
Drinking with an elastic strip

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Abstract

If hummingbirds' wings beat at 60 strokes per seconds, it is not only to parade with their acrobatic flight ability, but also because it enables them to hover above flowers while they harvest nectar. This process, strongly energy consuming, forces these small animals to find clever ways to drink the viscous nectar. Unlike other birds, who fill their beak then tilt the head to let liquid flow, hummingbirds rather use their tongue to drink. We investigate this unique feeding technique by direct observation and by designing a biomimetic device with an elastic strip. We show that hummingbirds use their tongues not only as a capillary pump but also as an elastic trap to capture liquid. In addition, our artificial device allows us to characterize the details of the liquid capture, but also how the withdrawal of the tongue allows the birds to harvest much more liquid – a rare case where contact angle hysteresis is turned in an advantage.

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