Recent Weed Management Research in Asparagus

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Introduction

The asparagus industry in California has experienced a substantial increase in new-planted acreage over the past four years. When all of the new asparagus reaches the full cutting season stage, statewide acreage will be approximately 35,000 acres. The current value of the crop is nearly $130 million.

Because asparagus is a limited acreage specialty perennial crop, it is difficult to get promising new herbicides registered. Most of the existing herbicide choices available to producers are relatively old with the exception of Solicam (norflurazon), as a preemergence choice on established asparagus, and Poast (sethoxydim) and Fusilade (fluazifop) for postemergence grass control use. Concerns about the eventual fate of older preemergence herbicides like Karmex (diuron) or Lorox (linuron), a preemergence/postemergence material, due to regulatory scrutiny, the Food Quality Protection Act (FQPA), and commitment by chemical manufacturers to maintain specialty crop registrations, require an effort by researchers and growers to convince companies to include asparagus (or other vegetable commodities) in their product development programs for registration of promising new herbicides. This becomes increasingly important for the control of perennial weed species like yellow nutsedge (*Cyperus esculentus*), field bindweed (*Convolulus arvensis*), bermudagrass (*Cynodon dactylon*), Johnsongrass (*Sorghum halepense*), hoary cress (*Cardaria* spp.) and perennial pepperweed (*Lepidium latifolium*).

Methods

Over the past two years, two preemergence and three postemergence weed management trials have been conducted on asparagus in San Joaquin County, evaluating both new and old herbicides for weed control efficacy and crop safety. Preemergence chemicals evaluated included Karmex, Devrinol (napropamide), Aim (carfentrazone), Authority (sulfentrazone), Visor (thiazopyr), Goal (oxyfluorfen), Prowl (pendimethalin), Permit (halosulfuron), Frontier (dimethanamid), Milestone (azafenidin) and Valor (flumioxazin). The postemergence herbicides evaluated included Lorox (linuron), Sencor (metribuzin), Stinger (clopyralid), Permit and Shadeout (rimsulfuron).

Both preemergence trials and two of the postemergence trials involved treatment of newly planted one-year-old asparagus crowns. The third postemergence trial involved different rates of Permit plus X-77 spreader as directed sprays in post cutting season, fern stage asparagus for the control of yellow nutsedge.
All treatments were applied with a handheld CO₂ backpack sprayer using 8002 nozzles at 40 psi in a spray volume of 30 gal/A water. The plot design of all trials was a randomized complete block with four replications. The asparagus cultivar involved in all trials was UC157F₁. All rates of applied herbicides are expressed as lb/A a.i. (active ingredient).

**Results**

A pre/postemergence weed control trial at Victoria Island Farms, west of Stockton, CA, on newly planted one year old crowns was established on March 19, 1998. All treatments were soil incorporated by winter rainfall. Postemergence treatments of Permit plus crop oil concentrate were made on April 27, 1998. The soil type at the trial site was an Egbert muck. Best preemergence control of the weeds present – common lambsquarters (*Chenopodium album*), London rocket (*Sisymbrium irio*), prickly lettuce (*Lactuca aerriola*), redroot pigweed (*Amaranthus retroflexus*), prostrate knotweed (*Polygonum aviculare*) and barnyardgrass (*Echinochloa crus-galli*) occurred with a combination of Karmex (2 lb/A) plus Prowl (4.00 lb/A) followed by Prowl (4.00 lb/A) alone, and Milestone at 1.00 lb/A alone. All treatments demonstrated excellent crop safety. The postemergence treatments of Permit at 0.065 lb/A plus ½% crop oil concentrate alone or over the earlier preemergence Permit treatment (0.083 lb/A) provided good control of prickly lettuce and redroot pigweed but was somewhat weak on prostrate knotweed, common lambsquarters and barnyardgrass. Safety to the 14 to 20 inch tall crop fern was excellent.

A postemergence weed control trial on 14 to 20 inch tall newly planted asparagus fern was established at Victoria Island Farms on April 27, 1998. All applications were applied over the crop fern and the weeds present – first true leaf to 6 inch tall common lambsquarters, 4 to 8 inch tall London rocket, 3 to 5 inch tall prickly lettuce, 2 to 3 inch tall redroot pigweed, 2 to 14 inch diameter prostrate knotweed and 1 to 3 inch tall barnyardgrass. Best weed control occurred with a 1.00 lb/A rate of Sencor, followed by a 0.50 lb/A rate of Sencor and a 1.00 lb/A rate of Lorox. All trial treatments were weak in controlling prostrate knotweed and barnyardgrass. Permit at 0.031 lb/A or 0.065 lb/A plus ¼% X-77 spreader was additionally weak on common lambsquarters but was very effective in controlling a very limited population of 4 to 5 true leaf yellow nutsedge in the trial. All treatments provided excellent safety to the crop fern.

A 1999 preemergence weed control trial, evaluating nine herbicides and/or combination treatments was established at Victoria Island Farms, west of Stockton, CA, on March 2, 1999. The soil type at the trial site was an Egbert muck and all of the treatments were soil incorporated with a combination of winter rainfall and sprinkler irrigation. Best weed control of the volunteer sunflower, swamp smartweed and common lambsquarters was attained by a 0.375 lb/A rate of Valor, followed by Permit (0.083 lb/A) and Milestone (0.50 lb/A). All other treatments were only partially effective on volunteer sunflower and the combination treatment of Karmex (2.00 lb/A) plus Devrinol (2.00 lb/A) only provided marginal control of swamp smartweed. None of the treatments caused injury to the crop, although there appeared to be a very slight slow down in asparagus crop growth with the combination treatment of Visor (1.00 lb/A) plus Goal (0.25 lb/A).
A postemergence weed control trial, evaluating five herbicides on newly planted one year old asparagus crowns, was established at Victoria Island Farms on April 12, 1999, west of Stockton, CA. The soil type at the trial site was an Egbert muck. All treatments were applied over the 6 to 18 inch tall crop fern and the weeds present – first true leaf to 14 inch tall volunteer sunflower, second true leaf to 6 inch tall swamp smartweed, 2 to 5 inch tall common lambsquarters, 3 to 6 inch rosette prostrate knotweed and a limited population of 4 to 6 inch rosette curly dock. Best weed control of all weed species present was obtained with Sencor at 1.00 lb/A. Lorox (1.00 lb/A) plus ½% crop oil concentrate was weak on prostrate knotweed and swamp smartweed, with only partial activity on volunteer sunflower. Stinger at 0.25 lb/A only effectively controlled volunteer sunflower. Permit at 0.065 lb/A plus ½% crop oil concentrate was weak on prostrate knotweed and swamp smartweed with only fair activity on common lambsquarters. Shadeout at 0.065 lb/A plus ½% crop oil concentrate was weak on prostrate knotweed with only partial control on common lambsquarters, swamp smartweed and curly dock. Some fern phytotoxicity occurred with Stinger and Shadeout plus crop oil concentrate. All other treatments gave excellent crop safety.

A trial, designed to evaluate different rates of Permit plus ¼% X-77 spreader for the postemergence control of yellow nutsedge, was established at Marca Bella Farms near Tracy, CA on July 14, 1999. The soil type at the trial site was a Sacramento clay/Piper sandy loam mix. The treatments were applied over 4 to 9 true leaf (4 to 18 inches tall) yellow nutsedge but directed to the base of the post-cutting season 6 foot tall asparagus fern. All rates (0.023 – 0.065 lb/A) of Permit plus X-77 spreader gave good to excellent control/suppression of yellow nutsedge if the weed stage of growth was less than 6 inches tall. Greater than 6 inches tall, best suppression/control occurred with the high rate (0.065 lb/A) of Permit plus X-77. Another application of all rates was not conducted due to an inadvertent cultivation of the trial site just prior to the treatment date. All of the single application treatments showed excellent safety to the crop.

References
