Insecticide Runoff from Homes Treated for Ant Infestations

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Summary

Insecticides are commonly used for ant control around residential homes, but post-treatment runoff may contribute to contamination of surface water in urban watersheds. Here we report the runoff of insecticides from single family residences after applications were completed. We have looked at applications of pyrethroids and fipronil under a variety of conditions. Many standard practices for using these compounds gives runoff high enough to be toxic to sensitive aquatic organisms. The most effective means for reducing runoff of both classes of insecticides is to not treat on or near the driveway or sidewalks.

Materials and Methods

Treatments. Perimeter treatments refer to sprays applied to the outside house walls and adjacent ground. Spot treatments refer to spray applications only where ants are seen anywhere on the property.

Sprays were applied with a 19-L backpack sprayer. House perimeter sprays were applied 30 cm up and 30 cm out from the foundation. Houses were treated with either Termidor SC® (0.06% fipronil), Talstar One® (0.06% bifenthrin), 0.1% cyfluthrin (Cy-Kick®), or 0.2% Talstar® bifenthrin EZ Granules® (FMC).

Water collection. We have used two types of water dams to collect samples at homes. In our first trials a Styrofoam dam was used to collect the water runoff at the curb (see Fig. 1). Our newer dam consists of soft foam glued onto hinged wooden two-by-fours that unfolds to nearly the entire width of the driveway to collect samples there (Fig. 2).

Fig. 2 (left). Styrofoam dam at curb. **Fig. 3** (right). Styrofoam on hinged 2 by 4 boards that extend almost 14 ft to collect water on driveway

Research Highlights

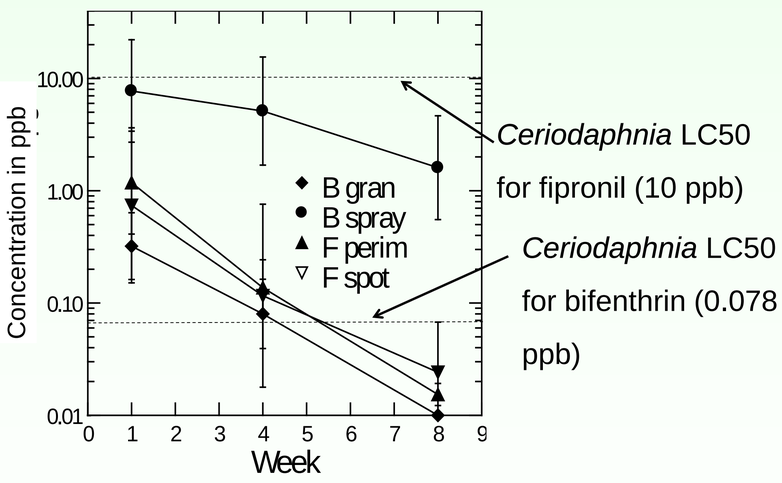

Figure 3. Runoff of **bifenthrin** and **fipronil** around houses. The bifenthrin perimeter and spot spray had the highest runoff (exceeding LC_{50} for *Ceriodaphnia*), granular bifenthrin the lowest, fipronil intermediate. These results were from irrigation runoff down the driveway and into the street.

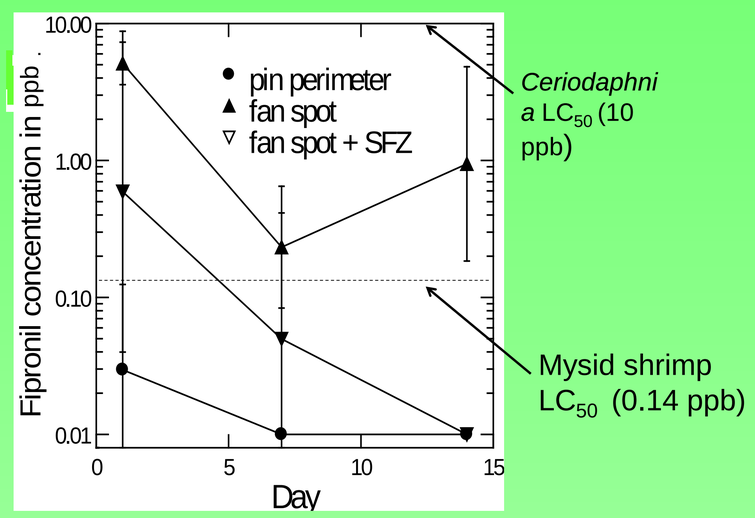

Figure 4. Attempts to mitigate runoff of **fipronil** around houses. Pin= pin steam application (5.1 cm band); fan=fan spray; spot=spot treatments where ants were seen; SFZ=spray-free buffer zones, 4.6 m from the street and 1.5 m from the sidewalks and the driveway. Day 14 was a driveway flush.

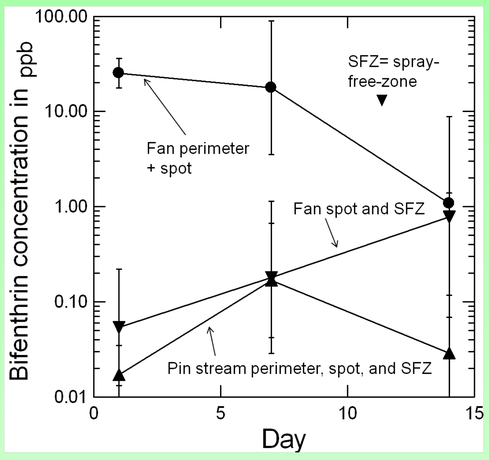

Figure 5. Attempts to mitigate **bifenthrin** runoff. The fan perimeter + spot spray had the highest runoff; the fan spot + no-spray zones had lower runoff; the pin stream perimeter + spot + SFZ the least runoff. Day 14 was a driveway flush.

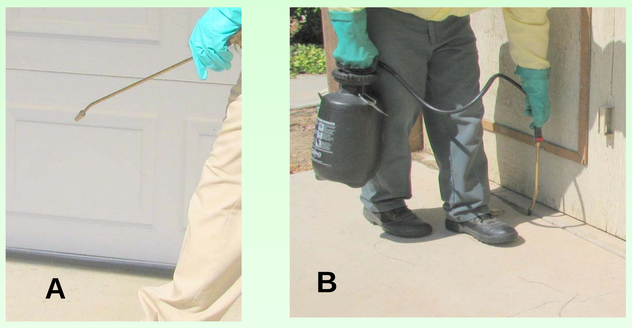

Figure 6. (**A**) Pin stream application of **fipronil** at the base of the garage door (Protocol 1). (**B**) Crack and crevice application of **fipronil** directly into the expansion joint next to the door (Protocol 2). The latter technique reduced runoff by an order of magnitude (see Fig. 7).

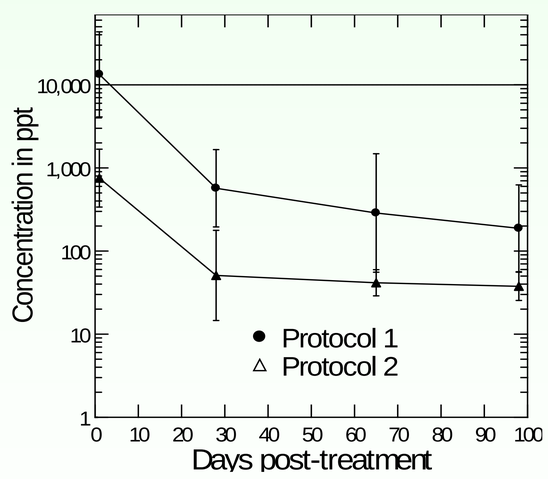

Figure 7. Fipronil runoff from homes pictured in Fig. 6. Protocol 2 was the crack and crevice application into the expansion joint. All samples were collected using a driveway flush.

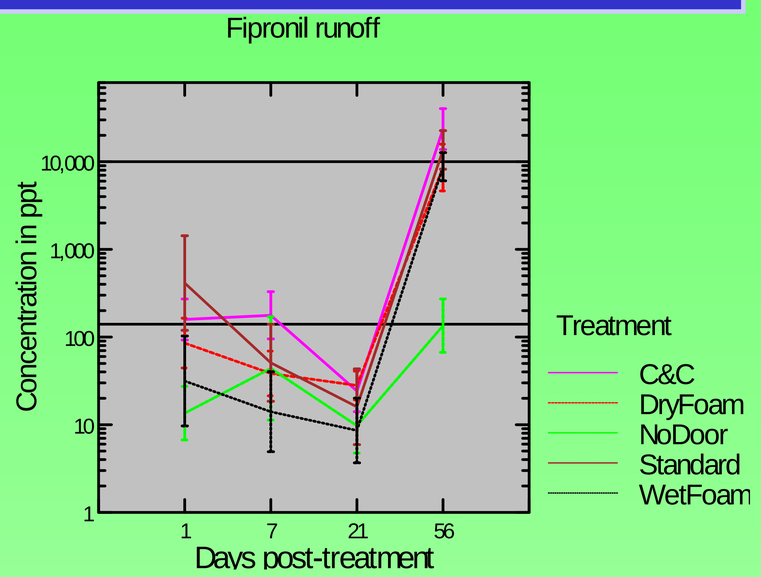

Figure 7. Efforts to limit **fipronil** runoff. Standard=one ft. up and one ft out from foundation; C&C=crack and crevice and pin stream**;** NoDoor = no treatment at garage door. Day 56 was a driveway flush. Wet and dry foam perimeter applications were also made. **Not treating the driveway gave significantly less runoff than all other treatments.**

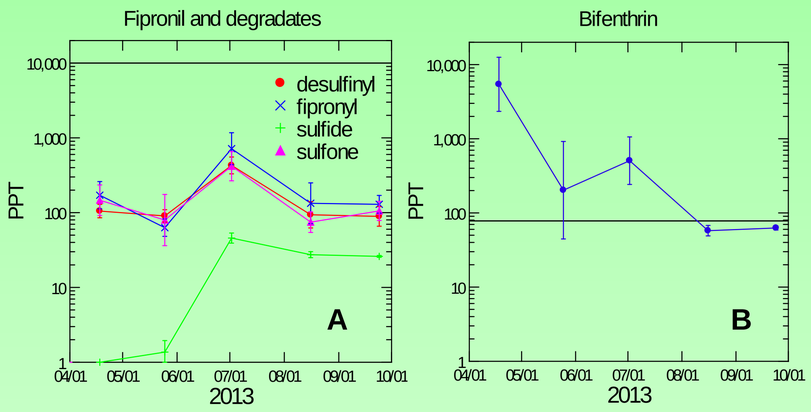

Figure 8. (A) Runoff of **fipronil** and degradates with driveway untreated. **(B)** Much higher runoff of **bifenthrin**, also with driveway untreated. Both treatments had buffer zones between treatments and driveway. Driveway flush done for all samples.

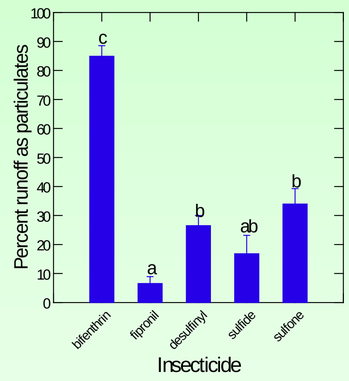

Figure 9. Runoff of **bifenthrin** and **fipronil** as percent particulate vs. liquid phase. Much higher bifenthrin runoff as particulates may help explain why a buffer zone is less effective than with the fipronil and its degradates. Driveway flush done for all samples.

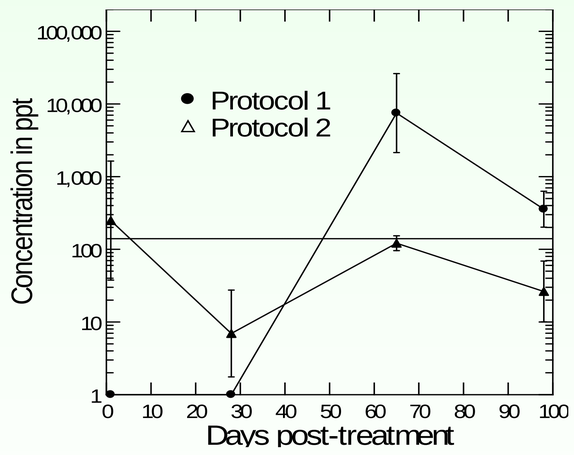

Figure 10. Application of the pyrethroid **cyfluthrin** around homes. Protocol 1 applied it on day 63 as a foundation perimeter treatment and as a pin stream at the driveway and the edge between the lawn and driveway. Protocol 2 used cyfluthrin more sparingly at day 0 as spot or crack and crevice treatments on the lawn and at the lawn edge. Driveway flush done for all samples.