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Introduction

In cooperative breeders, **reproduction is highly skewed** toward dominant individuals. Thus, **dominant male's reproductive success** depends on :

- number of young sired
- dominance tenure length

Subordinates can increase their direct reproductive success by:

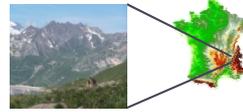
- performing extra-pair paternity (EPP)
- becoming dominant

→ Conflict between dominants and subordinates

Hypothesis: The presence of sexually mature male subordinates decreases dominant's reproductive success

Methods

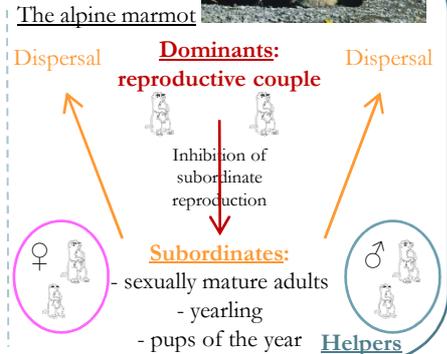
Study site



Natural population in the French Alps, studied since 1990

Statistical methods:

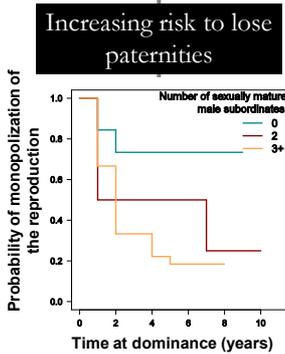
Survival analyses, using Cox model with time dependent data



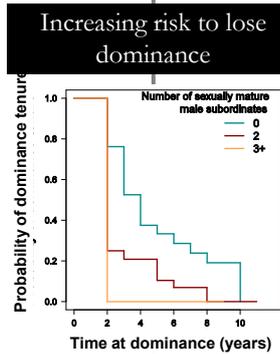
Results

↑ Number of sexually mature helpers

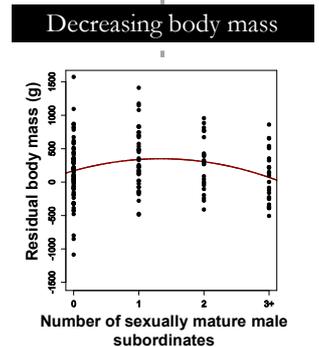
Possible mechanism



Hazard ratio = 1.36 [CI95%: 1.04-1.77]
 $\beta = 0.31 \pm 0.13$, $z = 2.31$, $P = 0.021$,
 $N = 152$

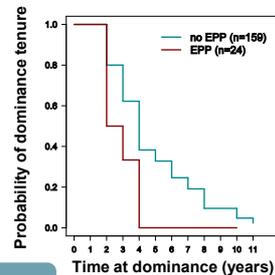


Hazard ratio = 1.27 [CI95%: 1.02-1.58]
 $\beta = 0.24 \pm 0.11$, $z = 2.19$, $P = 0.03$,
 $N = 190$



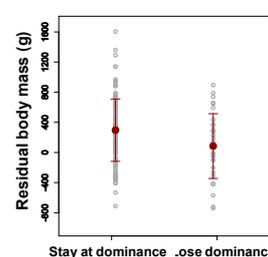
$\beta = 200.11 \pm 93.53$, $t = 2.14$, $P = 0.03$,
 $\beta^2 = -67.68 \pm 33.09$, $t = -2.05$, $P = 0.04$,
 $N = 177$

Males that cannot monopolize reproduction cannot maintain dominance



Hazard ratio = 2.16 [CI95%: 1.23-3.79]
 $\beta = 0.77 \pm 0.29$, $z = 2.68$, $P = 0.007$,
 $N = 183$

Males losing dominance have lower body mass than males staying dominant



$t = 2.54$, $P = 0.01$
 $N_{stay} = 128$, $N_{lose} = 33$

Extra-pair paternities

Dominance tenure

Body mass

Conclusion

→ The presence of more than one sexually mature helpers have strong consequences on dominant's reproductive success

Dominant males with a high number of helpers are more likely to lose the control over both paternity and dominance, one possible mechanism being that the presence of more than one competitor decrease the dominant's body mass and thus, its competitive abilities.