

# Does chick development relate to breeding latitude in waders and gulls?

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Growth rate and energetics of avian chicks are expected to be adapted to mode of development, breeding habitat and geographic location of breeding. Waders and gulls are excellent organisms on which to test these hypotheses since they have wide breeding distributions from the Arctic to Antarctica, and exhibit considerable variation in breeding ecology. I use growth rate coefficients to analyse the growth of wader (Charadrii) and gull (Lari) chicks from my own fieldwork and published data (142 species). I also analysed published and new energy expenditure data for wader and gull chicks. These datasets are larger than those of previous studies and include novel data for precocial and semi-precocial wader species from the southern hemisphere. I found (1) that growth rate coefficients are greater in smaller species; (2) that growth rate coefficients of waders and gulls increase with breeding latitude, and those of gulls are greater than those of waders of similar size; (3) that peak daily metabolisable energy (DME) and total metabolisable energy (TME) of 23 wader and gull species are influenced by fledging mass, and peak DME increased with both increases in the length of the pre-fledging period and latitude; (4) that hatchling resting metabolic rate (RMR), peak RMR and RMR over the whole pre-fledging period of waders and gulls increases with increasing body mass; and (5) that chicks with shorter pre-fledging periods had a greater peak RMR and semi-precocial chicks expended less energy on RMR over the whole pre-fledging period than precocial chicks. These results gave me the opportunity to discuss evolutionary adaptations that might explain differences in growth and energetics among wader and gull species. Further analyses are necessary to control for phylogenetic non-independence of species and to consider other potentially confounding life-history variables such as parental care.