# Evaluation of Non-Chemical Deterrents to Repel Slugs

Lindsey Okumura, Aimee Taniguchi, and Jari Sugano
University of Hawai`i at Mānoa
College of Tropical Agriculture and Human Resources
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Slugs and snails cause economic crop damage to commercial edible crops. These agricultural pests also serve as vectors for Angiostrongyliasis, or Rat lungworm disease. Rat lungworm is a significant concern as it causes eosinophilic meningitis or gastrointestinal and central nervous system disease in humans (Lindo et al. 2002). There has been an increase in the number of individuals contracting Rat lungworm in Hawaii. An integrated pest management approach to managing vectors of the Rat lungworm disease in gardens and on farms includes, managing habitats with changing environmental conditions, utilizing cultural and physical controls such as handpicking slugs and snails, using slug jugs, barriers, rat traps, field sanitation, electric shock, etc., using tolerant crop varieties, encouraging natural predators, and proper rotation of approved crop protection chemicals.

Aquaponic and hydroponic growers requested non chemical control options for slugs and snails to retain their organic certification. These unique growing systems are often moist, humid and serve as an ideal habitat for slugs and snails. New formulations of iron phosphate baits are approved for use in many agricultural crops. These baits are an effective tool in organic and non-organic systems. However, growers requested assistance in deterring slugs and snails from climbing up hollow tile legs commonly used in raised bed systems, using a non-chemical approach.

In 2018, various barrier materials (copper wires and mesh, aluminum flashing, hydrophobic paints, etc.) were tested at the Waimanalo Research Station. Our objective was to find an affordable and effective slug and snail deterrent (photo 1 &2).


Of all the materials tested, copper tape was the most efficacious barrier when placed on vertical surfaces. A 2” strip of copper tape was wrapped around the center portion of the hallow tile block. Slugs were placed on the bottom of the tile and observations were made as they moved up the tile. Ten different slugs were used for each trial. Two slugs were placed on the bottom of the tile at a same time. No slugs crossed the 2” copper barrier. Slugs which contacted the copper tape turn around and headed back in the direction in which they came or turned horizontal (photo 3). Snails can also climb tile; however, they were not as cooperative as slugs for trial purposes.

There have been many questions regarding the width of the copper tape. We widened the width of the tape to 5.0-6.0 inches (photo 4). Overall, we found the 2” tape was adequate to keep slugs from moving up the hallow tile. However, we did not use any food lures for this trial. Therefore, if the slug or snail is highly determined to get to the food source at the top of the tile, and surpasses 2” band, a wider band could be pursued. The cost will go up as well. The tape was left out and exposed to the elements. After 15 weeks, the copper tape was still able to deter 100% of the slugs from crossing the physical barrier.

Photo 4

A retest of the copper tape was conducted in March 2019, using the same vertical set up as the previous trial. Once again, all ten slugs did not pass the copper tape and advance up the tile block. Copper tape was also placed on weed mat and on a flat wooden surface. The tape was shaped into a rectangular box and slugs were placed inside. Fifty percent of the slugs were able to climb over the copper on the weed mat and get to the other side. All slugs were able to escape from the copper box when placed on a wooded surface (photo 5). The deterrent attributes of the copper tape seem to be more effective on a vertical surface vs horizontal, with or without food as a lure.

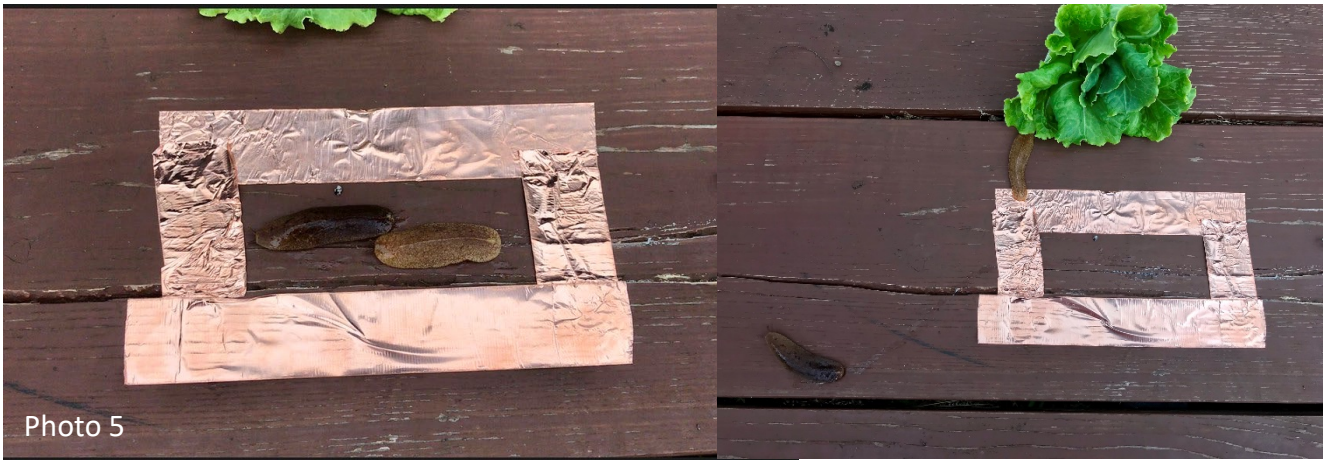

Photo 5

It is important to note that the slugs were not killed after touching the tape but presumably experienced discomfort that caused them to turn around and retreat. This approach is largely preventative vs. a control or eradication effort. In the case of the tape being placed on a horizontal surface, the slugs seemed unaffected as they slid effortlessly over the tape. Implications of this field study suggest that copper tape is an effective tool to deter slugs when wrapped around an upright like a hallow tile cement block, which is commonly used in aquaponic and hydroponic systems versus being placed on the ground under the uprights.

Growers also asked us to evaluate electricity as a suppressive tool after seeing an article in the Maui News about students creating electric anti-slug strips. Two double AA (3 V) batteries, a 6-volt battery and a 9-volt battery respectively, were attached to two wires on a 4”x4” upright wooden block (photo 6). A galvanized steel wire was attached to the positive terminal and another wire was attached to the negative battery terminal.

Photo 6

Slugs experienced a shock when their bodies touched both wires. Twenty percent of slugs fell off the pole after being shocked. However, the 6 to 9-volt shock was not powerful enough to kill the slugs (photo 7).

Photo 7

These simple electric shock systems can be made using home improvement store products and used for aquaponic or hydroponic uprights. They require protection from the elements. Deterrents like copper tape and electric shock systems serve as non-chemical, physical barrier to minimize slug and snail damage. However, they are not effective suppression tools as the pest population does not subside. Traps and baits can be integrated into the overall pest management program to reap a higher level of pest suppression.

You Tube Video:

https://www.youtube.com/watch?v=iJV_d24ZQDY

**References**

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