

Summer Foods of American Widgeon, Mallards, and a Green-winged Teal near Great Slave Lake, N.W.T.

Abstract. Foods found in three species of dabbling ducks collected during summer from bog ponds, and sedge pools in taiga on the north side of Great Slave Lake, Northwest Territories, are described. Animal material in the esophageal contents of 10 adult American Widgeons (*Mareca americana*) averaged 31 ± 34 per cent ($P < 0.05$) by volume. A significantly higher percentage of animal material was found in Class I and II widgeon ducklings (66 ± 22 per cent) than in Class IIIa ducklings and flying juveniles (12 ± 20 per cent) of this species. Animal material comprised 87 ± 35 per cent of esophageal contents from five Class II and flying juvenile Mallards (*Anas platyrhynchos*) and 100 per cent of that from an adult female Green-winged Teal (*A. carolinensis*).

Introduction

American Widgeons, Mallards, and a Green-winged Teal were collected from June through September 1967 from subarctic taiga in the vicinity of the Yellowknife Highway, near Yellowknife, Northwest Territories. The purpose of this study was to determine the summer foods of the more abundant species of waterfowl, particularly juveniles, in this area. Summer foods of Lesser Scaup (*Aythya affinis*), most numerous of ducks in this locality, and the wetland habitat are described elsewhere (Bartonek and Murdy 1970).

Methods

Procedures (Swanson and Bartonek 1970) for obtaining food samples from ducks included: (1) collecting actively feeding birds; (2) using for analyses only materials taken from the esophagus in order to avoid foods subjected to physical or chemical breakdown; and (3) immediately removing and preserving the foods in ethanol in order to stop post-mortem digestion. Generally no more than two birds per flock or brood were collected. Foods were identified, segregated, external moisture removed and volumes measured by liquid displacement. Juvenile birds were aged and classified according to plumage development (Gollop and Marshall 1954).

Results

Five male and five female adult American Widgeon collected between June 10 and August 4, 1967, contained averages of 23 ± 54 per cent

($P < 0.05$) and 40 ± 68 per cent animal material, respectively. Two adult females were collected in June, one of which had an egg in her oviduct, had consumed only animal foods, whereas three females collected in late July and early August had consumed only plant material. Sexes were combined in this small sample to give an average of 31 ± 34 per cent animal material (Table 1). Larval and adult midges (Chironomidae) accounted for over 99 per cent of the dipterans eaten; adult mosquitoes (Culicidae) and adult blackflies (Simuliidae) accounted for the remaining trace. Adult damselflies and dragonflies (Odonata), larval predaceous diving beetles (Dytiscidae), and adult leaf beetles (Chrysomelidae) comprised the remainder of the animal food. Vegetative portions of plants comprised 97 per cent of plant material consumed. Blades of sedges (*Carex* sp.) and grasses and foliage of pondweeds (*Potamogeton* spp.), horsetails (*Hippuris* sp.), and mosses (*Drepanocladus* sp.) were important in the diets of individual birds, but they were seldom found in more than two birds. Achenes of sedges were found in one bird, and nutlets of pondweed were found in two other birds. Additionally, nutlets of slender bur-reed (*Sparganium minimum*) and water crowfeet (*Ranunculus* sp.) and utricles of water hemlock (*Cicuta* sp.) were found in gizzards; but they were not measured because of the bias which inflates the importance of the less readily digested foods in the diet (Swanson and Bartonek 1970).

Sixteen nonflying juvenile American Widgeon ranging in age from Classes Ib to IIc (median, Class IIa — 19 to 26 days) and collected between July 18 and August 7, 1967, contained an average of 66 ± 22 ($P < 0.05$) per cent animal material in their esophagi. This was significantly more than the average of 12 ± 20 per cent animal in material taken from two nonflying juveniles (Class IIIa — 42 to 50 days) and nine flying juveniles (7 weeks or older) collected between August 21 and September 8, 1967.

Juvenile American Widgeon of both groups contained a diversity of animals and plants, with only a few items being consumed by many individuals in either group (Table 1). Among the animal foods, nymph and emerging adult mayflies (Ephemeroptera) and larval and adult caddisflies (Trichoptera) occurred most often; they were found in 6 and 8 birds, respectively, of the 27 juveniles. Seventy-one per cent of the average percentages of volume of animal material from

TABLE 1. — Occurrence and average percent of volume of foods in the esophagi of adult (10 birds), Classes I and II juvenile (16 birds), and Class III and flying juvenile (11 birds) American Widgeon collected near Yellowknife, Northwest Territories, during the summer of 1967.

Food Items	Occurrence			Percent of volume		
	Adults	Juveniles		Adults	Juveniles	
		Classes I & II	Class III & flying		Classes I & II	Class III & flying
Clam shrimps (Conchostraca)		2	1		10	1
Water fleas (Cladocera)		2			3	
Amphipods (Amphipoda)			2			8
Mayflies (Ephemeroptera)		6			24	
Dragonflies and damselflies (Odonata)	1	2		7	4	
Water boatmen and water striders (Hemiptera)		4			4	
Caddis flies (Trichoptera)		6	2		12	tr.
Leaf beetles and predaceous diving beetles (Coleoptera)	1	1	3	3	tr.	3
Midges, blackflies, mosquitoes and horseflies (Diptera)	4	4		22	4	
Miscellaneous and unidentified animal material		7	2		6	tr.
TOTAL ANIMAL MATERIAL	4	15	4	31	66	12
Filamentous algae (Chlorophyceae)	1	2		tr.	2	
Mosses (<i>Drepanocladus</i> spp.) – foliage	1	3	2	8	15	16
Horsetails (<i>Equisetum</i> spp.) – foliage	2	1		10	1	
Pondweeds (<i>Potamogeton</i> spp.) – foliage	1	4	2	10	13	11
Bladderworts (<i>Utricularia</i> spp.) – foliage		1	9		1	59
Miscellaneous and unidentified plants – foliage	4	4		38	2	
Miscellaneous plants – seeds, fruits	3	1	5	2	tr.	1
TOTAL PLANT MATERIAL	8	10	11	69	34	88

both age groups of juvenile ducks were comprised of adult and immature aquatic invertebrates, excluding the flying adults of aquatic insects. These flying adults and the terrestrial invertebrates comprised the remaining 29 per cent. Vegetative portions of plants were consumed in greater quantities than seeds (97 per cent vs. 3 per cent of the average percentages of volume of both groups). Bladderworts (*Utricularia* spp.), pondweeds, and mosses were the most frequently consumed foliages.

Four Class IIc (36 to 45 days) and one flying (52-50 days) Mallards collected between July 19 and August 8, 1967, average 87 ± 35 per cent animal material in esophageal contents. Average per cent of volume for animal items included: amphipods (Amphipoda), 28 per cent; larval horseflies (Tabanidae), 12 per cent; larval predaceous diving beetles, 12 per cent; adult mayflies, backswimmers (Notonectidae) and adult leaf beetles, each 11 per cent; damselflies, 2 per cent;

and leeches (Hirudinea), clam shrimps (Conchostraca), waterboatmen (Corixidae), larval caddis flies and snails (Gastropoda), each 1 per cent. Larval cases of caddis flies were a prominent (60 per cent) item in material from the gizzards of these birds. Nutlets of pondweeds, 13 per cent, and achenes of sedges, trace, comprised the plant material. Except for trace amounts in two juveniles, the plant material was attributable to one bird, the flying juvenile.

An adult female Green-winged Teal collected on September 2, 1967, contained only animal material in her esophagus. Mollusca was the most important phylum and was represented by orb snails (Planorbidae), 22 per cent; pouch snails, (Physidae), 12 per cent; round-mouthed snails, (Valvatidae), 10 per cent; and fingernail clams (Sphaeriidae) 1 per cent. Insects were represented by damselflies, 20 per cent; caddis flies, 18 per cent; and midges, 3 per cent. Amphipods (*Hyalella azteca*) contributed 5 per cent of the total. Seeds

of slender bur-reed, pondweeds, sedges, and horse-tails were found only in the gizzard.

Discussion

The summer foods of the American Widgeon taken in this study are akin to those reported elsewhere. Munro (1949) found the foods of 10 downy young American Widgeon from British Columbia to be 88 per cent animal matter, chiefly larval midges and larvae and nymph dragonflies and damselflies. He characterized the 54 adult widgeon that were collected from fall through spring as being mainly vegetarians that fed upon foliage and stems of aquatic plants to a greater extent than almost any other species of dabbling duck. However, this study shows animal material to be an important part of the diet of some adults of either sex during the summer. I believe that a larger sample of adults taken during the nesting season would have shown that females consumed significantly more animal material than males. Sugden (1969) found in a sample of 129 juvenile widgeon collected in southern Alberta that mostly surface invertebrates were eaten at first and later replaced in the diet by aquatic invertebrates and plant foods as the ducks grew. Insects made up the bulk of the animal food. Slender pondweed (*Potamogeton pusillus*) comprised 59 per cent of the plant food; and filamentous algae (Chlorophyceae) contributed 20 per cent.

Diets of the juvenile widgeon reported in this study apparently changed with age (i.e., they ate progressively more plant material as they became older) as did those reported by Munro (1949) and Sugden (1969).

Chura (1961) noted that Mallards from Utah underwent a progressive shift from almost entirely invertebrate foods in Class Ia ducklings to almost entirely plant foods in Class III and older juveniles. The small sample of four Class IIc and one flying juvenile Mallards from this study contained 99 and 35 per cent animal matter, respectively, which differed considerably from those percentages reported by Chura which were 11 per cent and trace (unspecified sample sizes) for the same age groups, respectively. Perret (1962) did not detect any differences among the predominately animal diets of three nonflying age-classes of juvenile Mallards from Manitoba; however, the foods found in these 54 nonflying juveniles (94 ± 4 per cent animal material) differed, but not significantly ($P < 0.05$), from those in 8 flying juveniles (71 ± 36 per cent animal material).

Perret (1962) believed that the differences in diets were attributable mainly to availability and abundance of food items within the birds' feeding range, i.e., they must feed upon that which is available. Changing nutritional requirements and adaptive feeding behavior of birds may be equally or more important in determining the quantity of animal versus plant matter consumed. Bartonek and Murdy (1970) demonstrated that Lesser Scaup seldom or never ate certain abundant and readily available organisms but that they would consume other organisms in proportions that were not significantly different ($P < 0.05$) from those found in the habitat.

Foliage of bladderwort (*Utricularia* spp.), mostly winter-buds, was consumed by 10 young widgeon in this study. Martin and Uhler (1939) found no record of this plant being used by ducks taken throughout most of North America; however, they believed that if used it was only of limited local value.

The foods found in 25 adult and 38 juvenile Lesser Scaup that were collected concurrently with the dabblers in this study, but reported elsewhere (Bartonek and Murdy 1970), were almost entirely animal material (99 ± 1 per cent, $P < 0.05$). Juvenile Lesser Scaup collected in mid-summer had tended to feed on free-swimming organisms such as phantom midge larvae (Chaoborinae) and clam shrimps; whereas juveniles collected in late summer had tended to feed, as did adults in June, on bottom-associated organisms such as amphipods, odonates, and corixids. Unlike the dabblers of this study, the Lesser Scaup were not found to contain either flying forms of aquatic insects or terrestrial insects; and they did not show a shift from animal to plant foods with increasing age.

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Predation at a Northern Yukon Bank Swallow Colony

During late July 1970, while conducting archaeological survey operations along the Old Crow River in northern Yukon Territory, I had occasion to observe numerous colonies of Bank Swallows (*Riparia riparia*). These colonies often include a hundred or more nesting holes though not all are occupied simultaneously. The holes are excavated in alluvial silts and clays which have been exposed by the continuous dissection of the Old Crow River. On 30-31 July I was able to spend several hours at a large colony (ca. 150 holes) three miles below the mouth of Schaeffer Creek on the left bank of Old Crow River (67°50' N, 139°58' W.). This colony was situated in a north-facing bank about 30 feet high, and the distribution of active nests had gradually shifted upstream along the bank as the Old Crow River had eroded a sharp point at the downstream end. Erosion had exposed the interiors of several formerly deep swallow burrows, and I

was unable to establish the precise number of active holes still remaining in the colony.

Two agencies of predation were noted at the colony. Fourteen holes in the relatively shallow downstream part of the bank had been opened by a bear shortly before my arrival. Eggs and/or young birds could have been obtained by the bear, and large, deep claw marks were clearly evident along a portion of the bank about 20 feet in length. A brown bear (*Ursus americanus*) and two cubs were observed directly across the river on the evening of 31 July and they may have been responsible for the excavations at the colony. Upon my arrival I found a dead adult swallow at the water's edge, but I could not determine the cause of death.

I set two 30-foot mist nets in front of the bank, and succeeded in banding 50 swallows. The shortness of time prohibited extensive observations, but numerous repeats of banded swallows clearly indicated that individual birds did not always return to the same holes. During a brief absence from the nets for a 15 minute supper on 30 July, a Northern Shrike (*Lanius excubitor*) appeared on the scene. As I returned the shrike flew from a low perch behind the mist net to a higher one on the top of the bank. Directly in front of the shrike's perch was a dead swallow still in my net, and a small hole surrounded by fresh blood was visible on the swallow's head. Apparently the shrike attempted to steal the swallow from the net, because the bird was badly tangled and difficult to remove. I have seen in the literature only a few scattered reports of this sort of predation during mist-netting operations, but none to my knowledge has involved a shrike. Nor have I noticed at any of the many other Bank Swallow colonies in northern Yukon any evidence that bears had attempted to obtain eggs or young birds.

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