LOGAN COUNTY EXTENSION NEWS

Horticulture Tips for May

By: David Hillock Consumer Horticulturist

Trees and Shrubs

- Prune and feed azaleas immediately after blooming.
- Insect Alert: (EPP-7306)
  Bagworms on juniper and arborvitae. (Late May)
  Elm leaf beetles and larvae on elms. (Late May)
  Mimosa webworms on mimosa and honey locust.
  Lace bugs on sycamore, pyracantha and azalea.
- Soak new transplants and newly planted trees unless rainfall is abundant.
- Pine needle disease treatments are needed in mid-May.

Flowers

- Annual bedding plants can be set out for summer color.
- Plant summer bulbs such as cannas, dahlias, elephant ear, caladiums and gladiolus.
- Shake a leaf over white paper to look for spider mites. If the tiny specks begin to crawl, mites are present.

Fruits and Vegetables

- Plant watermelon, cantaloupe, cucumber, eggplant, okra, sweet potatoes, etc.
- Fruit spray programs should be faithfully continued during the next several weeks.
- Late May is the best time to control borers in the orchard. Check for label recommendations and controls.

Water Gardens

- Clean out water garden and prepare for season. Divide and repot water garden plants.
- Begin feeding fish when water temperatures are over 50°F.

Turfgrass

- Cool-season lawns can be fertilized again. If you did not fertilize cool-season grasses in March and April, do so now.
- Warm-season lawns may be fertilized again in May. (HLA-6420)
- Seeding of warm-season grasses such as bermudagrass, buffalo grass, zoysia grass and centipede grass is best performed in mid-May through the end of June. The soil temperatures are warm enough for germination and adequate growing season is present to promote winter hardiness.

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May Horticulture Tips

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- Dollar spot disease of lawns can first become visible in mid-May. Make certain fertilizer applications have been adequate before ever applying a fungicide. (EPP-7658)
- Nutsedge plants become visible during this month. Post-emergent treatments are best applied for the first time this month. Make certain warm-season grasses have completed green-up.
- The second application of pre-emergent annual grass herbicides can be applied in late-May or early June, depending upon timing of first application. Check label for details.
- Vegetative establishment of warm-season grasses can continue. (HLA-6419)

Bagworms

- Bagworms can be a real nuisance on many plants. In Oklahoma the most common hosts are eastern redcedar, other junipers, and arborvitae. Other hosts sometimes include pines, spruce, bald cypress, maple, boxelder, sycamore, willow, black locust, oaks, and roses. The bagworm has been recorded on 128 plant species in various parts of the United States.

Symptoms: Bagworm larvae damage their hosts by feeding on the foliage. Heavy infestations can completely defoliate small plants. Defoliation usually kills hosts such as redcedar and other junipers. Broadleaf hosts are not killed, but are weakened and become more susceptible to borers and diseases.

Life Cycle: The overwintered eggs (in the year old female bags) begin to hatch in late April or early May and the young larvae begin to feed and construct bags immediately. The first evidence of an infestation is normally a small bag, about 1/4 inch long, standing almost on end. As larvae grow, silk and fragments of the host plant foliage are added to the bag until it reaches 1 1/2 or 2 inches long. When larvae are mature they fasten the bag to a plant stem with silk. Pupation occurs in the bag in August and males emerge in late August and September. They engage in a mating flight in search of the wingless females still inside their bags. After mating the female lays several hundred white eggs inside her old pupal case, drops from the bag, and dies. There is one generation per year.

Description: Adult males are small, clear winged moths with a black, hairy body and a wingspread of about 1 inch. Adult females are wingless, have no functional legs, eyes, or antennae, and are almost maggotlike in appearance. The female's body is soft, yellowish white, and practically naked except for a circle of woolly hairs at the posterior end of the abdomen. Mature larvae have a dark brown abdomen and the head and thorax are white, spotted with black. They are about 1 inch long. Both larvae and adult females are found in silken bags on the host plants.

Cultural control: Infestations can be reduced by handpicking bags (and overwintering eggs within bags) during fall, winter, or spring before eggs hatch. Eggs remain viable within bags so be sure to destroy bags upon removal by crushing or burning them. When larvae become active, bagworms can still be removed by hand if the numbers are small and the affected host plants are small enough to reach the canopy. Again, take care to destroy the bags once they are removed.

Biological control: There are several naturally occurring parasitic wasps and predatory insects that attack bagworms. The activity of these natural enemies apparently explains the fluctuation in bagworm populations observed from year to year.

Chemical control: Chemical controls are most effective if applied early when larva are small. In Oklahoma, it is normally a good practice to make applications of insecticide by early June. Bacillus thuringiensis var. kurstaki, a bacterial insecticide, is reported to provide good control of bagworms. Also effective are products that contain the active ingredient spinosad, another microbial agent. These insecticides must be ingested by the caterpillars in order to achieve kill, so be patient as it will take some time to see results. Repeat applications may be needed later in the summer. This is not due to the occurrence of multiple generations. Rather, not all eggs will hatch at the same time in some years and there may be migration of larvae between host plants. In most years, treatment in early June will catch most of the emerging larvae and provide fairly good, season long control. The larger, older larvae can be controlled with products containing acephate (Orthene), carbaryl (Sevin), bifenthrin, cyfluthrin, and lambda cyhalothrin.

2020 Soybean Budget

By: Trent T. Milacek, Area Ag Econ Specialist

Soybeans will be an important crop for Oklahoma producers in 2020. Grain prices are very different than they were last year, and demand outlook is bleaker. However, these are things that producers cannot control. They must look past this and focus on what their skillsets can manage.

The cost to produce soybeans will include the burndown herbicide, seed, rent, crop insurance, phosphorus fertilizer, planting, and harvest costs. Excluding planting and harvesting, those costs could total $170. One unit of seed, or 140,000 seeds, can cost from $55-$65 depending on what technology traits are included. Inoculant, fungicide and insecticide treatments can cost another $10/unit. Herbicide programs and fertility requirements will change this number significantly on a producer basis. With that in mind, it is not uncommon to have a burndown herbicide application and another herbicide treatment with the preemerge herbicide. To cover $170, producers will need to raise 21.5 bu./acre. Of course, this is dependent on a $7.90/bu. selling price at harvest.

Some producers may consider custom planting and harvesting if they do not own the required equipment to produce soybeans. Those costs could climb above $50 per acre depending on the custom applicator. All costs included, a yield above 28 bu./acre will be required to breakeven.

Without price protection, a producer is open to market risk. New crop beans are currently bid at $8.65/bushel. Basis bids vary based on location, but assuming $0.75 for basis gives a cash price of $7.90/bu. A November put option with a strike price of $8.60 costs $0.36 and would guarantee a producer a futures price of $8.24/bu. Using current basis values, this results in a cash price of $7.49/bushel. With this price risk strategy, breakeven yield is increased by 1 bushel to 29 bu./acre if prices fall below the protected price. If prices increase, a producer is able to capture that price movement.

If there is average to above average rainfall, it should be possible to breakeven. The 5-year average yield from 2014-2018 in the north-central district of Oklahoma is 29 bu./acre. However, in a dry year it will be difficult. This breakeven yield commands fertile soil to be successful. Be careful planting on low pH soils or ground that lacks fertility. Everything must be in good order for a chance to succeed.

If you would like more information on budgeting or growing soybeans, please contact your local county extension educator. Enterprise budgeting software is available to producers so that individual costs and production goals can be used. This will assist producers in adopting new enterprises on their operations.

Soybean Weed Management

By: Josh Bushong, Area Agronomy Specialist

Weed control in soybean production has been a persistent issue year after year for many in northwest Oklahoma. Inadequate control is one of the most yield-limiting factors, as some research has shown losses as high as 79%. Certain herbicide programs may seem expensive but can still be economical if yields are protected. From soybean emergence to the V3 growth stage (third trifoliate) is the most critical period to limit weed competition to protect yield potential.

In addition to lost yield potential, weed control is usually going to be more effective when weeds are small. Many herbicide options will provide weed size limits on the product label. If a herbicide is applied later than the labeled timing and is not controlled, the weed is not considered herbicide resistant. Increases in herbicide-resistant weeds is becoming a major concern with many producers in the area. Utilizing multiple modes (or sites) of action either in the soybean crop or with other crop rotations is paramount to managing these weeds.

Only relying on postemerge ("over-the-top" or "in-season") herbicide products limits options and will tend to lead to herbicide resistance sooner. Options are limited especially if applications are delayed due to weather events or breakdowns as weeds become rank and less controllable. A more robust management plan includes preemerge products with residual activity. This may not be as cheap as some of the postemerge products but will provide more modes of action, act as a safety net in case of delayed post applications, and ultimately should provide much less weed competition early on in the season.

Preemerge products can be applied preplant, prior to crop emergence, and some can be tank mixed with early postemerge products. Preemerge products need to be applied to the soil before germination of the weeds. In no-till production, some products can remain in the previous crop residue and control can be reduced. Some products need to be incorporated

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Soybean Weed Management

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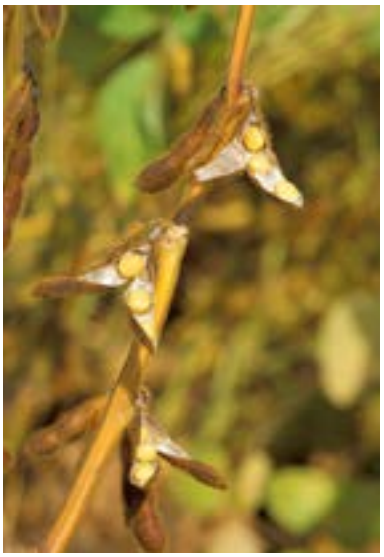
into the soil with rain or irrigation to become active. Preemerge and some postemerge products can provide residual soil activity.

To complement a herbicide program, soybean producers can also strategize agronomic practices that can help suppress weeds. Utilizing seeding rate, row spacing, plant populations, and planting date can aid in weed management. Achieving canopy closure as early as possible is the goal. Preventing sunlight from reaching the soil surface will significantly reduce germination of some weed species, especially broadleaf weeds. A thicker stand will cause the soybean plants to grow more erect at a faster pace. Planting around a major weed flush can also allow a final tillage pass or burndown treatment.



Recent field trials by OSU have shown that pairing preemergent herbicides with postemergent herbicides resulted in higher yields (about 10-15 more bushels) and fewer weeds. These trials looked at planting date and postemerge application timings with and without a preemerge. Later planted soybeans generally benefited more from the pairing of a premerge and postemerge.

To save yield potential, it is best to start clean and stay weed-free for the first few weeks of crop growth. Soybean producers must first decide which herbicide traits are best for their operation, develop a herbicide plan, and also make a backup plan if herbicide applications are delayed or lack satisfactory control. Weed control strategies need to consider future crop rotations and should also be a long term investment in managing herbicide resistant weeds. Going cheap now may become much more expensive later.

To find out more information, contact your local OSU County Extension Office to visit with your Ag Extension Educator and review the Oklahoma Cooperative Extension Service factsheet PSS-2794, Meshing Soybean Weed Management with Agronomic Practices in Oklahoma.

Realistic Expectations for Estrus Synchronization and AI Programs

By: Glenn Selk, OSU Animal Scientist

Producers that are wanting to improve the genetic makeup of their beef herds very often turn to artificial insemination (AI) as a tool to accomplish that goal. Many times, these producers have very high expectations as they begin the first season of artificial breeding. Perhaps they have heard other producers tell of situations where "near-perfect" pregnancy rates resulted from THEIR artificial insemination program. Everyone wants to get every cow or heifer bred as they start the labor and expense of an AI program. However, the rules of biology do not often allow for 100% pregnancy rates in most situations.

First, it is important to understand several terms: Estrous response rate: the percentage of cows found to be cycling in response to an estrus synchronization protocol. In other words, if we put 100 cows through the working chute and give them estrus synchronization drugs, and only 80 of those cows responded to the products, then we have an "estrous response rate" of 80 percent. Perhaps some of the cows were not "ready" because they were later calving or they were in poorer body condition. If we are breeding only after they are detected in heat, then only 80 of the original 100 cows would be bred to AI after standing heat. If "timed AI" is the method of choice (in this scenario) only 80 of the cows would be in a biologically suitable stage of a heat cycle to have a chance to conceive. Replacement heifers that are slightly too young or lightweight may not be available to respond to the synchronization protocol and therefore unlikely to conceive to insemination.

Conception rate: the percentage of the cows that were actually cycling, then inseminated and were palpated later and found to be pregnant to AI breeding. In other words, of the 80 cows in the above example, that were found in heat and inseminated, IF we later found that 70 percent of those "settled" or became pregnant, we would have found 56 cows pregnant. Experienced AI technicians often achieve 70 percent conception rates. Semen quality must be adequate. Also semen handling techniques must be appropriate in order to expect 70 percent conception rates.

AI Pregnancy rate: the percentage of cows that were initially started on the estrous synchronization protocol that actually became pregnant. Fifty-six of

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Realistic Expectations

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the original 100 cows became pregnant to the AI program resulting in a pregnancy rate of 56%.Therefore, the Estrous response rate X Conception rate = AI Pregnancy rate. In this example: 80% Estrous response X 70% Conception = 56% Pregnant to artificial insemination. The above example is hypothetical, yet very much close to the expected outcome of a successful synchronization and AI program. If heat detection is incorporated as part of the system, then it becomes another very important part of the equation.

Research conducted that evaluated different synchronization protocols very often illustrated variables other than protocol were most important. Differences in body condition of the cattle, experience and skill of the AI technicians, and weather influences, often played larger roles in the pregnancy rates than did the synchronization protocol. There was more difference expressed between operations than between the synchronization methods chosen.

Help in choosing the synchronization protocol that best suits your situation can be found courtesy of the Applied Reproductive Task Force. This group of scientists list preferred protocols for both replacement heifers and adult cows.

After artificial insemination is conducted on the cows or heifers, clean up bulls will be introduced to the breeding pasture to breed those females that did not conceive to AI. How many clean up bulls are needed?

University of Nebraska researchers (Nielson and Funston, 2016) have published a review on beef AI trials and evaluated the reported cow to bull ratios used in the clean up portion of the breeding seasons. They grouped the trials into three categories based on the cow to bull ratios. Final pregnancy rates for cow to bull ratios of 1:20 to 30, 1:31 to 49, or 1:50 to 60 were 87.8, 82.6, and 89.2%, respectively. These ratios are based on the number of cows entering the estrus synchronization and AI breeding season. The fact that the wider cow to bull ratio was as successful as the others should not be surprising. Half or more of the cows were already bred when the bulls were introduced and therefore an actual number of cycling cows to bull ratio was actually near 25:1. less intense breeding pressure on the cleanup bulls. In addition, estrus synchrony on the subsequent heat cycles was not as tightly synchronized as the first heat at AI. Natural variation in cycle lengths will cause less synchrony and therefore less intense breeding pressure on the cleanup bulls.

Fungicides for the Home and Garden

By: John Damicone, OSU Plant Pathologist

A problem with disease control for the home and garden is that the numerous fungicides registered for use on vegetable, fruit, and nut, and ornamental crops usually come in large quantities such as a 1 or even 2.5 gal container costing $100 or more. Users generally only need and can use a few ounces. I recently searched the database of fungicides registered for use in Oklahoma with the Oklahoma Department of Agriculture and Forestry:

(http://www.kellysolutions.com/ok/) for home and garden brands of fungicide active ingredients.

The following active ingredients are registered for use in Oklahoma:

Calcium polysulfide: Lime sulfur dormant spray for fruit trees and ornamentals that is particularly useful for peach leaf curl. Lime sulfur is sold under Bonide and Hi-Yield brands.

Captan: A broad spectrum, protectant fungicide for fruit, ornamentals, turf, and seed treatment uses sold under Bonide and Hi-Yield brands.

Chlorothalonil: Same active ingredient as Bravo. Chlorothalonil is a protectant fungicide with broad-spectrum activity against most foliar diseases sold under Bonide, Fertilome, GardenTech, Gordon, Hi-Yield, and Ortho brands for use on vegetable crops, stone fruits, and ornamentals.

Copper hydroxide: Same active ingredient as Kocide. A broad-spectrum, protectant fungicide and bactericide labeled on vegetable crops, fruits, nuts, and ornamentals under Ferti-lome and Hi-Yield brands.

Copper octanoate: A copper soap fungicide and bactericide registered under Natural Guard and Bonide brands for use on vegetable crops, fruits, nuts, and ornamentals.

Copper sulfate: Often called Bordeaux mixture, it is the original broad-spectrum protectant fungicide and bactericide. Copper sulfate is sold under Hi-Yield and Gordon brands for use on vegetable crops, fruits, nuts, and ornamentals.

Mancozeb: Broad-spectrum fungicide for use on vegetable crops, grapes and ornamentals under the Bonide brand. Mancozeb is the same active ingredient as Dithane and is often tank-mixed with copper in tomato spray programs.

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Fungicides

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Maneb: Broad-spectrum fungicide for use on vegetable crops, grapes, and ornamentals under the Gordon and Hi-Yield brands. Maneb is often tank-mixed with copper in tomato spray programs.

Myclobutanil: A systemic triazole fungicide for use on fruit, ornamentals and turf under the Spectracide brand. It is the same active ingredient as Nova and is particularly useful for control of cedar-apple rust, other rusts, and powdery mildews.

Propiconazole: A systemic triazole fungicide for use on fruit, ornamentals, nuts, and turf under Bonide, Ferti-lome, and Gordon brands. It is the same active ingredient as Tilt. A tank mixture of propiconazole and chlorothalonil is excellent for control of black spot on rose.

Streptomycin sulfate: An antibiotic for control of fire blight on fruit and ornamentals under the Ferti-lome brand.

Sulfur: Effective against powdery mildew on a range of vegetable, fruit, and ornamental crops under the Hi-Yield, Ferti-lome, Green Light, and Bonide Brands. All are 90% wettable sulfur that can be applied as a spray or dust. Wettable powder formulations of sulfur can be difficult to mix with water.

Tebuconazole: A systemic triazole fungicide for use on ornamentals and turf under the Bayer Advanced brand. It is the same active ingredient as Folicur.

Thiophanate-methyl: A systemic benzimidazole fungicide for use on ornamentals and turf under the Ferti-lome, Green Light, and Bonide brands. It is the same active ingredient as Topsin.

Triademifon: A systemic triazole fungicide for use on ornamentals and turf under the Green Light brand. It is the same active ingredient as Bayleton.

Triforine: A systemic triazole fungicide for use on ornamentals under the Ortho brand. It is mostly used for control of black spot on rose.

The next challenge is to find a source for these products.

Pesticide Certification Testing Available

Pesticide certification exams are now available at PSI test centers in Oklahoma City and Tulsa. PSI is limiting the amount of tests given and following social distance guidelines. Look for the other PSI test locations to become available at a later time. To make a reservation go to: http://pested.okstate.edu/html/new-odaff-testing-procedure or the PSI website at https://candidate.psiexams.com/ To check for available dates and times at all locations go here: https://candidate.psiexams.com/faqs/schedule_faqs.jsp OSU Pesticide Safety Education Program also tweets out available test dates weekly on: Twitter@OkstatePestEd. (OSU PSEP)

Private Applicator Testing Packets Available in Response to Covid-19

ODAFF has once again made the take home Private Applicator test packets available for the short term in response to the COVID-19 emergency. This will still allow an opportunity for producers to acquire a Private Applicator certification to purchase and use Restricted Use Pesticides on their farm or ranch for agriculture production. Private Applicator packets can be purchased from Oklahoma State University Mailing at 405-744-9037 for $20. Exams must be completed and answers sheets mailed to ODAFF along with a $20 license fee. A score of 70% must be achieved before the applicator license can be issued. For more information please see the information linked at http://pested.okstate.edu/ or directly at http://www.oda.state.ok.us/admin/covid19PrivateApp.pdf (OSU PSEP)

Contacting OSU Pesticide Safety Education Program During Covid-19 State Of Emergency

Oklahoma State Pesticide Safety Education Program in accordance with the Governors orders for social distancing will be working from home during the COVID-19 state of emergency. We will still provide help and information on pesticides by phone or email and other electronic options. If you have questions on pesticide certification, contact Kevin Shelton-phone, 405-744-1060/email, kevin.shelton@okstate.edu or contact Charles Luper-phone, 405-744-5808/email, charles.luper@okstate.edu

For updated information please check our webpage at http://pested.okstate.edu or follow us on Twitter@OkstatePestEd (OSU PSEP)

Wheat Disease Update
May 9, 2020

By: Bob Humger, Wheat Pathologist OSU
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This past week was quite cool across Oklahoma (mid 60s F in Stillwater today) and central Oklahoma received needed rain. Unfortunately, western OK and the panhandle were not as fortunate and remain dry. Wheat around Stillwater this week was as far along as the milk to soft dough stage; wheat today at Lahoma in north-central OK ranged considerably but was as far along as approaching full kernel but watery.

Stripe rust has fairly well shut down across the state as indicated by turning to the telial spore stage (see 27-April update at http://entoplp.okstate.edu/pddl/2020/PA%2019-15.pdf), and although this cool weather with rainfall and dew in central OK will favor stripe rust, I doubt if we will stay sufficiently cool and wet for stripe rust to pick up again across Oklahoma (plus, northwestern OK and the panhandle remain dry). However, leaf rust has started to become more prevalent over this past week and likely will continue to increase in areas where there is rainfall or dew formation. This past week around Stillwater, both Dr. Brett Carver and I were able to rate plots and trials around Stillwater for leaf rust incidence and severity. Additionally this past week here at Stillwater for the first time in about a decade, I found wheat stem rust. Recall there are three wheat rusts including stripe rust, leaf rust, and stem rust. Stem rust is rare in Oklahoma and is only observed in years when we have an extended cool spring (much like this one).

Figure 1 shows photos comparing these three rusts on wheat leaves. In contrast to the implication of its name, stem rust can occur on leaves as well as on stems, whereas pustules of stripe rust and leaf rust are more typically found on leaves.

Leaf browning also is still apparent around much of the state and has multiple causes this year as discussed in the 27-Apr Disease update (http://entoplp.okstate.edu/pddl/2020/PA%2019-15.pdf). These causes include leaf spot diseases, freeze, drought, necrosis (tissue death) due to a resistant reaction to stripe rust, and even a browning due to an unknown physiological factor. Over this past week, both Dr. Brett Carver and I have observed another possible cause of leaf browning, which is bacterial streak (Figure 2). Bacterial streak isn't usually a significant problem in Oklahoma, but occasionally has been observed in low to moderate incidence. It causes not only a browning of leaves (but without the "pepper spots" as with Septoria/Stagonospora), but also can cause a darkening of the heads (black chaff). As I said, we have not confirmed bacterial streak to be present, but it is a possibility.

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Figure 1. The active spore stage (urediniospores) of the three wheat rusts, including stripe rust (left photo; credit to Dr. Guy Padgett, Louisiana State University), leaf rust (second photo from left), and stem rust (two photos on the right). Note the difference in color between stripe rust and the other two wheat rusts. Leaf rust and stem rust spores are similar in color, but stem rust pustules typically are more robust than leaf rust, often are found on leaves as well as stems, and seem to me to have a bit darker brick-red brown color than leaf rust. Figure 1. Wheat leaf rust (courtesy Dr. Jeff Edwards, OkSU)

Figure 2. Bacterial streak on wheat leaves (left photo; Dr. Jeff Edwards, Oklahoma State University), a wheat head and stem just under a wheat head (center photo), and causing black banding on wheat awns (right photo).

Finally, it is worth mentioning that a number of individuals have reported seeing a higher incidence of wheat heads with loose smut (Figure 3) this year. This agrees with what Dr. Carver, Dr. Amanda de Oliveira Silva, and I have seen. Spores of the loose smut fungus (Figure 3, right photo) are released in the field when wheat is flowering. The spores infect the fertilized seed and are carried within the seed. If this infected seed is used to plant the next year's crop, the growing plant from that seed will be infected and produce loose smutted heads in the spring – hence, completing the disease cycle. The ways to avoid problems from loose smut are to (1) not save seed wheat from fields in which loose smut is present, and (2) plant seed wheat treated with a fungicide labeled for use to manage loose smut. Many such seed treatments are available. I need to point out that if you have a field this year with loose smut and you plant treated wheat in this field next year, there may still be some loose smut-infected plants the next spring. These infected plants would not be from the treated seed wheat, but are volunteer plants from the previously infected crop. If you have questions about the bunts and smuts please contact your local county extension educator or me, Bob Humger.

Figure 3. Loose smut of wheat. The center photo is to show that the smut fungus does not necessarily take over an entire head. The left photo is to show the powdery nature of the spores of the loose smut fungal pathogen.

Water Quality Affects Pesticide Performance

Before blaming applicator error or attributing poor pesticide performance to a faulty product, check the water.

"Failed application causes are not always obvious," says Kim Brown, pesticide safety coordinator at the LSU AgCenter in Alexandria, LA.

Brown, speaking at the recent Louisiana Agricultural Technology and Management Conference in Marksville, LA, said applicators might blame other factors, maybe weather or pest resistance, for poor control.

"Water can make up more than 95 percent of the spray solution," she says, "so poor water quality could affect pesticide efficacy."

Water quality factors that affect pesticides' ability to bind include turbidity, pH, hardness and temperature.

Those factors may reduce solubility and absorption by the target plant and could require retreatment.

Turbidity, Brown explains, is the haziness of a liquid caused by suspended particles. "Suspended positively-charged organic pesticides are attracted to and bind with negatively-charged particles in water. Some products, glyphosate, for instance, bind to suspended sediments, rendering them unavailable for plant uptake."

Brown says pesticide labels may offer warnings such as: "Product performance may be significantly reduced if water containing soil sediment is used as a carrier. Do not mix the product with water from ponds or ditches that is visibly muddy or murky."

"So, clear water should be okay?" she asks. "Maybe, maybe not." The pH makes a difference, too.

"Pesticides are normally formulated as weak acids or neutral to weakly alkaline," she says. "A general rule of thumb: Pesticides perform best in slightly acidic water, pH 4 to 6.5."

She says pH outside the preferred upper or lower range can compromise performance. "In some cases, pesticides will fall out of solution."

She says paraquat is not stable at pH above 7.

She advises testing water pH. A highly accurate test kit, she says, may be as much as $500. A cheap option, paper test strips, "are good for field testing. A hand-held device runs about $50 and is fairly reliable."

She says a pH of 5 to 6 is a good target. Water with a pH of 5 to 8 should be good, then?

Maybe, but dissolved minerals, hard water, could cause trouble, too. "Pesticides bind with those minerals," Brown explains, "and can't enter the target pest."

Again, she recommends testing. "Lab testing is the most accurate and costs $6 to $10 per sample. Results are very reliable and should be available in three to five days."

Test kits are available, but Brown recommends users make certain the kits contain everything they need. Paper strips, she says, are cheap, "but not highly accurate."

Water is clear, free of minerals and the pH is well within range, what else could go wrong? Temperature.

"Water temperature above 102 degrees creates problems," Brown says, "and 40 degrees is too low." She says 72 degrees is a good target.

She cautions pesticide applicators not to lose track of "the big picture. Drift, pesticide selection, application timing, etc., remain important concerns."

She says water plays an important role in effective pesticide performance. She offers a check list:

- Sediments can bind up pesticides.
- High pH (above 8) can be harmful to pesticides.
- High mineral content can bind up pesticides.
- Extreme water temperature can affect pesticide performance.

Before looking for something or someone to blame, she cautions, check the water.

(Southwest FarmPress, March 11, 2020) https://www.farmprogress.com/crops/water-quality-affects-pesticide-performance Source: May 2020 Pesticide Reports Division of Agricu1tural Sciences and Natural Resources• Oklahoma State University• http://pested.okstate.edu

Relax, we can answer your cucurbit questions .

https://www.uaex.edu/publications/MP558_ArkansasCommonCucurbitProblems_Final2.pdf

Do you want to know what Extension is doing in Logan County? Find out on these websites.

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