Issue 846

K-STATE Research and Extension

Extension Agronomy

eUpdate

03/25/2021

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate 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 Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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1. Update on Kansas wheat 2021: A tale of two crops

The crop conditions around Kansas are variable depending on region and planting date. Around the state, there was good precipitation around mid-September, so wheat that was planted up until the later part of September emerged on time and attained good stand establishment and early development. For the large majority, these would include wheat fields planted after a fallow period in western Kansas (about 57-66% of the crop in western Kansas), and wheat fields planted after wheat or after canola in central Kansas (about 32-49% of the crop in central Kansas) (Figure 1, 2, 3). For the most part, these fields emerged by the first week of October and were able to produce a good number of tillers, as well as good root development, improving its winterhardiness.

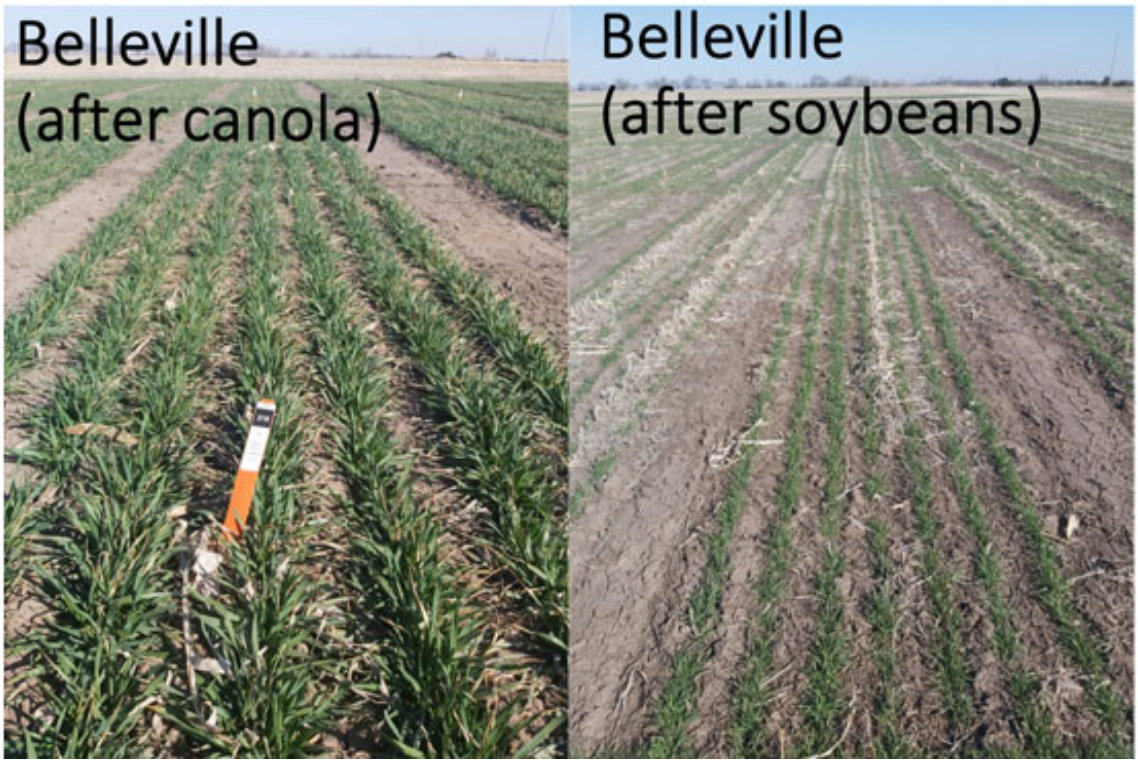

Figure 1. Wheat crop planted late-September after canola or early-October after soybeans in Belleville, North Central Kansas, during the 2020-21 season. Photos by Nicolas Giordano, graduate student in Agronomy.

Wheat fields that were planted later, especially those after ~October 10th, had very limited moisture to ensure a timely emergence, owing to a very dry month of October and early November (Figure 4). These fields were usually planted after a preceding corn crop in western Kansas or after soybeans in central Kansas. Even if these fields were planted relatively on time (for example, mid-October in central Kansas), the emergence rate was considerably lower due to a lack of precipitation. Consequently, as much as 36% of the Kansas crop emerged as late as November, depending on the region of the state. These fields had a much more limited development in the fall both in terms of tillers and root, owing to a combination of a late emergence and cool and dry weather conditions.

Figure 2. Wheat crop planted mid-September after wheat or early-October after soybeans in Hutchinson, North Central Kansas, during the 2020-21 season. Photos by Luiz Pradella, visiting scientist, Agronomy.

Figure 3. Wheat crop planted late-September after a fallow period near Leoti, West-Central Kansas, during the 2020-21 season. Photo by Romulo Lollato, K-State Research and Extension.

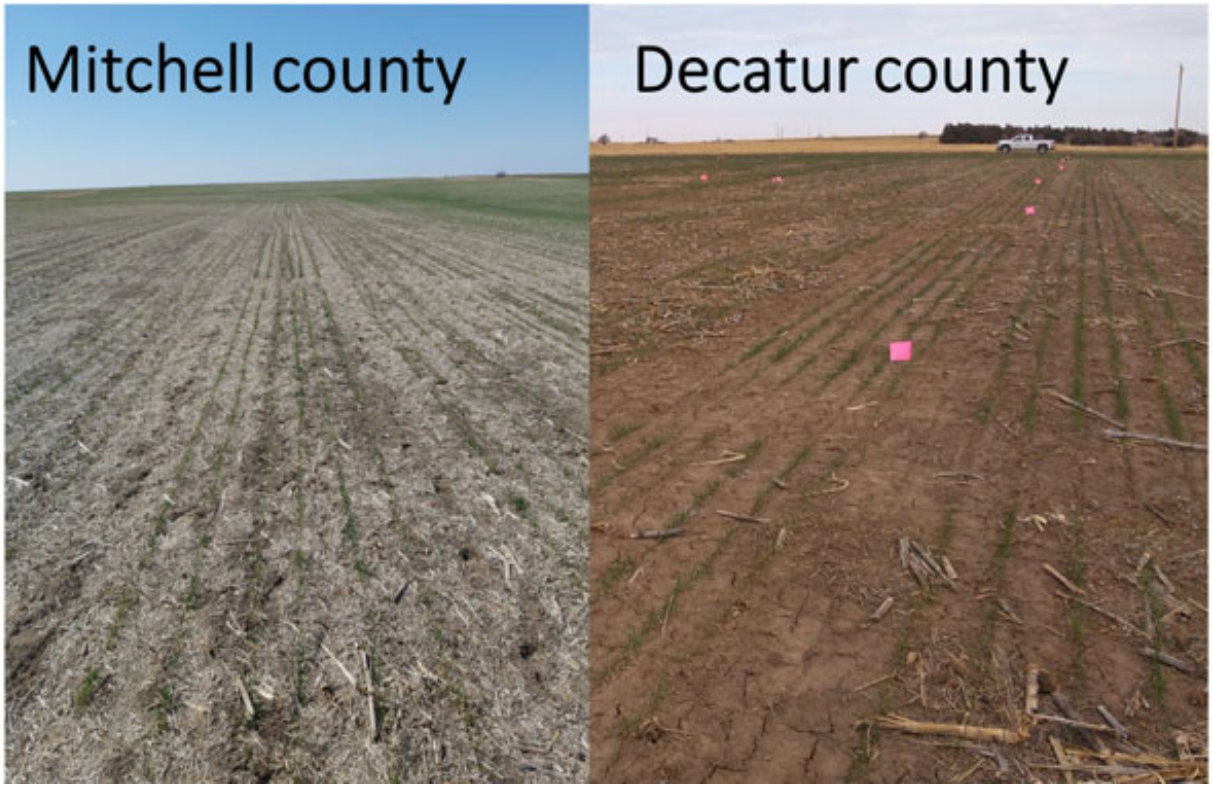

Figure 4. Wheat planted mid- to late-October in Mitchell county (North Central Kansas) and Decatur county (Northwest Kansas) that did not emerge until November or December 2020.

Any winterkill from the mid-February arctic temperatures?

The lowest air temperatures in mid-February ranged from -11°F in south central Kansas to -29°F in north central Kansas, which is sufficiently cold to cause damage and/or winterkill to the wheat crop. Another factor increasing the chances of winterkill was the dry topsoil at the time of the cold spell, as well as very limited snow cover (only 1-2 inches received for the majority of the wheat growing region in Kansas, as compared to as much as 10 inches in parts of Oklahoma and up to 20 inches in parts of Nebraska). While the three factors above increase the chances for winterkill, one promising factor at the time was that soil temperatures at the 2-inch depth never reached single digits, being usually sustained above ~12-14°F in north-central and northwest Kansas, and at higher temperatures in other parts of the state. The temperature at this depth is important as it reflects the environment where the crown of the crop is located, and minimum temperatures at single digits or lower can increase the chances of winterkill, as seen in past years in Kansas. At any rate, the potential for winterkill from the aforementioned factors would be greater in a small (late-emerged) crop, as it would have less tillers and a less developed root system, being less cold hardy. At the moment, several field visits across the state have not resulted in visible widespread winterkill, so the perspective is positive

Recent weather conditions

In the period between March 12-24, there was anywhere from 0.85 to 8 inches of precipitation accumulation across the state (Figure 5). This precipitation will definitely bring several benefits to the crop: (i) improve the chances of recovery from any potential winter damage; (ii) incorporate the N and S fertilizers topdressed earlier in the year; (iii) promote spring tillering, which can still contribute

to yield especially in the late-emerged crop; (iv) match the period with increasing water demand in the spring as the crop elongates the stem, likely being used more efficiently by the crop.

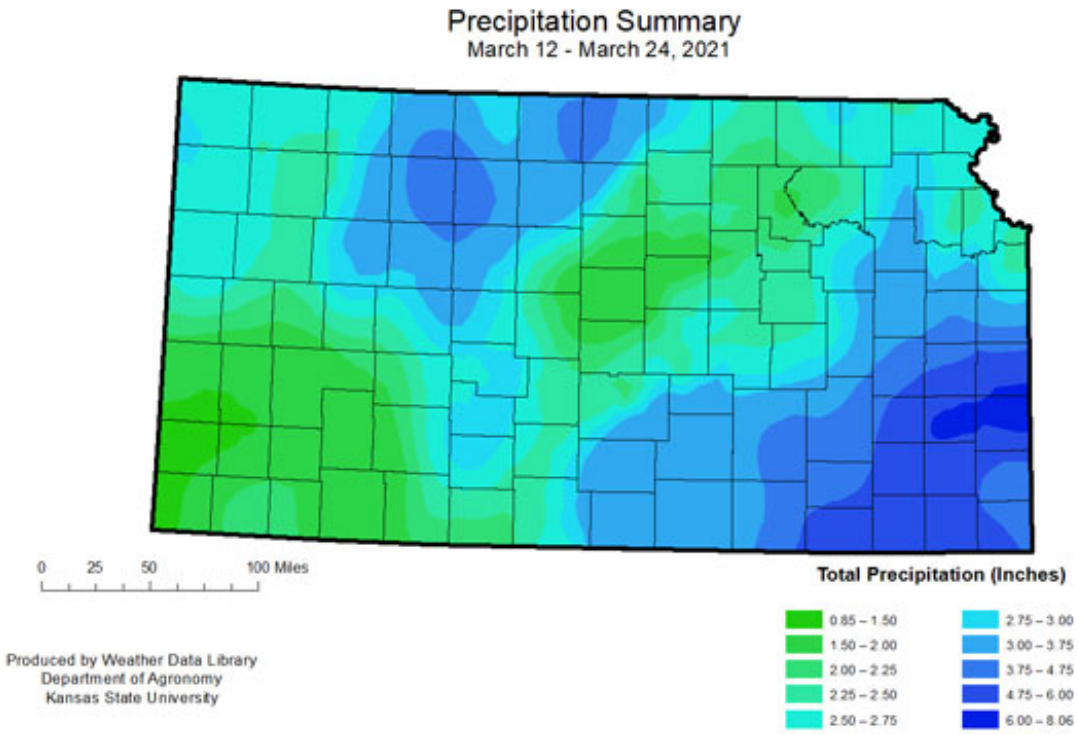

Figure 5. Total precipitation for the period of March 12-24, 2020. Map by the Weather Data Library.

How efficiently can the wheat crop use the available water?

A survey of 654 commercial wheat fields in Kansas during 2016-2018 showed that the average water use efficiency for wheat in Kansas is about 2 bushels per acre per inch of available water (rainfall plus soil water stored at sowing). However, some fields were as efficient as ~5-8 bushels per acre per inch if the precipitation was timely and used more efficiently, coupled with appropriate management. These recent precipitation events were definitely timely, so might be used efficiently by the Kansas wheat crop.

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2. Outlook for stripe rust in the 2021 Kansas wheat crop

The weather is warming, and wheat has started to green up across the state. With the onset of spring weather, it is time to look at factors that could influence the yield potential of the Kansas wheat crop. Recent rainfall across the state has improved the condition of the crop. Producers may be starting to consider disease management plans.

Looking south helps predict disease outbreaks in Kansas

Experience has taught us that weather conditions in Texas play a critical role in the development of regional outbreaks of stripe rust. Weather conditions in Texas in both the fall and spring can be used to predict the severity of the disease in Kansas in a given season. K-State research has been focused on further understanding these weather relationships. This year there were two weather events that may lower stripe rust pressure in Kansas: 1) dry weather in the fall in Texas, and 2) the recent February freeze event in Texas. The early dry weather likely lowered overall inoculum levels heading into the spring. The recent freeze likely killed off leaves with active stripe rust pustules. These two weather events together should delay arrival of stripe rust in Kansas and lower overall final disease levels.

The research points to two time periods that strongly influence the amount of disease in the region. The first time period occurs in the preceding fall (October - December) when the wheat crop is being planted and beginning to grow. The second time period occurs in the early spring (February - March) as the crop in Texas moves into the grain-filling stage. To illustrate these findings, let us look at a series of maps showing moisture conditions in southern Texas over some recent growing seasons (Figure 1). These maps indicate that stripe rust epidemics in Kansas are often preceded by above-normal moisture conditions in these key overwintering locations for the rust diseases. However, when these regions are dry, stripe rust severity in Kansas generally remains low. A look at the moisture patterns for 2021 indicates that rainfall in this area was below normal (see the 2021 map in Figure 1). This pattern suggests that the risk of a severe outbreak of stripe rust in Kansas is low for this year.

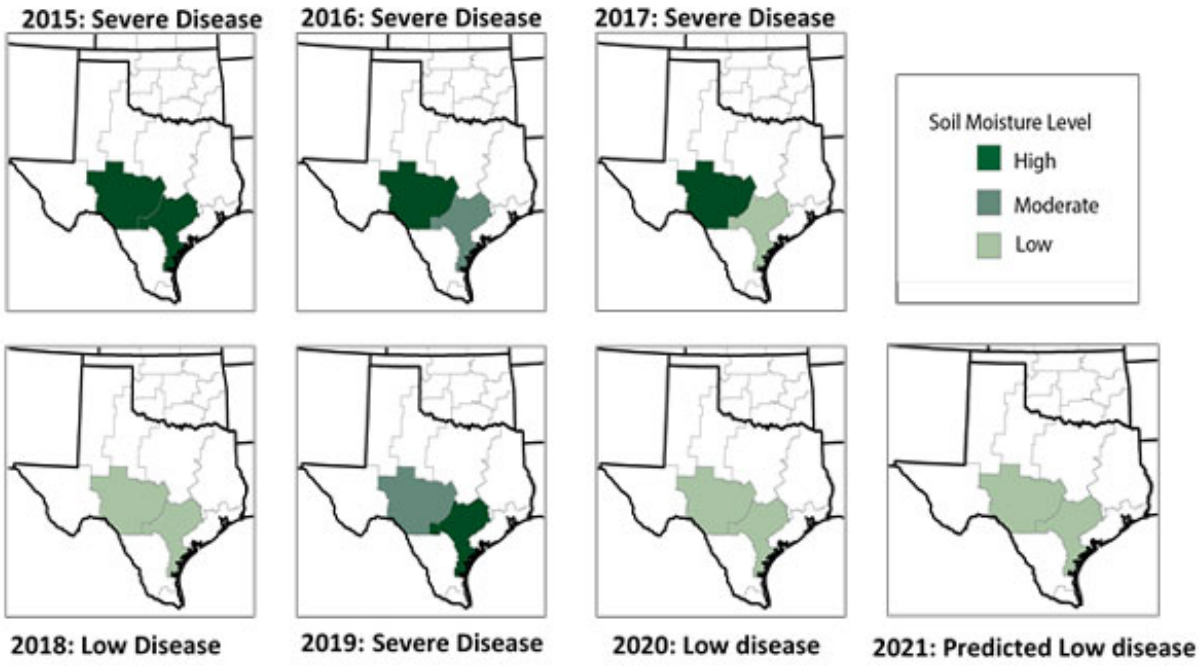

Figure 1. Soil moisture levels in southern Texas when the wheat crop was established for the 2015-2021 growing seasons. Notice that in the low disease years, dry conditions (lightest green colors on the maps) dominate southern Texas. In years with severe stripe rust, moderate or high soil moisture conditions are prevalent in these same regions. These maps show soil moisture levels based on November "Palmer Z-Index" provided by NOAA-National Centers for Environmental Information.

This is consistent with observations from Dr. Amir Ibrahim, wheat breeder at Texas A&M University, who has indicated lower than normal stripe rust in 2021 with no disease observed in breeding nurseries near San Antonio and low initial levels of stripe rust reported near College Station.

Reports from Dr. Bob Hunger and Dr. Amanda de Oliveira Silva, Oklahoma State University indicate low levels of stripe rust near Stillwater, OK. Leaf rust was also detected prior to the freeze event, but has not been detected since.

Although weather this past week has been favorable (cool and wet), we have not received any reports of stripe rust in Kansas in 2021. We will need to remain vigilant over the coming weeks to see if the disease moves north.

Please contact us (andersenk@ksu.edu) if you detect stripe rust in Kansas so we can update regional maps.

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3. World of Weeds - Giant ragweed

Giant ragweed (*Ambrosia trifida*), also called horseweed, often comes to mind as a contributor to seasonal allergies in the fall. However, emergence of this weed begins in early spring, making it a timely topic for the March World of Weeds article.

Ecology of giant ragweed

There are several ragweed species that are native to North America. Species found in Kansas include two summer annuals, giant ragweed and common ragweed (see Table 1), and two perennials, western ragweed and woollyleaf bursage (bur ragweed). Wollyleaf bursage is a noxious weed in Kansas and was featured in Issue 820 on September 25, 2020.

Table 1. Key features that distinguish giant ragweed from common ragweed.

	Giant ragweed	**Common ragweed**
Distribution	Throughout US	Throughout US
Height	3 to 16 feet	6 inches to 5 feet
Stem	Rough hairs when mature	Hairs when young
Leaves	Opposite then alternate, 3-5 lobes, rough	Opposite then alternate, many lobes, hairy

Giant ragweed is often found in ditches and fencerows. It is a problem in cultivated crops, especially those in bottomlands, throughout the United States. Giant ragweed is an annual plant that emerges March through June, with peak emergence in Kansas in mid-April.

Identification

Seedlings emerge with large, fleshy cotyledons with a purple stem (Figure 1-top photo). Giant ragweed typically grows to about 5 feet tall, but can reach up to 20 feet in ideal environments. Stems and leaves are rough and hairy. Leaves are opposite and typically having three lobes, but there is variability in lobe number (Figure 1-middle photo). Leaves are 4 to 8 inches wide by 2 to 12 inches long with toothed margins.

Giant ragweed produces green flowers from July through October. Pollen-producing male flowers are clustered at the ends of the branches with seed-producing female flowers below the cluster (Figure 1-bottom photo). Brown, crown-shaped seeds with 6 points are 1/4- to 1/2-inch long and about 1/10-inch wide.

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Figure 1. Giant ragweed seeding (top photo), leaves with differing number of lobes (middle photo), and flowers (bottom photo). Photos by Sarah Lancaster, K-State Research and

Extension.

Management

Giant ragweed is very competitive, especially in soybean, where 1 plant per square yard can reduce yield up to 77%.

Giant ragweed in the United States has confirmed resistance to glyphosate (Group 9) and ALS-inhibiting herbicides including Pursuit, Classic, and FirstRate (Group 2), with glyphosate-resistant giant ragweed confirmed in Kansas (Table 2).

Table 2. Occurrence of herbicide-resistant giant ragweed in the US

State	**Herbicide site of action group**
Arkansas	9
Illinois	2
Indiana	2, 9
Iowa	2, 9
Kansas	9
Kentucky	9
Minnesota	9
Mississippi	9
Missouri	2, 9
Nebraska	9
Ohio	2, 9
Tennessee	9
Wisconsin	2, 9

Data from www.weedscience.org
Herbicide site of action group 2 = ALS-inhibitors; 9 = EPSPS inhibitors

Studies conducted in Nebraska suggest that tillage or burndown application of 2,4-D provided excellent control of giant ragweed 14 days after treatment. In the same study, the greatest season-long weed control was recorded from treatments that included sulfentrazone at planting and/or multiple applications of glyphosate. Other effective herbicides include dicamba, metribuzin, Boundary, Envive, and Surveil.

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The use of trade names is for clarity to readers and does not imply endorsement of a particular product, nor does exclusion imply non-approval. Always consult the herbicide label for the most current use requirements. For more information on controlling marestail, see 2021 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland, K-State publication SRP-1162.

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4. Join the CoCoRaHS Network...because every drop counts!

Most people think basketball when they hear the phrase "March Madness". However, in the weather reporting world, March Madness means the annual recruitment drive for the national Community Collaborative Rain Hail and Snow network (CoCoRaHS). Every state vies for the chance to have the most recruits during the month of March. A trophy is awarded for both the total number of new recruits and for the highest per capita recruitment total. The latter category gives states with lower population densities a chance to win against the more populous states.

What is CoCoRaHS?

CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow Network. CoCoRaHS is a unique, non-profit, community-based network of volunteers of all ages and backgrounds (Figure 1) working together to measure and map precipitation (rain, hail, and snow). By using low-cost measurement tools, stressing training and education, and utilizing an interactive website, the aim is to provide the highest quality data for natural resource, education, and research applications. CoCoRaHS has been active in Kansas since 2004. More observers are always very welcome.

Figure 1. Two young scientists in the making! Weed Science Specialist, Sarah Lancaster, sent in this photo of her two sons reading their CoCoRaHS rain gauge following a rain event in late

April 2020. Photo by Sarah Lancaster, K-State Research and Extension.

Each time a storm -- rain, hail, or snow -- crosses your area, volunteers take measurements of precipitation from as many locations as possible. These precipitation reports are recorded on the website, https://cocorahs.org/. The data are then displayed and organized for the end users to analyze and apply to daily situations ranging from water resource analysis and severe storm warnings to neighbors comparing how much rain fell in their backyards. For example, Manhattan was able to document the highest rainfall amount during the Labor Day 2018 flood, thanks to a CoCoRaHS observer (Figure 2).

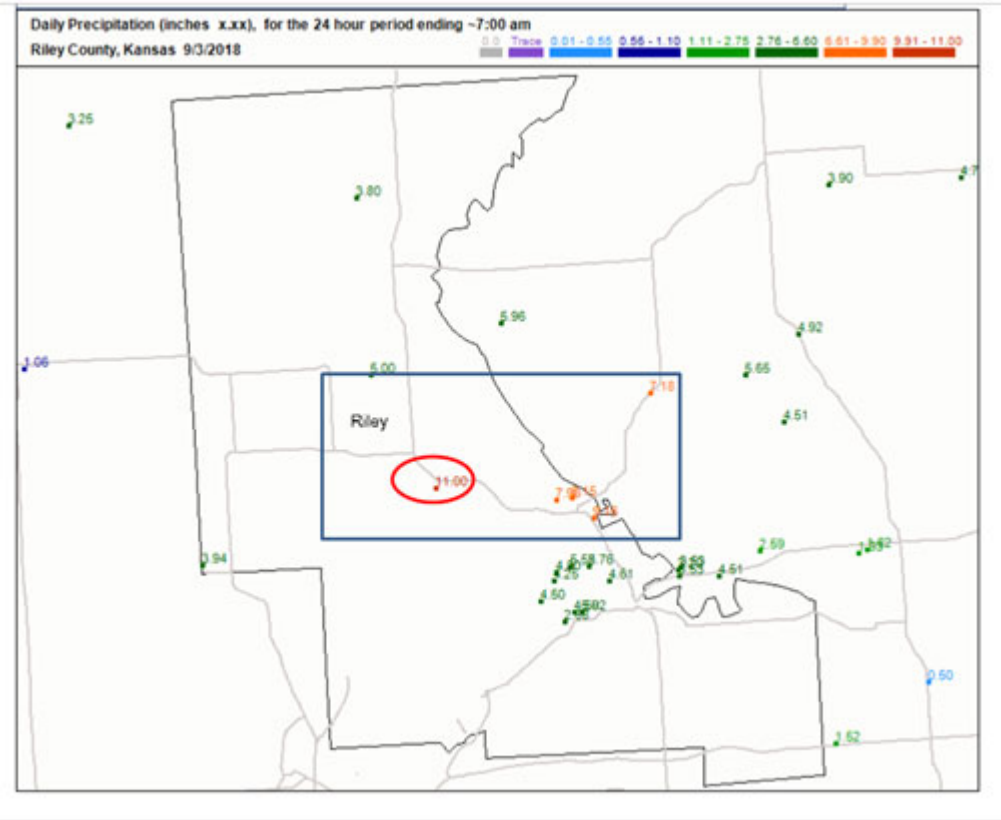

Figure 2. Riley County, KS CoCoRaHS reports for September 3, 2018.

No rain is still an important observation

Volunteers also report when it DOES NOT rain. Documenting the fact that a part of the county missed a precipitation event helps improve our understanding of drought conditions. That information is also useful in improving radar and satellite rainfall estimates.

Who uses the CoCoRaHS data?

CoCoRaHS is used by a wide variety of organizations and individuals. The National Weather Service, other meteorologists, hydrologists, emergency managers, city utilities (water supply, water conservation, storm water), insurance adjusters, USDA, engineers, mosquito control, ranchers and farmers, outdoor & recreation interests, teachers, students, and neighbors in the community are just

some examples of those who visit the website and use the data.

One of the neat things about participating in this network is coming away with the feeling that you have made an important contribution that helps others. By providing your daily observation, you help to fill in a piece of the weather puzzle that affects many across your area in one way or another.

Don't worry if you don't get signed up in March. New observers are welcome any time of the year. In fact, while Kansas hasn't won either trophy in a number of years, we have seen steady increases in observers with June actually being our top month for recruitment. We have also achieved a significant milestone – highest percentage of new recruits actually making their first observation. It is important to make that second step. After you sign up and get your gauge, actually deploy the gauge and send in the observations.

To join CoCoRaHS, just go to the website CoCoRaHS.org and click "Join Now".

If you have questions about the program, contact Mary Knapp at Kansas State University by email at mknapp@ksu.edu or phone at 785-313-1562.

WANTED!

VOLUNTEERS OF ALL AGES
TO HELP SCIENTISTS STUDY STORMS

Measure precipitation in your own backyard with CoCoRaHS!

The **Community Collaborative Rain, Hail and Snow Network (CoCoRaHS)** needs you! Everyone can participate, both young, old, and in-between. The only requirements are an enthusiasm for watching and reporting weather conditions and a desire to learn more about how weather can affect and impact our lives.

CoCoRaHS needs your help !

To learn more or to become a volunteer observer, please visit our web site at:

www.cocorahs.org

Funding for CoCoRaHS provided by:

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