

# POSSIBLE SPECIALIZATION FOR HUMMINGBIRD-HUNTING IN THE TINY HAWK

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**ABSTRACT.**—This paper describes the hunting tactics of the Tiny Hawk, *Accipiter superciliosus fontanieri*, in a Costa Rican rain forest, where it appears to be a hummingbird specialist. Three tactics were used by the hawks to hunt hummingbirds: typical *Accipiter* still-hunting (probably not specifically for hummingbirds), waiting in ambush by a hummingbird's regular territorial perch, and flying rapidly between the perches of several territorial hummingbirds. Relative use of the latter two tactics may reflect the local density of territorial hummingbirds. *Received 7 April 1977, accepted 9 July 1977.*

THE cosmopolitan genus *Accipiter* is a well-defined group of short-winged, long-tailed woodland hawks, most of which prey chiefly on birds, which they capture by sudden attacks rather than sustained aerial pursuit (Friedmann 1950, Storer 1966, Wattel 1973). In most of Europe and North America the woodland bird-hawk guild comprises two or three species of *Accipiter* only (Storer 1966, Wattel 1973), but in humid neotropical forests one or more species of the genus may coexist with one or more species of the convergently similar falcon genus *Micrastur*. At Finca La Selva, in the Caribbean lowlands of Costa Rica, two species of *Accipiter* and three of *Micrastur* are recorded with some regularity (Slud 1960, Stiles unpubl. data). In such a densely packed carnivore guild some specialized hunting techniques should be evident; an example is the ventriloquial calling and provoking of mobbing of *M. mirandollei* (Smith 1969). In such guilds the size range of prey taken by the larger species generally includes that of the smaller species (Storer 1966, Wilson 1975), possibly leading to stronger selection on the latter for specialization on prey not easily available to the others. This paper describes what appear to be specialized techniques for catching hummingbirds in the Tiny Hawk, *A. superciliosus fontanieri*, the smallest member of the woodland bird-hawk guild in tropical America. Wing chords of males and females average 131 mm and 148 mm, respectively (Friedmann 1950), making this the smallest form in the genus *Accipiter* (cf. Wattel 1973.) A male and a female that I handled live at La Selva had weights and wing chords of 74 g and 130 mm, and 116 g and 146 mm, respectively—hardly larger than a robin (*Turdus*)!

Predation on hummingbirds away from the nest is rarely seen, and the only report known to me of repeated, regular hummingbird predation is that of Beebe (1950) by nesting Bat Falcons (*Falco rufifularis*). The falcons attacked their prey, including hummingbirds, while in the air, in the open (or at least outside the forest). Hummingbirds comprised 16% of the birds taken, but there was no indication that the falcons had developed any special technique to hunt them (Beebe 1950).

*Accipiter superciliosus* is a little-known species with no close relatives except the possibly conspecific *A. collaris* (Wattel 1973). The only prey items so far recorded are small birds (Carriker 1910, Wetmore 1965). A probable hunting technique of the species is "still-hunting," a common *Accipiter* tactic of waiting quietly in dense vegetation and rushing out to seize birds that come within range (Slud 1964, Wattel 1973). Such a technique can be rather easily adapted specifically to hunting hum-

mingbirds by taking advantage of their territorial behavior. Territorial hummingbirds often use a very few perches with great regularity (Wolf and Stiles 1970, Stiles 1973); a hawk could learn the location of these perches and position itself accordingly. In an area with many hummingbird territories close together, a further specialization could occur: the hawk could learn the perches of several resident hummingbirds and move rapidly between them, attempting to catch one or another of the hummingbirds off guard. All three of these tactics ("typical" still-hunting, waiting near a regular territorial perch, and movement between such perches) are used by Tiny Hawks in catching hummingbirds at Finca La Selva, as described below.

*Still-hunting.*—On 16 May 1972 at 0705 I was observing an *Amazilia tzacatl* hummingbird as it gleaned insects along the edge of dense second growth in which *Heliconia pogonantha*, a major food plant, was abundant. The bird alternated periods of foliage-gleaning with bouts of perching and preening, and had just alighted when an adult-plumaged Tiny Hawk burst out of a tangle of vines 1.5 m away, seized the hummingbird, and flew with it to a low tree limb 10 m distant. I walked over to the tree where the hawk, perched barely a meter above my head, mantled and hissed at me as I threatened it with a stick to make it drop the still-gasping hummingbird. Finally the hawk flew off with its prey. From my vantage point ca. 4 m from the site of prey capture, I believe I would have seen the hawk had it flown into the thicket during my observation of the hummingbird. Probably it had been waiting quietly in the thicket for some time. The hummingbird did not have a territory where it was captured, nor was the perch it used a regular one.

*Waiting near a regular territorial perch.*—I have observed two unsuccessful attempts by Tiny Hawks to catch color-marked male *Chalybura urochrysia* territorial at clumps of *Heliconia*. At about 1400 on 31 March 1972 D. Lyon and I saw a small hawk, almost certainly *A. superciliosus*, dash out of a thicket at a *Chalybura* on one of its regular perches; the hummingbird dodged and, chattering, followed the hawk out of sight. On 9 August 1972, I obtained more detailed observations of this tactic, as I was observing territorial behavior of a male *Chalybura* at a large clump of *Heliconia* ca. 100 m from the aforementioned attempt. At 0936 I saw an adult Tiny Hawk fly into a thicket 2 m from one of the regular perches of the territorial *Chalybura* while the latter was apparently absent from its territory. At 0938 the hummingbird returned to the perch, and the hawk immediately rushed out at it. The hummingbird dodged and, as the hawk swept by, followed close behind uttering a steady stream of chalyburine imprecations. The hawk perched briefly ca. 20 m away where it was mobbed by at least three *Chalybura*; it quickly moved on, making no attempt to attack its tormentors.

*Movement between territorial perches.*—I observed this most impressive tactic of *A. superciliosus* on several occasions between 13 and 28 July 1974, while studying hummingbird territoriality in an area of dense second growth. In an area of about 0.5 ha, some 30–35 hummingbirds (chiefly *Thalurania furcata*, *Amazilia tzacatl*, and *Chalybura urochrysia*) held feeding territories at clumps of *Heliconia imbricata*. On several occasions on 22 July, while I was walking slowly through the area making a census of the hummingbirds, I saw a bird shoot past a hummingbird's territorial perch at high speed, the hummingbird barely dodging in time. On one occasion the bird was a Gray-chested Dove, *Leptotila cassinii*, but in at least two other instances the culprit was a small hawk or forest-falcon. On the latter occasions, the *Thalurania*, upon dodging, uttered a squeal I had not heard the species give under any other circumstances. On 27 July I was observing the behavior of a single male

*Thalurania* and was seated about 4 m from his favorite territorial perch. At 1103 and 1115, a small hawk (tentatively identified as *A. superciliosus*) flashed past the bird's perch, apparently trying to catch it off guard; both times the hummingbird dodged, squealing. The hawk approached from different directions on the two occasions, and I had the impression that it had flown low from some distance away, rather than simply dashing from a nearby thicket. Within the next minute after each attempt on the bird I was watching, I heard squeals from other *Thalurania* territories. On a third occasion, the hawk swept past the perch from still another direction when the hummingbird was not there, indicating that it was directing its attacks to the perch itself. In each case the hawk passed above the perch and within 2–4 cm of it. At 0840 the next morning, during another census, I heard a *Thalurania* squeal and saw a subadult Tiny Hawk (with a number of rufous feathers dorsally) dash into a thicket 5 m away, pause briefly, then dash off low and fast in another direction—from which other squeals promptly issued. Passing by where the hawk had gone some 15 min later, I noted the absence of a marked male *Thalurania* that had been on territory 1 h earlier. In all, three marked hummingbirds disappeared from their territories on days when the hawk was about. Although I never actually witnessed prey capture by the hawk using this tactic, I strongly suspect that the missing birds were taken by this predator. I was present for most or all of every day in the study area between 20 and 28 July, and am fairly certain that the hawk was present only on three of those days.

In all of the attacks described here on territorial hummingbirds, it was very evident that the hawk knew exactly where to expect to find each prospective victim. Which tactic the bird used in hunting might have depended upon the local density of territorial hummingbirds. In an area of relatively low density, waiting in ambush near a territorial perch might be most effective. However, in an area of high hummingbird density, the hawk might be seen and mobbed by one bird while it waited for another, and would thus lose any chance of surprising its chosen victim. Moreover, I never saw a Tiny Hawk attempt to catch a hummingbird that was mobbing it or otherwise aware of its presence; once airborne, hummingbirds must be difficult for such a predator to catch. The tactic of rapid movement between perches, flying low and inconspicuously, may minimize the possibility that the hawk will be detected and mobbed before making its strike. It is probably no accident that the leks and song perches of the hermits (*Phaethornis* spp.) are in extremely dense vegetation, as this would make rapid approach by such a predator difficult (Stiles and Wolf in press).

Obviously any given hummingbird can only be attacked occasionally by either of the specialized methods before it learns to avoid such attacks by changing its perches or flight paths. In all cases of such attacks, the hawk was only present in any given area for a few days and then apparently moved on. I do not know how the hawks learn the locations of the hummingbirds' perches: whether by moving through the area beforehand, or by simply observing perch sites while waiting in concealment during typical still-hunting.

The apparent behavioral specializations of the Tiny Hawk for taking hummingbirds are reflected in its morphology. Compared to other small *Accipiter*, *A. superciliosus* has rather longer, more pointed wings and a shorter tail, as well as longer and more powerful feet (Wattell 1973, Storer in litt.). This suite of characters suggests some departure from the typical forest *Accipiter* syndrome towards a more falcon-like condition. The corresponding change in hunting behavior would be from still-

hunting towards more active, fast-flying, hard-hitting tactics such as the last reported here (Storer in litt.).

No other hawks of tropical forest understory have been reported to take hummingbirds regularly, and at La Selva I have witnessed only one attack on a hummingbird that was not made by a Tiny Hawk (an unsuccessful attack on a passing hummingbird by a still-hunting immature Bicolored Hawk, *A. bicolor*). Hummingbirds would seem to offer an excessively low caloric reward in relation to difficulty of capture or energy needs of most members of this guild. Only very small predator size, coupled with specialized hunting techniques, would make hummingbirds a profitable staple prey item. To the extent that they are indeed hummingbird specialists, Tiny Hawks might constitute an exception to Wilson's (1975) generalization regarding prey size ranges in carnivore guilds, in that they exploit a prey that is relatively unavailable to larger members of the guild.

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