Toxicity to Tylenchorhynchus dubius and Hoplolaimus galeatus of Newly Unwrapped Plastic Containers

P. M. MILLER

Preliminary observations indicated that nematodes in plastic containers sometimes had unexpectedly poor survival when the containers were from newly opened packets, suggesting that volatile or soluble toxic substances might be responsible. The following controlled experiments were designed to test the possibility. *Tylenchorhynchus dubius* (Butschli) Filipjev and *Hoplolaimus galeatus* (Cobb) Thorne were isolated from bluegrass turf (*Poa pratensis* L). Five-ml portions of water containing 67 *T. dubius* and 94 *H. galeatus* were dispensed into each of 20 containers including 10 × 60-mm polystyrene petri dishes (Falcon Plastics, Los Angeles, California)

Received for publication 28 February 1978.
Plant Pathologist, Department of Plant Pathology, Connecticut Agricultural Experiment Station, New Haven, Connecticut 06504.

just removed from their polyethylene wrapping. Ten containers were left unwrapped, and ten were rewrapped and sealed. Three types of polystyrene containers were used: petri dishes, cups, and pill vials. Survival in polystyrene containers and glass petri dishes was compared after 24 h (Table 1).

Survival of *T. dubius* was excellent in glass petri dishes but poor in polystyrene ones newly removed from their wrappers, especially if they had been returned to their polyethylene wrappers. Survival was much better in plastic petri dishes that had been unwrapped for some time.

Survival was better in polystyrene cups of 4 × 4 cm (Premium Plastics, Inc., Chicago, Illinois) and polystyrene vials of 2.25 × 6.25 cm (Owens-Illinois Glass Corporation, Toledo, Ohio) than in polystyrene petri dishes all freshly unwrapped. Survival in these containers was much lower if they were rewrapped in their polyethylene wrappers within 5 minutes.

Survival of *H. galeatus* followed a similar pattern, although with some indication that it was less sensitive to the treatments.

It is reasonable to assume that volatile substances from the plastic containers, such as PCB (polychlorinated biphenyls) are toxic to nematodes and are responsible for the association of poor survival with such containers. This conclusion is supported by the observation that water left in plastic petri dish wrappers for 24 h is toxic. Survival of *T. dubius* and *H. galeatus* was only 10% and 30%, respectively, after 24 h of exposure to such an extract in glass petri dishes. The dishes contained no PCB, but the Analytical Chemistry Department of this Station found 9 ppm PCB in the wrappers. Fifty μg/g of PCB killed 45% of *T. dubius* and 35% of *H. galeatus* in 48 h.

To avoid these toxic effects, plastic containers should be left to aerate for several days after removal from the plastic bag.

TABLE 1. Survival of nematodes after 24 h of incubation at 22 ± 3C in 5 ml of water in wrapped or unwrapped containers.

Container	Percentage of nematodes surviving			
	Tylenchorhynchus dubius		*Hoplolaimus galeatus*	
	Trial 1	Trial 2	Trial 1	Trial 2
Glass petri dish	90 a[z]	81 a	82 a	71 a
Plastic petri dish				
Unwrapped, 10 days before use	83 a	74 a	78 a	70 a
Unwrapped, 5 min before use	42 b	36 b	75 a	66 a
Unwrapped 5 min, then rewrapped after nematode addition	21 c	18 c	50 b	42 b
Plastic cup				
Unwrapped 10 days before use	90 a	78 a	96 a	84 a
Rewrapped after nematode addition	25 c	31 b c	70 a	57 a b
Plastic pill vial				
Unwrapped 10 days before use	84 a	92 a	92 a	78 a
Rewrapped after nematode addition	52 b	48 b	38 b	31 b

[z]Averages of 5 replicates. Averages in each column followed by same letter not different from each other (P = 0.05) by Duncan's New Multiple-Range Test (P = 0.05).