



Soil Test Signals Deer Baiting

Aaron Haines, professor of biology at Pennsylvania's Millersville University, along with a group of his students, has discovered that testing soil for chemicals commonly found in commercial deer foods can help identify sites used for deer baiting, a practice that has become increasingly common among unethical hunters and that has been banned in some states. In addition, "baiting sites are known links to the spread of saliva-transmitted diseases among deer populations throughout the United States," says Haines, which makes finding the sites all the more important for wildlife conservation.

Though their research is as-yet unpublished, this is the first known method to test soil and link its chemical composition to baiting areas. The team hopes to generate a soil-testing kit that can eventually help conservation officers pinpoint illegal deer-baiting sites even in the absence of physical evidence, such as leftover bait or deer-trampled earth.

To conduct their research, Haines and his students collected and tested samples of soil from known baited sites and found high levels of chloride, phosphorous, and calcium in the soil. The team tested the chemical composition of three different types of deer bait—powder, liquid, and pellets—and found the same three chemicals. They then set the three types of bait in two landscapes—prairie and forest—for a five-week period in 2012, establishing a control and baited site roughly 200 meters apart in each of the two landscape types. After two days, the team took



credit: Aaron haines

Student Teah Nauman puts an acetic acid solution on a deer-baited site and checks for bubbling, which occurs when acid hits carbonate and bicarbonate, common in most powdered baits. This test could help identify illegal bait sites.

small soil samples from the test and control sites, and consistently found evidence of the three deer-food chemicals in the soil at the baited sites. Traces of the chemicals that had leached into the soil remained after a couple of weeks of setting bait, an indication that chemical leaching may help authorities locate baiting sites even after all traces of bait have vanished.

Teah Nauman, one of Haines's students, is taking the study a step further to examine whether it's also possible to detect the food chemicals in deer fecal matter. If so, that could give conservation officers another method to detect baiting sites, and possible evidence for prosecuting offenders in states where baiting is illegal. "Our primary goal in this study is to generate an active tool for conservation officers to use in the field that would hopefully prevent baiting from illegally occurring," says Haines. "Baiting methods that perpetuate disease are detrimental to the species, and we aim to maintain the ecological integrity of the species for future generations."

— Based on research by Haines et al.

Mapping Audio Recordings

When Brendan Shirkey set out three years ago to conduct aerial waterfowl surveys for his master's research, some biologists were still marking flock locations on a paper map with a pencil. Most surveyors now use a GPS unit to collect waypoints, but there is still no reliable way to tie this location data to important information—such as species and flock size—without taking your eyes off the survey transect to jot down notes or type them into a laptop.

"We were surprised that there wasn't a more standardized way to do this," says Shirkey, a research assistant with Michigan State University and the Michigan Department of Natural Resources. "Everybody had their own methods that worked best for them, but they all had glitches and bugs."

So after a "catastrophic loss of data" when a GPS unit failed during one survey, Shirkey and his colleagues began experimenting with different GPS data loggers, and found one that had the capability to make audio recordings of researchers' observations and tie those recordings to GPS waypoints, in effect eliminating the need to take meticulous notes. Half the size of a smart phone, the logger collected waypoints once every second, maintained a strong connection to satellites even during survey flights, and cost less than \$100—cheap enough