

NOTE

Laboratory and Field Trials with Commercial Ultrasonic Devices Against Three Ant Species (Hymenoptera: Formicidae)¹

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Several reports have demonstrated the possibility of using ultrasound to manage or repel urban insect pests. Ballard et al. (1984) found that ultrasound increased the activity of the German cockroach, *Blattella germanica* (L.), in wooden enclosures. Like many other insects (Spangler 1988), some ant species produce ultrasound, but its function is unknown (Esperson 1994). There are no published reports on the responses of ants to ultrasound, despite claims made by manufacturers of ultrasonic devices that their units are effective in repelling ants. The Federal Trade Commission has urged manufacturers and retailers of ultrasonic pest control devices to examine their advertising and ensure that they have competent and reliable scientific evidence to support claims that an ultrasonic device eliminates or repels certain pests (Federal Trade Commission 2001).

We conducted laboratory and field trials to determine the repelling abilities of three commercial ultrasonic devices against three common ant species—*Camponotus festintatus* (Buckly), *C. pennsylvanicus* (De Geer), and *Formica pallidiflava* (Latreille). The three commercial ultrasonic devices were labeled as A, B, and C for proprietary reasons. Huang et al. (2000) described detailed sound measurements produced by these devices. Ultrasonic device A generated peak frequencies at 26 kHz and 34 kHz, a sound pressure level (SPL) of 95 ± 1 dB at 50 cm from the source ($0 \text{ dB} = 20 \log_{10}(20 \mu\text{Pa}/20 \mu\text{Pa})$), and the sound cycle lasted 0.123 s. Device B generated peak frequencies at 27 kHz and 35 kHz. The unit produced a 92 ± 4 dB sound pressure level at 50 cm and a 0.123-s sound cycle. Device C generated a wide range of peak frequencies between 27.7 and 42 kHz. This unit produced an 88 ± 2 dB sound pressure level at 50 cm, and had a sound cycle that lasted 0.075 s.

In laboratory trials, two enclosures (cubes), each side measuring $1.2 \times 1.2 \times 1.2$ m, were constructed using plexiglas. The two enclosures were connected at the bottom by a 91-cm long square conduit (7.5×7.5 cm) made of cardboard. Plexiglas gates placed at the junction of the conduit and enclosures could be opened or

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