

## FUSARIUM WILT RACE 4 DISEASE OF COTTON IN TEXAS

Fusarium wilt of cotton, caused by the fungus, *Fusarium oxysporum* f. sp. *vasinfectum* Race 4 (FOV4), was confirmed in numerous fields in El Paso and Hudspeth counties of Texas in 2017, although it was present and unrecognized there for several years prior to 2017. It is not known how the pathogen was introduced to the area. Previously, FOV4 was present only in the San Joaquin Valley of California, since 2001.



**Fig. 1. Bare spots within a field can indicate the presence of *Fusarium oxysporum* f. sp. *vasinfectum* Race 4.**

### The Threat of FOV4 to Texas Cotton Production

The FOV4 fungus is different than the other races of the *Fusarium* wilt fungi that are found in the cotton production regions of the United States, including the races that occur in the Southern High Plains of Texas. FOV4 is better adapted to causing disease of cotton than the other *Fusarium* wilt fungal races. It causes disease without the involvement of nematodes and in soils with neutral to alkaline pH. In contrast, to cause disease, the other races require nematode infestation – usually root knot nematode – and they are restricted to soils with a pH that is neutral to acidic.

Once FOV4 is introduced into a field, it is there forever. Crop rotation or fallowing will not eliminate it, as the fungus is capable on growing on the roots of plants other than cotton, without causing disease. Resistant commercial Upland varieties are not yet available, and current fungicides are not effective.

### Symptoms

It can take several years after FOV4 is introduced into a field to see disease symptoms. Bare spots occur randomly throughout the field, indicating areas where seedlings were killed earlier in the season (**Fig.1**). Seedling damping-off caused by FOV4 can resemble disease caused by other fungal pathogens, such as *Rhizoctonia solani*. Over several years, these bare spots will increase in size, usually associated with tillage or furrow irrigation movement of infested soil.

Although all the races of the pathogen cause wilt, FOV4 is unique in that it causes root rot and does not discolor the vascular system of the stem. When infected plants are about two months old, black streaking of the center of the root can be seen (**Fig. 2**). This streaking is limited to the roots. As the fungus continues to grow in the roots, more of the tissue becomes decayed and, eventually, this is seen as wilting and then death of the plants.

### How the Fungus Can Spread

As is the case with all *Fusarium* wilt fungi, FOV4 is soilborne and seedborne. The fungus produces spores that are closely associated with soil. Spread within a field occurs when infested soil is moved with implements or furrow irrigation. Infested soil carried on implements can allow movement of the fungus to other fields.



**Fig. 2. Black streaking in the center of the root caused by *Fusarium oxysporum* f. sp. *vasinfectum* Race 4.**

There is also a low level of internal colonization of seed by FOV4. The fungus does not kill the seed and survives acid delinting and seed treatment fungicides. Contaminated seed is a means to disseminate FOV4 great distances.

### What the Farmer Can Do to Prevent Infestation

- Do not plant seed (e.g. “brown bag”) originating from a region with FOV4. To date, this region in Texas is limited to El Paso and Hudspeth counties. Not all fields in this region are infested, but there is no reliable test to ensure seed is free of FOV4.
- Clean soil and plant material from farming equipment that have been in infested fields, before moving to other fields. Use a pressure washer and soap.
- Don’t apply gin trash from infested fields or manure from cattle fed cottonseed from infested fields.
- Investigate the cause of randomly-distributed bare spots and seedling death in fields. Submit plant samples to your county agent, extension specialist or plant disease diagnostic clinic.

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