Drought threatens VAM levels in fallow fields

nforced long fallow in some cotton fields due to the drought could have significant implications for next season's cotton crop in drought-affected areas.

Dr David Nehl, Research Scientist with NSW Agriculture and the Cotton CRC, said long fallows are a concern, as cotton is very reliant on mycorrhizal fungi (VAM fungi) which can only grow on the roots of a living plant host.

Speaking on the weekly CSD Web on Wednesday video, he said VAM fungi are important for normal growth of cotton.

"Usually there are sufficient VAM fungi in the soil for cotton. We conducted several experiments during the 1990s that showed an 18-month bare fallow is generally not a problem for VAM development in cotton. Enough VAM fungi survive through that period until another host crop is sown.

"The concern is that when bare fallows of two or three years are forced by drought, the VAM fungi might not survive until cotton is sown again, and the crop might have some trouble growing," he said.

But recent assays of VAM fungi in fields at Bourke, which were in bare fallow for up to 35 months at March this year, have shown very positive results.

"We planted small test-strips of linseed and cotton, assessed VAM fungi in the roots after four to five weeks, and they were actually quite well colonised. In one field, around 30 per cent of the roots were colonised, and in the other field it was even higher at around 40 to 50 per cent. That's not too bad — its in line with what we would see at that stage in a normal cotton crop."

"One of those fields will have had 41 months of fallow by the time the cotton is sown in October and we are quite hopeful that there will be sufficient levels of VAM fungi in the soil."

David said one of the reasons behind this long-term survival of VAM fungi could be the lack of rain, as microbial activity slows dramatically when soil is dry.

"If there are regions where we have had wetting and drying cycles during a very long bare fallow then the survival of VAM fungi may be adversely affected. In those areas where conditions have been dry, reasonable numbers of VAM fungi appear to be surviving two or three years of bare fallow."

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He said the best way to test for the presence of VAM fungi in a field was to grow a mycorrhizal plant in that soil and assess the colonisation of roots by the fungi.

"If you came back with cotton in an area where the VAM fungi are depleted, that could lead to a delay in colonisation. If the fungi were at very low numbers, this could lead to depressed cotton growth and, if that was sufficiently severe, it may result in a yield loss. When mycorrhizal development of cotton is poor, it generally recovers later in the season and the problem is not observed in the following year.

"A 'nurse' crop, such as a winter cereal grown for a few months prior to cotton, is possibly the only way that you could build those fungi up. The use of a nurse crop would need to be justified by an identified lack of VAM fungi in the soil," David said.

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