Freshwater mussels as duck food

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FOOD OF WINTERING CANVASBACKS IN NORTH AMERICA, 1974-77.

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Abstract: The gullet and gizzard of 293 canvasbacks (Aythya valisineria) from eight wintering areas in North America were analyzed for food contents. In the major canvasback wintering area, Chesapeake Bay, the birds are feeding predominantly on the Baltic clam (Macoma balthica). Vegetation was found in only trace amounts. In North Carolina the Baltic clam is also the predominant food in estuarine areas, although vegetation is still available and utilized in less saline areas. The Baltic clam ranks second to the soft-shell clam (Mya arenaria) in New Jersey. In Pennsylvania the fingernail clam (Sphaerium transversum) is the predominant food. Wild celery (Vallisneria americana) is the most important food item in the Detroit and Upper Mississippi River. The Upper Mississippi River has the greatest diversity of canvasback food items. Sago pondweed (Potamogeton pectinatus) is the most important food item for birds wintering in Nevada, California, and Oregon.

Table 1. Food of 165 canvasbacks from Chesapeake Bay, January-March 1975 and 1976[1/]

Animal Food	1975 Gullet	1975 Gizzard	1976 Gullet	1976 Gizzard
Macoma balthica	83(26)	93(98)	100(14)	94(97)
Mya arenaria	9(6)	2(7)		
Macoma mitchelli	3(7)	Tr(9)		Tr(3)
Rangia cuneata		2(14)		2(8)
Leptocheirus plumulosus	1(6)	1(11)		Tr(5)
Nereis sp.	Tr(1)	1(18)		Tr(8)
Balanus sp.		Tr(1)		1(5)
Mulinia lateralis	Tr(2)	Tr(5)		
Brachidontes recurvus		Tr(4)		
Rhithropanopeus harrisii	Tr(1)	Tr(4)		
Congeria leucophaeata		Tr(3)		Tr(2)
Gammarus tigrinus	Tr(2)	Tr(3)		Tr(2)
Cyathura polita	Tr(4)	Tr(4)		
Odostomia sp.		Tr(1)		
Retusa canaliculata		Tr(1)		
Bittium sp.		Tr(1)		
HYDROIDA		Tr(2)		
Vespa sp.		Tr(1)		
Chalepus dorsalis		Tr(1)		
PORIFERA				Tr(2)
Fish bones		Tr(2)		
Plant Food				
Potomogeton perfoliatus	3(1)	Tr(6)		1(3)
Potomogeton pectinatus				Tr(2)
Ruppia maritima		Tr(4)		Tr(3)
Vallisneria americana				Tr(2)
Myriophyllum spicatum				Tr(2)
Nyssa sylvatica		Tr(3)		
Scirpus americanus		Tr(3)		Tr(2)
Scirpus olnevi		Tr(1)		
Scirpus robustus		Tr(1)		
Carex lurida				Tr(2)
Polygonum punctatum				Tr(2)
Cladium mariscoides				Tr(2)
Geranium sp.		Tr(1)		
Prunus serotina	Tr(1)			
Vitis sp.		Tr(2)		Tr(2)
Pinus taeda		Tr(1)		Tr(2)
Ilex decidua		Tr(1)		
Ilex opaca				Tr(2)
Rhus copallina		Tr(1)		Tr(2)
Myrica cerifera		Tr(1)		Tr(2)
No. Samples	29	103	9	65
Ave. Volume (cc)	9.2	7.1	9.7	6.1

1/ Quantities represent percent by volume of food material. Percent by occurrence given in parentheses. Volume of less than 0.5 percent represented as Tr.

Table 1. Gizzard contents[1/] of canvasbacks from North Carolina

	Back Bay - Currituck Sound 1958-63 n=11	Pamlico River 1974-77 n=23
Animal Food		
Macoma balthica		81(100)
Rangia cuneata		12(52)
Congeria leucophaeata		5(9)
Brachidontes recurvus		1(13)
Mulinia lateralis		1(13)
Rhithropanopeus harrisii		Tr(13)
Nereis sp.		Tr(21)
Littorina irrorata		Tr(9)
Balanus sp.		Tr(9)
Odostomia sp.		Tr(4)
Nassarius vibex		Tr(4)
Gemma gemma		Tr(4)
AMPHIPODA	2(9)	
Unidentified Animal	5(9)	
Total Animal	7(9)	100(100)
Plant Food		
Potamogeton pectinatus	28(64)	Tr(13)
Vallisneria americana	27(27)	
Potamogeton perfoliatus	18(64)	
Ruppia maritima	9(91)	
Unidentified Vegetation	6(9)	
Scirpus americanus	3(18)	
Melilotus alba	1(9)	
Najas guadalupensis	Tr(18)	
Myrica cerifera	Tr(9)	Tr(17)
Myrica pensylvanica	Tr(9)	
Cladium jamaicense	Tr(9)	
Echinochloa walteri	Tr(9)	
Polygonum hydropiper	Tr(9)	
Polygonum punctatum	Tr(9)	
Prosperpinaca palustris	Tr(9)	
Rumex sp.	Tr(9)	
Scirpus olneyi	Tr(9)	
Spartina cynosuroides	Tr(9)	
Pinus taeda		Tr(4)
Total Vegetation	93(100)	Tr(17)
Average food volume (cc)	5(62%)	3.2(99%)
Average grit volume (cc)	3(38%)	Tr(1%)
Total gizzard contents (cc)	8(100%)	3.2(100%)

[1/] Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as Tr.

Table 2. Gullet and gizzard contents[1/] of canvasbacks from Pea Island National Wildlife Refuge, North Carolina, 13 December 1976.

	Gizzard n=10
Animal Food	
Mya arenaria	8(30)
Macoma balthica	2(40)
Mitrella lunata	Tr(20)
Bittium varium	Tr(10)
Lippia sp.	Tr(10)
Nassarius vibex	Tr(10)
Nereis sp.	Tr(10)
Plant Food	
Potamogeton pectinatus	78(90)
Zea mays	10(10)
Myrica cerifera	1(70)
Myrica pensylvanica	Tr(40)
Rubus sp.	Tr(40)
Scirpus americanus	Tr(50)
Ruppia maritima	Tr(30)
Chara sp.	Tr(10)
Cladium sp.	Tr(10)
Myriophyllum spicatum	Tr(10)
Polygonum punctatum	Tr(10)
Potamogeton pusillus	Tr(10)
Scirpus olneyi	Tr(10)
Zostera marina	Tr(10)
Average Food Volume (cc)	5.9(74%)
Average Grit Volume (cc)	2.1(26%)
Total Contents (cc)	8.0(100%)

[1/] Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as Tr.

Table . Gizzard contents— of canvasbacks from the Detroit River, Michigan, November 1975.

	Canvasbacks n=9
Animal Food	
ANNELIDA	Tr(11)
Campeloma integrum	Tr(11)
Campeloma sp.	Tr(33)
GASTROPODA	Tr(11)
Gyralus sp.	Tr(11)
Helisoma trivolvis	Tr(11)
Helisoma sp.	Tr(11)
Hexagina sp.	Tr(11)
Invertebrate remnants	Tr(22)
Mammal remnants	Tr(22)
Pleurocera sp.	Tr(11)
Plant Food	
Vallisneria americana	81(55)
Potamogeton perfoliatus	9(11)
Sparganium eurycarpum	3(55)
Cladium mariscoide	2(33)
Scirpus validus	1(55)
Potamogeton gramineus	1(33)
Potamogeton pusillus	1(33)
Polygonum lapathifolium	1(22)
Vitis sp.	Tr(44)
Cornus stolonifera	Tr(33)
Myriophyllum spicatum	Tr(33)
Scirpus americanus	Tr(33)
Scirpus fluviatilis	Tr(33)
Myriophyllum exalbescens	Tr(22)
Prunus serrotina	Tr(22)
Scirpus acutus	Tr(22)
Butomus umbellatus	Tr(11)
Ceratophyllum demersum	Tr(11)
Cornus sp.	Tr(11)
Cyperus sp.	Tr(11)
Eleocharis obtusa	Tr(11)
GRAMINEAE	Tr(11)
Leersia oryzoides	Tr(11)
Polygonum amphibium	Tr(11)
Polygonum punctatum	Tr(11)
Rhus sp.	Tr(11)
Rubus sp.	Tr(11)
Average Food Volume (cc)	3(42%)
Average Grit Volume (cc)	4(58%)
Average Gizzard Contents (cc)	7(100%)

1/ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 eprcent represented as Tr.

Table . Food of canvasbacks from Pennsylvania and New Jersey.

	New Jersey n=13	Pennsylvania n=5
Animal Food		
Mya arenaria	60(62)	10(20)
Sphaerium transversum		69(80)
Macoma balthica	39(54)	
Panopeus herbstii	1(8)	
OLIGOCHAETA		20(20)
Nassarius obsoletus	Tr(8)	1(20)
Nereis sp.	Tr(62)	
Rhithropanopeus harrisii	Tr(15)	
Neopanope texana sayi	Tr(15)	
Mulinia lateralis	Tr(8)	
Balanus sp.	Tr(8)	
Plant Food		
Polygonum arifolium		Tr(20)
Sagittaria latifolia		Tr(20)
Elodea canadensis		Tr(20)
Lemna minor		Tr(20)
Vitis sp.		Tr(20)
RHODOPHYCEAE	Tr(8)	
Average Food Volume (cc)	7.5(100%)	5.8(79%)
Average Grit Volume (cc)	Tr(0%)	1.5(21%)
Total gizzard contents (cc)	7.5(100%)	7.3(100%)

Table . Gizzard contents[1/] of canvasbacks from the Mississippi River, Pool 5, Wabasha County, Minnesota, winter of 1975-76.

	Canvasbacks n=2
Animal Food:	
Campeloma sp.	tr(50)
Helisoma sp.	8(50)
Lampsilis radiatasili	5(50)
Pectinatella magnificata	tr(50)
Plant Food:	
Aquatic rootstock	tr(100)
Ceratophyllum demersum	2(50)
Myriophyllum exalbescens	10(50)
Najas marina	tr(50)
Potamogeton foliosus	7(50)
Potamogeton nodosus	6(50)
Potamogeton pectinatus	18(50)
Potamogeton pusillius	7(50)
Prunus serotina	tr(100)
Sagittaria sp.	32(100)
Scirpus fluviatilis	2(100)
Scirpus validus	tr(100)
Sparganium eurycarpum	2(50)
Vitis riparia	tr(100)
Average food volume (cc)	3(37)
Average grit volume (cc)	5(63)
Total gizzard contents (cc)	8(100)

1/ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as tr.

Table . Gizzard and gullet contents[1/] of canvasbacks from the Mississippi River Pools 7, 8, and 9, La Crosse, Wisconsin, the winters of 1973-74 through 1975-76.

	Gizzard Canvasback n=29	Gullet Canvasback n=4
Animal Food:		
Anodonta grandis	tr(3)	
Anodonta imbecillis	2(19)	
Asellus sp.	4(7)	27(50)
Belostoma sp.	tr(3)	
Campeloma decisum	1(15)	
Campeloma integrum	tr(7)	
Campeloma sp.	2(42)	
CORIXIDAE	tr(3)	
GASTROPODA	tr(3)	
Helisoma sp.	tr(3)	tr(25)
Hexagenia bilineata	23(50)	18(50)
Hexagenia sp.	5(26)	
HIRUDINEA	tr(11)	
Pectinatella magnifica	tr(7)	
Physa sayii	tr(3)	
Sphaerium striatinum	tr(7)	
Sphaerium transversum	4(15)	
Sphaerium sp.	tr(19)	tr(25)
TENDIPIDAE	1(7)	
TRICHOPTERA	tr(7)	
UNIONIDAE	tr(11)	
Viviparus intertextus	tr(3)	
Plant Food:		
Alisma Plantago-aquatica	3(3)	
Carex lupulina	tr(7)	
Ceratophyllum demersum	tr(11)	tr(25)
Elodea canacensis	tr(3)	
Heteranthera dubia	tr(7)	
Lemna minor	tr(3)	
Myriophyllum exalbescens	tr(15)	
Potamogeton crispus	10(15)	
Potamogeton nodosus	5(53)	
Potamogeton pectinatus	tr(7)	
Potamogeton perfoliatus	tr(3)	
Potamogeton pusillus	tr(7)	
Potamogeton sp.	4(11)	
Prunus serotina	tr(3)	
Rhus sp.	tr(3)	
Rubus occidentalis	tr(7)	
Sagittaria latifolia	tr(1)	3(25)
Sagittaria rigida		2(25)
Sagittaria sp.	4(3)	
Scirpus fluviatilis	tr(7)	
Scirpus validus	tr(3)	

Table . Gizzard and gullet contents[1/] of canvasbacks from the Mississippi River Pools 7, 8, and 9, La Crosse, Wisconsin, the winters of 1973-74 through 1975-76.

	Gizzard Canvasback n=29	Gullet Canvasback n=4
Sparganium androcladum	tr(3)	
Sparganium eurycarpum	3(5)	
Spriodela polyrhiza	tr(3)	
Vallisneria americana	28(38)	49(50)
Vitis riparia	tr(7)	
Average food volume (cc)	5(55%)	16(100%)
Average grit volume (cc)	4(45%)	0(0%)
Total contents (cc)	9(100%)	16(100%)

[1/] Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as tr.

Table . Gizzard contents[1/] of canvasbacks from Desert National Wildlife Refuge, Nevada, December 1975 and Merced National Wildlife Refuge, California, November and December 1975.

	Canvasbacks n=20
Animal Food	
TENDIPEDIDAE	4(10)
ANOSTRACA	Tr(5)
Corbicula manilensis	Tr(5)
FORMICIDAE	Tr(5)
GASTROPODA	Tr(5)
Plant Food	
Potamogeton pectinatus	82(95)
Elodea canadensis	5(5)
Ruppia maritima	4(10)
Scirpus olneyi	2(20)
Echinochloa crusgalli	1(5)
Najas marina	1(5)
Marsilea mucronata	Tr(10)
Polygonum lapathifolium	Tr(10)
Rumex crispus	Tr(10)
Scirpus heterochaetus	Tr(10)
Albutilon theophrasti	Tr(5)
Atriplex sp.	Tr(5)
Holcus lanatus	Tr(5)
Hordeum sp.	Tr(5)
MALVACEAE	Tr(5)
Melilotus alba	Tr(5)
Polygonum aviculare	Tr(5)
Polygonum persicaria	Tr(5)
Potamogeton crispus	Tr(5)
Scirpus americanus	Tr(15)
Scirpus maritimus	Tr(5)
Scirpus sp.	Tr(5)
Sorgum vulgare	Tr(5)
Average Food Volume (cc)	3(60%)
Average Grit Volume (cc)	2(40%)
Average Gizzard Contents (cc)	5(100%)

1/ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as Tr.

Table . Gizzard contents[1/] of canvasbacks from Malheur National Refuge, Oregon, October and Nobember 1975.

	Canvasbacks n=14
Animal Food	
ANISOPTERA	Tr(7)
GASTROPODA	Tr(7)
Helisoma sp.	Tr(7)
Lymnaea sp.	Tr(7)
PELECYPODA	Tr(7)
Valvata sp.	Tr(7)
Plant Food:	
Potamogeton pectinatus	76(98)
Ruppia maritima	8(21)
Scirpus acutus	7(49)
Potamogeton nodosus	7(7)
Potamogeton lapathifolium	1(7)
Potamogeton pusillus	Tr(28)
Myriophyllum exalbescens	Tr(7)
Polygonum coccineum	Tr(7)
Scirpus paludosus	Tr(7)
Average Food Volume (cc)	3(60%)
Average Grit Volume (cc)	2(40%)
Average Gizzard Contents (cc)	5(100%)

1/ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as Tr.