**Coffee and Plant Science Meeting Minutes – 4/20/21**

Attendance – Art Franke, Aimee Wentworth, Brooke Rudicel, Charles Enea, Darin Hadley, David Greene, Don Rekeweg, Ellen Bauman, Heath Hurst, Jain Young, Janel Meyer, Kate Sanders, Kellie Adkins, Marissa Renz, Mike Werling, Nellie Peffley, Tom Miller

Art Franke – NRCS District Conservationist in Steuben County, IN. He grew up in Lagrange County, and went to Purdue University for sustainable agronomy systems, studying plant and soil science. During his college summers, Art worked for Pioneer doing de-tasseling and seed core work. He also worked with Lennard Ag doing crop scouting for weeds and irrigation management for potatoes.

**Weed biology**

* A weed is any plant growing where people do not want it. Anything can be a weed if you don’t want it where it is.
* All plants need sunlight, water, nutrients, and growing space. If you have a weed competing with your crop, the weed is going to take away some of what that plant needs (water, sunlight, nutrients, etc.). This may take yield away.
* A study from Purdue showed that just two giant ragweed plants per 110 square feet can reduce corn yield by 13%. It also showed that when giant ragweed plants emerges with soybeans and interferes with it for at least four weeks, yields can reduce by more than 25% if weather conditions are unfavorable for crop development.
* Annual: A plant that completes its lifecycle within a year and reproduce typically by seeds only. (redroot pigweed, mares tail)
	+ Common Lambs-quarters (*Chenopodium album*) has goose foot shaped leaves. It has a powdery covering on some of the leaves that can be rubbed off. This can help with identification. It can be found in tilled areas like crop fields.
	+ Redroot pigweed (*Amaranthus retroflexus*) is named for its red root. This is a problematic weed in row crops. It germinates early in the season and seeds in the fall.
	+ Palmer Amaranth (*Amaranthus palmeri*) is becoming more of a problem because of its herbicide resistance. They are 5-6 feet tall, and each plant sets thousands of seeds. You can try different herbicides or walk rows to cut them out.
* Biennial: A plant that completes its lifecycle within two years, growing vegetatively one year and reproductively the second. Typically, only reproduces via seeds. (wild mustard, sweet clover, wild radish)
	+ Poison Hemlock (*Conium maculatum*) is deadly poison. It can cause serious illness or death to animals or humans. Don’t touch or eat. It’s often confused with Queen Anne’s lace or wild carrot, but poison hemlock has purple splotches on the stems. It has a foul odor if it is disturbed. It is susceptible to any herbicides. It flowers in May.
	+ Wild radish (*Raphanus raphanistrum*) grows a taproot and has yellow flowers. It can be seen some on roadsides, but not very common in Indiana.
* Perennial: A plant that lives over multiple yars and can reproduce either via seeds or vegetative means, by rhizomes from the root system, etc. Can be a woody species, such as trees, or herbaceous species, such as turf grass. (e.g. Canada Thistle, Johnsongrass, wild grape vine)
	+ Canada thistle (*Cirsium arvense*) grows and spreads by flowers and fluffy seeds. It has an extensive root system that allows it to spread. It is an Indian prohibited noxious weed, meaning it is illegal to let it grow on your property. It is not as common in row crops because it is fairly susceptible to herbicides and tillage. It’s a problem in pastures and roadside areas.
	+ Johnsongrass (*Sorghum halepense*) is another Indiana prohibited noxious weed. It spreads by seeds and underground rhizomes. It was originally used as a forage species. It’s not found as much in row crops because it is susceptible to herbicides. It is found in pastures and roadsides, sunny areas.
* Weed control options
	+ Tillage exposes the soil, burying weed seed, but it also brings some to the surface of the soil.
		- Tillage is powerful but has major drawbacks. It has a negative impact on biologicals and erosion.
	+ Herbicides are a very powerful tool, but they also have drawbacks. Herbicide resistance is becoming more of an issue. Over-reliance on one single herbicide mode of action group can lead to herbicide resistance. Over application and not following herbicide labels causes issues. Herbicides can cause groundwater contamination, leading to animal and human harm. Herbicide resistance can cause an issue when you’re trying to promote conservation practices.
		- There are chemical mode of action groups.
		- Spray when the weed is small.
	+ Mulching creates a barrier down to keep weed seeds from germinating or keeping germinated weeds from coming above the mulch. This is hard to do on a large scale so it’s better to do on a small scale or garden. Knocking cover crops down can be considered mulching. This is much more doable on a large scale system.
	+ Cultural methods examples are crop rotation, cover crops, etc.
		- Rotating between crops because the weeds that grow alongside a crop tend to have needs that are similar to the crop. You will most likely have grass type weeds in a corn crop, but you probably won’t have grassy weeds in your soybean crop. Adding cover crops and having a diverse crop rotation can break the cycle of these weeds.
		- Cover crops will compete with the weeds.
		- Adjust plant population or row spacing may give the crop a better chance to outcompete the weeds. Keep the weed crowded out and in the shade. Keep the weeds under control when they’re small.
	+ Alternate methods
		- Firing
		- Hand weeding
* Weed ecology
	+ Weeds are typically “ruderal species” meaning they thrive in a recently disturbed or early successional environment.
	+ In nature, weeds colonize disturbed soil, stabilizing the area with their rapid root growth, and contribute to topsoil formation (free cover crop).
	+ In some cases, weeds may be considered beneficial when not competing with desired plants or crops. For example, white clover and dandelions are beneficial to pollinators
* Common weeds in Indiana
	+ Row crop weeds
		- Velevetleaf
		- Amaranth species (redroot pigweed, water-hemp, palmer amaranth)
		- Giant ragweed (can be a huge weed, 10-12 feet tall)
		- Cocklebur
		- Marestail
		- Foxtail grass species
	+ Vegetable gardens and landscaping
		- Purslane has purple stems that creep along the ground. You can pick the entire plant and boil it
		- Hairy Gallingsoga spreads all over and has little tiny white flowers
		- Wild morning-glory species is viny. It will climb up anything and stunt it.
		- Dandelions has a long tap root and is hard to dig out
		- Knotweed
	+ Pasture and Hay
		- Canada thistle has thistles. Hay with thistles will lose its value.
		- Jimsonweed is poisonous and can harm animals.
		- Common ragweed is not poisonous, but it’s not good forage. If it’s present in your hayfield, the field is probably over grazed. If it’s present, you may want to consider re-seeding because it’s outcompeting what’s already present.
		- Curly Dock has big tough weeds that aren’t very palatable to livestock.
		- Burdock tough leaves and burs that stick to people and animals.
	+ Forests
		- Many of the weeds in forests can really have an impact on full grow trees and hardwood samplings that are trying to get a start.
		- Bush honeysuckle
		- Autumn Olive
		- Multi-flora rose
		- Callery pear
		- Garlic mustard
		- Burning bush
		- Kudzu is the vine that ate the south. It will climb up anything. It will bring trees and buildings down. It’s not necessarily a problem in our area because of our winters, but it is in Southern Indiana.
	+ Wildlife habitat
		- Common and cutleaf teasle can be a massive plant (6 ft tall), and it has spines all over it. It is invasive, and it spreads like crazy.
		- Reed canarygrass is a wetland grass. It forms a turf and grows very tall. It puts out a lot of pollen.
		- Callery pear are those pretty white trees flowering currently. It spreads by fruits and root systems. It’s displacing native trees and native vegetation.
		- Poison hemlock is found in waste areas and field edges.
		- Canada goldenrod is a native plant, but it is very competitive. It has pretty yellow flowers in the fall. It is allelopathic meaning it produces a biochemical substance that keeps plants from growing around it. It is aggressive but not invasive.
* Questions
	+ What are some rotations in a garden situation to fight weeds?
		- The garden is tricky because there are so many different species. Every year Art tries to put a different garden plant in an area that it was not in the year before. That’s mainly for pest control.
		- Use companion crops, plants that grow well together
		- Marigolds and zinnias bring pollinators and beneficial insects.
		- Keeps plants in the same family away from each other.
	+ What are your recommendations on using higher strength vinegars and surfactants?
		- Stronger vinegars will burn and kill weeds above ground.
		- One of the participants uses a 20% vinegar. If there isn’t a surfactant in the vinegar, she adds a little dish soap to help it stick. She doesn’t dilute it. Some of the deeper rooted stuff is harder to get rid of with the vinegars.
	+ What are some uses for weeds?
		- Dandelion wine
		- Amaranth species such as lambs-quarters. When young they can be boiled and eaten. Just be careful of your nitrate levels in the soil. This can go with purslane, dandelions, and chicory roots.
		- Be careful to do research so you know what you’re doing.

Heath Hurst is with the Indiana State Dept. of Agriculture as a Resource Specialist.

**Cover Crop Basics**: Going through row crops, gardening, and the organic industry.

* What is a Cover Crop?
	+ A crop planted between a commodity or specialty crop for overall soil and ecological benefits.
* Considerations
	+ Cost
	+ Management
	+ System – If you’ve never dabbled with cover crops, this is going to be a new system.
	+ References/mentors – You want to ask those people who have used cover crops before, what worked and what didn’t? What absolutely failed? You’ll want to come up with some plan B’s and C’s.
	+ Confidence – Start small and slow to build that confidence.
* Benefits
	+ Return on investment
	+ Keeping the soil where it belongs
	+ Healthier soil, healthier plants – You’ll be more resistant to diseases and pests.
	+ Sustainability – In a hundred years, the world will be in different hands, and it will be important to have systems in place to pass you land down.
	+ Moisture retention – In the spring we get lots of rain, but in the summer, there may not be a whole lot of rain. Cover crops can help keep the moisture from the spring in the summer.
* Imitating natural life cycles
	+ The prairie setting is a template to mimic.
* Cover crop species
	+ Brassicas
		- Oilseed radish
		- Rapeseed
		- Yellow mustard
		- Tillage turnips
	+ Legumes – A good complement with corn because they provide nitrogen to the soil.
		- Cowpeas
		- White clover
		- Red clover
		- Crimson clover
		- Hairy vetch
		- Field Peas
	+ Non-legumes
		- Annual rye
		- Barley
		- Buckwheat
		- Cereal rye
		- Oats
		- Sorghum
* Radishes – A good one to start with
	+ Winter kills – don’t have to worry about herbicide or another pass.
	+ Rapid fall growth can capture nitrogen
	+ Alleviate soil compaction – tillage turnips
	+ Above and below ground biomass
	+ The later you plant them the less big they get.
* Hairy vetch
	+ Nitrogen source
	+ Early weed suppression
	+ Can be mowed or crimped for organic systems
	+ Caution! Can be the gift that keeps on giving. Crimp after it flowers but before it seeds.
* Oats – A great one to start with!
	+ Winter kill
	+ Good biomass
	+ Cheap
	+ Suppress weeds
* Cereal Rye
	+ Can be terminated by crimping for organic systems
	+ Weed suppressor
	+ Large amount of organic matter
	+ Can be planted late season
	+ You can harvest seed and use it on a different field next year.
	+ If in vegetable production don’t plant in field with early spring planting, but you can plant plugs of tomatoes in it. Crimp down and then transplant late season plants
* Buckwheat
	+ Phosphorus scavenger
	+ Weed suppressor
	+ Quick grower
	+ Winter kill
	+ Great for pollinators
	+ Don’t want it to go to seed!
	+ One farmer said the most he learned about cover crops was in his vegetable garden.
* Application
	+ Aerial – If there’s no rain for a bit after applying, that’s money down the drain because the seed will die. Talk around to your local SWCDs or seed dealers about who does aerial application.
	+ Broadcast – You can broadcast as you harvest.
		- You can modify your equipment to do different cover crop broadcasting methods.
	+ Slurry seeding
		- If you mix with manure the seed could burn, but there has been success.
		- Talk with those who have done it to see what worked.
	+ Drilled
		- Good seed to soil contact.
	+ Interseeding
		- Planting into standing corn.
* Grazing
	+ A full circle natural system. The system has animals and continuous living roots
	+ As you grow in your cover crop system try to add livestock
	+ Forage kale
	+ Oats, turnips, annual rye
	+ Oats, turnips, cereal rye
	+ Brassicas
* Terminations
	+ Herbicides
		- Residual carry-over – Talk to your seed dealer and mentors because you don’t want to use a cover crop that is not going to handle residual carryover from an herbicide you used previously.
		- Cost
		- Timing – Is it going be a wet spring? Is the cereal rye going to get so tall that you get really nervous.
	+ Mowing/crimping
		- Timing – You can go a little later in the season, but make sure you put it in the right spot
		- Mulch
		- Organic option
	+ Winterkill
		- Free
		- Organic option
	+ Solarization – Put a tarp down to kill vegetation. You can use cardboard down and put your plugs in it.
		- Time consuming – takes several months
		- Can take several months
* Crimping
	+ The one pass system is crimping and planting at the same time. Crimp first and plant behind in the direction you crimped.
	+ In a smaller system you can use a board with to ropes, then stand on the board as you go.
* Resources
	+ Purdue Extension: [www.extension.purdue.edu](http://www.extension.purdue.edu)
	+ No-till farmer: [www.no-tillfarmer.com](http://www.no-tillfarmer.com)
	+ Your local Soil and Water Conservation District: [www.wordpress.iaswcd.org](http://www.wordpress.iaswcd.org)
	+ Natural Resource Conservation Service: [www.nrcs.usda.gov/wps/portal/nrcs/in/home](http://www.nrcs.usda.gov/wps/portal/nrcs/in/home)
	+ Midwest Cover Crops Council: [www.mccc.msu.edu](http://www.mccc.msu.edu)
		- Cover crop decision tool
	+ SARE: [www.sare.org](http://www.sare.org)
* Questions
	+ How do you choose what type of application method to use?
		- If you have irrigation, you can use a broadcaster, either whirly bird or a handheld broadcaster. You can get a walk behind for a bigger area. Both have settings where you can dial them in. You can test it out by lbs/acre too.
	+ Can you expand on companion crops?
		- If you’re doing sweet corn, you might want to have a sweet pea growing with it.
		- Heath likes using cereal rye because it acts as a great mulch and weed suppressor. It also keeps moisture for the late summer when things are dry.
		- White clover is a good companion crop between vegetable rows. It can be mowed to keep it from competing with the crop, but it suppresses weeds and supplies nitrogen to the soil over time.
	+ The Allen County SWCD has an interseeder that it rents out. We’ve been practicing with it for four years. You can seed cover crops into standing corn. We typically do it at V4-V7. This is around the time you’re doing side-dress nitrogen. It’s shown to be profitable. If anyone is interested, give us a call at 260-484-5848, ext. 3. We can do 6-8 rows and we can match other planter widths.
	+ What are some other natural suppressants?
		- Vinegar
		- Garlics and mustards might be natural suppressant, but some research would need to be done.
			* There’s an insecticide for house plants that has garlic in it, but this participant has not heard of using it as an herbicide.
	+ The Nature Conservancy (TNC) has a farmer to farmer mentor program. They have trained mentors, and they are starting classes to train even more. Mentors are paid, and the training is paid as well.
	+ What resource do you have to identify weed species?
		- Purdue has an extension booklet (crop field guide). It has pictures of the weeds as they come up. They will also have how to identify the weed later in the season.
		- Web searches. There are a lot of keys online. There are apps as well that can tell you what the plant is.
		- Agency resources. You can take a plant to Extension, SWCD, or NRCS
		- Weeds of the Midwest book
		- Plant identification books
	+ One participant shared <https://www.aeroseeder.com> to look at videos of aerial seeding cover crops.
	+ One of the participants has a smaller space, and she uses buckwheat in her space as a pollinator and a cover crop. She even incorporates it into areas where she just has wildflowers growing. She doesn’t mind if it reseeds because its roots are shallow.
	+ Every year is different because of the weather. A wet rainy year is going to produce different weeds than a dry year.

Our next “Coffee and” event is **Coffee and Water Quality on May 18th from 8:30am-10:30am**. We all make an impact on our water’s quality, so join us to learn how yours can be a positive and how you can enjoy the rivers around you.

**Allen County SWCD Urban and Small Farms Program**

* Who’s Eligible
	+ Urban farms, small farms, and community gardens within the Western Lake Erie Basin.
	+ A small farm makes less than $250,000 of gross annual revenue.
* What We Offer
	+ Free soil sampling
	+ Technical assistance
* Contact Info
	+ Joelle Neff
		- Joelle.neff@in.nacdnet.net
		- 260-484-5848, ext. 3