



Immature Broad-tailed Hummingbird with tongue extended. Photographed in New Mexico by Ross Hawkins. Used with permission.

The Amazing Hummingbird Tongue!

Everything about the hummingbird seems to be a source of amazement. We are familiar with its extraordinary mode of flight, with its high-speed metabolism, and its rainbow-like iridescence. Less dramatic, but equally impressive is its long tongue, shown fully extended in the photo above.

We normally get few chances to see the hummingbird's tongue, as it is sheathed inside the bill. In hummingbirds this bill is long and slender compared to other birds. Bill length varies widely, though, depending on species: The shortest bill found among the 328 species is less than 1/2 inch (12 mm) in the Purple-backed Thornbill (*Ramphomicron microrhynchum*), and the longest is 3.25-4 inches [!] (83-105 mm) in the Sword-billed Hummingbird (*Patagona gigas*).

The tongue in virtually all species is quite long and typically can extend beyond the bill a distance equal to the

length of the bill itself! This allows the tongue to reach into deeply tubular corollas of nectar-containing blossoms, even if the bill itself cannot.

Early investigators thought the tongue was like a soda straw, and that the nectar in the flower was sucked up. That may be the case with the proboscis of insects like butterflies and moths, but it turns out not to be the case with hummingbirds. Hummers do not suck the nectar, but lap it.

Picture the long tongue, with the outermost end forked and with fringes; then picture two troughs

along both sides of the tongue, each like a soda straw with 1/4 of the circumference removed. Clearly, suction cannot be the mechanism, because the troughs are open.

When the tongue is inserted into nectar, capillary action causes the liquid to be pulled up into the troughs. Then, when the bird retracts the tongue, it is believed that pressure on the tongue causes the liquid to be squeezed out. Other mechanisms are possible, however. What matters is that once the liquid is extracted from the tongue, it can be ingested and sent to the crop, on its way to becoming power for its powerful—but inefficient—mode of flight. Nectar is also used, of course, for body tissue growth and maintenance.

The tongue can move into and out of the nectar quite rapidly, in the range of 3-12 times per second. Perhaps you may have noticed this if ever you have been close enough to a feeder to watch the tongue moving in and out of the liquid.

Research on the Ruby-throated Hummingbird shows that each of the troughs on the side of the tongue can carry as much as 0.4 microliter. If the bird is to take in 6,000 microliters of nectar a day, that implies many licks in many blossoms. One study of an Anna's Hummingbird showed it visited just over 1,000 blossoms a day!

Movement of the tongue is controlled by the rear half, which is mostly muscular rather than cartilaginous. In a curious structure called the hyoid apparatus also found on certain other birds like woodpeckers, this muscle goes under and up around the rear of the skull.

What the tongue does *not* do is to catch insects. A hundred years ago, investigators knew that hummingbirds fed on insects. They guessed that the tongue was sticky, enabling tiny insects to be extracted from the base of flower corollas, caught in midair, or gleaned from the undersides of leaves. Not so. The tongue is demonstrably not sticky. And midair catches are done with a widely gaping bill (hawking), not the tongue.

The tongue is yet another reason to be fascinated by a hummingbird!

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