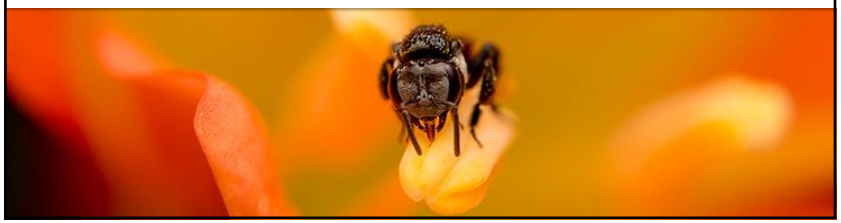
Fighting swarms and tolerance to crowding in Australian stingless bees

THE UNIVERSITY OF SYDNEY

Ros Gloag
Behaviour and Genetics of Social Insects Lab
School of Life and Environmental Sciences



Fighting swarms

Tetragonula sp.

sensu Wagner & Dollin (1982).

Fighting pairs one worker from defending colony and one from attacking colony

Gloag et al. 2008 Ins Soc; Cunningham et al. 2014 Am Nat.

Why fight?

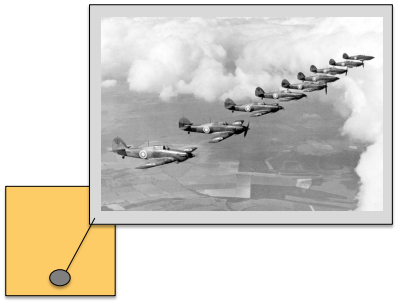
Colony in need of 2nd home

Build from scratch over many months, or….

Steal one ready-made

Gloag et al. 2008 Ins Soc; Cunningham et al. 2014 Am Nat.

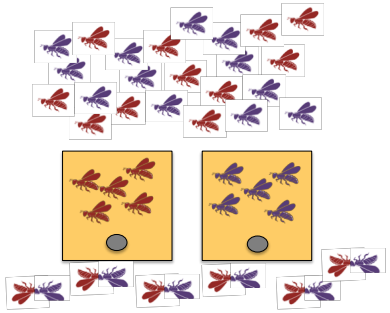
Fighting swarms



- Swarm = Airforce of defending colony, intercept attackers on the wing
- Collateral damage common (20% fighting pairs are both defenders)

True fights and Drift fights

- Entry of foreign workers triggers airforce
- Accidental drifters can trigger airforce (→ drift fight)
- <20 intruders in 1 hour sufficient for drift fight



Gloag et al. 2008 Ins Soc; Gloag & Mitchell, unpubl.

No drift in natural nests

- Naturally-occurring nests in the bush: low density, variable entrance orientation, zero drifters.

Stephens et al. 2017, Biol J Linn Soc.

Tolerance to crowding

Prevailing wisdom: **minimize drift to minimize drift fighting**

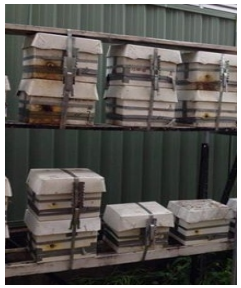
Use same tricks used for honey bees:

- Different colours/patterns
- Different orientations
- Different heights

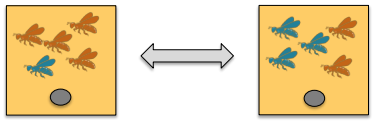
Tolerance to crowding

T. carbonaria hives (photo credit?)

High drift between neighbours



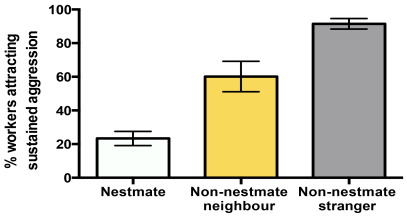
When crowded, up to 40% of all foragers exiting hives originated in other colonies (similar % to other managed social bees).



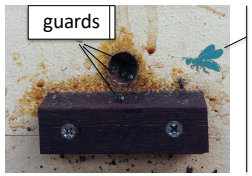
Stephens et al. 2017, Biol J Linn Soc.

High drift between neighbours

Guards tolerate foreign workers from nearby, but not faraway, colonies



Origin of worker presented to guards

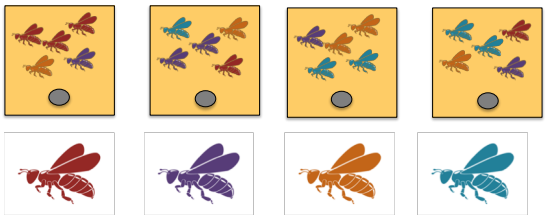


Add chilled bee and see what happens

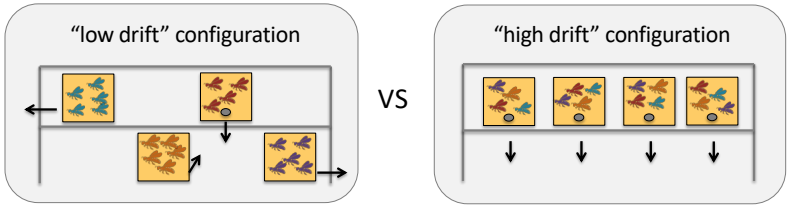
Stephens et al. 2017, Biol J Linn Soc.

Crowded bees make recognition errors (good news for beekeepers)

So, ***maximize*** **drift to minimize drift fighting?**



Field tests of crowding tolerance



- Phase 1: Compare health/growth after 6 months.
- Phase 2: Compare incidence of drift-fighting after relocation.

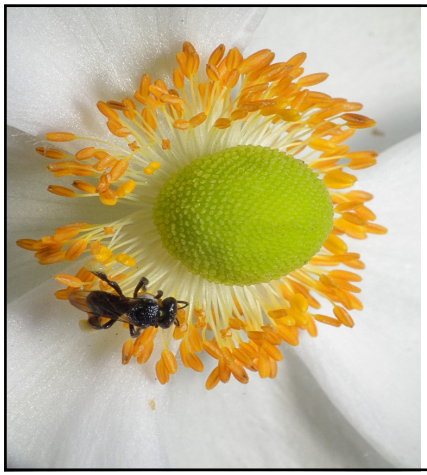
Bueno, Heard et al., unpublished data

What about minimizing *true* fights?

- Possibly mitigate by dividing colonies before they get too strong (but attackers are wild colonies?)
- Crowded colonies may be less likely to attempt usurpations of each other

Tolerance to honey bee neighbours?

- *T. carbonaria* will defend nest from honey bees if needed, but not by deploying airforce



Acknowledgements

Ruby Stephens
Tim Heard
Madeleine Beekman
Francisco Bulle Bueno
Benjamin Oldroyd
Dean Haley
Bob Lutterall
John Klumpp
Matt Keir

THE UNIVERSITY OF SYDNEY