“Vegetable Weed Control in the Desert”
Barry Tickes
University of Arizona
Yuma Agricultural Center
Herbicides Registered In Arizona And California 2008
New Herbicide Registrations Since 2000

- Cotton: 9
- Wheat: 7
- Alfalfa: 6
- Melons: 1
- Cole Crops: 1
- Lettuce: 0
<table>
<thead>
<tr>
<th>Herbicide</th>
<th>CA/AZ Year first registered or expected</th>
<th>Grasses</th>
<th>Mustards</th>
<th>Goosefoot</th>
<th>Sunflower</th>
<th>Nightshade</th>
<th>Other</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balan</td>
<td>CA/AZ 1965 Y</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Prefar</td>
<td>CA/AZ 1968 N</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Kerb</td>
<td>CA/AZ 1969 N</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Poast</td>
<td>CA/AZ 1984 Y</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Select</td>
<td>CA/AZ 1987 Y</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

● Good Control  ❗ Partial Control  ○ No Control
### Lettuce Weed Control/ Low Deserts

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>CA/AZ</th>
<th>Year first registered or expected</th>
<th>Grasses</th>
<th>Mustards</th>
<th>Goosefoot</th>
<th>Sunflower</th>
<th>Nightshade</th>
<th>Other</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Summer Annual</td>
<td>Winter annual</td>
<td>London Rocket</td>
<td>Shepardspurse</td>
<td>Wild mustard</td>
<td>Lambsquarters</td>
<td>Nettleleaf Goosefoot</td>
</tr>
<tr>
<td>Balan</td>
<td>CA/AZ</td>
<td>1965</td>
<td>Y</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Prefar</td>
<td>CA/AZ</td>
<td>1968</td>
<td>N</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Kerb</td>
<td>CA/AZ</td>
<td>1969</td>
<td>N</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Poast</td>
<td>CA/AZ</td>
<td>1984</td>
<td>Y</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Select</td>
<td>CA/AZ</td>
<td>1987</td>
<td>Y</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

- ● Good Control
- ● Partial Control
- ○ No Control
### Lettuce Weed Control/ Low Deserts

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Year first registered or expected</th>
<th>Grasses</th>
<th>Mustards</th>
<th>Goosefoot</th>
<th>Sunflower</th>
<th>Nightshade</th>
<th>Other</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balan</td>
<td>CA/AZ 1965</td>
<td>Y</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Prefar</td>
<td>CA/AZ 1968</td>
<td>N</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Poast</td>
<td>CA/AZ 1984</td>
<td>Y</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Select</td>
<td>CA/AZ 1987</td>
<td>Y</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

**Grasses**: Winter annual, London Rocket, Shepardspurse, Wild mustard, Lambsquarters, Sowthistle, Sunflower, Prickly Lettuce, Groundcherry, Silverleaf Nightshade, Purslane, Malva, Pigweed

- **Good Control**:Investigators indicate this herbicide is effective against the listed weeds.
- **Partial Control**: Investigators indicate this herbicide has some limited control against the listed weeds.
- **No Control**: Investigators indicate this herbicide has no control against the listed weeds.

**Comments**: Must be mechanically incorporated. Do not concentrate on bed top or injury can occur. Incorporate with high volume of sprinkler irrigation to push down to where weed seeds are germinating. Will not control annual bluegrass or Sprangletop. Use highest rates to control annual bluegrass and Sprangletop. Can use either NIS or COC with Select Max but only COC with Select.
## Lettuce Weed Control/ Low Deserts

**Herbicide** | **CA/AZ** | **Year first registered or expected** | **Available as a generic Summer Annual** | **Winter annual** | **London Rocket** | **Shardgrass** | **Milletgrass** | **Lambquarters** | **Nettleleaf Goosefoot** | **Sowthistle** | **Sunflower** | **Prickly Lettuce** | **Groundcherry** | **Silverleaf Nightshade** | **Purslane** | **Malva** | **Pigweed** | **Comments** |
Balan | CA/AZ | 1965 | Y | | | | | | | | | | | | | | | | | Must be mechanically incorporated. Do not concentrate on bed top or injury can occur. |
Prefar | CA/AZ | 1968 | N | | | | | | | | | | | | | | | | | Incorporate with high volume of sprinkler irrigation to push down to where weed seeds are germinating. |
Poast | CA/AZ | 1984 | Y | | | | | | | | | | | | | | | | | Will not control annual bluegrass or Sprangletop. Always use COC. |
Select | CA/AZ | 1987 | Y | | | | | | | | | | | | | | | | | Use highest rates to control annual bluegrass and Sprangletop. Can use either NIS or COC with Select Max but only COC with Select |

- **Good Control**
- **Partial Control**
- **No Control**
Modern Chemical Era:  *in the last 15 years* .

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>Products</th>
<th>Spectrum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Neonicotinoids</td>
<td>Admire, Assail…</td>
<td>Whitefly, aphid, beetles</td>
</tr>
<tr>
<td>2. Spinosyns</td>
<td>Success, Radiant</td>
<td>Worms, leafminers, thrips</td>
</tr>
<tr>
<td>3. Diacylhydrazine</td>
<td>Confirm, Intrepid</td>
<td>Worms</td>
</tr>
<tr>
<td>4. Pyridine</td>
<td>Fulfill</td>
<td>Aphids</td>
</tr>
<tr>
<td>5. Pyridine - IGR</td>
<td>Knack</td>
<td>Whiteflies</td>
</tr>
<tr>
<td>6. Oxadiazine</td>
<td>Avaunt</td>
<td>Worms</td>
</tr>
<tr>
<td>7. Thiadiazine</td>
<td>Courier</td>
<td>Whiteflies</td>
</tr>
<tr>
<td>8. Carbozimide</td>
<td>Beleaf</td>
<td>Aphids</td>
</tr>
<tr>
<td>9. Diamides</td>
<td>Coragen, Synapse</td>
<td>Worms, Leafminers</td>
</tr>
<tr>
<td>10. Ketoenols</td>
<td>Oberon, Movento</td>
<td>Aphids, Whiteflies</td>
</tr>
</tbody>
</table>
## U.S Crop Acreage 2008

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Corn</td>
<td>86,351,000</td>
</tr>
<tr>
<td>Soybeans</td>
<td>75,718,000</td>
</tr>
<tr>
<td>Wheat</td>
<td>55,685,000</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>20,980,000</td>
</tr>
<tr>
<td>Cotton</td>
<td>9,470,000</td>
</tr>
<tr>
<td>Head Lettuce</td>
<td>151,000</td>
</tr>
<tr>
<td>Broccoli</td>
<td>126,000</td>
</tr>
<tr>
<td>Romaine</td>
<td>82,5000</td>
</tr>
<tr>
<td>Leaf Lettuce</td>
<td>53,9000</td>
</tr>
<tr>
<td>Spinach</td>
<td>37,400</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>36,910</td>
</tr>
</tbody>
</table>
P. McDougall (Crop Life America and European Crop Protection Assn.)
<table>
<thead>
<tr>
<th>Number of years between the first synthesis and the first sale of the product</th>
<th>1995</th>
<th>2000</th>
<th>2005-8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.3</td>
<td>9.1</td>
<td>9.8</td>
</tr>
</tbody>
</table>
World Pesticide Use
Acres Treated (% of total)
2000

- Herbicides, 36
- Insecticides, 25
- Fungicides, 12
- Other, 29
(Nematicides, Rodenticides, Fumigants, Bird, Fish and Aquatic, etc.)
U.S. Pesticide Use
Acres Treated (% of total)
2001

- Insecticides, 10
- Fungicides, 6
- Other, 40
- Herbicides, 44

(Nematicides, Rodenticides, Fumigants, Bird, Fish and Aquatic, etc.)
Arizona Pesticide Use
Acres Treated (% of total)
2005

- Insecticides, 58
- Herbicides, 17
- Fungicides, 12
- Other, 13
Arizona Crop Acreage

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Acres</th>
<th>Field Crops</th>
<th>Vegetables</th>
<th>Fruit and Nuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>1,800,000</td>
<td>1,400,000</td>
<td>300,000</td>
<td>100,000</td>
</tr>
<tr>
<td>1987</td>
<td>1,400,000</td>
<td>1,200,000</td>
<td>200,000</td>
<td>80,000</td>
</tr>
<tr>
<td>1997</td>
<td>1,200,000</td>
<td>1,100,000</td>
<td>150,000</td>
<td>50,000</td>
</tr>
<tr>
<td>2007</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>100,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Herbicide</td>
<td>Vegetable crop(s)</td>
<td>Date First Registered</td>
<td>Date New Registrations</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------</td>
<td>-----------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>EPTC (Eptam)</td>
<td>Carrots</td>
<td>1960</td>
<td>2009</td>
<td></td>
</tr>
<tr>
<td>Linuron (Lorox)</td>
<td>Spinach</td>
<td>1962</td>
<td>In progress</td>
<td></td>
</tr>
<tr>
<td>DCPA (Dacthal)</td>
<td>Cole crops, Onions (Formulation)</td>
<td>1965</td>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>Bentazon (Basagran)</td>
<td>Onions, carrots</td>
<td>1968</td>
<td>In progress</td>
<td></td>
</tr>
<tr>
<td>Pronamide (Kerb)</td>
<td>Lettuce (Formulation &amp; Chemigation)</td>
<td>1969</td>
<td>2004 and in progress</td>
<td></td>
</tr>
<tr>
<td>Napropamide (Devrinol)</td>
<td>Lettuce</td>
<td>1969</td>
<td>In progress</td>
<td></td>
</tr>
<tr>
<td>Pendimethalin (Prowl H2O)</td>
<td>Cole crops, onions, transplanted lettuce (Formulation change)</td>
<td>1975</td>
<td>In progress</td>
<td></td>
</tr>
<tr>
<td>Oxyfluorfen (Goaltender)</td>
<td>Cole crops, onions, celery, leeks (Formulation change)</td>
<td>1976</td>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>Metolachlor (Dual Magnum)</td>
<td>Spinach, carrots, transplanted lettuce</td>
<td>1977</td>
<td>In progress</td>
<td></td>
</tr>
<tr>
<td>Clopyralid (Stinger)</td>
<td>Cole crops</td>
<td>1987</td>
<td>2003</td>
<td></td>
</tr>
<tr>
<td>Dimethenamid (Outlook)</td>
<td>Carrots, onions</td>
<td>1993</td>
<td>In progress</td>
<td></td>
</tr>
<tr>
<td>Halosulfuron (Sandea)</td>
<td>Melons</td>
<td>1993</td>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>Carfentrazon (Aim)</td>
<td>Melons, transplanted fruiting vegetables</td>
<td>2000</td>
<td>In progress</td>
<td></td>
</tr>
<tr>
<td>Flumioxazin (Chateau)</td>
<td>Onions, asparagus</td>
<td>2001</td>
<td>In progress</td>
<td></td>
</tr>
</tbody>
</table>
Kerb 50W
Rates: 1-2 lbs.

Kerb 3.3
Rates: 1.2 - 2.4 pts.
Kerb Chemigation Applicators
GoalTender Chemigation Equipment
General Search of Food Request Database

IR-4 Food Use Request

Print (IR-4 Report)  Export to XLS

<table>
<thead>
<tr>
<th>Pr#: 09577</th>
<th>Pesticide(MFG)</th>
<th>Commodity (Crop Group)</th>
<th>Project Status</th>
<th>MRID#:</th>
<th>EPA Status:</th>
<th>Req States</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>METOLACHLOR/METOLACHLOR (DREXEL SIPCAM SYNGEN)</td>
<td>SPINACH (04A = LEAFY GREENS SUBGROUP)</td>
<td>FINAL REPORT COMPLETED &amp; READY FOR SUBMISSION</td>
<td>MRID:</td>
<td>PEND.11/09</td>
<td>NY MD CA AZ</td>
</tr>
</tbody>
</table>

EPA PRIA:

**Reasons for need:** BROADLEAF WEEDS

**Residue Data Sites:**

**Performance Data Required:**

**Use Pattern:**

**PCR:** 0.24-0.94 LB AI/A; PRE-EMERGENT SURFACE BROADCAST APPLIC; APPLY AFTER PLANTING & PRIOR TO WEED GERMINATION; USE AT LEAST 15 GPA; DO NOT INCORPORATE

**Protocol:** 0.65 AND 1.02 LB AI/A; APPLY EACH RATE IN 10-40 GPA, SINGLE APPLIC, BROADCAST PRE-EMERGENCE AFTER PLANTING BUT PRIOR TO CROP EMERGENCE (20-DAY PHI); ALSO 0.65 LB AI/A, APPLIED TWICE-FIRST APPLIC AS PRE-EMERGENCE BROADCAST SPRAY AFTER PLANTING BUT PRIOR TO CROP EMERGENCE; SECOND APPLIC IS POST-EMERGENCE, BROADCAST, FOLIAR AT 20 DAY BEFORE HARVEST

**Label to EPA:**

**Comments:** REQUEST TO REDUCE THE PREHARVEST INTERVAL FROM 40 DAYS (PR# 6336) TO 20 DAYS; FUTURE SUBMISSION FOR SPINACH (9577) , CANTALOUP (9406), CILANTRO (9595) ALSO INCLUDE LEAF LETTUCE (10099) & BEET GREENS (7486)

**State Requestor:** NY : Bellinder, R. MD : Beste, E. CA : Fennimore, S. AZ : Tickes, B.
Lettuce Weed Control
Yuma County Arizona 2009

Herbicides: 100%
Cultivation: 93%
Hand Hoed: 82%
Non-chemical Weed Control

- Exclusion
- Hand Labor
- Mechanical
- Solarization
- Cultural
Prevention
Labor
Lobbyists fight to keep payday lending legal

Law permitting niche industry set to expire June 30

BY HOWARD FISCHER
CAPITOL MEDIA SERVICES

PHOENIX — Rejected by voters and stymied in the House, lobbyists for payday lenders are now trying to get a Senate panel to approve legislation to keep the industry alive beyond June 30.

But now there's a sweetener: They're offering to set aside an estimated $1.5 million of their proceeds each year for community-based organizations that help the needy.

That still may not be enough to corral the votes they need to keep the doors open. Most Democrats and several Republicans already have announced their opposition to extending the life of a special law that allows lenders to charge what would be the equivalent of 400 percent interest on an annual basis.

Gov. Jan Brewer, facing a tough re-election campaign, has not taken a position on the bill. But press aide Paul Senseman said Brewer voted against the 2006 lender-sponsored initiative to keep payday lending legal, a measure that went down to defeat by a 3-2 margin despite a $14.7 million industry spending.

With the law allowing payday lending set to expire June 30, that leaves legislation as their only remaining option.

House Majority Whip Andy Tobin, R-Paulden, sponsor the necessary legislation.

But Tobin pulled the plug when it became clear that not a single Democrat on the panel would support it. Tobin said he did not want the issue of

BLM seeks volunteers needed to help pull weeds

BY JAMES GILBERT
SUN STAFF WRITER

If you enjoy doing yardwork, then the Bureau of Land Management's Yuma Field Office could use your help.

BLM spokeswoman Lori Cook said the agency is inviting the public to come help agency staff pull some weeds from 9:30 to 11:30 a.m. Sunday.

Cook said staff and volunteers will be pulling up weeds known as Brassica tournefortii from an area in the Foothills that is overrun with the plants.

"Every plant that gets pulled means there will be fewer seeds getting out to grow more plants. The site will be at will be an ongoing problem for us for many years."

Brassica is a nonnative mustard plant from North Africa and Central Asia, Cook said, and it typically occurs in disturbed areas such as dry washes and road sides.

The weed often infests new areas when its sticky seeds adhere to the undercarriages of all types of vehicles, including construction vehicles and off-road vehicles.

Cook said since Brassica outcompetes native plant growth for sunlight and water because biological controls do not exist in North America, Brassica lowers native plant diversity and degrades wildlife habitats.

"Brassica grows between March and May, so this is the perfect time for us to be out there pulling them."

All volunteers are asked to meet BLM specialists where the dirt road starts at the end of Foothills Boulevard north of Interstate 8.

To get to the location from Yuma, take Interstate 8 east about 10 miles to Foothills Boulevard. Turn north on Foothills Boulevard.

SEE WEEDS/A6
1850-1882
Chinese Era

1890’s – 1900’s
Japanese Era

1920’s – present
Mexican Era
Agents find illegal aliens inside hay

BY JONATHAN ATHENS
SUN STAFF WRITER

U.S. Border Patrol agents on Monday arrested 46 illegal immigrants hiding within secret compartments inside hay bales on two tractor-trailers.

The arrests, which took place within a 20-hour span at a Border Patrol checkpoint along Interstate 8, is the first significant one of the new year and had all the markings of "a large-scale, organized, commercial human smuggling operation," said Joe Brigman, spokesman for the Border Patrol's Yuma sector.

All of the illegal immigrants admitted they each paid approximately $2,000 to be smuggled to various locations throughout the United States, Brigman said.

The drivers of the trucks, both Mexican men legally residing in the United States, have each been charged with felony smuggling, Brigman said.

The illegal immigrants were hiding inside makeshift plywood compartments within the bales of hay and were discovered when Border Patrol canines detected human scent, he said.

"This is the length that they're trying to get away from the people away from Yuma," Brigman said, adding the case is under investigation.

Two truckloads of hay sit at the U.S. Border Patrol Yuma sector headquarters Tuesday morning after agents apprehended a number of aliens at the Telegraph Pass checkpoint on Interstate 8 the day before.

AN ILLEGAL ALIEN is seen inside a hidden area of a truckload of hay on Monday morning about 3 a.m. When Border Patrol agents apprehended 20 aliens in this load at the Interstate 8 checkpoint near Telegraph Pass. Also, 26 other aliens were apprehended in another truckload of hay at 11:30 p.m. Monday.

More than 90,000 arrests were made in the Yuma sector in 2004 alone. "There are no indications the number of arrests will decline" this year, Brigman said.

Jonathan Athens can be reached at...
Cultivation
Cultivation

**Advantages**
- Roots, shoots and above ground portions of the weeds are destroyed and buried.
- Surface crusts are broken up, aeration and water penetration is improved.
- Other pests may be controlled.

**Disadvantages**
- Perennial weeds can be dispersed.
- Weed seed brought to the surface.
- Moisture loss and soil erosion.
- Crop roots damaged.
Soil Solarization
- Clear polyethylene
- 4-6 weeks
- Moisture
Disadvantages

• Time
• Only effective at shallow depths
• All weeds not controlled

Advantages

• Non-chemical, broad applicability
• Controls other pests as well
• Effective on some seeds
2005 field soil solarization trial
2005 field soil solarization trial
Fusarium wilt at crop maturity
Cultural Control Methods

- Crop Rotation
- Mulch Planting
- Preplant Germination of weeds
- Water Management
- Planting Pattern
- Fallow
- Stale Seedbed
- Planting Time
- Variety Selection
- Smother Crops
- Competitive Crops
- Grazing
- Biological Control (insects)

- Biological Control (Diseases)
- Allelopathy
- Flooding
- Weed Free Seed
- Weed Laws
- Row Spacing
- Crop Population
- Clean Borders and Edges
- Timely Crop Destruction
- Land Selection
- Planting Date
- Reduced Tillage
- Natural Enemies
PERMANENT FILE COPY
YUMA COUNTY AGENT
ERADICATION AND CONTROL OF
NUT GRASS

Agricultural Experiment Station
University of Arizona, Tucson
Traditional Breeding
• STS - SU tolerant soybeans
• Poast Protected Field Corn
• Clearfield (Imi resistant) corn
  wheat, canola, sunflower, rice

Genetic Engineering (GMO’s)
• Glyphosate resistant crops
• Glufonsinate (Liberty-Link) resistant
• BXN (Bromoxynil) resistant
Conclusions

- Because of the costs to develop and register pesticides, the development of new herbicides for vegetables is unlikely.
- Reliance on cheap labor has always put vegetable growers in a precarious position.
- Non-chemical cultural practices, automated cultivation equipment and old herbicides will likely continue to be relied upon.
- With the help of the IR4 Project the industry will remain competitive. **THANK YOU**
Extra Slides
Family: *Brassica/Crucifer*

Crops: Bok Choy, Napa, Mizuna, Kale, Kohlrabi, Turnip Greens, Mustard, Tatsoi, Arugula, Radish, Daikon

<table>
<thead>
<tr>
<th>Herbicides</th>
<th>Year First Registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefar</td>
<td>1962</td>
</tr>
<tr>
<td>Trifluralin</td>
<td>1967</td>
</tr>
<tr>
<td>Dacthal</td>
<td>1970</td>
</tr>
<tr>
<td>Stinger</td>
<td>1987</td>
</tr>
<tr>
<td>Poast</td>
<td>1984</td>
</tr>
<tr>
<td>Select</td>
<td>1991</td>
</tr>
</tbody>
</table>
**Family: Umbelliferae**

**Crops:** Cilantro, Coriander, Parsley, Dill, Parsnip, Fennel

<table>
<thead>
<tr>
<th>Herbicides</th>
<th>Year First Registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefar</td>
<td>1962</td>
</tr>
<tr>
<td>Lorox</td>
<td>1965</td>
</tr>
<tr>
<td>Poast</td>
<td>1984</td>
</tr>
</tbody>
</table>
Family: Aster

Crops: Endive, Escarole, Chicory, Radicchio

<table>
<thead>
<tr>
<th>Herbicides</th>
<th>Year First Registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefar</td>
<td>1962</td>
</tr>
<tr>
<td>Trifluralin</td>
<td>1967</td>
</tr>
<tr>
<td>Kerb</td>
<td>1969</td>
</tr>
<tr>
<td>Fusilade</td>
<td>1984</td>
</tr>
<tr>
<td>Poast</td>
<td>1984</td>
</tr>
<tr>
<td>Select</td>
<td>1991</td>
</tr>
</tbody>
</table>
Family: *Amaranth*

Crops: Spinach, Chard, Beets

<table>
<thead>
<tr>
<th>Herbicides</th>
<th>Year First Registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roneet</td>
<td>1987</td>
</tr>
<tr>
<td>Dual Magnum (AZ. Only)</td>
<td>1977</td>
</tr>
<tr>
<td>Poast</td>
<td>1984</td>
</tr>
<tr>
<td>Select</td>
<td>1991</td>
</tr>
</tbody>
</table>
Cauliflower

Arizona - California

Year  | Acres
-----|-------
2000  | 3000
2001  | 8000
2002  | 13000
2003  | 18000
2004  | 23000
2005  | 28000
2006  | 33000
2007  | 38000
2008  | 43000

California

Arizona
Romaine

Arizona - California

Year

Acres


California

Arizona
Untreated: 2007

$186/ac.

Untreated: 2008

$138/ac.
Dacthal 14pts.: 2007
$12/ac.

Dacthal 14pts.: 2008
$16/ac.
Prefar 6qts. + GoalTender 6oz.: 2007

Prefar 6qts. + GoalTender 6oz.: 2008

$15/ac.

$18/ac.
2008 New Tolerances (246)

- 125 Fungicides
- 89 Insecticides
- 32 Herbicides (8 veg.)