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**Figure 1. Vince Davis doing weed seedling counts.**

## Indiana's Top Ten Most Problematic Weeds

Weed control practices often have an effect on the weeds we deal with on a year by year basis. Before the development of herbicides, growers relied heavily on tillage as a tool for controlling and suppressing weeds. Once herbicides became a valuable tool, some of the problem weeds found in predominantly tillage based management practices began to fade and new problematic weeds began to fill the gap. I often am caught saying, "nature finds a way". As our habits change, specific weeds will exploit the new niches we create and become the more dominant species. This can be exemplified in the development of herbicides resistant weeds. As we use herbicides we apply selection pressure for the development of resistance or for the shift into species that have natural tolerance for the herbicides we choose to use. This can and does apply to any strategy we may come up with.

Several people who work in weed science take an interest in weed distributions and how they change over time. Understanding why particular problems arise in complex plant communities is a difficult but essential process. One way in which weed shifts are studied is to survey weed problems in different weed management practices. This can be done by sending written surveys to consultants, coops, county educators, or producers. Another way weed shifts are studied is by the physical counting of weeds in selected fields.

Written surveys were conducted in 1996, 2000, and 2004 in the state of Indiana by Purdue University Extension weed scientists. The survey in 2004 was sent out to 3000 people and 612 responses were received. The majority of responses (69 to 84% depending on district) listed weeds as their primary crop pest<sup>1</sup>. The survey requested the participant to list their top five of the most problematic weeds in corn and soybean production. The responses were compiled and used to develop a top 10 problematic weed lists (table 1).

**Table 1. Top ten problematic weeds from 1996, 2000, and 2003 surveys.**

	1996	2000	2004
1	giant ragweed	giant ragweed	giant ragweed
2	Canada thistle	Canada thistle	lambsquarters
3	hemp dogbane	Johnsongrass	Canada thistle
4	lambsquarters	lambsquarters	cocklebur
5	horseweed (marestail)	shattercane	velvetleaf
6	Johnsongrass	hemp dogbane	horseweed
7	burcucumber	burcucumber	waterhemp
8	shattercane	velvetleaf	burcucumber
9	giant foxtail	common ragweed	chickweed
10	fall panicum	cocklebur	dandelion

# Indiana's Top Ten Most Problematic Weeds

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## Most Problematic Weeds in 1996, 2000, and 2004

Giant ragweed, Canada thistle, lambsquarters, cocklebur, and horsweed (marestail) are problematic weeds that show up on the top 10 list in 1996, 2000, and 2004.

Giant ragweed has been ranked the most problematic weed over the three surveys. It was ranked among the top five most problematic weeds and the most common in a 1992 survey<sup>2</sup>. Again there is no surprise there; Indiana is the giant ragweed national forest. Giant ragweed's adaptive germination, tolerance to herbicides due to rapid growth rates, resistance to ALS herbicides, and persistence has made this plant one of the most common and problematic weeds.

Waterhemp was rated seventh as a rapidly increasing weed in the 1996 survey<sup>2</sup>, but did not make the top 10 most problematic list in 1996. It first appeared in the top 10 list in the 2004 survey as the number seven most problematic weed. Migrating from the West it is most prevalent in the northwest, southwest, and central districts of Indiana.

Chickweed and dandelion did not appear in the top 10 list in previous surveys. However, with reduced use of residual herbicides, and the move to earlier planting dates, these weeds are now major problems and have lead to increased interest in fall herbicide applications.

Another noticeable difference between the 1996 and 2004 surveys is the lack of grass weed species in the 2004 survey. Giant foxtail and fall panicum were listed ninth and tenth, respectively, in 2000 and do not appear on the list in 2004. The introduction of Roundup Ready soybean production systems has done a great job controlling annual and perennial grasses and been a major contributor to reducing grass weed problems. However, weeds difficult to control with glyphosate alone such as waterhemp, chickweed, and horseweed have increased in importance over the last couple of years. Surveys conducted in Kentucky also saw a decline in Johnsongrass prevalence, but increased prevalence of horseweed<sup>3</sup>.

## Geographic Distribution of Specific Weeds

Responses were also geographically variable, some of the responses appearing to have patterns, yet others not. The following information was compiled from the 2004 survey data. For this survey the state of Indiana was divided up into nine extension reporting regions. In figures 1 through 6, the shade of green indicates the percent of responses in each region relative to the highest percent of responses that deemed a specific weed to be in their top five most problematic weeds. The darkest green indicates the weed is thought to be most problematic in that region. No green shading meant that the weed was not considered among the most problematic. The highest percent response is given in the figure caption.

Responses regarding giant ragweed were fairly uniform across the state (data not shown). Velvetleaf appeared to be more problematic in the northern and western regions of the state (Figure 1.). As expected, due to the frequency of glyphosate resistant horseweed in the southeast portion of the state, these regions tended to rank horseweed as a problematic weed (Figure 2). Furthermore, horseweed was also deemed to be a problem in several different regions. Burcucumber was problematic in similar regions as horseweed (Figure 4). Waterhemp was problematic in the northwest and east central regions, to a lesser extent in southwest Indiana. Dandelion is well known as one of the most problematic weeds in the northeast of the state (Figure 5). Finally, the winter annual weed chickweed was deemed the most problematic winter annual and made it into our top ten list in 2004. It is considered problematic throughout the state, although the western regions tend to have higher levels of concern than the eastern regions (Figure 6).

Information listed here is based on research and outreach extension programming at Purdue University and elsewhere.

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### References:

- <sup>1</sup> David Hillger, Kevin Gibson, and Bill Johnson. 2004. Weed Management Survey of Indiana Corn and Soybean Producers. North Central Weed Science Proceedings 59:70.
- <sup>2</sup> Dan J. Childs, Tom N. Jordan, and Ron L. Blackwell. 1996. Survey of Problem Weeds in Indiana: 1996. Purdue University Cooperative Extension Service. WS-10 (out of print).
- <sup>3</sup> T. Saphangthong, M.W. Marshall, J.D. Green, and J.R. Martin. 2004. Field Survey of Weeds Observed in Kentucky Before and After Widespread Adoption of Glyphosate-Tolerant Soybeans. North Central Weed Science Proceedings 59:20.



Figure 1. Relative distribution of growers who consider velvetleaf among the top 5 most problematic weeds. Highest response is 20%.



Figure 2. Relative distribution of growers who consider horseweed among the top 5 most problematic weeds. Highest response is 21% for a summer annual and 44% as a winter annual (not shown).



Figure 3. Relative distribution of growers who consider waterhemp among the top 5 most problematic weeds. Highest response is 13%.



Figure 4. Relative distribution of growers who consider burcucumber among the top 5 most problematic weeds. Highest response is 14%.



Figure 5. Relative distribution of growers who consider dandelion among the top 5 most problematic weeds. Highest response is 39%.



Figure 6. Relative distribution of growers who consider chickweed among the top 5 most problematic weeds. Highest response is 52%.

As this survey shows, some weed problems such as giant ragweed, Canada thistle, common lambsquarter and burcucumber are consistent from year to year regardless of production practices. Other weed management issues, such as dandelion, common chickweed, and waterhemp emerge in response to changing management practices, while others, specifically grass weeds, decline in importance. This survey shows that unique weed problems occur throughout Indiana. This poses challenges to growers, consultants, and county educators and makes it unlikely that a weed management program that relies on a single herbicide will be sustainable in the long-term.