



Cotton Management Guidelines



FUSARIUM INFORMATION — September Update

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Something Different in 2002-2003? Within the past year, in a very limited number of locations, Fusarium wilt occurred in both Pima and Acala cotton growing in loam and clay loam soils. The disease in these limited locations is different in that it has developed and caused plant damage even in the absence of root-knot nematode or other kinds of significant stress, and this has increased our concern about Fusarium wilt. The Fusarium at these sites is different than those with the nematode association, and can be separated genetically as a different race of FOV. Our initial findings from these sites, which we have reported at our County UCCE Cotton Production meetings in summer of 2002 and 2003, were that this race of FOV was first identified in the SJV in a Pima cotton field. Follow-up greenhouse tests of the pathogen isolated from these fields indicated that several Pima varieties tested were infected at a higher rate and damaged much more seriously than several Acala varieties evaluated in the same greenhouse tests. Subsequent field tests this year have clearly shown that some Acala varieties can also be infected by this race of FOV, albeit with significantly less plant damage than in most Pima varieties tested to date. Further field evaluations of a range of Acala and Pima varieties are underway, and will help determine how broadly susceptible Acala, Pima and non-Acala Uplands may be to this pathogen.

These recent incidences of FOV damage are not necessarily due to newly-introduced virulent strains of FOV, but rather may indicate that certain Pima varieties (now more widely grown in CA) could be more susceptible to local, previously unrecognized FOV strains than are Acala varieties. UC Plant Pathologists have been using genetic “mapping tools” for the past two years which

allow clear identification and differentiation of strains of FOV found in the SJV. To date, we have identified 4 distinctly different strains of FOV in California; only one of these strains causes significant damage in the absence of nematodes. A major reason why these analyses were initiated several years ago was to determine if either of two very damaging strains of FOV currently causing severe problems in Australia could have been moved into California cotton fields. The results to date indicate that the SJV strains of Fusarium are different from the Australian FOV strains, and furthermore, none of the sampled SJV fields have been shown to have the Australian FOV strains. It must be remembered, however, that with concerns for Australian FOV strains or other strains of FOV, our ability to detect new or expanding problems is only as good as our field sampling and the degree to which growers and consultants point out problem areas for further investigation.

Most cotton crop loss in the SJV associated with Fusarium wilt is probably still closely associated with nematode damage and FOV strains we have known about for many decades. This is particularly likely if you are producing cotton in sandy, sandy loam and silt loam soil in

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areas with a history of root-knot nematodes or Fusarium. However, some of the recent findings mentioned above warrant renewed attention to FOV by consultants and growers.

Symptoms of Fusarium Wilt. Plant symptoms of infection by the Fusarium that involves root knot nematode infestations and the more recently-identified race of Fusarium found in 2002 and 2003 appear to be very similar. Fusarium wilt can affect cotton at any growth stage, but is favored by warm weather. When the disease hits at seedling stage or with young plants, cotyledons and leaves can turn brown and dry right on the plant, or can wilt and drop, resulting in bare stems. At this stage, symptoms of Fusarium wilt resemble those caused by damping off, and the disease may be overlooked. At later growth stages (squaring and into bloom), in addition to causing a general wilting of leaves seen on warm days, symptoms of Fusarium wilt include leaf yellowing and necrosis that typically begin on leaf margins of lower leaves. In mildly-affected plants, lower leaves will show symptoms, but the plant may survive, often as a stunted plant with reduced vigor. In more severely affected plants, leaves wilt and abscise (drop) and some plants may die. As the disease progresses, the vascular system (water and food-conducting tissue) of infected plants becomes discolored brown to black. Symptoms are described more thoroughly in a UC website article mentioned at the end of this article.

Control or Containment Options. Due to resistant spores and the ability of FOV to sustain itself as a saprophyte on roots of many plant species and in plant debris, it is nearly impossible to eradicate FOV from large production fields. This is true for the previously- recognized FOV associated with root knot nematode, and is likely to also be true with other FOV races. Preventative strategies, early detection, and containment of infested soil and plants can be used to manage the disease and limit or slow dispersal of inoculum. Containment strategies are described in more detail in recent CA Cotton Review newsletter articles or updates available on the UC cotton website. In order to avoid increasing populations of FOV spores, general suggested practices to follow include:

- Use clean planting seed
- Consider avoiding land application of cotton gin trash
- Reduce equipment and foot traffic to near zero in affected patches of the fields where plants with symptoms were identified and confirmed for FOV
- Minimize and restrict tractor and foot traffic in areas near field locations with symptoms, particularly when the soil is wet and more likely to stick to equipment or shoes
- Destroy affected plants and those within a few yards of plants with symptoms
- Consider changes in irrigation practices, including flow of irrigation water through the infested areas or return flows out of infested areas. Water movement through infested areas can move plant debris and soil, spreading FOV spores to new areas.
- **Do not produce planting seed in affected fields or fields immediately adjacent to infested fields**

With this information and these precautions in mind, growers and consultants should keep an eye out for Fusarium symptoms, particularly in areas with prior low incidence of FOV. At this time of year (late summer), symptoms become increasingly difficult to see as plants grow tall and foliage starts to deteriorate after cutout and as final irrigations are made. If you noticed symptoms earlier on and want those areas checked out, contact your Farm Advisor or Bob Hutmacher with questions or requests for field visits. Phone numbers for UCCE Advisors and Specialists, color photos showing plant FOV symptoms, suggestions for containment options for FOV, plus additional information is available at the UC cotton web site (<http://cottoninfo.ucdavis.edu>).



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