

Management of Insect Pests at Stand Establishment on Desert Produce and Melon Crops

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Flea Beetles, Pale striped flea beetle and Western black flea beetle

Description: Flea beetle adults are small, shiny, hard beetles with enlarged hind legs that allow them to jump like fleas (Plates 1, 2). The pale striped flea beetle is the most destructive flea beetle on vegetables and melons. It has a pair of pale yellow stripes along the back, one on each elytron and can be confused with striped cucumber beetles. The stripe is broad, usually measuring one-third the width of the elytron. Although the background color of the elytron is usually dark, in some specimens it is much paler, approaching yellow. The western black flea beetles are a shiny black beetle and much smaller. Flea beetles have a broad host range and can be found on most important field crops and many common agricultural weeds. The adult beetle is highly mobile and disperses readily onto emerging crops, particularly in the fall. They are most active on warm and sunny days.

Damage: Adults do most of the damage on desert crops; flea beetle larvae may mine leaves or feed on roots, but generally do not damage vegetables crop or melons. The one exception is carrots where larvae have been found to feed on developing carrots and rendering them unmarketable. Flea beetles feed on both sides of leaves, creating small scars or irregularly shaped holes (Plates 2, 3). Large populations can kill or significantly stunt seedlings. Damage to cotyledons and young leaves is the major cause of crop loss, usually through uneven stand development. Older plants rarely suffer economic damage although their older, lower leaves may be damaged. Damage to cole crops

and melons can be severe during September and October and preventative treatments are recommended.

Management and Control: It is important to control weeds in and around the field which could act as a host for flea beetles. Sudan grass, alfalfa and cotton can harbor large number of beetles so it is important to destroy plant residue immediately after harvest if vegetable are to be grown nearby. There are no natural predators or parasites that can effectively control flea beetle populations. Monitor newly emerged seedlings frequently during stand establishment for flea beetle damage until plants are well established. Relatively low populations can cause economic damage when plants are in the cotyledon or first-leaf stages. Treat if you find several damaged plants or if populations of beetles are high. A single insecticide application is usually sufficient, but under heavy pressure repeated sprays may be needed to control new beetles that re-invade the field. Lannate, pyrethroids and foliar neonicotinoid sprays (Venom, Scorpion, Belay, Assail, Endigo, Admire Pro, etc.) will effectively knockdown adult flea beetles for 3-7 days. Pyrethroids can be effectively applied by chemigation, but timing is important. Soil-applied, neonicotinoid insecticides may be used at planting in areas where flea beetles are a chronic problem, but deep soil placement or delayed application through drip irrigation may reduce their effectiveness. Insecticidal baits will not provide adequate control. Neonicotinoid seed treatments (Nipsit) are available that provide good activity against adults for up to 14-21 days.

Darkling Beetles, *Blaspstinus* spp.

Description: Darkling beetle adults chew off seedlings, feed on foliage, and occasionally on melons fruit laying on the soil. The adults are from 3-6 mm long and are black or brown (Plate 3A). Darkling beetles, which are in the family Tenebrionidae, can be easily confused with predaceous ground beetles (family Carabidae), which prey on various soil insects. The two beetles can generally be distinguished by the carabids lack of clubbed antennae. Darkling beetles are most active at night but can be spotted moving on the ground during the day. They generally stay hidden in the soil or within field debris (Plate 3A). Larvae are cylindrical soil-inhabiting worms that are yellow and range from 1-8 mm in length. They are often referred to as false wireworms, and are not considered economically important.

Damage: Darkling beetles are generally not a problem unless large populations move into a field when plants are emerging. They usually invade fields from weedy areas or crops such as cotton and alfalfa, so damage is often first observed on field edges. Seedling plants may be girdled or cut off at the soil surface. Once the plants have 5-6 leaves, the beetles are usually not a problem. As the season progresses, feeding can occur on flowers, on the undersides of leaves and on the netting or rind of mature melons. Under moist soil conditions, they can also bore into fruit where it rests on the seed bed.

Management and Control: Several cultural practices can help reduce potential problems associated with darkling beetles. Maintain fields and ditches free of weeds. Water barriers placed around the field can aid in reducing migrating populations. Reducing organic matter in the soil by fallowing or deep-plowing may minimize beetle reproduction. When beetles are observed migrating into melons from surrounding fields, insecticide baits placed around the edges of the field may provide adequate control. Treat fields with insecticides (pyrethroids or Lannate,) whenever beetles are readily observed feeding on plants, flowers or fruit.

Other Beetle Pests, Ground Beetles (Carabids), Rove Beetles (Staphylinids).

Description: These insects are annual pests in early planted sprinkler irrigated produce fields in the low desert. When they occur, they can

quickly destroy large portions of a field. Problems are usually in fields planted closely to cotton or Sudan grass in August and September. Large numbers can migrate out of these crops onto seedlings if available. Most damage occurs at night. They hide during the day in soil cracks, ditches, weeds, and under irrigation pipes. They are similar in appearance to ground beetles. Ground beetles are predators feeding primarily on other insects. Rove beetles are mostly small elongated beetles less than ¼ in. in length and shiny dark black or brown. They have very short elytra covering their wings, but their abdomen is not covered. Rove beetles are often confused with winged ants or termites (Plate 3). When disturbed they will elevate their abdomens similarly to a scorpion. Rove beetles are insect predators or scavengers feeding on debris in the field.

Damage: Although ground beetles and rove beetles do not feed on the plants and are usually considered beneficial insects, they often damage fall vegetable crops by digging and rooting up the seed and small seedlings.

Management and Control: These insects are difficult to monitor. Early planted produce crops in close proximity to cotton or Sudan grass should be considered high risk fields and should probably be treated as soon as the plants begin germinating. If available apply permethrin baits around field edges to control migrating populations or chemigate insecticides (pyrethroids) through sprinkler irrigation during germination.

Field crickets, *Gryllus* spp.

Description: Crickets are annual pests in fall melons, especially where over-head sprinkler irrigation is being used. The adults are black or brown and are 1.5-2.5 cm in length (Plate 3). Eggs are laid in damp soil both within and outside of cultivated fields. Adults and nymphs are usually present throughout the season, but appear to be most harmful during stand establishment of direct seeded vegetable and melon crops.

Damage: Crickets will reduce crop stands by eating the newly emerged seedlings. When they occur in large numbers, they can quickly destroy large areas of a field. Problems usually occur in fields planted adjacent to cotton or Sudan grass in August and September, where large numbers are capable of migrating to crops during stand establishment.

Management and Control: Most damage occurs at night and crickets hide during the day in soil cracks, ditches, weeds, and under irrigation pipes. It is difficult to monitor for cricket abundance. Scout the field by looking under the sprinkler pipe for cricket adults. In most cases, cricket activity can be determined by the visual estimate of damaged seedlings. Immediate postharvest disking of previous crops aids in area-wide cultural control of crickets. Direct seeded melons planted in close proximity to cotton or Sudan grass should be considered high risk fields and damage should probably be treated as soon as seedlings begin emerging. Insecticide-treated (pyrethroid) baits are available that can be placed around field edges to control migrating populations. Additionally, insecticides can be applied through the sprinkler system during plant emergence.

from entering a field. Saltmarsh caterpillar larvae do not like to cross fence type barriers of aluminum sheeting and can be used to direct populations into holes containing cups of oil. Carbaryl or permethrin baits can be spread on edges of cotton fields or along ditches to kill migrating populations. Lannate, Radiant, Intrepid, Lorsban and pyrethroids are all effective against saltmarsh larvae.

Saltmarsh Caterpillar, *Estigmene acrea*

Description: Often referred to as “wooly worms”, saltmarsh caterpillars are not normally a pest of fall grown vegetables but will often migrate in as larvae from neighboring cotton or alfalfa. Large populations can be extremely damaging to melon plants. The larvae are usually yellowish to brown in color and covered with long, dark black and orange hair (Plate 4). Full grown larvae may be 2 in. long. Adult moths have white to yellowish wings and are peppered with black spots. Their wing span is approximately 2 in. Eggs are laid in clusters of 20 or more on the leaves

Damage: Most damage occurs to early planted seedling plants. Large populations of larvae will move out of newly defoliated cotton or cut alfalfa and devour the young plants. After thinning, saltmarsh caterpillars are generally not a problem. However, they should be included in counts for Lepidopterous larvae. On older plants damage is distinctive. They prefer to feed in groups and will completely skeletonize several adjacent plants.

Management: Scout adjacent cotton fields prior to melon plant emergence. It is best to control saltmarsh caterpillars before they enter the field. If possible, treat the population in the cotton field during or just before defoliation. Larvae are particularly sensitive to *Bacillus thuringiensis (B.t.)*. Physical barriers are effective at preventing larvae



Plate 1. A) Western black flea beetle (WBFB) on broccoli seedling, B) Fresh feeding damage by WBFB to broccoli cotyledons , C) Heavy feeding damage by WBFB to broccoli seedlings, D) Old damage cause by WBFB feeding.



Plate 2. A) Pale striped flea beetle (PSFB) on cantaloupe seedling, B) Fresh feeding damage by PSFB on upper surface of melon cotyledon, C) Fresh feeding damage by PSFB on lower surface of melon cotyledon, D) Heavy feeding damage to melon cotyledons by PSFB.



Plate 3. A) Salt marsh caterpillar moth, B) hatched SMC egg mass , C) SMC "woolly worm" larvae; dark form, D) SMC "woolly worm" larvae; light form.



4. A) Darkling beetle found underneath a mature cantaloupe fruit, B) Field cricket in melon field, C) Dead staphylinid beetles following chemigation in seedling lettuce.

Plate