce the efficacy for the seed treatment.

For more information, see K-State publication MF2955, *Seed Treatment Fungicide Wheat Disease Management 2017* at: <u>http://www.ksre.ksu.edu/bookstore/pubs/MF2955.pdf</u>

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4. Estimating soybean yield potential: A web-based app

Many producers would like to estimate the yield potential of their soybeans well before reaching the end of the season. In contrast with corn, soybean can easily compensate for abiotic or biotic stresses. The final number of pods is not determined with finality until close to the end of the season (beginning of seed filling, R5 stage). In corn, the final kernel number is attained during the 2-week period after flowering. Thus, when estimating soybean yield potential, we have to keep in mind that the estimate could change depending on the growth stage at the time the estimate is made and weather conditions. For example, wet periods toward the end of the reproductive period can extend the seed-set period, promoting greater pod production and retention, with larger seed size and heavier seed weight.

From a physiological perspective, the main yield driving forces are: 1) plants per acre, 2) pods per area, 3) seeds per pod, and 4) seed size. Estimating final yield in soybean before harvest can be a very tedious task, but a simplified method can be used for just a basic yield estimate. This method is based on an article by Dr. Shaun Casteel (Soybean Specialist, Purdue University). For details, see: https://www.agry.purdue.edu/ext/soybean/News/2012/2012_0814SOYSimplifiedYieldEstimates.pdf

When can I start making soybean yield estimates?

There is not a precise time, but as the crop approaches the end of the season (R6, full seed or R7, beginning of maturity) the yield estimate will be more accurate. Still, you can start making soybean yield estimates as soon as the end of the R4 stage, full pod (pods are 3/4 inch long on one of the top four nodes), or at the onset of the R5 stage, beginning seed (seeds are 1/8 inch long on one of the top four nodes), knowing that the yield prediction is less precise at those early stages.

Is plant variability within the field an issue in soybean?

Variability between plants relative to the final number of pods and seed size needs to be considered when trying to get an estimation of soybean yields. In addition, variability between areas within the same field needs also to be properly accounted for (e.g. low vs. high areas in the field). Yield estimations should be made in different areas of the field, at least 6 to 12 different areas. It is important to properly recognize and identify the variation within the field, and then take enough samples from the different areas to fairly represent the entire field. Within each sample section, take consecutive plants within the row so as to have a fairly good representation.

Conventional approach to estimating soybean yields

In the conventional approach, soybean yield estimates are based on the following components:

- Total number of pods per acre [number of plants per acre x pods per plant] (1)
- Total number of seeds per pod (2)
- Number of seeds per pound (3)
- Total pounds per bushel, or test weight, which for soybeans is 60 lbs/bu (4)

The final equation for the estimation of the potential soybean yield is:

Simplified approach to estimating soybean yields

The main difference between the "conventional" and "simplified" approaches is that the conventional approach uses the total number of plants per acre in its calculation; while in the simplified approach, a constant row length is utilized to represent 1/10,000th area of an acre (Figure 1).

For the simplified approach, sample 21 inches of row length in a single row if the soybean plants are spaced in 30-inch rows; in 2 rows if the row spacing is 15 inches; and in 4 rows if the row spacing is 7.5 inches.



Figure 1. In the "simplified" approach to estimating yields, sample 21 inches row length to equal 1/10,000th of an acre. The number of rows to sample will depend on the row spacing. With 30-inch row spacings, sample one row. With 15-inch row spacings, sample two rows. With 7.5-inch row spacings, sample four rows. Photo by Ignacio Ciampitti, K-State Research and Extension.

This procedure should be repeated in different sections of the field to properly account for the natural field variability.

Driving forces of soybean yield

1) Total number of pods per acre:

The total number of pods (Figure 2) within this constant row length should be counted. After counting all the plants within the 21-inch row sections that represent 1/10,000th of an acre, a final pod number per acre can be estimated. A similar procedure should be used in different areas of the field to get a good overall estimate at the field scale. One good criterion is to only consider pod sizes that are larger than ³/₄ or1 inch long. Smaller pods can be aborted from this time on in the growing season until harvest.



Figure 2. Total number of pods per plant (only consider the pod sizes larger than ³/₄ or 1 in). Photo by Ignacio Ciampitti, K-State Research and Extension.

2) Total number of seeds per pod:

Soybean plants will have, on average, 2.5 seeds per pod (ranging from 1 to 4 seeds per pod), primarily regulated by the interaction between the environment and the genotypes (Figure 3). Under severe drought and heat stress, a pessimistic approach would be to consider an average of 1-1.5 seeds per pod. This value is just an approximation of the final number of seeds per pod, and can change from the time the estimate is made until the end of the growing season.



Figure 3. The number of seeds per pod will vary somewhat, depending on the growing environment and genotype. Photo by Ignacio Ciampitti, K-State Research and Extension.

3) Seed Size:

Seed size can range from 2,500 (normal to large seed weight) to 3,500 (small seed size) seeds per pound. This season, conditions are mostly favorable in Kansas for promoting large seed sizes. In more stressful years, such as 2012 and 2011, seed size is normally smaller, meaning a larger number for the seeds per pound (e.g. 3,500 seeds per pound). In the simplified estimation approach published by Dr. Casteel, you do not need to actually measure the number of seeds per pound in order to estimate yields, as is done in the conventional approach. Instead, a seed size conversion factor is used. If the conditions are favorable and large seed size is expected, the conversion is 15 units; while if abiotic or biotic stresses are present during the seed-filling period, a seed size factor of 21 units is used. Further details related to the seed size factor can be found in the link to the Purdue University extension

article listed at the end of this article.

Example of the simplified approach for estimating soybean yields:

Let's say that we have 120,000 plants/acre in a 30-inch rows. Then, we should have around 12 plants in 21 inches of row. In those 12 plants, we have measured on average 22 pods per plant, with a total number of 264 pods (22 x 12).

If we assume a "normal" growing season condition, then the final seeds per pod will be around 2.5, and for the seed size factor, we can assume large seeds, and will use a conversion factor of 15 units.

Equation for a "Favorable" Season:

264 pods x 2.5 seeds per pod / 15 = 44 bushels per acre

For a "droughty" (late reproductive, from R2 to R6 stages) growing season, the final seed number and size will be dramatically affected. Thus, even if the pod number is the same as in a normal season, the yield calculation could be:

Equation for a "Drought" Season:

264 pods x 1.5 seeds per pod / 21 = 19 bushels per acre

This "simplified approach" basically relates the total number of pods in a "known" unit area (easily extrapolated to the acre unit), and is affected by the total number of seeds in the pod. This is adjusted by the estimated seed weight, which is affected by two main components: duration of seed fill and rate of dry mass allocation to the seeds.

New K-State mobile app for estimating soybean yields

If you have an Android device, there is a "free" mobile Web-App that can help estimate soybean yields before harvest. The app is called "KSUSoyYieldCalc." Complete information can be found at: <u>https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=635</u>

The KSUSoyYieldCalc has only four inputs for predicting the final yield:

1. Plant population (plants/acre). This component can be estimated by counting the number of plants in a 21-inch row length for 30" row spacings (1/10,000th area), and by multiplying that number by 10,000;

2. Pods per plant. If the simplified approach is used, this factor can be obtained by counting all pods per plant in the 21-inch row length (total 10 boxes – 10 plants);

3. Seeds per pod. A good average number is 2.5 seeds per pod, but the range presented in this webbased app is from 1 to 4 seeds per pod;

4. Seed size. Seed size typically ranges from 2,500 (large) to 3,500 (small seeds) seeds/lb, with an

average of 3,000 seeds/lb.

Inputs 1, 2, and 3 have been already discussed in the "simplified approach" section earlier in this article. Once all these components are estimated in the field, the numbers can be entered into the KSUSoyYieldCalc app.

The last factor "seed size" is the same as the one presented in the "conventional approach." This factor normally varies from 2,500 to 3,500 seeds/lb. If the conditions until harvest will be favorable, then the "seed size" component should be a lower number (e.g., 2,500 seeds/lb). If conditions are likely to be unfavorable, resulting in a short seed-fill period, then this factor should be higher (e.g., 3,500 seeds/lb). This factor will be ultimately determined as the crop approaches maturity, but an estimation is needed considering the importance of this factor for influencing final soybean yields.

All steps are also highlighted in the below image:



Here is one example of how to use this web-based App:

INPUTS:

1. Plant Population: 12 plants (measured at 12 sites within the field) in 21-inch row length x 10,000 = 120,000 plants/acre

2. Pods per plant: 24 pods per plant (average of 12 plants in 21-inch row length)

- 3. Seeds per pod: 3 seeds per pod (estimation)
- 4. Seed size: 2,800 (assuming "normal" conditions during seed-fill period)

OUTPUT:

Final yield estimation: 43 bu/acre

More examples on how to use the App and estimate yields are presented in the below figure:

JAR Soyk	beanYield(Calc Scon the QR code and get it now!	
First Free App for Android to Estimate Yields in Soybeans			
Scenario 1	Scenario 2	Scenario 3	
In the second se			
29 bu/ac	44 pods 47bu/ac	75 83 bu/ac pods	
	Smaller size	K STATE	
ds/pound	2,500 seeds/lb	KSUCROPS Concernent and the state Soyvield Calc	
Poor Better	SEED SIZE effect: scenario 1 - larger seed size - #24% yield cenario 3 - smaller seed size -8.5% yield	K-STATE Research and Extension	

You can see a video explaining the app and download the app from the Google Play link: <u>https://play.google.com/store/apps/details?id=com.ksu.tania90.soya1</u>

For more information on how to estimate soybean yields, check the following resources:

"Simplified-Approach" Purdue University <u>http://extension.entm.purdue.edu/pestcrop/2012/issue21/index.html</u>

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist <u>ciampitti@ksu.edu</u>

5. Soybean insect update – Green cloverworms, thistle caterpillars, stink bugs, soybean, aphids, and beneficials

(Editor's note: The following article is from the August 25, 2017 Issue 21 of the Kansas Insect Newsletter.)

Insect activity is still increasing around north central Kansas. One positive, bean leaf beetles seem to be at really low densities in most fields, at least so far. Green cloverworm larvae are at various developmental stages but there are still many early instars. This means there probably is considerable defoliation to come because, as the larvae get larger, they simply eat more leaf tissue. However, as green cloverworm populations increase, they are often infected with an entomophagous fungus which decimates their populations.



There also are many areas with significant infestations of thistle caterpillars and garden webworms. Both species web leaf tissue around and over themselves, creating a relatively secure area from which they feed on leaves. Many thistle caterpillars are really small right now and may not be noticed

yet. So, continued monitoring is important, especially with soybeans just entering the reproductive stages of development.



Green stink bugs are relatively common in both conventionally planted and double-cropped soybeans. There are eggs, nymphs, adults, and mating adults all present at this time so sampling needs to be conducted periodically as these bugs can feed on the beans while they are developing inside the pods.



Soybean aphids were detected in double-cropped soybeans in Dickinson Co. on 24 August. Many soybean fields have significant populations of green lacewings and lady beetles, both of which may help control soybean aphids if and when they migrate into these fields. So, as always, please take these into consideration if insecticide applications are contemplated.



For more information of thresholds and management options for these pests, please refer to the KSU Soybean Insect Management Guide: <u>https://www.bookstore.ksre.ksu.edu/pubs/MF743.pdf</u>

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6. 2017 Kansas Wheat Seed Book now available

The 2017 Kansas Wheat Seed Book is now available. In this book, you will find a recap of the 2016-17 wheat crop, with a detailed discussion of factors that may have played an important role in the record-breaking yields observed across the state. More importantly, the results of the 2017 wheat variety performance tests are also shown.

Producers and crop consultants can use this resource to help select wheat varieties for their operation by checking for varieties that show a consistently good performance in their region. After selecting a few, well-adapted varieties, just flip to the second half of the book to find the contact for certified seed producers who carry the seed of the varieties you would like to plant.



The 2017 Kansas Wheat Seed Book is now available, with the report of the 2017 wheat variety performance tests and the certified seed directory.

Click <u>here</u> to access the online version of the variety performance test results, or <u>here</u> for the certified seed directory. For a hard copy, please contact your local extension office.

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7. Tips for fall planting of alfalfa

Alfalfa is often considered as the "Queen of Forages" because it produces high yields that are highly digestible and high in protein. Alfalfa is a very important leguminous crop for dairy and other livestock industry in Kansas. Late summer and early fall are often the best times to plant alfalfa in Kansas due to less weed pressure than spring planting.

With the rains this spring and summer in most areas of Kansas, there may be enough moisture to achieve good stand establishment in many fields. Available moisture at planting is crucial for alfalfa establishment, but too much moisture can increase seedling disease incidence and reduce alfalfa nodulation and nitrogen fixation.

If soil moisture is available, growers in northwest Kansas can plant as early as Aug. 10-15. Those in southeast Kansas can plant in mid- to late-September. In other parts of Kansas, the optimal planting time is late August or early September. Producers just need to plant early enough to have three to five trifoliate leaves before the first frost.

Alfalfa is a three- to five-year, or longer, investment and therefore it is crucial to ensure proper establishment. Some producers shy away from alfalfa because of its high establishment cost and risk of stand failure. In the long run, however, it's relatively inexpensive, if amortized over the life of the crop.

If managed properly and given favorable weather conditions, dryland alfalfa can produce 3 to 6 dry matter tons of forage per acre per year. Irrigated fields can produce 6 to 8 dry matter tons per acre per year or more.

When planting alfalfa, producers should keep the following in mind:

Soil test and correct soil acidity. Alfalfa grows best in well-drained soils with a pH of 6.5 to 7.5, and does not tolerate low soil pH. If the soil is acidic, add lime to raise soil pH to 6.8 before planting. Ensuring appropriate soil pH levels prior to planting is essential, especially as lime is relatively immobile in the soil profile and the field will not be worked for the next 3-5 years.

Soil test and meet fertilization needs. Apply the needed phosphorus (P) and potassium (K) amounts according to soil test recommendations. Phosphorus fertilizer will be required if soil test P levels are below 25 ppm, and potassium fertilizer will be required if soil K levels are below 120 ppm. Even soils that test higher than these thresholds may need additional fertilizer. Small amounts of nitrogen fertilizer (15 to 20 lb/acre) as a starter at planting are beneficial for alfalfa establishment.

Plant certified, inoculated seed. Ensuring the correct *Rhizobium* inoculation is crucial for alfalfa seedlings to fix available soil nitrogen to meet the needs of growing alfalfa for optimum production.

Plant in firm, moist soil. A firm seedbed ensures good seed-soil contact; therefore, use a press wheel with the drill to firm the soil over the planted seed. No-till planting in small-grains stubble will usually provide a good seedbed.

Don't plant too deeply. Plant one-fourth to one-half inch deep on medium- and fine-textured soils and three-fourths inch deep on sandy soils. Don't plant deeper than 10 times the seed diameter.

Use the right seeding rate. Plant 8 to12 pounds of seed per acre on dryland in western Kansas, 12 to15 pounds per acre on irrigated medium- to fine-textured soils, 15 to 20 pounds per acre on irrigated sandy soils, and 12 to 15 pounds per acre on dryland in central and eastern Kansas.

Check for herbicide carryover that could damage the new alfalfa crop – especially when planting alfalfa no-till into corn or grain sorghum stubble. In areas where row crops were drought-stressed and removed for silage, that sets up a great seedbed for alfalfa, but may still bring a risk of herbicide damage.

Choose pest-resistant varieties. Resistance to phytophthora root rot, bacterial wilt, fusarium wilt, verticillium wilt, anthracnose, the pea aphid, and the spotted alfalfa aphid is essential. Some varieties are resistant to even more diseases and insects.

Purchase alfalfa varieties with a fall dormancy rating ranging from 4 - 6 for Kansas. Fall dormancy relates to how soon an alfalfa variety will stop growing in the fall and how early it will begin growing in the spring or late winter. Simply put, it would be better not buy a variety with fall dormancy of 9-10, which can be more suitable for California and regions where alfalfa can keep growing year-round under irrigation.

More information about growing alfalfa in Kansas can be found in the *Alfalfa Production Handbook*. That information also is available on the web at: <u>www.ksre.ksu.edu/bookstore/pubs/c683.pdf</u>

Also see *Alfalfa Growth and Development*, available on the web at: <u>https://www.bookstore.ksre.ksu.edu/pubs/MF3348.pdf</u>



Figure 1. Alfalfa seedlings. Photo by Doohong Min, K-State Research and Extension.



Figure 2. Early bloom alfalfa. Photo by Doohong Min, K-State Research and Extension.

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8. South Central Kansas Experiment Field fall field day, August 29

The South Central Kansas Experiment Irrigation Field near Hutchinson will host its fall field day on Tuesday, August 29. The field day begins at 5 p.m. with registration. A complimentary meal will be served after the presentations. Pre-registration to obtain a head count for the meal is requested by Monday, August 28 by contacting Gary Cramer at 620-491-3485 or by email at gcramer@ksu.edu.

Field day sponsored by Kansas State University Research and Extension and Kansas Corn Commission.

Field day topics and presenters include:

- Review of Growing Season Conditions Gary Cramer, Agronomist-in-Charge, South Central Kansas Experiment Field
- Kansas Corn Commission update Paige Lutz, Kansas Corn Commission Central Kansas Representative
- Re-evaluation of recommended corn seeding rates Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
- Variable rate application of soil-applied herbicides Garrison Gundy, Agronomy Graduate Student
- Update on cotton research Stu Duncan, Northeast Area Crops and Soils Specialist and Gary Cramer
- Sugarcane aphid and other insects update Jeff Whitworth, Extension Entomology

The field day will be held at the irrigation field, approximately 2 miles south of Partridge on Highway 61, at the intersection of Highway 61 and Red Rock Road, on the east side of the road. The field address is 9314 W. K-61 Highway.

9. Comparative Vegetation Condition Report: August 15 - 21

The weekly Vegetation Condition Report maps below can be a valuable tool for making crop selection and marketing decisions.

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 28-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography, and his pioneering work in this area is gratefully acknowledged.

The maps have recently been revised, using newer technology and enhanced sources of data. Dr. Nan An, Imaging Scientist, collaborated with Dr. Antonio Ray Asebedo, assistant professor and lab director of the Precision Agriculture Lab in the Department of Agronomy at Kansas State University, on the new VCR development. Multiple improvements have been made, such as new image processing algorithms with new remotely sensed data from EROS Data Center.

These improvements increase sensitivity for capturing more variability in plant biomass and photosynthetic capacity. However, the same format as the previous versions of the VCR maps was retained, thus allowing the transition to be as seamless as possible for the end user. For this spring, it was decided not to incorporate the snow cover data, which had been used in past years. However, this feature will be added back at a later date. In addition, production of the Corn Belt maps has been stopped, as the continental U.S. maps will provide the same data for these areas. Dr. Asebedo and Dr. An will continue development and improvement of the VCRs and other advanced maps.

The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, and the continental U.S., with comments from Mary Knapp, assistant state climatologist:

Kansas Vegetation Condition

Period 34: 08/15/2017 - 08/21/2017



Figure 1. The Vegetation Condition Report for Kansas for August 15 – August 21, 2017 from K-State's Precision Agriculture Laboratory shows the area of greatest vegetative activity continues to be in eastern Kansas, particularly in extreme northeast Kansas. The impact from the recent rains has begun to be visible, and the flooded areas of Wyandotte and Johnson counties show reduced photosynthetic activity. In central and south central Kansas the lower rainfall shows the continued stress on vegetation.

Kansas Vegetation Condition Comparison





Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for August 15 – August 21, 2017 from K-State's Precision Agriculture Laboratory shows the greatest change in vegetative activity is in the western third of the state, where rainfall has been more consistent this year. In contrast, much of the eastern half of the state has lower vegetative activity. Although August has been running cooler, this summer has been hotter and much drier than last year in this area.



Kansas Vegetation Condition Comparison Mid-August 2017 compared to the 28-Year Average for Mid-August

Figure 3. Compared to the 28-year average at this time for Kansas, this year's Vegetation Condition Report for August 15 – August 21, 2017 from K-State's Precision Agriculture Laboratory above-average activity in the western parts of the state. Wetter-than-normal conditions have favored parts of the west, particularly Wallace County. Meanwhile continued dry weather has stressed vegetation in the central parts of the state.



Figure 4. The Vegetation Condition Report for the U.S for August 15 – August 21, 2017 from K-State's Precision Agriculture Laboratory shows the highest NDVI values are centered in the Midwest, particularly in eastern Nebraska and western Iowa. A second area of higher vegetative activity is visible along the West Coast, where the recent warm weather has yet to have a visible impact. Extremely Iow NDVI values continue to highlight the severe drought in eastern Montana and western South Dakota.

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Continental U.S. Vegetation Condition Period 34: 08/15/2017 - 08/21/2017



Continental U.S. Vegetation Condition Comparison Mid-August 2017 Compared to Mid-August 2016

Figure 5. The U.S. comparison to last year at this time for August 15 – August 21, 2017 from K-State's Precision Agriculture Laboratory again shows the impact that the split in moisture has caused this year. Much lower NDVI values are visible in Montana and South Dakota, with slightly lower values in the Plains and into the Oklahoma Panhandle. In contrast, the desert Southwest and southern Texas have much higher NDVI values than last year at this time.



Continental U.S. Vegetation Condition Comparison Mid-August 2017 Compared to 28-year Average for Mid-August

Figure 6. The U.S. comparison to the 28-year average for the period of August 15 – August 21, 2017 from K-State's Precision Agriculture Laboratory shows the drought impacts in the Northern Plains are visible as below-average NDVI values. In Colorado, parts of Idaho, and the Sierra Nevada of California, the below-average NDVI values are due to clouds associated with monsoon moisture. Wetter-than-normal conditions continue in parts of Arizona.

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