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Temperate Wadden Sea helps bar-tailed godwit adapt to climate change in the Arctic

The amount of food in the Wadden Sea determines whether or not bar-tailed godwits will make it to their Siberian breeding grounds and back alive. In the latest issue of *Nature Communications,* Dr. Eldar Rakhimberdiev of the NIOZ Royal Dutch Institute for Sea Research and colleagues analyse the density of lugworms in the Wadden Sea in relation to the survival of godwits. "Due to the changing climate, these birds need to arrive in Siberia a bit earlier every year, in order to benefit from the shifting peak in insect abundance. Whether or not they are able to make this adjustment, is determined by the number of worms in our Wadden Sea", Rakhimberdiev says.

A bar-tailed godwit in the Wadden Sea looking for food. Photo: Jan van de Kam

Climate changes faster in Siberia

The further up north on the globe, the faster the climate is changing. As a result, on the Siberian peninsula Taimyr snow now melts on average fifteen days earlier than twenty years ago. This early spring prompts insects like crane flies to emerge from the soil ten days earlier. To keep up with the changing life cycle (phenology) of the insects their chicks feed on, tundra-breeding migratory birds like bar-tailed godwits are forced to arrive earlier at their breeding grounds. During the past twenty years, the birds were able to advance their spring migration four days, Rakhimberdiev shows.

Fuelling station in temperate Wadden Sea
Bar-tailed godwits spend the winter in western Africa. By the end of April, they arrive on the intertidal flats of the Wadden Sea, that stretches from Denmark to The Netherlands, after a non-stop flight of approximately five thousand kilometres in just four days. Here they double their body mass from two hundred grams on arrival to four hundred grams on departure, on a diet of mainly lugworms. “Our analysis shows that at a certain point the birds just leave for Siberia”, Rakhimberdiev says, “regardless of whether or not they have fuelled up enough. Their urge to leave in time for the breeding grounds appears to be stronger than their need to fuel up to the top.”

Bar-tailed godwits fly approximately five thousand kilometres in just four days to get to their breeding area in Siberia. Photo: Jan van de Kam

More worms, better survival
With this pressing need to leave for Siberia, the density of lugworms in the intertidal flats of the Wadden Sea appears crucial for the survival of the birds. In years with higher numbers of worms, survival rates of godwits were significantly higher than in years with lower worm densities.

Wadden crucial link
“These analyses show that the problems birds encounter due to the changing climate in the Arctic, can, at least partly, be solved in the temperate regions”, says Theunis Piersma, team-leader of Global Flyway Ecology research at NIOZ and the University of Groningen. “By analysing data that we have been collecting over the past decades, we were now able to show the vital importance of the Wadden Sea for migrating birds like these bar-tailed godwits. They can cope with climate change in the Arctic only if they find enough food in our Wadden Sea.”

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Article

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