



# Genetic structure of a world-wide ant invasion

## Background

- The little fire ant *Wasmannia auropunctata* is native to the Neotropics but has numerous invasive populations throughout the world, including the US (Hawaii and Florida), many Pacific islands and Central Africa (Cameroon and Gabon).
- By tending plant pests *W. auropunctata* can directly harm agriculture. Its surprisingly painful sting makes work on infested farms nearly impossible.
- *W. auropunctata*'s arrival is usually correlated with decreases in abundance and species richness of ants and other invertebrates. Reports of attacks on vertebrates are also common.



*W. auropunctata* worker scavenging dead bullet ant.

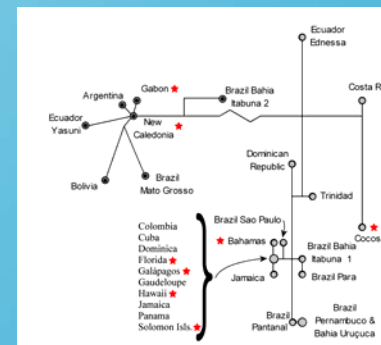
## Results



Distribution and sampling of *W. auropunctata*. Native range is outlined in black. The two types of circles represent two different clades (see below).

## Methods

- Sequenced COI/COII region of mtDNA, including tRNA leucine and an intergenic spacer
- Genetic relationships determined using traditional phylogenetics (not shown) and a genotype network.
- Relationships used to test McGlynn's (1999) observation that invasive populations are smaller in size than native population using Purvis and Rambaut's (1995) algorithm.



Median-joining network of *W. auropunctata* populations. Invasive populations are marked by stars. Note that the edge joining the two clades (grey and black-dotted) has been scaled down by a factor of 2.5.

- Two genetically distinct sympatric clades, according to both intraspecific network and traditional phylogenetic models. Both clades are invasive.
- At least three separate source populations:
  - Caribbean region → Florida & Pacific
  - South America → Africa & New Caledonia
  - Central America → Cocos Island
- High genetic relatedness of invasive populations.
  - Low power for testing relative size of native vs. invasive populations ( $N=3$ , Wilcoxon signed rank test  $P=0.091$ ).

## Future directions

- Are the Caribbean populations native?
  - Fine scale genetic analysis.
- Are there two cryptic species?
  - Morphological and behavioral studies.

## References

- McGlynn, T.P. 1999. Am. Nat., 164: 690-9
- Purvis, A. & Rambaut A. 1995. CABOIS, 11:247-251

## Study goals

Ultimately, I plan to use the multiple introductions of *W. auropunctata* for studying parallel evolution of invasive populations. However, the following questions must be addressed first:

- I. Is '*auropunctata*' just one species?
- II. Given *W. auropunctata*'s large native range, where are the sources of invasive populations?
- III. What are the genetic relationships between populations?

