

HAVE WE BECOME RESISTANT TO USING THE TERM TOLERANCE? Andrew R. Kniss, Assistant Professor, Department of Plant Sciences, University of Wyoming, Laramie, WY 82071.

Discussions on differential herbicide susceptibility within a weed species have typically been centered around the question “When should a weed be classified as resistant?” In order to confirm resistance, researchers will typically compare a putatively resistant biotype with a known susceptible biotype of the same species. This method is appropriate and generally conclusive when a high level of resistance is observed, as typically found in ALS resistant weeds. However, recent investigations into common lambsquarters susceptibility to glyphosate conducted at the University of Wyoming, The Ohio State University, and Purdue University have produced results that are difficult to interpret. It has been demonstrated repeatedly that biotypes of common lambsquarters do indeed respond differently to glyphosate. However, the low magnitude of this difference has led to a discussion on whether this species has become 'resistant' to glyphosate. By definition, a herbicide resistant population must have been selected over time. This typically occurs by selecting for a rare resistant biotype with repeated use of a single herbicide mode of action. The speed at which a resistant population develops is largely dependent on the initial proportion of resistant plants in a population. Estimates of this initial proportion of resistant biotypes vary widely depending on the weed species and herbicide of interest.

Tolerance is the term reserved by the WSSA for species which are naturally less susceptible to a herbicide. That is, the species has a very high proportion of biotypes which are relatively insensitive to the herbicide. When analyzed critically, it seems that the difference between the two definitions lies largely with the initial proportion of individuals in a population that are susceptible to the herbicide. If the initial proportion of insensitive plants is 1 in a million, or 1 in 10,000, then the population was obviously not tolerant to the herbicide to begin with. However, what if one out of every ten plants is insensitive? Five out of ten? How many plants must survive the first application of a herbicide for the species to be tolerant?