

Alpine Birds: The secrets to life on high

In mountain habitats, temperatures approach freezing almost nightly and it can snow or hail on any summer day. In such conditions, humans need a winter-rated sleeping bag for a comfortable rest, but small 20 to 40g songbirds can survive and maintain their eggs at almost 40°C sitting on their ground nests above the permafrost for about 19 hours/day. Birds at low elevation start breeding in late March and produce 3 to 4 broods of young/year, but in the alpine the same species may not start nesting until early June and produce only one brood per year. Little is known about how songbirds live at high elevation, yet over 90 bird species, as well as many mammals and herptiles, live and breed successfully in the often inhospitable mountain habitats.



Alpine in summer on Hudson Bay Mountain (HBM), near Smithers British Columbia; Inset shows HBM after snow storm on 4 July 2002.

Dr. Kathy Martin (EC S&T, Vancouver) and her students at UBC conduct research aimed at understanding the ecological secrets and conservation status of avian life on high. Mountain bird populations could be comprised of inferior individuals that move away from alpine habitat as soon as they get a chance, or birds may live life differently in mountains to compensate for the rigorous conditions. The main hypothesis being tested is that as elevation increases, mountain birds adopt a slower lifestyle (ALPINE TIME) where they produce fewer offspring each year compared to birds at low elevations, but live longer and thus have more years to breed.

Research on Dark-eyed Juncos, Horned Larks and Savannah Sparrows in British Columbia, Alberta, and the Yukon has revealed some secrets to alpine living. High elevation songbirds are larger and have up to 20% higher annual survival than the same species living in lower elevation habitats. Their offspring also have high survival and a strong tendency to return to their birth sites. Thus, most of the birds living in alpine habitats are not inferior individuals, but have developed a slow lifestyle and live and breed successfully.



Hungry horned lark nestlings in ground nest in the alpine

Secrets to alpine life yet to be revealed centre around how birds adopt this slow lifestyle at high elevation. Do they differ genetically from their low elevation counterparts, or switch to a slow lifestyle if they find themselves at high elevation? Little is understood about the coping mechanisms for animals living in the alpine, although we know birds can adjust their physiology, biochemistry or endocrinology to avoid severe stress responses to low oxygen levels or to extreme weather events that would result in certain failure for birds breeding at low elevation. For most species, we do not know whether ALPINE TIME is comparable to the faster life styles at low elevations.

This research has relevance to avian conservation and management. Some alpine populations may differ genetically, and thus may represent new sub-species or new species. For many species, such as horned larks, with rapid declines at low elevation across North America, mountains may represent critical refuge habitats. Since alpine habitats are experiencing globally significant warming, it is critical to determine the vulnerability of alpine birds to climate change. With a slow life style, they may be reasonably buffered against extreme weather events that cause breeding failure every few years, but climate change impacts that reduce their survival could be catastrophic for alpine birds. More information on alpine birds is available at the Centre for Alpine Studies Website:

<http://www.forestry.ubc.ca/alpine>



Male horned lark in the alpine

Recent references for alpine bird ecology and conservation:

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