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Food of the Chestnut Teal, *Anas castanea*, in the Gippsland Lakes Region of Victoria

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Abstract

Items of food in gizzards of 124 chestnut teal, shot in the Gippsland Lakes area between August 1971 and July 1973, were identified as far as practicable, and percentage volumes were estimated. Plant remains formed most (74%) of the material identified in almost all months; members of the Cyperaceae were well represented (22%) and *Ruppia* sp. were also abundant (5%). Animal material was usually from insects, but molluscs and crustaceans were also recorded. We conclude that the species feeds opportunistically in, and mainly around the edge of, wetlands in the region.

Introduction

Little is known of the range of food items taken, or required, by chestnut teal *Anas castanea*. Frith (1967), while noting the absence of any systematic studies, thought that the species might obtain items similar to those taken by grey teal *A. gibberifrons* when both species fed together in the same area. More recently, Delroy (1974) reported on the diet of teal shot (almost entirely in November 1965) on the southern part of the Coorong in South Australia. In that saline habitat both chestnut and grey teal fed almost exclusively on tubers of *Lamprothamnium papulosum* (Characeae) and *Ruppia spiralis* (Ruppiaceae).

As part of a continuing study of the ecology of chestnut teal in Victoria, specimens were collected in an attempt to identify the food requirements of the species. In this note we report on food items found in teal shot in the Gippsland Lakes region of Victoria between August 1971 and July 1973.

Study Area

The low-lying land forms around the Gippsland Lakes (Lakes Wellington, Victoria and King) support a range of wetland types varying in size and depth, water regimes, permanence and salinity; the river flats may also be flooded following heavy rains in the local catchments. The vegetation of these wetlands is related to local physiography and thus to water availability, but exposure and salinity influence specific distribution and hence wetland categorization (Corrick and Norman 1980). In the region the deeper freshwater marshes may be variously dominated by shrubs, e.g. *Melaleuca ericifolia*, reeds *Phragmites australis*, sedges *Lepidosperma longitudinale*, or rushes *Eleocharis sphacelata*, whereas the shallower freshwater wetlands have a greater diversity of plant species, being dominated usually by herbs and sedges; open waters may also be fringed by eroding stands of *Eucalyptus camaldulensis*. Saline wetlands also have a diverse vegetation related to salt load, depth and periods of inundation (Corrick and Norman 1980).

Table 1. Major food items found in gizzards of chestnut teal, Gippsland Lakes region, Victoria, August 1971–July 1973

Values are the mean percentage volume in gizzards

Food item	1971								1972								1973					Mean
	A	S	O	N	D	J	F	Mr	Jl	A	S	O	N	D	J	F	Mr	A	M	Jn	Jl	
Plant material																						
Chlorophyta	< 1	< 1	9	8		< 1								11	< 1					< 1	1	2
Lemna minor				10	9	29																2
Cyperaceae	26	11	19	4	13	16	21	43	11	30	19	14	69	40	12	1		38	21	17	36	22
Ruppia sp.	12	9	1	1	13	1	6		8	< 1	6	4	< 1	< 1	2		3	7		11	12	5
Elatine gratioloides									21	1	< 1				9						< 1	2
Claytonia australasica	< 1								7	4									49	21	2	4
Other species	5	1	3	1	10	2	6		9	1	1	< 1	2	1	2	1		< 1	< 1	< 1	< 1	2
Unidentified	36	40	30	52	40	21	21	57	38	34	29	77	27	27	35	2	96	35	30	14	20	36
Animal material																						
Insects	14	33	38	18	15	31	46		3	26	33	5	2	1	1		1	5		35	29	16
Mollusca	< 1	1	< 1	2					3	3	12			20	33	96		15				9
Crustacea	7	5		4											6					2	< 1	1
Total plant	79	61	62	76	85	69	54	100	94	71	55	95	98	79	60	4	99	80	100	63	71	74
Total animal	21	39	38	24	15	31	46		6	29	45	5	2	21	40	96	1	20		37	29	26
No. of teal	9	10	11	8	10	3	2	1	13	10	8	5	4	10	6	1	1	3	2	3	4	

Temperatures in the study are at a maximum in January and February, and a minimum in July, rainfall being relatively evenly distributed throughout the year (Sale, for example, has 629 mm per year with July (38 mm) the month with the lowest rainfall). Droughts are infrequent and usually of short duration; floods, which fill some wetlands and modify the salinities of others, usually occur between July and October. Some stream-flows have been modified by diversions (Nicholson 1972; Bureau of Meteorology 1975, 1976; Corrick and Norman 1980).

Methods

Attempts were made to obtain at least 10 birds per month, but availability frequently governed sample sizes. The teal were shot (mainly in the early morning or towards dusk) from hides, boat or natural cover around the Lakes; collection sites varied according to the distribution of the birds. In this note we include results for gizzards obtained from 124 ducks shot mainly on or around Lake Wellington (77) and on wetlands behind Lake Reeve (41); small numbers were also collected on Sale Common.

Once the birds had been shot and collected, the teal's body cavity was immediately injected with 10% formal saline, and the oesophageal tract was filled anteriorly, in an attempt to reduce post-mortem digestion (see for example Swanson and Bartonek 1970). The lower oesophagus and gizzard were later removed and stored in formalin until examination. The contents of both oesophagus and gizzard were evenly distributed on petri dishes and examined under a stereomicroscope (to 40×). Individual items were identified as far as possible (or were subsampled and subsequently identified), and their frequency of occurrence and estimated percentage volumes (Swanson *et al.* 1974) were determined. The monthly mean percentages for the major items or groups were calculated from combined data from both sexes (71 males, 52 females and 1 unsexed bird).

Only items from gizzards are reported here, since the oesophageal material was generally minimal; the inorganic components (shell grit, granitic quartz and other sand particles) have been ignored.

Results

The mean percentage volumes of major items, or groups of items, identified in the gizzards of chestnut teal are summarized in Table 1. For all samples combined, the food items were mainly of plant origin (74%); the animal component was usually lower (mean 26%). Nevertheless, fragments of, and occasionally whole, animals were found in 96 gizzards; plant remains were found in almost all (123) gizzards.

In most months gizzards of teal shot contained a high proportion of unidentified plant material, predominately finely macerated fragments of leaves and stems (similar to larger fragments identified as *Ruppia*, *Scirpus*, *Eleocharis* and *Lemna* spp.). In the identified material, mainly seeds and seed cases, there was considerable variation within monthly samples. The teal fed extensively on Cyperaceae and their gizzards usually (98 of 124) contained seeds of one or more members of the family; indeed the average gizzard held an estimated 22%. *Scirpus* (*S. americanus*, *fluitans*, *fluviatalis*, *?inundatus*, *maritimus* and *validus*) was found in 77 gizzards, *Cladium procerum* in 59 and *Eleocharis sphacelata* in 31 gizzards respectively, and *Carex* sp. (probably *fascicularis*) in another four.

Seeds of *Ruppia* sp. (presumably *maritima*, but see Aston 1977) were found in 57 gizzards collected throughout the period of sampling but usually at a low percentage volume; tubers of *Ruppia* sp. were also present in gizzards examined from December 1971, *Lemna minor* occurred frequently in the few gizzards obtained between November 1971 and January 1972, and filamentous green algae were also recorded during summer months. In 13 samples collected in late autumn and winter seeds or seed coats of *Claytonia australasica* were numerous.

Seeds of several species in other families were also identified in the gizzards: *Phragmites australis* (in three gizzards); ?*Isachne globosa* (one); *Vallisneria spiralis* (two); *Triglochin procera* (one); *Potamogeton* sp. (three); *Typha* sp. (six); *Lepilaena bilocularis* (one); *Betula pendula* (one); *Montia fontana* (one); *Trifolium* sp. (one); *Vicia* sp. (four); ?*Medicago* sp. (one); *Ranunculus* sp. (six); *Hydrocotyle* sp. (three). However, these were represented usually by a small volume of seeds only, and Chenopodiaceae (13), *Elatine gratioloides* (12), *Polygonum hydropiper* (12), and *Myriophyllum elatinoides* (13) were more abundant.

Insects were present in 87 gizzards from birds shot throughout the study period. Exoskeletal remains were generally of unidentifiable fragments but coleopterans, including *Necterosoma undecimlineatus*, *Enochrus cyrensis*, *Copelatus simplex*, *Pseudomicrocora* sp., *Cestrinus trivialis* and members of the Psephenidae and Helodidae, were found in 42 gizzards. Hemipterans, *Anisops*, *Sigara* and *Micronecta* spp., and a Gerridae species, were present in seven gizzards; dipterans, mainly chironomid larvae, *Odontomyia* sp. and a tipulid larva, in nine, and the hymenopteran *Iridomyrmex* sp. was recorded in three gizzards, as were a lepidopteran and a larval neuropteran. Arachnid remains (family Amaurobioididae) were also found in three birds.

Entire molluscs, or shell fragments, were present in 20 gizzards from birds shot mainly in spring and summer, particularly during the drier summer of 1972–73. Usually these were the gastropods *Hydrobia buccinoides* (20) or *Tatea rufilabris* (five) but *Coxiella striata* (one) and the pelecypod *Fluviolanatus amarus* (four) were also identified. In contrast, crustaceans were apparently of lesser importance, being found only in seven gizzards; *Daphnia* sp. in two, *Austrochiltenia australis* in two, *Paracalliope* sp. in one, and a cyclopoid copepod in one. The crab *Amarinus laevis* was also found in one gizzard.

Discussion

The Gippsland Lakes, and their surrounding catchments, are an important area for chestnut teal, indeed over 30% of recoveries of teal banded in Victoria have been made in the region (Corrick and Norman 1980). Studies on a freshwater wetland elsewhere in Victoria (Norman *et al.* 1979) showed that the species had no apparently exclusive feeding zone but utilized flooded grasses and rushes extensively. Results presented above indicate that plant material is of considerable importance in the diet of teal within this study area. Whilst unidentified fragments of plants formed a large proportion of the contents of gizzards examined, seeds of the Cyperaceae and of *Ruppia* were important constituents present throughout the sampling period. Separation of the identified plant species into strictly aquatic (i.e. those which require permanent water, eight species) and non-aquatic groups (21 species) showed that the chestnut teal fed extensively on the non-aquatic range of species, though plant species in the aquatic group were frequently more abundant. The presence of seeds in gizzards taken throughout the year, and outside known fruiting seasons, indicates that the teal were taking fallen seeds, presumably from the littoral areas.

Apart from the adventitious occurrence of the ant *Iridomyrmex*, all animal material was identified as aquatic, either bottom-dwelling larvae, molluscs, crustaceans or insects inhabiting wetlands, and all were littoral in habit. The small sizes of the samples did not allow the identification of any major periodic change in the import-

ance of plant or animal foods, but the results support the view that most teal feed in and around the margins of wetlands. Details obtained in this study also suggest that the chestnut teal in the Gippsland Lakes region, like the grey teal elsewhere (e.g. Frith *et al.* 1969), are non-selective and opportunistic feeders which utilize a variety of food sources concurrently. Indeed the species is clearly quite adaptable to a range of food items, since in another study area at Corner Inlet it feeds entirely on marine organisms (Norman, unpublished data).

We are aware that, as in other studies (e.g. Goodrick 1979), possible bias may exist in favour of animals with less digestible exoskeletons, or plants with heavier and harder seed coats. Additionally, and as in other reports, no bird shot in this study was actually feeding; both these factors may overestimate the importance of hard-bodied invertebrates or the more durable parts of plants. Nevertheless the data do indicate the range of foods taken and suggest that the margins of wetlands are important in the economy of the species, at least for feeding. Attention should be paid to such areas in the further management of habitat for chestnut teal in this region of Victoria.

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