

Cultural Practices Key to Whitefly and Virus Management in Fall Melons

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Whiteflies, *Bemisia tabaci*, are the most economically important pest of cantaloupes, honeydews and mixed melons grown during the fall in the desert southwest. Not only do they cause direct reductions in yield and quality from the feeding of nymphs, but the adults vector a very devastating plant virus. Historically, whitefly populations were managed in melons through an integrated approach that stressed the conservation of natural enemies and the judicious use of selective insecticides to control whitefly immatures. However, that approach changed after 2007 when a new crinivirus, *Curcurbit Yellowing Stunting Disorder Virus* (CYSDV), vectored solely by adult *Bemisia* whiteflies became established in desert cropping systems. This semi-persistent virus has caused significant economic losses in fall melons over the past 13 years.

To manage CYSDV, growers have focused on avoiding virus transmission by whitefly adults. This has been primarily achieved through aggressive chemical control approaches that rely on soil, systemic insecticides (Venom, Sivanto prime) that prevent migrating whitefly adults from feeding on emerging seedlings. This is augmented with foliar applied insecticides (PQZ, Sefina, Venom, Assail, Minecto Pro, Exirel and Transfrom) sprayed throughout the season to reduce secondary spread of the virus within the field. If not timed properly, these applications can be hard on natural enemies and disrupt pollination by honeybees. Furthermore, dependence on insecticides is not only expensive, but also increases the risk of resistance, particularly to the neonicotinoids. Fortunately, research over the past decade has shown that specific growing practices can help reduce insecticide usage while mitigating the impact of the virus on melon production.

Avoidance with Growing Practices

There are several times during the seasonal cropping cycle when whitefly management can most effective in the desert; during the winter when whitefly abundance is lowest, in late spring during the transition from melons to cotton, and in August and September during the transition between summer crops to fall vegetable/melon plantings. These periods all involve the movement and colonization by adult populations. Consequently, cultural management practices can be implemented that help avoid or minimize problems with whiteflies before they have the chance to occur.

In managing CYSDV in melons, it is important to effectively avoid whitefly populations migrating from spring and summer melon crops. After CYSDV first appeared in the desert, local growers attempted to abate whitefly movement onto fall melons by creating of a 25 day “host-free” that prohibited melon production during July. Unfortunately, establishing this melon-free bridge between crops was not successful in suppressing CYSDV in t fall melons due to the preponderance of volunteer melons from previous spring crops, as well as the discovery that alfalfa and several common weeds (common mallow, groundcherry and silverleaf nightshade) serve as reservoirs for CYSDV. However, growers soon discovered

that other cultural growing practices could be employed to minimize the host-availability for CYSDV and movement of whiteflies onto fall melon crops.

Crop Management. Maintaining strong, healthy plants is fundamental to IPM and can minimize whitefly issues. It is important to optimize growing practices to avoid stressing melon crops, and includes proper management of irrigation, plant nutrition and salinity. Experience has demonstrated that a vigorously growing plant is better able to withstand external stresses from whitefly feeding/ virus infection that can delay growth and reduce yield potential.

Sanitation In preparing for the establishment of new fall melon plantings, growers should be aware of crops in the surrounding landscape. For example, host-crops approaching defoliation/harvest (e.g, cotton, alfalfa) and weeds are usually the primary sources from which whiteflies disperse. Sanitation and clean culture are perhaps the most important cultural practices that can be employed to mitigate this movement on an area-wide basis.

- Prompt removal of whitefly and CYSDV host plants in areas where fall melons will be grown can reduce virus transmission. This includes rapid destruction of plant residue following harvest of spring melons which not only serves as a reservoir of CYSDV, but for whiteflies too.
- The destruction of volunteer melons between spring and fall crops can reduce the source of virus inoculum available. Emerging volunteer plants should be destroyed as soon as practical. This can be done by disking or applying a contact, burn-down herbicide to fields soon after volunteers emerge.

Crop Placement / Isolation Careful consideration of crop sequencing and planting dates can have significant impacts on adult whitefly dispersal onto fall melons.

- Whenever possible, fall melons should be planted as far away from previously grown spring melons. Research has demonstrated that fall melons planted near locations where spring or summer melons were previously grown (<1.8 miles) are at a high risk of CYSDV infection.
- Also, fall melons should be planted as far away from cotton, alfalfa and other host crops that serve as a reservoir for whiteflies. Recent research has also indicated that fall melons grown within 1 mile of cotton is at a higher risk of CYSDV infection. This is due to cotton being a potential source of large whitefly populations, as well as harboring virus infected weeds and volunteer melons within the field.
- Avoid planting near residential subdivisions and citrus/date orchards, both of which may contain sources of infected weed hosts.

Row Covers Lightweight, fabric row covers have been successfully deployed in both experimental plots and commercial melon fields to delay virus incidence and severity. Covers must be present on the seed bed prior to plant emergence to prevent adult whiteflies from feeding on emerging seedlings and transmitting CYSDV. Covers must be removed prior to blooming to ensure adequate pollination of the crop. Use of a foliar insecticide spray immediately following removal is recommended when whiteflies are actively migrating into the field. Keep in mind, deployment of these covers is often labor intensive and expensive.

Conclusion: Cultural practices can be effective in minimizing whitefly movement onto susceptible crops, should be the first line of defense in local IPM programs. In fall melons, experience in the desert southwest indicates that crop isolation, rapid elimination of host crops during the summer, and timely insecticide applications have collectively been effective in managing whiteflies and suppressing CYSDV in fall melon fields.