

**1. Project title: Thick eggshells of brood parasitic cowbirds protect their eggs and damage host eggs during laying**

**2. Project description** (Abstract from manuscript in press in *Behavioral Ecology*):

Brood parasites lay thick-shelled eggs and numerous hypotheses have been proposed to explain the significance of this trait. We examined whether thick eggshells protect the parasite egg during laying events. We used eggs of the parasitic shiny cowbird (*Molothrus bonariensis*) and its hosts, the house wren (*Troglodytes aedon*) and chalk-browed mockingbird (*Mimus saturninus*) in South America and the eggs of the parasitic brown-headed cowbird (*M. ater*) and its hosts the house wren and red-winged blackbird (*Agelaius phoeniceus*) in North America. We experimentally dropped parasite eggs onto host eggs to simulate laying by the parasite, parasite eggs onto parasite eggs to simulate multiple parasitism, host eggs onto parasite eggs to simulate hosts laying from the height cowbirds lay, and stirred eggs in the nest to simulate jostling. We found that cowbird eggs were significantly less likely to be damaged than host eggs when they were laid onto a host egg and when host and cowbird eggs were laid onto them. There was minimal damage to eggs during jostling experiments, thereby failing to support the hypothesis that thick eggshells provide protection when eggs are jostled. These findings support the hypotheses that thick eggshells resist damage when laid from an elevated position, when additional cowbird eggs are laid onto them in multiply parasitized nests, and these eggs also damage host eggs when laid.

**3. Project goals:** The funds for this project were almost exclusively used for student (Stephanie Allers) travel to and from the study site.

**4. Project impact:** This was a collaborative project between my lab and colleagues in Argentina and the resulting paper has been accepted for publication in the journal *Behavioral Ecology*. We demonstrated the benefits of thick eggshells in brood parasites, and also how these eggs damage host eggs and further contribute to host losses when parasitized.