

# Residual Activity of Insecticide on Wooden and Plastic Pesticide-treated Spheres

Bradley Chandler and Ronald Prokopy

*Department of Entomology, University of Massachusetts*

To date, all tests of pesticide-treated spheres (PTS) for control of apple maggot flies (AMF) in commercial apple orchards in Massachusetts have been conducted using spheres made of solid wood. As of spring 2001, wooden spheres in the form in which they have been purchased and sold by commercial pest management supply companies for the past three decades (rejected croquet balls) no longer are manufactured. Hence, if PTS capped by discs of sugar and wax are to remain viable as a potential means of controlling AMF (see preceding article) then an alternative to wooden PTS must be found. For several years, Great Lakes IPM of Vestaburg, Michigan has been producing and marketing durable hollow plastic spheres for coating with Tangletrap and use in monitoring populations of AMF. Such plastic spheres (or a similar type) are the most likely spheres to be used for future control of AMF by sugar-capped PTS.

Here, we report on studies conducted in 2001 evaluating the residual activity of insecticide in paint applied to wooden and plastic spheres.

## ***Materials & Methods***

Wooden spheres were the same 3.25-inch diameter spheres that we have had on hand and have been using for several years in our studies on sugar-capped PTS. Plastic spheres were 3.5 inches in diameter and purchased from Great Lakes IPM (marketed as “reusable red ball traps”). Before painting, plastic spheres were shaken in a container of sand to roughen the surface. Preliminary testing showed that paint containing insecticide tended to chip off of non-roughened plastic spheres. In addition to clean-surface wooden spheres and roughened-surface plastic spheres, we also evaluated wooden spheres that had been treated

in 2000 with a coating of latex paint containing 2% (a.i.) imidacloprid (Provado) and exposed for 12 weeks in commercial orchards in 2000. These spheres were not cleaned before application of paint and insecticide in 2001. Rather, they were partially covered with sooty mold that grew on sugar on the sphere surface during field exposure in 2000.

All spheres received a single coating of black latex paint containing 4% (a.i.) imidacloprid (Provado) before deployment. The only exception was control spheres, which received paint but no insecticide. Half of the pesticide-treated wooden and plastic spheres received 20% sugar (sucrose) in the mixture applied to the sphere surface. The remaining half received no sugar in the paint. Addition of sugar to the paint mixture assures presence of sugar on the sphere surface at the time of sphere deployment, but could result in a tendency of paint to deteriorate or chip off during field exposure.

In early July, all spheres were hung from branches of apple trees in an unsprayed section of the Horticultural Research Center in Belchertown. Spheres remained in place for 12 weeks, when they were returned to the lab for evaluation of residual toxicity of insecticide. For this, we applied a 20% sucrose solution to the surface of each sphere to stimulate fly feeding and then exposed 10 AMF individually to two spheres of each type. Flies were allowed to remain on a sphere for up to 10 minutes, after which they were transferred to clean cups with food and water. Mortality was measured at 72 hours.

## ***Results***

Data presented in Table 1 show that 90-100% of AMF exposed to each type of wooden or plastic PTS

Table 1. Mortality of AMF after exposure to wooden or plastic PTS. All PTS were exposed on unsprayed apple trees for 12 weeks before testing.

Sphere	Sphere surface clean when paint applied	Paint contained 20% sucrose when applied	AMF mortality (%) 72 hours after exposure
Wooden	Yes	No	100
Wooden	Yes	Yes	100
Wooden	No*	Yes	90
Plastic	Yes	No	90
Plastic	Yes	Yes	100
Control	Yes	No	0

\* Uncleaned spheres used in commercial orchards in 2000.

died as a consequence of feeding on the sphere surface. During the 12-week period of field exposure, 10.7 inches of rain fell on the spheres.

### Conclusions

Our findings indicate that latex paint containing 4% (a.i.) imidacloprid applied to plastic spheres (after roughening of the sphere surface) conferred an amount of residual toxicity to AMF essentially equal to that of the same mixture applied to wooden spheres, and did so after 12 weeks of field exposure to 10.7 inches of rainfall. Our findings also indicate that addition of 20% sucrose to the paint-pesticide mixture did not detectably affect residual activity of paint or pesticide.

Finally, we found that it is not necessary to clean spheres prior to repainting with latex paint and insecticide in order to obtain a high level of mortality of alighting AMF.

Together, these findings pave the way for substitution of durable plastic spheres for wooden spheres in the pursuit of effective PTS for controlling AMF.

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