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Where do your nuisance and invasive insects come from?

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Abstract

The talk will cover how stable isotope ratio mass spectrometry (SIRMS) has proven to be a very useful tool in determining the origin of nuisance insects# and might help to identify the origin of invasive species in future.
House flies (Musca domestica) cause nuisance, when they appear in large numbers, in and around the home. For our study, larvae (strain: Cooper) were raised in the laboratory on five substrates (artificial diet, chicken manure, cattle manure, corn oil-spiked artificial diet and household waste). After hatching, adult flies were either culled immediately or given 10% cane sugar solution diet for 10 days.
The substrates, whole flies and various fly body parts (wing, leg, head), collected at both time points, were prepared for δ15N and δ13C measurements by EA-IRMS. δ15N values of fly wings were very distinct; although the best analytical data was achieved by correlating δ15N and δ13C values for whole milled flies (n = 10 to 15), which clearly differentiated their origin.
Further experiments in the field, with a broader range of substrates/locations, and monitoring of the isotope ratios of the substrates over time, should follow.
Based on this very promising pilot study and due to a past outbreak of EU quarantine listed pest in Kent (UK), a new development project 'Determination of the origin of the Asian Longhorn Beetle (Anoplophora glabripennis)' has been initiated.
This outbreak resulted in environmentally and financially costly eradication actions. Whilst monitoring at the outbreak site continues, this pest is also occasionally entering the UK with imported materials. Therefore, differentiating between newly arrived beetles and those from previously undetected in country populations would be of immediate practical benefit in making appropriate strategic decisions on surveillance and eradication.
The project outline and preliminary results will be presented.

Reference:
#Heinrich, K., Bell, H., Weaver, R., (2012) Determining the source of house flies (Musca domestica) using stable isotope analysis, Pest Management Science, 68, 31-37.