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Chemical Application Equipment for Improved Deposition in Cotton

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Air-assisted electrostatic and hydraulic sprayers developed in recent years to improve pesticide deposition within the plant canopy and on the undersides of cotton leaves were evaluated to determine their effectiveness compared with conventional sprayers. The study determined and compared within-canopy deposition of spray from conventional hydraulic nozzle, air-assisted, and electrostatic sprayers in cotton plants. Water-sensitive paper, residue washed from leaves, and fluorescent dye collected on strings were used to determine the effect of sprayer method on spray deposition within the canopy and on cotton leaf surface. Spot diameters generated by all five sprayers in cotton and collected on water-sensitive paper were larger on the top than on the lower surfaces of leaves. Coverage was greater on leaf topsides than on undersides and in the top portion of the plant canopy. The air-assisted sprayer offered better coverage than other sprayers on the undersides of the leaves and good coverage on the topsides. The hydraulic nozzle sprayers deposited more spray material, measured by the leaf-wash method, on leaves at locations where the nozzles were directed. The air-assisted sprayer deposited spray material throughout the plant and on both leaf surfaces better than other sprayers did. Total net fluorescence on collector strings generally decreased from the top to the bottom of plants, and was highest where hydraulic nozzles directed spray. Sprayer methods influenced spray deposition and coverage in cotton canopies, and can be selected to provide improved application in the plant canopy where optimum coverage is needed.