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## **Tropical Birds 2: Diversity and Colour**

This week, I will continue to explore the birds of the Neotropics as experienced by a migrant blackburnian warbler, born and raised in the north Kawarthas, making his first trip to wintering grounds in Ecuador and Columbia.

The blackburnian warbler winters further south than most migrants that nest in the Kawarthas. Most species choose to overwinter further north in Central America, Mexico and the West Indies. Therefore, our warbler friend won't see many other migrants from the woods of central Ontario. In fact, the only species that may be familiar to him are the broad-winged hawk, red-eyed vireo, Canada warbler and eastern kingbird. He might not even recognize the kingbirds, however, given their strange behaviour. In the summer, these familiar black and white denizens of fence rows and roadsides are extremely aggressive and territorial, shunning others of their kind. But, during migration and while they are on their Amazon Basin wintering ground, kingbirds congregate in large, nonterritorial flocks. Their flycatching ways are abandoned for a diet of mostly fruit.

The first thing the blackburnian will notice upon his arrival in the tropics is the mind-boggling variety of forms of life. In every sector of the flora and fauna, tropical nature is typified by an overwhelming diversity of species. Ecuador, for example, a country the size of Colorado, has nearly 1600 species of birds. Canada and the United States together have fewer than 700! If you compare the number of breeding birds in areas of approximately equal size, there are about 60 around Hudson Bay, 110 in northwestern Ontario, 150 in southern Texas, 600 in Panama and 800 in eastern Ecuador. Whereas a large woodlot in the Kawarthas may have a dozen species of trees, an area the same size in Ecuador may have well over 200. Be it bats, butterflies, frogs or fish, this same trend is repeated again and again in every sphere of life.

Obviously, we must ask why it is that the number of species increases in such a predictable fashion as you move south towards the Equator? First of all, we have to consider the evolutionary events that produced so many species in the first place. Factors such as geographical history, competition between species and the structural complexity of rainforests themselves have played a huge role in this regard. It's also necessary to identify the present-day mechanisms that accommodate so many species and allow them to continue to flourish. These include a warm climate and the presence of year-round foods such as fruit and nectar that are lacking in temperate latitudes such as ours.

Tropical forests have numerous unfamiliar birds with no obvious North American counterparts. This can partly be explained by the incredibly complexity of the plant life itself. Each of the thousands of plant species presents a different challenge to birds if they wish to exploit them as a source of food.

Take hummingbirds, for example, of which more than 200 species call Ecuador home. Tropical hummingbirds show an amazing range of body sizes, tail shapes, bill lengths and degree of bill curvature. This incredible diversity allows them to specialize in extracting nectar in a multitude of ways, depending on the species. Some, such as the fairies, specialize in stabbing the base of a flower's corolla and stealing nectar; coquettes are so small and agile that they can dart in and feed at a nectar source before other species see them and chase them away; hermits, unlike most hummingbirds, are not territorial but visit scattered flowers in the understory, almost like a trapper working a trapline; sicklebill hummingbirds sport bills that are curved downward at 90 degrees which allows them to extract nectar from Heliconia (wild plantain) flowers - no other bird is able to reach the Heliconia's nectar; jacobins are so big that they can bully themselves into a smaller hummer's territory and feed as they please. And the list goes on.

Not only does the diversity of species take some getting used to but the richness and variety of colour in many tropical birds will be an eye-opener. Tanagers, of which 115 species call Ecuador home,

are maybe the best example. It's almost as if a crazed artist has been at work, dabbing the birds with bold patches of yellows, reds, blues, purples, greens and blacks. Looking at the tanager plates in the field guide "Birds of Ecuador," you would almost think that evolution has exhausted every color pattern and combination possible for a sparrow-sized bird. One author described these birds as the avian equivalent of the splendor of tropical coral reef fishes. Other bird families such as hummingbirds, toucans, parrots, macaws, cotingas, jacamars and trogons are equally colourful.

Although many tropical species are actually dull-coloured and not terribly remarkable, there is definitely a greater proportion of colourful birds in the tropics of Central and South America than in either North America or Europe. Once again, the question immediately - why the colour?

Turning to Charles Darwin to provide a way of thinking about bird appearance, we must assume that the colours are adaptive. In other words, they contribute to a greater overall level of reproductive success. Over generations, we can assume that individuals of certain colours and patterns will have left more offspring than those members of the same species that were less suitably attired.

A well-known example can be found in the streaked backs and underparts of open country birds. Almost anyone who has walked across a meadow has probably had the experience of flushing a meadowlark or sparrow from underfoot. Birds of the forest floor are clothed in simple grays and browns. In Ontario, these include thrushes and grouse. In the tropics, we find woodcreepers, wrens and antbirds, among many others. Some are so confident of their concealment that they even sing from their nests! However, brightly coloured upperparts are non-existent in both of these habitats, no matter where you go.

But how do we explain the adaptiveness of colour? Let's start with green. Tropical forests are green all year-round whereas temperate forests are leaf-less for half the year. It therefore makes sense that the green plumage we see in so many parrots and tanagers functions as a form of protective coloration. When a flock of parrots flies into a tree, the birds effectively "disappear."

It still seems strange that colourful, strongly-patterned birds like toucans and tanagers aren't easily detected and killed by the many falcons, eagles and hawks that patrol tropical habitats. Part of the reason may be that these birds, like nearly all colorful tropical birds, live their lives in the brightly lit branches of the forest canopy. This is a world of high contrast, of lights and darks, of dazzling sunshine, and deep shadow. Feathers radiate breath-taking colour one minute and then disappear in the shadows the next. In other words, colour does not have to be drab and dull to offer concealment. Only when taken out of their environment do tropical birds seem to stick out like sore thumbs. The gaudy patches of bright and dark feathers, side by side, may simply imitate the conditions of the forest canopy where high contrast is everywhere. Darting from sun to shade and back again, the marked difference in brightness makes it difficult for even a predator's eyes to adjust and to track the location of the birds. Birds may also get away with bright colours in the rainforest canopy because it is such an open place with excellent visibility.

Many questions remain, however. Why is it that fruit-eating and nectar-feeding birds are by far the most colourful, while their insect-eating counterparts are much more likely to be dull? This is one of many questions I'll have in mind when I meet my daughter in Ecuador this week for several days of birding in the cloud forests west of Quito.

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