

## **Auglaize County OSU Extension Weekly Agriculture Newsletter – January 29, 2020**

### **Scouting and Latest Information**

Hello!! Good morning! I pray you are well.

If you are a buyer or seller of hay, let me know and I can keep a list to share with others. Call the OSU Extension office at 419-739-6580 or e-mail me at [stachler.1@osu.edu](mailto:stachler.1@osu.edu).

### **Joke: What do you call a sleeping bull??**

Rain fell two days in the past week. Rainfall for Friday, January 24<sup>th</sup>, ranged from 0.28” near Valley and Idle Roads to 0.4” at about 1 mile north of St. Marys, near Kettlersville and Santa Fe – New Knoxville roads, and near Uniopolis. Rainfall for Saturday ranged from 0.02” near Kettlersville and Santa Fe – New Knoxville roads to 0.31” at about 2 miles southeast of Fryburg. Rainfall for the week ranged from 0.33” near Townline – Lima and Wapakoneta – Fisher Roads to 0.66” at about 2 miles southeast of Fryburg. The average rainfall for the week was 0.44”. The average high temperature is now 35 degrees F. Hurray we are headed in an upward trend of temperatures!! Temperatures for the week were either equal to the average high temperature or above the average high temperature.

Wheat – I have not rated the wheat for some time. I rate the wheat the same as last week which was 7% excellent, 29% good, 69% fair, and 0% for poor and very poor.

Alfalfa – Nothing to report.

Corn – There is still corn to be harvested in the county that I am aware of.

Soybean – Nothing to report.

Weeds – When planning your herbicide programs do not forget to choose herbicides to control waterhemp! If you need help planning your herbicide program, feel free to call the office.

Insects - No report.

**There WERE large changes to the Engenia label this past week. There were NO changes to the XtendiMAX, FeXapan and Tavium labels.** The Engenia label still has the most approved products compared to XtendiMAX and FeXapan. No new herbicide was added to the XtendiMAX label this past week, which totals 202 herbicides. No new adjuvants were added the XtendiMAX label, now totaling 386. No new nozzles were added to the XtendiMAX label, which totals 36. No new Drift Reducing Adjuvant (DRA's) were added to the XtendiMAX label this week, making a total of 64 DRA's. No new nutritional products were removed from the XtendiMAX label which totals 215. No new products were added to the Insecticides, Fungicides, Plant Growth Regulator and Other group on the XtendiMAX label which totals 97. Sixteen new adjuvants were added to the Engenia label, which now totals 516. Nine new herbicides were added to the Engenia label, which brings the total herbicide count to 155. Two new products were added to the Other category (growth regulators, and fungicides) on the Engenia label, which totals 31. Three new insecticide were added to the label which currently has 31 products. Seven new Drift Reducing Adjuvants (DRA's) were added to the Engenia label, which totals 115. No new nozzles were added to the Engenia label, which totals 29. Twenty-eight new nutritional products were added to the Engenia label which totals 205 products. No new product was added to the pH Modifier group of the Engenia label which totals 16 products. The FeXapan label has many of same the products and nozzles as the XtendiMAX label, but NOT all are the same, so check the FeXapan label carefully. There are 120 herbicides, 49 DRA's, 312 adjuvants, 151 nutritionals, 44 insecticides, fungicides, and others, and 26 nozzles that have been approved for the FeXapan label. There are 47 herbicides, 77 DRA's, 258 adjuvants, 30 nutritionals, 16, insecticides, 7 fungicides, 8 other products, and 41 nozzles approved for use with Tavium.

## Upcoming Meetings

**Get signed up for these important meetings!! Time is running out for some of these meetings.**

- 1. Farm Transition/Succession Workshop.** This meeting is a two day workshop. The meeting will take place on February 3 and February 25, 2020 from 10:00 AM to 3:00 PM at Mid-Ohio Energy in Kenton, Ohio. David Marrison, Robert Moore, and Peggy Hall will be the speakers for this meeting. The cost for the meeting is \$30 per person and registration is due January 27, 2020. To register contact the Hardin County Extension office at 419-674-2297 or email [stachler.1@osu.edu](mailto:stachler.1@osu.edu).
- 2. H2Ohio Meeting by SWCD.** This meeting is being held on February 11, 2020 at 6:00 PM at the Auglaize County Junior Fair Building. Contact the Auglaize County SWCD at 419-738-4016 for more information.

**Answer to joke: A bull-dozer!**

### Choosing Herbicides for 2020 Soybean Crop



Some soybean herbicide choices have already been made for 2020, while others are making those decisions now. Choosing soybean herbicides for 2020 is very critical to maximizing weed control.

Based upon the 2019 weed survey, only 12 percent of soybean fields were weed free at harvest time in Auglaize County, meaning some work needs to take place to improve weed control. This was an improvement by 7% over last year, so thank you for working harder to achieve more weed free fields. The top three weeds in soybean fields in 2019 were waterhemp at 53 percent, giant ragweed at 32 percent, and marestail at 20 percent. Giant ragweed declined by 50%! Thank you! Waterhemp populations continue to grow. In 2019, waterhemp was found in 57 percent of fields west of I-75 and 46% of fields east of I-75.

Significant changes in waterhemp management are necessary to manage this weed in soybean in 2020 and beyond.

If planting Roundup Ready soybean or Xtend soybean and NOT planning to apply dicamba products postemergence, then purchase fomesafen (known as Flexstar) to control waterhemp and giant ragweed. Fomesafen will not control marehail. Fomesafen needs to be applied at 1.3 pints per acre. When purchasing fomesafen also purchase a methylated seed oil adjuvant or a high surfactant methylated seed oil adjuvant to apply at a rate of 1.5 to 2.0 pints per acre. The methylated seed oil must be used with fomesafen to maximize herbicide activity. Also include a nitrogen-source adjuvant. When applying fomesafen, the spray volume needs to be at least 20 gallons per acre and choose nozzles that produce fine to medium spray droplets.

To control volunteer corn in all types of soybean and to control barnyardgrass and yellow foxtail in LibertyLink soybean purchase clethodim (known as Select) or Fusion. Apply clethodim at four fluid ounces per acre (3EC products), six fluid ounces per acre (2EC products) or 9 fluid ounces per acre (1EC products) or Fusion at six fluid ounces per acre to control volunteer corn. To control barnyardgrass and yellow foxtail, apply clethodim at six fluid ounces per acre (3 EC products), eight fluid ounces per acre (2EC products) or 12 fluid ounces per acre (1EC products) or Fusion at eight to ten fluid ounces per acre.

Residual control of marehail, giant ragweed, and waterhemp is critical to improving postemergence control. For residual control of marehail apply products containing sulfentrazone (known as Spartan) or flumioxazin (known as Valor) and add metribuzin (known as Sencor). These products will also provide good control of waterhemp. To assist in residual control of giant ragweed and marehail be sure the premixes include chlorimuron (known as Classic) or cloransulam (known as FirstRate).

In fields with moderate to heavy waterhemp pressure the addition of metolachlor (known as Dual), Zidua (pyroxasulfone), Outlook, or Warrant should be considered. Adding these herbicides to the above herbicides could preempt the need for a second postemergence herbicide application. Zidua is the most effective of these products. Do not add metolachlor or Outlook with Valor as significant injury is likely.

For burndown herbicides apply glyphosate (known as Roundup) at 1.5 pounds acid equivalent per acre plus 2,4-D ester at 1.0 pound acid equivalent per acre. This combination is usually enough to control weeds in a field, but sometimes control has not been adequate. In addition the combination must be applied 15 days before planting soybeans. Other burndown herbicides include Sharpen, paraquat (known as Gramoxone), and glufosinate (known as Liberty), but there are limitations to these products.

If planting LibertyLink soybean prepare to apply glufosinate two times, but hopefully only one application is needed following a good preemergence herbicide program. The second application should only be necessary in fields with moderate to heavy giant ragweed and/or waterhemp pressure. Apply glufosinate at 32 to 43 fluid ounces per acre.

If you are planning to plant Xtend soybean, there are four dicamba products to choose from. They are XtendiMAX, Engenia, FeXapanm, and Tavium. These products are now restricted use pesticides, so a pesticide license is necessary to apply, mix, handle, and purchase these products. In addition there is a special training you must attend to use these products. These dicamba products must be applied before R1 soybean or 45 days after planting, whichever comes first. Remember that only approved pesticides and adjuvants can be mixed with these dicamba products which you find at manufacturers websites. At this time, Engenia has the most tank-mix partners. Apply XtendiMAX and FeXapan at 22 fluid ounces per acre, Engenia at 12.8 fluid ounces per acre, and Tavium at 56.5 fluid ounces per acre.

Enlist soybeans became available last season. The E3 soybean is resistant to 2,4-D, glufosinate, and glyphosate. The only 2,4-D products allowed to be applied is Enlist One and Enlist Duo. Enlist One is 2,4-D choline by itself and Enlist Duo is glyphosate plus 2,4-D choline. The 2,4-D will control nearly all broadleaf weeds, however it can be a little variable on waterhemp and marehail at times. A good foundational preemergence herbicide program followed by glufosinate plus 2,4-D or Enlist Duo should provide fairly effective control.

## **C.O.R.N. Newsletter**

<https://agcrops.osu.edu/newsletter/corn-newsletter>

No news this week!

## **Other Articles**

Warmer and wetter, Ohio's climate is shifting

[Alayna DeMartini](#)

JAN. 27, 2020



*(Photo: Getty Images)*

COLUMBUS, Ohio—Little snow, warmer days. It's been an unusual winter.

Or has it?

For the past four decades, Ohio's winters have been warming twice as fast as its summers. And the state is getting more rainfall as well. 2019 was the sixth wettest year in Ohio and the 12th warmest, said Aaron Wilson, climate specialist for The Ohio State University College of Food, Agricultural, and Environmental Sciences (CFAES).

"It was certainly our wettest decade on record," Wilson said.

On average, Ohio's annual rainfall has increased 5%–15% since the early 1900s, with the largest increases in areas such as north-central Ohio where fall rainfall has risen by 31%, Wilson said.

So far, this winter is proving to be warmer than average. December was Ohio's 15th warmest on record and January, too, is fairly mild, Wilson said. Despite the recent cold bite, average temperatures in January across Ohio are between 8 degrees and 12 degrees Fahrenheit balmier than average for the month.

Jan. 11 was an unusually temperate winter day. In Columbus, the high was 71 degrees; the average high for that day is 36 degrees.

Snow shovels have not been wielded much. Much of the state is 5–10 inches below average. The Wooster area is down 10–20 inches, and northeast of Cleveland is 20–40 inches below average, Wilson said.

Ohio's warming is not much different from the worldwide trend. 2019 was the second hottest year ever, according to a [report](#) released Jan. 15 from the National Oceanic and Atmospheric Administration.

Across the Midwest, this spring is expected to be warmer—mostly in May and June—and wetter than average, Wilson said. How wet? It's unclear.

Rainfall this spring could hamper planting again, he said.

“Just because it happens one year does not mean it's going to happen the same, the following year,” Wilson said, referring to last spring's record rainfall, the highest ever, which delayed and prevented planting and led to significant drops in corn and soybean yields.

“Given the trends we're seeing, the probability of overall wetter conditions this spring is great, so we need to be prepared.”

Warmer weather causes more evaporation to occur, which puts more water into the atmosphere. That water vapor eventually falls as rain.

Despite the increased precipitation, Ohio still suffers periods of drought as well. By October 2019, 80% of the state was severely dry, and 30% was in moderate drought conditions, Wilson said.

“The rain just shut off,” he said.

September 2019 marked the hottest September on record in Ohio. “So all of a sudden, we were dealing with some drought conditions,” he said.

Even in the face of these weather challenges, farmers can take precautions. To help farmers deal with the impact of climate shifts, CFAES created a farm crisis [task force](#) that offers farmers and their families recommendations for solutions to their challenges.

To contend with the rise in rainfall, Wilson recommends having effective underground drainage systems and finding ways to store water during wet periods to use during intense dry periods. Diverting and collecting water needs to be looked at on a regional level, to have the greatest effect, Wilson said.

Planting cover crops on fields instead of leaving them bare for any period can also slow down the flow of water off of a field, prevent erosion, and improve the condition of the soil, he said.

“It's not that I can tell farmers what the answer is. I'm hoping farmers have conversations on how to build resilience in their communities,” Wilson said. “We can build buffers to these heavy rainfall events and to short-term drought events.”

*(Wilson will address climate change and its effect on farmers at the upcoming Ohio Ecological Food and Farm Association [OEFFA] Conference Feb. 13–15 in Dayton. He will be one of several CFAES speakers*

at the event. For more information on the conference, visit [oeffa.org/conference2020](http://oeffa.org/conference2020). For more information on the farm crisis task force, visit [go.osu.edu/agcrisis](http://go.osu.edu/agcrisis).)

## New experimental vaccine for African swine fever virus shows promise

Date: January 23, 2020

Source: American Society for Microbiology

Source: <https://www.sciencedaily.com/releases/2020/01/200123134053.htm>

Government and academic investigators have developed a vaccine against African swine fever that appears to be far more effective than previously developed vaccines. The research appears this week in the *Journal of Virology*, a publication of the American Society for Microbiology.

Currently, there is no commercially available vaccine against African swine fever, which has been devastating the swine industry in Eastern Europe and Southeast Asia. African swine fever virus (ASFV) is highly contagious and often lethal to domestic and wild pigs. Outbreaks have been quelled -- more or less -- "by animal quarantine and slaughter," according to the report. (Humans are not susceptible to ASFV.)

In the study, both low and high doses of the vaccine were 100% effective against the virus when the pigs were challenged 28 days post-inoculation.

The research was motivated by the 2007 outbreak of African swine fever in the Republic of Georgia, said principal investigator Douglas P. Gladue, PhD, Senior Scientist, Plum Island Animal Disease Center, Agricultural Research Service, US Department of Agriculture. "This was the first outbreak in recent history outside of Africa and Sardinia -- where swine fever is endemic -- and this particular strain has been highly lethal and highly contagious, spreading quickly to neighboring countries." This is also a new strain of the virus, now known as ASFV-G (the G stands for Georgia).

The 2007 outbreak was also the genesis of the African swine fever that has been spreading through Eastern Europe and east Asia, said Manuel V. Borca, PhD, also a Senior Scientist at the Plum Island Animal Disease Center.

There is limited cross-protection between strains of African swine fever, likely because the antigens and degree of virulence differ among them, and none of the historical experimental vaccines have been shown to be effective against ASFV-G, said Dr. Gladue.

So the investigators at Plum Island Animal Disease Center set out to develop a vaccine. Part of the process of developing whole virus vaccines involves deleting virulence genes from the virus. But when the researchers deleted genes similar to those that had been deleted in older ASFV strains to attenuate them, "it became clear



that ASFV-G was much more virulent" than the other, historical isolates, because it retained a higher level of virulence, said Dr. Gladue. The investigators then realized they needed a different genetic target in order to attenuate ASFV-G.

They used a predictive methodology called a computational pipeline to predict the roles of proteins on the virus. The computational pipeline predicted that a protein called I1771 could interfere with the immune system of the pig. When they deleted this gene, ASFV-G was completely attenuated.

More work needs to be done to meet regulatory requirements for commercialization, said Dr. Gladue. But "This new experimental ASFV vaccine shows promise, and offers complete protection against the current strain currently producing outbreaks throughout Eastern Europe and Asia."

## Insect bites and warmer climate means double-trouble for plants

Date: January 21, 2020

Source: Michigan State University

Source: <https://www.sciencedaily.com/releases/2020/01/200121133319.htm>



Caterpillars on leaf (stock image).

Credit: © nataba / [Adobe Stock](#)

Recent models are telling us that, as our climate warms up, herbivores and pests will cause increased damage to agricultural crops. One study predicted that crop yield lost to insects increases 10 to 25 percent for every 1 degree Celsius increase.

Michigan State University scientists think that these models are incomplete and that we may be underestimating the losses. A new study shows that infested tomato plants, in their efforts to fight off caterpillars, don't adapt well to rising temperatures. This double-edged sword worsens their productivity.

According to the study, two factors are at play. The first is rising temperatures. Insect metabolism speeds up with heat and they eat more. Also, warmer temperatures could open up a wider range of hospitable habitats to insects.

Second, and this is what current models ignore, is how the infested plants react to the heat.

"We know that there are constraints that prevent plants from dealing with two stresses simultaneously," said Gregg Howe, University Distinguished Professor at the MSU-DOE Plant Research Laboratory. "In this case, little is known about how plants cope with increased temperature and insect attack at the same time, so we wanted to try and fill that gap."

Plants have systems to deal with different threats. Caterpillar attack? There is a system for that. When a caterpillar takes a bite off a leaf, the plant produces a hormone, called Jasmonate, or JA. JA tells the plant to quickly produce defense compounds to thwart the caterpillar.

Temperatures too hot? Overheated crops have another bag of tricks to cool themselves down. Obviously, they can't make a run for the inviting shade under a tree. They lift their leaves away from the hot soil. They also "sweat" by opening their stomata -- similar to skin pores -- so that water can evaporate to cool the leaves.

Nathan Havko, a postdoctoral researcher in the Howe lab, had a breakthrough when he grew tomato plants in hot growth chambers, which are kept at 38 degrees Celsius. He also let hungry caterpillars loose on them.

"I was shocked when I opened the doors to the growth chamber where the two sets of plants were growing at 'normal' and 'high' temperatures," Howe said. "The caterpillars in the warmer space were much bigger; they had almost wiped the plant out."

"When temperatures are higher, a wounded tomato plant cranks out even more JA, leading to a stronger defense response," Havko said. "Somehow, that does not deter the caterpillars. Moreover, we found that JA blocks the plant's ability to cool itself down, it can't lift its leaves or sweat."

Perhaps, the plants close their pores to stop losing water from the wounded sites, but they end up suffering the equivalent of a heat stroke. It's even possible that the caterpillars are crafty and do extra damage to keep the leaf pores closed and leaf temperatures elevated, which will speed up the insect's growth and development.

And, there are consequences.

"We see photosynthesis, which is how crops produce biomass, is strongly impaired in these plants," Havko said. "The resources to produce biomass are there, but somehow they aren't used properly and crop productivity decreases."

There are many open questions to be resolved but, as of right now, the study suggests that when global temperatures rise, plants might have too many balls to juggle.

"I think we have yet to appreciate the unexpected tradeoffs between defense responses and plant productivity, especially when other types of environmental stress are present," Howe said. "Turning on the defense response may do more harm than good if the plants face high temperatures or other stresses."

The study is published in the journal *Proceedings of the National Academy of Sciences*. The research team from the Howe lab includes Michael Das, George Kapali, Nathan Havko and Gregg Howe. Research on photosynthesis was done with the support of Alan McClain and Thomas Sharkey from the Sharkey lab.

## **IS THIS THE FINAL WORD ON WOTUS, OR IS THE RULE JUST BEING KICKED DOWNSTREAM?**

By: Ellen Essman, Friday, January 24th, 2020

Source: <https://farmoffice.osu.edu/blog/fri-01242020-158pm/final-word-wotus-or-rule-just-being-kicked-downstream>

There's always something going on with the waters of the United States (WOTUS) rule. Last September, we wrote a [post](#) about how the 1986/1988 WOTUS rule would replace the 2015 Obama rule until the Trump administration finalized its new rule. Well, the final rule was just announced by the EPA on January 24, 2020. So, what does the new rule categorize as "waters of the United States?" Are there any differences between the rule as it was [proposed in February of 2019](#) and the final rule? Will this version of WOTUS stick?

*What is (and isn't) WOTUS now?*

The Trump EPA's WOTUS rewrite maps out which waters are and *are not* waters of the United States. The following are WOTUS in the new rule:

- The territorial seas, and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide;
- Tributaries;
- Lakes and ponds, and impoundments of jurisdictional waters; and
- Adjacent wetlands.

Notably, this definition is a great deal shorter than the 2015 iteration of the rule, meaning that less waters fall under the rule. For a refresher on the 2015 rule, we discussed it at length [here](#).

In addition, the new rule contains a much longer list of waters that are *not* WOTUS:

- Waters or water features that are not identified in the definition of WOTUS, above;
- Groundwater, including groundwater drained through subsurface drainage systems;

- Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools;
- Diffuse stormwater run-off and directional sheet flow over upland;
- Ditches that are not territorial seas, waters used in foreign commerce, or tributaries, and those portions of ditches constructed in some adjacent wetlands;
- Prior converted cropland;
- Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease;
- Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters that are connected the territorial seas, or waters used in interstate or foreign commerce;
- Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel;
- Stormwater control features constructed or excavated in upland or in nonjurisdictional waters to convey, treat, infiltrate, or store stormwater run-off;
- Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention, and infiltration basins and ponds, constructed or excavated in upland or in non-jurisdictional waters; and
- Waste treatment systems.

A draft version of the final rule is available [here](#), and the EPA has a webpage with more information on the rule [here](#).

#### *Changes made to proposed rule*

The most significant difference between the proposed rule and the final rule is the treatment of some waters connected by ephemeral streams. Ephemeral streams are those streams that only last for a short time after precipitation. In the proposed version of the rule, if upstream perennial and intermittent tributaries were connected to a water of the United States by an ephemeral stream, they were not WOTUS. The final rule changes this, and such tributaries are WOTUS if they have a surface water connection to a downstream water of the United States during a normal year. To make a long story short, the final rule protects some bodies of water that the proposed rule left out.

#### *So, WOTUS is set in stone now, right?*

Not exactly. In addition to the ongoing lawsuits over the brief recodification of the 1986/1988 rules, (see our post [here](#)), it is almost certain that environmental groups and some states will file lawsuits against the new WOTUS rule. Additionally, while many in the world of agriculture cheer the new rule, there are other groups that have already spoken out against it. For example, the group Public Employees for

Environmental Responsibility (PEER), which includes many EPA employees, scientists, and lawyers, filed a lengthy [complaint](#) against the rule with the Inspector General. In the complaint, PEER argues that the new rule violates EPA's "Scientific Integrity Policy," which EPA employees must follow when making decisions. PEER alleges that top employees at the EPA did not follow this policy when writing the rule because the rule was not based on science, and EPA staff with expertise in the area were not consulted. While the new rule is currently the law of the land, we'll have to wait and see how long it will last. Challenges like the PEER complaint will have to be addressed, as well as an inevitable wave of lawsuits. Like the 2015 rule, the lawsuits and challenges will likely alter and/or interrupt the implementation of this so-called "final" rule.

## Dance of the honey bee reveals fondness for strawberries

Date: January 24, 2020

Source: University of Göttingen

Source: <https://www.sciencedaily.com/releases/2020/01/200124124518.htm>

Bees are pollinators of many wild and crop plants, but in many places their diversity and density is declining. A research team from the Universities of Göttingen, Sussex and Würzburg has now investigated the foraging behaviour of bees in agricultural landscapes. To do this, the scientists analysed the bees' dances, which are called the "waggle dance." They found out that honey bees prefer strawberry fields, even if they flowered directly next to the oilseed rape fields. Only when oilseed rape was in full bloom were fewer honey bees observed in the strawberry field. Wild bees, on the other hand, consistently chose the strawberry field. The results have been published in the journal *Agriculture, Ecosystems & Environment*.

A team from the Functional Agrobiodiversity and Agroecology groups at the University of Göttingen established small honey bee colonies next to eleven strawberry fields in the region of Göttingen and Kassel. The scientists then used video recordings and decoded the waggle dances. Honey bees dance to communicate the direction and distance of attractive food sources that they have visited. In combination with satellite maps of the landscape, the land use type that they preferred could be determined. The team also studied which plants the bees used as pollen resources and calculated the density of honey bees and wild bees in the study fields.

Their results: honey bees prefer the strawberry fields, even when oilseed rape is flowering abundantly in the area. However, honey bees from the surrounding landscapes are less common in the strawberry fields when oilseed rape is in full bloom. "In contrast, solitary wild bees, like mining bees, are constantly present in the strawberry field," says first author Svenja Bänsch, post-doctoral researcher in the Functional Agrobiodiversity group at the

University of Göttingen. "Wild bees are therefore of great importance for the pollination of crops," emphasizes Professor Teja Tscharntke, Head of the Agroecology group.

"With this study, we were able to show that small honey bee colonies in particular can be suitable for the pollination of strawberries in the open field. However, our results also show that wild bees in the landscape should be supported by appropriate management measures," concludes Head of Functional

**Prepared by Jeff Stachler**  
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