Tiscia (Szeged) Vol. XVII, pp. 207—218 (1982)

ECOLOGICAL AND QUANTITATIVE RELATIONS OF THE BIRD COMMUNITY IN THE HOLM KÖRTVÉLYES

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(Received 10 October, 1981)

Abstract

The authors made ornithological investigations on one of the typical flood-plains of the Tisza, on the so called Körtvélyes-holm (South Hungary, lower reacses of the river Tisza). They classified the ecosystems of this region in the light of the effects of the most important ecological factors affecting the bird community. They introduce the species living and nesting in the different biotops and regions of the aquatic and terrestrial ecosystems. They discuss the effect of floods on the nesting community and on migration of birds.

Participation of Passeriformes in the energy flow of the territory is demonstrated on the basis of the biomass of bird species.

Introduction

Our study is the prosecution of a systematical examination of bird community living on the flood-plains of the lower Tisza reaches at Tápé, Vesszős, Lakitelek publicated in the years 1965, 1973, 1978.

The land — to which the flood-plain, named Körtvélyes holm belongs — has still maintained some characteristics of the geographical and biological state from before the Tisza's control, therefore it was selected to be a nature conservancy area by the National Nature Conservation Office (1971).

Körtvélyes holm which is enough good protected against antropogenic effects in consequence of the terrain's attributes and the water covering of the frequent, long lasting floods, is the biotop of a typical Tisza flood-plain bird community. Its examination is an important task in the respect of Tisza-research, but its result can be well used for the nature preserve and forestry practice, too.

The first of its examiners was probably K. LAKATOS, who was fowling on this territory in the final years of the last century, then B. BODNÁR collected there. Later on P. BERETZK, I. STERBETZ, M. MARIÁN, A. BANKOVICS, GY. TREASER examined this bird community. (i. BOGDÁN. M. MARIÁN, L. PUSKÁS, L. SALAMON)

The systematical work was carried out by the ornithological group in the frame of the Tisza Research Work-group. Now we should like — beside the environmental effects on bird community — to introduce the quantitative relations of the songbirds (Passeriformes) living there.

Materials and Methods

Körtvélyes holm lays 30 km far from Szeged, to the North. Its surface is about 20 km². The horseshoe-shaped territory is surrounded from northern-east by the Tisza reach between 203—204,6 river-km, from the other sides by the Körtvélyes back water. On terrestrial way it can be approached only from the north-western corner (1. scatch map).

The area belonging to the Tisza basin in geological sense was formed by the erosion of the Holocene Tisza. Its highest parts are the river-side sand-hills accompanying the recent stream-bed. The marshy lowlands lieing inside the holm are originated on the place of the mortlakes originated as a consequence of the former river-bed-drag.

The Körtvélyes back-water disconnected from the Tisza in 1887, is connected with the river — only at high waters — by a canal. The water overflow of the surrounding agricultural land polluted sometimes by plant protectives and chemical fertilizers, is lifted into the back-water.

The holm is inundated with 2—3 m high water by the Tisza flood in almost every sring, so it is one of the most important factors of the evolution of ecosystems respectively bird communities.

This ground belongs to the climatic zone with warm, dry and hot summers, of the Lower-Tisza region. The mean annual temperature is 10.5 C. The long, warm autumn is characteristic. Winters are moderately cold, poor in snow. So it becomes possible for the song-birds arriving in flocks from north to overwinter here. The annual precipitation is few, 580 mm.

The half of the plants covering the holm's whole surface consists of soft wood and hard wood forests, respectively paper-poplar plantations. On a smaller and steadily decreasing territory we can find agriculture and orchards suffering from floods (1st scatch-map).

As a method of the research including the whole ground of Körtvélyes holm we used a relative-linear one between 1968 and 1981 (TURCEK 1958).

The quantitative survey of Passeriformes population was carried out on a standard territory of two hectares marked out in the old willow-poplar forest flourishing by the northern reach of Körtvélyes back-water. There we survayed with an absolute quantitative method (MARIÁN, 1979) in every two weeks during hatching time.

There were such years or yearly such periods at the every twoo investigations when we could come nearer to Körtvélyes holm only through the river Tisza by ship and we could move on the territory only with boats.

Results

In the following we examine first of all the effects of the most important ecological factors regulating the vital conditions of nesting species.

Birds as living beings in general get into close connections with their surrounding through the possibilities respectively processes of feeding (food supply), reproduction (nesting places, presence of nest material) defence (hiding places against climatical effects and natural animies, posts for watching the latter).

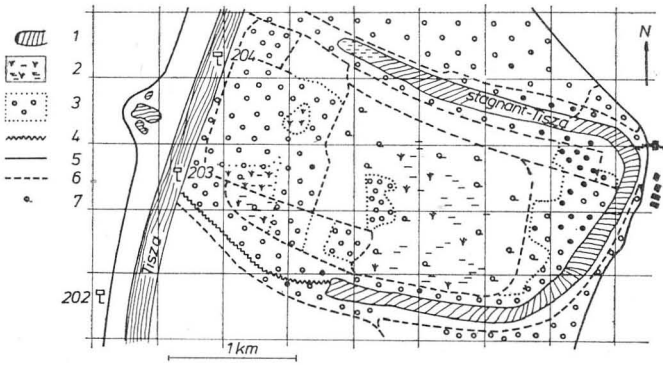
Because of the regular floods — about the ecological effects we shall write later — Körtvélyes is one of the few South-plain territories (of the great Hungarian Plain) where the antropogenic interposition (hunting, tree cutting, soil cultivation tried over again, hay making) is relatively insignificant, not occured in some years. The whole region is practically unpopulated.

Taking all these into consideration and typifying the ecosystems of this region in the intrest of characterisation, we can establish the followings.

Aquatic ecosystems

1. Back-water

On its surface grow the associations of water-chestnut (*Trapetum natantis)* MÜLL. et GÖRS 60 and water-fern *(Salvinio-Spirodeletum)* SLAVN. 56. Its tidal water is lined in many places by rich sedge-association, elsewhere by reed-spots. Its water



Ihetch map. The Mártély holms: 1. backwater, 2. meadow 3. forest 4. caual 5. dam 6. path 7. clump

is refreshed and dammed by the yearly icy and green flood of the river Tisza. As a function of that the water level fluctuates between 2—0.8 meters. The buttom is covered by 50—60 cm deep mud. The water is rich in micro-organisms and fishes. A lot of water and wading birds can find here their food but only few satisfactory hatching places are to be found. Establishment for nesting of birds is disturbed by the anglers being active there.

Characteristic nesting species are: Anas platyrhynchos (this hatches also in hollows and among the top branches of water side willows), *Fulica atra, Podiceps cristatus, Ixobrychus minutus.*

It means an important feeding place for the species *Nycticorax nycticorax, Egretta garzetta, Ardea cinerea* and *Larus ridibundus.*

2. Stagnant waters, pools

These waters entagling the inside of the holm remain some month long after the flood's passing. They dry up regularly only at the end of July, in August, that is they provide a convenient living place just in nesting time for the riparian and swimming birds. In the stagnant waters wide sedgy-rushy associations can be found which turn into marsh-fields.

Its characteristic species feed predominantly on plant food: *Aythya nyroca, Gallinula chloropus* and *Rallus aquaticus.*

The *Anas platyrhynchos* is nesting here on the ground, on the shore of these stagnant pools. *Fulica atra, Aythya ferina* and *Podiceps rufipes* are hatching in a small number.

Our herons (first of all packs of grey herons) and Limicols are gathering in a great number for the food gived by the ebbing, desiccating stagnant waters during the autumnal migration time. Conversely numerous open water surfaces give accomodation for flocks of duck-arts during the spring migration. The scattered accipitral community is represented only by Haliaëtus albicilla appearing from time to time.

Terrestrial ecosystems

1. Fields

The greatest part of the holm is covered by speargrass marsh-fields *(Carici Alopecuretum pratensis* Soó 71). The above mentioned stagnant waters can be fount in this. As an effect of floods it can be described as a moist field in the greatest pard

of the growing season. Its annual plant-associations are changing in accordance with the water-cover. In the infrequent years free from flood on a part of the territory is clipping, what decreases the number of species nesting on ground.

The scattered nearly ground poplar groups *(Populus alba)* are characteristic of the Körtvélyes field. These are resting places for buzzards and kestrels flying above the territory.

Vanellus vanellus hatching on the edge of stagnant waters, *Gallinago gallinago, Saxicola rubetra, Embreza calandra* nesting on the grassy part of the higher, drier places are characteristic among terricol species. *Tringa totanus* also lays her eggs on moist fields in wet years.

Larger or smaller packs of molting ducks (Anas platyrhynchos, Aythya nycroca) also can find a hiding place here. A great number of Ciconia nigra come together for autumnal migration. (We observed 180 specimens on 18th of July in 1976.) More hundred Merops apiaster flit gathering for migration above the territory at the end of July, in August.

2. Forest

About the half of the holm is covered by forest. The bank of the river and the back water is edged with willow-poplar gallery forest *(Salicetum albaefragilis* Soó (33) 58). A coppice of dewberry *(Rubus caesius* facies*)* forms its underwood. The old willow stand along the northern reach of the back water is expecially valuable, it insures the establishment of many hollow living birds. A willow-bush stripe *Salicetum triandrae* Soó 34 runs along the bankline of the Tisza-bed. It is the favourite way of small birds during migration.

Extensive poplar plants are with scattered underwood and with a very small bird community inside the territory. Nests — corresponding to the ecotone type — can be found on the edge pf plantations. Smaller hard-tree forest spots *(Quercus robur, Fraxinus pennsylvanica)*. Platanus hispanica stand on one place grow sparsely. The forest rounds and agricultural parts are edged by rapidly spreading *Amorpha fruticosa* stands.

From the terricol species we have to mention *Troglodytes troglodytes* and *Erythacus rubecula. Phasianus colchicus* — the population of that is increased forcefully by placing out, too — lays her eggs in little dips among dewberry tendrils. One characteristic feature of the wet soiled flood plain forest is that the ground-nesting species make their nests sometimes on fallen, moulding trunks, logs *(Luscinia megarhynchos)*.

Among the arbicol, bush-living species *Lanius corrulio* is nesting mainly on willow bushes adjoined the fields, *Hyppolais icterina* in shrubs. The nest of Hyppolais pallida was found in the riverside willow bus by A. Bankovics (Bankovics 1975).

The presence of 15 hollow-living species was stated in tree-trunk level. The most characteristic are Parus maior, and Phoenicurus phoenicurus. Also many Certhya brachydactyla are nesting in cracks of old trees. Athene noctua is the most frequent among owles.

14 species are nesting in the level of leafy crown. Characteristic are *Columba palumbus, Streptopelia turtur, Garrulus glandarius* and *Buteo buteo. Turdus merula* hatches in the lower region, *Corvus cornix* on the highest part of the trees.

In accordance of our former investigations we can state that there can not be observable adaptation to plant species or to plant associations in nestplacing of the flood-plain arbicol species (Marián—Bankovics—Bogdán—Lőrincz 1978).

The Tisza flood appearing regularly in every year, is an important ecological factor in the forming of the Körtvélyes holm's bird community.

Its outstanding and negative result is the relatively small number of terricol species and individuals. The spring-flood makes impossible the nest building of these species, or what more catastrophic is — the late flood liquidate the brood of the already hatching birds. It thins the brush- and trunk-living arbicol species out. Its food decreasing effect throws the number of crown-mesting birds back.

The flood has a positive effect for the migration in years, following great floods as in 1971, or when green-floods retire slowly, as in 1974, wide, shallow lakes take the place of stagnant pool system. These remain during all the growing season. The number of bird species characteristic for the flood plain of the river increases with typical spring species. *(Platalea leucorodia* packs, wandering *Egretta alba* and *Plegadis falcinellus* individuals can appear).

The importance of Körtvélyes holm, this significant bird-lodgeing-place becomes more evident when we take into consideration the juiding role of the Tisza-line in the Middle-European bird migration (MARIÁN 1980).

* * *

The most characteristic species of gallery forests of Hungarian rivers, so that of the flood plain of the river Tisza, belong to the order of sing-birds (Passeriformes). At the same time these species show the greatest fidelity to place, to the biocenosis of flood plain forests. Therefore we made quantitative examinations on the species belonging to this ordo and nesting in the gallery forest. Our aim was to state the role of these birds in the natural production of the territory.

Our investigation was carried out during the time period, on the place and with the methods described in the second chapter.

We estimated the bird community's role in the matter and energy flow of the environment on the basis of their weight (biomass, BALOGH 1958). The mean weight of the species was estimated on the basis of the data of SZÉKESSY (1958), where there was no reference to that, we calculated it no the basis of the publications of HEINROTH, O. u. M. (1924—1931). We calculated their weight from the total mean values of males and femails (Table 1).

Averagely 172 individuals lived on the standard territory during the time of hatching and breeding youngs, with minimal calculations (taking single hatching and the lowest descendent number for basis) in the examined three years. The sum of their weight (descendants counted with their adult weight) is 6.8 kg (Table 1). That is 86 sing birds, in 3.4 kg weight falls to 1 ha of the flood plain forest with similar ecological features on the Körtvélyes holm.

Copared it to the Passeriformes community of Vesszős flood plain forest wich has the similar vegetation but more favourable geological position (MARIÁN—PUSKÁS 1973), we can state that it counts about onethird of that. There fall 240 individuals with 11 kg in weight to 2 ha of forest territory. The willow-poplar forest of Körtvélyes is far from agricultural areas wich mean good feeding places for some species. Perhaps this is the reason of the absence of COLEUS MONEDULA and STURNUS VULGARIS colonies and a great *Passer montanus* population. We have still to think that this bird quantity is characteristic for the flood plain maintaining its near natural conditions. The Vesszős flood area has to thank the bird cumulating effect of the forest-zone extending among the wide treeless agricultural terrain for its greater population.

Table 1

Species	Trophismus	Individuals per 2 ha	Biomass
Oriolus oriolus	C	6	438
Corvus cornix	D	2	984
Garrulus glandarius	D	4	660
Parus maior	D	26	520
Parus caeruleus	C	16	176
Aegithalos caudatus	C	10	90
Certhia brachydactyla	C	6	42
Troglodytes troglodytes	C	4	32
Turdus philomelos	D	2	136
Turdus merula	D	10	880
Phoenicurus phoenicurus	C	4	52
Luscinia megarhynchos	C	8	144
Erithacus rubecula	D	2	32
Hippolais icterina	C	4	56
Hippolais pallida	C	2	28
Sylvia atricapilla	D	6	108
Sylvia curruca	C	4	48
Phylloscopus collybita	C	6	54
Muscicapa striata	C	6	114
Sturnus vulgaris	C	22	1694
Passer montanus	D	16	368
Fringilla coelebs	D	6	126
Total		172	6782

D Diversivores
C Carnivores

We can get a picture about the practical economical value of the sing-bird community of our territory with the classification of species on the ground of their tropical distribution (Table 2).

Table 2.

Trophismus	Numbers of birds		Biomass	
	Individual	%	g	%
Diversivores	74	43	3814	56
Carnivores	98	57	2968	44
Total	172	100	6782	100

Exclusively plant-feeding (Herbivores) that is pest bird species — in human relation, live not on the examined territory. Diversivore and carnivorous species (insectivorous ones are also ranged with carnivorous) occur in much the same percent.

It can be stated that the species ranged with Passeriformes ordo are important not only as a nature values to be preserved but they are siginificant members of the biocenosis of flood plain forests in the respect of forest economy, protection, too. The value of our conclusion is emphasized by the fact, that we haven't made estimations but calculations on the basis of populations' weight approaching well the reality. The whole bird community of Körtvélyes holm is shown on a fauna-picture — indicating the phenological relations, too (Table 3).

Table 3. *Picture of the fauna*

Species		Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Gavia stellata	W												
Podiceps ruficollis	N												
Podiceps cristatus	N												
Ardea cinerea	P												
Ardea purpurea	P												
Ardeola ralloides	P												
Egretta alba	R												
Egretta garzetta	P												
Nycticorax nycticorax	N												
Ixobrychus minutus	N												
Ciconia ciconia	P												
Ciconia nigra	P												
Plegadis falcinellus	R												
Platalea leucorodia	P												
Anser anser	P												
Anser albifrons	P												
Anser fabalis	P												
Anas platyrhynchos	N												
Anas querquedula	P												
Anas crecca	P												
Anas acuta	P												
Anas penelope	P												
Aythya ferina	N												
Aythya nyroca	N												
Bucephala clangula	W												
Milvus migrans	P												
Buteo buteo	N												
Buteo lagopus	W												
Aquila heliaca	R												
Haliaaetus albicilla	N												
Circus cyaneus	W												

N Nesting
P Passing migratory
W Winter visitory
R Rarity

Species		Month 1 2 3 4 5 6 7 8 9 10 11 12
Pandion haliaetus	R	
Falco subbuteo	P	
Falco tinnunculus	N	
Phasianus colchicus	N	
Grus grus	R	
Rallus aquaticus	N	
Gallinula chloropus	N	
Fulica atra	N	
Vanellus vanellus	N	
Numenius arquata	P	
Limosa limosa	P	
Tringa totanus	N	
Tringa stagnatilis	R	
Tringa nebularia	P	
Tringa ochropus	P	
Tringa glareola	P	
Actitis hypoleucos	P	
Gallinago gallinago	N	
Philomachus pugnax	P	
Larus argentatus	P	
Larus ridibundus	P	
Larus minutus	R	
Sterna hirundo	P	
Columba palumbus	N	
Streptopelia turtur	N	
Streptopelia decaocto	N	
Cuculus canorus	N	
Athene noctua	N	
Strix aluco	N	
Asio otus	N	
Asio flammeus	W	
Caprimulgus europaeus	P	
Alcedo atthis	N	

Species		Month
		1 2 3 4 5 6 7 8 9 10 11 12
Merops apiaster	P	
Upopa epops	N	
Jynx torquilla	N	
Picus viridis	N	
Picus canus	P	
Dryocopus martius	P	
Dendrocopos maior	N	
Dendrocopos syriacus	N	
Galerida cristata	N	
Alauda arvensis	N	
Hirundo rustica	N	
Delichon urbica	P	
Riparia riparia	P	
Oriolus oriolus	N	
Corvus cornix	N	
Corvus frugilegus	P	
Coloeus monedula	N	
Pica pica	N	
Garrulus glandarius	N	
Parus maior	N	
Parus caeruleus	N	
Aegithalos caudatus	N	
Remiz pendulinus	P	
Certhia brachydactyla	N	
Troglodytes troglodytes	N	
Turdus viscivorus	P	
Turdus pilaris	W	
Turdus philomelos	N	
Turdus merula	N	
Saxicola rubetra	N	
Phoenicurus phoenicurus	N	
Luscinia megarhynchos	N	
Erithacus rubecula	N	
Locustella fluviatilis	N	

Species		Month
		1 2 3 4 5 6 7 8 9 10 11 12
Hippolais icterina	N	
Hippolais pallida	N	
Sylvia atricapilla	N	
Sylvia communis	P	
Sylvia curruca	N	
Phylloscopus trochilus	P	
Phylloscopus collybita	P	
Phylloscopus sibilatrix	P	
Regulus regulus	P	
Muscicapa striata	P	
Muscicapa albicollis	P	
Anthus pratensis	P	
Anthus trivialis	P	
Motacilla alba	P	
Motacilla flava	P	
Lanius excubitor	W	
Lanius minor	P	
Lanius collurio	N	
Sturnus vulgaris	N	
Passer montanus	N	
Coccothraustes coccoth.	P	
Chloris chloris	N	
Carduelis carduelis	N	
Carduelis spinus	P	
Carduelis cannabina	W	
Carduelis flavirostris	W	
Pyrrhula pyrrhula	W	
Fringilla coelebs	N	
Fringilla montifring.	W	
Emberiza citrinella	P	
Emberiza calandra	N	
Emberiza schoeniclus	P	

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Körtvélyes sziget madárállományának ökológiai és mennyiségi viszonyai

MARIÁN M. és PUSKÁS L.

Kivonat

Szerzők 1968—1980 között végeztek ornitológiai kutatást a Tisza egy jellegzetes hullámterén, az úgynevezett Körtvélyes szigeten (Dél-Magyarország, Tisza folyó alsó szakasza). A madárállományra ható legfontosabb ökológiai faktorok hatását figyelembe véve tipizálták e táj „ökoszisztémáit". Bemutatták az aquatilis és terresztrisz ökoszisztémák különböző biotópjaiban azok régióiban élő fészkelő fajokat. Foglalkoznak a folyó árvízeinek a fészkelő állományára és a madárvonulásra gyakorolt hatásával.

A passeriformes állománynak a terület anyag-energia fogalmában való részvételét a madárfajok biomasszája alapján mutatják be.

Ekološki i kvantitativni aspekti ornitofaune ostrva Körtvélyes

MARIÁN M. i PUSKQS L.

Abstrakt

Autori su na specifičnom plavnom području reke Tise, na ostrvu Körtvélyes, vršili ornitološka osmatranja u periodu 1968—1980. godine. Uzimajući u obzir uticaj najznačajnijih ekoloških faktora na ornitofaunu, izvršili su tipiziranje ekosistema datog područja. Prikazali su gnezdarice pojedinih biotopa unutar vodenih i terestičnih ekosistema. Obradjuju uticaj poplava na gneždjenje i seobu ptica.

Analizom biomase pojedinih vrsta Passeriformes ukazuju na njihovo učešće u prometu materije i protoku energije istraživanog područja.

ЭКОЛОГИЧЕСКИ И КОЛИЧЕСТВЕННЫЙ СОСТАВ ПТИЦ НА ОСТРОВЕ КЁРТВЕЙЕШ

М. Мариан и Л. Пушкан

Резюме

Авторы начиная с 1968 по 1980 год проводили орнитологические исследования на поймах реки Тисы — на так называемом острове Кёртвейеш (Южной Венгрии, в нижнем течении реки Тисы). На основании самых главных экологических факторов влияющие на жизнь птиц, — провели типизацию этой «экосистемы» по гнездование птиц в различных биотопах. Знакомились с влиянием разливов рек на гнездование и перелеты птицы.

Запасы воробьиных (Pasiformes) в материально-энергетическом обороте данной территории приводятся на основании биомассы указанных видов.