

HEADS UP! (TAKE ACTION NOW)



July 23rd, 2014

by Matt Hagny

The Worst Thing to Happen to Your No-till Cropping in 20 years: Glyphosate-resistant Palmer pigweed alert for KS.

This has blown up (literally and figuratively) across a big swath of central KS this summer, from Wichita westward to Larned, and northward to the Nebraska border—at a minimum. There were isolated documented cases in a couple counties as far back as 2011, and a few were escaping notice or being shrugged off (even by vigilant me) yet as of last year, 2013. The problem is now really obvious, and very widespread. Locations that are undeniably loaded up with GR (glyph-resistant) Palmer amaranth include Wichita, Peabody, Hesston, McPherson, Minneapolis(KS), Clay Center, Lincoln(KS), Beloit, Cawker City, and light infestations westward as far as Larned and Great Bend. Blackwell, Oklahoma and Winfield, KS have had significant infestations for a couple years already, but it's just now becoming widespread and obvious. One no-tiller at Blackwell says, "Our control relies on not letting them emerge....If paraquat stops working, I don't know what is next."

Why is this far more alarming than, for instance, glyph-resistant (GR) maretail, or even GR waterhemp? (GR waterhemp is also prevalent in eastern KS, and gaining a toehold elsewhere, including north of Wichita; a high percentage of maretail across the region are now GR)

At least in central KS, there are still quite a few herbicides suitable for controlling GR maretail, especially where wheat is a major part of the crop rotation. Fall or wintertime applications of several different modes of action (MOAs) are still effective for corn, milo, and soybean acres, and several MOAs are effective yet as preplant or early post-emerge in those summer crops. Most maretail in this part of the world are still susceptible to triazines.

[Click on any image to view larger](#)



All these are Palmers, despite different look of the leaves. A few Palmers dead from glyphosate. Most are unaffected (resistant).



Variations amongst Palmers

GR waterhemp are a problem, too, but again not (yet) in the same category as GR Palmers. In general, the PPO chemical family ('burners,' but also including preplant chems such as Sharpen, sulfentrazone/Authority, Valor) is far more effective on waterhemp than on Palmers. We don't yet have any significant resistance to PPOs by either pigweed species in central KS, but Palmers are just naturally more tolerant of these and it's unusual to get complete control of Palmers from these without stacking full rates of two or more PPOs, and having everything else work in your favor—enough precip, but not too much, and never any soil washing away to break the barrier.

In central KS, waterhemp are still triazine-susceptible, while all Palmers should be considered triazine-resistant. (Both species are almost all ALS-resistant biotypes also.) Waterhemp are more susceptible to chloracetamides (metolachlor/Dual, etc) than are Palmers. Finally, Palmers are simply much more strongly adapted to the hot conditions found in this part of the world—Palmers have optimum photosynthetic capability at 108F! Palmers may grow to be 10-ft tall, and are far leafier and more competitive than waterhemp in this region.

All this adds up to make GR Palmers a truly monstrous weed biotype in central KS, as it has been in the Deep South of USA for 5 to 8+ years already—and has totally changed how farming is done in that part of the world. It has hit the cotton and peanut industries the hardest, but also no-tillers in general. A lot of long-term no-till was abandoned in the Deep South because of GR Palmer infestation. But that needn't be the outcome—especially not if you're taking immediate steps to prevent the GR Palmers from getting a toe-hold in your fields. But you may have them going to seed right now in your fields, or will be starting to set seed in the next week or so. In this case, an ounce of prevention is worth dozens of pounds of cure. Unless you're done farming a tract, it's good management to make sure there are zero Palmers setting seed on it—take action immediately. Go scouting (intensively, or hire it done), and do what needs to be done in terms of preventing seed-set.

How do I know if my pigweeds are Palmers, waterhemp, or redroot?

Palmers have much wider leaves than waterhemp. The length:width ratio on Palmer leaves is about 2:1 or 3:1, while waterhemp are 4:1 (long, skinny leaves). Waterhemp leaves often are a bit shinier or waxier than Palmers. Palmers may or may not have a 'watermark' on their leaves. These species sometimes hybridize, so don't worry if some of yours appear halfway in-between—just be concerned with the ones that are true Palmers. Redroot pigweeds are a rarity in central KS



Palmers, more variations



Palmer variations



Palmer with 'watermark' on leaves. Had been sprayed with plenty of glyph; hence, a couple Palmers and some nutsedge dying.

any more, but they have little notches on their leaf edges, have more of a grey cast to the leaves, and a little bit hairy—Palmer's have no leaf hairs. Redroot pigweeds have rougher stems. See images.

Which fields are my top scouting priority?

Anywhere you relied primarily (or only) on glyphosate for killing Palmer's. E.g., Roundup Ready soybeans, RR cotton, or if you didn't include any HPPDs (Laudis, Callisto) or dicamba products on your RR corn. Or if your 'burndown' of wheat stubble was glyphosate-only, glyphosate plus a burner (Aim, Sharpen), or glyph plus a low rate of growth-regulator (2,4-D or dicamba). If all other species have died, and there's no obvious issue with plugged nozzles, sprayer skips, or coverage (weeds too thick), yet some of the Palmer's have zero glyph symptoms, then you quite possibly have GR Palmer's. However, if glyph performance was poor in general, then it must be some other factor—weather, mixing procedure, rate too low, etc. Or if the surviving Palmer's have at least some glyph symptoms (leaves drooping and/or some of them yellowed), then it is a rate or performance or coverage issue, and not GR. It's the plants that are totally unaffected and perfectly green and growing yet that are GR, and this is especially true if all the other Palmer's in that field died. Or if the weed species that are tough to kill with glyphosate all died, but a certain percentage of Palmer's appear completely unaffected.

If you are in the infested region, your second priority is looking for Palmer's elsewhere—in your milo fields especially. These won't necessarily be GR Palmer's, but the female non-GR Palmer's are landing sites for pollen that carries the GR trait. You see, Palmer's are plants that are strictly male and strictly female—they cannot self-pollinate the way that 99% of plant species do (and this is why they can evolve so quickly and spread new traits so widely). *And the pollen does carry the GR trait and confers it to the seeds developing from it. Apparently Palmer pollen easily moves around by dozens of miles.* Even if you are merely somewhat near a problem area, you could develop a problem by next year. Especially if some male GR Palmer's have already been shedding pollen.

What should I do if I find Palmer's, especially GR or suspected GR ones?

If they are well above the crop height—soybeans for instance, you can try wiping them with paraquat (Gramoxone or generic), usually at a 50/50 mix of paraquat to water. Try to douse the plants enough to get some paraquat mix to run down the stem, and yet not have it dripping all over the crop. Even if it doesn't completely kill the Palmer plant, this top-killing is sufficient to prevent that plant from setting seed—



Palmer amaranth



Palmer amaranth



Palmer's + one waterhemp (yellowed from glyph application). Entire palmer population is GR.

strange but true. A standard wick or rope-type wiper will work, or a "carpet roller" or sponge-type is even better.

'Roguing' (chopping or pulling) the Palmers is another option. You needn't do it all yourself—there are crews of farm laborers who specialize in this, or work on Saturdays doing this apart from their day jobs in construction or roofing or whatever. Some of the crews are expensive enough that you might as well just hire your kids or local high school students (or hungry college students) to do the job. Roguing might seem expensive now, but it is a far cry from what you'll experience in higher herbicide bills if GR Palmers gain a toe-hold in your fields. Just figure the herbicide bills for soybeans will go up to \$50 – 60/acre when you have GR Palmers, and you'll double the number of spray trips, and the control may not be perfect even then.

If you discover an extremely bad infestation in some part of the field, you may be wise to spray both the Palmers and the crop out. Seriously. In talking to highly experienced tech reps and agronomists from Arkansas, where they've been battling GR Palmers heavily for 5 yrs, they say, "Whatever you do, don't ever let them go to seed. You're royally screwed if you do." The point being that a single female Palmer can easily produce 450,000 seeds (despite crop competition), which, if scattered across an acre, is over 10 seeds/ft². As tricky as it is to control GR Palmers, and often you're down to using contact herbicides that require very good spray coverage (and therefore, sparse weed densities, not a thicket), you just can't have that sort of pressure. 99% control of that heavy of a seed bank is an utter disaster. 99.9% control is still a wreck. You wouldn't be able to grow milo (or cotton) at all in that field for many years, and soybeans would be very tricky and require 'layering' of various herbicides with soil activity. You'd be down to just wheat and corn for 'easy' control of Palmers in that field, and totally reliant on 1 or 2 MOAs depending on your choices—maybe 3 MOAs if you're disciplined and willing to spend more to prevent resistance selection by the other 2 MOAs (my rule of thumb for 20 yrs has always been that you should have at least 3 MOAs working well on any given weed species; extremely good shading by a crop or cover crop may count as one MOA however).

If you discover Palmer survivors in a field where you seeded cover crop, you may need to spray with enough dicamba to kill or snarl up the Palmers—letting the grass component (if any) of the cover survive, and sacrificing the broadleaf species that are susceptible to those growth regulators. If the Palmers are getting large and woody, you will likely need paraquat and sacrifice the cover crop entirely (although you might be able to kill the Palmers with paraquat and merely burn the



A waterhemp surrounded by Palmers.



A single waterhemp in foreground, surrounded by Palmers in the background. Notice difference in leaf shape, and sheen. The Palmers are yellowed from N-starvation and heavy competition from each other as well as other nearby weeds, and previously the wheat crop. Other nearby weeds = Venice mallow, now mature.

grass species back from which they might recover).

Won't Liberty Link and other new soybean traits save us from the GR Palmers?

No. Liberty only works consistently on Palmers that are less than 4 inches, and so you are spraying it once per week to make that program work (and at moderately high GPA carrier rates), plus you would start out with a maximum load of sulfentrazone-type product preplant, perhaps also with Reflex (depending on geography and carryover risk) and/or chloroacetamides for more help. None of this is cheap or easy.

'Enlist' (2,4-D resistant trait) is actually obsolete before it ever gets put into market—some Palmer populations (and waterhemp) in NE, eastern KS and north-central Oklahoma are already resistant to 2,4-D, and you'll need a bunch of other chemistries and traits to kill the weeds that 2,4-D doesn't.

Dicamba-resistant soybeans will be much better, but not a silver bullet, and too much usage of dicamba on Palmers gradually selects for greater tolerance, or outright resistance.

HPPD-resistant soybeans would work great for awhile—until the Palmers got resistant to this chemistry too, which has already happened at a few locations in the USA, including Stafford & Russell counties of KS. We already have the situation where Lexar/Lumax products pre-emerge are not as solid on Palmers as they once were—particularly on fields that have had these products applied multiple times in the past 10+ yrs. If you were using HPPDs for Palmer control in both soybeans and corn (or milo), you'll either soon find resistance, or it will find you. So I'm not much interested in HPPD-resistant soybeans except in the rare case of someone who doesn't grow corn or milo and therefore doesn't use HPPDs in the window where Palmers grow (Huskie in wheat wouldn't be applying any significant HPPD selection pressure on Palmers due to low soil longevity, and Palmers usually not emerging yet at time of Huskie application in wheat).

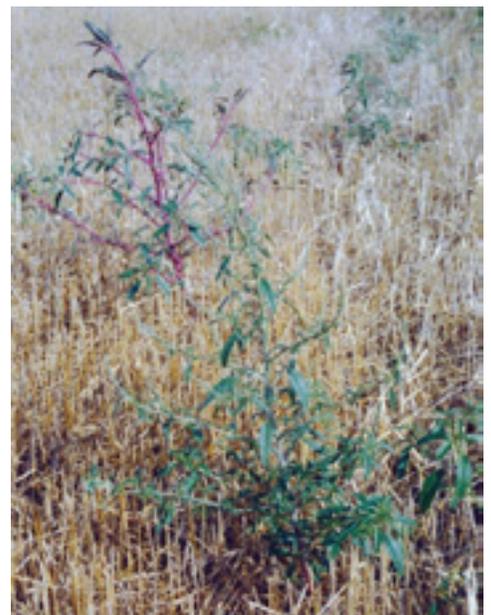
GR Palmers greatly impede the ability to do certain cover-crop mixes after wheat harvest. At a minimum, your burndown now relies on paraquat (usually with a pinch of this and that added for better results), with all the fun of needing to use 20 GPA rather than 5 GPA. You might even start spraying at night to further improve paraquat activity. You will need to be a bit more careful on your handling procedures as compared to glyphosate. (Although I personally would rather handle paraquat than Lorsban, or even 2,4-D, given the long-



This field had been sprayed with a high enough rate of glyphosate to kill nutsedge (an impressive feat) and a few of the Palmers have glyph symptoms (the ones that are yellowed and/or slightly wilted), although the one in the foreground has zero symptoms and is truly GR.



Palmers yellow from heavy competition & lack of N



Waterhemp

term effects.) But these things are all do-able. A great many people have relied on paraquat for a great many years—you just set up to be able to handle it. Instead of taking 1,500 or 3,000 gallons of water with you on the semi trailer, you might just buy a tanker and take 8,000 gallons with you to the field. Etc. (I didn't say any of this was going to be cheap or fun; but it is realistically economical and viable to do them.)

With heavier Palmer pressure, your cover-crop choices might be restricted to grass species where you can spray out a flush of Palmers germinating in the cover. You may not be able to do double-crop soybeans at all anymore. Nor milo. Nor sesame. Nor sunflowers.

This is sure gloomy. Is there any light at the end of the tunnel?

As far as miraculous new herbicide MOAs under development, no, there haven't been any new ones discovered in decades (entirely new MOAs, that is), and R&D in herbicides dropped off to almost nothing when RR took over the marketplace.

But technology might yet save you, if you can survive a few years and make enough money to afford robots to help with the roguing efforts. I suspect they will become affordable and widespread in ~ 3 yrs. You may need several of them, and they won't be truly cheap at first, but they will work 24/7. Eventually they may be nearly as cheap as Roombas that clean the floors of houses and offices everywhere.

Also, I know of a certain largish black insect that occasionally shows up and completely defoliates Palmers—it may not prevent seed-set entirely, but it's a good weapon to have if we could buy them and release a few across the field to find the Palmers that our own eyes cannot find. I am working with Jonathan Lundgren to identify this insect (I found a couple today, obscure though they are). To my knowledge, this particular insect doesn't eat anything but Palmers—it is so selective it won't even eat waterhemp if they are intermixed with Palmers. This won't be anything that will more than nibble at the problem, but at least they would multiply and adapt on their own if we released a few into our fields every season to kick-start the population.

Crop competition, of course, does play a role in Palmer suppression. But the only good one is wheat (or rye) that is thick, heavy, and has no gaps in it. But if it rains much as the wheat is dropping its leaves and drying up, then here come the Palmers! As for summer crops that will keep up with the growth rate of Palmers, well, hah, hah, good luck with that. About the only ones that I know of that will hold their own



Waterhemp



Redroot Pigweed

against Palmers would be a very healthy, thick stand of proso millet or pearl millet, or narrow-row sudangrass or forage sorghum. Even then, the Palmers will survive to maturity, but will be curtailed as to amount of seed produced—but not enough to make any headway on the problem; indeed, it is a losing battle against Palmers unless the control is virtually 100%.

As a reminder, tillage is not the answer, even though some knee-jerk reactions will be that “no weeds ever became resistant to steel,” or some such commentary. Well, if tillage was so good at getting rid of weeds, you’d think the problem would’ve been all taken care of by now—there certainly was plenty of tillage fervor in the past 60 – 70 years. In actuality, tillage is merely burying seeds that you will dig up again at some later date—they remain viable far longer when buried than when resting on the soil surface. One weed scientist, Leon Wrage, has remarked that burying weed seeds is like putting them in a jar to save for later. Meanwhile, your current tillage is bringing up grandpa’s weeds. Tillage is tremendously damaging to soils, and really shouldn’t be seriously considered as an option anywhere with the teeniest amount of runoff, or anywhere the wind blows more than 10 mph. Even then, the carbon loss (soil OM loss) from tillage is very damaging, not to mention the compaction. Only if you are growing garlic or onions will I cut you some slack on doing tillage :-), and even then it is possible to grow & harvest them with no-till.

Rather than going back to old-school between-row cultivation, you might just as well run a hooded sprayer. This is what the Aussies are doing for their ryegrass that’s resistant to everything, which is about equivalent to GR Palmers for Kansas farmers in terms of headache created.

My alarmist message isn’t a sudden freak-out or obsession by me on this topic: I’ve been waiting and holding my breath for years for the GR Palmer thing to hit Kansas. I had no clue it would sweep across the region so quickly and thoroughly (apparently pollen routinely moves a lot further in the wind than I thought). I thought we would have small localized populations of glyph-resistant Palmers and a little more time to react and educate people. Totally the opposite scenario. And another consultant friend of mine says that when GR waterhemp hit the eastern 1/3 of KS a couple years ago, it swept across the entire region in a year—lending credence to what I’m seeing and hearing with Palmers. (Dallas Peterson at K-State says don’t bother much with trying to verify the GR Palmers anymore—if they act GR, they probably are.)



Tumble Pigweed



Tumble Pigweed

Any farmer, especially any no-tiller, who lets many of these GR Palmers go to seed in the next week or two, on fields they intend to continue farming, will greatly rue their complacency and ignorance in coming years. Don't let that be you. Good management is pro-active when necessary, and if ever there was a time for it, this is it.

Sincerely,

Matt Hagny
Pinnacle Crop Technologies Inc

Copyright 2014, [Pinnacle Crop Technologies, Inc.](#)
(reprint with written permission only).