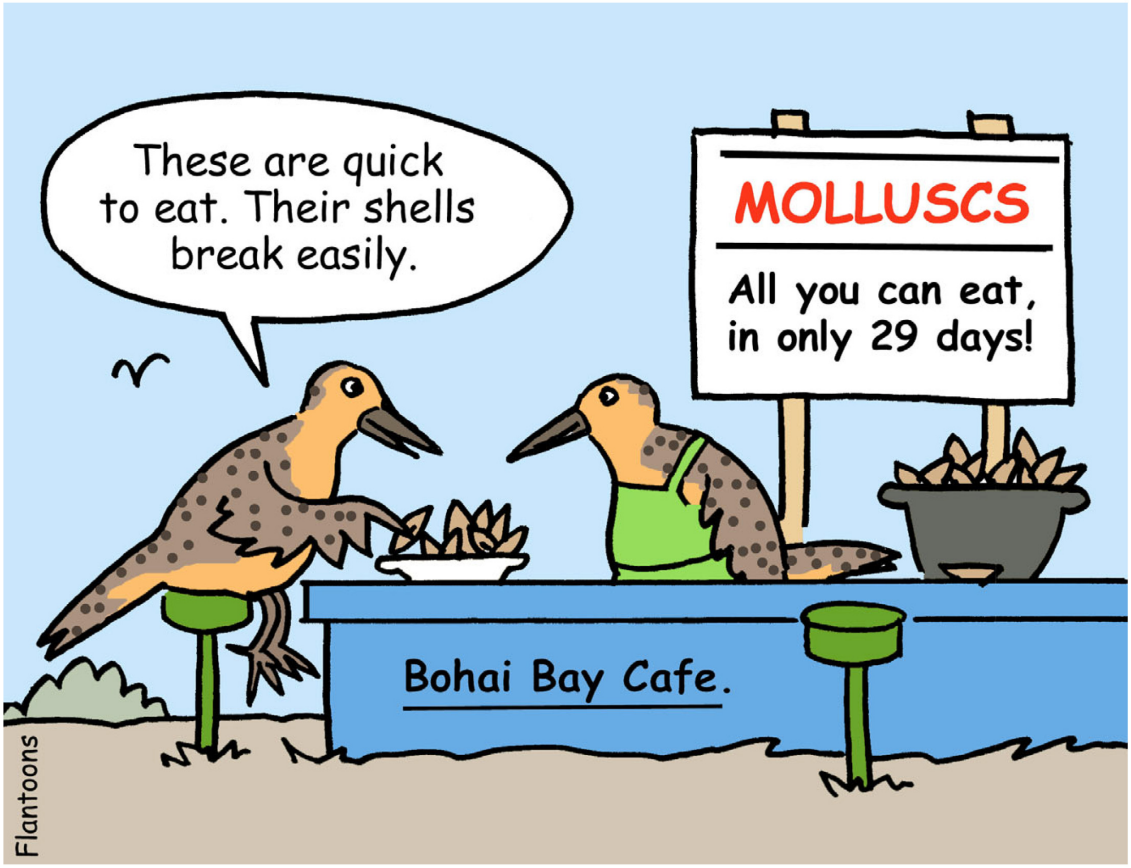
CRUSHABLE MOLLUSCS KEY TO BOHAI BAY'S POPULARITY



As they make their long Artic-bound journeys from their wintering grounds in the southern hemisphere, red knots make at least one short pit stop. They need to refuel fast, and if prey quality is low, they will usually increase the size of their gizzards so they can handle more food. However, if the menu is good, they'll reduce their gizzards instead, to save hauling excess weight around. Red knots travelling up from Australia and New Zealand usually stop over at Bohai Bay, in China and Theunis Piersma, from the University of Goningen, The Netherlands, wondered what fuelling opportunities were on offer at these mud flats. To find out he assembled a team (p. 3627).

By collecting the birds' droppings, the team found that red knots mainly eat the most available, *Potamocorbula*, molluscs. However, these tiny bivalves, with their low flesh to shell ratio, provide little energetic value – just 1.32 kJ g^{-1} dry shell mass, almost three times lower than the food from the red knot's summer homes – and usually they would ignore them. What's more, when the team analysed the birds' gizzards they found that they hadn't grown but had in fact shrunk by 17–48%. With such measly fare on offer, and small gizzards, the knots would, on average, have an intake rate of just 2.7 J s^{-1}, well below the 3.6 J s^{-1} rate required to fatten up during their brief 29 day layover.

So why do red knots keep stopping off at Bohai Bay? Piersma and his team decided to look at how quickly red knots could digest the shells. As the *Potamocorbula* molluscs are so small, they can be easily crushed and were processed at a speedy 3.93 mg s^{-1}. With such high rates, the overall energy intake rate increased to 5.1 J s^{-1} – more than enough to gain the 80 g of fat needed for their onward journeys. While *Potamocorbula* molluscs might not be a red knot's first choice, the crushability of these bivalves and their unique abundance at Bohai Bay offers knots the best of both worlds – the ability to stock up quickly and reduce gizzard size.

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Yang, H.-Y., Chen, B., Ma, Z., Hua, N., van Gils, J. A., Zheng-Wang, Z. and Piersma, T. (2013). Economic design in a long-distance migrating molluscivore: how fast-fuelling red knots in Bohai Bay, China, get away with small gizzards. *J. Exp. Biol.* **216**, 3627-3636.

Nicola Stead
nicola.stead@biologists.com