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Composition of the Fauna and the Communities' Structure of the Cicadina (Homoptera) in the Lowland Trans-Volga Woodlands

G. A. Anufriev and N. V. Smirnova

N.I. Lobachevsky State University of Nizhniy Novgorod, Russia
"Kerzhenskii" State Nature Biosphere Reserve, Cheboksary, Russia

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Abstract—179 species of 7 families of the Cicadina were found in the lowland Trans-Volga woodlands within Nizhniy Novgorod Province, the Republic of Mari El, and Chuvashia. Thirty-tree commonest species were distinguished, and their abundance was compared. Comparison of the species composition of the Cicadina complexes in the model biotopes has shown the greatest similarity between the complexes in the birch forests and spruce forests.

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The aim of the present study was to investigate the fauna and community of Cicadina (Homoptera) and some aspects of their diversity in the territory of the lowland trans-Volga woodlands [an area of mixed forests of the southern taiga zone and mixed forests of the Trans-Volga forest zone (*Physicogeographic Division into Districts*, 1964)].

Though Cicadina of the lowland trans-Volga woodlands were studied by many entomologists in the Chuvash Republic (Anufriev and Kirillova, 1998, 2001; Kirillova, 1998, 2000, 2002; Smirnova, 2000, 2004a, 2004b, 2000c; Smirnova and Kirillova, 2000), Nizhniy Novgorod Province (Kirillova and Averkin, 1982; Anufriev et al., 1995; Anufriev and Panfilova, 1995; Anufriev and Bayanov, 2002; Nikanorova, 2007a, 2007b), and the Republic of Mari El (Kirillova, 1996; Anufriev, 1999), these data were not summarized for the territory under study. Analysis of the Cicadina community of the main biotopes has been performed for the first time, with the dominant and subdominant (commonest) species distinguished there.

The material was collected in the territory of Nizhniy Novgorod Province ("Kerzhenskii" State Nature Reserve [SNR]), in the Republic of Mari El ("Bolshaya Kokshaga" State Nature Reserve and the territory beyond the reserve), and in the northern part of the Chuvash Republic (left bank of the Volga River) [herein, the trans-Volga Area of Chuvashia]. According to the physicogeoraphic division of the Middle Volga River Area into districts, performed under the supervision of A.V. Stupishin (*Physicogeoraphic Division into Districts*, 1964), the territory of the "Bolshaya Kokshaga" SNR and the trans-Volga Area of Chuvashia belong to the Vetluzhsko-Kokshagskii woodland district, and the territory of the "Kerzhenskii" SNR, to the Nizhne-Kerzhenetskii sandy-flat district of pine-oak forests. The collections were made from late May to mid-September of 2002–2004 by sweeping grasses with an entomological net (10 × 10 sweeps). A total of 19 thousand insects were collected and identified. As a result, 179 of Cicadina species of the following nine families were found: Achilidae (2 species), Aphrophoridae (6), Cicadellidae (121), Cixiidae (5), Delphacidae (46), Issidae (2), Membracidae (1), and Ulopidae (1). A list of 33 species new to the territory under study is given below with the following abbreviations used: TVCh, the trans-Volga Area of the Chuvash Republic; BK, the "Bolshaya Kokshaga" SNR, Republic of Mari El; M, the Republic of Mari El (without species from BK); KR, the "Kerzhenskii" SNR, Nizhniy Novgorod Prov.; the exclamation mark (!) designates territories from which a species is recorded for the first time.

A TAXONOMIC LIST OF SPECIES

The list comprises all the published data on the Republic of Mari El [M] (Anufriev, 1999a, 1999b, 1999c; Kirillova, 1996; Smirnova, 2004a, 2004b, 2004c) and the trans-Volga parts of Nizhniy Novgorod Prov. [N] (Kirillova and Averkin, 1992; Anufriev, etc., 1995; Anufriev and Panfilova, 1995; Anufriev, 1999a;

Anufriev and Bayanov, 2002; Nikanorova, 2007a, 2007b), and Chuvashia (Ch) (Kirillova and Averkin, 1982; Anufriev, etc., 1993; Kirillova, 1996, 1998a, 1998b, 2000, 2004; Anufriev and Kirillova, 1998, 2001; Smirnova, 2000; Smirnova and Kirillova, 2000); a newly collected material was also taken into account.

Family **APHROPHORIDAE**

Aphrophora alni Fall.—M, N, Ch; *A. pectoralis* Mats. (= *costalis* Mats.)—M, N, Ch; *A. salicina* Gz.—M, Ch; *Lepyronia coleoptrata* L.—M, N, Ch; *Neophilaenus lineatus* L.—M, N, Ch; *Peuceptyelus coriaceus* Fall.—N; *Philaenus spumarius* L.—M, N, Ch.

Family **CICADIDAE**

Cicadetta montana Scop.—Ch.

Family **MEMBRACIDAE**

Centrotus cornutus L.—M, Ch; *Gargara genistae* Fabr.—M, N, Ch.

Family **ULOPIDAE**

Ulopa reticulata Fabr.—M, N, Ch.

Family **CICADELLIDAE**

Subfamily **Macropsinae:** *Hephathus nanus* H.-S.—M, N! (KR); *Macropsis cerea* Germ.—M, N; *M. fuscinervis* Boh.—M, N; *M. fuscula* Zett.—Ch; *M. impura* Boh.—M; *M. infuscata* J. Shlb.—M, ?N; *M. prasaina* Boh.—M, N; *M. scutellata* Boh.—M; *M. viridinervis* Wagn.—M; *Oncopsis alni* Schrk.—N; *O. flavicollis* L.—M, N, Ch; *O. subangulata* J. Shlb.—M, N. Subfamily **Agalliinae:** *Megophthalmus scanicus* Fall.—M, N, Ch; *Agallia brachyptera* Boh.—M, N, Ch; *A. estonica* Vilb.—M, N, Ch; *A. ribauti* Oss.—M, N! (KR), Ch!; *A. venosa* Fourcr.—Ch. Subfamily **Idiocerinae:** *Idiocerus herrichii* Kbm.—M; *I. lituratus* Fall.—N, Ch; *Metidiocerus elegans* Fl.—M; *M. poecilus* H.-S.—M, Ch; *Populicerus confusus* Fl.—M, N, Ch; *P. populi* L.—M, N; *Sahlbergotettix salicicola* Fl.—Ch; *Tremulicerus rutilans* Kbm.—N; *T. tremulae* Estl.—N, Ch. Subfamily **Iassinae:** *Batracomorphus allionii* Turt.—M, Ch; *Iassus lanio* L.—M, N. Subfamily **Eupelicinae:** *Eupelix cuspidata* Fabr.—N, Ch. Subfamily **Aphrodinae:** *Anoscopus albifrons* L.—M; *A. albiger* Germ.—M!, N! (KR), Ch; *A. flavostriatus* Don.—M; *Aphrodes bicinctus* Schrk.—M, N! (KR), Ch; *A. makarovi* Zachv.—N; *Planaphrodes bifasciatus* L.—Ch; *P. laeva* Rey (= *trifasciata* Fourcr.)—M, Ch!; *Stroggylocephalus agrestis* Fall.—M, Ch; *S. livens* Zett.—N! (KR). Subfamily **Cicadellinae:** *Cicadella viridis* L.—M, N, Ch; *Evacanthus acuminatus* Fabr.—M, N! (KR), Ch; *E. interruptus* L.—M, Ch. Subfamily **Typhlocybinae:** *Aguriahana germari* Zett.—N, Ch; *A. stellulata* Burm.—N; *Alebra albostriella* Fall.—M, N; *A. wahlbergi* Boh.—N; *Alnetoidia alneti* Dhlb.—M, N, Ch; *Arboridia erecta* Rib.—M, N; *A. parvula* Boh.—M, N, Ch; *A. velata* Rib.—M; *Austroasca vittata* Leth.—N! (KR); Ch; *Chlorita paolii* Oss.—M, N! (KR); *Ch. viridula* Fall.—M, N! (KR), Ch; *Dikraneura variata* Hardy—Ch; *Edwardsiana ampliata* Wagn.—Ch; *E. geometrica* Schrk.—M; *E. ishidae* Mats.—M; *E. menzbieri* Zachv.—Ch; *E. prunicola* Edw.—M; *E. severtsovi* Zachv.—Ch; *E. soror* Lnv.—N! (KR); *E. tersa* Edw.—Ch; *Emelyanoviana mollicula* Boh.—M, N! (KR), Ch; *Empoasca apicalis* Fl.—N! (KR); *E. affinis* Nast.—M, Ch!; *E. kontkaneni* Oss.—M, N, Ch; *E. ossiannilssoni* Nuort.—M; *E. serrata* Vilb.—M, N! (KR), Ch; *E. solani* Curt.—M, N; *E. vitis* Göthe—M, N, Ch; *Eupteryx artemisiae* Kbm.—Ch; *E. atropunctata* Goeze—M, N, Ch; *E. aurata* L.—M, N, Ch; *E. calcarata* Oss.—M; *E. collina* Fl.—M; *E. cyclops* Mats.—M, N, Ch; *E. notata* Curt.—M, N, Ch; *E. ?origani* Zachv.—N; *E. stachydearum* Hardy—M, N! (KR); *E. tenella* Fall.—M, N! (KR), Ch; *E. urticae* Fabr.—Ch; *E. vittata* L.—M, N! (KR); *Eurhadina pulchella* Fall.—M, N, Ch; *Forcipata citrinella* Zett.—M, N! (KR), Ch; *F. forcipata* Fl.—M, N! (KR); *Kyboasca bipunctata* Osh.—M; *K. zachvatkini* Anufr.—M; *Kybos abstrusus* Lnv.—M; *K. butleri* Edw.—N; *K. lindbergi* Lnv.—M, N, Ch; *K. ludus* Dav. et DeL. (= *betulicola* Wagn.)—M; *K. smaragdulus* Fall.—M; *K. strigilifer* Oss.—M, Ch; *Linnavuoriana decempunctata* Fall.—N, Ch; *L. sexmaculata* Hardy—M, N, Ch; *Micantulina micantula* Zett.—M (BK); *Notus flavipennis* Zett.—M, N, Ch; *Typhlocyba quercus* Fabr.—M, N! (KR); *Wagneriala minima* J. Shlb.—N; *Zygina flammigera* Fourcr.—M, N; *Z. hyperici* H.-S.—M, N; *Z. rubrovittata* Leth.—M; *Z. salicina* Mit.—M; *Zyginidia viaduensis* Wagn.—N. Subfamily **Deltocephalinae:** *Adarrus bellevoyei* Put.—Ch; *A. multinotatus* Boh.—Ch! (Sosnovka Vill., pine forest, 3.VIII.2002, 1 spm.); *Allygus commutatus* Fieb.—N! (KR), Ch; *A. mixtus* Fabr.—N, Ch; *Arocephalus languidus* Fl.—M, Ch; *Arthaldeus pascuellus* Fall.—M, N, Ch; *A. striifrons* Kbm.—M, N! (KR), Ch; *Artianus interstitialis* Germ.—M! (BK), Ch!;

Athysanus argentarius Metc.—M, N, Ch; *A. quadrum* Boh.—N; *Balclutha punctata* Fabr.—M, N, Ch; *Bobacella corvina* Horv.—N! (KR), Ch; *Boreotettix bidentatus* DeL. et Dav.—Ch; *Cicadula albingensis* Wagn.—M, N; *C. flori* J. Shlb.—M, Ch; *C. frontalis* H.-S.—Ch; *C. quadrinotata* Fabr.—M, N, Ch; *C. quinquernotata* Boh.—M, Ch; *C. intermedia* Boh.—Ch; *C. ornata* Metc.—N; *C. persimilis* Edw.—M! (KR), N! (KR), Ch!; *C. saturata* Edw.—N, Ch; *Colladonus torneellus* Zett.—M, Ch; *Cosmotettix caudatus* Fl.—N! (KR); *C. costalis* Fall.—M, Ch; *C. edwardsi* Lindb.—Ch; *C. panzeri* Fl.—N; *Deltocephalus pulicaris* Fall.—M, N, Ch; *Diplocolenus abdominalis* Fabr.—M, N, Ch; *D. bohemani* Zett.—M, N, Ch; *Doratura homophyla* Fl.—M, N, Ch; *D. impudica* Horv.—N; *D. stylata* Boh.—M, N, Ch; *Elymana kozhevnikovi* Zachv.—M, N, Ch; *E. sulphurella* Zett.—M, N! (KR), Ch; *Enantiocephalus cornutus* H.-S.—M; *Errastunus ocellaris* Fall.—M, N, Ch; *Euscelis distinguendus* Kbm.—M, Ch; *Exitianus nanus* Dist.—Ch; *Graphocraerus ventralis* Fall.—M, N, Ch; *Grypotes puncticollis* (H.-S.)—N, Ch; *Handianus flavovarius* H.-S.—M, N, Ch; *H. ignoscus* Mel.—M; *Hesium domino* Rtr.—M, N, Ch; *Idiodonus cruentatus* Panz.—M, N, Ch; *Jassargus allobrogicus* Rib.—N! (KR); *J. flori* Fieb.—M, N! (KR); *J. repletus* Fieb.—M, N, Ch; *J. sursumflexus* Then—M, N; *Laburrus impictifrons* Boh.—N; *Lebradea flavovirens* Gill. et Bak.—Ch!; *Limotettix atricapillus* Boh.—N; *L. striola* Fall.—M, N, Ch; *Macrosteles alpinus* Zett.—Ch; *M. cristatus* Rib.—Ch; *M. frontalis* Sc.—Ch; *M. laevis* Rib.—M, N, Ch; *M. ossiannilssoni* Lindb.—M; *M. quadripunctulatus* Kbm.—N! (KR), Ch!; *M. septemnotatus* Fall.—M, N, Ch; *M. sexnotatus* Fall.—M, N! (KR), Ch; *M. variatus* Fall.—M; *M. viridigriseus* Edw.—M, N, Ch; *Macustus grisescens* Zett.—M, Ch; *Mendrausus pauxillus* Fieb.—M; *Metalimnus formosus* Boh.—M, N, Ch; *Mocuellus collinus* Boh.—M, N! (KR), Ch; *M.* (*Erzaleus*) *metrius* Fl.—M, Ch; *Neoaliturus fenestratus* H.-S.—N! (KR), Ch!; *Paluda flaveola* Boh.—M, N! (KR), Ch; *Paralimnus phragmitis* Boh.—M, N, Ch; *Pinumius areatus* Stål—M, Ch; *Pithyotettix abietinus* Fall.—M, N, Ch; *Platymetopius henribauti* Dlab.—M, N, Ch; *Psammotettix cephalotes* H.-S.—M; *P. confinis* Dhlb.—M, N, Ch; *P. dubius* Oss.—M, Ch; *P. koeleriae* Zachv.—Ch; *P. poecilus* Fl.—N, Ch; *P. striatus* L.—M, N! (KR), Ch; *Pseudophlepsius binotatus* Sign.—Ch; *Recilia coronifera* March.—M; *Rhoananus hypochlorus* Fieb.—M; *Rhopalopyx adumbrata* C. Shlb.—N; *Rh. preyssleri* H.-S.—M, N! (KR), Ch; *Sagatus punctifrons* Fall.—M, N; *Scleroracus corniculus* Varsh.—M; *S. decumanus* Kontk.—M, N! (KR), Ch!; *S. russeolus* Fall.—M; *S. transversus* Fall.—M, N! (KR); *Sonronius binotatus* J. Shlb.—Ch; *Sorhoanus assimilis* Fall.—M, Ch; *S. medius* M. R.—M; *S. xanthoneurus* Fieb.—M, N; *Speudotettix subfusculus* Fall.—M, N, Ch; *Stictocoris picturatus* C. Shlb.—M; *Streptanus confinis* Rtr.—M; *S. okaensis* Zachv.—N! (KR); *S. sordidus* Zett.—M, N; *Thamnotettix confinis* Zett.—M, N, Ch; *Turrutus socialis* Fl.—M, N! (KR), Ch.

Family **DELPHACIDAE**

Acanthodelphax denticauda Boh.—M, N, Ch; *Achorotile longicornis* J. Shlb.—N, Ch; *Chloriona smaragdula* Stål—M, N, Ch; *Ch. stenoptera* Fl.—M; *Conomelus anceps* Germ.—M, N, Ch; *C. lorifer* Rib.—N! (KR, Rustai Vill., water-meadow, 29.VIII.2004, 2 spms.); *Criomorphus albomarginatus* Curt.—M, N, Ch; *C. borealis* J. Shlb.—N! (KR); *C. wilhelmi* Anufr. et Averk.—Ch; *Delphacinus mesomelas* Boh.—M, Ch; *Delphacodes venosus* Germ.—M! (BK), N! (KR); *Delphax crassicornis* Panz.—M, N, Ch; *Dicranotropis hamata* Boh.—M, N! (KR), Ch; *Ditropsis flavipes* Sign.—M, N! (KR), Ch; *Euconomelus lepidus* Boh.—M, Ch; *Euides basilinea* Germ.—M; *Eurybregma nigrolineata* Sc.—M, N! (KR), Ch; *Eurysula lurida* Fieb.—M, N! (KR), Ch; *Gravesteiniella boldi* Sc.—M, N, Ch; *Hyledelphax elegantula* Boh.—M, N, Ch; *Jassidaeus lugubris* Sign.—N! (KR, Chernozer'e locality, edge of birch forest, 27.VIII.2004); *Javesella dubia* Kbm.—M, N! (KR), Ch; *J. obscurella* Boh.—M, N! (KR), Ch; *J. pellucida* Fabr.—M, N, Ch; *J. stali* Metc.—M, N! (KR); *Kelisia guttula* Germ.—M, N; *K. monoceros* Rib.—Ch!; *K. praecox* Hpt.—M, N! (KR), Ch; *K. ribauti* Wagn.—Ch; *K. vittipennis* J. Shlb.—M!; *Kosswigianella exigua* Boh.—M, N, Ch; *Laodelphax striatella* Fall.—M, N, Ch; *Megadelphax sordidula* Stål—M; *Megamelus notula* Germ.—M, N, Ch; *Metropis inermis* Wagn.—N! (KR), Ch; *Mirabella albifrons* Fieb.—N! (KR); *Muellerianella brevipennis* Boh.—M, N, Ch; *M. extrusa* Sc.—N; *Nothodelphax distincta* Fl.—M, N; *Oncodelphax pullula* Boh.—Ch; *Paradelphacodes paludosus*—M; *Paraliburnia adela* Fl.—N! (KR); *P. clypealis* J. Shlb.—N! (KR); *Ribautodelphax albostriata* Fieb.—M, N! (KR), Ch; *R. altaica* Vilb.—Ch; *R. collina* Boh.—M, N! (KR), Ch; *R. imitans* Rib.—Ch; *R. pungens* Rib.—N! (KR), Ch; *Stenocranus fuscovittatus* Stål—M, N, Ch; *S. major* Kbm.—M, N, Ch; *Stiroma affinis* Fieb.—M, N! (KR), Ch; *S. bi-*

Table 1. Composition of the Cicadina fauna of the lowland trans-Volga woodlands

Taxon	Number of species			
	Republic of Mari El	Nizhniy Novgorod trans-Volga Area	trans-Volga part of Chuvashia	Sum total
Family Aphrophoridae	6	6	6	7
Family Cicadidae	0	0	1	1
Family Membracidae	2	1	2	2
Family Ulopidae	1	1	1	1
Family Cicadellidae	143	123	122	204
Subfamily Macropsinae	10	8	2	12
Subfamily Agalliinae	4	4	5	5
Subfamily Idiocerinae	5	5	5	9
Subfamily Iassinae	2	1	1	2
Subfamily Eupelicinae	0	1	1	1
Subfamily Aphrodinae	6	4	5	9
Subfamily Cicadellinae	3	2	3	3
Subfamily Typhlocybinae	44	38	29	62
Subfamily Deltocephalinae	69	62	71	101
Family Delphacidae	39	42	37	56
Family Cixiidae	3	2	3	5
Family Achilidae	1	1	2	2
Family Issidae	2	1	1	2
Total number:	197	179	175	280

carinata H.-S.—N; *Struebingianella lugubrina* Boh.—M; *Trichodelphax lukjanovitschi* Kusn.—M, N; *Xanthodelphax flaveola* Fl.—M, N, Ch; *X. straminea* Stål—M, N, Ch.

Family **CIXIIDAE**

Cixius cambricus China.—Ch; *C. cunicularius* L.—M, N! (KR); *C. distinguendus* Kbm.—M, N; *C. similis* Kbm.—M, Ch; *Pentastiridius leporinus* L.—Ch.

Family **ACHILIDAE**

Cixidia confinis Zett.—Ch; *C. lapponica* Zett.—M, N, Ch.

Family **ISSIDAE**

Ommatidiotus dissimilis Fall.—M, N, Ch; *O. inconspicuus* Stål—M.

Records of *Adarrus multinotatus* Boh. and *Conomelus lorifer* Rib. are of peculiar interest. In the territory of the former USSR, *Adarrus multinotatus* Boh. is known from Transcarpathia, Belarus, Latvia, Lithuania, Kazakhstan, Kirghizia, and Bashkiria (South-Ural and Bashkir Nature Reserves). The second taxon was identified by us as *Conomelus lorifer* subsp. *dehneli* Nast, 1966. Logvinenko (1975) considered *Conomelus oclryssius* Dlabola, 1965 and *C. dehneli* Nast, 1966 synonyms, but Remane and Asche (1979) reported them as separate species. According to notes of V.M. Logvinenko, R. Remane, and M. Asche, the aedeagus of *C. odryssius* bears no teeth, but a figure in G. Nast's (1965) publication shows the aedeagus possessing teeth, similarly to that in our specimen. Holzinger and co-authors (2003) reported this form as *Conomelus lorifer* Ribaut, 1948 ssp. *dehneli* Nast, 1966 and indicated that the form had been found in Central, Eastern, and Southeastern Europe and in Asia Minor. In addition, we recorded this taxon from Kaluga Prov. ("Ugra" National Park).

At present, 275 Cicadina species of 9 families have been found in the lowland trans-Volga woodlands (Table 1).

ANALYSIS OF THE COMMON SPECIES (BY ABUNDANCE)

In the territory under study, the abundance of the commonest Cicadina species (collected by sweeping

Table 2. Common species in the Cicada fauna in the model biotopes

Species	Biotope													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Aphrophora alni	+*					+	+*							
Lepyronia coleoptrata							+		+*	+*	+*			
Neophilaenus lineatus									+					
Philaenus spumarius							+*	+						
Cicadella viridis							+*			+	+*			
Evacanthus acuminatus						+*								
Arocephalus languidus													+*	
Balclutha punctata	+	+		+*	+*									
Cicadula quadrinotata										+*	+*	+		
Deltocephalus pulicaris												+*		
Diplocolenus adbominalis													+*	
Elymana ikumae				+*										
Jassargus flori			+*	+*										
Macrosteles laevis										+*			+	
Psammotettix confinis											+			
Speudotettix subfusculus	+*				+*									
Oncopsis flavicollis						+*								
Chlorita viridula													+	
Empoasca kontkaneni	+	+*	+*		+	+	+*	+*						
E. vitis								+*						
Eupteryx cyclops								+						
Forcipata citrinella		+		+*								+		+*
Notus flavipennis												+		+
Criomorphus borealis				+			+*							
Dicranotropis hamata							+*							
Hyledelphax elegantula	+*	+*	+*		+*									
Javesella dubia												+*		
J. obscurella												+*		
Kelisia praecox										+*	+*			
Megadelphax sordidula													+*	
Nothodelphax distincta									+*					
Ribautodelphax albostriata										+*				
Xanthodelphax flaveola				+*										
Total number of common species	6	4	3	6	4	4	7	4	3	6	5	6	5	2

Notes: 1, spruce forest; 2, pine forest; 3, mixed forest; 4, glade in mixed forest; 5, birch forest; 6, oak forest; 7, willow stand; 8, alder forest; 9, upland bog; 10, lowland bog; 11, transitional bog; 12, water meadow; dry meadow; 14, near-water biotope; +, species can be attributed to the common ones not only in certain intervals of the spring–autumn period, but also based on the total abundance of Cicadina in the biotope; +*, species can be attributed to the common ones only in certain intervals of the spring–autumn period.

Table 3. Change of the commonest Cicadina species in the model biotopes during the vegetative period

Biotope	Common species			
	III ten-day period of May–I ten-day period of July	II ten-day period of July–I ten-day period of August	II ten-day period of August–I ten-day period of September	II–III ten-day periods of September
1	*Balclutha punctata, Empoasca kontkaneni*	*Aphrophora alni, Speudotettix subfusculus, Hyledelphax elegantula*	*E. kontkaneni*	–
2	*B. punctata, H. elegantula*	*Forcipata citrinella*	*B. punctata, E. kontkaneni*	*B. punctata*
3	*E. kontkaneni, H. elegantula*	Common species absent	*E. kontkaneni, Jassargus flori*	–
4	*Criomorphus borealis*	*Jassargus flori, Xanthodelphax flaveola*	*B. punctata, Elymana ikumae, F. citrinella*	–
5	*B. punctata, E. kontkaneni*	*S. subfusculus, H. elegantula*	*E. kontkaneni*	–
6	*E. kontkaneni*	*A. alni, Evacanthus acuminatus, Oncopsis flavicollis*	*A. alni, E. kontkaneni*	–
7	*E. kontkaneni, C. borealis*	*Lepyronia coleoptrata, Dicranotropis hamata*	*A. alni, Philaenus spumarius, Cicadella viridis*	–
8	*E. kontkaneni, E. vitis*	*Ph. spumarius, E. vitis, Eupteryx cyclops*	*Ph. spumarius, E. cyclops*	–
9	*Nothodelphax distincta*	*Neophilaenus lineatus*	*L. coleoptrata, N. lineatus*	–
10	*Ribautodelphax albostriata*	*L. coleoptrata, C. viridis*	*Cicadula quadrinotata, Macrosteles laevis*	*C. quadrinotata, Kelisia praecox*
11	*C. quadrinotata, Psammotettix confinis*	*Lepyronia coleoptrata, Cicadella viridis*	*P. confinis*	*K. praecox*
12	*Javesella dubia, J. obscurella*	*Deltocephalus pulicaris*	*C. quadrinotata, F. citrinella, Notus flavipennis*	*C. quadrinotata, F. citrinella, N. flavipennis*
13	*Diplocolenus abdominalis, Megadelphax sordidula*	*Arocephalus languidus*	*Chlorita viridula, M. laevis*	–
14	*N. flavipennis*	*N. flavipennis, F. citrinella*	*N. flavipennis*	–

grasses and shrubs) and the coefficients of the species diversity were analyzed for 14 model biotopes.

The dominating species were determined using the following formula: $p_i = (n_i / N) \times 100\%$, where n_i is the number of individuals of i-th species; N, the total number of individuals of all the species. The qualitative estimate of the relative abundance was obtained using the following scale: species constituting 40–100% of the total number of individuals are dominants, 16–40%, subdominants, and less than 16%, rare species (Pesenko, 1982). The dominant and subdominant species were considered to be common.

The Shannon index (H) was used as the diversity index: $H = \sum p_i \ln p_i$, where p_i, is a fraction of individuals of i-th species. The community evenness index (E, the observed to the maximum diversity ratio) was calculated on the basis of the Shannon index (Megarran, 1992): $E = \frac{H}{\ln S}$, where S is a number of the species found.

Similarity of the model biotopes was estimated using the Sørensen-Czekanowski similarity index (Pesenko, 1982).

A BRIEF DESCRIPTION OF THE MODEL BIOTOPES

The Kerzhenskii Nature Reserve

The environs of Chernozer'e locality. *Green-moss spruce forest* in a depression on the floodland area of the Kerzhenets River. *Moist glade in mixed forest* on the floodland of the Kerzhenets River, a gentle slope of a hill with the tuberculate microrelief; among grasses, *Melampyrum pratense* L., *Achillea millefolium* L., *Galium* sp., and *Veronica chamaedrys* L.

dominate. *Birch forest. Oak forest* in the area above the floodland of the Kerzhenets River left bank. *Willow stand* situated in the same locality. **The environs of Rustai Village.** *Upland bog* with pine + cottongrass + subshrub + sphagnum, insects were collected several meters from the peripheral part of the bog. *Water-meadow* in the area between hills, crossed by a stream running into the Vishnya River; undergrowth of alders, birches, and pines occurs along the stream; the meadow edge is used as a hayfield.

The Trans-Volga Part of Chuvashia

The environs of Sosnovka Vill. *Pine forest with cowberry + green moss* on a gentle slope of a low hill. *Medium-aged alder forest* adjoining a lowland bog and an earth road. *Lowland bog* passing into an alder forest; water stands between hummocks all the summer long. **The environs of Oktyabrskii Vill.** *Transitional bog* (*passing into a meadow*) on the bank of a drainage canal, near vegetable gardens.

The Republic of Mari El

The "Bolshaya Kokshaga" Nature Reserve. *Dry meadow* near Shaptunga Vill. on watershed plateau; the relief is even, the surface is only slightly hummocky. **The environs of Kokshamary Vill.** *Mixed forest* on the left bank of the Bolshaya Kokshaga River. *Near-water biotope*, sweeping was made on grasses along the bank of the Bolshaya Kokshaga; the biotope is partly trampled down by cattle.

Data on the common species in the model biotopes are given in Table 2.

The common species in the model biotopes were found to change (Table 3).

As a result of the study, 33 common Cicadina species have been found in the model biotopes.

Comparison of the species composition of Cicadina in the model biotopes has shown the greatest similarity between the faunas of the spruce and birch forests (0.56). The least similarity was found between the faunas of the birch forest and the upland meadow (0.044). Three complexes of biotopes were distinguished.

(1) The green-moss spruce forest, birch forest, oak forest, green-moss pine forest, and alder forest.

(2) The mixed forest, glade in mixed forest, willow stand.

(3) The lowland bog, transitional bog, upland bog, water-meadow, near-water biotope, dry meadow.

The similarity of the Cicadina faunas in these complexes is caused by similarity of the humidity and temperature regimes in the model biotopes and also by similarity of the plant composition of their grass-shrub layer.

The highest mean indices of the specific variety (*H*; *E*) were recorded on the dry meadow (2.02 ± 0.19; 0.71 ± 0.04, respectively), in the near-water biotope (1.95 ± 0.18; 0.9 ± 0.05), and in the transitional bog (1.84 ± 0.16; 0.87 ± 0.01); the least indices, on the upland bog (0.66 ± 0.25; 0.45 ± 0.13) and in the spruce forest (0.94 ± 0.16; 0.88 ± 0.03). The great diversity on the water-meadow can be accounted for by the fact that the biotope undergoes a change of the moisture degree during the vegetative period and also by a great diversity of the plant component of the community. Heterogeneity of a forage reserve is also the reason of the high species diversity on the transitive bog grown with plants characteristic of both bog and meadow. The high evenness on the near-water biotope (one dominant species, *Notus flavipennis*, was found only in July) resulted in the indicated parameters of the diversity. The low parameters of the variety are caused by a poor development of the grass layer in the spruce forest, and by a low variety of the forage reserve of cicadas on the upland bog.

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