FATE OF HONEYDEW ON COTTON AND IMPACTS

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The Problem

Cotton aphid and silverleaf whitefly feed on phloem sap and produce sugar rich honeydew that can contaminate open cotton bolls leading to downstream problems with processing. Despite established management strategies for these pests honeydew contaminated crops still occur. The factors that may reduce honeydew in the field include moisture (rainfall), sunlight (UV radiation) and microorganisms (sooty mould fungi). Our experiments aim to establish the importance and effectiveness of each factor in reducing honeydew to levels that are safe to harvest.

Results

Rainfall, either natural (range 8.1-21.8 mm) or simulated through overhead irrigation (range 0-60 mm, Figure 1) or micro sprinklers (range 0-32 mm, Figure 2) dramatically reduced honeydew concentration on bolls. Data over three years showed that as little as 10 mm of rainfall removed up to 80 % of honeydew (Figure 3). Further rainfall removed more honeydew but at a slower rate.

Short term exposure of contaminated bolls to sunlight and dry conditions did not show any significant reductions in honeydew (Figure 4). Sooty mould fungi growing on honeydew may degrade honeydew, reducing contamination and we are currently investigating this.

Impact

We have established that sunlight alone is unlikely to reduce honeydew in the field while rainfall or overhead irrigation can remove significant amounts of honeydew from contaminated lint. Our data provides a basic guideline to the amount required to ensure non-sticky bolls at harvest. Rainfall intensity and distribution also plays a part in the speed and efficiency of honeydew removal and we intend to investigate this and further rainfall effects in relation to sooty mould development and fibre deterioration due to excessive moisture.

1. OVERHEAD sprinkler system used to simulate rainfall

2. MICROSPRINKLER system used to simulate rainfall

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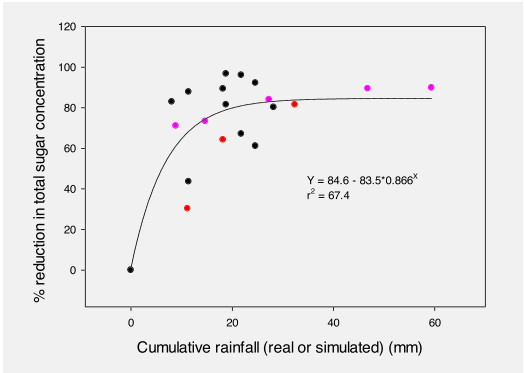

FIGURE 3. Percentage reduction in honeydew sugars due to natural rainfall (black dots), micro-sprinkler irrigation (red dots) or overhead irrigation (pink dots).

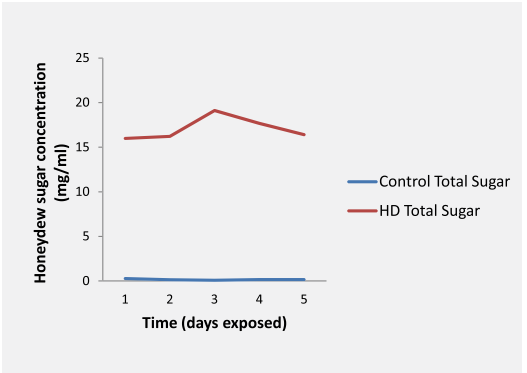

FIGURE 4. Behaviour of honeydew under short term exposure to sunlight