

## **Angry wasps vs less angry wasps: Colony-level differences in aggression in *Vespula vulgaris* (Family: Vespidae) wasps**

Jennifer Jandt <sup>\*1</sup>, Kevin Loope <sup>2</sup>, Jana Dobelmann <sup>3</sup>, Monica Gruber <sup>3</sup>, Oliver Quinn <sup>3</sup>, Davide Santoro <sup>3</sup>, Phil Lester <sup>3</sup>

<sup>1</sup> University of Otago

<sup>2</sup> University of California-Riverside

<sup>3</sup> Victoria University, Wellington

Social wasps are probably best known for their aggressive and relentless pursuit of anything (or anyone) that disturbs their nest, yet individuals within and between colonies exhibit considerable variation in aggression. Here, we explored the extent to which colony factors (activity level, colony size, reproductive investment, and viral load) can be used to predict colony level defensive response to a simulated predator attack. We show that, although colonies were consistently more or less aggressive within a population, that aggressive response could not be predicted by activity level or reproductive investment. That is, larger colonies are not necessarily more likely to aggressively defend their nest compared to small colonies. Instead, viral load was the strongest correlate of aggression: colonies with high viral loads in workers were significantly less aggressive compared to those with lower viral loads. The underground / in-nest social environment, therefore, may be more important in influencing colony-level aggressive phenotype above ground than colony size or foraging activity rate.

