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Cooperative Extension

Weed Control in Melons

Weed control practices in cantaloupe, watermelon, honeydew, and specialty melons are limited to the use of very few herbicides and rely extensively on mechanical tillage and hand hoeing. Additionally, the use of plastic mulch reduces many weeds and offers advantages for growing early season melon crops and protecting fruit. In addition to competing for water, space, nutrients, and sunlight, weeds are a nuisance to workers who hand-harvest the fruit and some weeds serve as hosts for insect pests and diseases. The economic consequences of weed infestations in melons are decreased fruit yield and quality. In the desert production systems of Arizona, the spring melon crops may be infested with a combination of winter and summer annual weeds while fall planted melons are infested with both summer annuals and perennials. Weed control practices that integrate weed identification with herbicides, tillage, and cultural practices are not very different between the January through March plantings and the July through August plantings.

Problem Weeds in Melons

Although there are not very many weed species in the low desert melon production regions, there are key problem weeds that are persistent in most vegetable crop systems. In spring crops that are planted from January through March, winter annual weeds occur in both direct-seeded and transplanted melons. Difficult to control cruciferous weeds include London rocket (*Sisymbrium irio*), black mustard (*Brassica nigra*), wild radish (*Raphanus sativus*), and shepherdspurse (*Capsella bursa-pastoris*). Other problem weeds during the winter are cheeseweed (*Malva* spp.), sowthistle (*Sonchus oleraceus*), prickly lettuce (*Lactuca serriola*), and annual yellow sweetclover (*Melilotus indicus*). Grass weeds that may appear in the early spring plantings could include canarygrass (*Phalaris minor*), wild oat (*Avena fatua*), annual bluegrass (*Poa annua*), and wild barley (*Hordeum* spp.). Volunteer small grains from a previous crop of wheat or barley could occur in spring or fall melon crops. As winter transitions to spring, common lambsquarters (*Chenopodium album*), nettleleaf goosefoot (*C. murale*), Russian thistle (*Salsola iberica*) and knotweed (*Polygonum* spp.) appear in many fields. In the later spring and summer plantings, common purslane (*Portulaca oleracea*), pigweeds (*Amaranthus* spp.), and Wright's groundcherry (*Physalis wrightii*) are the predominant broadleaved weeds. During the summer, morningglories (*Ipomoea* spp.) and purple nutsedge (*Cyperus rotundus*) are major weed problems in some melon fields. Annual grass weed problems include watergrass or barnyardgrass (*Echinochloa crus-galli*), junglerice (*E. colona*), sprangletop (*Leptochloa* spp.), and cupgrass (*Eriochloa* spp.) in the late spring through summer. Johnsongrass (*Sorghum halepense*), a warm-season perennial grass weed occasionally infests neglected melon fields. When plastic mulch or mid-bed trench planting system is used for an early spring crop planted in January or February, the greenhouse-like conditions are conducive for summer annual weeds to emerge.

Herbicides Used in Melons

The most commonly used herbicide in desert melon production is bensulide (Prefar®) which is applied preemergence to control grass weeds as well as purslane and other small-seeded broadleaved weeds such as pigweed. Ethafluralin (Curbit®) is occasionally used in the production region of southwest Arizona as a preemergence herbicide for control of grass weeds and a few small-seeded broadleaved weeds. On preirrigated fallow ground before final bed preparation, nonselective postemergence weed control can be achieved using glyphosate (Roundup Ultra® and various other brand products), paraquat (Gramoxone Extra®), or pelargonic acid (Scythe®). Trifluralin (Treflan® and various other brand products) and DCPA (Dacthal®) are labeled for use after the crop is established as layby preemergence treatments to prevent late

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season weeds from emerging. Sethoxydim (Poast®) is labeled for postemergence grass weed control.

Prefar (up to 6.0 lb. AI / A)

The actual rates used on melon crops is primarily determined by the soil texture. Prefar is applied preemergence to the soil surface. It is common to mount a single flat fan nozzle behind the planter units to apply a band directly over the seedline. Prefar requires immediate soil incorporation to be effective. Since mechanical incorporation is not possible after planting, sprinkler irrigation is the most efficient method to uniformly incorporate Prefar to a depth of one-half inch to control weeds that germinate within the crop seed zone. Furrow and drip irrigation usually do not uniformly apply water to equally wet the bed surface to effectively activate the preemergence herbicide. Prefar may be applied by chemigation through sprinklers. Prefar has not demonstrated detrimental effects on emerging melons grown under plastic using the mid-bed trench method of production. Prefar offers good control of most grass weeds, purslane, and pigweeds.

Curbit (1.125 to 1.7 lb. AI / A)

Curbit is applied preemergence to the soil surface as a band over the seedline after planting. Curbit is incorporated and activated by water because mechanical preplant incorporation into the soil before planting will cause crop injury. Curbit use under plastic is not allowed because it will severely injure the melons. Curbit will injure melons if cold, wet weather persists after application. Curbit offers good control of most grass weeds and some of the small-seeded broadleaved weeds such as pigweed and purslane. Crop rotation restrictions limit crops planted after Curbit use to those listed on the Curbit label. Sugar beets, red beets, and spinach are sensitive crops that cannot be planted immediately following Curbit applications.

Trifluralin (0.5 to 1.0 lb. AI / A)

The actual rates used on melon crops is primarily determined by the soil texture and organic matter content. Trifluralin is applied as a postemergence directed spray at layby and then mechanically incorporated. Trifluralin will control grass weeds and small-seeded broadleaved weeds such as pigweed. Contact with the foliage will cause crop injury. Trifluralin will not control emerged weeds.

Dacthal (6 to 14 lb. AI / A)

Dacthal is applied as a postemergence directed spray at layby and is then incorporated and activated by irrigation. Dacthal provides relatively good control of most grasses and broadleaved weeds except weeds in the mustard family. Cheeseweed and clover often escape Dacthal treatments

Poast (0.09 to 0.28 lb. AI / A)

Poast is a postemergence herbicide used to control grass weeds that become a problem in melons. Small actively growing grasses are most susceptible to Poast applications. Larger grass weeds approaching the tillering or heading stages of growth require higher rates and may not be adequately controlled by Poast. Poast applications are most effective when a crop oil concentrate is added to the final spray solution. Poast is effective against most annual and perennial grass weeds.

In other cucurbit growing regions of the U.S., naptalam (Alanap®) and clomazone (Command®) might be used as soil-applied herbicides. Alanap is generally not an effective herbicide and Command caused undesirable crop phytotoxicity and there are potential rotational crop restrictions if used in desert melon production systems. In current research, halosulfuron, which is especially active against purple nutsedge in desert growing regions, is being investigated as a potential herbicide for use in cucurbit crops.

Mechanical Weed Control in Melons

Land preparation beginning with deep moldboard plowing or ripping can bury weed residues and weed seeds from previous crops. Dormant weed seed may be returned to near the surface and breaking dormancy so that it could germinate and weed seedlings could emerge. Preirrigation by flooding a level basin field or by sprinkler irrigation in a newly listed field could induce germination and emergence of anticipated problem weeds. The emerged weeds can be removed by applying a nonselective herbicide or mechanically removed using a rotary hoe, power tiller, disk, or harrow. Disturbing the soil mechanically will expose more weed seeds and induce subsequent seedling emergence.

Desert melons are typically grown on 80-inch wide beds and are frequently cultivated early in the season until the vines preclude any further cultivation. Encouraging vigorous vine growth can create a competitive canopy to prevent weed competition after the final layby cultivation. The bare ground between rows on wide beds and frequent cultivations favors applying herbicides in bands to control weeds in the seedline. Within the seedline, weeds that escape herbicide treatment require hand hoeing for removal. Various methods are utilized to plant melons on wide beds based on irrigation methods and planting configurations.

Drip irrigation

Subsurface drip irrigation facilitates the use of minimum or reduced tillage. Reducing cultivations to eliminate weeds between the rows may potentially result in fewer tractor passes over the field. A few well-timed cultivations using a variety of sweeps, shanks, disks, knives, and rolling cultivators can effectively remove or bury emerging weeds between the rows of melons. Weeds are more prevalent within the seedline where the water is delivered to the crop by the drip emitters. Weeds within the seedline can only be removed by hand hoeing due to the lack of commercially available postemergence herbicides for broadleaved weed control.

The use of drip irrigation facilitates the use of plastic mulch on melon beds. Black plastic, the most commonly used material, prevents sunlight penetration and increases soil temperatures in the early spring melons for cold protection. The black plastic suppresses most weeds except purple nutsedge which pierces through the plastic. Plastic mulches also protect maturing fruit against moisture, diseases, and insects in the soil. The black plastic mulch is often used for growing two melon crops. For the second or fall melon crop, the vines from the previous crop are brushed off and a white-wash is painted on the plastic to reflect solar radiation and prevent the melon seedlings from being exposed to extremely high temperatures near the plastic surface.

Sprinkler irrigation

Sprinklers can be used in two ways to complement cultivation in melons. First, preirrigation can be used to stimulate weed seed germination and seedling emergence prior to planting as previously described. Mechanical cultivation or chemicals can remove existing weeds and melons can then be direct seeded into a soil mulch to gain a head start on the next flush of weeds to emerge. Secondly, sprinklers are used to directly germinate a melon crop. Competing weeds will germinate and emerge with the crop. Close cultivations are necessary immediately after melon seedlings achieve sufficient size. Furrow irrigation is commonly used to grow the melon crop after sprinklers are used for crop stand establishment. Several well-timed cultivations generally remove or bury emerged weeds between the rows until the vines fill in between the rows. The early season cultivations are commonly synchronized with sidedress fertilizer applications.

Furrow irrigation

Coordination of furrow irrigations with cultivations for melon weed control generally requires greater management intensity and diligence. Close cultivations are initiated soon after crop stand establishment to remove or bury weeds emerging between the rows. Various bed configurations are used in melon production systems. In southwestern Arizona, the slant-bed or "Yuma" beds are commonly prepared with a tall, steep, sloping bed oriented in the east-west direction. The melons are seeded in a single line on the south-facing slope of the bed that maximizes soil heating by solar radiation and stimulates seed germination and seedling emergence. Several cultivations are used after crop stand establishment to reduce and eventually eliminate the steep slope and reshape the beds and re-center the planted row of melons on a standard 80-inch bed. The process of reconfiguring the beds buries or removes emerging weeds until the vines fill in between the rows.

Throughout the desert growing region, the mid-bed trench method is also used to promote earliness by stimulating early melon crop establishment and to protect against frost. A typical 80-inch raised bed is shaped with a grooved trench offset 10-15 inches from center where the melons are seeded or transplanted. The trench is covered with a sheet of clear plastic to create a warm greenhouse-like environment. The plastic is removed in the spring when frost is no longer a threat. The raised beds are reshaped by several cultivations and the planted rows of melons are re-centered on standard 80-inch beds. These cultivations frequently disturb the soil between the rows and remove any new weeds that emerge following irrigations. Hand hoeing is required after the removal of the plastic to eliminate both winter and summer annual weeds that proliferated in the warm and moist greenhouse-like environment.

Few melon crop acreages are planted on 40-inch raised beds and direct seeded into every other bed. Several cultivations are used to re-center the melon rows on 80-inch beds by eliminating the unused beds.

Cultural and Biological Weed Controls in Melons

The date of planting of melons, environmental conditions, and cultural practices determine the spectrum of weeds that occur in fall or spring melon crops. Growers in different geographic locations will alter the date of planting due to varying micro-climatic conditions and this influences the weed species that emerge. Rainfall in the late spring or summer monsoons will have a tendency to cause emergence of a new flush of weeds if it occurs after cultivations and before a scheduled irrigation.

The movement of weed seed in mud, dirt, and plant residues stuck on tractors, tillage implements, and harvest equipment can be reduced by cleaning equipment between farm fields. Irrigation water from sumps, reservoirs, and canals can transport weed seed from

different locations to newly planted melon fields. The use of manure can spread weed seed to fields. Well composted manures are less likely to spread viable weed seeds that were fed to animals.

Encourage the melon crop to grow as vigorously as possible to effectively compete against emerging weeds. At planting, precisely plant seeds or transplants to enable uniform crop stand emergence and establishment. Irrigate and fertilize the crop in a timely manner to optimize crop utilization of applied nutrients. Apply proper amounts of starter fertilizer and then sidedress at appropriate intervals to encourage effective competition against weeds. Melons can effectively establish a canopy and shade out weed competition between the rows.

Crop rotations and knowledge of field conditions could contribute to minimizing weed problems in melon crops. Rotating and planting high value melon crops on lands of unknown weed history could lead to disaster with a plethora of atypical weeds emerging. Generally, vegetable crops following another vegetable crop or cotton that had optimal weed control will continue to have minimal weed problems. Vegetable crops planted after alfalfa may be weedy due to the nature of alfalfa being grown for multiple years and decreasing weed control practices as the crop stand declines and weeds proliferate and go to seed. Small grains planted during the previous winter often pose competitive problems for melon crops since the preemergence grass herbicides do not adequately control and Poast herbicide may be necessary to eliminate the volunteer grains. Volunteer melons from a previous cantaloupe crop commonly emerge in new melon crop plantings in the early fall and cultivation and hand hoeing are the only means of removal. If herbicides were used in a previous crop, read the label to ensure that there are no restrictions or limitations for growing melons.

Biological control agents are difficult to establish or augment in most short season vegetable crops. Microbial pathogens or herbivorous insects often cannot get established early enough to reduce weeds that actively compete with annual crops soon after emergence. Some seed-feeding insects or pathogens may occur in the soil and may reduce some seeds of certain weeds species.

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Note:

This information summarizes suggestions for herbicides used to supplement other weed control practices in Arizona melons.The suggestions are in conformance with currently available labels for each product. Because these labels are subject to frequent change, always consult the product label before using any herbicide.The user must assume responsibility for proper application of herbicides and for residues on crops as well as any damage or injury caused by herbicides referred to in this bulletin, whether to crop, person, or property.

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