

THE COMPARATIVE ORNITHOLOGICAL INVESTIGATION INTO THE FLOOD-PLAIN MEADOW AT TISZALÖK AND RÁKAMAZ

A. LEGÁNY

North-plain Inspectorate of OKTH, Debrecen

(Received 10 November, 1979)

Abstract

The paper compares the avifaunas of the flood-plain meadows at Rakamaz and Tisza. I have established in the course of the systematic stock-takings the number of the nesting species and pairs. In connection with these and the analysis of the observed ecological changes, I have established the following:

- 1) The areas are degraded as a result of human effects.
- 2) As a result of afforestation, foreign — mainly arboricolous and dendricolous — species settle down in the area of the meadow.
- 3) In the flood plain of the Tisza, some areas preserving original floral and faunal elements can also be found.
- 4) The meadow at Rakamaz is like this, too; its protection would, therefore, be worth while and reasonable.

Introduction

The continuous research, observation of our rivers and among these the Tisza is justified by the permanent transforming human activity. As a result of these effects, the fall of the river, the direction of flowing, the dimension of flood plain, etc. change. In the area, restricted within banks — though here mostly an agricultural activity is going on — there are still some sections, which preserved more or less of the by-gone animal and vegetable kingdoms. But the dimension of these areas decreases more and more, it is therefore important to observe and take them into consideration. It is therefore that I chose — after previous information — the flood-plain meadows at Rakamaz and Tisza. We can namely get — after duly investigating and comparing them — a certain picture of the causes, direction and degree of the changes to be expected. These meadows are the most characteristic ecosystems of these Tisza reaches, because here have been forests of major dimension neither today, nor in the past. My decision is justified by this, as well.

Natural conditions

- 1) The flood-plain meadow at Rakamaz lies south of the railway line connecting Tokaj with Rakamaz, its extent being about 900 ha (cf. Fig. 1). Its surface is flat, having the lone and mostly silted up mortlake beds as terrain depressions.

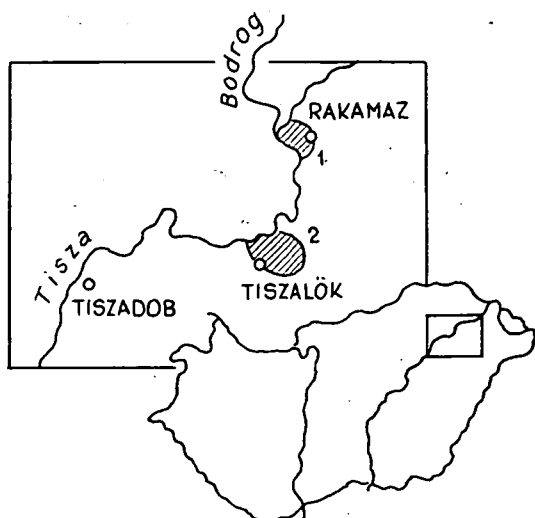


Fig. 1. Geographical situation of the investigated areas in Hungary.

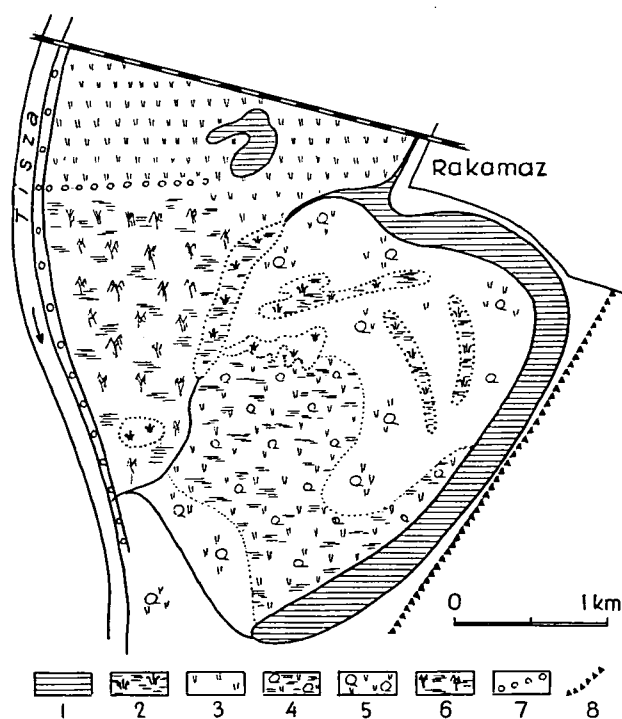


Fig. 2. Distribution of the nesting biotopes in the flood-plain meadow at Rakamaz

Key to the signs used: 1 Mortlake 2 Swamp 3 Grazing land 4 Meadow with willow bushes and puddles 5 Dry meadow with willow bushes 6 Bleak grass-land with puddles 7 Row of trees 8 Dike.

Despite grazing and mowing, the vegetation has preserved much of its former state. I perform the botanical analysis of the meadow as an ecosystem in nesting biotopes, but only in a depth necessary from ornithological point of view. (Cf. Fig. 2).

1) The mortlake — mostly with a free water surface, at the surface with a floating vegetation — *Nymphaeoidetum alboluteae*. There are several *Typha angustifolia*, a few *T. latifolia*, *Glyceria maxima*, *Phragmites communis*, with narrow reed-fringes towards the meadow. Here and there, there are several *Schoenoplectus lacustris*, in spots.

2) In the mortlake beds, already filled up for the most part, marshes were formed where the stock-forming species are *Glyceria maxima* and *Schoenoplectus lacustris*. There are comparatively few *Typha latifolia* and *Phragmites communis*.

3) The grazing land is generally the highest part of the area, becoming dry at first, where owing to the continuous treading and grazing the vegetation became poorer and degraded. The basis is here, too, the *Lythro-Alopecuretum pratensis* association but with much fewer species. Stock-forming is *Alopecurus pratensis*. There are characteristic: *Poa pratensis*, *Rumex conglomeratus*, in fresher places *Symphytum officinale* and *Ranunculus sceleratus*.

4) The most characteristic biotope — and scenic element — of the area is the meadow with willow-bushes, where rich bush groups are sporadically formed by *Salix alba*. Here and there, in the deeper parts, temporary puddles are formed with an *Eleocharis acicularis*, *Carex vulpina*, *Agrostis stolonifera*, and *Symphytum officinale* vegetation.

5) In the higher and dry parts of the willow-bush areas a characteristic flood-plain meadow: *Lythro-Alopecuretum hungaricum* was formed, with *Alopecurus pratensis*, *Poa pratensis*, *Trifolium pratense*, *Chrysanthemum leucanthemum*, *Leucosium aestivum*, *Equisetum arvense* and in fresher places *Symphytum officinale* and *Ranunculus sceleratus* species.

6) The vegetation of the grass-land without willowy bushes completely agrees with the former, only *Salix alba* is missing.

7) The area is comparatively poor in trees, at least much poorer than the meadow at Tiszalök. Its only row of trees is formed by planted *Populus robustus*.

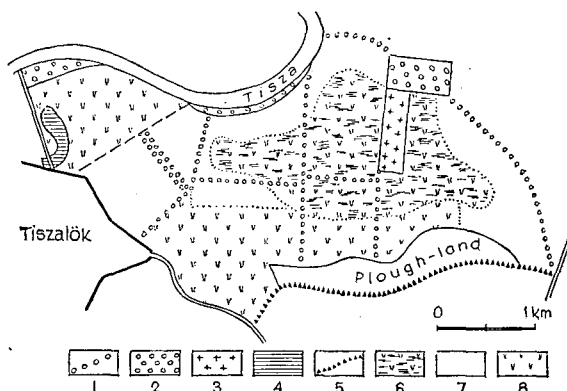


Fig. 3. Distribution of the nesting biotopes in the flood-plain meadow at Tiszalök

Key to the signs used: 1 Row of trees 2 Forest belt 3 Willow plantation 4 Mortlake 5 Dike 6 Meadow with puddles 7 Dry meadow — grass-land 8 Dry meadow — grazing Land

II) The flood-plain meadow at Tiszalök similarly lies at the left bank of the river, east-northeast of Tiszalök, its extent being about 970 ha (cf. Fig. 1). In respect of its character, it differs from the former meadow. It has more rows of trees and even a forest belt. By human impacts deeper changes are caused and this is manifest both in its vegetation and in the animal kingdom (cf. Fig. 3).

1) The row of trees and the forest belt consists of a 20 to 25 years old planted *Populus robusta* stock.

2) At the side of the channels, covering with a network the area, a characteristic, 2 to 3 m broad bush belt is formed by *Salix alba*, somewhat replacing with its presence the willow bushes of the meadow at Rakamaz.

3) The forest belt is a 10 to 12 m broad forest, with an Austrian oak row at its skirts. Its growing stand is *Populus robusta*.

4) It has no swamp. This is partly replaced here by a willow plantation, created for growing willow-twigs, used for wicker-work, planted with 1 m foot and row spaces. It is yearly pruned about 50—60 cm high from the ground. The resected head formed in this way, as well as the mass of thick shoots, mean a biotope suitable for nesting. Its area is about 22 ha. Its maximum water covering is 60 cm, which gradually decreases till being dried.

5) A meadow with puddles, at its deeper points with a *Carex vulpina*, *C. distans*, *C. elata*, *Eleocharis palustris*, *Juncus inflexus*, *Glycerina maxima*, and *Schoenoplectus lacustris* vegetation. In its higher parts — in case of an entirely shallow water — there are: *Agrostis stolonifera*, *Symphytum officinale*, *Rumex conglomeratus*. This biotope developed in temporarily water-covered areas.

6) A dry meadow — at the highest points of the flood plain. A part of it is mown, another part is grazed. (Cf. Fig. 4). Its vegetation is the characteristic, and above mentioned, *Lythro-Alopecuretum pratensis* association.

7) The mortlake is an area of no importance, with much broader reed skirts, without any floating vegetation.

Methods of the investigation

The methods are determined by the aim: to get from the area a material as much useful as possible. For this purpose I already began informative surveyings in 1977 and 1978. With the help of these I demarkated the two areas, which were systematically investigated in 1979. In the course of this, I endeavoured to establish possibly every nesting species and pair in both meadows. I ranged, therefore, systematically over the area from early Spring till Autumn, in the course of which I have recorded the observed species, their activity and number. The data were fixed in each biotope — e.g., grass-land, grazing land, meadow with willow bushes, row of trees, swamp, etc. — separately, in order to get a picture, by means of this, of the structure of the bird colony.

For establishing the hatching species, I have taken into consideration the observed nests, the parents leading nestlings, the singing males and every circumstance that referred to hatching: egg-shell, behaviour showing an anxiety for the nest, etc. During the surveys, I have recorded the data, as well, in connection with species that only arrived here for nutrition. This was primarily important in Autumn and Spring, on the occasion of migration.

Results of the investigation

In the course of the observations I have established that in respect of the number of nesting species, there is no considerable difference. (Cf. Tables 1 and 2). In the composition of species, however, there is a more considerable difference, caused by the different natural fundamentals of the two areas. As mentioned above, in the flood-

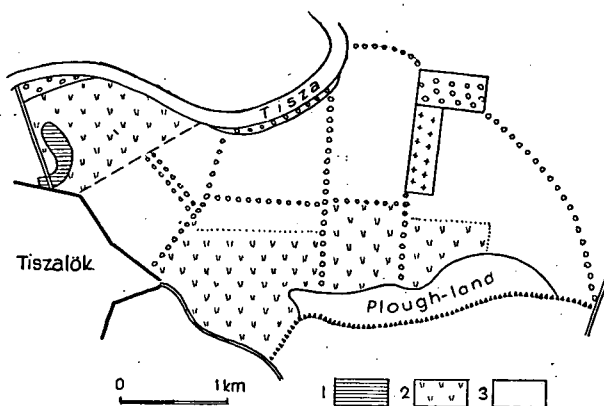


Fig. 4. Human impacts on the flood-plain meadow at Tiszalök
Key to the signs used : 1 Fishing, angling 2 Grazing 3 Mowing.

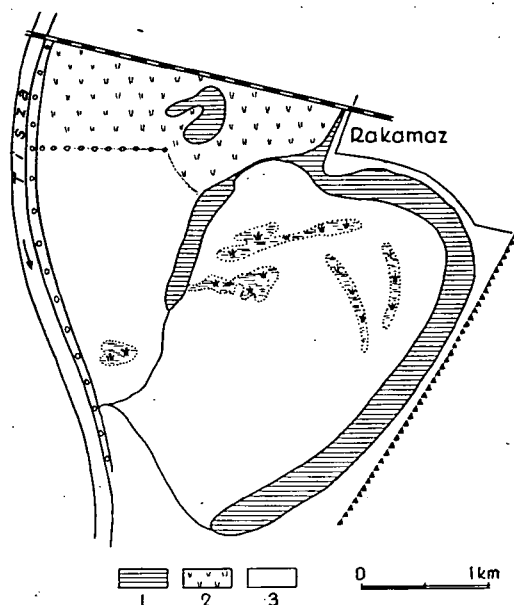


Fig. 5. Human impacts on the flood-plain meadow at Rakamaz
Key to the signs used : 1 Fishing, angling 2 Grazing 3 Mowing.

plain meadow at Tiszalök, the role of forest belts and rows of trees is more considerable, in a result of which the number of species that prefer this has increased. This is proved by the numbers, as well, which give the distribution of the bird colonies of the two areas, on the basis of nesting levels:

	Tiszaölök per cent	Rakamaz per cent
Hydrocolous	3 species, 10.7	3 species, 9.3
Phragmitidicolous	7 species, 25.—	9 species, 28.1
Terricolous	7 species, 25.—	16 species, 50.—
Fructicolous	3 species, 10.7	1 species, 3.3
Dendricolous	3 species, 10.7	— species,
Arboricolous	5 species, 17.9	3 species, 9.3

Table 1. Number of species and pairs, nesting in the flood-plain meadow at Rakamaz in 1979

Species	1	2	3	4	5	6	7	Total
1 <i>Ardea purpurea</i> L		2						2
Number of nesting species	4	16	5	5	8	5	2	32
Number of nesting pairs	11	219	13	60	52	32	2	389

Meaning of numbers in the head-piece: 1 = mortlake, 2 = swamp, 3 = grazing land, 4 = meadow with willow bushes and puddles, 5 = dry meadow with willow bushes, 6 = bleak grass-land with puddles, 7 = row of trees.

In both areas, the backbone of the colony is formed by hydrocolous, phragmitidicolous and terricolous species — what corresponds to the possibilities of the flood-plain meadow. — In case of the meadow at Tiszaölök, the value of the fructicolous, dendricolous and arboricolous species is 39.3 per cent, while at Rakamaz this value is not more than 12.6 per cent.

The value of species identity — with 17 common species — is 37.8 per cent. This is showing the doubtless and close relationship of the areas. But just the former data show the transformation, resp. the direction of it, induced by the human impact.

In the course of surveying, it could be established that in the meadow — as within an ecosystem — the species are separated in biotopes. The swamps, meadows with willow bushes, grazing lands, rows of trees, etc. (cf. Tables 1 and 2) may be characterized with definite nesting part-colonies. The nesting biotopes, to be found within the single meadows, can be paralleled. They satisfy identical or similar demands. Their bird colonies are, therefore, also identical or similar to each other. This is shown by the following:

Table 2. Number of species and pairs, nesting in the flood-plain meadow at Tiszaölök in 1979

Species	1	2	3	4	5	6	Total
1 <i>Podiceps ruficollis</i> Pall.					2		2
Number of nesting species	5	5	7	5	6	3	28
Number of nesting pairs	12	16	13	60	33	27	161

Meaning of numbers in the head-piece: 1 = row of trees, 2 = row of bushes, 3 = forest belt, 4 = willow plantation, 5 = meadow with puddles, 6 = dry meadow.

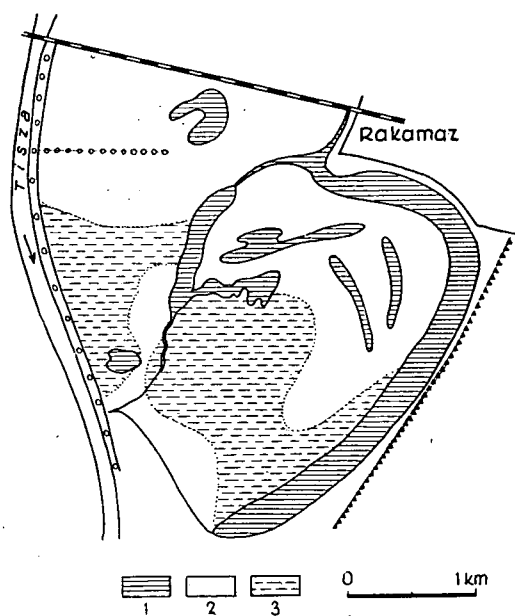


Fig. 6. The extent of water-cover in the flood-plain meadow at Rakamaz

Key to the signs used: 1 Standing water 2 Water-covered only in flood 3 Temporary, in late Summer dried.

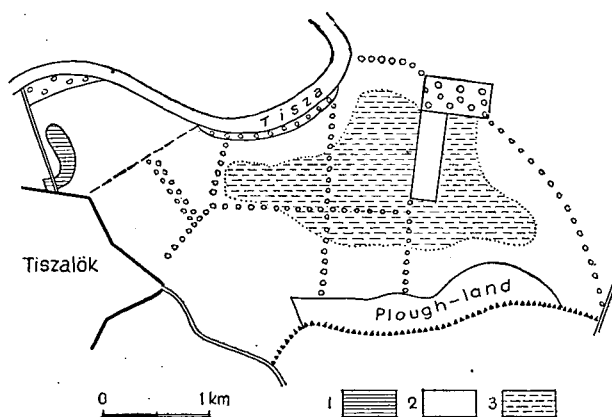


Fig. 7. The extent of water-cover in the flood-plain meadow at Tiszalök

Key to the signs used: 1 Standing water 2 Water-covered only in flood 3 Temporary, in late Summer dried.

Rakamaz:

Row of trees
Swamp
Grazing land
Meadow with willow bushes
and puddles
Bleak grass-land with
puddles
Dry meadow with willow
bushes

Tiszalök:

Row of trees
Willow plantation
Grazing land
Meadow with puddles, a row
of bushes
Meadow with puddles
Dry grazing-meadow
Forest belt

The observed difference between the bird colonies of the two areas can also be perceived at parallelling the nesting biotopes. The forest belt of the meadow at Tiszalök has, namely, no corresponding pair at Rakamaz. Therefore here appear the forest species, the existence of which in a meadow can only be explained in this way.

The species composition of the nesting stock of the single part-areas is permanent. This is caused by the firm demands of species towards their environment. A species or colony is namely only inclined to settle in an other biotope if it can fulfil similar demands. This can be observed in case of reed warblers, which can mainly be observed at Rakamaz in the swamp, at Tiszalök in the willow plantation. A role, like this, is played at Tiszalök by the row of bushes, as well, which enables the settlement of the birds of the meadow with willow bushes at Rakamaz, to some extent.

In the interest of the further evaluation and comparison of the areas, I have calculated, how many nesting pairs can be found in a 25 ha area. I have chosen just this areal extent because I wanted to make a comparison with the data obtained from a flood-plain meadow at the Upper Tisza (LEGÁNY 1974). On this basis, I have obtained the following data:

At the Upper Tisza, in a 25 ha area, 5.3 pairs nested	
At Rakamaz	25 ha area, 6.2 pairs nested
At Tiszalök	25 ha area, 4.1 pairs nested

Here I note that, at calculating the value at Rakamaz, I have not taken into consideration the gull colony, which — with its 166 nesting pairs — would have increased and deformed the value. Accordingly, it turns out of the investigation into the values referred to the areal unit (25 ha) that the meadow at Rakamaz is a comparatively richer area, which is better than the average and more valuable from biological point of view. The same cannot be said of Tiszalök.

I have investigated into the distribution of species, according to the consumed food. At ranging into the single categories, I have decided on the basis of the feeding stuffs, making the most part of nourishment. The obtained results are projected in both areas to the nesting biotopes. This was important because most species — with the exception of carnivores and a few mixed eaters — take their food in the nesting biotopes (cf. Table 3).

It is to be established on this basis that the backbone of the part-colonies of each nesting biotope is formed by insectivores, apart from which, an important role is played by the mixed eaters, as well. The carnivores — being super-predatory birds — cannot nest in every biotope, owing to their long action-radius. At the same time, they visit almost the whole meadow, in order to take nourishment.

Table 3. *Distribution of the nesting species of the flood-plain meadows, on the basis of the consumed nourishment, in the single nesting biotopes*

Rakamaz				
Mortlake			I/2	M/2
Swamp	C/3	H/5	1/6	M/2
Grazing land			1/4	M/1
Meadow with willow bushes and puddles			1/5	
Dry meadow with willow bushes		H/2	1/4	M/2
Grass-land with puddles		H/1	1/3	M/1
Row of trees	C/1			M/1
Tiszalök:				
Row of trees	C/1		1/2	M/2
Row of bushes			1/5	
Forest belt		H/1	1/5	M/1
Willow plantation	C/1	H/1	1/3	
Meadow with puddles		H/3	1/2	M/1
Dry meadow			1/1	M/2

Sign legends: C = carnivore, H = herbivore, I = insectivore, M = mixed eater. The numbers behind the letters designate the number of nesting species.

On the basis of observations, the meadow proved to be an ecological unit, where the production of feeding stuffs is larger than the consumption. I have not observed any influx of matter — feeding stuff — only the export of that. That is to say, I have observed in several cases some species that took nourishment in the meadow but did not nest there. In order to show the degree of this, I am publishing here the data of a single day of observation — 21 May, 1979 — from the meadow at Tiszalök:

1 <i>Ardea cinerea</i> L.	4 individuals
2 <i>Ardeola ralloides</i> SCOP.	4 individuals
3 <i>Egretta garzetta</i> L.	5 individuals
4 <i>Nycticorax nycticorax</i> L.	30 individuals
5 <i>Ciconia ciconia</i> L.	25 individuals
6 <i>Ciconia nigra</i> L.	1 individuals
7 <i>Anas platyrhynchos</i> L.	80 individuals
8 <i>Anas querquedula</i> L.	30 individuals
9 <i>Aythya ferina</i> L.	50 individuals
10 <i>Aythya nyroca</i> GÜLD.	30 individuals
11 <i>Philomachus pugnax</i> L.	150 individuals

Note: The above species all were observed in the meadow with puddles.

The number of the individuals, which only took food there, mainly increased in the time of the spring migration. It is, namely, in that time that the spring flood recedes to the riverbed, filling with water every small dip. This gives an excellent eating and resting place to the various Anatidae and *Limicola* species. The decisive role of water is also proved by, that on the occasion of autumn migration the number of bird masses is much lower, and even it may be entirely missing, because there is no water in the area. Then, a movement of birds may only be observed in the deeper laying areas of the meadow at Rakamaz with standing water.

It is obvious even from the above described facts that the meadow at Rakamaz is a more valuable area from any points of view. The cause of this can be explained by various human impacts. There are among these primarily: grazing, mowing, and river control. During my observations, I attempted to investigate into the effects of these upon the living world.

Grazing — owing to its known effects — degrades the meadow. This may be registered not only in the vegetation but, as a result of this, in the bird colony, as well. The grazed lands have, namely, always a lower species number than the similar, but not grazed, sections. For instance, I have observed at Rakamaz five and at Tiszaölök only three hatching species. And even the same species occurs here with a lower individual number than in control areas.

For instance, at Rakamaz, in the grazing land, three pairs of *Vanellus vanellus* L. nested, while in the bleak grass-land with puddles 15, and in the meadow with willow bushes and puddles 10 pairs.

Not more than one pair of *Limosa limosa* L. hatched in the grazing land, on the other hand, 10 pairs did this in the bleak grass-land with puddles, and 6 pairs in the meadow with willow bushes and puddles.

It is to be noted, at any rate, that we must not draw of this conclusions of general value because this is valuable only here. At the same time, there are some species that hatch or mostly hatch in grazing lands and their number is not influenced at all by grazing — e.g., *Alauda arvensis* L.

As mowing takes place, luckily, after the first hatching, its effect does not seem to be as harmful as it could be otherwise. But it cannot be called advantageous, either, because I have established in the course of surveyings that in the mown areas I have not observed any bird, at all, where before — in case of a high grass — they were in large numbers. This was my concrete observation in the meadow at Tiszaölök on 11 June, 1979. And I had similar observations at Rakamaz, as well.

As to river control, it was of the most obvious effect upon the avifauna of meadows. As long as the meadow at Rakamaz preserved its original surface — we find in it hardly any channel — as a result of this, the draining of the area follows much later every year. To say nothing of that some continuously water-covered deeper places always remain in this area. On the other hand, in the meadow at Tiszaölök — with the aim of an intensive meadow and grazing-land economy — a network of canals was formed for drainage and possibly for irrigation. As a result of this, the area is dry at the end of May or the beginning of June and the hygrophilous species disappear.

At last, I mention afforestation from among human effects. This has induced, besides the economy of water supplies, the most important change. This manifests itself in the composition of species and has caused the difference between the two areas (cf. Figs. 4 and 5).

By reason of all these, we may draw the following conclusions:

- 1) As a result of the human environment-forming activity, the original, autochthonous bird colony is reduced to poverty, changes, in respect both of its species and individual numbers.

- 2) As a result of afforestation, in the meadow a settling down of species followed that was foreign from the ecosystem there.

- 3) It is still possible to find in the flood plain of the Tisza some ecosystems that have preserved comparatively much of their original feature and living world. For instance, the flood plain at Rakamaz.

- 4) The areas, where the premaeval state can still be found, even if with more or less changes, ought to be placed under protection. It is justified, therefore, to declare the flood-plain meadow at Rakamaz protected, connected with the Tokaj Region Conservation District, to be created in the future.

References

- BALOGH, J. (1958): *Lebensgemeinschaften der Landtiere*. Berlin.
- KÁRPÁTI, Z. (1969): *A növények világa* (The kingdom of plants). II. — Budapest.
- LEGÁNY, A. (1974): Ornithological observations in some biotopes of the Upper-Tisza inundation area. — *Tiscia*. (Szeged) 9, 115—124.
- LEGÁNY, A. (1975): *A fészkelő madárközösségek szerepe a Felső-Tisza árterének biotópjaiban* (Role of the nesting bird colonies in the biotopes of the flood plain of the Upper-Tisza). Cand. thesis. (Manuscript.)
- PÉCSI, M. (1969): *A tiszai Alföld*. (The Great Hungarian Plain along the Tisza). — Academic Press, Budapest.
- SZABÓ, L. V. (1965): *Fészkelő madártársulások vizsgálata a kunmadarasi szikeseken* (Investigation into the nesting bird associations in the alkali soils at Kunmadaras). — *Állattani Közl.* 52, 111—134.

A tiszalöki és rakamazi árteri rét összehasonlító ornithológiai vizsgálata

LEGÁNY A.

Kivonat

A dolgozat a rakamazi és tiszalöki árteri rétek madárvilágának összehasonlító elemzését végezte el. Szerző a rendszeres állományfelvételezések során megállapította, hogy milyen összefüggések adódnak a fészkelő madárfajok és párok számát illetően, valamint a környezetökölógiai változások minőségét illetően. Eszerint:

- 1) A fokozódó anthropogén hatásra a vizsgált területen is bizonyos mérvű degradálódás mutatható ki.
- 2) A rétek és legelők befásítása következtében idegen madárfajok, főleg arborikol és dendrikol elemek telepedtek meg.
- 3) A Tisza fent nevezett árterületein azonban az eredeti flora- és faunaelemeket napjainkig megőrző szakaszok.
- 4) Mivel a Tisza eredeti élővilágának megőrzésére volna itt lehetőség, szerző kíváncsún tartja rakamazi rét természetvédelmi területté nyilvánítását.

СРАВНИТЕЛЬНОЕ ОРНИТОЛОГИЧЕСКОЕ ИССЛЕДОВАНИЕ ПОЙМЕННЫХ ЛУГОВ В РАЙОНЕ ТИСАЛЁК И РАКАМАЗ

А. Легань

Резюме

Автор провёл сравнительный анализ мира птиц пойменных лугов в районе Тисалёк и Ракамаз. В ходе систематического подсчёта численности птиц автором установлены определённые зависимости относительно видов гнездящихся птиц и числа пар, а также качественных экологических изменений среды. В соответствии с этим:

- 1) Усиливающееся антропогенное влияние и на исследуемой территории вызывает определённую деградацию.
- 2) В силу насаждения деревьев на лугах и пастбищах поселились новые виды птиц, главным образом арборикольные и дендрикольные элементы.
- 3) Вышеуказанные пойменные участки представляют собой такие территории, которые до настоящих дней сохранили первоначальную флору и фауну.
- 4) Поскольку здесь возможно сохранение первоначального живого мира, автор считает желательным объявить луг в Ракамази заповедной территорией.

Uporedna ornitološka istraživanja plavnih ritova na području Tiszalök i Rakamaz

LEGÁNY A.

Abstrakt

U radu je izvršena uporedna analiza ornitofaune plavnih ritova na području Tiszalök i Rakamaz. Autor je na osnovu redovnih snimanja utvrdio uslovljenost medju gnezdaricama kao i njihovih parova u zavisnosti od kvalitativnih ekoloških promena sredine, i to:

- 1) Pod povećanim antropogenim uticajem i na ispitivanim područjima se javljaju određene degradacije.
- 2) Usled pošumljavanja ritova i pašnjaka javljaju se strani predstavnici ornitofaune, pre svega arborikolni i dendrikolni elementi.
- 3) Navedena plavna područja Tise su svakako deonice koje su do današnjih dana sačuvali autohtone florističke i faunističke elemente.
- 4) S obzirom da na ovom području postoji mogućnost za očuvanje autohtone faune autor smatra poželjnim proglašenje rakamazinog rita zaštićenim područjem.