

PAST AND CURRENT STATUS OF PIGWEED DISTRIBUTION THROUGHOUT WISCONSIN

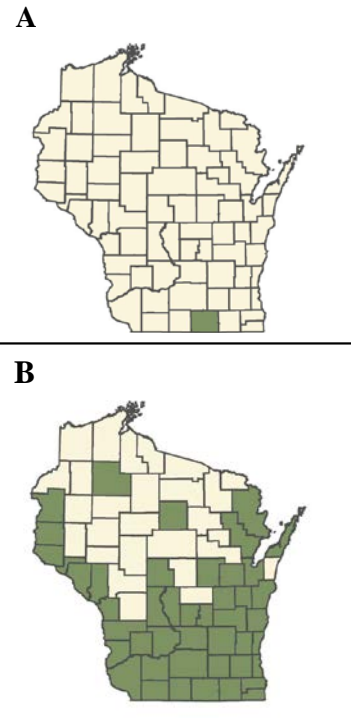
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Wisconsin is home to 13 species of Pigweeds (plants in the genus *Amaranthus*). Of these species, two (red-root pigweed and smooth pigweed) are widespread in Wisconsin and have historically plagued farmers as competitive weed species. With the rapid increase in herbicide resistance, concern exists with respect to the spread of two particular pigweeds that have historically been called uncommon: common/tall waterhemp (*Amaranthus tuberculatus*) and Palmer amaranth (*Amaranthus palmeri*). These species are of higher priority to prevent spread compared to other pigweeds as they have been found to develop resistance to multiple herbicides and be more competitive.

Herbarium records for waterhemp and palmer are limited throughout the state (see www.wisflora.herbarium.wisc.edu). As of December 2016 only one record of Palmer amaranth exists in the Wisconsin herbariums (see figure 1A). Due to proactive reporting from others, additional locations have been documented in Wisconsin (Sauk, Iowa, Grant County; Drewitz et al. 2016). In contrast over 200 records of waterhemp exist throughout the southern and eastern parts of the state with the first report before 1900 (see figure 1B). In addition to these counties, waterhemp has been documented to exist in Polk, Chippewa, Eau Claire, Jackson, and Monroe County (Hammer et al. 2016). Herbarium records along with confirmed reports indicate that waterhemp is widespread while palmer is rarely present in Wisconsin. This information, while valuable, contradicts many of the reports we receive on status of these species in agronomic fields. As concern exists on the spread of these species, we conducted a survey of these two species in Wisconsin corn and soybean fields.

Figure 1. Wisconsin Herbarium Records of palmer amaranth (A) and waterhemp (B) as of December 2016.

www.wisflora.herbarium.wisc.edu



METHODS

Surveys were conducted by WI Department of Trade and Consumer Protection (DATCP). DATCP staff visited 257 corn, 168 soybean, 45 wheat, three oat, and one potato field (n=474 total) between the end of July and September of 2016. Fields were selected randomly as part of other surveys that DATCP conducts annually (e.g. corn earworm, soybean aphid) (figure 2). The field edge, center of the field and margin were visually surveyed for the presence of waterhemp, Palmer amaranth, or other pigweed species. Presence and level of infestation were recorded.

Figure 2. Sites surveyed for pigweeds between the end of July and September 2016 (n=474).



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2016 SURVEY RESULTS

Waterhemp: Populations were found in 26 fields from the survey (5% of fields sampled) in each region of Wisconsin (Figure 3). While the percent of fields infested with waterhemp varied by region, the survey found northcentral (13%), northwestern (11%) and southcentral (10%) all had more than 10% waterhemp. Crop in the field didn't appear to impact the survey as corn only had 7% of fields infested with waterhemp and soybeans 5%. No waterhemp was found in fields of oats, potatoes, or wheat.

Palmer amaranth: No fields were found that were positively identified to have Palmer amaranth as a result of this survey.

Other pigweed species: Populations of other pigweeds that were NOT palmer amaranth or waterhemp were found in 15 fields as a result of this survey (3% of fields sampled). Unlike waterhemp, it was NOT found in the northwestern, northcentral or northeastern regions. In contrast it was common in the eastern central (19%), and southcentral regions (11%) as more than 10% contained other pigweeds. Crop in the field didn't appear to impact results as corn (4%) and soybeans (3%) both had similar levels of infestation.

Figure 3. Sites where waterhemp was discovered from 2016 surveys.



Figure 4. Sites where other pigweed species were discovered from 2016 surveys.



COMPARISON OF 2016 SURVEY RESULTS WITH 2012-13

Several other weed surveys have been conducted in corn and soybean fields over the past decade. We will focus on the survey conducted by Recker et al. (2014) in 2012-13 as the timing of the survey was identical to the 2016 survey (July-September). The 2012-13 survey found 5% of fields infested with waterhemp and 9% of other pigweed species. This survey effort did find one field infested with Palmer amaranth (Dane county). Thus results on waterhemp presence suggest that spread of this plant to new fields has not occurred as presence was 5% in both surveys. While no fields were found with Palmer amaranth compared to one in 2013, the number of infested fields remains very low. Interestingly the presence of other pigweed species (excluding palmer and waterhemp) did differ as the 2016 survey found only 3% while the 2012-13 survey found 9%. Differences could be due to the years when the surveys were conducted, methodology, or even the difference in area surveyed. Nevertheless results suggest that waterhemp, palmer amaranth, and pigweed populations in general are not infesting a higher percentage of fields in Wisconsin over the past 3-4 years.

SUMMARY

Palmer amaranth and waterhemp are both present in Wisconsin annual cropping systems, but contrary to belief we did not document an increase of infested fields. This is likely due to the large number of agronomic fields present in comparison to our sample size. Thus randomly sampling of fields alone will not be an effective method to detect early populations, but this in combination with monitoring by farmers, crop consultants, and agribusiness is our best hope to prevent potential future spread. Using this approach verified reports of Palmer amaranth have

been documented in Sauk, Iowa, Grant County. In addition, waterhemp has also been verified in Polk, Chippewa, Eau Claire, Jackson, and Monroe County. Although our surveys suggest that more fields are not appear becoming infested with these species, we have yet to analyze the density of populations within infested fields. If these densities of these escaped weed species are increasing, this would raise the potential for spread in the future.

CITATIONS

Drewitz N, Hammer D, Conley S, and D Soltenberg. 2016. Multiple Resistance to ALS- and HPPD-inhibiting Herbicides in Palmer Amaranth from Iowa County, Wisconsin. Wisconsin Crop Manager. Accessed on December 19, 2016. <http://ipcm.wisc.edu/blog/2016/10/multiple-resistance-to-als-and-hppd-inhibiting-herbicides-in-palmer-amaranth-from-iowa-county-wisconsin/> .

Hammer D, Drewitz N, Conley S, and D Soltenberg. 2016. Common Waterhemp (*Amaranthus rudis*): Confirmed Herbicide Resistance and Spread Across Wisconsin. Wisconsin Crop Manager. Accessed on December 19, 2016. <http://ipcm.wisc.edu/blog/2016/10/common-waterhemp-amaranthus-rudis-confirmed-herbicide-resistance-and-spread-across-wisconsin/> .

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