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 Pests and Diseases
 

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## Identification, biology, epidemiology and geographical distribution of fungal and bacterial pathogens associated with avocado in California

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### Avocado Branch and Trunk Canker (formerly *Dothiorella* Canker)

In year three of three of this branch and trunk canker study, our objective is to evaluate effective chemical and organic materials to protect pruning wounds in the field from infection by *Botryosphaeriaceae* and *Phomopsis/Diaportha* (*P/D*) spp.

#### *Chemical Field Trials*

Five chemicals are presently being tested in field trials at the South Coast Research and Extension Center (SCREC) in Irvine. This chemical field trial includes three single and two combination formulations (Table 1). Chemical Field Trials 1 and 2 have been harvested for a total of 960 branch samples. Trial 1 branches have been processed; however, Trial 2 branches are still being processed in the lab. Data analysis for these trials is in progress.

Table 1. Fungicides used in chemical field trials

Active ingredient	Trade Name	Manufacturer
Pyraclostrobin	Cabrio 20 EG	BASF
Metconazole	Quash 50 WDG	Valent
Myclobutanil	Rally 40 WSP	Dow AgroSciences
Propiconazole+azoxystrobin	Quilt Xcel	Syngenta
Fludioxonil+Cyprodinil	Switch 62.5 WG	Syngenta

#### *Organic Field Trials*

Two more field trials are also currently set up at SCREC to test two organic materials on pruning wounds. The Organic Field Trials will be harvested starting in January 2012.

#### *Pathogenicity Tests*

Results of a pathogenicity test of nine *Botryosphaeriaceae* species and one *P/D* sp. on grafted 1-year-old avocado seedlings was presented in the 2009-2010 midyear report. A repeat pathogenicity test was done in 2011 with similar results. The results of the two pathogenicity tests were combined for analysis and are shown below (Fig. 1).

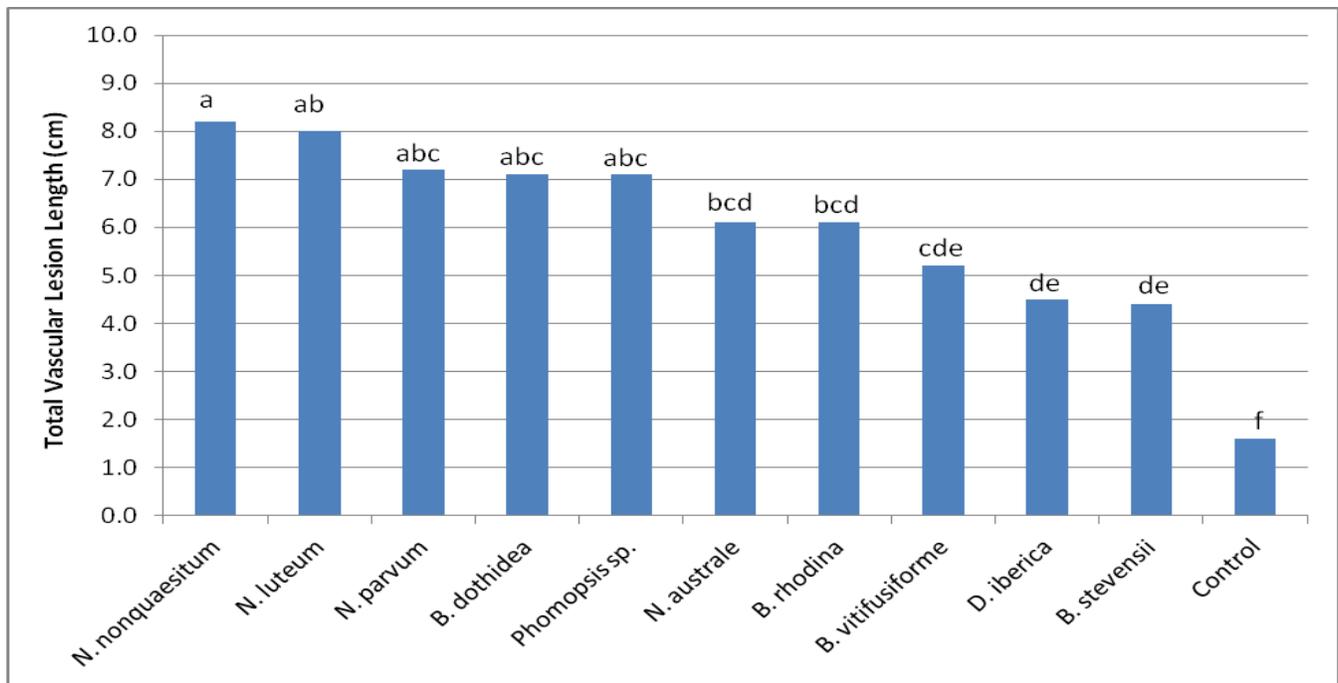


Fig.1. Combined data from mean values of vascular lesion length from two pathogenicity tests of nine Botryosphaeriaceae and one *Phomopsis/Diaporthe* sp. on 1-year-old grafted avocado seedlings (cv. Hass). Means with the same letter are not significantly different at the 0.05 level.

These results show that all 10 fungi are pathogenic on avocado, based on the vascular lesion length, and that there are significant differences in aggressiveness between the fungi. However, preliminary results in our lab indicate that the fungicides tested in field trials mentioned above are effective against all 10 fungi. Further analysis of the Chemicals Field Trials data is still in process.

### Fruit Rot Study

As Botryosphaeriaceae and *P/D* have been implicated in avocado fruit rot, and branch cankers could serve as a source of inoculum, we identified 194 fruit rot isolates, supplied by Dr. Jim Adaskaveg, to determine their relationship to branch canker pathogens.

Out of 194 isolates, 59 were sequenced and came back 63% *N. luteum*, 31% *Colletotrichum* sp., and 0.02% *P/D*. Of the 135 not sequenced, visual inspection identified them as 57% *N. luteum*, 30% *Colletotrichum* sp. and 0.03% *P/D*.

These results were interesting and surprising in that only one Botryosphaeriaceae species (*N. luteum*) predominated in the fruit rot isolates. *N. luteum* is also a major contributor to branch canker and is also suspected to be a cause of Avocado Black Streak disease. A separate pathogenicity study on avocado fruit is currently in process in this lab.

### Conclusion

Branch and trunk canker disease is caused by a complex of fungal pathogens primarily from the Botryosphaeriaceae family. All of the fungal pathogens isolated have been shown to be pathogenic on avocado seedlings in the greenhouse, as measured by internal vascular lesion length. Evaluation of fruit rot fungal isolates has shown a majority to be *N. luteum*, which is also an important contributor to branch canker disease. Since initial infection of avocado fruit usually occurs in the field, untreated

branch cankers could be a source of inoculum to fruit on the tree. Evaluation of various chemicals in the field to help manage branch canker will lead to a recommendation for an effective chemical control for use on pruning wounds, or any other type of wound on the tree. Three organic chemicals are also being tested in the field.