

Weed Control in Celery

Oleg Daugovish, University of California Cooperative Extension, Ventura County, Ventura, California, 93003, odaugovish@ucdavis.edu, Steve Fennimore, University of California Davis, Salinas, CA, and Richard Smith, , University of California Cooperative Extension, Monterey County.

Weed control in celery produced in Ventura County is accomplished by using herbicides and by rotating to strawberries, a crop that is fumigated annually for the purpose of pest control. Fumigation controls many broadleaf weed species but often fails to control hard-seeded weed species such as little mallow (cheeseweed) and California burclover. Fumigant alternatives to methyl bromide that are increasingly used in California provide partial or no control of yellow nutsedge, a major troublesome perennial weed in Southern California vegetable production.

There are three preemergence and/or postemergence weed control materials currently registered for use on celery: Prometryn (Caparol), linuron (Lorox) and trifluralin (Treflan), and in 1999 were applied to 72, 28 and 1% of the California celery acreage, respectively. The original impetus for this research project was the uncertainties of the regulatory situation for each of these herbicides as they passed through the first round of the Food Quality Protection Act (FQPA) review. It appears that each material has made it through the first round of the FQPA process. However, it seems prudent to explore other herbicide options for celery, given that EPA has classified linuron as a possible human carcinogen. Additionally, Caparol and Lorox do not control yellow nutsedge and thus, new materials should be evaluated.

Three trials at Oxnard, CA and five trials at Salinas, CA compared performance of pre-transplant (PRE) herbicides to the standard post-transplant (POST) applications of Caparol (1.5 lb ai /acre) or Lorox (1 lb ai/acre) in 2001-2004. Pre-plant herbicides were (lbs ai/acre): S-metolachlor (Dual Magumat 0.5, 0.63 and 0.95), flufenacet (Define 0.4, 0.5 and 0.6), flumioxazin (Chateau 0.06, 0.094 and 0.188), oxyfluorfen (GoalTender 0.125) and carfentrazone (Shark 0.032).

Dual Magnum and Define at all rates provided 90% control of yellow nutsedge grown in pots (Salinas) and reduced the weed density at Oxnard from 19 plants per 45 ft² plot. However, when yellow nutsedge population in untreated control was 83 plants/plot at Oxnard in 2003 only highest rates of Dual Magnum and Define significantly reduced the nutsedge number (70 and 52%, respectively). All other treatments did not control yellow nutsedge.

The major broadleaf weed species were: burning nettle, shepherdspurse, little mallow, black nightshade, nettleleaf goosefoot, redroot pigweed and chickweed. Caparol and Chateau (at all rates) provided the most consistent broadleaf weed control (90-98%) at both locations over the years and also controlled annual bluegrass at Salinas. In 2004 study at Oxnard tank mix of Chateau with Dual Magnum (PRE) and Caparol (POST)

following Dual Magnum (PRE) provided near 100% control of all broadleaf weeds. Knowing that Dual Magnum was the best material for yellow nutsedge control, these combinations may provide season-long weed control of all weeds and in case of Dual Magnum +Chateau tank mix it may be achieved with a single PRE application.

Lorox controlled (>90%) little mallow at Oxnard and shepherdspurse at both locations. Goaltender controlled shepherdspurse, chickweed nightshade and nettle. Dual Magnum and Define failed to control broadleaf weeds at lowest rates but provided partial weed control at increased rates (except nightshade that were not controlled by any rate of Define). Shark failed to control any weeds at both locations.

When herbicide injury was recorded 3-5 weeks after transplanting Shark and GoalTender did not cause any visual injury to transplant celery, except in one study in Salinas, where GoalTender caused crinkling of leaves but celery plants later outgrew the injury. Caparol, Chateau and lower rates of Dual Magnum and Define had similar levels of crop injury (1-2 on a 10 point scale, 0=no injury, 10=dead plant). Lorox and highest rate of Dual Magnum caused greater injury (3-3.5 points) than other herbicides. At Oxnard all treatments in all years had similar number of marketable heads to untreated control, indicating that celery outgrew initial herbicide injury at that location. However, in two studies at Salinas Chateau significantly reduced the number of marketable heads.

These studies showed that Chateau can be an excellent replacement for Caparol and Lorox and can provide similar or better broadleaf weed control. Ability to use Chateau PRE still leaves an opportunity to control weeds POST with Caparol if that becomes necessary. Lower label rates of Chateau should be used to avoid crop injury and potential yield reduction. Yellow nutsedge control can be achieved with Dual Magnum and Flufenacet but high densities of nutsedge required maximum rate of Dual Magnum which was injurious to celery transplants. Dual Magnum has indemnification label with Syngenta and is currently available for use in celery, while Chateau is in IR4 process and may potentially be registered in 2007.