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Motivational Speeches from the Bean Field

Integrated Pest Management and Pest Resistance Management- What are they and do they really matter?

The greatest motivational speech ever may have come from a tractor seat. “Screw this up and you’ll end up with a hoe in your hands again!” Likely one of the shortest motivational speeches ever too, but Tom Osborne or Bear Bryant couldn’t have gotten a greater effort out of us.

We got the speech while we were strapped into the seats of what might as well been the space shuttle to us, the technology was so far ahead of where we had been just a few days earlier. Sitting on a steel beam running across the front of a tractor and getting paid to “shoot weeds” from above beat the heck out of whacking them on foot. Some other key points from the boss included “the spray kills everything” “hit as many weeds as you can” “as few beans as you can” “don’t spray each other” and “it’s bright purple so we can all see who’s screwing up”.

A couple of seasons on the bean buggy and we learned a lot about weed management. The spray didn’t “kill everything”, so later in the season we still had some spots to walk. Nozzle selection, distance from and size of target and wind speed were just a few of the variables that determined where and how much purple spray ended up on weeds vs beans. But hey, when the incentive for figuring it out quickly is not spending as much time hiking with a hoe, learning seems easier.

Those first lessons in Integrated Pest Management (IPM) and Pest Resistance Management (PRM) stuck with me because the boss was a great guy who kept things fun and simple knowing the limited attention spans of high school boys. Whatever IMP we were doing seemed like it worked back then since the boss had pretty clean fields, we spent less time on the business end of a hoe, and we got handed some cash.

What is IPM?

Hang in there, I won’t get all scientific. You all have a pretty solid idea of what it is since you’ve been doing it for a living for years, so we’ll just hit a few basics. There are varying definitions of IPM, but the general ideas are;

Integrated Pest Management (IPM) is a process consisting of the balanced use of cultural, biological, and chemical procedures that are environmentally compatible, economically feasible, and socially acceptable to reduce pest populations to tolerable levels.

Integrated means that many strategies are used to avoid or solve a pest problem, like combining higher plant populations or narrow rows with herbicide programs to limit weed competition for example.

Pests... disease, weeds, bugs, politicians...

Management is the process of making decisions in a systematic way to keep pests from reaching “intolerable levels”.

What about Resistance Management?

Pest resistance management (PRM) is the effort to delay pests from developing resistance. Pest resistance will impact yields, increase the cost of production, and limit farmers' future options to manage pests.

There are other definitions out there for PRM, but one thing most of them have in common are concepts relating to "delaying" or "limiting" resistance. Mother Nature has found ways to work around or flat out kick the tar out of a lot of various control measures to date, so "stopping" resistance... probably not possible in the foreseeable future.

Why are These Concepts Important?

We all have a pretty good idea what some various answers to this question are, and the definitions of IPM and PRM lay it out too. If we don't collectively implement and continually improve our IPM and PRM programs, yields drop, cost of production rises, and pest management options become more limited. So yes, we know why the concepts are important, *yet we keep fighting a growing number of resistant pests*. In other words, "we" aren't doing a good enough job.

Oh man, that probably got the blood boiling- hold on. "We" means scientists (industry, university, wherever), industry reps and agronomists, consumers, farmers, EPA lawyers, you name it... collectively guilty of dropping the ball on ensuring that IPM and PRM are developed and carried out effectively. Just to be clear, it isn't that we all said the heck with it and didn't implement IPM and PRM it on purpose. In many cases there were mistakes, miscommunications or some other problem somewhere up or down the information chain that led to pest resistance. We don't need to, or have time to, play the blame game, we just all have to step our game up and do better from the cutting edge science all the way through to the consumer.

Mother Nature is hard to Beat

Let's take a look at just a couple of types of pesticides- insecticides and herbicides- for examples of how quickly and creatively nature has adapted to some of our pesticides.

Insecticide resistance- It could be said our "chemical age" kicked off with the introduction of synthetic organic insecticides in the early 1940's (think DDT). Resistance to DDT was confirmed in houseflies by 1947. New insecticides came out... and with every new insecticide introduction, cases of resistance appeared some 2 to 20 years after their introduction in a number of key pest species. Mother Nature has won every time.

Weed resistance- This has been beating us over the head for decades; we have weeds right here in our fields resistant to a lot of herbicides and they have cost a lot of time and money. But so far, we have risen to the challenge and found a way to pound weeds back into submission for a time. The cycle is evolving, and the discovery of waterhemp resistant to Group 15 herbicides in at least 2 Illinois counties is pretty crappy news. 15's are some of the most resilient and rock solid products we have, used heavily in both corn and beans. Worldwide there are only a handful of cases of grass weeds resistant to the 15's and only one in the US. These waterhemp populations are the first broadleaf weed in the world resistant to the Group 15's. This might not come as a big surprise- the two documented G15 resistant waterhemp

populations in Illinois- were resistant to other herbicides as well, with some now resistant to 6 sites of action.

Group 4 herbicides have been pretty solid for us over the years, so 2,4-D and dicamba resistant soybean systems are viewed as an important tool in weed IPM by many. If we aren't careful though, the ride could be pretty short. Waterhemp resistant to 2,4-D has been found in Illinois, Missouri, and Nebraska, so the experts tell us it is most likely present somewhere in Iowa. The Nebraska population demonstrated a low level of cross-resistance to dicamba.

Good old Mother Nature knows how to stack and manipulate genes pretty well; maybe better than we do.

We can do it

Mother Nature has knocked around a lot of our good IPM strategies, and just demolished us when our IPM work was lacking. On the flip side, we keep bouncing back and finding ways to keep our fields in pretty good shape on a consistent basis. Yes, there are a lot of resistant pests out there, including the pretty scary sounding 5 and 6 way resistant waterhemp. There have been some tough looking fields from weed escapes, but they are dwarfed by the number of incredibly clean fields most growing seasons. We'll keep improving and evolving to try to keep ahead of the pests because it is our livelihood.

I've seen area farmers and service providers broaden their IPM and PRM practices significantly in recent years, in particular being more strategic with rates, timing and product selection in herbicide programs over the last few years. Others are "implementing" additional "pest management" tactics (yeah, one last plug for IPM there) along with their herbicide programs. They mention strategies like narrow rows, cover crops and GIS guided cultivation and I am probably missing a few others.

The bottom line is that spraying the right rates at perfect times alone won't keep us ahead of the pests.

Narrow rows and cover crops alone won't keep us ahead of the pests.

New chemicals and technology alone won't do it.

GIS cultivation or solid seeding or any other strategy alone won't do it.

But if we integrate many strategies... we'll have a pretty good shot at long term success.

And just for fun, I'll leave you with some inspirational words from a farmer I worked for years ago-

"Screw this up and you'll end up with a hoe in your hands again!"

Thanks and have a safe and successful 2019 crop season!