

Effect of cannon sprayer configuration and adjustment on spray deposit and ground drift in high-tunnel strawberry cultivation



Daniel Bondesan, Paolo Miorelli, Claudio Rizzi

Foundation Edmund Mach, Technology Transfer Centre, via E. Mach, 1 38098 San Michele all'Adige (TN) – Italy

Summary

Efficient spraying is essential for modern agricultural production to ensure biological efficacy and high-quality and abundant harvests. At the same time, it is crucial to minimize the negative impact of plant protection products on the environment. Hence, it is necessary to implement the appropriate technical and technological factors for the treatment and consider the conditions under which the spray application is carried out (Cieniawska et al., 2024).

The aim of this study was to evaluate the use of alternative application techniques, i.e., the reduction in application volume, the use of an electrostatic charger and air injection nozzles, in comparison to a standard cannon sprayer application in high-tunnel cultivation in Trentino (Northern Italy). To do this, paper collectors were placed along strawberry rows at different distances from the front openings of the tunnels, and the tunnels were sprayed with a tracer dye (tartrazine) using the mentioned application techniques to evaluate spray deposition. Moreover, some Petri dishes were placed at different distances outside the tunnel to estimate the ground deposit due to spray drift.

Deposits were similar for all the application techniques for the external part of the canopy. Inside the canopy, slight significant differences were found only for the deposits retrieved in the central part of the tunnel (Kruskal–Wallis test, $p < 0.05$). In this case, the electrostatic charged spray showed the highest average value of deposit, and the air injection nozzles marked the lowest. However, the ground deposit retrieved outside the tunnel for the electrostatic configuration was not different from most of the other equipment arrangements. The sprayer equipped with air injection nozzles showed significantly higher losses close to the tunnel and significantly lower losses starting from 3.5 m from the tunnel opening in comparison to the other sprayer configurations.

In general, these spray techniques, singularly or combined with one another, could be considered as alternatives to the reference spray practice in strawberries, and when put together, they may ensure better efficiency of applications and a reduction in negative environmental impacts.

