DO PATTERNS OF FLUCTUATING ASYMMETRY REFLECT THE STRENGTH OF NATURAL AND SEXUAL SELECTION IN THE SAND CRICKET?

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INTRODUCTION

Fluctuating asymmetry (FA) refers to deviations from perfect symmetry that reflect the level of genetic and environmental stress experienced by individuals during development, and therefore may be a useful tool in evaluating the strength and type of selection acting on the various body parts of organisms and on the distinct polyphenic morphs that comprise populations. Individuals with unique life-histories (for example ♀ vs. ♂) may rely on different structures for maximizing life-time fitness and exhibit predictable patterns of FA specific to their own fitness-gaining strategies.

In the polymorphic sand cricket, *Gryllus firmus*, two distinct morphs exist, each with a unique life-history strategy for maximizing fitness:

Short-wing morph (SW): individuals have non-functional flight wings, but invest early in reproductive behavior so they can have many offspring

Long-wing morph (LW): individuals develop long functional flight wings for dispersal, but reproduce later in life, producing fewer offspring

Short-wing male | Long-wing male

QUESTION

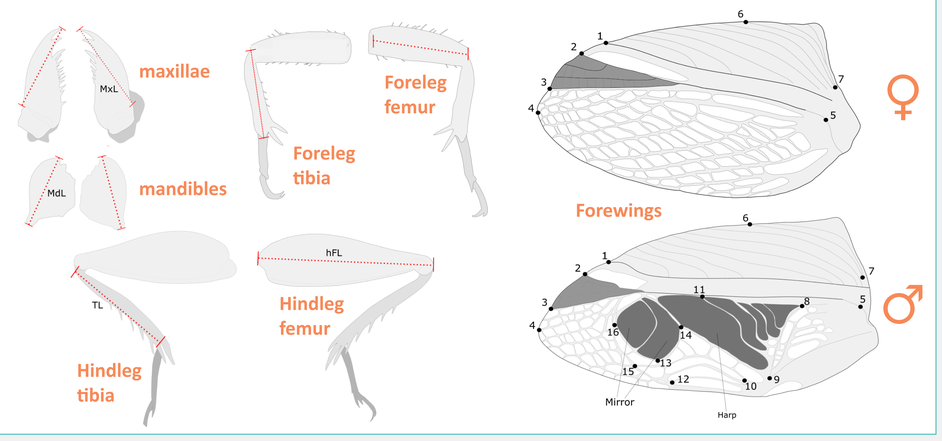
Do crickets of different morphs or sexes strategically allocate available resources during development to maintain the symmetrical growth of structures most vital for their life-history strategy of maximizing fitness?

PREDICTIONS

Bilateral Structure	Function	Pred. FA SW vs. LW	Pred. FA ♀ vs. ♂
Forewings	calling (♂)	SW < LW	♀ > ♂
Hindwings	flight (LW)	SW > LW	♀ = ♂
Forelegs	walking	SW = LW	♀ = ♂
Hindlegs	jumping	SW = LW	♀ = ♂
Maxilla	eating	SW = LW	♀ = ♂
Mandible	fighting (♂)	SW < LW	♀ > ♂
Tympanum	hearing	SW > LW	♀ = ♂

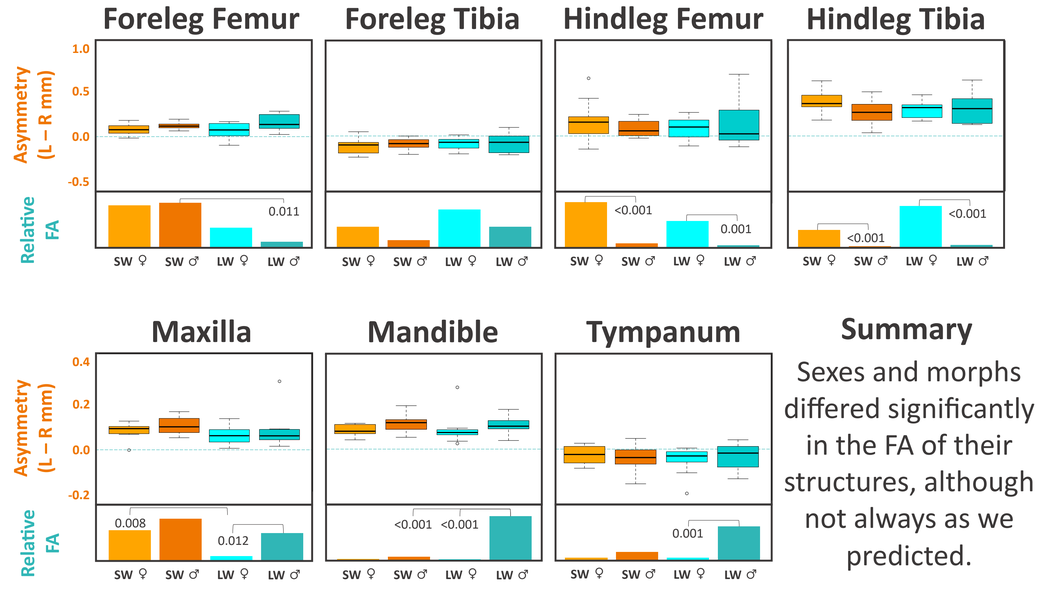
METHODS

We analyzed 10* adult ♀ and ♂ of each morph by photographing body structures and taking the following linear measurements 3×. Forewings *will be* digitized using the depicted landmarks and analyzed using GMM; and hindwings *will be* analyzed for total area and length.



* Our intended final sample size will be 40 crickets of each morph and sex.

RESULTS



Summary

Sexes and morphs differed significantly in the FA of their structures, although not always as we predicted.

Future: 1) Increase sample size (N = 40) and complete FA analysis of all structures.
2) Expose each sex × morph to extreme developmental challenges.
3) Investigate a natural field cricket population for biological relevance.