

Colourful boundary trespassers: burrowing parrots crossed the Andes 120,000 years ago

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Burrowing Parrots at a feeding place. These parrots originated in the meagre steppes of the Andean slopes in Chile, from where they expanded to Patagonia reaching as far as the Atlantic Ocean. © Fabián Llanos

The Andes of southern South America form a hostile mountain range with glaciers, salty deserts and meagre high elevation steppes. Birds from more moderate climate zones cross this mountain range only rarely. Nevertheless, many species live on both sides of the Andes, as in the case of the Burrowing Parrot *Cyanoliseus patagonus*. Researchers from the Max Planck Institute for Ornithology, together with colleagues from the University of Freiburg and the Konrad Lorenz Institute for Ethology, Viena, found that the ancestral population of the Burrowing Parrot occupied what is today Chile, and from there only a single crossing of the Andes was successful.

Burrowing Parrots offer good possibilities to study how [animal species](#) expand to suitable habitats overcoming natural barriers, as they are tied to specific places for breeding, thus restricting the number of breeding sites. These colourful parrots breed in colonies located in cliffs of sandstone or limestone. The ravines with the colonies are usually located along rivers, in the valleys at both sides of the Andes, and along the cliffs of the Atlantic coast. The researchers conducted two surveys of more than 13,000 kilometres, discovering 66 colonies of Burrowing [Parrots](#) where they collected naturally moulted feathers. The researchers were able to decode relationships among individual colonies using [genetic material](#) extracted from these feathers.

“The results are fascinating”, Juan F. Masello explains, “Contrary to our expectations, the ancestral population originated on the Pacific side of the Andes, where Chile is now, and where there are only small colonies at present. From there, this species managed to successfully cross the Andes on a single occasion. The two Argentinean sub-species originated from this starting population. One of them successfully expanded along rivers until reaching the Atlantic Ocean, where the largest colonies of the species can presently be found. In El Cóndor, this species forms the largest parrot colony in the world, with more than 35,000 breeding pairs.”

“The genetic data were brought into a timeframe using the age of fossils” added Petra Quillfeldt. “This way, we were able to estimate that the crossing of the Andes occurred more than 120,000 years ago.” “Our findings are very important for improving conservation actions of the different sub-species”, added the researchers. The Chilean sub-species is highly threatened by extinction, as only 5,000 – 6,000 of these animals remain. Even today, too many individuals are caught and kept as pet companions. The strong genetic separation of the Chilean sub-species is another reason for the strengthening of conservation measures. A similar situation affects the northern sub-species in Argentina, of which only

2,000 pairs breed in the wild. The numerically largest sub-species, occurring in Patagonia (southern Argentina), is threatened by habitat destruction, as the steppes are rapidly cleared for the production of Soya.

A similarly comprehensive study, investigating a bird species in its entire range on both sides of the Andes, was not available until now. The study shows that the Andes are an effective barrier to gene flux that is only rarely overcome. The crossing of the Andes occurred in the area of the high [Andes](#) close to the Aconcagua (6,962m), probably over a pass of more than 3,000 meters of altitude.

More information: Masello, J.F., Quillfeldt, P., Munimanda, G.K., Klauke, N., Segelbacher, G., Schaefer, H.M., Failla, M., Cortés, M. & Moodley, Y. The high Andes, gene flow and a stable hybrid zone shape the genetic structure of a wide-ranging South American parrot. *Frontiers in Zoology*, 8, e16, published 15 June 2011.
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