# Lesser Scaup diets during migration and winter in the Mississippi flyway

ALAN D. AFTON[1] AND ROSS H. HIER[2]

*Wetlands Wildlife Populations and Research Group, Minnesota Department of Natural Resources, 102 23rd Street, Bemidji, MN 56601, U.S.A.*

AND

STUART L. PAULUS[3]

*Rockefeller Wildlife Refuge, Louisiana Department of Wildlife and Fisheries, Route 1, Box 20-B, Grand Chenier, LA 76043, U.S.A.*

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We examined diets of Lesser Scaup (*Aythya affinis*) during midwinter ($N$ = 41) in southwestern Louisiana (1986), and during spring ($N$ = 57) and fall ($N$ = 48) in northwestern Minnesota (1984–1988). Diets of males and females generally were similar during migration and winter. Diets of adults and immatures differed during fall migration but were similar during winter. In fall, immature scaup fed heavily on amphipods and did not consume certain foods, such as fish and fingernail clams, that were important in adult diets. Aggregate percent dry weight of animal foods was higher during fall (adults 91%, immatures 93%) and spring (92%) than during midwinter (61%). Important foods during all periods were crustaceans, insects, and mollusks.

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Nous avons étudié le régime alimentaire du Petit Morillon (*Aythya affinis*) au milieu de l'hiver ($N$ = 41) dans le sud-ouest de la Louisiane (1986), au printemps ($N$ = 57) et à l'automne ($N$ = 48) dans le nord-ouest du Minnesota (1984–88). Les mâles et les femelles ont généralement le même régime alimentaire durant la migration et au cours de l'hiver. Le régime des adultes et celui des individus immatures diffèrent au cours de la migration d'automne, mais sont semblables au cours de l'hiver. À l'automne, les morillons immatures se nourrissent abondamment d'amphipodes et s'abstiennent de certains aliments, comme les poissons et les sphaeriidés qui constituent une part importante du régime des adultes. La masse sèche relative des organismes animaux dans les contenus stomacaux est plus élevée à l'automne (adultes 91%, immatures 93%) et au printemps (92%) que durant l'hiver (61%). Les principales proies consommées durant toute l'année sont des crustacés, des insectes et des mollusques.

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## Introduction

Several studies have shown that young birds are less efficient foragers than adults (reviewed by Baillie and Milne 1982; Giroux and Bédard 1988). Lower foraging efficiency has been implicated as a factor in greater winter mortality of juveniles in some species (Goss-Custard and Durell 1987; Conroy *et al.* 1989). Poor reproductive performance of young female ducks has been attributed to (*i*) less experience in locating, competing for, and exploiting food resources, (*ii*) less ability to accumulate large endogenous reserves, and (*iii*) lower efficiency at foraging for specific nutrients needed for egg formation (reviewed by Afton 1984).

Sexual differences in diets are well documented for dabbling ducks during egg laying, when females consume large quantities of invertebrates to satisfy protein demands (see Swanson and Duebbert 1989). Diets seemingly should differ between sexes during other periods of the annual cycle because ducks exhibit sexual differences in molt chronology and nutrient reserve dynamics before and after reproduction (Hoppe *et al.* 1986; Alisauskas and Ankney 1991; Hohman *et al.* 1991). Our objectives were to investigate sex and age variations in diets of Lesser Scaup (hereafter called scaup) during migration and winter.

## Study areas

*Midwinter*

We collected scaup in southwestern Louisiana on Rockefeller Wildlife Refuge (WR) in January 1986. Rockefeller WR is bounded on the south by the Gulf of Mexico and on the north by the Grand Chenier ridge complex (Wicker *et al.* 1983). It contains 30 797 ha, of which approximately 2025 are lakes and 16 000 are impounded marshes (Chabreck 1960; Wicker *et al.* 1983). Collections were confined to Unit 2 and Price Lake Management Unit, areas of highest use by scaup.

*Spring migration*

We collected scaup in northwestern Minnesota on Thief Lake Wildlife Management Area (WMA) and Roseau River WMA in April 1986–1988. Thief Lake WMA includes the 2891-ha Thief Lake and its adjacent marshes (Parker *et al.* 1980). Roseau River WMA includes three large impoundments totalling 4291 ha (Hansen *et al.* 1980). Collections at Roseau River WMA were confined to Pool 1, where scaup were most abundant.

*Fall migration*

We collected scaup in northwestern Minnesota on Thief Lake WMA and Agassiz National Wildlife Refuge (NWR) in October and November 1984–1987. Agassiz NWR has 18 impoundments and a total of 14 980 ha of wetlands (Parker *et al.* 1980). Collections at Agassiz NWR were confined to Tamarack and Thief Bay pools, areas of highest use by scaup during the study.

## Methods

We attempted to collect scaup that were actively feeding (Swanson and Bartonek 1970), but this was not always possible. Actively feeding birds constituted 55, 67, and 87% of samples during winter ($N$ = 41), spring ($N$ = 57), and fall ($N$ = 48), respectively. Contents of the esophagus and proventriculus were removed immediately from ducks observed feeding, and preserved in 10% formalin.

[1]Author to whom all correspondence should be sent at the following address: U.S. Fish and Wildlife Service, Louisiana Cooperative Fish and Wildlife Research Unit, 310 Forestry, Wildlife and Fisheries Building, Louisiana State University, Baton Rouge, LA 70803, U.S.A.

[2]Present address: Minnesota Department of Natural Resources, 203 West Fletcher Street, Crookston, MN 56716, U.S.A.

[3]Present address: Innovative Research Services, P.O. Box 371, North Bend, WA 98045, U.S.A.

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