Crop Profile for Cantaloupes and Honeydew Melons in Texas

Prepared: October, 2000
Revised: September, 2009

General Production Information

State Rank: third in honeydew melon and fifth in cantaloupe (2007)
Acres Planted: cantaloupe 2,500; honeydew melon 800 (2008)
Acres Harvested: cantaloupe 1,800; honeydew melon 700 (2008)
Cash Value: cantaloupe $6,732,000; honeydew melon $5,538,000 (2008)
Yearly Production Costs: Costs range from $500 to $1,000 in The Cross Timbers to $3,125 per acre in the Lower Valley (for cantaloupe or honeydew melon)
Commodity Destination: All of the Texas cantaloupe crop and honeydew melon goes to fresh market. Here fresh market includes value added products such as prepared fruit salads at grocery stores.

Production Regions:
Nearly half of the cantaloupes produced in Texas are grown in the Lower Valley. Over one third are grown in the Trans-Pecos. The remainder come out of the Winter Garden, the Cross Timbers, the Blacklands, the Edwards Plateau and South Texas.

The majority of the honeydew melon are produced in the Lower Valley, a few are produced in the Winter Garden and in Trans-Pecos.

Cultural Practices

General: Cultural Practices and Pest Information in this report refer to cantaloupe but pertain to honeydew melon as well.

Soil Preference: Cantaloupe are adaptable to a wide range of soils. Optimum soil is well-drained, medium textured with a pH of 6.0 - 8.0. Cantaloupes will tolerate heavier soils than most other cucurbits.

Irrigation: A cantaloupe crop has a moderate water demand, about 15 - 20 inches per season. The critical water demand periods are during establishment and vining through fruit netting.

Land preparation: Land preparation varies depending on many factors such as individual management practices, weather, region, soil type, and preceding crop. The following are prevalent land preparation practices in the Lower Valley: shred crop and weed residue
and disc with an offset disc five months before planting; disc, plow, chisel, disc again and
cultivate four months before planting; float and cultivate three months before planting; cultivate
again in the third month before planting; form the beds, fertilize, and apply herbicide and
nematicide the month before planting; and cultivate one more time just prior to planting.
In the Trans-Pecos when cantaloupe follows fallow land most growers disc the field with a
tandem disc and apply herbicide in one operation. Subsequently they disc the field a second time,
float it, and then list it (form the seed beds and make the furrows). When cantaloupe follows
cotton growers shred crop and weed residue and double disc in the fall. In the spring they do the
same as when following fallow land.

**Planting:** Spring planted cantaloupe should be planted when the soil temperature is greater than
70° F. If planted in the Fall cantaloupe should be planted 80 - 90 days prior to the average first
frost date. There are approximately 1,300 seed per ounce. It is recommended to plant 0.75 to 2
pounds seed per acre. Seeds are planted at 0.5 to 1 inch deep in a single line 8 to 12 inches apart
in 78 to 80 inch beds or 12 to 24 inches apart in 2 lines on 78 to 80 inch beds. Normally planting
runs from about the third or fourth week of January to the second week of February in the Lower
Valley. In the Trans-Pecos growers usually begin planting about March 20. A second planting
is made about two weeks after the first and a third planting two weeks after that. The multiple
plantings are to extend out the harvest and marketing period.

**Varieties:** Recommended hybrid varieties include: Caravelle, Explorer, Mission, Hy Primo, and
Cruiser. Some trial varieties are: Marco Polo and Ovation. TAM Uvalde and Perlita are open
pollinated varieties.

**Optimum growing conditions:** Cantaloupes grow best in hot days and warm nights. Low soil
and air temperatures can stunt growth. Fruit maturing with temperatures below 70° F are usually
poor quality.

**Fertility/Fertilization:** Fertilizer rates should be based on actual soil test results. General
nitrogen, phosphorus and potassium rates are 120, 70, and 70 pounds per acre, respectively.
Nitrogen at 40 to 50 pounds can be applied at or prior to planting, another 20 - 30 pounds can be
side-dressed and at the 2-4 true leaf stage, and another 20 - 30 pounds can be side-dressed at
vining. Phosphorus at 60 to 100 pounds can be banded approximately 2 inches below the seed at
planting. Most Texas soils contain adequate potassium. Potassium at 60 to 100 pounds can be
applied if needed.

**Pre-harvest Activities:** Many growers in the Lower Valley use a black plastic mulch to control
weeds. A special implement is used to apply the plastic mulch. Where plastic mulch is not used,
after planting the field is ditched, irrigated, nitrogen is applied and it is irrigated again. In the
second month after planting the field is ditched and then irrigated; insecticides and herbicides are
applied; fungicides are applied twice; bees are rented to put in the field for pollination; and the
field is cultivated. In the third month after planting insecticides and fungicides are applied twice;
and the field is ditched, irrigated, and cultivated. In the fourth month after planting insecticides
and fungicides are applied twice; and the field is ditched and irrigated. In the fifth month after
planting the cantaloupes are harvested, packed, counted, and marketed. Many growers use a drip
irrigation system.
In the Trans-Pecos growers cultivate the cantaloupe fields and turn the vines twice before harvest. Long metal rods attached to the front of the cultivator turn the vines over and up onto the row to clear the furrow.

**Harvest:** Direct seeded cantaloupes are harvested 85 - 95 days after planting and transplanted cantaloupe 70 - 80 days after transplanting. The fruits are usually harvested at the 75% slip stage of maturity. Fields may be harvested 5 - 10 times over a 3-week period. Normally the cantaloupe is harvested by hand using harvest aid machinery. They are placed bulk in wagons. The cantaloupe is graded based on the fruit diameter and freedom from defects. The cantaloupe is packed in half cartons of approximately 38 – 41 pounds with 9, 12, 18, or 23 cantaloupes per half carton. Sometimes they are bulk loaded. Usually the cantaloupe is hydro cooled to remove field heat and treated with chlorine prior to packaging. Statewide average yields are about 175 hundred weight per acre. Harvest begins about the third or fourth week of April and ends around the third week of May in the Lower Valley. It begins about the tenth of July in the Trans-Pecos and lasts for about 6 weeks.

**Worker Activities**
Activities during the growing season involving worker contact could include transplanting, cultivating, irrigating, scouting, spraying, occasional hand weeding, and harvesting. The strict adherence to reentry intervals (REIs) should minimize any risk of exposure to pesticides during these activities. If workers are required to go back in the field before the proper time limit has expired then personal protective equipment (PPE) is worn. Activities that bring workers in direct contact with the plants during the growing season are generally limited to harvest time because the fruit is hand-harvested.

**Insect Pests**

**Sucking Insects**
- sweet potato whiteflies (*Bemisia tabaci*)
- melon aphids (*Aphis gossypii*)
- spider mites
- western flower thrips (*Frankliniella occidentalis*)
- onion thrips (*Thrips tabaci*)
- squash bugs (*Anasa tristis*)

**Frequency of Occurrence:**
*Sweet potato whiteflies* are present in cantaloupe fields every growing season in the Winter Garden and the Lower Valley. *Melon aphids* appear annually in The Blacklands, The Cross Timbers, and the Winter Garden, every two years in Trans-Pecos and seldom in Lower Valley cantaloupe fields. *Spider mites* occur annually in the Lower Valley and the Winter Garden and sporadic in The Cross Timbers. They usually show up after fruit set but do not cause much damage. *Thrips* infest cantaloupe fields annually in the Lower Valley but they are not considered a major pest problem. They seldom infest cantaloupe fields in other cantaloupe growing areas of the state. *Squash bugs* appear annually in the Cross Timbers cantaloupe fields.
Damage Caused:
Desiccation of plants occurs with moderate to heavy populations of *sweet potato whiteflies* and the production of honeydew gives rise to sooty mold. The plant becomes unthrifty and nonproductive, and the fruit is rendered unmarketable. The *sweet potato whitefly* is also a vector of some viruses, such as the cucurbit yellow stunt disorder virus. *Melon aphids* build up very rapidly and deposit considerable honeydew on leaves. Adults and nymphs suck juices from leaves, sapping the plant energy and causing leaves to curl, become malformed and eventually die. A dark sooty mold grows on the honeydew these aphids excrete. A particularly important aspect of this aphid damage is the spread of plant viruses. The viruses they spread cause more damage to the cantaloupe crop than the *melon aphids* alone. Even a very low population of various aphids vector viruses and cause crop loss or failure. *Spider mites* pierce leaf tissues and suck sap in larval, nymphal and adult stages. Plants attacked begin to lose color, fading from green to yellow and eventually turning reddish. *Thrips* rasp the surface and then suck the juice. This causes the formation of whitish blotches that first appear as dashes. Severely attacked plants develop a gray or silver appearance and may become distorted. Damage may be found first in the leaf sheaths and stem or on the undersides of a bent leaf where the insects always are most abundant. They are also injurious to blooms. Leaves attacked by the *squash bug* wilt rapidly and soon become blackened, crisp and dead. Attacked plant stems often are enlarged but later wither and die.

Percent Acres Affected:
State wide an estimated 30% of cantaloupe acreage is affected with *sweet potato whiteflies*, *melon aphids* 35%, *spider mites* 15%, *thrips* 40%, and *squash bug* 3%.

Pest Life Cycles:
_Sweet potato whiteflies_ colonize the underside of leaves; adults and eggs are commonly found on the lower surface of younger leaves and the scalelike nymphal stages on somewhat older leaves. The tiny, oval eggs hatch into a first larval stage that has legs and antennae and is mobile. The legs and antennae are lost after the first molt and subsequent stages remain fixed to the leaf surface. The last nymphal stage, often called the pupa or the red-eye nymph, is the stage that is easiest to identify. *Melon aphids* develop in colonies and prefer the underside of leaves. Unlike other aphids, *melon aphid* populations do not diminish with high temperatures. Adult *Spider mites* lay eggs on the underside of leaves and spin webs beneath which eggs hatch and mites feed. *Spider mites* reproduce rapidly during hot, dry weather. *Thrips* insert minute eggs into leaves or stems. These hatch in 2 to 10 days. The larval stage lasts from 5 to 30 days. Adult females can reproduce regularly without mating with the rarely found males. All stages can be found during warmer months but during colder months only adults and larvae can be found. It is probable that five to eight generations occur per year, but more may occur in the warmer parts of the State. Adult *squash bugs* overwinter unmated in any type of shelter. They appear and mate in the spring as plants begin to vine. Yellowish to bronze-brown eggs are laid in clusters on the underside of leaves, usually in vine angles. Eggs hatch in 1 to 2 weeks and nymphs feed in groups on the stems of the plant for 6 to 8 weeks before transforming to adults.

Timing of Control:
Generally an insecticide is applied at planting for *sweet potato whitefly* control. Some growers treat for whiteflies when the cantaloupes are at the 4-5 true leaf stage or through the drip
irrigation system at the 6-8 leaf stage or later in the season. Growers spray for melon aphids in early July, when observed through scouting activities or close to harvest time. When scouting reveals a problem with thrips or squash bugs, insecticides are applied.

Yield Losses:
Estimated yield loss from uncontrolled insect infestations is 75% for sweet potato whiteflies, 60% for melon aphids, 15% for spider mites, 15% for thrips, and 5% for squash bugs.

Regional Differences:
The sweet potato whitefly is the most prevalent and most damaging insect attacking cantaloupe in the Lower Valley and the Winter Garden. It can also be a problem in Trans-Pecos (Presidio). It is not a problem in The Cross Timbers and The Blacklands. Melon aphids are a problem in cantaloupe throughout the state. Spider mites are quite prevalent in the Lower Valley and the Winter Garden and they infest a small percentage of cantaloupe acreage in The Cross Timbers. Thrips affect a substantial number of cantaloupe acreage in the Lower Valley and the Winter Garden and a small number of acreage in the Cross Timbers. Squash bugs are present in a significant number of the cantaloupe acreage in the Cross Timbers.

Cultural Control Practices:
The following practices are used to help control these insects: planting early (before whitefly populations get big), crop location (do not plant close to cabbage that may have had whiteflies overwinter), plant transplants, rotate crops (plant cantaloupe following crops that do not attract whiteflies), turn under stubble, keep fields clean between crops, proper management in operation of irrigation equipment, spray fall cantaloupe when neighbors are defoliating cotton to prevent insect problem because insects will leave cotton and seek other hosts, use black plastic mulch. The plastic mulch helps reduce weeds which can serve as additional insect hosts.

Biological Control Practices:
Preserve beneficials by applying insecticides judiciously. Control insects on neighboring crops. Scientists have had some success with applying imidacloprid (Admire) to knock down whiteflies and follow up with parasites to keep whiteflies under control. Parasites alone are ineffective when whitefly populations get large. Some success has been demonstrated with experimental parasitoid releases for whitefly control in soybeans and cotton fields in combination with Admire. Planting resistant varieties can be helpful but they are not extremely effective. No information was found on specific practices for biological control of melon aphids, spider mites, thrips, and squash bugs.

Other Issues:
Early planting is advisable for marketing purposes. The IPM plan for controlling whiteflies is to manage whitefly populations within the area rather than within the particular crop or field. Sweet potato whiteflies are more of a problem in fall cantaloupe production than in spring production in the Winter Garden region.

IPM Management:
Product quality is critical with cantaloupes as with other vegetable crops since the public demands unblemished produce. In crops where quality is not as critical the IPM approach may be
to delay insecticide applications and accept limited crop loss to minimize pesticide use. With cantaloupes, however, where history suggests that particular insects are expected to be a problem, growers apply preventative insecticides rather than waiting until the insect is observed. Waiting until the insects are observed before applying insecticide would result in excessive crop damage. This is the case with sweet potato whiteflies in the Lower Valley and the Winter Garden. Whiteflies build up so fast it is too late to control them if insecticide applications are not made until whiteflies are observed. Admire is applied for whitefly control to nearly all cantaloupe acres in these two growing areas. This helps keep area whitefly populations down reducing the need for insecticide applications in cotton and thus, minimizing overall area insecticide use. It serves as an IPM practice for area whitefly control. The agriculture IPM strategy for whitefly control is to focus on the whole area rather than on individual fields and crops. Also using Admire as a preventative prevents the need to make several applications of broad spectrum insecticides throughout the season.

**Use in Resistance Management:**
By using Admire in cantaloupe for early area control of whiteflies less is required later for control in cotton and other crops. Therefore, whiteflies are not as likely to build up resistance.

**Soil Insects**

**Cutworms**

**Frequency of Occurrence:**
Cutworms are present in some cantaloupe fields annually in the Winter Garden and the Lower Valley. They occur about every 3 years in Trans-Pecos and their occurrence is sporadic in the Cross Timbers.

**Damage Caused:**
Most species of *cutworms* sever the seedling just above or below the soil line and pull the plant into the ground as they feed.

**Percent Acres Affected:**
An estimated 25% of cantaloupe acreage statewide is infested with cutworms.

**Pest Life Cycles:**
*Cutworms* deposit eggs singly or in small batches on low leaves or stems. There may be four or more generations in a year. They over winter as larvae or pupae.

**Timing of Control:** Treat for *cutworms* when observe feeding damage.

**Yield Losses:** If present and not controlled, *cutworms* can cause an estimated 55% yield loss.

**Regional Differences:**
*Cutworms* infest cantaloupe fields in the Lower Valley, the Winter Garden, Trans-Pecos, and the Cross Timbers. Generally the infestations are not large enough to cause severe damage.
Cultural Control Practices:
Cultivation to destroy weeds and other vegetation 10-30 days before planting may reduce the number of cutworm larvae. Prudent crop rotation is advisable.

Biological Control Practices:
Cutworm larvae have several natural enemies. Avoid unnecessary insecticide applications to conserve the natural enemy populations.

Post-Harvest Control Practices:
Keep field clean and free of weeds to assist in cutworm control.

Other Issues:
Cutworms are often found in low lying areas of the field where there is moisture.

Chewing Insects
- melon worm (*Diaphania hyalinata*)
- serpentine leafminer (*Liriomyza brassicae*)
- cucumber beetle (*Acalymma vittata*)
- cabbage looper, flea beetles

Frequency of Occurrence:
*Melon worms* are found in Lower Valley cantaloupe fields about every 4 years, every 2-3 years in the Winter Garden, and sporadically in the Cross Timbers. *Leafminers* occur annually in the Lower Valley and the Winter Garden and occasionally in the Cross Timbers and the Blacklands. *Cucumber beetles* show up annually in the Lower Valley, the Winter Garden, the Cross Timbers and the Blacklands. *Cabbage loopers* are present annually in Lower Valley cantaloupe fields and about every other year in Winter Garden cantaloupe fields. *Flea beetles* occur annually in the Lower Valley, seldom in the Winter Garden and sporadically in Trans-Pecos.

Damage Caused:
*Melon worm* larvae feed on foliage rather than blossoms before they tunnel into stems and fruits. Maggots of *serpentine leafminers* live by eating leaf tissue between the upper and lower surfaces, leaving slender, white winding trails through the leaf's interior. Leaves are weakened greatly. *Cabbage loopers* are voracious feeders, which can strip foliage from infested plants in a short time. Often, when populations become crowded, a virus disease strikes, causing high larval mortality. *Flea beetles* eat numerous, very small, rounded or irregular holes eaten through plant foliage or into the leaf, so that leaves look as though they have been peppered with fine shot. When these small holes are numerous, leaves may wilt and turn brown, killing or stunting the plant.

Percent Acres Affected:
An estimated 20% of the state cantaloupe acreage is affected with *melon worms*, 15% with *serpentine leafminers*, 35% with *cucumber beetles*, 35% with *cabbage loopers*, and 40% with *flea beetles*. 
Pest Life Cycles:
*Melonworm* new adults emerge after hibernating in the pupal stage and are active at night, laying tiny eggs in small clusters on leaves, buds, vines and fruits. Hatching occurs in a few days and larvae feed for approximately 2 weeks, then pupate inside silken cocoon on leaves. In 5 days or more, adults appear. There may be five generations per year. Ten to 20 generations of *serpentine leafminers* occur in a year in the Lower Valley. Fewer generations per year occur in northern Texas where the growing season is shorter. Adults deposit small eggs into leaf tissue. Under optimum conditions, eggs hatch in 4 days, larvae feed in the leaf tissue 14 days, pupate in the soil, remain there 5 days and then emerge as adults. The life cycle, under optimum conditions, is completed in 23 days. There are continuous generations of *cabbage loopers* in the Lower Valley with reproduction slowing down during cold periods. In colder areas, the insect overwinters as pupae in flimsy silken cocoons attached to food plant residue. A complete generation occurs in 4 to 6 weeks in warm weather. *Flea beetle* adults hibernate in the soil, or in crop remnants. They become active in spring, feeding on host plants as new growth appears. Eggs are laid on or in soil near the plant base. They hatch in about a week and larvae feed on plant roots or tubers for 2 to 3 weeks, followed by pupation and adult emergence. Life cycle from egg to adult may be completed in 6 weeks or less. One to four generations develop each year depending on species. Adult feeding may extend over 2 months.

Timing of Control:
The best time to apply insecticides for *melon worm* control is when the worm eggs hatch. This requires scouting. Generally the eggs hatch about the time of netting (rough covering outside melon, within 10 days of harvest). If *leafminers* are expected to be a problem preventative treatments should begin at the 4 true leaf stage. The crop will suffer damage if treatments are delayed until *leafminers* are observed. When *cucumber beetles* and *flea beetles* are a problem insecticide applications begin shortly after crop emergence. *Cabbage looper* controlled is applied when scouting reveals populations have reached threshold level.

Yield Losses:
Estimated yield loss from uncontrolled insect infestations is 20% for *melonworms*, 30% for *serpentine leafminer*, 25% for *cucumber beetles*, 15% for *cabbage looper*, and 50% for *flea beetles*.

Regional Differences:
*Melonworms* are found in cantaloupe fields in the Lower Valley, the Winter Garden, the Cross Timbers, and the Blacklands. *Cucumber beetles* affect cantaloupe fields in all Five growing areas except Trans- Pecos. *Cabbage loopers* are mainly a problem in the Lower Valley and the Winter Garden. *Flea beetles* infest cantaloupe fields in the Lower Valley, the Winter Garden, and Trans-Pecos.

Cultural Control Practices:
Early planting, good crop rotation, and proper crop fertilization help minimize damage by insects. Also, good irrigation management is important, avoiding water logging or ponding which causes yellowing in plants and attracts insects. Some growers use trap cropping to control *cucumber beetles*. They plant a border of squash around the cantaloupe to deter *cucumber beetles* from entering the cantaloupe.
**Biological Control Practices:**
Use insecticides judiciously to avoid killing beneficials.

**Post-Harvest Control Practices:**
Keep fields clean. Turn under stubble.

**Other issues:**
Darkling beetles are a problem occasionally in Trans-Pecos cantaloupe fields. They occur about every 4 to 5 years. When present treatment should be made early at the plant dicot stage.

**Chemical Controls for Insects:**

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Typical Rates</th>
<th>REI (hours)</th>
<th>MOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esfenvalerate (Asana XL)</td>
<td>2.9-9.6 fl oz</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td><strong>Target insects</strong></td>
<td></td>
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<tr>
<td>Bifenthrin (Capture 2EC)</td>
<td>0.04-0.10 lb a.i./A</td>
<td>24</td>
<td>3</td>
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<tr>
<td><strong>Target insects</strong></td>
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<tr>
<td>Endosulfan (Thionex 3EC)</td>
<td>0.66-1.33 qt</td>
<td>24</td>
<td>2A</td>
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<tr>
<td><strong>Target insects</strong></td>
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<tr>
<td>Imidacloprid (Admire, Provado)</td>
<td>16/24 oz of Admire 2F</td>
<td>12</td>
<td>4A</td>
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<td><strong>Target insects</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Oxamyl (Vydate L)</td>
<td>2-4 pts</td>
<td>48</td>
<td>1A</td>
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<td>Permethrin (Ambush, Pounce)</td>
<td>0.10-0.20 lb a.i./A</td>
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<td>3</td>
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<td><strong>Target insects</strong></td>
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<tr>
<td>Carbaryl (Sevin)</td>
<td>1 qt. of 4F; 1 qt of XLR Plus</td>
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<td>1A</td>
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<td><strong>Target insects</strong></td>
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<td>Methomyl (Lannate LV)</td>
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<td>Target insects</td>
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<td>Fenpropatrin (Danitol 2.4EC)</td>
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<td>Dicofol (Kelthane 50)</td>
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<td>Cyromazine (Trigard)</td>
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**Summary of Insecticide Use in Texas in 2006-All Insects**

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<thead>
<tr>
<th>Insecticide</th>
<th>Trade Name</th>
<th>% of Planted Acres Treated</th>
<th>Applications</th>
<th>Total lbs.</th>
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</thead>
<tbody>
<tr>
<td>Carbaryl</td>
<td>Sevin</td>
<td>1</td>
<td>2.2</td>
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<tr>
<td>Esfenvalerate</td>
<td>Asana</td>
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<td>1.0</td>
<td>&lt; 50 lb</td>
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<tr>
<td>Methomyl</td>
<td>Lannate</td>
<td>14</td>
<td>1.3</td>
<td>300</td>
</tr>
</tbody>
</table>

**Diseases**

**Downy Mildew** (*Pseudoperonospora cubensis*)

**Alternaria Leaf Spot** (*Alternaria cucumerina*)

**Anthracnose** (*Colletotrichum obiculare*)

**Gummy stem blight** (*Didymella bryoniae*)

**Powdery mildew** (*Sphaerotheca fuliginea, Erysiphe cichoracearum*)

**Type of Pest:** Fungi

**Frequency of Occurrence:**
*Downy mildew* occurs annually in some cantaloupe fields in the Lower Valley and the Winter Garden. Its occurrence is sporadic in the Blacklands and the Cross Timbers. *Alternaria leaf spot*
is a problem in cantaloupe fields about every 3 to 4 years. Anthracnose is an annual problem in some fields in the Cross Timbers. Gummy stem blight occurs about every 2 to 3 years. It is more prevalent in high rainfall years. Powdery mildew occurs annually.

Damage Caused:
Downy mildew infection produces lesions on the leaves. The lesions expand and in a few days the entire leaf maybe dead. Death of the leaves decreases photosynthetic capacity and exposes the fruit to sun scald, which results in reductions in both quality and quantity of marketable yield. Alternaria leaf spot develops on the leaves only. Severely infected leaves become yellow around brown lesions, and senesce and then die. Heavily infected plants have fewer and smaller fruit. Anthracnose lesions can form on seedlings, leaves, petioles, stems, and fruits. On fruit, lesions are circular, sunken, water-soaked areas which first develop as the fruit approaches maturity and then expand to a large size. In moist weather, these lesions turn black and are covered with pink spore masses. Gummy stem blight infects leaves and stems, and is more prominent in the crown at soil level. Leaf symptoms begin with irregular spots that dry and drop out giving the lesion a ragged appearance. The most conspicuous phase of the disease is the brown exudation in the crown of infected plants. Vine cankers are found near the soil line, producing a gummy brown ooze. Powdery Mildew reduces yields by decreasing the size or number of fruit or the length to time crops can be harvested. Fruit quality can be reduced by sun scald and premature or incomplete ripening with resultant poor flavor.

Percent Acres Affected:
An estimated fifty percent of statewide cantaloupe acreage is affected with downy mildew, 70% with Alternaria leaf spot, 30% with anthracnose, 65% with gummy stem blight, and 35% with powdery mildew.

Pest Life Cycles:
The season-to-season survival of the fungus that causes downy mildew is dependent on the presence of cucurbit hosts in areas with climates which permit their growth throughout the year. The disease is spread via sporangia singularis "sporangium" that are carried through air currents from infected cucurbits in areas where these plants survive the cold season. Within a field the sporangia are dispersed by air currents, rain splash, or contact with workers or tools. Cool temperatures along with free moisture are ideal for mildew infection and spread. Hot, dry weather may reduce or stop disease development.

The pathogen causing Alternaria leaf spot survives between crops on infected debris. It may also be carried on cucurbit seed. Infection can develop within 2 hours with leaf wetness at temperatures between 50o F and 100o F. Optimum temperature for development is 80o F. Lesions become visible in 4-5 days, under conditions favorable for their development.

The pathogen that causes anthracnose survives between crops on infected plant residue or infected volunteer plants and can be carried on seed harvested from infected fruit. Conidia are disseminated by wind, rain, implements, and field workers. Humid, rainy weather is essential for infection. Spore germination and growth are optimum at 72-81o F and 100% relative humidity for 24 hours. Infection takes place up to 72 hours after conidial deposition. Visible symptoms appear about 96 hours after infection. Gummy stem blight overwinters in the soil and on crop
residue. The fungus is also seed-borne. Once the fungus becomes established, millions of spores are produced which can be readily disseminated to other plants by rain, wind or mechanical equipment. *Powdery mildew* develops quickly under favorable conditions. The time between infection and symptom appearance is usually only 3-7 days, and a large number of spores can be produced in this time. Favorable conditions include dense plant growth and low-intensity light. High relative humidity is favorable for infection and conidial survival: however, infection can occur at relative humidities below 50%. Dry conditions favor colonization, sporulation, and dispersal. The optimum temperature for disease development is 68°F to 81°F; infection can occur between 50°F and 90°F. Under field conditions, *powdery mildew* development is arrested at 100°F and higher temperatures.

**Timing of Control:**
Generally fungicide applications are made to prevent disease development. Some growers begin treatment prior to fruit set and repeat applications as needed every 7-10 days throughout the season. Some growers watch weather forecasts and apply fungicides when weather conditions are favorable to the disease. Downy mildew develops under cool wet weather and anthracnose and Alternaria leaf spot under warm humid weather. Powdery mildew is most abundant under dry weather conditions.

**Yield Losses:**
Yields drop by an estimated 50% when *downy mildew* is present and not controlled. Estimated loss is 50% with *Alternaria* also, and 20% with *anthracnose*, 20% with *powdery mildew*, and 45% with *gummy stem blight*.

**Regional Differences:**
*Downy mildew* is a problem in cantaloupe in all growing areas except Trans-Pecos. *Alternaria* is seen in the Lower Valley, the Winter Garden, and Trans-Pecos. *Anthracnose* is mainly found in the Cross Timbers. Growers experience problems with *powdery mildew* and *gummy stem blight* in cantaloupe fields throughout the state.

**Cultural Control Practices:**
In the Lower Valley many growers use drip irrigation and plastic mulch. Using drip irrigation instead of sprinkler keeps water off plants reducing disease-conducive conditions. Plastic mulch helps prevent fungal diseases by keeping leaves from getting dirty from rain splash. Good management including proper fertilization and careful irrigation (avoiding excessive irrigation) help prevent disease development. Resistant varieties and crop rotation are also recommended to help keep disease development low.

**Chemical Controls:**

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Typical Rates</th>
<th>REI (hours)</th>
<th>MOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azoxyostrobine</td>
<td>2-5 oz</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>(Amistar 80WDG)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td><strong>Alternaria leaf blight and powdery mildew.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorothalonil</td>
<td>1.20-2.20 lb</td>
<td>48</td>
<td>M5</td>
</tr>
<tr>
<td>(Bravo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target diseases</td>
<td>Downy mildew, anthracnose, alternaria leaf blight, and gummy stem blight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimethomorph (Acrobat)</td>
<td>6.4 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Downy mildew.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Famoxadone + Cymoxanil (Tanos)</td>
<td>8 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Downy mildew.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fenamidone (Reason 500SC)</td>
<td>5.5 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Downy mildew.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mancozeb (Dithane DF)</td>
<td>1.0 - 2.0 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Downy mildew and anthracnose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maneb (Maneb 75 DF)</td>
<td>1.5 – 2.0 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Downy mildew and anthracnose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mefenoxyfam (Ridomil Gold 4E)</td>
<td>0.5-1.0 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Downy mildew.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mefenoxyfam + chlorothalonil (Ridomil Gold/Bravo)</td>
<td>1.5 – 2.0 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Powdery mildew.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myclobutanil (Rally 40W)</td>
<td>2.5-5.0 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Powdery mildew, alternaria leaf blight, and gummy stem blight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyraclostrobin (Cabrio 20EG)</td>
<td>12 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Powdery mildew and gummy stem blight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyraclostrobin + boscalid (Pristine 38W)</td>
<td>12.5-18.5 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Powdery mildew.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quinoxyfen (Quintec)</td>
<td>4-6 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Powdery mildew and alternaria leaf blight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trifloxystrobin (Flint 50 WDG)</td>
<td>2.9-3.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Powdery mildew.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triflumizole (Procure 50WS)</td>
<td>4-8 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target diseases</strong></td>
<td>Powdery mildew.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vine Decline and Fruit Rot

In Texas vine decline may develop when any of the following fungal diseases are present: charcoal rot, gummy stem blight, purple stem, Lasiodiplodia decline, fusarium wilt, myrothecium canker, and monosporascus root rot; fruit rot may develop from the presence of: alternaria rot, bacterial brown spot, bacterial soft rot, black rot, blue mold, crater rot, fusarium rot, lasiodiplodia fruit rot, phomopsis black rot and purple stem, rhizopus soft rot, sclerotinia rot, and southern blight.

Frequency of Occurrence:
Vine decline develops annually in some cantaloupe fields in the state. Fruit rot occurs in years of real wet weather, about every 4 years.

Damage Caused:
*Vine decline* prevents the cantaloupe from maturing resulting in small cantaloupes. They also become sunburned because the foliage dies leaving them exposed to the sun. Ultimate results are loss of yield and reduction of quality. *Fruit rot* causes the cantaloupes to rot and makes them unmarketable.

Sometimes the damage is not visible having only slight lesions. *Fruit rot* damage may not be discovered until the cantaloupes arrive at the packing house and if it is discovered on a few cantaloupes the entire crop may be rejected.

Percent Acres Affected:
Statewide, *vine decline* affects an estimated 20% of the cantaloupe acreage. *Fruit rot* affects an estimated 40% of the acreage.

Pest Life Cycles:
Most of the pathogens that cause vine decline and fruit rot are fungal and live in the soil. Some are bacterial, however. When these pathogens are present they can enter the roots and infest the crop.

Timing of Control:
If the field has a history of *vine decline* or if it is expected to be a problem fumigation can be applied before planting the cantaloupe. The cost is prohibitive, though. Early treatment applied to the leaves can help slow down the development of *fruit rot*.

Yield Losses:
Estimated yield loss from *fruit rot* when present and not controlled is 55% and 60% from *vine decline*.

Regional Differences:
*Vine decline* is a problem in the Lower Valley and the Winter Garden. *Fruit rot* is a problem in the Lower Valley, the Winter Garden, the Cross Timbers, and the Blacklands.
Cultural Control Practices:
Crop rotation or field selection (planting cantaloupe where *vine decline* has not been a problem) may help protect the crop from *vine decline*. *Vine decline* pathogens remain in the soil for several years.

Planting more vigorous varieties helps reduce damage from *vine decline*. Use of plastic mulch can help reduce *fruit rot* development by preventing soil from splashing on to the fruit.

Chemical Controls:
There are no fungicides labeled for *vine decline*. Mancozeb (trade name Dithane), chlorothalonil (trade name Bravo), azoxystrobin (trade name Quadris), and myclobutanil (trade name Nova) can help control the buildup of spores causing *fruit rot* if applied early in the season. Otherwise there is no control.

### Summary of Fungicide Use in Texas in 2006

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Trade Name</th>
<th>% of Planted Acres Treated</th>
<th>Applications</th>
<th>Total lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azoxystrobin</td>
<td>Amistar</td>
<td>21</td>
<td>1.6</td>
<td>400</td>
</tr>
<tr>
<td>Chlorothalonil</td>
<td>Bravo</td>
<td>31</td>
<td>1.4</td>
<td>2200</td>
</tr>
<tr>
<td>Mancozeb</td>
<td>Dithane</td>
<td>10</td>
<td>1.3</td>
<td>500</td>
</tr>
</tbody>
</table>

**Nematodes**

**Frequency of Occurrence:**
Nematodes are found every year in some individual fields but only occasionally in most areas.

**Damage Caused:**
Nematode damage is usually associated with patches of stunted, chlorotic plants within a field. Symptoms are usually most severe in light soils where drought stress occurs. Root not nematode infestation of susceptible plant roots results in the formation of galls or swellings on the roots. Root systems of heavily infected plants may become necrotic and have few feeder roots. Symptoms of infected plants include yellowing of foliage, reduced size and number of leaves, excessive wilting in warm weather, and poor fruit quality and yield. Severely damaged plants may die before producing marketable fruit. Nematodes also interact with bacterial and fungal pathogens in numerous root rot and wilt disease complexes. In the Lower Valley, the reniform nematode can be a problem on heavier soils. Plants are stunted, but there are no obvious root symptoms. Diagnosis can be confirmed by a soil test for nematodes.
Percent Acres Affected:
An estimated fifteen percent cantaloupe acreage is affected with nematodes, statewide.

Pest Life Cycles:
*Nematode* species pathogenic to cantaloupe include the root knot nematode (*Meloidogyne* spp.). A single female deposits 500-1,000 eggs in a gelatinous matrix called an egg mass, which is usually located at the root surface. The eggs develop into second-stage juveniles in about 14 days, hatch, and reinfect the root system of the plant. The life cycle is dependent on soil temperature and the host species; it is usually completed in about 21-28 days at soil temperatures of 77°F to 86°F. Many weeds, particularly broadleaf species, are hosts and may harbor eggs, juveniles, and females over season.

Timing of Control:
Fumigant application to control *nematodes* is made before planting.

Yield Losses:
*Nematodes*, when they are present can cause yields to decline as much as 25% if not controlled.

Regional Differences:
*Nematodes* are a problem primarily in the Lower Valley, the Winter Garden and the Cross Timbers.

Cultural Control Practices:
Rotation with non-host crops for two years and avoiding the introduction of *nematodes* to clean fields from infested soil on equipment can aid in nematode management.

Chemical Controls:

<table>
<thead>
<tr>
<th>Nematicide</th>
<th>Typical Rates</th>
<th>REI (hours)</th>
<th>MOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium N-methyldithiocarbamate (K-Pam)</td>
<td>varies</td>
<td>48</td>
<td>na</td>
</tr>
<tr>
<td>Dichloropropene + chloropicrin (Telone C-17)</td>
<td>varies</td>
<td>120</td>
<td>na</td>
</tr>
<tr>
<td>1,3-Dichloropropene (Telone II)</td>
<td>varies</td>
<td>120</td>
<td>na</td>
</tr>
<tr>
<td>Oxamyl (Vydate L)</td>
<td>1-2 gal</td>
<td>48</td>
<td>1A</td>
</tr>
</tbody>
</table>
Weeds

Broadleaf Weeds
pigweed (Amaranthus spp.), purslane (Portulaca oleracea), sunflower (Helianthus annuus), morningglory (Ipomoea spp.), cocklebur (Xanthium strumarium), silverleaf nightshade (Solanum spp.), kochia (Kochia scoparia), prostrate and spotted spurge (Euphorbia Spp.), and tumbleweed (Salsola iberica).

Frequency of Occurrence:
Broadleaf weeds infest cantaloupe fields annually. They are more abundant in wet years.

Damage Caused:
Weeds reduce yields by competing with cantaloupe for space, sun, water, and nutrients. They also interfere with harvest and act as alternate hosts for diseases, nematodes, and insects.

Percent Acres Affected:
An estimated 70% of cantaloupe acreage is affected with pigweed, state wide, 30% with purslane, 25% with sunflower, 25% with spurge, and 55% with morningglory.

Pest Life Cycles:
Broadleaf weed seeds can germinate throughout the summer if adequate moisture is present. In the absence of regular moisture, flushes of seed germination often coincide with rainfall events or irrigation. Pigweed (Amaranthus spp.) is a vigorous warm season annual native to Texas that produces a very large number of seeds that can survive in the soil for up to 40 years. Within the pigweed group, the most serious species is redroot pigweed (Amaranthus retroflexus). Fields with a history of redroot pigweed should be treated with pre-emergence or early post-emergence herbicides to prevent outbreaks in the current season. Purslane, sunflower, and spurge are native to Texas warm season annuals. Morningglory and silver nightshade are native (introduced) to Texas annual (perennial) warm season broadleaf weeds. Kochia and tumbleweed are annual warm season weeds introduced to the state.

Timing of Control:
Herbicides for weed control are applied pre-plant, pre-emerge, and /or post-emerge depending on weed growth and weather conditions. Some growers apply herbicide pre-plant with soil incorporation and then spot treat as needed latter in the season.

Yield Losses:
Yield loss is estimated at 40% where pigweed is present and not controlled, 25% with purslane, 25% with sunflower, 25% for spurges, and 20% with morningglory.

Regional Differences:
Pigweed is a problem in all five growing areas. Purslane is a problem in the Lower Valley, the Winter Garden, and the Cross Timbers. Sunflower is a problem in the Lower Valley, Trans-Pecos, and the Cross Timbers. Morningglory is a problem in the Lower Valley, the Cross Timbers, and the Blacklands. Silverleaf night shade, kochia, and tumbleweed are a problem in Trans-Pecos. Spurge is a problem in the Lower Valley.
Cultural Control Practices:
Deep plowing before planting, crop rotation, fallow and cultivation, field selection (don't plant where nutsedge is a big problem, for example), cultivation, hand hoeing and use of black plastic are some cultural control practices used for weed control in cantaloupe. Only a few herbicides are labeled for use in vegetables and it is recommended that vegetables follow crops that have more herbicides labeled. These fields are less likely to have big weed problems. Many growers in the Lower Valley and the Cross Timbers use black plastic mulch to help control weeds (Some weeds grow through the holes in the plastic, however, while nutsedge grows right through the plastic itself). In Trans-Pecos growers discontinued using black plastic mulch because the weather is too hot. Some growers apply fertilizer via banding, supplying nutrients to the crop within the beds only and not the weeds between the beds. Drip irrigation, used by some growers helps keep weeds down by supplying water just to the crop and not to the area between crop beds.

Biological Control Practices:
Some growers in the Cross Timbers have tried using a rust disease to control nutsedge but have found it ineffective.

Grasses and Sedges
johnsongrass (Sorghum halepense), bermudagrass (Cynodon dactylon), Texas panicum (Panicum texanum), and yellow and purple nutsedge (Cyperus spp.)

Frequency of Occurrence:
Grass, and sedge weeds are present in cantaloupe fields every year in varying degrees of severity.

Damage Caused:
Weeds reduce yields by competing with cantaloupe for space, sun, water, and nutrients. They also interfere with harvest and act as alternate hosts for diseases, nematodes, and insects. Nutsedge grows right through the black plastic in fields where black plastic mulch is used.

Percent Acres Affected:
An estimated 15% of statewide cantaloupe acreage is affected with nutsedge, 10% with Texas panicum, 5% with johnsongrass, and less than one percent with bermudagrass.

Pest Life Cycles:
Grasses (Gramineae family) are serious pests because of their vigorous growth and ability to produce copious amounts of seed. They are very tolerant to moisture and temperature extremes once they are established. All annual grasses should be controlled before they set seed. Johnsongrass and bermudagrass are perennial warm season grasses introduced to Texas. Texas panicum is a annual warm season grass native to Texas. Nutsedge is a perennial monocot with grass-like foliage, but it is not a true grass, and is not controlled with grass herbicides. The plant reproduces by underground tubers called nutlets. The underground tubers can overwinter and survive soil temperatures of 20o F. The tubers sprout from May to late July and each sprouting tuber is capable of producing numerous plants. Nutsedge is a perennial warm season sedge introduced to Texas.
Timing of Control:
Both pre-emergent and post-emergent herbicide applications are used. It is best to apply the herbicides when the weeds are small and more vulnerable.

Yield Losses:
Estimated yield loss is 35% for nutsedge, 30% for johnsongrass, and 25% for Texas panicum.

Regional Differences:
Johnsongrass is a problem in all the growing areas except the Blacklands. Nutsedge is a problem in the Lower Valley, Trans-Pecos, and the Cross Timbers. Texas panicum is a problem in the Winter Garden, the Blacklands, and the Cross Timbers. Bermudagrass is a problem in Trans-Pecos and the Cross Timbers.

Chemical Controls – Pre-plant Incorporated or Preemergence

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Typical Rates</th>
<th>REI (hours)</th>
<th>MOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bensulide (Prefar 4EC)</td>
<td>5-6 lb</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primarily for annual grass control. May be applied under plastic mulch or preemerge.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clomazone (Command 3ME)</td>
<td>0.094 – 0.188 lb</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Controls annual grasses and many broadleaves including common lambsquarter, cocklebur, purslane, and kochia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethalfluralin (Curbit 3E)</td>
<td>0.38-0.75 lb</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pigweed, barnyardgrass, seedling johnsongrass, purslane, Texas panicum.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethalfluralin + clomazone (Strategy 2.1 SC)</td>
<td>0.394 – 1.575 lb</td>
<td>24</td>
<td>3 +</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pigweed, barnyardgrass, seedling johnsongrass, purslane, Texas panicum, cocklebur, and kochia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halosulfuron (Sandea 75WG)</td>
<td>0.023 – 0.047 lb</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>May be applied under mulch or between rows of plastic mulch. Primarily used for nutsedge control and certain broadleaves such as pigweed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chemical Controls – Postemergence

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Typical Rates</th>
<th>REI (hours)</th>
<th>MOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clethodim (Select Max)</td>
<td>13 - 16 oz</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Barnyardgrass, bermudagrass, Texas panicum, and johnsongrass.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCPA (Dacthal 75W)</td>
<td>6-14 lb</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Barnyardgrass, crabgrass, goosegrass, seedling johnsongrass, common lambsquarter, and purslane.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halosulfuron (Sandea 75WG)</td>
<td>0.5 – 1.0 oz</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply as a banded directed spray between rows of mulch. Primarily used for nutsedge control and certain broadleaves such as pigweed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sethoxydim (Poast)</td>
<td>1-2.5 pints</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Barnyardgrass, bermudagrass, Texas panicum, and johnsongrass.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trifluralin (Treflan)</td>
<td>0.5 – 1.0 lb</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td><strong>Target weeds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply as a directed spray. Controls many annual grasses and some small-seeded broadleaves.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary of Herbicide Use in Texas in 2006

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Trade Name</th>
<th>% of Planted Acres Treated</th>
<th>Applications</th>
<th>Total lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bensulide</td>
<td>Prefar</td>
<td>28</td>
<td>1.0</td>
<td>6000</td>
</tr>
<tr>
<td>Chlorothalonil</td>
<td>Bravo</td>
<td>31</td>
<td>1.4</td>
<td>600</td>
</tr>
<tr>
<td>Pendimethalin*</td>
<td>Prowl</td>
<td>2</td>
<td>1.0</td>
<td>100</td>
</tr>
</tbody>
</table>

*Pendimethalin is not labeled for use in cantaloupe or honeydew.
Contacts

Dr. Mark Matocha – Extension Program Specialist
Texas AgriLife Extension Service
College Station, TX 77843
E-mail: Ma-matocha@tamu.edu

Dr. Juan Anciso – Extension Vegetable Specialist
Texas AgriLife Extension Service
Weslaco, TX 78596
E-mail: janciso@ag.tamu.edu

Dr. Russ Walace – Extension Vegetable Specialist
Texas AgriLife Extension Service
Lubbock, TX 79403
E-mail: rwwallace@ag.tamu.edu

Dr. Noel Troxclair – Extension Entomologist
Texas AgriLife Extension Service
Uvalde, TX 78801
E-mail: ntroxcla@ag.tamu.edu

References