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# IS IT A BOY OR A GIRL? TESTING HYPOTHESES TO EXPLAIN VARIABLE SEX RATIOS IN COLUMBIAN GROUND SQUIRRELS

Thibaut Barra , Vincent A. Viblanc , Claire Saraux , Jan O. Murie , and F. Stephen Dobson 

## Study description

Three main hypotheses have been proposed for explaining departures from even sex ratios in animal populations, based on variation in maternal and social characteristics. The Trivers–Willard (1973) model proposes that mothers in good condition will produce more males, based on their competitive ability, and superior future reproduction. The local resource competition model proposes that philopatric females will produce more sons in large matriline, to reduce future competition with daughters. A final model invokes advantages of maintaining matriline, despite increased competition among females. We evaluated these hypotheses in the Columbian ground squirrel (*Urocitellus columbianus*), a semi-social species characterized by strong female philopatry.

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Photo 1. Columbian ground squirrel female with dry grass material collected from the meadow she inhabits, with which she will line her burrow. Ground squirrel females give birth and raise their young in individual nest burrows that they defend against other colony members. Daily field observations allow us to detect and identify those nest burrows and capture the young as they first emerge above ground, around the time of weaning. Photo credit: Sebastian Sosa, Institut Pluridisciplinaire Hubert Curien, CNRS, France.



Photo 2. Columbian ground squirrel juvenile busy foraging. Offspring are born naked and blind, and nursed in nest burrows over a period of approximately 27–28 days. They are weaned shortly after and must rapidly forage and gain weight over a few weeks before their first hibernation. Our study suggests that male offspring are costlier to produce than females, in terms of body mass. With more local kin present, mothers in the best condition biased offspring sex ratio towards males, and mothers in poor condition biased offspring sex ratio towards females. Without co-breeding close kin, the pattern was reversed, with mothers in the best condition producing more daughters, and mothers in poor condition producing more sons. These results suggest a combination of influences of relative maternal condition and matriline dominance on offspring sex ratio. Photo credit: Sebastian Sosa, Institut Pluridisciplinaire Hubert Curien, CNRS, France.

These photographs illustrate the article “Parental investment in the Columbian ground squirrel: empirical tests of sex allocation models” by Thibaut Barra, Vincent A. Viblanc, Claire Saraux, Jan O. Murie, and F. Stephen Dobson, published in *Ecology*. <https://doi.org/10.1002/ecy.3479>