Investigation of the applicability of hand-held pesticide electrostatic sprayer

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Abstract

Hand-held pesticide electrostatic sprayers are introduced in Taiwan in recent years. The apparatus are claimed to enhance the droplet coverage on the target crop because the spraying droplet attached with negative charge, and the apparatus are applicable on all kinds of melons and fruit crops. In this study, we utilize electrostatic sprayers to investigate its applicability on the coverage and penetration of pesticide, control of melon diseases and the reduction of pesticide usage. We conducted the experiment on creeping growth melon in greenhouse. The results showed that the electrostatic sprayer has obvious effect on spray drift reduction, and the coverage of droplets on the leaf lower surface is improved. The vertical growth cucumber in greenhouse was used for further experiment. Our results showed that the electrostatic spraying droplet had better penetration ability on vertical growth crops, and electrostatic sprayers have potential for pesticide reduction. The electrostatic sprayer was also applied to spray 800 times of phosphorous acid mixed 200 times narrow range oil. The control rate of powdery mildew on cucumber was improved. However, the control rate of whitefly did not reveal significant difference when electrostatic sprayer was utilized. Furthermore, electrostatic sprayer was used to apply fertilizer, and the weight of cabbage leaf was improved. The weight of cabbage leaf was surveyed in the spring and autumn, 2018. In the spring survey, the average weight of single plant in electrostatic sprayer and traditional sprayer treatment were 1,098g and 797g, respectively. In the autumn survey, the average weight of single plant in electrostatic sprayer and traditional sprayer treatment were 1,328g and 978g, respectively. Our results show the potential of electrostatic sprayers to improve pesticide and fertilizer droplet coverage.

Key words : electrostatic sprayer、pesticide reduction、disease control、fertilizer

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