

EMERGENCE CHARACTERISTICS OF GIANT RAGWEED BIOTYPES FROM OHIO, ILLINOIS AND IOWA. Robert G Hartzler, Professor, Department of Agronomy, Iowa State University, Ames, IA 50011, Kent Harrison, Assoc. Professor, Department of Horticulture and Crop Science, The Ohio State University, Columbus, OH 43210, and Christy Sprague, Asst. Professor, Department of Crop Sciences, University of Illinois, Urbana, IL 61801.

While giant ragweed is found throughout the Corn Belt, it is a much greater problem in the eastern portion of this region than in the west. Independent research in Iowa and Ohio suggested that giant ragweed exhibits different emergence patterns in these states, and that these differences could partially account for the regional variation in problems caused by this weed. To test this hypothesis, seed from four giant ragweed biotypes were collected in Ohio, Illinois and Iowa. Three of the biotypes from each state were collected from agronomic fields, whereas the other was from a non-agricultural habitat. Experiments were established at each participating state in the fall of 2001 in which 500 seed of the 12 biotypes were buried in the upper 5 cm of soil contained within 30 cm diameter PVC pipes. Emerged seedlings were counted and pulled twice weekly throughout the 2002 growing season. Significant biotype and location effects occurred for all emergence parameters (initial date, cumulative emergence, duration and days to reach 95% emergence). Significant biotype by location interactions occurred for several parameters, but were less than the main effects. All ag-biotypes from Ohio had similar emergence characteristics, and the Iowa ag-biotypes behaved similarly to each other and also to the three biotypes from undisturbed habitats. In contrast, two of the Illinois ag-biotypes had similar emergence characteristics to the Ohio ag-biotypes, whereas one Illinois ag-biotype behaved in a manner similar to the Iowa ag-biotypes. Cumulative emergence was less at Ohio (28 to 43%) than at Illinois or Iowa (40 to 57%). At the Illinois site there was a nine day difference in initial emergence dates among biotypes, with the biotypes collected in non-agricultural habitats emerging first (March 27). At Ohio and Iowa first emergence was recorded on March 17 and April 13 respectively, with a five day difference in emergence among biotypes at Ohio and only a two day difference at Iowa. The Ohio ag-biotypes and the two similar Illinois ag-biotypes were the latest to emerge at all locations. The total time period over which emergence occurred did not vary at Illinois, whereas at the other two locations the non-ag and Iowa ag-biotypes completed emergence in a shorter time period than the Illinois and Ohio ag-biotypes. The number of days required to reach 95% emergence varied more among biotypes than did the total duration of emergence. At the Ohio location, the biotypes from non-ag sites, the Iowa ag-biotypes and one Illinois ag-biotype reached 95% of total emergence in 29 days, whereas the three Ohio ag-biotypes and two Illinois ag-biotypes required 63 and 80 days, respectively. Similar responses were seen at the Iowa and Illinois locations. Early and rapid emergence can be disadvantageous to survival in corn and soybean fields since a high percentage of the plants emerge prior to normal planting dates and are killed by tillage or burndown herbicides. Ag-biotypes from Ohio, where giant ragweed is rated the number one weed problem, exhibited a later initial emergence date and more prolonged emergence than biotypes from Iowa where giant ragweed is much less of a problem. The Ohio emergence pattern is much more problematic for giant ragweed management than the pattern of Iowa biotypes. In Illinois, where giant ragweed has increased as a problem in recent years, giant ragweed populations were identified with both Ohio and Iowa emergence patterns. The distribution of biotypes with differing emergence patterns suggests an adaptation of giant ragweed for survival in agronomic fields that could result in increasing problems for farmers in the western part of the Corn Belt.