Spray-drift from an axial fan sprayer Full-scale measurement in a wind-tunnel: low-drift' v's standard nozzle performance

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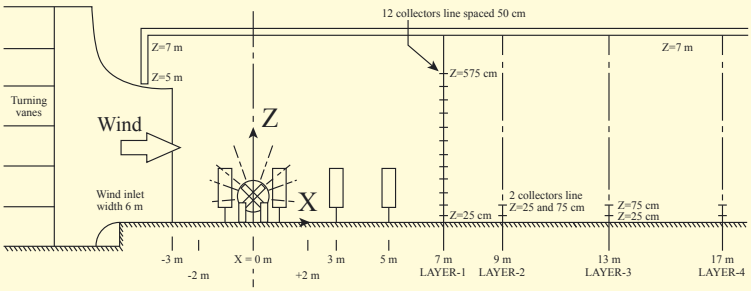
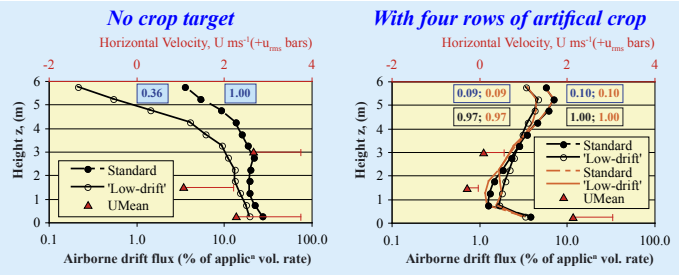


Figure 1: Cross section view of the experimental arrangements in the wind tunnel

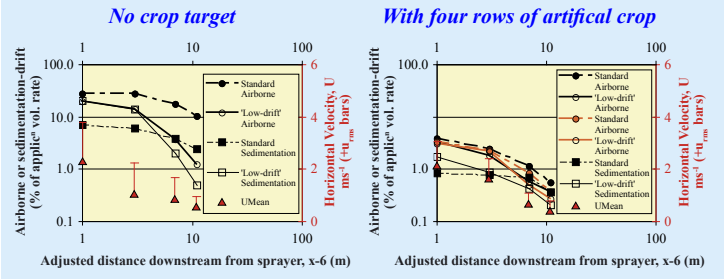
Comparisons of airborne-drift measurements: Vertical distributions from Layer-1

(Relative 'Drift Index' values are given in boxes)

- A 'No crop' comparison over predicts the benefit of 'low-drift' nozzles
- Four rows of crop reduce the nozzle effect after spray filtering & redistribution
- Favourable evaporative conditions (>6ºC Wet Bulb Depression) yield little effect
- The Velocity measurements shows unabated wind beneath the artificial canopy



Distributions of airborne-drift (z = 0.25 m) and Sedimentation: from LAY-1 to LAY-4 downwind (See Fig. 1)

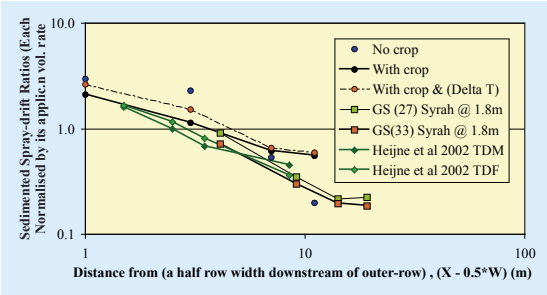


- The ratio of Airborne-drift to sedimentation shows a marked difference between nozzle types for 'No crop'
- As expected from the vertical distribution, the effect of the crop is to reduce all drift values: by almost a decade
- The contrast in sedimentation between nozzle types is maintained: indicative of large 'low-drift' droplets falling beyond the crop

NB: Airborne measurements, when in a field context; need to be made above any filtering plants in the downwind zone.

Wind tunnel compared to Field distributions of Spray sedimentation ratios ('low-drift'/standard nozzle). Each normalised by Application volume rate.

- 'Low-drift' nozzles can produce a worse sedimentation within 5 m or so downwind of the last crop row; with axial-fan spraying
- Extrapolation of the full-scale Syrah Vineyard data of Balsari & Marruco suggests so (at both of their growth stages)
- And Heijne et al.'s June apple orchard data demonstrates the same with a cross-flow sprayer and two types of low-drift nozzle



References

- *P Balsari And P Marruco.* Influence of canopy parameters on spray drift in vineyard Aspects of Applied Biology 71, 2004 pp 157-164.
- *B Heijne, M Wenneker And J C Van De Zande.* Air inclusion nozzles don't reduce pollution of surface water during orchard spraying in the Netherlands Aspects of Applied Biology 66, 2002 pp 193-199.