

SULFONYLUREA HERBICIDE RESISTANT WEEDS IN NORTH AMERICA

D.C. Thill, C.A. Mallory-Smith, M. Alcocer-Ruthling, and W.J. Schumacher
 Department of Plant, Soil, and Entomological Sciences,
 University of Idaho, Moscow ID, 83843 and
 E.I. du Pont de Nemours & Co., Agricultural Products Department
 11419 Hardtner, Wichita, KS 67212, USA

Abstract. Sulfonylurea herbicide resistant prickly lettuce, *Lactuca serriola*, was discovered in a no-till winter wheat, *Triticum aestivum*, field near Lewiston, Idaho in April 1987 (4). This was the first confirmed occurrence of herbicide resistance resulting from sulfonylurea herbicide use. Chlorsulfuron resistant kochia, *Kochia scoparia*, seeds were collected in a winter wheat field near Liberal, Kansas in October 1987 (6). In 1988, sulfonylurea herbicide resistant biotypes of Russian thistle, *Salsola iberica*, and common chickweed, *Stellaria media*, were found in winter wheat fields in Kansas, Montana, North Dakota, and Washington and Alberta, Canada, respectively (9). Sulfometuron resistant perennial ryegrass, *Lolium perenne*, was collected from an industrial weed management site in California during autumn 1989 (8). Sulfonylurea herbicide resistant biotypes of kochia and Russian thistle also were found in industrial weed management sites (8). The mechanism of resistance is an altered site of action, acetohydroxyacid synthase (AHAS) enzymes, which is inhibited less in resistant than in susceptible biotypes by sulfonylurea herbicides (3,8). Sulfonylurea resistant prickly lettuce (4) and kochia (6) also are cross resistant to other AHAS inhibiting herbicides. The sulfonylurea resistance trait is controlled by a single nuclear gene with incomplete dominance in prickly lettuce (5). Sulfonylurea susceptible prickly lettuce is 1.2 to 2 times more fit than the resistant biotype (1).

In April 1987, 43% of the prickly lettuce plants collected from the wheat farm where the resistant biotype was discovered resisted metsulfuron (3). Following three annual applications of growth regulator-type herbicides, 10% of prickly lettuce plants collected during April 1990 resisted metsulfuron (1). During March 1990, four replicated sites on this farm were sprayed with chlorsulfuron plus metsulfuron and the percentage of resistant and susceptible prickly lettuce plants was determined. The number of resistant biotypes ranged from 3 to 45% among sites. Overall, 25% of the prickly lettuce plants resisted the herbicide treatment (1). Prickly lettuce seeds were harvested during September 1989 at 23 sites from plants growing along roads and in fields within a 4 km radius from the original point of resistance (2). Five sites had plants that were resistant to metsulfuron; two sites were from areas adjacent to a highway that had been sprayed twice with sulfometuron and may be an independent event of resistance development. The three other sites were adjacent to fields known to contain resistant plants.

Farmers in the United States of America and Canada reporting the occurrence of sulfonylurea herbicide resistant weeds on their farm (7) were asked up to 135 questions regarding their weed management practices. The telephone survey was conducted during April 1990. Information on environmental edaphic, and agronomic factors was collected. Most farmers with sulfonylurea herbicide resistant weeds grew monoculture winter wheat under dryland conditions and used chlorsulfuron and/or metsulfuron sequentially for two or more years.

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