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INSIDE JEB

Testosterone soups up golden-collared manakin roll-snap at expense of endurance

Golden-collared manakin (*Manacus vitellinus*) males like to put on a flamboyant show for the ladies. Snapping their wings together almost as fast as bees to produce a distinctive mechanical buzz – known as a roll-snap – the dainty males bound to and fro between saplings during the mating season in an attempt to outshine other nearby suitors. But the diminutive birds pay a price for their ostentatious demonstration; they can't continue snapping their wings for long before the scapulohumeralis caudalis muscle powering the whirlwind display tires. 'A faster roll-snap results in a display with fewer total snaps', says Matthew Fuxjager from Brown University, USA. Yet it wasn't clear whether the trade-off between roll-snap speed and duration occurs because the muscle is working at its physical limits, losing endurance as it contracts faster, or whether the muscle adapts in the run up to the breeding season to reduce the trade-off.

Intrigued by the flirtatious little creatures, Fuxjager, Daniel Tobiansjy, Meredith Miles and Franz Goller headed to Panama to find out how the extraordinarily fast muscle performs when the hormone testosterone – which builds up the muscle in preparation for their show – can't work its magic. The team reasoned that if physical limits were impeding the muscle's ability to contract fast, blocking testosterone would reduce the impact of the trade-off, reducing how quickly the muscle tired at the fastest contraction rates.

Giving three male golden-collared manakins a drug that prevented testosterone from having an effect for a week, the team then compared how the birds' roll-snap muscle contractions compared with the muscle contractions of birds that still benefited from their testosterone surge. They discovered that the muscle of the birds that could respond to testosterone began tiring significantly at wingbeats faster than 67 beats s^{-1}; they traded-off endurance for speed. However, when the team tested the muscle of the birds treated with testosterone blocker the muscle contracted more slowly; testosterone was speeding up the contraction resulting in the speed/endurance trade-off.

Fuxjager says, 'Our results suggest that testosterone speeds up the muscle so that it can produce a sexy display, but in doing so reduces the muscle's endurance. In this way, testosterone enhances one element of the bird's courtship signal, while impeding another at the same time'.

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