RESEARCH ARTICLE

Running head: A NEW FRAMEWORK FOR FIGHTING

Does population density moderate the importance of information in intraspecies contests?

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Keywords: contests, density dependence

Summary

The diversity of animal mating systems is astounding. In some of these systems, very costly combat behaviour – among males, among females, or both – is a feature of the mating process. In other systems, resources are divided among individuals in an entirely pacific process. Can we understand why? Animal combat strategies likely emerge from trade-offs in investment in growth, mate seeking, and information gathering. Willingness to engage in combat is a trait that evolves based on the fitness landscape, which itself changes depending on both the environment and the strategies of other individuals. Using recently developed methods for modelling dynamic fitness landscapes, we examine: (1) why combat behaviours arise, (2) under what conditions combat behaviours are evolutionarily stable, and (3) when different combat strategies co-exist. We hypothesize that the reliability and "public-ness" of information is an important feature driving combat or lack thereof in many animal systems.

Introduction

Evolution of animal personalities: (Wolf *et al.*, 2007; Wolf *et al.*, 2012) show can have coexistence of risky, explorative strategies and risk-averse strategies.
Animal personalities linked to other life history traits: (Biro & Stamps, 2008)
Individual-based models of natural selection: (M'Gonigle *et al.*, 2012)

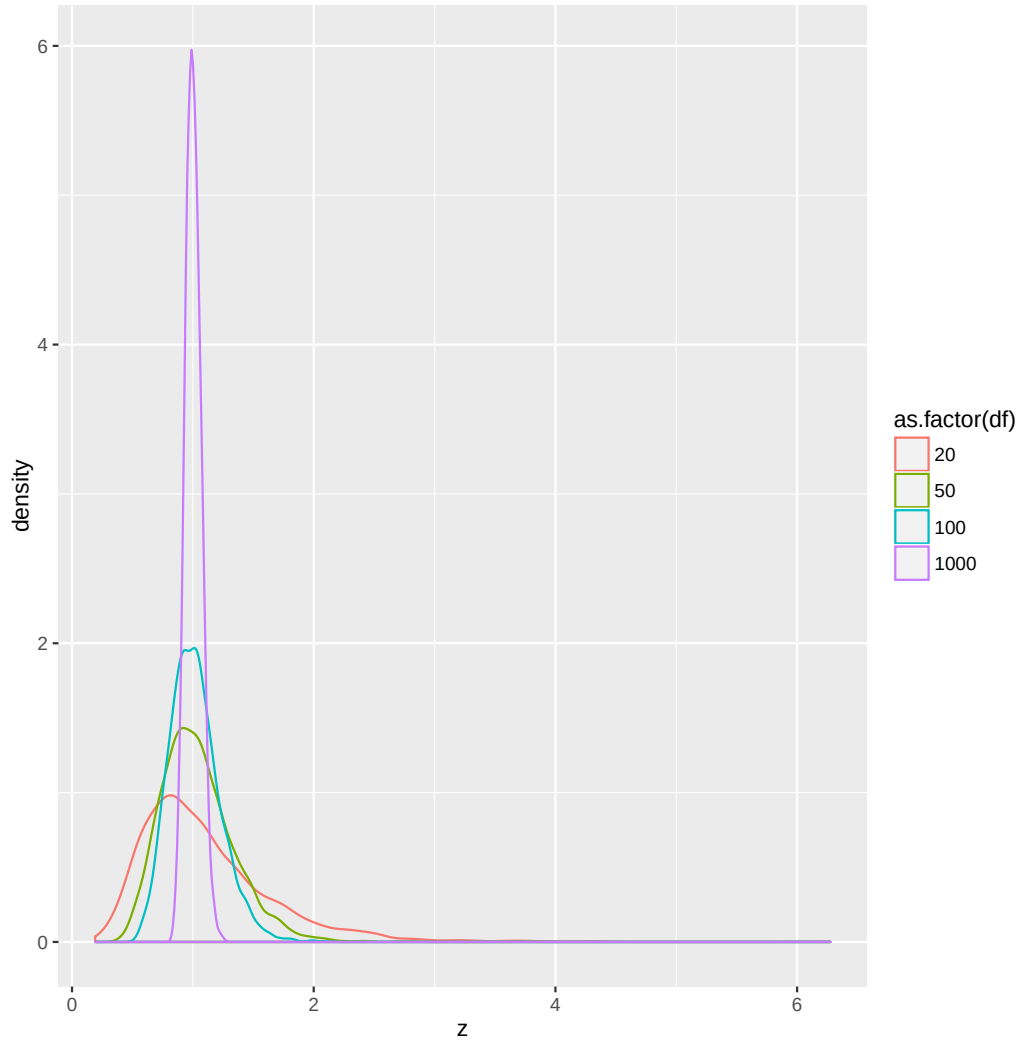

Figure 1: Randomness in perception of self and opponent

Methods

Results

Discussion

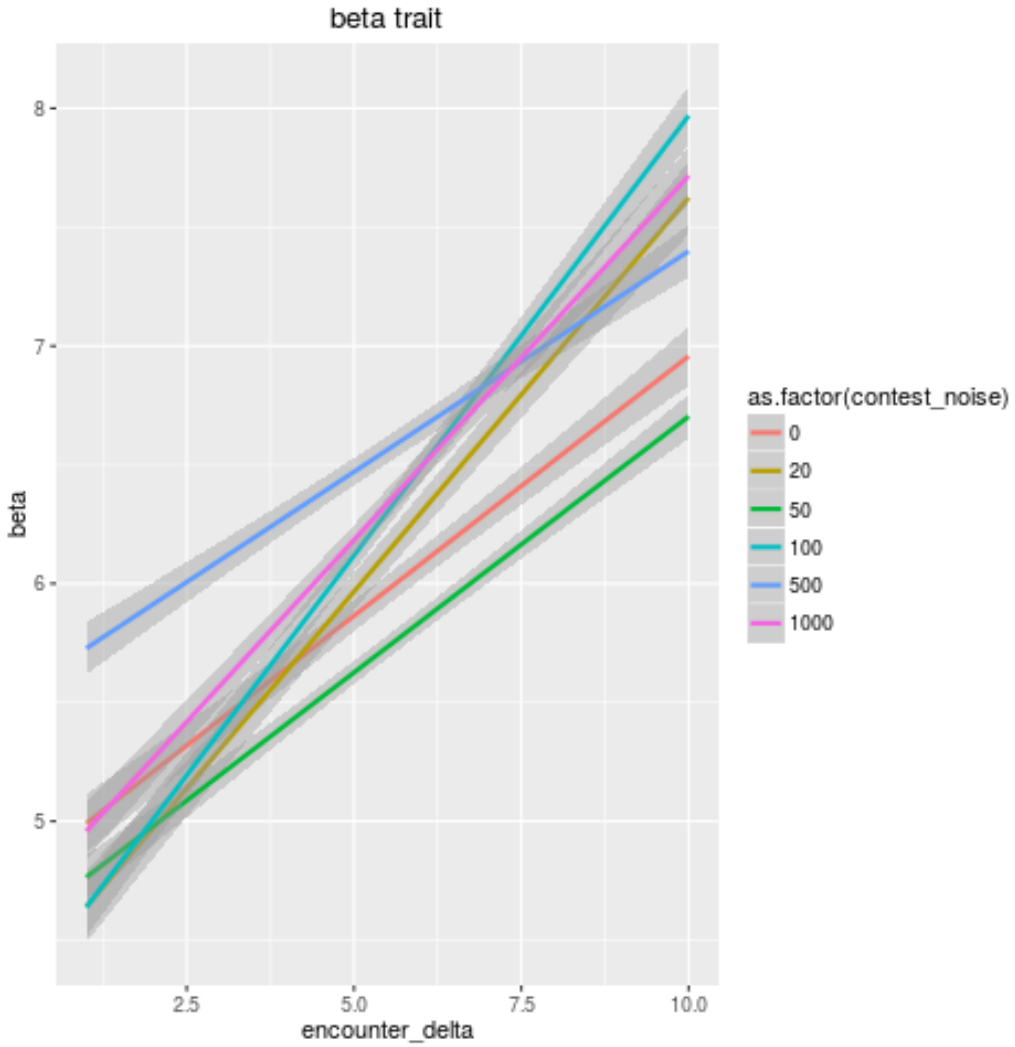

Figure 2: β trait with increasing average time between encounters. coloured by level of reliabilty of in self and opponent mass judgements.

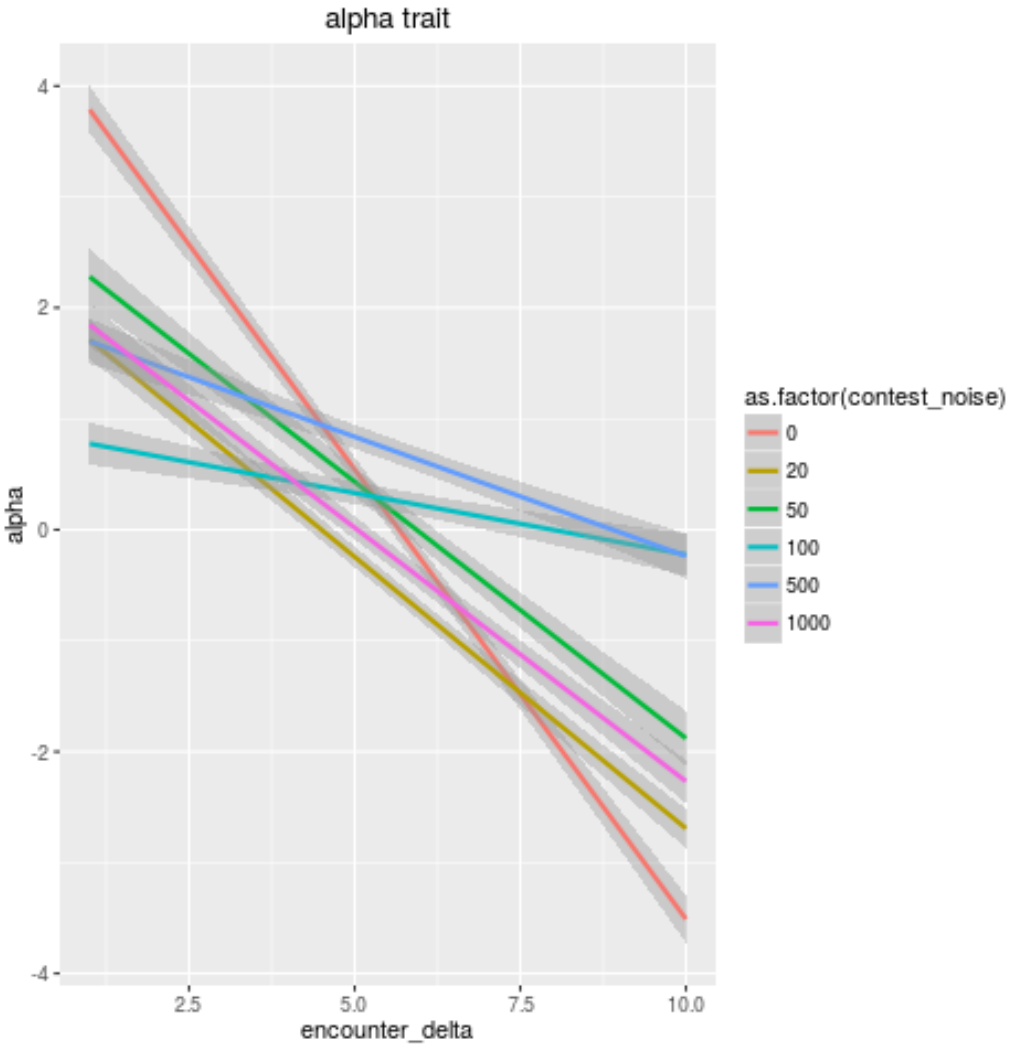

Figure 3: Randomness in perception of self and opponent

	Parameter	.
1	max_gens	10000.00
2	males_per_winner	10.00
3	num_nests	100.00
4	encounter_delta	1.00
5	metabolism	1.00
6	female_mat_time	10.00
7	maturation_rate	1.00
8	mutation_rate	0.00
9	mutation_sd	0.01
10	mass_to_energy	10.00
11	growth_a	0.50
12	growth_b	0.10
13	initial_mass	5.00
14	alpha_mean	0.00
15	alpha_sd	3.00
16	beta_sd	3.00
17	beta_max	10.00
18	beta_mean	0.00
19	verbose	0.00
20	log_every	1000.00
21	contest_noise	0.00
22	quiet	1.00

Table 1: The Parameters used to run the model

References

Biro, P.A. & Stamps, J.A. (2008) Are animal personality traits linked to life-history productivity? *Trends in Ecology & Evolution*, **23**, 361–368.

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