

RING-BILLED GULLS HAWKING STONEFLIES IN EARLY SPRING

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ABSTRACT -- Ring-billed Gulls (*Larus delawarensis*) were hawking two species of stoneflies (Order Plecoptera, Families Capniidae and Taeniopterygidae) on five days in late March and early April, 1996. The location was northeastern New York State, in Clinton County, Town of Beekmantown. Environmental conditions and hawking behavior are described. The hawking of emerging stoneflies by Ring-billed Gulls appears to be consistent with food foraging behavior relative to optimality theory.

KEYWORDS: Ring-billed Gull, *Larus delawarensis*, stonefly, Plecoptera, Capniidae, Taeniopterygidae, New York State, hawking, food foraging, optimality theory.

INTRODUCTION

Ring-billed Gulls (*Larus delawarensis*) were observed hawking insects at the end of March and the beginning of April, 1996, in extreme northeastern New York State. Hawking by a bird, as used here, is simply defined as the pursuit of airborne prey animals while constantly flying about; there is no

perching nor sallying out in pursuit of a particular prey animal. The method by which the prey animal is taken is not considered; this will be discussed later.

The study area was along a small stream (Ray or Rea Brook) in the Town of Beekmantown, Clinton County. Two kinds of stoneflies (Order Plecoptera) were emerging from the stream, and it appeared that these were the only flying insects active so early in the spring. Under a stereoscopic, dissecting microscope (70X) they were identified as Small Winter Stoneflies (Family Capniidae) and Winter Stoneflies (Family Taeniopterygidae) (Borror and White 1970). The observations described below supplement what has been published on insect-hawking behavior by the Ring-billed Gull.

OBSERVATIONS

Environmental Conditions

Most observations took place in the early afternoon; perhaps the sun had a necessary effect on the insects and also sufficiently warmed and dried the air to cause them to become airborne. Overnight temperatures were in the high 20⁰s. Fahrenheit. The hawking took place on sunny days, with air temperatures ranging from 40⁰ to 50⁰F. Wind speeds ranged from light (below five miles per hour) to moderate (about ten miles per hour) and were mostly from the north.

Flock Numbers

The numbers of hawking gulls fluctuated widely between days and within minutes on the same day. The numbers of gulls hawking at any one time were estimated to have been: 29 March, twenty-five; 30 March, ten; 31 March, twenty-five; 1 April, twenty-five; and 6 April, fifty.

As an example of the changeability of flock numbers, on April 6, when the gulls were first seen hawking at about 1 pm, they numbered about 25. Within five minutes the number had increased to about 50; two minutes later only 10 were visible. The increase in numbers appeared to have been caused by gulls coming from surrounding agricultural land or from gulls cruising about looking for an indication of food availability. Presumably, nearby gulls could detect feeding behavior and respond accordingly. Also, the gulls were frequently uttering "kee-aow" calls as they flew about; possibly this alerted others to the feeding activity. Being constantly on the wing, the gulls also moved quickly from one area to another, at distances of hundreds of yards. Presumably, this variation reflected differences in the densities and locations of the prey insects as wind currents carried them about.

Non-Hawking Days

On 2 through 5 April, no gulls were detected hawking insects, although the area was observed several times a day from my nearby house. These days differed from the hawking days in being somewhat cooler (air temperature 35⁰

to 40° F.) and windier (10 to 20 mph, from the north). No insects were seen flying about, but there were small numbers of Small Winter Stoneflies on the streamside tree trunks. Most appeared to have wings that were only half developed. On 6 April the air temperature was 44° F, with light and variable winds under a sunny sky, and the gulls were back, hawking insects. On 7 April through 12 April (end of observation period) a cooler, rainy and snowy weather period ensued, with no gulls observed hawking. There were only small numbers of stoneflies on the tree trunks.

Hawking Behavior

The hawking behavior was generally similar to other published accounts. The gulls flew swiftly in large flight patterns, circling about at treetop level (about 40 feet) and higher (about 100 feet). Then, at times when they were apparently actively pursuing prey insects, their flight behavior assumed the erratic flying pattern one sees in bats hunting insects. The gulls made quick, sideways movements, often wing flipping to do so. The head and neck was often turned sideways. Sometimes they made very tight, 180 degree turns to double back. Other maneuvers were sudden, upward ascents, accompanied by more rapid wing beats and momentary hovering. These flight patterns suggest that the gulls were discovering the prey insects at close range, and this necessitated rapid adjustments in flight trajectory to seize the prey. Those gulls observed with 10 x 50 binoculars were not flying with the mouth open; on a few occasions I was able to observe a gull open its mouth and snap at something. I could not observe directly what the gulls were feeding upon. My conclusion that it was the two kinds of stoneflies is based on the large numbers I found on the tree trunks, on my nearby house, and seeing some flying about.

LITERATURE REVIEW

Food Foraging

This report reaffirms the opportunistic food foraging habits of the Ring-billed Gull and adds to the published list of animal food items, to the habitat source of the animals, and to the foraging behavior of the gull. Martin, Zim and Nelson (1951) state, "The principal items of its diet are fish, beetles, grasshoppers, crickets, true bugs, amphibians, and molluscs." Bent (1963) mentions the Ring-billed Gull following the plow, picking up worms, grubs, grasshoppers, and other insects, as well as small rodents. He also included a description of the hawking of flying grasshoppers. Ryder (1993) cites summer studies of the diet of eastern populations (Great Lakes) of the Ring-billed Gull that indicated it consisted predominantly of fish, arthropods (Orders Coleoptera, Diptera, Homoptera, Odonata, Hemiptera, and Lepidoptera), and earthworms.

Hawking

There have been several reports of hawking behavior by the Ring-billed Gull in this journal. Elliot (1961), Lauro (1977), and Cooley (1983) reported Ring-billed Gulls preying on swarms of flying ants on the shores of Long Island. Chamberlaine (1995) identified flying ants as one of several kinds of airborne animals that Ring-billed Gulls were feeding on, over the extensive wetlands of the eastern Lake Ontario shoreline. Pitocchelli and Capainolo (1990) observed Ring-billed Gulls insect-hawking in Ontario and Maine. Salzman (1995) reported Ring-billed Gulls feeding on what were probably abundant small mosquitoes or midges over a salt marsh on Long Island. In some of these reports the prey animals were only tentatively identified as aquatic insects, mostly because of their occurrence over aquatic habitats. Although not an exhaustive search of the literature, the information presented here gives readers a comprehensive framework of the known diet of the Ring-billed Gull, into which new observations can be integrated.

Prey Taking

Various observers have reported differing aerial prey taking techniques used by Ring-billed Gulls. Cooley (1983) and Pitocchelli and Capainolo (1990) described the gulls as snapping up insect prey with the bill, whereas Salzman (1995) did not observe any bill snapping. He states that the gulls appeared to emulate the basic swallow, swift, or nightjar open bill gathering technique. The latter method is part of the definition of hawking in *The Audubon Encyclopedia of Birds* (Terres, 1980). Because of the difficulty of ascertaining exactly what a flying bird is doing, I believe that the definition of hawking should be simplified, concentrating on the constant flight and leaving out the actual method of taking the prey animals. Possibly both techniques are used by the Ring-billed Gull, depending upon the prey species, specifically the size of the prey animal, its ability to take evasive action, and the need to kill the animal before swallowing it. Chamberlaine (1995) observed that, "The bill is not open as they fly but opens as they flare up and abruptly stop in the air and grasp the prey. At other times I believe the prey goes directly down the gullet with no grasping by the bill."

Airborne Prey

Sometimes, I have used the term "airborne prey animal" instead of insects because Chamberlaine (1995) suggested that the Ring-billed Gulls he observed aerial feeding may have been taking spiders dispersing on air currents by parachuting on silk threads. Spiders, are not insects, thus complicating the terminology and requiring a more general term (such as airborne arthropod), if absolute accuracy is desired.

Mayflies

Parenthetically, one additional animal species can be added to the list of known food items of the Ring-billed Gull. In the late spring of at least two previous years, I have observed Ring-billed Gulls hawking mayflies from Ray Brook at the same site as described for the stoneflies. The large size and the appearance of these insects made it possible to identify them to the Order Ephemeroptera; no further, specific identification was attempted.

DISCUSSION

Returning to the stoneflies for some concluding commentary, these are very small, slender insects whose body length, not including wings or other appendages, was measured at about seven millimeters for the Small Winter Stoneflies and about ten millimeters for the Winter Stoneflies. (The total length, including wings, was about eight millimeters for the Small Winter Stoneflies and about sixteen millimeters for the Winter Stoneflies.) Therefore, their body masses are much less than that of most other animals cited in the known and suspected items reported in the diet of the Ring-billed Gull, except for the ants, gnats, midges, mosquitoes, and spiders. Given the very small size of these packets of prey relative to the much greater body size and nutritional demands of a large bird, it is a matter of some wonderment that these gulls would make the effort required to hunt the stoneflies. Previous observers (Cooley 1983, Pitocchelli and Capainolo 1990, Chamberlaine 1995) have also raised the question of the efficiency of a large bodied bird feeding on such small prey animals. In the case of the gulls I observed, several factors could have been important. There may not have been much other animal food available because the ground was still frozen, and there was no plant growth occurring to sustain animal life. There were no puddles of rain or snow meltwater in the agricultural fields, and the farmers had not yet begun plowing. On the other hand, the marshes and open waters of Lake Champlain were only three miles away. In addition, and probably most importantly, the abundance and density of the stoneflies must have been sufficient to make it worthwhile for the gulls to exploit this temporary food source.

Interestingly, *The Kingbird* accounts cited here, as well as my observations, indicate that the Ring-billed Gulls were hawking aerial prey that were abundant and in fairly high densities. I conclude that even small animals, flying about in sufficiently high density, are profitably exploitable by the Ring-billed Gull through hawking behavior, although it must be an energy intensive activity for these birds.

Optimality Theory

It appears that the foregoing information is in agreement with optimality theory (Alcock 1989), which states that animals will utilize a foraging behavior

if it produces a net benefit in food energy by maximizing this benefit relative to the energy of the physical effort expended in the pursuit of a particular kind of food. However, food energy is not the only dietary factor in an animal's foraging behavior, as Cooley (1983) and Chamberlaine (1995) have suggested for the Ring-billed Gulls they observed hawking aerial animals. Necessary nutritional components (such as protein or minerals) may be sought also, possibly achieved simply by obtaining a diverse diet, and as an adjunct to energy gathering. Sometimes this must be done at the expense of an adverse energy balance (Alcock 1989:327). Therefore, the instances of hawking reported and reviewed here, should be simply viewed as opportunistic food foraging behavior by Ring-billed Gulls that results in a gain in total nutrition, not only in food energy.

ACKNOWLEDGMENTS

I wish to thank my wife, Carole, for advice and assistance in the writing of this article. Thanks are due to the State University of New York, College at Plattsburgh, for library resources and for laboratory and office facilities.

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