

## OF FLIES AND RAPTORS

**B**IRDS FLY. That's usually the only way people relate "flies" with "birds," but the link is strong and permanent. Flies of the family Hippoboscidae, more commonly known as louse flies or flat flies, are ectoparasites often found crawling through the feathers of raptors and other birds as well as on mammals. The only well known member of the family is the sheep ked, a wingless parasite that is of importance to sheep farmers. Most other hippoboscids look like leather house flies that got stepped on. They move in a characteristic crablike manner, scuttling through the feathers or fur, fleeing deeper when disturbed. Their specially adapted comblike claws enable them to maintain a secure hold on the feathers or hair of their hosts, even on a Peregrine Falcon in a power dive or on an Oldsquaw [Long-tailed Duck] 50 feet below the scoters on the surface of Delaware Bay.

The family Hippoboscidae is a relatively small one as insects go; fewer than 30 species are known from North America. The life cycle begins by a most peculiar process, called "viviparity," which is shared only with three other families in the world, all ectoparasitic: the Streblidae and Nycteribiidae (bat flies) and the Glossinidae (tsetse flies); instead of being deposited on the host, the egg remains in the uterus of the adult female fly until it hatches and the larva has undergone two molts, feeding throughout the "gestation" period on a milklike glandular secretion. The larva is finally born as a late third instar, which pupates immediately, usually in the host's nest or at the roost. Upon eclosion, adults locate and parasitize a suitable host, thereafter feeding solely on its blood.

In 1984 I began studying the possibility that strong bonds ("host specificity") evolved between hippoboscids and raptors—the "one fly, one hawk" idea. Each species of raptor might be thought of as a biological island traveling through the air with its own accompanying fauna, which consists of flies, beetles, lice, and mites, along with whatever creatures are contained in the mud or seeds on their feet and feathers. Except during a very busy hawk banding period or when in captivity, each species of hawk is very much isolated from others. An Osprey, for example, would rarely come in contact with a Red-tailed Hawk, and the transfer of hippoboscids from one species to the other would be improbable. In the usual interactions between raptors, such as tail-chases and other close encounters, I would suspect that the fly would tighten its grip rather than abandon ship. If this isolation were strong enough, one would expect to find certain species of hippoboscids only on certain species of hawks.

A second possibility, however, is that as a large hawk preys on a smaller one, flies from the prey might transfer to the predator. Hippoboscids are known to leave distressed and dead hosts and to settle temporarily on nearby mammals, birds, and humans, even if the animal is unsuitable as a host. This form of contact and transfer would blur the sharp gradient of isolation, and one would expect to find little or no specificity. In this scenario, if one did find host-

specific species of flies, there should be more of them on large hawks than on small ones.

After receiving the green light from Pete Dunne to proceed under the auspices of the Cape May Bird Observatory, I worked for two weeks during the autumn of 1984 with Bill Clark's hawk-banding team at Cape May. The group turned up 52 hippoboscids from Sharp-shinned, Cooper's, and Red-tailed Hawks, more than doubling the total number in the Smithsonian's collection. Dr. Robert V. Peterson of the Systematic Entomology Laboratory in the Insect Identification and Beneficial Insect Introduction Institute, USDA, identified them all as *Icosta americana* (Leach), the European Starling of the hippoboscid world. An additional specimen from a Cooper's Hawk (donated by Brad Silfies of the Little Cap Banding Station, Allentown, Pennsylvania), also proved to be *I. americana*.

In an effort to obtain more material, I have requested loans of host-associated specimens from 12 North American museums. One common label entry that poses a problem is how to properly tabulate a specimen labeled "collected from Chicken Hawk"!

During this lull in the banding season, I am soliciting any and all hippoboscid specimens that can be definitely associated with a species or genus of raptor. Such specimens should be pinned or placed in alcohol (the preservative of choice). All specimens I receive will be identified to species and retained in the U.S. National Insect Collection unless their return is requested.

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