

Male-biased dispersal promotes large scale gene flow in the army ant *Dorylus fulvus*



Benjamin Barth¹, Robin Moritz¹, Christian Pirk², Bernhard Kraus¹

(1) MLU Halle-Wittenberg, Germany. (2) University of Pretoria, South Africa. Contact: benjamin.barth@zoologie.uni-halle.de

Queens: Bad dispersal

Permanently wingless
Spread by colony fission
Underground nesting



Introduction

Army ants, important key-stone predators in the tropics, are particularly prone to population fragmentation due to their extraordinary mating system¹. Here we show the potential of sex-biased dispersal to counteract genetic depletion in the subterranean African army ant *Dorylus (Typhlopone) fulvus*.

Males: Good dispersal

Go on mating flights
Fly well and far to search queens



Hypothesis

Genetic differentiation vs. Mixture, gene flow

Methods and Results

Genetic population structure²

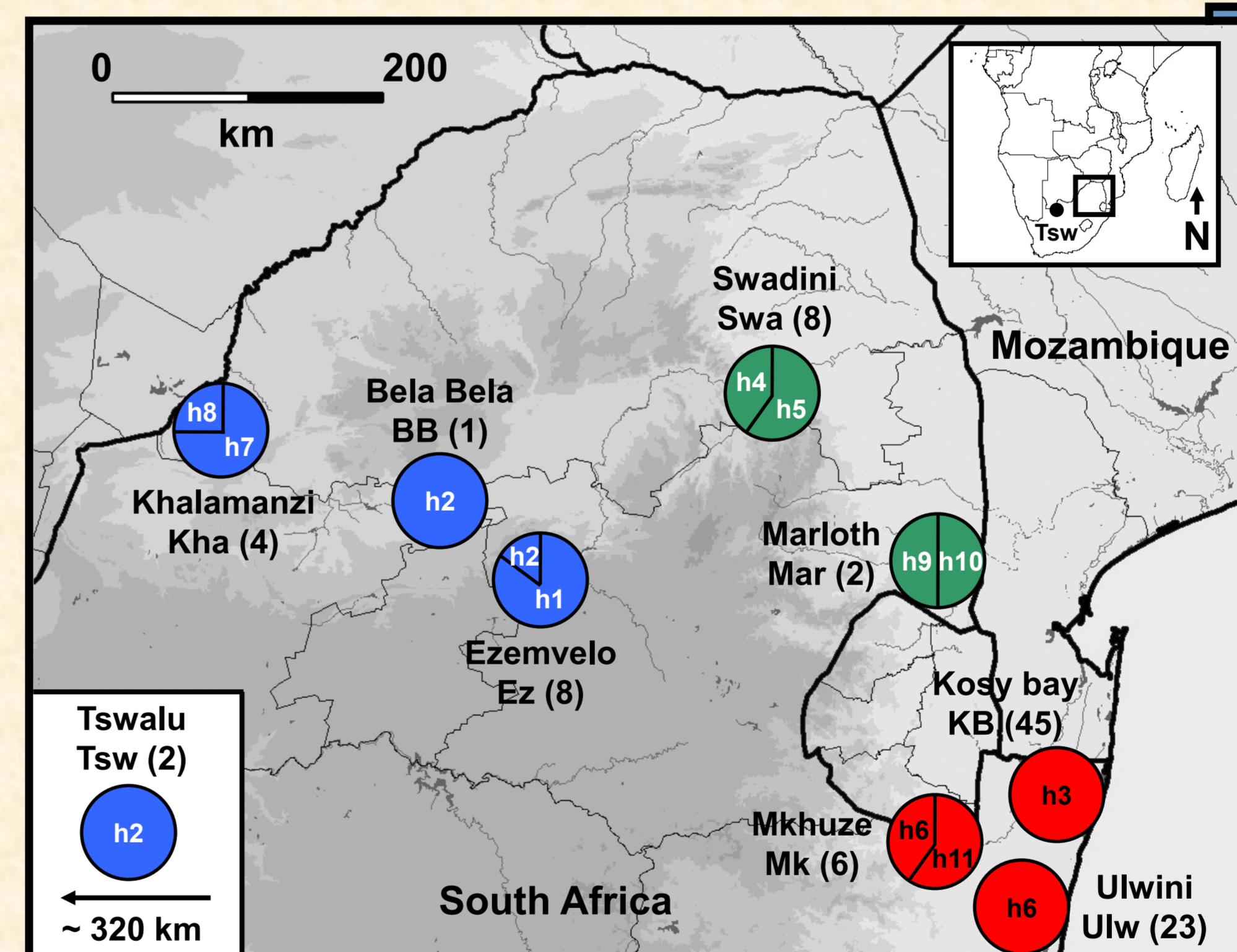
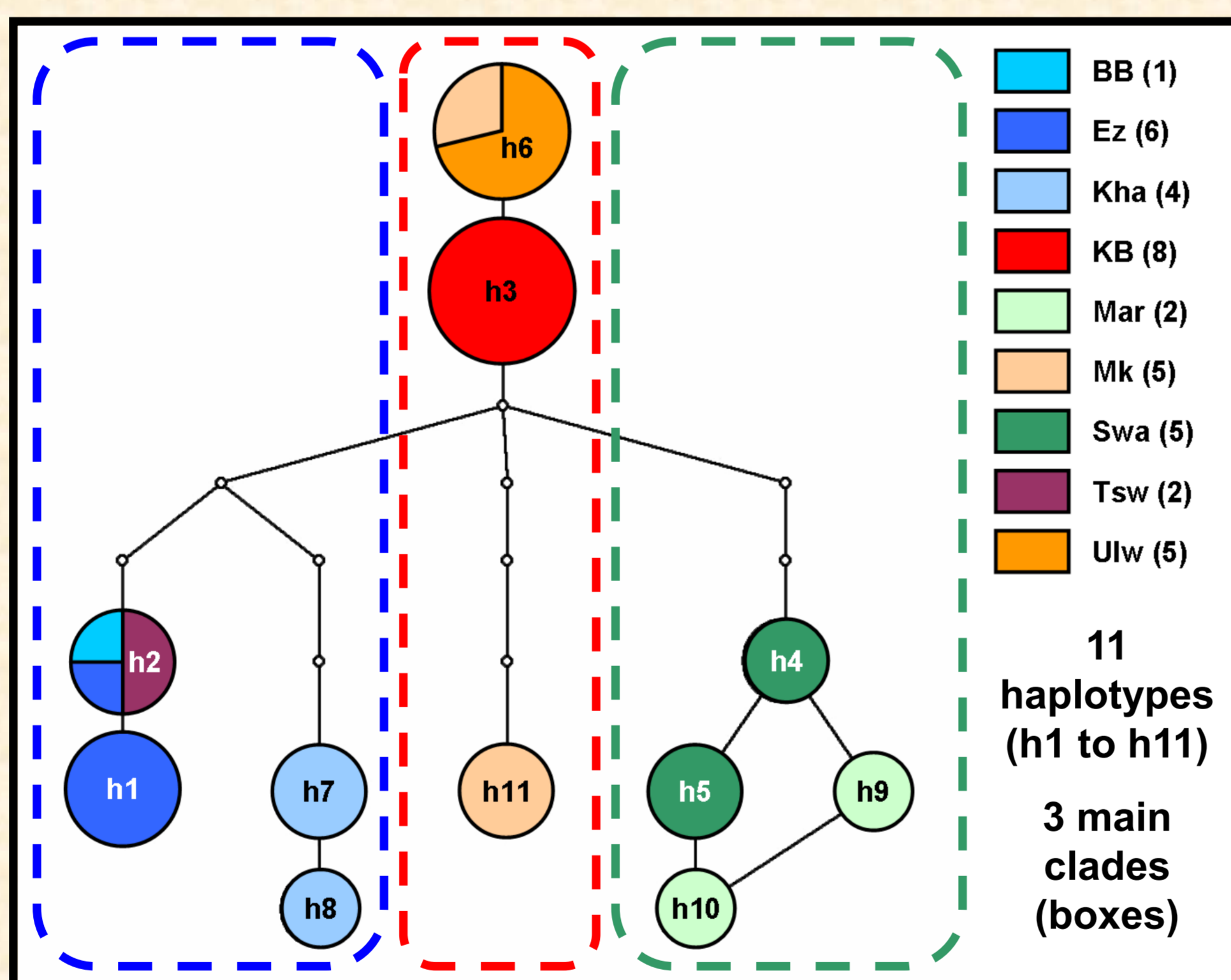
Maternal vs. Paternal



4 microsatellite loci⁴
bi-parentally inherited

mtDNA, *cox1*, 363 bp³
only maternally inherited

Assigning males to mother queens
(Colony 1.3⁵)
N = 38 sequences



Male sampling via light traps

N = 94 genotypes
from 6 pops.
with $N \geq 4$

from ~ 2 mm³ wing muscle of unambiguously assigned males

$$\Phi_{ST} = 0.85$$

Haplotype genetic differentiation reveals strong structuring, highest variance (0.40) is among clades (AMOVA, $p < 0.05$)⁷

$$\frac{\Phi_{ST}}{F_{ST}} = 3.7 > 3$$

(jack knifing, t -test, $p = 0.014$)
Ratio of 3 would be expected with equal differentiation⁸

$$F_{ST} = 0.23$$

Population genetic differentiation reveals weak structuring, highest variance (0.78) is within populations (AMOVA, $p < 0.001$)⁷

Conclusion

Significantly less population differentiation of males compared to queens shows the importance of male-biased dispersal in *D. fulvus* and the efficiency of mating systems in maintaining gene flow over large scale.



The long way to the queen...

