Improving Short-term Removal Methods of the Introduced Pest Species the Cane Toad, *Chaunus* [*Bufo*] *marinus*, in North-eastern Australia

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I declare that no other persons contributed to this thesis other than myself and my supervisors, Ross Alford and Lin Schwarzkopf. I did not receive any financial help or editorial assistance. I also declare that all procedures reported in this thesis were conducted under the approval of JCU Animal Ethics Committee, approval number A1166.

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Abstract

The cane toad's (*Chaunus* [*Bufo*] *marinus*) introduction in 1935 into Australia has had tremendous consequences for the native wildlife which inhabit the area of invasion. Much effort has recently been concentrated on minimizing the impact of the toad, especially along the invasion front in the Northern Territory and Western Australia. Efforts have focused on implementing short-term management solutions while long-term solutions are being developed. Trapping has proved useful in the Northern Territory, and there is strong interest in improving the efficiency of this technique. Current traps use fluorescent lights which improve trapping success, but the mechanism of this has not been documented, and the efficacy of alternative light sources has not been investigated. I investigated the reactions of toads to four different light sources (incandescent, white fluorescent, yellow fluorescent and ultraviolet lights). My results indicate that toads are not attracted to any of these light sources, and white fluorescent and incandescent lights actively repel toads. This suggests that the attractiveness of lighted traps is due to the insects that are attracted by lights, which the cane toads feed upon. Yellow fluorescent and ultraviolet lights neither attract nor repel toads; given this result, and the fact that toads are apparently attracted to traps by the insects that lights attract, it is likely that using UV lights on traps would increase their effectiveness. Previous research indicated that both male and female cane toads are attracted to conspecific mating calls, and that playing back toad calls in the vicinity of traps can improve their efficiency. In other species, it has been established that manipulating certain aspects of calls can produce "superstimuli", calls that are more attractive than any natural call. Playbacks of a superstimulus might provide even greater efficiency increases for toad traps. I recorded and analyzed the calls of toads in nature to

determine the mean and range of dominant frequency, pulse rate, and call length. I evaluated the responses of toads to manipulated calls with characteristics just outside the natural range for dominant frequency (high and low) and pulse rate (high and low). Both male and female toads were more attracted to calls with high pulse rates than they were to natural calls. The responses of females to manipulated calls also depended on their reproductive status. Based on my findings, it appears that the efficiency of traps could be substantially improved by using ultraviolet lights instead of white fluorescent lights, and by adding playbacks of high pulse rate advertisement calls. Validating these suggestions will require field experiments, which should be undertaken as soon as possible.

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