

Title Effects of ultrasound on Indian meal moth reproduction.
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Citation Advances in stored product protection. Proceedings of the 8th International Working Conference on
Stored Product Protection, York, UK, 22-26 July 2002 (2003); 852-857

Abstract

The effects of ultrasound emitted from a commercial ultrasonic device (Cix 0600) and a novel unit developed at Kansas State University (KSU) on the reproduction of Indianmeal moth, *Plodia interpunctella*, were evaluated in paired Plexiglas enclosures. The commercial ultrasonic device generated peak frequencies at 21, 25 and 35 kHz, and a 94-dB sound pressure level at a distance of 50 cm. The KSU unit produced frequency, pulse duration and quiet time at random. Ultrasound emitted from both of the ultrasonic units had a similar and significant impact on the number of spermatophores transferred by males to females, the number of larvae produced, larval weight and adult distribution within enclosures. In the presence of ultrasound, each female, on average, had 1.5 spermatophores. In the absence of ultrasound, each female had 2 spermatophores. Larval numbers were reduced by 48 and 38% when moths were exposed to ultrasound produced by the Cix 0600 device and KSU unit, respectively. Therefore, the total larval biomass in the enclosures with ultrasound was significantly less than that in the enclosures without ultrasound. The distribution of larvae within enclosures was affected by ultrasound emitted by the Cix 0600 device but not by the KSU unit. Higher number of *P. interpunctella* moths were found on the enclosure floor in the presence of ultrasound than without ultrasound. These data suggest that use of ultrasound technology could be exploited for the management of *P. interpunctella* reproductive behaviours.