

Knechtel, H.A. 1998. EFFECTS OF AGE, GENDER, AND CONDITION ON THE REPRODUCTIVE EFFORT OF CASSIN'S AUKLETS (*Ptychorampus aleuticus*) ON TRIANGLE ISLAND, BRITISH COLUMBIA. MSc, Simon Fraser University, Burnaby, BC. 96 pp.

ABSTRACT

The primary goal of my research was to determine the effects of age, gender, and individual phenotypic quality (body reserves and immune function) on reproductive effort (egg size and laying date) in Cassin's Auklets (*Ptychorampus aleuticus*) on Triangle Island, British Columbia. Breeding individuals were categorized as 'young' or 'old' based on iris colour. Two measures of condition were related to reproductive effort: body reserves (mass corrected for structural size) and immune function (heterophil:lymphocyte ratio or H:L ratio, an index of stress or infection). Although Cassin's Auklets exhibit a low degree of sexual dimorphism, I confirmed, using a molecular sexing technique, that bill depth is a reliable indicator of sex within breeding pairs. Using bill depth data from 115 pairs, I showed that 85% of randomly caught individuals could be accurately sexed. The ability to sex individuals is of value for determining gender in an ongoing mark-recapture study examining adult survival on Triangle Island. I further utilized the molecular sexing technique to show a male-biased offspring sex ratio close to fledging.

Egg size variation was related to offspring 'quality': larger eggs produced hatchlings of greater mass and structural size. Although this effect did not persist beyond 5 days post-hatch, hatching from a larger egg may lower starvation probability in years of poor food availability. I found significant age effects in some measures of female reproductive effort, but not in others. Old females laid significantly earlier, but no age-related differences were found in egg size. By laying late, young females may have incurred greater fitness costs, since conditions are usually unfavorable for raising young later in the season. I found no age effect on female body reserves, however, the H:L ratios of young females were significantly higher, indicating greater stress or infection. Elevated H:L ratios in young females, but not in young males, may reflect the greater gametic effort of females (egg production).

Variation in effort was related to condition in old breeders, but not in young breeders. Optimization theory suggests that for individuals to maximize lifetime reproductive success, they should base reproductive effort their condition, and maintain that level of condition throughout the breeding cycle. There was a positive correlation between laying date and H:L ratios in old males and females, but not in young breeders. This positive relationship in old males may mean that male 'quality' is important in determining laying date. Similarly, old females showed a positive correlation between body reserves and egg size, while young females did not. Since individual condition was measured late in incubation, the positive correlations between effort and condition in old, potentially more experienced individuals suggests that they are better at optimizing current reproductive effort.