Abstract: Farmworkers and their families may experience increased exposure to agricultural pesticides in their home due to track-in on work apparel, as well as pesticide spray drift and wind-driven resuspension of pesticide-contaminated soil particles from nearby fields. Previous interventions to reduce in-home pesticide levels have mainly focused on behavioral changes to reduce track-in to the home on shoes, clothes, and skin. Although some of these interventions successfully changed farmworkers' behaviors, they were not effective at reducing the level of pesticides in house dust or in the urine of farmworkers and their children. It is possible that past interventions were not targeting the primary exposure pathway. The aim of this study is to predict the relative contributions of the soil track-in versus the air infiltration pathway of pesticides into house dust using a contaminant transport model. Outdoor air, soil, and house dust samples collected from homes in agricultural community and analyzed for pesticides permethrin and bifenthrin. The contaminant transport modeling framework uses a series of mass-balance differential equations to simulate outdoor air particle infiltration into the home through ventilation, doors, and windows, along with outdoor soil transport via track-in on people and pets. Results suggest that air infiltration accounts for over 90% of the total contribution of both permethrin and bifenthrin in house dust, while soil track-in is limited to less than 10% of the total contribution. Therefore, air infiltration is likely the primary exposure pathway and may explain why previous interventions that focused on preventing track-in did not significantly reduce in home pesticide levels. Future interventions should target the air infiltration pathway in order to decrease pesticide exposures to farmworker families in their homes.

Keywords: B-pesticides, D-community, C-indoor

We-S-D3-05

Evaluation of new technologies to reduce drift and pesticide-related illness among tree fruit orchard workers

E. J. Kasner, M. G. Yost, K. Galvin, J. G. Pouzou, R. A. Fenske; University of Washington, Seattle, WA

Abstract: The airblast sprayer has been a standard tool for tree fruit pesticide application technology since its rapid and wide scale adoption in the 1950s. Present-day orchard management practices have greatly altered tree architecture. As a result, traditional airblast sprayer output no longer matches modern canopies and thereby increases drift potential. A pilot study was designed to identify methods that compare the ability of different spray technologies to minimize worker exposure to pesticide drift. Three spray trials tested whether postharvest foliar application of micronutrient tracers—zinc (Zn), molybdenum (Mo), and copper (Cu)—could be collected on a grid of 111 passive sampling targets and later recovered in a sensitive mass spectrometry procedure. Target matrices made of low-density-polyethylene (LDPE) plastic, chromatography filter paper, and pipe cleaners were placed at regular intervals in horizontal and vertical planes near an orchard block that was sprayed with label-recommended concentrations of Zn (895 µg/ml), Mo (21.3 µg/ml), and Cu (880 µg/ml). Geometric mean depositions of Zn on LDPE and filter paper (186 and 169 ng/cm^2, respectively) were larger than those for Mo (2.7 and 2.0 ng/cm^2). Coiled wire cores of pipe cleaners interfered with metals analysis and Cu was not easily extracted from filter paper. Average wind speed at the time of application ranged from 2.7 to 3.7 m/s. Horizontal deposition profiles for Zn and Mo indicated a negative correlation between mass recovered and downwind distance of target from the orchard (Adjusted R^2: 0.66-0.83). Vertical deposition profiles generally decreased with sampling height and distance from the orchard. The ratio of mass recovered to the limit of quantification for Zn (LDPE: 71, filter paper: 20) and Mo (LDPE: 35, filter paper: 66) demonstrated that it is possible to increase sampling distance. Future comparative studies will include additional sprayers, active air sampling methods, and cascade impactors.

Keywords: B-pesticides, A-sampling methods, C-air, D-occupational

We-O-E3: Sensors - III

We-O-E3-01

An Aerosol Sampler to Estimate Total Deposition of PAH within the Human Respiratory Tract

K. Koehler[1], P. Herckes[2], A. Newton[1]; [1]Johns Hopkins University, Baltimore, MD, [2]Arizona State University, Temp, AZ

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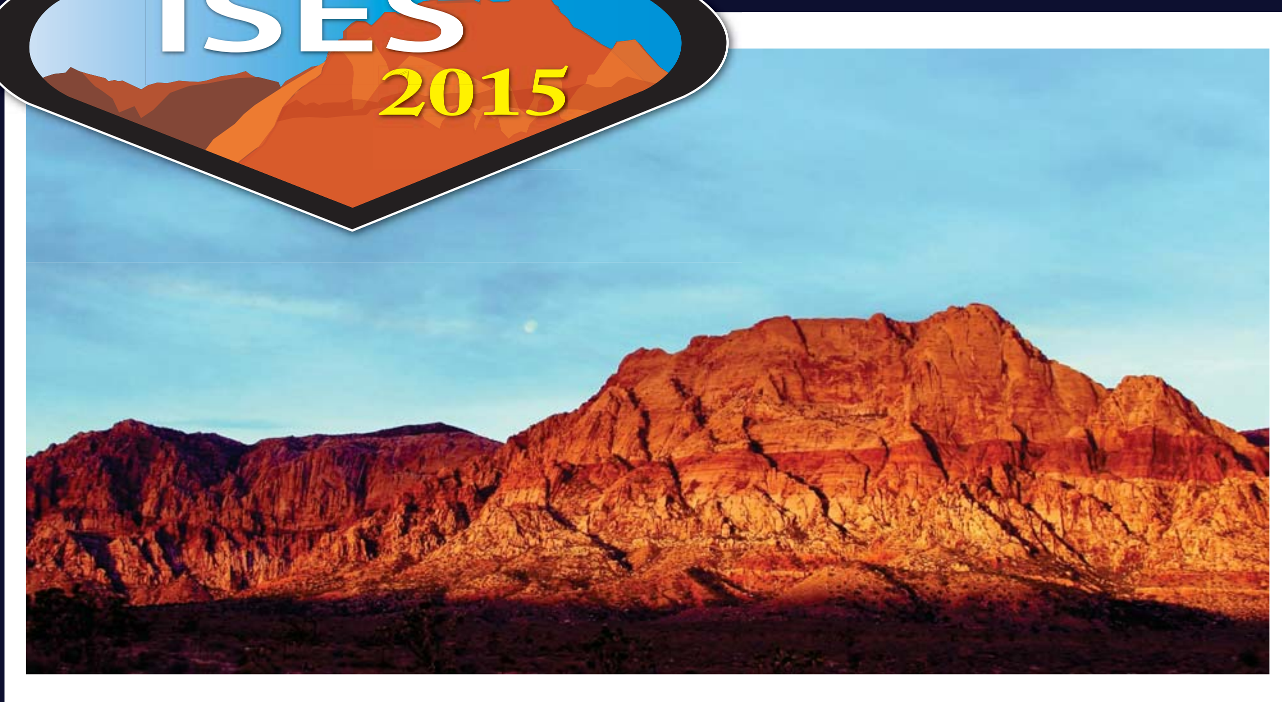

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