

Performance of Different Spray Nozzles in the Application of Defoliant on Cotton Plants (*Gossypium hirsutum* L.)

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Abstract : Defoliant spraying is an important link in the mechanized cotton harvest because adequate and uniform spraying can improve defoliation quality and reduce cotton trash content. In defoliant application, application volume and spraying technology are extremely important. In this study, the effectiveness of defoliant application to cotton plant that has come to harvest with two different application volumes and three different types of nozzles with a standard field crop sprayer was determined. Experiments were carried in two phases as field area trials and laboratory analysis. Application rates were 250 l/ha and 400 L/ha, and spraying nozzles were (1) Standard flat fan nozzle (TP8006), (2) Air induction nozzle (AI 11002-VS), and (3) Dual Pattern nozzle (AI307003VP). A tracer (BSF) and defoliant were applied to mature cotton with approximately 60% open bolls and samplings for BSF deposition and spray coverage on the cotton plant were done at two plant height (upper layer, lower layer) of plant. Before and after spraying, bolls open and leaves rate on cotton plants were calculated, and filter papers were used to detect BSF deposition, and water sensitive papers (WSP) were used to measure the coverage rate of spraying methods used. Spectrofluorophotometer was used to detect the amount of tracer deposition on targets, and an image process computer programme was used to measure coverage rate on WSP. In analysis, conclusions showed that air induction nozzle (AI 11002-VS) achieved better results than the dual pattern and standard flat fan nozzles in terms of higher depositions, coverages, and leaf defoliations, and boll opening rates. AI nozzles operating at 250 L/ha application rate provide the highest deposition and coverage rate on applications of the defoliant; in addition, BSF as an indicator of the defoliant used reached on leaf beneath in merely this spray nozzle. After defoliation boll opening rate was 85% on the 7th and 12th days after spraying and falling rate of leaves was 76% at application rate of 250 L/ha with air induction (AI1102) nozzle.

Keywords : cotton defoliant, air induction nozzle, dual pattern nozzle, standard flat fan nozzle, coverage rate, spray deposition, boll opening rate, leaves falling rate

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