Natural pest control saves coffee berry

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There is good news for coffee lovers and growers worldwide: A predator for the devastating coffee berry borer has just been discovered in Africa. Looking at coffee berries in Western Kenya, Dr. Juliana Jaramillo from the International Centre of Insect Physiology and Ecology in Kenya, Dr. Eric Chapman from the University of Kentucky, and colleagues have identified a previously unknown predatory thrips - *Karnyothrips flavipes* - which feeds on the eggs and larvae of the coffee berry borer *Hypothenemus hampei*.

According to the authors, this discovery could have important implications for the management of the coffee berry borer throughout the world. Their study, the first to quantitatively prove predation on the coffee berry borer, is published online in Springer's journal *Naturwissenschaften* - The Science of Nature. Previous studies were based on mere observations, for example of ants preying on the coffee berry borer.

The coffee berry borer *H. hampei* is the most widespread coffee pest in coffee producing countries. Yearly coffee losses are estimated at US $500 million, affecting the income of more than 20 million rural households in the tropics. The female coffee borer drills galleries into the coffee berries where she deposits her eggs. The larvae then feed on the coffee berries. Because the pest's lifecycle occurs mainly inside the coffee berry, *H. hampei* is very difficult to control, particularly in countries which pride themselves on their organic coffee production.

During routine dissections of coffee berries in Western Kenya, Dr.

Jaramillo observed, for the first time, adult thrips *K. flavipes* feeding on eggs of the coffee berry borer. Further observations in the laboratory showed that *K. flavipes* adults also prey on the larvae of *H. hampei*. She found that *K. flavipes* enters the coffee berry through the tiny hole bored by *H. hampei* and also deposits its eggs inside the berries. Newly hatched thrips then continue to develop inside the berries.

The authors used molecular techniques to detect the presence of small amounts of prey DNA in the digestive tracts of the predators by analyzing their gut contents. Nearly 18,000 *H. hampei*-infested coffee berries from 100-150 trees were collected in the Kisii area of Western Kenya between January and September 2008. In total, over 3,000 *K. flavipes* emerged from the borer-infested berries and pest DNA was detected in 8.3 percent of DNA extractions of the predator. The highest percentage of positive results occurred in April, when 47 percent emerging *K. flavipes* tested positive for *H. hampei* DNA.

These findings confirm for the first time the presence of a coffee berry borer predator in Africa, based on molecular gut content analysis. The authors believe that *K. flavipes* has the potential to have a significant impact on *H. hampei* populations in other coffee growing regions. Controlling this pest could potentially help stabilize coffee harvest and market value.

They conclude: "Our findings provide coffee growers and coffee scientists with new insights into a biological control agent that could be conserved and augmented in coffee growing regions where it occurs. This predator could make a significant contribution to integrated pest management of *H. hampei*."

  More information: Jaramillo J, Chapman EG, Vega FE, Harwood JD (2010). Molecular diagnosis of a previously unreported predator-prey association in coffee: Karnyothrips flavipes Jones (Thysanoptera:

Phlaeothripidae) predation on the coffee berry borer. *Naturwissenshaften;* DOI 10.1007/s00114-009-0641-7

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