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AUCHENORRHYNCHA ASSEMBLAGES OF THE "ÁSOTTHALMI LÁPRÉT" NATURE CONSERVATION AREA IN HUNGARY I.

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Abstract

The basic data evaluation of the Auchenorrhyncha fauna of the "Ásotthalmi Láprét" grassland area located in the southern part of Hungary was based on samples taken in 1990. The number of samples taken was 2070 (Barber traps) and 1242 (platter traps). According to the investigations made so far, 101 Auchenorrhyncha species live in the area. The number of species was higher here than in dry sandy grasslands or in wet areas, because of the high degree of heteromorphy and different microclimatic conditions. On the basis of Schiemenz's system, *Euscelis incisus* and *Turrutus socialis* were the dominant species, and *Anaceratagallia ribauti, Graphocraerus ventralis* and *Psammotettix kolosvarensis* were the subdominant species. More than fifty percent of the species were characteristic to xerotherm habitats. Most of the species spent the winter in the form of eggs. The northern distribution border of eleven species, and the western distribution border of four species, was the Carpathian Basin.

Key words: Auchenorrhyncha, fauna, bionomics, ecological valence.

Introduction

The protection of natural and semi-natural biotops was mostly based on botanical values. However, after this, a wider scope of undiscovered values would still be needed. Hopefully, these yet undetermined values could spread to other groups of living organisms. As a part of a similiar research project, this paper was trying to discover the Auchenorrchyncha fauna of the grassland area which only recently became protected. Research like this has mostly been made about the Great Plains region (KOPPÁNYI and WOLCSÁNSZKY, 1955; GYÖRFFY, 1980, 1982; OROSZ, 1981; GYÖRFFY and KINCSEK, 1986).

Materials and methods

The examined area

The "Ásotthalmi Láprét" area, situated in the southern part of Csongrád county, between the rivers Danube and Tisza (Fig. 1), had an area of ninety-five ha. This landscape appeared heteromorphous because of the varied relief with sand hills and wind furrows. The maximum height difference approximated 4-5 m.

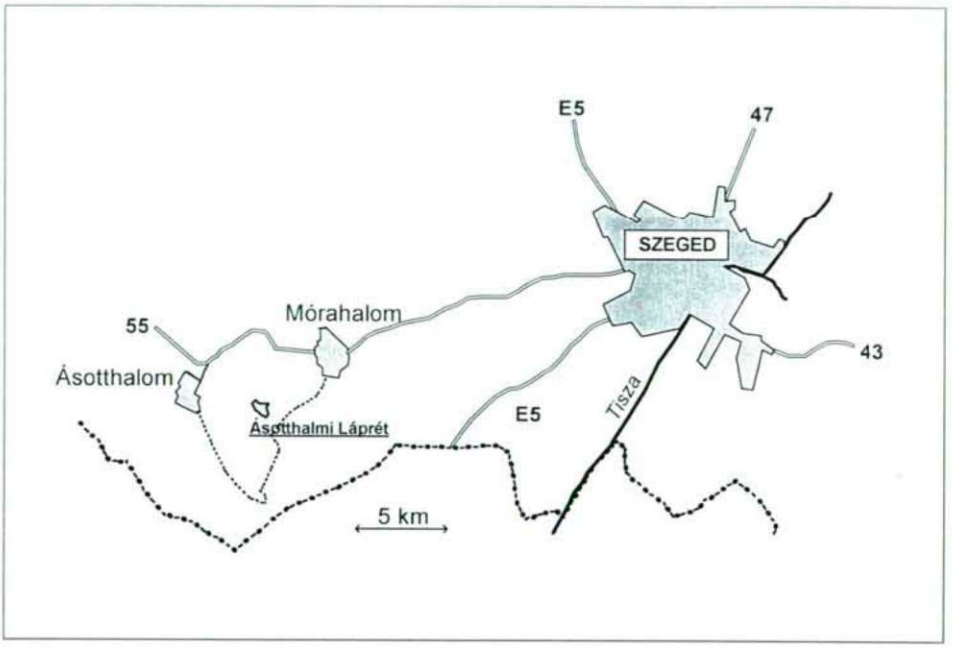

Fig. 1. The location of the 'Ásotthalmi Láprét' in the southern part of the Great Hungarian Plain.

The ten-to-twenty meter deep quicksand level of the table-land between the Rivers Danube and Tisza used mainly to be moved by the northwest winds of April. As a result of this, the previously mentioned sandhills and windfurrows were created. In these windfurrows, holocen-time water was collected which formed shallow ponds. These former ponds were fed by both rain and the dripping ground water which was rich in salts. As a result of the plants and the strong summer evaporation, an alkaline solution highly concentrated in salts was created. There used to be a sodic pond of this kind in most of the "Ásotthalmi Láprét". In the 1960s, it was drained with the help of a channel put in the middle of the pond. As a result of this, in the deeper parts marsh meadows appeared.

According to soil research drillings, under 90-180 cm of fine sand mixed with tiny sand could be found. Above this level, there was a 60-120 cm deep carbonate mud, which was covered by 30-60 cm deep quicksand. This was made of tiny sand mixed with fine sand. The upper sixty cm was soil-like and rich in humus. Under this level, the grey or white color was the result from leaching. The carbonate concentration of the carbonate mud was very high, as it reached seventy percent. The decreasing of the carbonate concentration of the northern sample at 130-150 cm was the same as the increasing of the sand fraction ratio. This sand fraction ratio resulted from sand carried by the wind from the higher edges of the terrain.

Botanical characterization

There were five characteristic plant associations in the area. On the highest terrain *Astragalo-Festucetum rupicolae* was found. Lower from that, *Chrysopogono-Caricetum humilis* appeared. In the wind

furrows, both *Salicetum rosmarinifoliae*, and *Succiso-Molinietum coeruleae* were developed. Finally, on the lowest terrain, *Scirpo-Phragmitetum* could be found (FÜZNÉ, 1989; GALUSKA, 1992).

Twenty-nine percent of the plant species indicated degradation, but the proportion of weeds was only 4.6 p.c. The reason for this low rate was the given treatment for prevention of the expansion of reeds. Mowing has been carried out in the last thirty years, usually in July. In 1990 this happened in two parts, first during the last week of July, and second at the end of August.

Collecting methods

Investigations were carried out in 1990, from 9 March till 30 November, on the northern part of the area. Barber and platter traps were used. The traps were arranged in nets; 115 Barber traps in five columns and twenty-three rows, and sixty-nine platter traps in three columns and twenty-three rows, respectively. The Barber traps were five meters apart from each other, and the platter traps were ten meters apart from each other. The trap-net covered a plot of 122 m long and 36 m broad. The numbers of rows increased from the highest to the lowest terrain. Samples were taken bi-weekly (Table 1). Less samples were available for platter traps because these traps were sometimes destroyed by mowing. The number of samples taken were 2070 (Barber traps) and 1242 (platter traps), for a combined total of 3312.

Results and discussion

Altogether 44946 specimens were trapped (5212 larvae and 5528 adults by Barber traps, and 11890 larvae and 21816 adults by platter traps). These belonged to 101 species (in Barber traps 80 species, in platter traps 90 species). The number of species was higher here, than in dry sandy grasslands or in wet areas, because of the high degree of heteromorphy and different microclimatic conditions. For example, in another sandy grassland in Hungary, 31.25 $\pm$ 1.78 species were collected in sand hills (over an average of four years). Also, 41.5 $\pm$ 3.64 species were collected in windfurrows by sucking apparate. Forty-six and forty-one species were trapped on the sand hills and twenty-three and twenty-nine species in the windfurrows by Barber traps during two years (GYÖRFFY, 1982). At three sodic zonations differing from each other in 10-15 cm ground level heights, fifty-one Auchenorrhyncha species were collected in Hungary during two years (GYÖRFFY and KINCSEK, 1986). During the same time, sixty-six species occured in four plant associations of a grassland — sand forest mosaic habitat (GYÖRFFY and KINCSEK, 1988). In low-productive, non-cultivated meadow moors (in Poland), the species numbers were thirty-five and twenty-three respectively (ANDRZEJEWSKA, 1965). From four types of upland seeded pastures in Kansas, 21.13 $\pm$ 4.27 species were collected between 1965 and 1968 (BLOCKER *et al.*, 1972). On average, 24.88 $\pm$ 6.31 species were found by SCHIEMENZ in eight dry and half-dry grassland types of Middle-Europe (SCHIEMENZ, 1969). The Auchenorrhyncha faunas of twelve moors and bogs in Germany consisted of 23.08$\pm$7.11 species (SCHIEMENZ, 1976), of seven bogs in Thueringer Wald and in Harz, 25.28 $\pm$ 7.59 species (SCHIEMENZ, 1975) and of ten German moss-moors 41.4 $\pm$ 9.15 species (SCHIEMENZ, 1971) respectively.

Table 1. Sampling periods and methods.

	Time period	Barber trap	Platter trap
1	03.09-03.23	X	X
2	03.23-04.06	X	X
3	04.06-04.20	X	X
4	04.20-05.04	X	
5	05.04-05.18	X	X
6	05.18-06.01	X	X
7	06.01-06.15	X	X
8	06.15-06.29	X	
9	06.29-07.13	X	X
10	07.13-07.27	X	
11	07.27-08.13	X	
12	08.13-08.24	X	
13	08.24-09.07	X	X
14	09.07-09.21	X	X
15	09.21-10.05	X	X
16	10.05-10.19	X	
17	10.19-11.02	X	
18	11.02-11.30	X	

The list of species, number of specimens, and percent of dominance can be found in Table 2. For evaluating the dominance relations, we used SCHIEMENZ'S division, (SCHIEMENZ, 1969) according to which (D-dominance):

D-group	D per cent	
5	64 -100	3, 4, 5: dominant species
4	36 - 64	2: subdominant species
3	16 - 36	+, 1: accessory species
2	4 - 16	
1	1 - 4	
+	<1	

There were some different divisions in the literature, but we did not know objective criteria for limitations of dominance classes (RAATIKAINEN and VASARAINEN, 1976; GASTON, 1994). We chose the SCHIEMENZ'S system due to its better comparison of data. On the basis of this, *Euscelis incisus* and *Turrutus socialis* were the dominant species, and *Anaceratagallia ribauti, Graphocraerus ventralis* and *Psammotettix kolosvarensis* were the subdominant species (Table 2.).

On the basis of the division of the occurring species according to ecological valence, more than 50 percent of the species live in xerotherm habitat (Fig. 2).

Comparing these values with SCHIEMENZ'S data (Table 3), it can be noted that 32.32 percent of the species in this area could not be found in SCHIEMENZ'S categories. The value of stenotop species living in xerothermous biotopes (X) was especially lower in the investigated area.

Table 2. List of species, number of individuals, percent of dominance (D.p.c.), and dominance classes according to SCHIEMENZ (d.c.). The abbreviations will be used in the following paper.

Species	abbreviation	Platter trap	Barber trap	Sum.	D.p.c.	d.c.
Acanthodelphax spinosus (FIEBER,1866)	Aca.spi.	5	5	10	0.037	+
Adarrus notatifrons (KIRSCHBAUM, 1868)	Ada.not.	323	68	391	1.430	1
Agallia laevis RIBAUT,1935	Aga.lae.	217	48	265	0.969	+
Alebra wahlbergi (BOHEMAN,1845)	Ale.wah.	1	0	1	0.004	+
Anaceratagallia ribauti (OSSIANNILSSON,1938)	Ana.rib.	555	661	1216	4.447	2
Anakelisia perspicillata (BOHEMAN,1845)	Ana.per.	11	2	13	0.048	+
Anoscopus serratulae (FABRICIUS,1775)	Ano.ser.	7	6	13	0.048	+
Aphrodes albiger (GERMAR,1821)	Aph.alb.	13	27	40	0.146	+
Aphrodes bicinctus (SCHRANK,1776)	Aph.bic.	409	209	618	2.260	1
Arocephalus languidus (FLOR,1861)	Aro.lan.	716	246	962	3.518	1
Arthaldeus pascuellus (FALLÉN,1826)	Art.pas.	5	3	8	0.029	+
Arthaldeus striifrons (KIRSCHBAUM,1868)	Art.str.	288	5	293	1.072	1
Artianus interstitialis (GERMAR,1821)	Art.int.	225	32	257	0.940	+
Athysanus argentarius METCALF,1950	Ath.arg.	34	16	50	0.183	+
Austroagallia sinuata (MULSANT et REY,1855)	Aus.sin.	124	8	132	0.483	+
Bobacella corvina (HORVÁTH,1903)	Bob.cor.	179	44	223	0.816	+
Chlorita dumosa (RIBAUT,1933)	Chl.dum.	18	31	49	0.179	+
Chlorita paolii (OSSIANNILSSON,1939)	Chl.pao.	26	5	31	0.113	+
Cicadella viridis (LINNAEUS,1758)	Cic.vir.	36	2	38	0.139	+
Cicadula persimilis (EDWARDS,1920)	Cic.per.	11	2	13	0.048	+
Cixius simplex (HERRICH-SCHÄFFER,1835)	Cix.sim.	1	0	1	0.004	+
Conosanus obsoletus (KIRSCHBAUM,1858)	Con.obs.	93	12	105	0.384	+
Delphacodes capnodes (SCOTT,1870)	Del.cap.	2	0	2	0.007	+
Delphacodes venosus (GERMAR,1830)	Del.ven.	0	1	1	0.004	+
Dicranotropis hamata (BOHEMAN,1847)	Dic.ham.	2	2	4	0.015	+
Dictyophara pannonica (GERMAR,1830)	Dic.pan.	0	3	3	0.011	+
Diplocolenus abdominalis (FABRICIUS,1803)	Dip.abd.	1	0	1	0.004	+
Doratura heterophyla HORVÁTH,1903	Dor.het.	135	13	148	0.541	+
Doratura homophyla (FLOR,1861)	Dor.hom.	498	59	557	2.037	1
Doratura impudica HORVÁTH,1897	Dor.imp.	174	55	229	0.837	+
Enantiocephalus cornutus (HERRICH-SCHÄFFER,1838)	Ena.cor.	1	0	1	0.004	+
Eupelix cuspidata (FABRICIUS,1775)	Eup.cus.	358	50	408	1.492	1
Eupteryx aurata (LINNAEUS,1758)	Eup.aur.	5	4	9	0.033	+
Eupteryx notata CURTIS,1837	Eup.not.	223	115	338	1.236	1
Eupteryx stachydearum (HARDY,1850)	Eup.sta.	1	0	1	0.004	+
Eurybregma nigrolineata SCOTT,1875	Eur.nig.	4	0	4	0.015	+
Eurysula lurida (FIEBER,1866)	Eur.lur.	0	2	2	0.007	+
Euscelis incisus (KIRSCHBAUM,1858)	Eus.inc.	5611	946	6557	23.980	3
Evacanthus acuminatus (FABRICIUS,1794)	Eva.acu.	1	0	1	0.004	+
Forcipata citrinella (ZETTERSTEDT, 1828)	For.cit.	63	7	70	0.256	+
Forcipata forcipata (FLOR, 1861)	For.for.	0	1	1	0.004	+
Graphocraerus ventralis (FALLÉN,1806)	Gra.ven.	1222	191	1413	5.167	2
Gravesteiniella boldi (SCOTT,1870)	Gra.bol.	16	2	18	0.066	+
Hecalus glaucescens (FIEBER,1866)	Hec.gla.	2	1	3	0.011	+
Hephathus nanus (HERRICH-SCHÄFFER,1835)	Hep.nan.	339	67	406	1.485	1
Idiocerus sp.	Idi. sp.	1	0	1	0.004	+
Jassargus obtusivalvis (KIRSCHBAUM,1868)	Jas.obt.	0	3	3	0.011	+
Jassargus sursumflexus (THEN,1902)	Jas.sur.	479	84	563	2.059	1
Jassidaeus lugubris (SIGNORET,1865)	Jas.lug.	8	4	12	0.044	+
Kelisia brucki FIEBER,1878	Kel.bru.	0	4	4	0.015	+
Kelisia guttula (GERMAR,1818)	Kel.gut.	74	12	86	0.315	+
Kelisia pallidula (BOHLMAN,1847)	Kel.pal.	48	11	59	0.216	+

Table 2. (continued)

Species	abbreviation	Platter trap	Barber trap	Sum.	D.p.c.	d.c.
Kelisia perrieri RIBAUT,1934	Kel.per.	16	6	22	0.080	+
Kelisia praecox HAUPT,1935	Kel.pra.	1	0	1	0.004	+
Kelisia vittipennis (J. SAHLBERG,1868)	Kel.vit.	1	0	1	0.004	+
Laodelphax striatellus (FALLÉN,1826)	Lao.str.	4	4	8	0.029	+
Lepyronia coleoptrata (LINNAEUS,1758)	Lep.col.	217	60	277	1.013	1
Macrosteles fieberi (EDWARDS,1889)	Mac.fie.	1	1	2	0.007	+
Megophtalmus scanicus (FALLÉN,1806)	Meg.sca.	48	56	104	0.380	+
Mendrausus pauxillus (FIBER,1869)	Men.pau.	25	10	35	0.128	+
Micantulina stigmatipennis (MULSANT et REY,1855)	Mic.sti.	13	0	13	0.048	+
Mocuellus collinus (BOHEMAN,1850)	Moc.col.	380	77	457	1.671	1
Mocydia crocea (HERRICH-SCHÄFFER,1837)	Moc.cro.	5	1	6	0.022	+
Mocydiopsis attenuata (GERMAR,1821)	Moc.att.	0	1	1	0.004	+
Mocydiopsis parvicauda RIBAUT,1939	Moc.par.	84	3	87	0.318	+
Muellerianella extrusa SCOTT,1871	Mue.ext.	0	5	5	0.018	+
Muellerianella sp.	Mue. sp.	29	0	29	0.106	+
Muirodelphax aubei (PERRIS,1857)	Mui.aub.	9	7	16	0.059	+
Neoaliturus fenestratus (HERRICH-SCHÄFFER,1834)	Neo.fen.	195	63	258	0.944	+
Neophilaenus campestris (FALLÉN,1805)	Neo.cam.	48	17	65	0.238	+
Neophilaenus lineatus (LINNAEUS,1758)	Neo.lin.	29	2	31	0.113	+
Neophilaenus minor (KIRSCHBAUM,1868)	Neo.min.	0	5	5	0.018	+
Ommatidiotus dissimilis (FALLÉN,1806)	Omm.dis.	4	1	5	0.018	+
Paluda preyssleri (HERRICH-SCHÄFFER,1838)	Pal.pre.	1	0	1	0.004	+
Paluda vitripennis (FLOR,1861)	Pal.vit.	357	57	414	1.514	1
Paralimnus sp.	Par. sp.	10	1	11	0.040	+
Philaenus spumarius (LINNAEUS,1758)	Phi.spu.	132	45	177	0.647	+
Psammotettix alienus (DAHLBOM,1850)	Psa.ali.	154	3	157	0.574	+
Psammotettix cephalotes (HERRICH-SCHÄFFER,1834)	Psa.cep.	8	7	15	0.055	+
Psammotettix confinis (DAHLBOM,1850)	Psa.con.	26	1	27	0.099	+
Psammotettix kolosvarensis (MATSUMURA,1908)	Psa.kol.	1173	184	1357	4.963	2
Psammotettix provincialis (RIBAUT,1925)	Psa.pro.	13	3	16	0.059	+
Psammotettix slovacus DLABOLA,1948	Psa.slo.	2	0	2	0.007	+
Recilia schmidtgeni (WAGNER,1939)	Rec.sch.	791	24	815	2.981	1
Ribautodelphax albostriatus (FIEBER,1866)	Rib.alb.	32	26	58	0.212	+
Ribautodelphax imitans (RIBAUT,1953)	Rib.imi.	130	61	191	0.699	+
Streptanus aemulans (KIRSCHBAUM,1868)	Str.aem.	151	61	212	0.775	+
Stroggylocephalus agrestis (FALLÉN,1806)	Str.agr.	5	0	5	0.018	+
Struebingianella palliceps (HORVÁTH,1897)	Str.pal.	281	226	507	1.854	1
Tetartostylus pellucidus WAGNER,1951	Tet.pel.	15	3	18	0.066	+
Tettigometra atra HAGENBACH,1825	Tet.atr.	1	0	1	0.004	+
Tettigometra fusca FIEBER,1865	Tet.fus.	2	0	2	0.007	+
Tettigometra impressopunctata DUFOUR,1846	Tet.imp.	18	4	22	0.080	+
Tettigometra obliqua (PANZER,1799)	Tet.obl.	0	3	3	0.011	+
Toya minuscula (HORVÁTH,1897)	Toy.min.	7	4	11	0.040	+
Toya propinqua (FIBER,1866)	Toy.pro.	39	0	39	0.143	+
Trypetimorpha fenestrata A.COSTA,1862	Try.fen.	0	1	1	0.004	+
Turrutus socialis (FLOR,1861)	Tur.soc.	4466	940	5406	19.770	3
Ulopa trivia GERMAR,1821	Ulo.tri.	112	410	522	1.909	1
Xanthodelphax stramineus (STAL,1858)	Xan.str.	2	1	3	0.011	+
Zyginidia pullula (BOHEMAN,1845)	Zyg.pul.	214	75	289	1.057	1

Table 3. Comparison of Auchenorrhyncha assemblages of dry grasslands (SCHIEMENZ, 1969) and of the investigated area according to their ecological valence.

ecological valence	Percent of all species	
	SCHIEMENZ' data	Own data
(X)	44.07	31.25
(X-m),(X-m-h)	24.33	16.66
(x-m),(x-m-h)	21.71	11.45
(x-M-h),(x-M-H),(x-m-H)	9.85	8.32
without X	-	32.32

Most of the species spend the winter in the form of eggs (Fig. 3). The percentage of specimens under the class "unknown" was only 1.89 %.

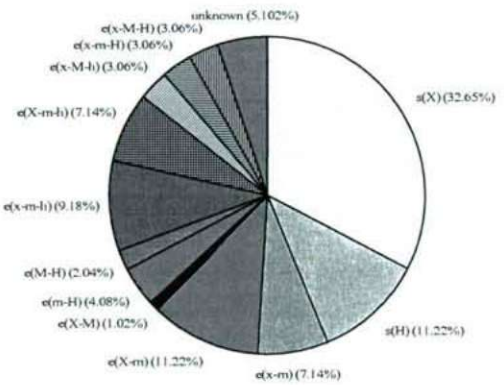

Fig 2. Division of Auchenorrhyncha species according to their ecological valence (e: eurytopic; s: stenotopic; x: xerophilous; m: mesophilous; h: hygrophilous; the capital letters indicate stronger dominances)

Table 4. Comparison of bionomical data (wintering stage, number of generations per year) of the occurring species in the "Ásotthalmi Láprét" with similar data from moors and dry grasslands (SCHIEMENZ, 1971)

wintering stage	moors			dry grasslands			Ásotthalmi Láprét			
	1 gen.	2 gen.	Sum.	1 gen.	2 gen.	Sum.	1 gen.	2 gen.	3 gen.	Sum.
adult	9.6	0	9.6	12.5	6.6	19.1	11.22	3.06	0	14.28
larvae	23.1	3.8	26.9	2.9	7.4	10.3	3.06	9.18	0	12.24
egg	50.0	13.5	63.5	33.8	36.8	70.6	30.61	29.59	2.04	62.24
Sum.	82.7	17.3	100	49.2	50.8	100	44.89	41.83	2.04	88.76
							unknown: 11.22%			

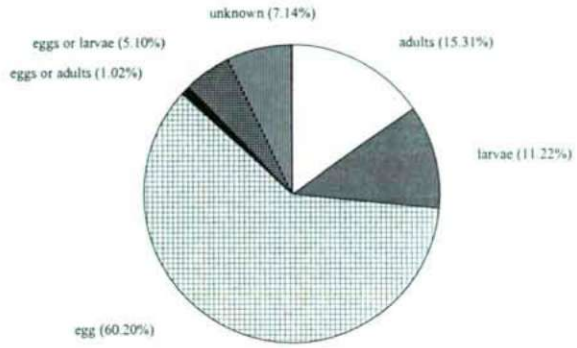

Fig. 3. Division of Auchenorrhyncha species according to wintering stage

Most species had one or two yearly generations (Fig. 4). The percentage of specimens under the class "unknown" was only 1.91%.

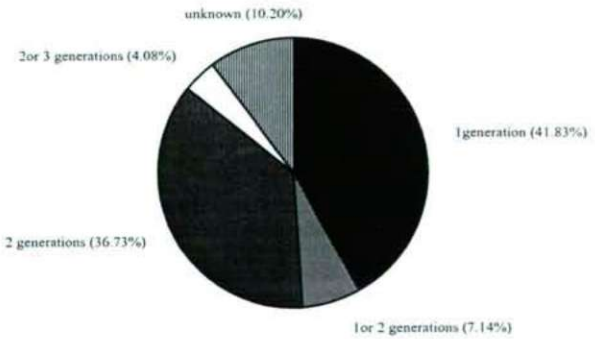

Fig. 4. Division of Auchenorrhyncha species according to the number of generations in a year

We compared this acquired data with similar data from moors and dry grasslands (SCHIEMENZ, 1971). On the basis of this data comparison, the investigated area was closer to the dry grasslands (Table 4).

The species occurring in the "Ásotthalmi Láprét" area were widely spread (holarctic, palearctic, and western-palearctic), but approximately twelve percent of the species were more common in the southern areas. The northern distribution border of eleven species, and the western distribution border of four species, was the Carpathian Basin.

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