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MOULTING ECOLOGICAL PROBLEMS OF WILD-DUCKS IN THE TISZA BASIN

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In the organization of the International Wildfowl Research Bureau Hungary serves the programme of the European protection of wild fowls partly by counting systematically her migrating fowl masses, partly by the ecological investigation, of her peculiar biotypes. The Tisza investigation, owing to the role of the Tisza basin in directing the fowl migrations of continental significance and to its valuable nesting fauna, is also qualified for participating in these investigations. The problem of river basin becomes conspicuous particularly in connection with wild ducks because a considerable part of the duck populations in the Carpathian basin is attracted by the biotop in the inundation area. I have therefore been interested in observing, both in respect of nature conservation and that of fowl economy, how the living conditions of this area can satisfy the demands of the species in question. In moulting aspect, an investigation of ecological endowments is particularly desirable. In that time the ducks become partly or fully incapable of flying for twenty-thirty days and it is a problem of vital importance for them to get in this crucial period a perfect protection and a sure base of nourishment by the summer environs.

In the period 1947—1968, I continued observing the phenomena of the moult of wild ducks in the river region between Szeged and Csongrád. During these observations it was striking how strongly the behaviour of the duck species hatching or grouping here in the moulting period is influenced by the peculiar ecological conditions in the inundation area. At the ducks moulting in the Tisza basin, we may often notice phenomena given anyway from the local conditions, without a possibility to generalize the facts experienced here for other biotops.

I am trying to elucidate all this below, by summing up my collections.

The biotop of duck moulting

The moulting ducks can be found, except the living water, in any types of the biotops described in several monographs in the inundation area of the Tisza. Their actual value is, however, determined by the formation of water conditions. The surest are the conditions of stagnant waters rich in submersed and riverside vegetation and with constant water, a scarcity of water being generally unknown. Only the regions of standing water cannot be taken into consideration where the area is too disturbed by breeding home ducks on a large scale or in case of another intensive economic exploitation of the area.

In contradiction to the always favourable stagnant waters, the

meadows, holes and wood pools in the inundation area are continuously depending upon the inundations, being therefore subejct to fluctuations between favourable and unfavourable cycles. If the green flood is protracted late and the high waters without outlet last even in July and August, then an ideal moulting area is to be found in their neghbourhood. On the other hand, in arid summers the waterless inundation areas become entirely depopulated.

In the Table below, the occurrence of the moulting duck species observed by me in the Tisza basin are demonstrated in the single biotops:

Table 1

	A. paltyrhynchos	A. querquedula	A. strepera	A. Acuta	A. nyroca	A. ferina
Stagnant water	x		x		x	x
Hole	x	x			x	
Meadow pool	x	x	x	x	x	
Wood pool	x				x	

Behaviour of ducks moulting in the inundation area of the Tisza

The deplumation of our commonest species, *Anas platyrhynchos,* may be generalized as follows. At the beginning of nesting, the drakes keep remaining near the brooder for a while but later on, together with the egg-laying ducks staying away from hatching, they form populous groups visiting in that way the moulting areas frequently very far from the brooding place. A scarce and individual phenomenon is also a case considered when the moulting drake persists remaining close to its mate, in the brooding area. It is not cleared up, as yet, when an in which percentage the far straying drakes find their way back to their mates stayed in the brooding place, after having moulted. (Literary summary in Bezzel, 1964, Stresemann, 1950, 1966, Szijj, 1965). On the other hand, in the Tisza region, investigated by me, the moulting of Anas platyrhynchos took place in that way: Here moult very probably only the members of a local population. For twenty years, I could observe only on two occasions relatively more populous flocks of *Anas* drakes (Szentes-backwater at Labodár, June 19th 1964, about 40 specimens and June 8th 1965, about 50 specimens). Apart from these exceptions, in favourable years of larger inundations, either, a more remarkable flocking proving the presence of moulting flocks arrived from other places. At the same time, I have not noticed that the moulting substance kept in evidence locally at the beginning of brooding period, would have decreased as a consequence of migrations to other remote moulting places. For the *Anas platyrhynchos* at the Tisza, the moulting behaviour declared to be rare by literature is characteristic. Here stay the drakes generally close to their mates in the neighbourhood of the

brooding place. In the summer months, at my observations in the early morning and in the evening, I could repeatedly be ascertained of that, meeting their specimens of limited flying ability. Later on, when the young ones are already on water, on the surfaces of holes and backwaters we have often seen also old drakes of moulting plumage, together with layers leading their youngs.

Both the consequent absence of drake flocks coming from other places and the moulting behavior so obvious at the *Anas* population of the Tisza basin may be explained with the adjacent inundation area. The middle sector of the Tisza in its present form cannot mean a force of attraction to the drakes of *Anas platyrhynchos* any more that migrate in flocks of many hundred specimens from various regions of the Carpathian basin to moulting stations. Such bird masses can be connected traditionally only to areas that assure the very particular ecological requirements of the moulting period in the framework of huge natural endowments from year to year. There can be found any constant moulting flockings like those only in the deserted marshy steppes in the Hortobágy, in the Danube islands, or in the huge reedy parts of the lakes Fertő and Velence. In the inundation area of the Middle Tisza, however, only the biotop of a smaller extent in itself is stable, the summer existence of the other biotops is uncertain. In case of the drakes that remained in family bonds at the nearby brooding place, during moulting, too, I think on a theory seeming very plausible. It is possible that in the ideal biotop of the pre-regularization inundation area of the Tisza just the moulting behaviour used to be natural that to-day, in the European biotops worried with the influences of civilization, is generally but a rarity. Why would have migrated the *Anas* drakes of the immense ancient moorlands of the Tisza in an age as the birds unable to fly could remain undisturbed with pleanty of easily available food in the brooding area itself. Perhaps the once created traditions have continued from generation to generation in case of the duck populations devoted to the region. This innervated behaviour has not changed necessarily by the inundation area diminished in the meantime, as the relatively lesser quantity of the nesting duck mates left behind can be satisfied even under the present conditions in a plenty similar ot the ancient one.

On a world scale, we are knowing comparatively little about the moulting of *Anas querquedula*. It is mentioned in Soviet studies that in the deltas of Dnieper, Donets, Oka, Volga and in the Azovi-moorlands flocks of *Anas querquedula* collected from Western Siberia, White-Russia and Ukraine moult. Nesters from Western Europe visit by far the greatest number the Dutch moorlands in the season of moisting. Literary summary in Impekoven, 1964). Bezzel (1964) is mentioning small *Anas querquedula* associations of 10—20 specimens mixed among *Anas platyrhynchos* from the Bavarian fishponds; according to him, major moulting flocks appear only in exceptional cases. The moulting problems of the Hungarian population haven't been treated of by the literature, as yet. From the duck species moulting in the inundation area of the Middle Tisza, I have found the *Anas querquedula* the most faithful to the area. Even in the driest summers, some moulting specimens of them are not missing. In the years poor in water, their

behaviour is similar to that of *Anas platyrhynchos* here, the moulting drakes can be observed scatterred near to their brooding places. If, however, there are favourable water conditions in the summer inundation area, there appear also outsider *Anas querquedula* drakes in large flocks. In the river region at Hódmezővásárhely, their number is generally changing between 50 and 100. I observed their most conspicuous meeting in the summer of 1965 as, from the last week of July till the middle of August, 400 specimens of them, containing about 90 p.c. drakes, were staying in a single flock on the water of 2—300 acres known under the name pool Kollantó of the meadow Barcirét. In the biotop of the Kollantó there dominated partly a grass getting to the waist, partly a young willow-plantation, with bowering foliage, dense and pathless. The grassy and wooded area was then covered uniformly with a 10—20 cm deap water, the ducks looking consistently for places where they could get till the soil with their bills dived under water. The meeting place in the Barcirét may be considered as a typical biotop of the moult of *Anas querquedula* as that species was forced into the biotop of the deep-water holes only seasons of aridity. If there is water in the pool Kollantó, the specimens of *Anas querquedula* of the inundation area moult exclusively there. At the end of August, the drakes are already flying well and then the novement of moulting converges inseparably with the autumn migration. The moult of layers extends, according to the literature, from August till December. At the Tisza I could observe only non-nesting layers joined drake flocks. The autumn layer moult falls already into the migration in the area investigated.

From the swimming ducks, *Anas acuta* and *Anas strepera* (grey ducks) that brood here comparatively rarely, moult seasonably in the inundation area of the Tisza. A requirmement of the presence of both species is plenty of water in the inundation area as a consequence of a late inundation. As their characteristic biotop the Kollantó can be mentioned, described above, and in addition to it, the grey duck can be found also in the so-called Little-Atka branch of the stagnant water at Atka but always only in a low quantity of a few numbers. I found the highest specimen number of *Anas acuta* similarly in the summer of 1965 as in Barcirét a flock of *Anas platyrhynchos* of about 400 specimens were gathering. Then about 20 specimens of *Anas acuta* lay in hiding in the grassy pools of the Kollantó. From grey ducks *(Anas strepera)* a major number arrived only on a single occassion at the inundation area. On May 20th 1968, about 30 ducks of this species consisting first of all of drakes, were assembling in the willow wood of the Barcirét. In the time of writing this paper, their further behaviour is not known, as yet.

Aythyax nyroca is similarly a species of ducks occurring and moulting every year. Its specimens changing their plumage may be observed in every biotop. At any rate, in the negihbourhood of holes, meadows in the inundation area and wood pools we can mostly see but sing le specimens, but in the biotop of the stagnant water the moult in flocks. Their maximum moulting meetings were: Zsúpsziget, August 19th 1960: 30 specimens; Little-Atka branch of backwater Atka, July 31st 1967; 63 specimens. The ducks were staying in the time of the change of plumage in the hidden open waters of the stagnant water

protected with dense vegetation, or in the biotop of similar character in the deeper holes. If disturbed, they are mostly looking for a protection in the riverside vegetation, like the swimming species. The under-water escape is not so characteristic of this species as of the diving duck. Their moulting is prolongated. The plumage change of the drake lasts from May till August. The moulting period of layers is not cleared up in literature. I observed in the backwaters of the Tisza some laying *Aythya nyroca* specimens of limited flying capacity in the period from the end of July till the end of August.

Aythya ferina, a duck species characteristic of the alkali pools of the Plain, moults only scarcely in the stagnant water. Its maximum gathering, noticed on a single occasion, is connected with the island Atka, as I observed about 30 of them in the backwater on July 15th 1967. Its moulting time and behaviour in the region of the Tisza agrees in every respect with those published in literature (Stresemann, 1940, Bezzel, 1964).

Food base of the moulting regions in the inundation area

For a moulting wild duck that is strongly limited in its movement and becomes more and more careful also the problem of getting food is growing worse. One of the main requirements of a moulting region is to afford plenty of easily available food supply. The varied and rich food supply of the moulting regions at the Tisza that is rich in marshy vegetation and in an inferior water fauna is well known, its further detailing, therefore, would be superfluous.

Analysing, anyway, the stomach content of ducks, changing without exception their plumage, collected in the period of June—August, it was manifest even on the basis of my modest material of investigation that the ducks preferred in that period to consume, green plant parts. This tendency was also seen from the stomach content of moulting ducks collected at sodic pools of the Plain (Kakasszék, Sóstó at Orosháza, Kardoskút, Gyopáros). Below I demonstrate in a Table the result of my material concerning food investigation collected in the inundation area at Hódmezővásárhely. The figures indicated are referring to the occurring cases of the single species of food.

Timeliness of investigation of the biotops in the inundation area of the Tisza

Atlhough in the last decades the duck moulting in the Tisza basin has not afforded any more spectacular mass phenomena, it is still an important task to investigate the conditions of the inundation area. The Tisza, even if it has a much smaller inundation area in our days, has preserved its ancient character in several places, and the present ecological investigation can; spare, therefore, a knowledge of the ancient conditions. The economic forms of exploitation in progress are theatening, unfortunately, this particular biotop with far-reaching changes. Our

Table 2

Greed vegetable specimens: food	Anas platyrhynchos /17/	Anas querquedula /15/	Anas acuta /2/	Aythya nyroca /6/	Aythya ferina /2/
Lemna sp.	14	10	2	3	2
Chara sp.	6	6		1	
Grains:					
Setaria glauca	2			1	
Polygonum sp.	1				
Cyperaceae sp.	1				
Carex sp.				1	
Trifolium sp.	1				
Animal food:					
Dytiscidae sp.	1				
Nepa rubra	1				
Broken chitin	1				
Planorbis sp.				2	

small reservations, in spite of their undisturbed biotops, are containing too little area for answering a number of essential ecological problems. Under such conditions, the Tisza investigation has to perform urgent and divergent tasks to elucidate in due time the unsettled questions of this ancient world on the brink of ruin.

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