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# Summary of Herbicide Vegetable Roundtable Discussion

Approximately 30 weed scientists, primarily from universities in the U.S. and Canada, but with some representation from industry, attended the initial Vegetable Herbicide Roundtable Discussion held on February 12, 2002 at the annual meeting of the Weed Science Society of America (WSSA). The purpose of the roundtable discussion was to provide an opportunity for weed scientists working in vegetable crops to discuss results and share ideas on their research in an informal atmosphere. Another purpose was to provide a forum for interaction and discussion among minor crop weed scientists.

The discussion was organized by crop, with the crops that are most vulnerable due to a lack of herbicide options discussed first. However, the summary is organized by crop group. If a use mentioned in the discussion is a request in the IR-4 database, the PR number for the project and an update are included. If there is no PR number associated with a use in the summary, then IR-4 does not have a request for that use.

## Root and Tuber Vegetables

Garden beet - The use of s-metolachlor on garden beet (06629) will be covered by root vegetable subgroup (1B). Studies on the rep crops in the root vegetable subgroup, carrot (06281) and radish (06899), are in petition prep and IR-4 plans to submit these studies to the EPA. In south Texas, metolachlor has caused some stunting to garden beet grown for tops. Dimethenamid has caused injury to garden beet and participants thought that this use is too risky to pursue, based on a performance study for this use (06662) conducted in 2001.

Radish - There are no new herbicides for radish.

Carrot - There are currently no products to control *Coryza* spp. in carrot. Options for weed control in carrot that were discussed included flumioxazin at 0.001 to 0.005 lb ai/A and sulfentrazone (07956, "C" priority). Oxyfluorfen at 0.031 to 0.062 lb ai/A was also mentioned as a possibility; however, adding new uses to the oxyfluorfen label cannot be considered until the ongoing re-assessment is completed. The use of linuron on carrots was discussed. There is a tolerance for the use of linuron applied postemergence to carrots (00685), but the preemergence use of linuron (06765) is a "C" priority. Linuron is scheduled to go through EPA re-assessment this year, and decisions on new uses can be made once the re-assessment is complete.

Potato - There was a comment that sulfosulfuron looks promising. There are currently several herbicides available for weed control in potato.

Sweet Potato - David Monks, NC State Univ., stated that there is a lot of interest for s-metolachlor on sweet potato in North Carolina and Louisiana. Even though there is a tolerance for s-metolachlor on potato, the crop subgroup was not covered at the time of the potato submission. Currently no new uses can be added to the metolachlor label, even though IR-4 has data for s-metolachlor on sweet potato (05413).

There are no herbicides available to control pigweed in sweet potato. David Monks also said that sweet potato selectivity to halosulfuron is acceptable in North Carolina.

Parsnip - Only linuron is available for use. Bob McReynolds, Oregon State Univ., mentioned that he liked prometryn (Caparol). Prometryn has a tolerance for parsnip seed crops (06341).

## Green onion and dry bulb onion

Flumioxazin was not safe when applied POSTEMERGENCE in California, but was safe when applied PRE in North Carolina. A flumioxazin/dry bulb onion (07389) residue study is in progress with field trials initiated in 2001. In Colorado, pyraflufen was equivalent to oxyfluorfen and bromoxynil. Fluroxypyr has a narrow weed control spectrum but it has controlled kochia, nightshade species, and volunteer potato. It also has controlled ragweed in NJ. Fluroxypyr/dry bulb onion (07705) is an active residue study as field trials were initiated in 2000. Products are still needed for weed control in green onion.

## Leafy vegetables

Spinach - Participants agreed that spinach remains the most vulnerable crop for losses due to weed pressure, and to a lack of weed control options. Ro-Neet (cycloate) is the only herbicide for fresh market spinach. The margin of selectivity for s-metolachlor on spinach is quite narrow; however, IR-4 has submitted a petition for the use of metolachlor on spinach (01217). The EPA will not review this petition until new uses can be added to the metolachlor label. The growing season for spinach was discussed. Brad Majek said that in NJ, spinach is grown as a spring, fall, and over-winter crop. Herbicides that have potential for use in dormant, over-wintering spinach are clopyralid at 2 oz. product/A (05434), and fluroxypyr (07280). Fluroxypyr can injure actively growing spinach. The petition for the use of clopyralid on spinach has been submitted to the EPA and is scheduled to be reviewed this year.

Steve Fennimore, Univ. of California located in Salinas, CA, proposed working with vegetable crop breeders to develop herbicide-tolerant spinach (among other crops) using methods traditional to crop breeding. As an example, he discussed the utility of spinach developed to be tolerant to AHAS/ALS herbicides (imidazolinone or sulfonyleurea). Citing the example of Clearfield (imidazolinone resistant) crops such as field corn, canola, or wheat; herbicide-resistant crops developed using traditional breeding methods have not attracted the negative publicity that has surrounded glyphosate-tolerant and glufosinate-tolerant crops.

Lettuce - Glyphosate-tolerant lettuce is considered to have tremendous potential and will likely be accepted by the growers when and if it becomes available. Consumer concerns about the product have tempered enthusiasm. It was pointed out that lettuce needs to be kept weed free the first three weeks in order to maintain optimal yield.

Parsley - The question was asked when cilantro would no longer require a tolerance separate from parsley. This item will be discussed at the Crop Group Symposium, scheduled for October 7-8, 2002.

## Celery

Bernie Zandstra, Michigan State Univ., stated that preemergence and postemergence applications of flumioxazin are safe to celery.

Continued on Page 18

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Continued from Page 17

## Head and Stem Brassica Vegetables

Steve Fennimore reported that in California applications of sulfentrazone at 0.11 lb ai/A were safe to head and stem *Brassica* crops and gave good weed control. Tim Miller, Washington State Univ. at Mt. Vernon, WA reported that sulfentrazone looks promising on *Brassica* crops in Washington. The petition for sulfentrazone/cabbage (06522) was submitted to the EPA in April 2001 and is on the EPA Work Plan for review in 2002. A sulfentrazone/broccoli (07724) residue study was initiated in 2001.

## Edible legumes

There were questions about the status of IR-4 residue studies on edible legumes. For clethodim, it is more efficient for IR-4 to repeat the work with clethodim on edible legumes (multiple PR numbers) than it is to use existing data. Petitions for fomesafen/snap bean (03011 and 03472) and fomesafen/dry bean (05403, regional restrictions) have been submitted to the EPA, but review has been held up by the anticipated re-assessment at the EPA. Mark VanGessel, Univ. of Delaware, asked about the safety of pendimethalin on snap beans. In response, injury was noted in research conducted in Michigan and Arkansas. Injury was also found in research conducted in Florida, but pendimethalin was safe at lower rates. Sulfentrazone has been found to be too injurious on many edible legume species. The manufacturer does not support sulfentrazone/snap bean (06521). The request for a national tolerance for sulfentrazone/lima bean (06519) has been withdrawn, but IR-4 has conducted work for a tolerance for this use in Tennessee only (07583). Sulfentrazone/succulent pea (06520) is a "B" priority. Other requests for sulfentrazone on edible legumes, which includes southern pea (06909), dry bean (06628), garbanzo (07586), lentil (07582), and dry pea (07585) are a registration objective of the manufacturer. An acifluorfen-resistant southern pea variety has been developed in Arkansas.

## Tomato and Pepper

Based on work done in Florida, products that have potential are sulfentrazone and flufenacet. Flufenacet also looked promising in Michigan. Sulfentrazone/tomato (07957) and sulfentrazone/pepper (08048) are "B" priorities. Flufenacet/pepper is a "C" priority. Trifloxysulfuron applied preplant incorporated in Florida resulted in stunting. The group was interested in examining sulfosulfuron on tomato and pepper. Bill Stall, University of Florida, mentioned that in Florida, sulfosulfuron looked good on potato, and predicted that it could have potential on other *Solanaceae* crops. The Gowan Company representative said that in their work on tomato and pepper, halosulfuron should not be applied over the top, but had potential applied postemergence directed. Halosulfuron/tomato (06843) and halosulfuron/pepper (07443) are Gowan registration objectives. The *Federal Register* notice of filing for this use was published in August 2001.

## Cucurbits

Melons - The situation regarding availability of herbicides for weed control in melons is good compared with some other minor

crops. There are some problems with herbicides used under plastic mulch in Florida. Sulfentrazone at 0.1 lb ai/A has been noted to control pigweed species in melons, as well as squash. A residue study for the use of sulfentrazone on cantaloup (08445) has been initiated in 2002. Efficacy and phytotoxicity trials for sulfentrazone/muskmelon (07911) and sulfentrazone/watermelon (07917) are also being conducted in 2002

Squash - Dave Monks reported that in NC there is injury to summer squash from postemergence applications of halosulfuron, depending on the variety. A tolerance for halosulfuron/summer squash (06365) was established in October 2000. Bob McReynolds said that there are no adequate herbicides available to control weeds in the processing winter squash, 'Golden Delicious'. Ethalfluralin does not control many of weeds present in Oregon. Specifically, growers need a herbicide to control hairy nightshade. s-Metolachlor/winter squash (06630) is a residue study that is being initiated in 2002. Dimethenamid/winter squash (06596), for use in Oregon only, is also a residue study that is being initiated in 2002.

Cucumbers - Dave Monks noted that in NC pendimethalin is at least as good as ethalfluralin (Curbit®) in controlling weeds in cucumber. Tim Miller reported that he has noted too much injury to cucumber from pendimethalin in several regions in WA. Work was initiated on pendimethalin/cucumber (01892), but was dropped in 1993 because of phytotoxicity. Cucumbers do not have adequate tolerance to sulfentrazone. Work was initiated on cucumber/sulfentrazone (07913), but the registrant withdrew support based on the amount of injury. A question was asked about the status of oxyfluorfen in cucumber. Field trials had been conducted in 1988 but the study was never submitted. Oxyfluorfen is currently undergoing re-assessment at the EPA and decisions on oxyfluorfen projects can not be made until the re-assessment is complete.

## Herbs

Because there are so many different plant families among the herbs, they have to be evaluated on a case-by-case basis in the states in which they are grown.

## Strawberry

Based on the current climate for registration, work should concentrate on flumioxazin and sulfentrazone. A flumioxazin/strawberry (08063) study is being conducted this year. Sulfentrazone/strawberry (07044) is a "B" priority, but there have been Section 18 uses granted in Washington and Oregon for the past two years.

At the end of the discussion, participants thought that the Roundtable was useful, but there appeared to be consensus that it did not need to be an annual event. At the present, the plan is for the Roundtable to be a biennial meeting. The next Roundtable Discussion is tentatively planned for the WSSA meeting scheduled for February 2004.

Article by Fred Salzman