DIFFERENTIAL yield responses of varieties of 2,4-D tolerant crops have been reported frequently (1, 2, 4). Wide variation in response of Canada thistle (Cirsium arvense (L.) Scop.) ecotypes or strains to 2,4-dichlorophenoxyacetic acid (2,4-D) and 3 amino-1,2,4-triazole (amitrole) treatments have been observed. Wiebe (6) reported that tolerance and susceptibility to dichlorodiphenyltrichloroethane (DDT) spray was conditioned by a single gene difference in certain barley varieties. This observation was confirmed in the field at Bozeman (Figure 1). Grogan et al. (2) determined that the reaction of a corn hybrid to 2-chloro-4,6-bis (ethylamino)-s-triazine (simazine) and 2-chloro-4-ethylamino-6-isopropylamino-s-triazine (atrazine) was controlled by a single recessive gene.

The occurrence of certain varieties of specific crops resistant to particular herbicides provides a source of improvement of weed control effectiveness. Discovery of susceptible varieties could possibly provide a means of other improvements such as hybrid seed production (5) and variety roguing. Information of this type could be of value in screening programs for new herbicides. This experiment was conducted to determine the yield responses of barley (Hordeum vulgare L.) and wheat (Triticum aestivum L.) varieties to eight herbicides.

MATERIALS AND METHODS

In 1961, 22 varieties of spring wheat and 22 varieties of spring barley were field planted in 3 replications of single rows 1 foot apart and 10 feet long at Bozeman, Montana. Arrangement was a split-plot with chemical treatments of a single crop, wheat or barley, as main plots and varieties as subplots. The barley varie-