MORISHITA, DON W.[1]*, MICHAEL P. QUINN, ROBYN J. WALTON and MICHAEL A. BECERRA[2], [1]University of Idaho, Twin Falls R&E Center, Twin Falls, ID and [2]Idaho Food Quality Assurance Laboratory, Twin Falls, ID. **Ethofumesate carryover potential in wheat and barley.**

ABSTRACT

Ethofumesate has long been an important herbicide for weed control in sugar beet. With the registration of triflusulfuron for broadleaf weed control in sugar beet, ethofumesate use declined slightly. As growers began experiencing declining kochia control with triflusulfuron due in part to reports of acetolactate synthase (ALS) resistant kochia, many growers have returned to using more ethofumesate for weed control. Also, with the introduction of generic ethofumesate to the marketplace, the ethofumesate price has declined to a point where growers are considering applying it broadcast rather than in a band. Currently, the ethofumesate label restricts planting wheat or barley less than 12 months after applying ethofumesate for weed control in sugar beet. Consequently, growers are faced with either not using ethofumesate if they plan to grow wheat or barley the following year or plant a different crop. Also, if lower ethofumesate prices allow growers to make broadcast applications, more ethofumesate will be applied broadcast, which increases the carryover potential to rotational crops such as wheat and barley. A study was conducted from 2004 to 2006 at the University of Idaho Research and Extension Center near Kimberly, Idaho to: 1) determine crop injury potential of spring wheat and barley to various ethofumesate rates and application timings on sugar beet and; 2) determine the dissipation rate of ethofumesate in an irrigated silt loam soil with 1% organic matter. Sugar beet was planted in 2004 and 2005. Spring wheat and spring barley were planted in April the year following each sugar beet crop. In the sugar beet crop, ethofumesate was applied preemergence and postemergence as a broadcast application and in an 11-inch band with a CO_2-pressurized bicycle-wheel sprayer calibrated to deliver 10 gpa for broadcast or 15 gpa for band applications. Ethofumesate rates applied preemergence were 1.75, 2.25, and 3.0 lb ai/A. These treatments were followed by three sequential postemergence applications of triflusulfuron at 0.0312 lb ai/A plus a 1:1:1 ratio of desmedipham, phenmedipham, and ethofumesate (dmp&pmp&efs) at 0.33 lb ai/A plus clopyralid at 0.094 lb ai/A. In the postemergence applications triflusulfuron at 0.0312 lb ai/A plus dmp&pmp&efs at 0.25 lb ai/A was applied at the sugar beet cotyledon stage followed by three triflusulfuron at 0.0312 lb ai/A plus dmp&pmp&efs at 0.33 lb ai/A plus clopyralid at 0.094 lb ai/A applications at approximately 7 day intervals. Ethofumesate was added to the second application at 0.75 lb ai/A, and to the third and fourth applications at 1.38 lb ai/A.

In 2005, postemergence ethofumesate applications were included with the preemergence ethofumesate treatments and postemergence triflusulufuron plus dmp&pmp&efs plus clopyralid applications. Postemergence ethofumesate rates were 0.125 lb ai/A at the second application followed by 0.25 lb ai/A at the third and fourth applications. These additional postemergence applications brought the total ethofumesate dosage applied in the season to 4.0 lb ai/A, which is the maximum ethofumesate amount that can be applied in a season.

In addition to the plant-back study, an ethofumesate soil dissipation study was conducted. In the dissipation study, ethofumesate was applied preemergence at 3 lb ai/A as one treatment and in another treatment ethofumesate was applied postemergence at 0.75 lb ai/A with the second application and 1.375 lb ai/A at the third and fourth applications. Soil samples were collected at two-week intervals beginning at the day of application and ending on September 27, 2004 and October 28, 2005.

Wheat and barley visual injury evaluations conducted in 2005 ranged from 0 to 9% for all herbicide treatments. Differences in wheat and barley injury were observed among herbicide treatments in both wheat evaluations and the first barley evaluation. However, none of the injury affected grain yield. Interestingly, treatments with a 0% injury rating were among the highest ethofumesate rates applied. Variation in crop injury among all treatments was likely due more to environmental and edaphic variability in the study site. No difference in grain yield was observed among the treatments with wheat yield ranging from 63 to 87 bu/A in and barley yield ranging 57 to 93 bu/A. Similar to the variability in crop injury, yield variability also was attributed to factors not associated with the herbicide treatments.

In 2006, wheat and barley injury ranged from 0 to 5% among all herbicide treatments. However, there were no differences in injury among the herbicide treatments at any of the three evaluation dates. Wheat yield ranged from 91 to 97 bu/A and barley yield ranged from 116 to 129 bu/A for all treatments. There were no differences in wheat or barley yield between the control and all herbicide treatments. No injury differences were observed in 2006. There were no differences in wheat or barley yield between the control and any of the herbicide treatments in either year, indicating no injury potential using high ethofumesate rates. Ethofumesate dissipation studies indicate that ethofumesate reached non-detectable levels (<13 ppb) by the end of September or October of the application year.