

ABOUT THE COVER: RUBY-THROATED HUMMINGBIRD

Almost everything about hummingbirds is unusual which may help explain why so many people are thrilled by the sight of these smallest and often brilliantly colored birds. They are the only birds that can hover in one spot as long as they wish and the only birds that can fly backwards. They also have the highest metabolic rate of all vertebrates.

The name "hummingbird" was acquired from the early english colonists who knew the Ruby-throated Hummingbird by its buzzing flight. The Rubythroat's body size is no larger than the end joint of one's thumb. It is the only hummingbird that breeds east of the Mississippi River, and is usually seen in Massachusetts from about mid-May to late September. The Rubythroat produces two, and occasionally three, broods per season in deciduous or mixed woodlands, open areas with scattered trees, gardens, and parks. Many Rubythroats, in both spring and fall, migrate across 600 miles of water of the Gulf of Mexico to and from its wintering grounds in Central America.

The male Ruby-throated Hummingbird has an iridescent green back and a brilliant red throat, while the female lacks the red throat. Interestingly, most of the colors of hummingbirds are the result of structural effects rather than pigmentation. The scaly feathers of hummingbirds produce their iridescence from the play of light on their surfaces. The only true pigments in hummingbirds are black and rufous: the rest of their spectacular colors are produced mechanically.

In breeding season, the male Ruby-throated Hummingbird moves from partner to partner, leaving the female to raise the young alone. Such mating systems, in which no pair bonds are formed, are termed promiscuous. During courtship, the male swings pendulumlike before the female, rising about eight to ten feet above and five to six feet to each side of her. Before copulation, the male and female face each other, alternately ascend about ten feet and descend, and eventually drop to the ground and copulating.

The nest, built by the female, is a delicate cup, about one and one half inches wide, decorated with lichens, bound together by spider silk, and anchored on a small branch. Two white bean-sized eggs are laid. The young birds are fed by regurgitation. The female puts her long sharp bill directly downward into the young bird's open gape.

One of the more fascinating aspects of hummingbirds is their ability to hover and their extremely rapid wingbeat. A high speed motion picture of the Ruby-throated Hummingbird in flight, taken in 1936 by Harold Edgerton of the Massachusetts Institute of Technology, revealed wing beats of fifty-five times per second while hovering, sixty-one times per second while backing up, and seventy-five times per second while flying straightaway. The ability to hover

can be traced to an extremely mobile shoulder joint which enables the bird to twist its wings in such a way as to generate lift on both the forward and backward strokes. Ehrlich and coauthors described the mechanics as follows:

The front edge of the wing leads on both strokes, and on the backstroke it is the underside of the feathers that face upward, the shoulder rotation having, in effect, turned the wing upside down . . . The direction of thrust changes between the forward and backward strokes, so that they cancel each other out . . . the hovering flight is quite expensive: about 30 percent of the total body weight of hummingbirds is invested in the breast muscles (which power the wings), whereas other strong-flying birds have about 20 percent, and weak fliers may have only about 15 percent [Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*, New York: Simon & Schuster Inc., p. 323].

Ruby-throated Hummingbirds feed on insects and occasionally tree sap from woodpecker drillings. The latter feeding behavior is an example of commensal feeding, where members of one species (such as a woodpecker species) assist the foraging of another (such as a hummingbird species) but incur no significant costs and receive no benefits.

Martha J. Steele

MEET OUR COVER ARTIST

This issue of *Bird Observer* is the second consecutive issue with cover art provided by Gordon Morrison. The cover shows a detail of a limited edition print of the Ruby-throated Hummingbird. In addition to his works described in our April 1991 issue, two coloring books of the Peterson series, *A Field Guide to Tropical Rainforests Coloring Book* and *A Field Guide to Endangered Animals of North America Coloring Book* are due for release in the fall of 1991. Gordon had previously provided the art for two other coloring books, *A Field Guide to Dinosaurs Coloring Book* and *A Field Guide to Seashores Coloring Book*. For readers interested in a limited edition print of this month's cover or in other artwork, Gordon can be reached at 52 Bulfinch Street, North Attleboro, MA 02760.

Martha J. Steele