Cross-sex genetic correlations constrain the evolution of a behavioral syndrome

Raphaël Royauté

In field crickets, males and female express genetically distinct behavioral syndromes, leading to diverging evolutionary responses

## Cross-sex genetic correlations constrain the evolution of a behavioral syndrome

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CONTEXT

- Behaviors often integrated into syndromes & have genetic basis
- Sex-specific architecture unknown
- Implications for the evolution of behavioral dimorphism

METHODS

- Field crickets (*Gryllus integer*) collected from 4 populations
- Breeding design over 3 generations and behavioral phenotyping of 965 individuals

Shelter emergence   **Open-field activity**   **Antipredator response**
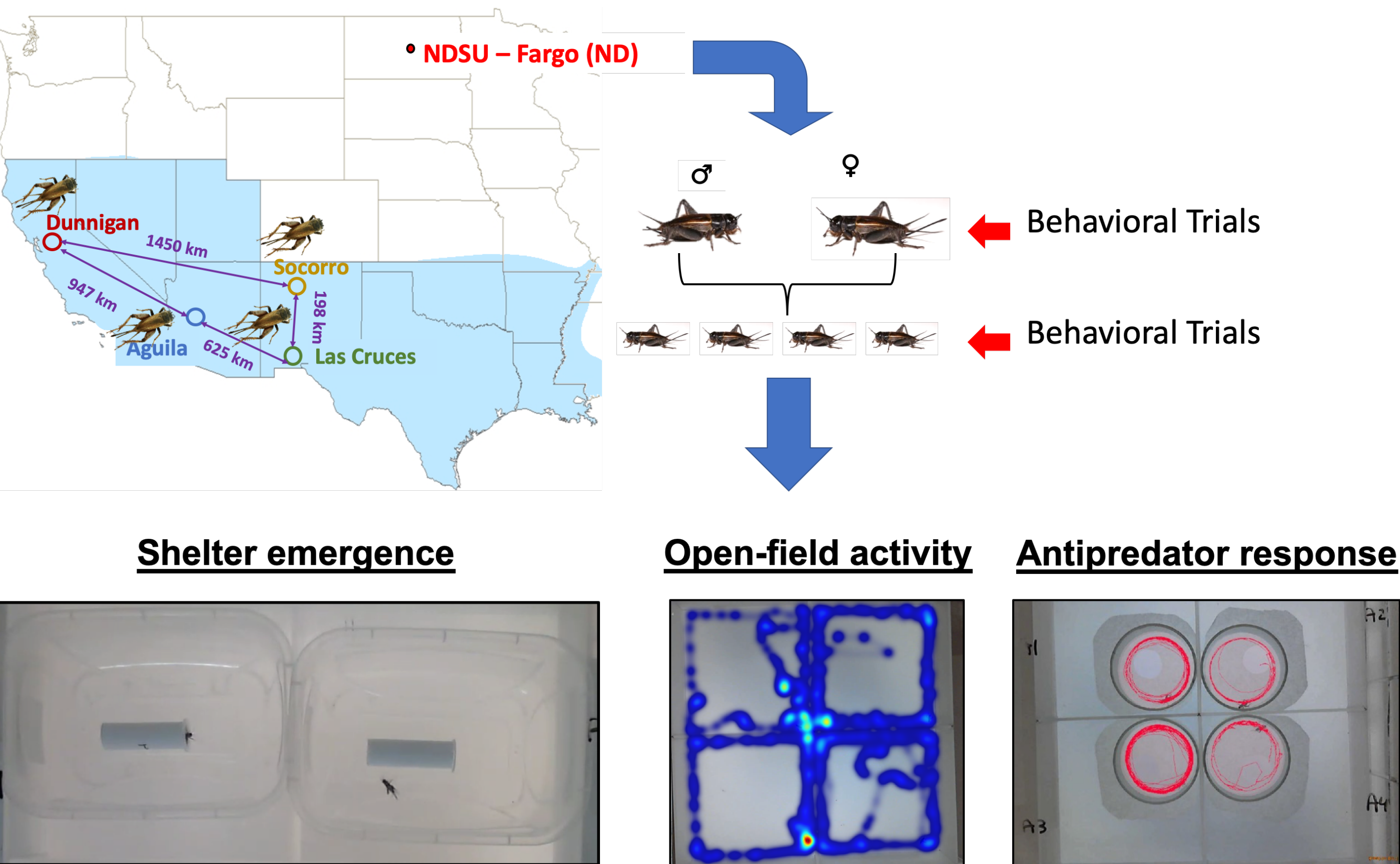
PREDICTIONS

Stronger selective pressure for ♀ to be active and for ♂ to guard burrows

→ ♀ quicker to exit shelter and more active ✗ ✓
→ Less genetic variance in shelter emergence & activity in ♀ ✗ ✓
→ Stronger activity-antipredator response syndrome in ♀ ✓

RESULTS
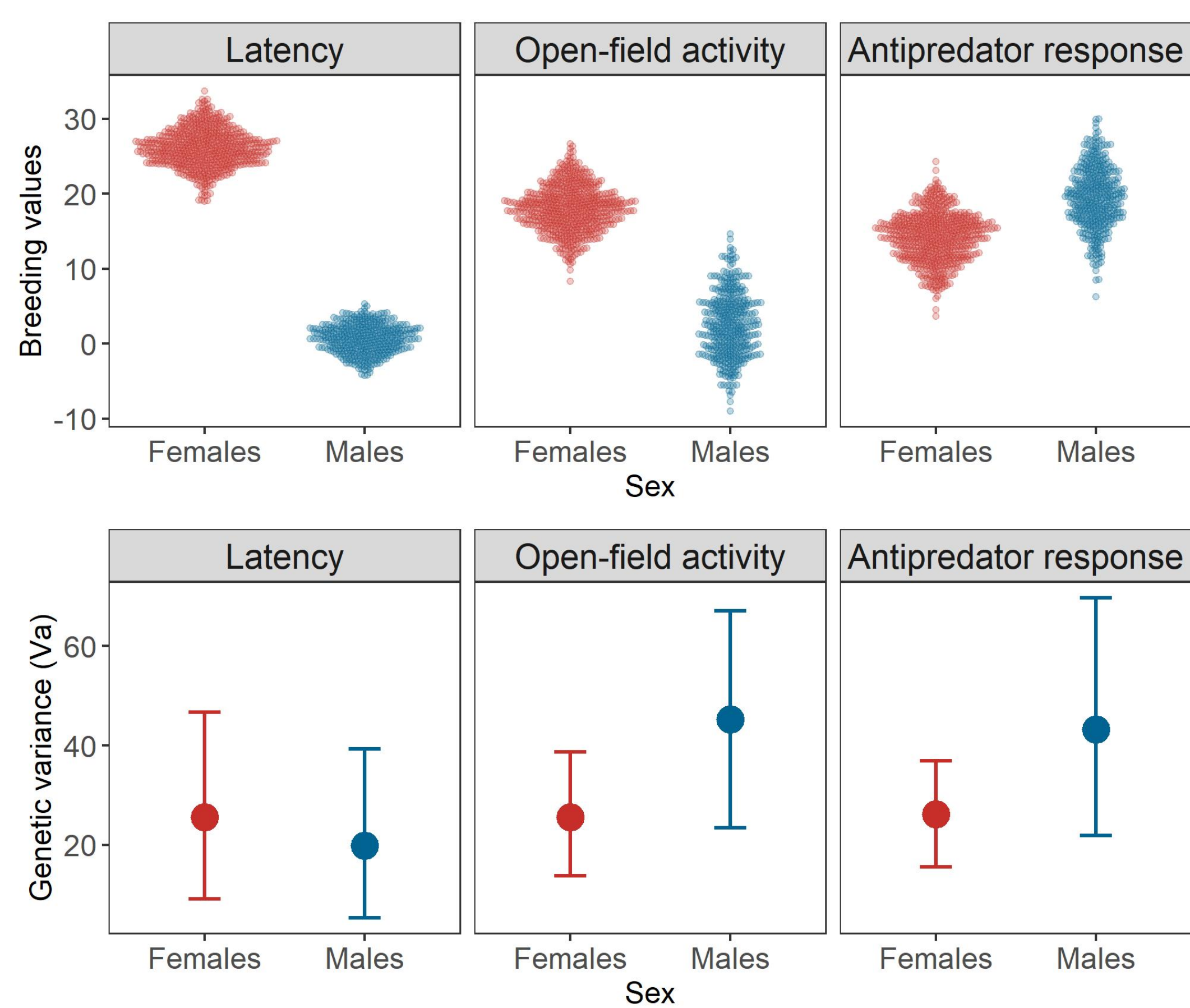
FIGURE 1. Males and females expressed diverging behaviors with females less prone to leave shelter (*Pmcmc* = 0.95) and more active than males (*Pmcmc* = 0.90). Males had more genetic variation in activity (*Pmcmc* = 0.95) and antipredator response (*Pmcmc* = 0.92). Shelter emergence had equal genetic variance among sexes (*Pmcmc* = 0.68).

Pmcmc: Bayesian probability for finding a difference among sexes.
Pmcmc < 0.7: Poor evidence of difference
Pmcmc > 0.8 : Moderate evidence
Pmcmc > 0.9 : Strong evidence
Pmcmc > 0.95: Very strong evidence
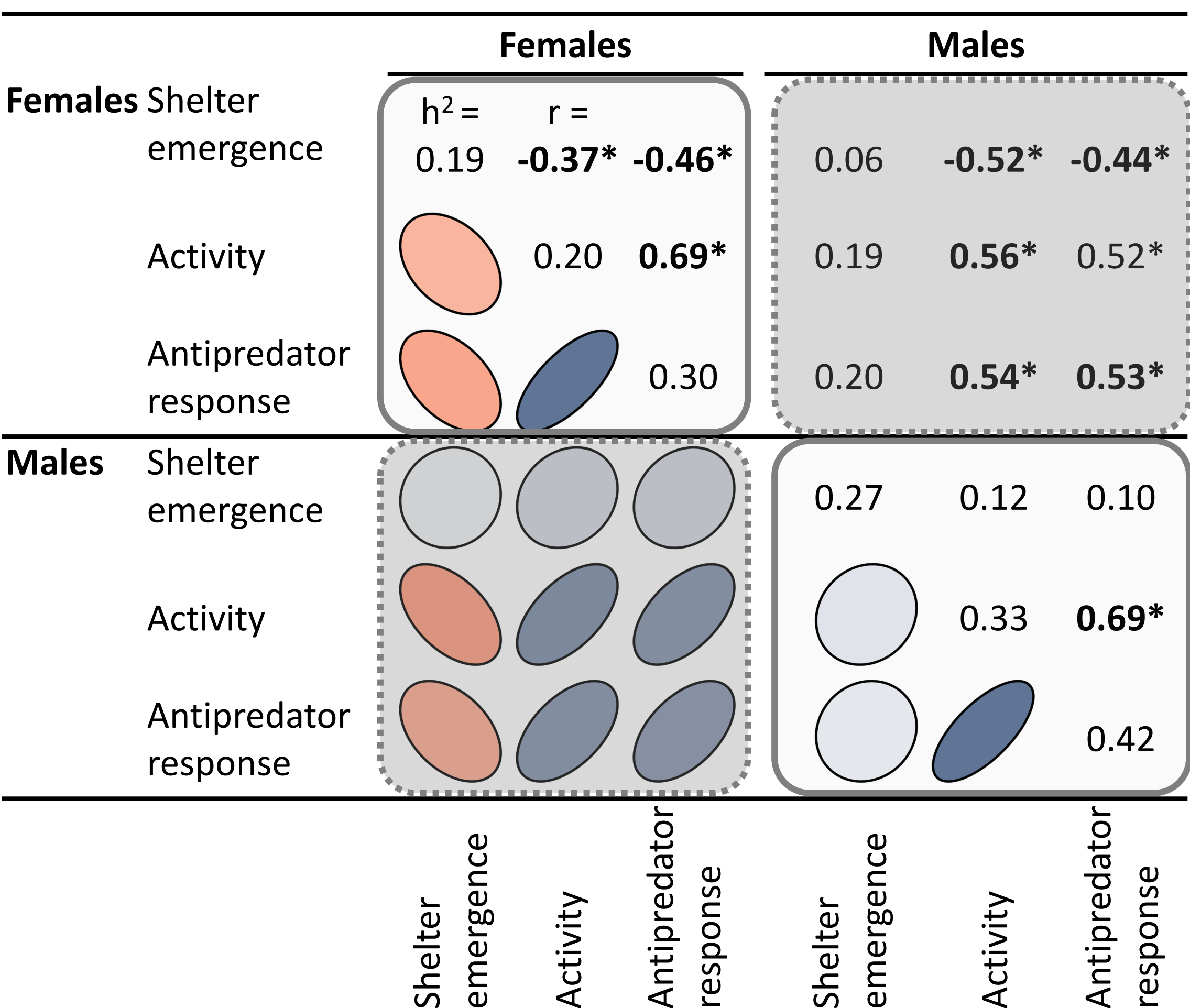
FIGURE 2. Genetic variance-covariance matrix. Heritabilities (h²) are indicated on the diagonal and genetic correlations (r) on the off-diagonal elements. Shelter emergence was genetically uncoupled between sexes (r = 0.07, *Pmcmc* =0.61). The activity-boldness syndrome had weaker correlations in males.

☐ sex-specific correlations
▨ Cross-sex correlations
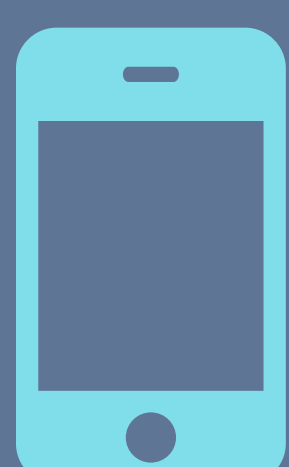
More information here!

🐦 @RRoyaute