

The impact of sooty mould contamination on cotton downgrades

■ By Simone Heimoana¹ and Matt Nott¹

COTTON infested with silverleaf whitefly (SLW) is at risk of experiencing some degree of honeydew contamination. The honeydew, which is excreted onto leaves and bolls by SLW, provides a good energy source for sooty mould fungi, which consume the honeydew and consequently produce dark spores as part of their lifecycle. On open cotton bolls, the spores are seen as a greyish or blackish layer that covers the surface of the lint.

Australian crops are generally managed to avoid honeydew but sometimes small amounts may be present. We have previously shown that rainfall can wash off most of the honeydew in a crop, but moisture can also promote mould growth under the right conditions. If a light rain washes off most of the honeydew, and the subsequent weather is overcast, moisture can be retained in the canopy and fungi can grow on any residual sugars. This can be a worst case scenario at the end of the season prior to defoliation.

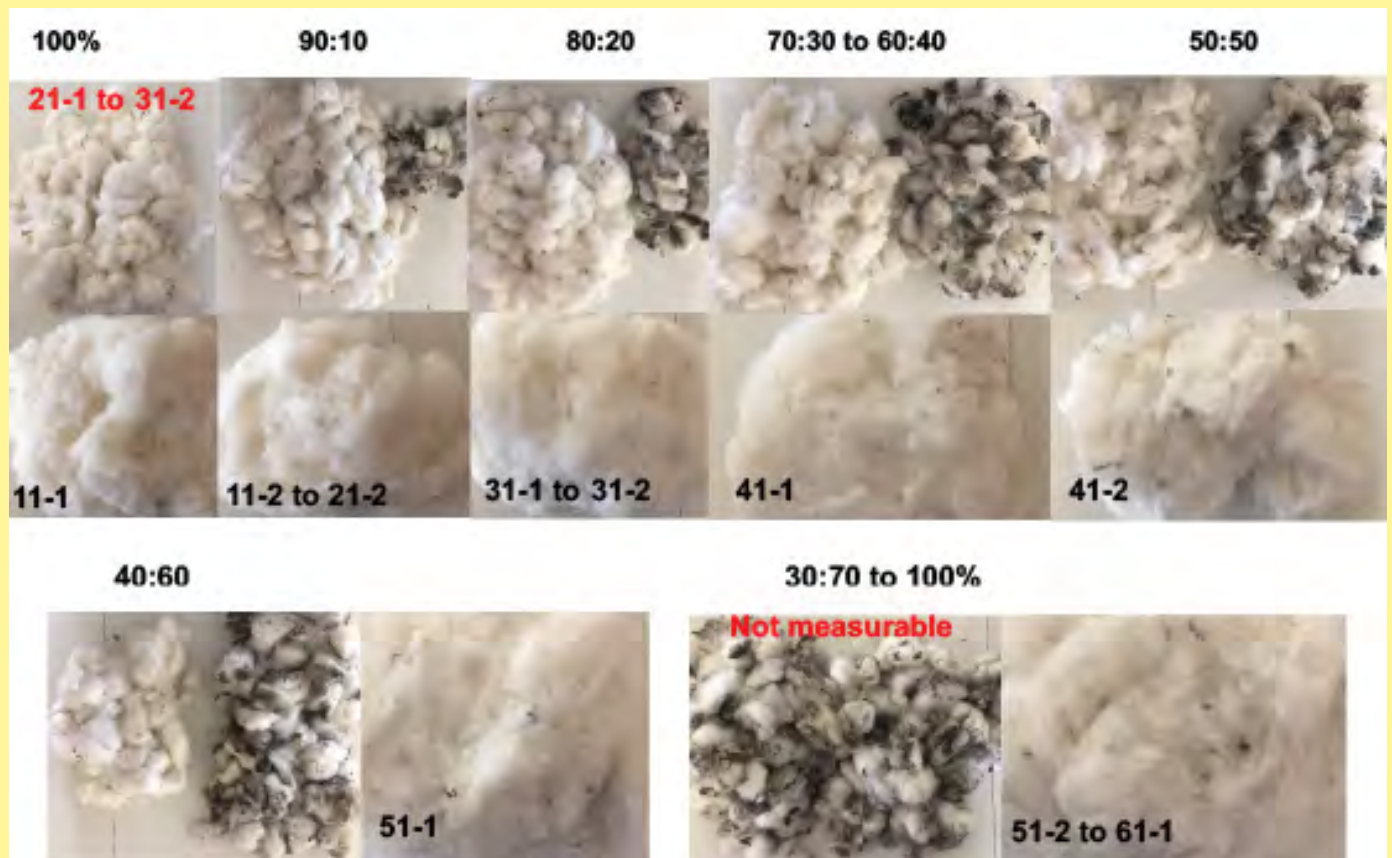
We conducted an experiment to estimate what proportion of the crop needed to be contaminated with sooty mould before

colour downgrades would be detected with the High Volume Instrument (HVI) that measures lint radiance and brightness which then translates into a colour grade. To generate cotton bolls heavily contaminated with sooty mould, we covered several rows of cotton with a tent and sprayed artificial honeydew on the opening bolls (see photo page 45).

The tent was closed up and over several days sooty moulds grew, aided by the warm and humid environment inside. We then mixed the heavily contaminated mouldy cotton bolls with clean bolls in varying proportions ranging from 100 per cent clean to 100 per cent mouldy (Figure 1). The initial grade HVI measurement of the clean seed cotton was 21-1 to 31-2. The base grade of Australian cotton is 31-3.

We could not obtain a grade measurement for the mouldy cotton as the HVI refused to provide a reading, interpreting the blackness from the mould as leaf material. We mixed the clean and mouldy cotton combinations, ginned the samples individually and put the lint through the HVI.

FIGURE 1: Clean and sooty mould contaminated cotton mixed in different proportions to evaluate final lint colour grade. Base colour grade of seed cotton indicated in red.



(IMAGES: Matt Nott)

The 100 per cent clean cotton sample with a base grade of 21-1 to 31-2 improved to 11-1 after ginning, indicating that the inner boll lint was still in better condition than the lint on the outside of the boll (we used stored cotton from the previous season). With 10 per cent of sooty mould in the crop, grades were not strongly affected and measured 11-2 to 21-2.

Once the proportion of contaminated lint reached 20 per cent, grades dropped to 31-1 and 31-2, i.e. still within base grade parameters. But with between 30–50 per cent of bolls contaminated, there was a further downgrade to 41-1 and 41-2, which would result in quality discounts, and past 60 per cent grades fell to 51-1 and 61-1, which would result in even heavier discounts.

In our experiment we set the upper limit of sooty mould impact on lint colour by only selecting bolls that were heavily contaminated with mould. But in a field situation, there would be a gradient of contamination through the crop which would lessen the impact.

Whiteflies are not a regular problem pest but there may be years where pest management is difficult and affected by influxes from other areas, dense canopies and unfavourable weather, and in this situation heavy mould contamination in the lower third of the crop could become a reality.

We have begun pilot experiments that explore options for mitigation and are evaluating a range of fungicidal agents to control sooty mould. Finding a fungicide that eliminates the mould is unlikely because once they have developed, the spores are persistent – we have difficulty washing them off open bolls. In the meantime, to reduce the risk of downgrades due to honeydew and sooty mould, crops should be managed for minimal whitefly presence by using IPM principles for all pests.

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Tents used to generate sooty mould on open cotton bolls, Australian Cotton Research Institute, Narrabri. (PHOTO: Simone Heimoana)

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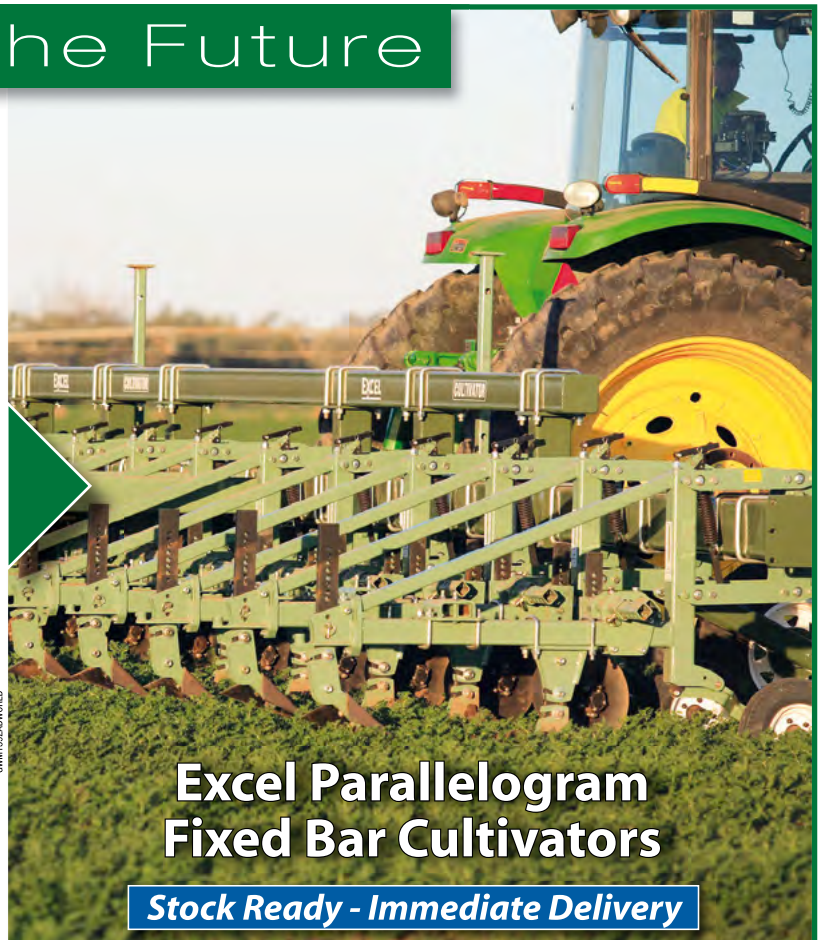
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