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Diazinon and Chlorpyrifos in the Air of Moving and Stationary Pest Control Vehicles[1,2]

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Pest control firms often use pickup trucks as service vehicles on pest control routes. Pesticides are transported in the pickups, both as concentrates and dilutions. WRIGHT & LEIDY (1980) reported on insecticide levels in the ambient air of cabs of moving pickups. The amount of insecticide present in the air of cabs of stationary pickups being used as pest control service vehicles has not been reported; therefore, a study was initiated to determine the amount of diazinon and chlorpyrifos in the cabs of stationary pickups. Additional air samples, taken while the same pickups were moving, provided data for comparison of insecticide levels in individual pickups when moving and stationary.

METHODS

Ambient air samples were taken in the cabs of six different model and year pickup trucks used daily by commercial pest control firm technicians.

Insecticide containers in all of the pickups were located in a utility box attached to the truck bed. The 3.8L compressed air sprayers used by two technicians were kept in the cabs of the pickups overnight while the others were kept in the utility boxes. Diazinon emulsion (1%) was kept in the compressed air sprayers and used in servicing accounts during the technician's workday.

Before the start of the technician's work schedule, two battery operated Monetaire Model-S air samplers were positioned in the cab of the pickup. Air samples were collected in the manner described by WRIGHT & LEIDY (1980). One air sampler was located on the seat, between the pest control technician and the researcher who operated the sampler. The sampler's inlet tube was fastened to the pickup cab's back window or the top of the seat, with the orifice of the inlet tube within 46 cm of the technician's head. The other sampler was located on the floor between the pest control technician and the researcher, with the orifice of the inlet tube

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attached to the dash area of the cab. The sampler whose inlet tube was located near the technician was activated when the technician first entered the vehicle in the morning and turned off each time he left the vehicle throughout the day. The other sampler was turned on when the technician left the vehicle and turned off while he was in the vehicle. The flow rate for the samplers was 2.8ℓ/min.

RESULTS AND DISCUSSION

Service technicians averaged 2.72 and 4.85 h in and out of their vehicles, respectively, during a workday (Table 1).

Table 1. Service technician's time (h) in and out of the service vehicle during one day.

Technician	In	Out	Technician	In	Out
1	2.20	2.50	4	2.38	3.97
2	3.82	5.98	5	3.07	5.67
3	3.03	4.80	6	1.80	5.97
			$\bar{x}$	2.72	4.85

The mean temperature in the pickups was 21°C (s.d. ± 3). There was no correlation between the temperature in the pickup's cab and the amount of insecticide detected in the ambient air (Table 2). Moving pickups with the sprayers left in the cabs overnight had no more diazinon in the ambient air than those with the sprayers removed. The reason for the no difference, which varied from an earlier finding (WRIGHT & LEIDY 1980), may have been due to the large amount of diazinon detected in pickup 3 or possibly because diazinon was used by the technicians while in the earlier study chlorpyrifos was used.

Table 2. Diazinon and chlorpyrifos detected in pickups in a 2 h period.[a]

		Amount detected ($\mu g/m^3$)			
		Diazinon		Chlorpyrifos	
Pickup	Temp. (C)	Moving	Stationary	Moving	Stationary
1[b]	19	2.10	0.55	0.59	0.28
2[b]	19	2.11	0.34	1.00	0.17
3[c]	17	5.15	2.05	0.26	0.19
4[c]	21	0.93	0.71	0.44	0.34
5[c]	25	0.58	0.43	0.42	0.14
6[c]	26	1.55	0.96	0.71	0.44
$\bar{x}$	21	2.07	0.84	0.57	0.26

[a]Significantly (1% confidence level) more diazinon than chlorpyrifos and more insecticide in the moving than the stationary vehicles.

[b]Compressed air sprayer kept in the cab of the pickup overnight.

[c]Compressed air sprayer not kept in the cab of the pick-up overnight.

Diazinon was present in significantly (1% level) greater concentrations than chlorpyrifos. This may be attributable to the fact that the service technicians kept diazinon in the sprayers during the sampling periods and that they used it in servicing accounts during the sampling day and it could have contaminated their clothing and skin and passed into the air when they were in the pickups. The presence of chlorpyrifos in the ambient air may have been related to earlier use of the insecticide by the service technicians, even though it was not being used during the period of air sampling. Further, more insecticide was detected (1% level) in the air samples taken while the vehicles were moving. This difference was probably related to greater air movement within the cabs of moving vehicles. However, insecticide detection ratio levels for moving and stationary were not constant between vehicles. This might have been due to vehicle construction, with some of them having more cracks and crevices, which could allow a greater movement of air and insecticide than in those with fewer cracks and crevices when the vehicles were moving.

Insecticide levels present in the vehicles were compared with the threshold limit values (TLV) of the AMERICAN CONFERENCE OF GOVERNMENT INDUSTRIAL HYGIENISTS which are standard for respiratory exposure in work situations. The TLV for diazinon is 100 $\mu g/m^3$ for an 8 h workday. The maximum diazinon detected was 5.15 $\mu g/m^3$ for a 2 h period or 20.6 $\mu g/m^3$ for an 8 h period which is about 1/5 of the allowable limit. However, the amount of airborne diazinon to which a technician was actually exposed during a workday was even less than this 20.6 $\mu g/m^3$, since the maximum time any technician spent in a pickup was 3.8 h.

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