A SUMMARY OF WEED SAMPLE IDENTIFICATION AT THE UNIVERSITY OF WISCONSIN[1]

One interesting aspect of being an extension weed scientist is identifying weed samples people send to us via the mail, deliver in person or now send via cyberspace as digital images attached to e-mail messages. The Department of Agronomy at the University of Wisconsin does this as a free service for our clientele. We believe it is important to give people an accurate weed identification and do not want a fee to inhibit them sending in samples. Many of the identifications are critical to making the right control decision in the immediate situation and they also help plan the most appropriate management system for the long term.

By reviewing the plants submitted for identification we see where additional educational efforts are needed to help people confidently identify plants of concern. Of course some samples are sent just because the person is curious to know what they have (or what they brought back while on vacation out-of-state!). Even these samples are interesting as they remind us of the great diversity of species on the landscape and occasionally today's plants of curiosity later appear as weeds of economic concern.

Methods

Since 1981 we have archived the plant ID forms and other written records regarding plant identification samples in the Department of Agronomy. The available information for each sample was entered into a computer data bank so that the information could be easily sorted and studied. For all plant samples we had data on the common name, plant family, and year of submission. Ninety-six percent of the time we knew the county where the sample originated and 75% of the time we knew its habitat. From 1981 to 1999 we received 902 samples for which we have records. At least two to five times as many other plant samples were identified over the telephone or when delivered personally, at Farm Progress Days, Agronomy field days and other field days and events for which we have no written records. For samples with documentation, we identified an average of 47 plants annually over the 19-year period. However, for the most recent period (1995-1999), an average 69 samples were identified annually, and in 1999 the most samples ever (79) were submitted (Table 1). This is perhaps due to better record keeping on our part in recent years, but more likely it is the result of increased recognition of the importance of accurate plant identification.

Results

Of the 902 samples, half have been submitted five times or more during the 19 years. Within this half, 50% were perennials, 44% annuals and only 6% biennials (Table 2). Twenty-six percent were monocots and 74% were dicots. The most common annual grasses were foxtails, large and smooth crabgrass, wild proso millet and barnyardgrass (Table 3). The most common perennial monocots were wirestem muhly, *Carex* spp., reed canarygrass, and yellow nutsedge (Table 4). The most frequently submitted annual broadleaves included the

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fleabanes, horseweed, galinsoga, hempnettle, buttercups, pennycress, the ragweeds, smooth hawksbeard, wild radish and marshelder (Table 5).

Wormwoods and spotted knapweed were the most common biennials submitted five times or more and perennial broadleaves in this category include Japanese knotweed, comfrey, white cockle, wild four O'clock, cinquefoils, goldenrods, yellow rocket, hoary alyssum, cresses, giant chickweed, rabbit's foot clover, horsetail, Jerusalem artichoke, swamp smartweed, poison ivy, horsenettle, bitter nightshade and stinging nettle (Table 6). The 902 samples represent 59 plant families with 57% of the samples belonging to five families: the composite, grass, mustard, buckwheat, and pink families (Table 7). The top 16 families contain 82% of all the specimens submitted.

Of the 72 counties in Wisconsin, twelve (17%) have contributed 40% of the plant samples to identify (Table 8). Counties that have submitted 30 or more samples since 1981 are Grant, Outagamie, Manitowoc, Chippewa and St. Croix. Only one county has never sent a sample to be identified. The most common habitats from which samples were sent were corn (18%), alfalfa and hay fields (14%), lawns and yards (10%), pastures (8%), small grains (7%), roadsides and other right-of-ways (7%), and gardens (5%) (Table 9). Some of the most unusual habitats were spineless cocklebur fruits in cotton seed imported from the southern states for use in dairy rations, weed seeds in turkey manure, and a plant sample collected from the rumen of a dead cow!

Weeds were not the only plants submitted for identification. We have identified eight forages species including orchardgrass, timothy, reed canarygrass, bromegrass and birdsfoot trefoil. We have also received plant samples of rye, castor bean, hemp, horseradish, cranberry, buckwheat and cotton to identify. The cotton plants were from Wisconsin farms where cotton seed is used as part of the dairy ration. Our expectation that this practice would result in more cocklebur infestations may or may not have happened, but it is clear that some cotton seed has gone through the animal and manure systems alive. The popularity of prairie restoration is illustrated in the samples of big and little bluestem, Indian grass, leadplant and coneflower that have been submitted.

The number of samples submitted in each five-year period was tabulated to see possible trends that might indicate changes in weed abundance or spread over time. Such observations are merely suggestive of weed changes, but when coupled with personal observations and the number of questions fielded on particular weeds, they can give further evidence of weed population shifts over time. It seems that several monocot species have increased over time, including wirestem muhly, crabgrass, *Carex* spp., and reed canarygrass while shattercane and wild proso millet have decreased in frequency of submission (Table 10). Dicots that may be increasing are horseweed, giant chickweed, white cockle, smooth hawksbeard, the wormwoods, spotted knapweed, wild four O'clock, comfrey, Japanese knotweed and waterhemp (Table 11). Perhaps pennycress and hempnettle have decreased while the fleabanes and buttercups seem to be consistent over the 19-year period (Table 12).

Summary

Reviewing the plant samples submitted for identification for 19 years is both interesting and informative. The data highlight several species that people have difficulty identifying and this information is useful as we develop future educational materials and programs on weed identification. In particular I plan to emphasize knowing the key characteristics of the top 10 to 15 plant families represented in these samples. If a person can correctly determine the family a plant belongs to, they are well on the way to reaching the correct species identification. Data analysis to date has also revealed where samples arise (counties and habitats).

Additional uses of the data bank of weed sample information are planned. One use will be to supplement information on the distribution of these species in the state. For example, the weed distribution maps in the book "Weeds of the North Central States" indicate smooth hawksbeard is found only in the northern tier of counties in Wisconsin. Weed identification samples submitted verify that it is now common in the southern two-thirds of the state as well. And the fact that 75% of the submissions have occurred in the 1990s strongly suggests that its movement south has occurred recently. More analyses of relationships between weed species and habitats, habitats and counties, and life cycles and habitats could also be investigated with this data base.