

by weight of polymer. Specifically, devices made from thermoplastic polymers and deltamethrin and lambda-cyhalothrin contained 3 percent of carbon black. The devices made from the remaining pesticides and thermoplastic polymers contained 7 percent of carbon black.

The devices made from S-113 urethane (a thermoset polymer) were made from a polymer mix containing 60% S-113, 40% castor oil and 5% of TIPA catalyst by weight. The polymer mix comprised 90% of the total weight of the device. The pesticide, deltamethrin, comprised the remaining 10% of the device. No carbon black was used in this device. The polymer/pesticide mixture was cast, using a spin caster into a 1/8 inch thick sheet and heated at about 60° C. for about 40 to 60 minutes to cure the cast sheet.

One inch squares were then cut from the 1/8 inch thick sheets that were injection molded or cast and the squares were tested for release rates. The following release rates were obtained:

TABLE 3

Release Rates for Pesticide/Polymer Combinations		
Pesticide (10 wt%)	Polymer	Release Rate
Deltamethrin	S-113 urethane	25.2 µg/cm ² /day
	Aromatic 80A	16.8 µg/cm ² /day
	pelletane 2102-80A	8.8 µg/cm ² /day
	pelletane 2102-55D	8.0 µg/cm ² /day
	Alipmtic PS-49-100	7.2 µg/cm ² /day
Cypermethrin	polyurethane 3100	0.4 µg/cm ² /day
	polyurethane 2200	0.7 µg/cm ² /day
	EVA 763	27.3 µg/cm ² /day
Lambda-cyhalothrin	Polyethylene MA7800	4.6 µg/cm ² /day
	polyurethane 3100	0.7 µg/cm ² /day
	polyurethane 2200	2.0 µg/cm ² /day
	EVA 763	20.6 µg/cm ² /day
Tefuthrin	Polyethylene MA78000	5.2 µg/cm ² /day
	polyurethane 3100	6.4 µg/cm ² /day
	polyurethane 2200	25.0 µg/cm ² /day
	EVA 763	40.4 µg/cm ² /day
Permethrin	Polyethylene MA78000	27.0 µg/cm ² /day
	polyurethane 3100	1.4 µg/cm ² /day
	polyurethane 2200	1.3 µg/cm ² /day
	EVA 763	28.5 µg/cm ² /day
	Polyethylene MA78000	4.0 µg/cm ² /day

Example 4

An experiment was conducted to determine the effect of lambda-cyhalothrin (pyrethroid) concentration and insecticide/polymer combination on release rate of insecticide from the polymer. The data are summarized in Table 4.

TABLE 4

Release Rate for Polymer/Pyrethroid Concentration Combinations		
Polymer	Pyrethroid Conc. (wt %)	Release Rate (mg/cm ² /day)
Ethylvinyl Acetate (EVA)	1	0.3
	5	2.2
	10	2.5
Polyurethane	1	0.9
	5	4.4
	10	8.3
Polyurethane/EVA (50/50)	1	2.6
	5	7.2
	10	9.1

Example 5

An experiment was conducted to determine the effectiveness of the exclusion zone against termites. Two species of

termite were selected for the tests, Eastern subterranean termite because it is the most common, and Formosan subterranean termite because it is the most aggressive.

Test cells were assembled with glass containers. Wood shavings were placed in the bottom of the containers. Insecticide impregnated polymer was placed over the wood chips in a manner that no path or opening existed from above the impregnated polymer to the wood chips. A nutrient free auger was placed above the impregnated polymer. The surface of the auger was the zero datum and the impregnated polymer was mounted at a distance of 5 cm below the surface of the auger. Termites were placed on the surface of the auger and their progress through the auger toward the impregnated polymer noted each day.

The impregnated polymer combinations are shown in Table 5a.

TABLE 5a

Release Rate for 10 wt % Pyrethroid		
Polymer	Pyrethroid	Release Rate (mg/cm ² /day)
Ethylvinyl acetate	Permethrin	3.9
	Polyethylene	1.4
	Tefuthrin	4.3
	Tefuthrin (2 wt % fatty acid)	3.2
Polyethylene	Tefuthrin	2.2
	Tefuthrin (2 wt % fatty acid)	2.0

Controls having no pyrethroid in a polymer barrier were also used. Results are shown in FIG. 21 and FIG. 22. In all controls, the termites ate through the polymer and obtained access to the wood chips. The rate of access through ethylenevinyl acetate was slower than for polyethylene. It is believed that the poor taste of vinyl may have slowed their progress. For all impregnated polymers, there was no penetration. Because the Formosan subterranean termites are so aggressive, they came closer to the impregnated polymer than the less aggressive Eastern subterranean termites. In fact, the polyethylene with permethrin suffered mandible marks from the Formosan termites, but no holes or penetration. After about 12-14 days, even the Formosan termites were discouraged by the release of insecticide and retreated from the impregnated polymer.

CLOSURE

From the foregoing description one skilled in the art can easily ascertain the essential characteristics of this invention and without departure from the spirit and scope of the invention thereof can make changes and modifications of the invention in order to adapt it to the various usages and conditions. It is intended that the scope of the invention be defined by the following claims including all equivalents which are intended to define this invention.

We claim:

1. A method of making an insect barrier comprising the following steps:
 - a. mixing a low volatility insecticide with a polymer having a high or medium density, as a first polymer;
 - b. mixing a higher volatility insecticide with a polymer having a low density as a second polymer;
 - c. combining the first and second polymers into a shaped controlled release device.
2. The method of claim 1 wherein the step of incorporating an insecticide with a polymer includes adding a filler.