What Causes Weed Population Shifts in Turf?

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In the March–April issue of Turfax™, we discussed how repeated use of the same herbicide or herbicides with the same mode of action can result in herbicide resistance. This is brought about by exerting selection pressure on a resistant biotype of the weed species that already exists in a weed population. Another problem caused by utilizing the same herbicide or herbicides with the same spectrum of weed control year after year is a weed population shift. A weed population shift is simply a shift away from a weed species that used to be a problem to a weed species that was not a problem in the past, but has suddenly become a problem. To explain it another way, it is a shift away from an old weed problem to a new weed problem.

How do weed population shifts occur? **Because individual herbicides only control certain weeds, repeated use over time can successfully control the weed species you have been trying to manage, but weed species that are not readily controlled by that herbicide increase in abundance over time.** In some cases, these population shifts can occur very rapidly. The following is a hypothetical example of how a weed population shift can occur. Suppose you start a job as a golf course superintendent at a golf course that has a high crabgrass (*Digitaria* spp.) population. You decide to utilize the best crabgrass herbicide available. Also, suppose this herbicide only provides fair control of goosegrass (*Eleusine indica*). Over time, you might see a weed population shift from crabgrass to goosegrass.

A change in herbicide use practices also can cause weed population shifts. In this case, a new or different herbicide or class of herbicides is being used to manage specific weeds. An example of this is with the use of simazine for winter annual weed control in warm-season turfgrasses. Simazine is commonly used for annual bluegrass (*Poa annua*) control in nonoverseeded warm-season turf species in many areas of the world. Because of annual bluegrass resistance to simazine in some areas, turfgrass managers have had to shift to other herbicides, such as those used for crabgrass/goosegrass control or to pronamide (Kerb®). All of these herbicides are effective on the annual biotypes of annual bluegrass, but are not nearly as effective as simazine on many winter annual broadleaf weeds. As a result of switching to these herbicides, an increase in winter annual broadleaf weeds has occurred.

Perhaps the most common new turfgrass weed problem is the incidence of various sedge species in recent years. The most common of these has been with two species of kyllinga: **green kyllinga (*Kyllinga brevifolia*) and false green kyllinga (*Kyllinga gracillima*). These two sedges have come from relative obscurity to become major turfgrass weeds in the last 5 years** in many areas of the United States. In many southern states, they are now two of the most problematic weeds on golf courses. They are spreading rapidly and extending their range. New cases are being reported in the southern tier of states from the east to west coasts. In addition, false green kyllinga is spreading northward and is a major weed problem in cool-season turf in the mountainous regions of midwestern North Carolina and Tennessee where the climate is very similar to many northern and midwestern states. It remains to be seen how far into the cool-season turfgrass areas it will spread; however, botanical specimens have been collected as far north as southern New York and Connecticut. Green kyllinga appears to be less cold tolerant and will probably be restricted in distribution to the warm-season turfgrass areas of the United States.

According to botanical records, green kyllinga was established in the United States over 100 years ago. Why then has this weed only become a problem in the last several years? Of course nobody knows all the answers to this question. However, the occurrence of these weeds on golf courses in recent years is probably due to a change in crabgrass/goosegrass control strategies. Research has shown the arsenical herbicides (MSMA, DSMA, CMA) provide a relatively high level per year for crabgrass control. With the development of highly effective preemergence crabgrass/goosegrass herbicides in the last 20 years, the arsenical herbicides are used much less than in previous years. Research also has shown that the preemergence crabgrass/goosegrass herbicides offer essentially no control of these two *Kyllinga* species.