

Waterlogging problems – for a change

Australian cotton growers have been warned to expect lower yields after crops suffered waterlogging from recent rainfall across northern NSW and southern Queensland.

Speaking on CSD's Web on Wednesday broadcast, CSIRO scientist Dr Mike Bange said crops under severely waterlogged conditions would stop growing for a period – effectively robbing them of time to produce yield.

“Waterlogging in its purest sense is soil with little or no oxygen in it so the plants' root function is impaired, restricting its ability to take up nutrients and photosynthesise properly.

“You get a reduction in photosynthesis which produces fewer nodes, leading to a reduction in the number of fruiting sites and ultimately fewer bolls. That is one consequence of waterlogging,” he said.

“Arthur Hodgson did some work with Greg Constable many years ago that showed that for every day where the soil was saturated and low in oxygen they were getting about 0.2 bale per day yield loss.

“We suspect that's not necessarily the level of yield that is lost in today's environment, due to better soil structure, and we've got better varieties that have been bred for our current systems,” he said.

CSIRO cotton nutrition scientist Dr Ian Rochester said waterlogged conditions also produce nutrient deficiencies within the crop.

“When we get severe waterlogging, most nutrients are not taken up in the quantities that they're needed so you can get deficiencies of nitrogen, phosphorus, and potassium in particular. Sulphur is often deficient and the micronutrients such as zinc and iron become deficient and they commonly show up as yellowing in the crop,” he said.



CSD agronomist, Rob Eveleigh, inspects a waterlogged cotton crop in the Namoi Valley.

In terms of reducing this impact of waterlogging, Mike said prevention rather than treatment after the event was the key in managing the problem.

“To prevent the soil from being saturated for too long you can improve drainage and the slopes of the fields.

“One thing we had to do to intentionally waterlog soil in experiments was to knock the hills down – so cotton was growing on relatively flat ground.

“It was quite evident that well-formed hills were a key to prevent waterlogging through better drainage,” he said.

Ian Rochester said the nutritional health of the crop prior to the waterlogging also had a big impact on its ability to cope with the stress.

“If there's any nutrient that's marginal or slightly deficient, it's going to be exacerbated by the waterlogging so it's important to do soil testing and plant testing if there's time available, to make sure you've got a good supply of all nutrients,” he said.

According to Ian, the good news for Australian growers is that the newer locally-bred varieties were less sensitive to water stress than older varieties.

“We've been looking at some of the current and redundant cotton cultivars and how they take up nutrients and the amount of nutrients that they accumulate and there are large differences between them.

“The current varieties are taking up a lot more nutrients – particularly nitrogen and iron – so they're more tolerant of waterlogged conditions, so I think they can survive those severely waterlogged conditions for much longer than what they would have done 10 or 20 years ago,” he said.

CSD extension and development agronomist Rob Eveleigh said waterlogging was most prevalent in growing areas in northern NSW, and was worse where growers had irrigated crops just before rain.

“While there are a few crops that will obviously suffer permanent damage, I'm confident most of them will make a reasonably full recovery, depending on how the rest of the season pans out. Everyone thinks the advantages of the rain far outweigh losses from waterlogging,” he said.

Further Information: Mike Bange on 02 6799 1500, Ian Rochester on 02 6799 1500 or Rob Eveleigh on 02 6795 0000.

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