

An Assessment of the Risks Associated with Pesticides Volatilized and Dislodged from Golf Turf

University of Florida

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Objectives:

1. *Identify by survey golfer practices and habits which lead to exposure from dislodged pesticides.*
2. *Quantify the amount of various pesticides dislodged, volatilized, and transferred during play.*
3. *Characterize the risk incurred by pesticide exposure while playing golf.*

Following laboratory studies to verify methodology, the concentration of ethoprop, fonofos, and isofenphos in air following application to a golf course fairway was determined. Although the weather was cloudy and rainy during the study, appreciable airborne pesticide residue was observed over a three-day measurement period. The highest concentration was found for ethoprop ($20 \mu\text{g m}^{-3}$ on day 2). Fonofos had a maximum concentration of $5.9 \mu\text{g m}^{-3}$ on day 2, and isofenphos was $1.0 \mu\text{g m}^{-3}$ on day 3. Although there was a general trend for increasing concentrations of ethoprop on the morning of the second day after application and a decline thereafter, trends were less evident for the other two pesticides. The study will be repeated in 2000, and an assessment of risks to golfers from inhalation of these pesticides will be conducted using available US EPA chronic reference dose data. An assessment using isazophos volatilized residues data from two previous studies indicated values exceeding the US EPA chronic reference dose for 18 to 19 hours after application. Of course, this assessment assumes inhalation of the residues by a golfer playing every day for 70 years. For a more realistic assessment, the risk can be reduced in proportion to the actual amount of exposure. A series of pesticide dislodgeability studies were conducted to evaluate the risks associated with golfer exposure to dislodged pesticides as a result of application to greens. The work, which was performed by Mr. Raymond H. Snyder as part of a master of science degree program at the University of Florida, involved 2,4-D. Dicamba, isazofos, chlorpyrifos, and fenamiphos. The full report of this work is contained in his M.S. thesis.

Generally, the amount of pesticide dislodged decreased with time after application, and was greatly reduced following irrigation. By combining the data, risk assessment calculations could be made for various scenarios. The lowest risks were found for dicamba and chlorpyrifos. Even for fenamiphos, the pesticide from the group that posed the greatest risk from dislodgeable residues, little risk was calculated for a golfer who plays the day after pesticide application and irrigation.