



FOOD AND FEEDING HABITS OF WILDFOWL

by P. J. S. Olney

THE increased public interest in wildfowl conservation and restoration heavily underlines the need for dependable information on which to base programmes for the improvement of feeding and breeding areas. The primary essentials are food and cover. Clearly the important animal and plant foods must be known, and consideration be given to their normal distribution and other relevant environmental factors before such programmes can be started with real hopes of success.

At the present time detailed information on the food of the British wildfowl is extremely meagre. It is fair to say that much of the existing information is not only valueless but is often misleading, either because it records an unusual food or feeding habit or, and this is the most common error, it is too vague. It is not enough to know that for a particular species 'pond weeds' or 'grain and grass' are part of the normal diet. Identification must be more precise. That there is a need for a detailed investigation is only too obvious when we study previous work in this field. Apart from J. W. Campbell's pioneer work on the food of various ducks and geese (1936, 1946A, 1946B, 1947), E. O. Höhn's (1948) brief report on the food of the Mallard (*Anas platyrhynchos*) in the London area and Mary Gillham's (1956) useful account of the feeding habits of the Mute Swan (*Cygnus olor*), there is relatively little information available on the foods of British wildfowl in Britain. Most ornithological textbooks, if they mention food at all, merely reiterate the summary information given in *The Handbook of British Birds* (1939). Occasionally there occurs the enthusiast who takes the trouble to have a particular food accurately identified. Thus W. A. Cadman (1953) noted the importance of the roots of the common Cotton-grass (*Eriophorum angustifolium*) in the winter diet of the Greenland White-fronted Goose (*Anser albifrons flavirostris*) on the peat-bogs of Wales. Later on (1956), he found that as the winter proceeded and the Cotton-grass hardened and became less palatable, they eat the shoots of the White Beak-sedge (*Rhynchospora alba*).

European sources are almost as disappointing, though Madsen (1954) has produced a very useful survey of the food habits of diving ducks in Denmark. There is evidence to suggest that valuable work has been carried

out in the Soviet Union (Dementiev and Gladkov, *Birds of the Soviet Union*, Vol. IV, 1952). Unfortunately the food sections of that book suffer grievously from condensation and lack of a bibliography. There are, however, a number of interesting records showing particularly the difference in the food habits of one species over a large area. The Pintail (*Anas acuta*) has been shown to have a predominantly vegetarian diet in the south, and yet in the north at the same time of year animal food is preponderant. It is also shown that Scaup (*Aythya marila*), on their Caspian wintering-grounds in the Lenkoran region, live entirely on the mollusc *Cardium edule*, whilst the mollusc *Mytilaster lineatus* forms the main diet of Scaup a little farther north in the rocky shores of Azerbaizhan. This variation in food habits throughout the year and from place to place is of obvious importance, although it is often overlooked.

It is not until we turn to the American sources that we realise how far behind we are in this field of work. Here a comparatively enormous amount of information has been gathered, not only on the actual foods eaten (Cottam 1939, Kubichek 1933, Mabbott 1920, Martin and Uhler 1939, McAtee 1918, 1922 and 1939), but also on methods of utilisation and propagation of such foods. Fortunately we can learn much from this information, even though the specific foods may be different and conditions and localities will obviously vary.

Above all, a review of available literature shows that for any conservation work in this country we badly need the initial research on the food of our wildfowl.

There are a number of methods for determining the food and feeding habits of birds, most of them admirably summarised by Gibb and Hartley (1957). The methods employed will of necessity vary with the species of bird being studied. The most obvious method and one lending itself to general use is field observation. The importance of field observations should not be underestimated, for only from them can we learn certain aspects of the complete picture. In particular, it is necessary to know how, when and where the food is taken and to what extent the food supply is depleted. This is especially important in determining whether a species is of economic importance, causing damage to crops or whether, for example, the birds are merely gleaning waste grain in stubble. Field observations do, however, need experienced and skilled participants, for inaccurate or careless records can often cause serious and embarrassing mistakes. The fallibility of field observations alone has been demon-



strated many times, and it is only in conjunction with other methods that the full story can be made known. Rarely can all important foods be identified accurately in the field. The only safe guide in ascertaining the food requirements of any species is to find out by stomach analyses what is actually eaten by that species under varying conditions in different localities. For investigation purposes, a bird in the hand is worth at least two in the bush. This often involves difficulties in the specific identification of food fragments, since different materials are digested at different rates (Koersveld 1950), and the foods will therefore not always be in the original proportions as consumed. The problems involved in quantitatively assessing the foods taken will vary from species to species, depending on the type and amount of food taken. Hartley (1948) clearly summarises the various methods of assessment and the inherent problems incurred by each. The primary objection to the extensive use of stomach analysis as a basis for food study in a rare species is the danger of reducing the population by too great an extent. This means that only populations numerically large enough to withstand the loss of an adequate sample of birds can be studied in this way. If a population is not large enough—as, for example, in the Brent Goose (*Branta bernicla*)—other methods must be employed. Faeces and, if present, pellets of undigested material can indicate what is being eaten. Obviously these can only be a guide to what is taken and will not provide the complete diet-sheet. However, their importance should not be underestimated, for in conjunction with stomach analyses field observations and possibly high-speed photography, a fairly complete picture can be constructed.

It is also essential that the completed picture should include a range of different ecological types, and if possible be complete for the whole year. The diet will almost certainly change with time and place. Studies carried out over a long period of time can show long-term changes in diet correlated with altered status and distribution. There are indications that the decline in *Zostera* of the 1930s has caused the diet and distribution of the Brent Goose and Wigeon (*Anas penelope*) to alter. There is some evidence to suggest that the Wigeon has been the more successful in adapting itself to a change in food supply. Where *Zostera* is not available, and their distribution suggests that this may often be the case, Wigeon will take other sources of food. Thus a high proportion of *Ruppia*, *Enteromorpha* and *Ulva* may be taken. Wigeon from north Kent marshes were found to have been grazing on a variety of grasses, including *Puccinellia maritima*, *Festuca rubra* sub. sp. *rubra*, *Poa trivialis*, *Poa annua*, *Glyceria fluitans* and *Agrostis stolonifera* var. *palustris*. Though we know that the total numbers of the Brent Goose have declined in the last thirty years and their distribution has altered, it is difficult to ascertain how far food has been a limiting factor. The main evidence is indirect and the crucial facts are unknown. We do not know the abundance or availability of its chief food or the quantity consumed and, what is equally important in assessing limiting factors, we do not know all the main causes of mortality. These can be particularly important in a species breeding in the far north, where the effects of weather can produce wide fluctuations in numbers. It is therefore really only safe to say that there is a probable association between the decline in Brent numbers and the reduction in *Zostera*. Ornithological journals can provide other examples of the dependence of winter numbers on the available food supply, though most of them are at the anecdotal level and quantitative studies are much needed.

A complete food study should be able to confirm Gause's (1934) contention that no two species of identical ecological requirements can live together. In

birds living in the same region the most obvious differentiation that has been evolved has been in their feeding habits, where each species takes mainly different foods and none compete for the same food (Lack 1944, 1947, 1949, 1954). It has been shown that the various diving ducks (*Somateria*, *Melanitta*, *Clangula*, *Aythya*, *Bucephala*) compete for food to a lesser extent than might have been expected. Madsen's (1954) survey of the diving ducks of Denmark has shown that the various species occupy ecological niches which, though they overlap, have a number of vital distinctions. Species which feed in the same type of locality dive to different depths and partly select food items (mainly molluscs) with different size limits. Some species are also more dependent on immobile or slow-moving food objects than others.

It is clear that such differences occur, and equally clear that we must know of them if we are to plan any broad conservation programmes in the future. It is hoped that the pioneer survey now being carried out at The Wildfowl Trust will produce some of the answers to the problems. The survey is based primarily on analysis of viscera provided by members of the Kent Wildfowlers' Association. The results of such an analysis combined with field observations, faecal examination and an ecological survey of the feeding area, should provide some indication of the food available and how much is consumed. With this basic knowledge of what a particular species eats, at what time of the year and in what type of locality, we can plan for the future propagation and conservation of our wildfowl.



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FEEDING GROUNDS FOR WILDFOWL

The Provision of Feeding Grounds for Wildfowl on Agricultural Land

by G. V. T. Matthews

IN the European wildfowl system, the British Isles are predominantly wintering grounds—for birds that breed in Iceland, Greenland, Scandinavia and Russia. Apart from a substantial population of Mallard, breeding ducks and geese are rather sparsely scattered or absent. It is doubtful whether attempts to increase the breeding of wildfowl in Britain other than Mallard could produce