

DRIFT MODELLING OF TWO DRONE MODELS ACCORDING TO THE FLIGHT HEIGHT

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Destaque: Some amount of deposited drift was found up to 64 m downwind in all treatments. The flight height was an important factor affecting drift.

Resumo: The aim of this work was to determine downwind drift of herbicide applications using two drone models at two flight heights. The method was based on the ASABE S561.1 (2009) standard. The deposited drift represents the particles deposited in the collectors (mylar cards) fixed at the distances of 2, 4, 8, 16, 32, 50 and 64 m from the edge of the sprayed plot. The trial was set up with at least five replications per treatment and the same plot was used to all applications. Applications were made with a DJI MG-1P (10 kg payload) and a DJI T-16 (16 kg payload) drone models, both equipped with Teejet nozzles (AIXR 110015) producing medium to coarse droplets and calibrated to 10 L/ha. The treatments were the combination of these two drones with two spray heights (2.5 and 5.0 m). Since all replications were sprayed in the same plot, in order to avoid contamination due to the several applications in the same area, a blank spray solution (without active ingredient) was used to simulate the solution with the herbicide, being a mixture of a modified seed oil at 15% v/v and a surfactant (Silwet - Momentive) at 0.05% v/v, in addition to a blue dye (6 g/L) used as a marker. The swath width was adjusted to 5 m for both models. After application the collectors were washed for spectrophotometry analysis. The data were submitted to regression analysis to adjust a drift decay curve and the power model ($y=ax^n$) was chosen. Spraying was restricted to time intervals with relative humidity above 50%, temperature below 30 °C and wind speed between 4 and 13 km/h. Results showed that some amount of drift deposited was found on the last collector (64 m) in all treatments. The flight height was an important factor affecting drift (more drift when spraying higher), and the DJI T-16 produced less drift nearby the sprayed areas if directly compared to the DJI MG-1P in all flight heights.

Palavras-chave: UAV; spray application; droplet spectra; aerial application; air induction nozzles