INFLUENCE OF SPRAY VOLUMES AND NOZZLES ON CONTAMINATION OF SPRAY OPERATOR IN GOLF COURSE

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Introduction

The use of pesticide to control pest of turf in golf course is a common practice. The pesticide is applied in the open area using application equipment such as a lever operated knapsack sprayer, tractor mounted boom sprayer and mist blower. one of the draws back in the application of the pesticides is contamination to spray operator. The pattern and degree of contamination depends on type and height of the crop. In the field, the contamination occurs from chest to feet (Lee and Chung, 1985). Lee et al. (1991) suggest that type of nozzle influence the contamination on spray operator. The earlier studies on spray contamination were conducted in agriculture crops. Little information is available on contamination of spray operator in the open area such as golf course. The study determined the influence of spray volumes and types of nozzle on the contamination of spray operator applying pesticide in golf course.

Materials and Methods

Evaluation was conducted at the golf course of Universiti Putra Malaysia, Serdang, Selangor. Spray operators were asked to apply spray solution to the target as though it was a normal pesticide solution. The spray solution contained 0.01% (w/v) of fluorescent tracer. Cotton linens (4x4 cm) were attached to various parts of spray operator. The spray volumes were 100, 200 and 300 L/ha and they were obtained using Crossmark multiple cone nozzle of brown, red and yellow colour respectively. Similar spray volumes were obtained using drift guard Teejet fan nozzle of 110015VS, 11004VS and 11005VS. Following spraying, the cotton linens were collected for the operator and the fluorescent was extracted using the method of Richardson (1989). The experimental design was split plot design with 4 replicates for each treatment. Data were subjected to ANOVA and means were separated by DMRT.

Results and Discussion

The spray volume did not influence the contamination on the spray operator. No significant different was observed between spray volumes of 100, 200 and 300 L/ha when sprayed either with the multiple cone nozzles or the drift guard nozzles. However, difference degree of contamination was observed on various parts of the operator with the highest being on the feet followed by lower leg and thigh. When the contamination between the multiple cone nozzles sprayed at 100 and 300 L/ha was compared with the drift guard fan nozzle sprayed at similar volumes, the former showed significantly higher degree of contamination compared with the later. This could be due to the cone nozzle produces smaller droplets compared to the fan nozzle. The volume median diameter of the Crossmark multiple cone nozzle of brown, red and yellow was 140, 128 and 128 µm respectively while for drift guard Teejet fan nozzle of 110015VS, 11004VS and 11005VS was 397, 490 and 516 µm respectively. Small droplets are liable to drift due to their low terminal velocities compared with bigger droplets. It is expected that small droplets would cause higher degree of contamination to the operator. It is estimated that spraying at 300 L/ha using the multiple cone nozzle caused ca 5X higher level of contamination compared with the drift guard fan nozzle. Nevertheless, the degree of contamination between the multiple cone nozzle and the drift guard nozzle was reduced to ca 2X when spraying at 100 L/ha. The degree of contamination on the various parts of the operator again showed similar result as the earlier experiment.

Conclusions

The study shows that spray operator contamination could be reduced by using the drift guard fan nozzle instead of the multiple cone nozzle.

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