

Evaluation of Fan-Pattern Spray Nozzle Wear Using Scanning Electron Microscopy

Worn nozzles on spray equipment severely affect the efficiency of crop management systems while causing unnecessary pesticide contamination of non-target areas. Droplet size significantly affects control of numerous pests and diseases. Changes in spray pattern and flow rate can result in inefficient and insufficient delivery of pesticides to the target surface. Nozzles with improved and more consistent performance will lead to enhanced pesticide efficacy, resulting in better disease, insect, and weed control and reductions in conventional pesticide usage.

Scanning electron microscopy (SEM) was used to observe worn and unused brass and stainless steel flat-pattern spray nozzles. Wear and other changes were observed in both nozzle materials. Scanning electron microscopy can provide nozzle manufacturers with greater insight and needed information on nozzle mechanics. More reliable delivery of pesticide spray should enhance integrated pest and disease management and crop protection for growers.

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Figure 1.(1) Scanning electron micrograph of an unused brass nozzle. Bar = 700 μm . (2) Scanning electron micrograph of an unused stainless steel nozzle. Note the rough edges at the arrows. Bar = 700 μm . (3) & (4) Scanning electron micrograph of worn brass nozzle. Note wear patterns (arrows) and increased width of orifice. Bars = 700 and 300 μm respectively.

