

Auchenorrhyncha captured at light in Finland (Hemiptera, Fulgoromorpha et Cicadomorpha)

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Kurzfassung: Zikadenfänge aus Lichtfallen in Finnland. – Nach umfangreichen Lichtfallenfängen in den Jahren 2002 und 2003 konnte für einen beträchtlichen Anteil der finnischen Zikadenarten nächtliche Aktivität festgestellt werden. In insgesamt 148 Jahresfängen an 76 Standorten wurden 214 Arten mit mehr als 147.000 Individuen festgestellt. Die Proben enthielten 14 Neufunde für Finnland und über 500 Neufunde für einzelne Provinzen. Es zeigte sich, dass die nächtliche Aktivität zwei Maxima mit unterschiedlichen Geschlechterverhältnissen aufweist.

Abstract: A considerable proportion of Finnish species of Auchenorrhyncha was found to be nocturnally active based on samples from extensive light-trapping in the years 2002 and 2003. Altogether 214 species and more than 147,000 specimens were recorded from 148 annual light trap samples in 76 sites. The samples revealed 14 species new to the country and more than 500 new provincial records. A periodical test showed that the nocturnal activity has two activity peaks with differing sex ratios.

Key words: Hemiptera, Auchenorrhyncha, Finland, light traps, nocturnal activity

1. Introduction

Almost 70 years have past since Wilhelm Wagner wrote the first article on leafhoppers captured at light (Wagner 1937). Afterwards only sporadic notes of some light-captured species have been mentioned in Europe (Ossiannilsson 1981, 1983; Nickel 2003). The method of collecting leafhoppers and planthoppers with artificial light sources is not usually mentioned in major European textbooks on Auchenorrhyncha (Linnavuori 1969; Ossiannilsson 1978; Nickel 2003; Holzinger *et al.* 2003). Little is also known about their nocturnal activity. Lewis & Taylor (1965) mention flight peaks in Cicadellidae around midday, dawn and dusk, but Raatikainen & Vasarainen (1973) reported a maximum activity in *Balclutha punctata* (F.) around midnight. Ossiannilsson (1978) notes that notorious virus-transmitters can make long-range migrations at night. The fact, that large numbers of leafhoppers are attracted to artificial light at night, seems to be known primarily to moth collectors using light trap designs (Leinonen *et al.* 1998) and to researchers who use light traps for controlling agricultural pests (Ghauri 1975; Kyriakidou & Drosopoulos 1993). Recently, however, the use of light traps has been introduced as a method for the assessment of insect diversity in tropical forests (Novotný & Missa 2000).

Research on Finnish Auchenorrhyncha went into near dormancy in the mid 1980s. This has caused difficulties when assessing the conservation status of species. More than 30 % of the known Finnish species were classified as data-deficient in the latest National Red List (Rassi *et al.* 2001). The major reason for this was the lack of recent data for a number of species. In the end of 2002 the Ministry of Environment in Finland counteracted this problem by financing a four-year research project to enhance the knowledge of the distribution and biology of Finnish Auchenorrhyncha. The author, being in charge of this project, could not rely on much field work assistance (since there are less than a handful of active collectors in

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Finland), so the only alternative was to use extensive networks of various passive trapping techniques (light traps, Malaise traps, yellow pans and pitfall traps).

2. Study sites and methods

Light-trapping was commenced in the years 2002 - 2003. The trap net included 148 trap-years in 76 sites (Fig. 1). The geographic coverage is slightly biased by a lepidopterologist's point of view. There are many sites along the southern coast, but few in the less interesting central regions. The habitats represent 12 dry boreal forests, 13 fresh boreal forests, 6 lush boreal forests, 13 groves, 9 coastal meadows, 5 lacustrine meadows, 1 dry grassland, 1 improved grassland, 1 abandoned field, 8 open ruderal areas, 6 gardens and 1 parkland. Notable is the lack of fens and mires that should hold a large number of oligo- and monophagous Auchenorrhyncha of the boreal region.

Most traps belonged to the National Moth Monitoring Scheme (Söderman 1994) using hanging traps (see Leinonen *et al.* 1998) with bulbs of 160 W blended light in southern and central Finland and 125 W mercury light in the northern part (to compensate for the light northern nights). These traps are hung at head-height along forest edges and the light from the bulbs spreads some 90 metres from the trap, mostly obliquely to the field layer. In addition, material from private collectors was used. Some of them used different trap designs, both inverse traps that spread the light upwards through the forest canopy, and ground-buried traps in open terrain. In these the light-bulbs are located only some 20-30 cm above the ground level. The latter spreads light effectively over short-grown vegetation. Some private collectors also used more effective bulbs ranging from 500 W to 1000 W mercury light. The material from all these traps, that were emptied weekly during the effective temperature season from April to October, was stored in freezers by the collectors themselves and sent to the author after the removal of moths. The author sorted and identified the Auchenorrhyncha from these. Most specimens were in good condition (due to the shape and smooth surface of the insects), and the genital structures of males could be dissected without maceration. In one place, in the National Park of Noux, some 50 km northwest of the city of Helsinki, an experimental field was established in 2003 with four similar light trap designs in an aspen-oak woodland. The traps were lit and turned off in sequence of two hours between 8.00 p.m. and 04.00 a.m. in order to test different nocturnal activity of light-attracted Auchenorrhyncha.

3. Results

The total trap capture of Auchenorrhyncha over the years 2002-2003 was ca. 147,000 specimens of which 144,929 could be identified to 214 species. The species number must be regarded as high as it comprises 61 % of the presently known Finnish fauna, and considering the fact, that about 20 % of the Finnish species are normally brachypterous or sub-brachypterous and not able to fly into the traps. Further, the proportion of identified individuals is very high, because ♂♂ often dominated by 7:1 to 9:1, particularly in Typhlocybiinae.

A cumulated curve of the relationship between sampled individuals and species (Fig. 2) clearly shows that about 40 species are abundant in the catches, and others are more rare. 50 % of the common nocturnal species belong to Typhlocybiinae, and 60 % are arboricolous. This is explained by the fact, that most light-traps were placed at or near forest margins. The ten most abundant species were *Kybos smaragdula* (Fn.), *Empoasca ossiannilsoni* Nuort., *E. kontkaneni* Oss., *Edwardsiana menzbieri* Zachv., *Macrosteles laevis* (Rib.), *M. sexnotatus* (Fn.), *Edwardsiana geometrica* (Schrk.), *E. alnicola* (Edw.) and *Cicadula ornata* (Mel.). Most systematic groups of Auchenorrhyncha known from Finland were represented in the samples, except Kelisiinae

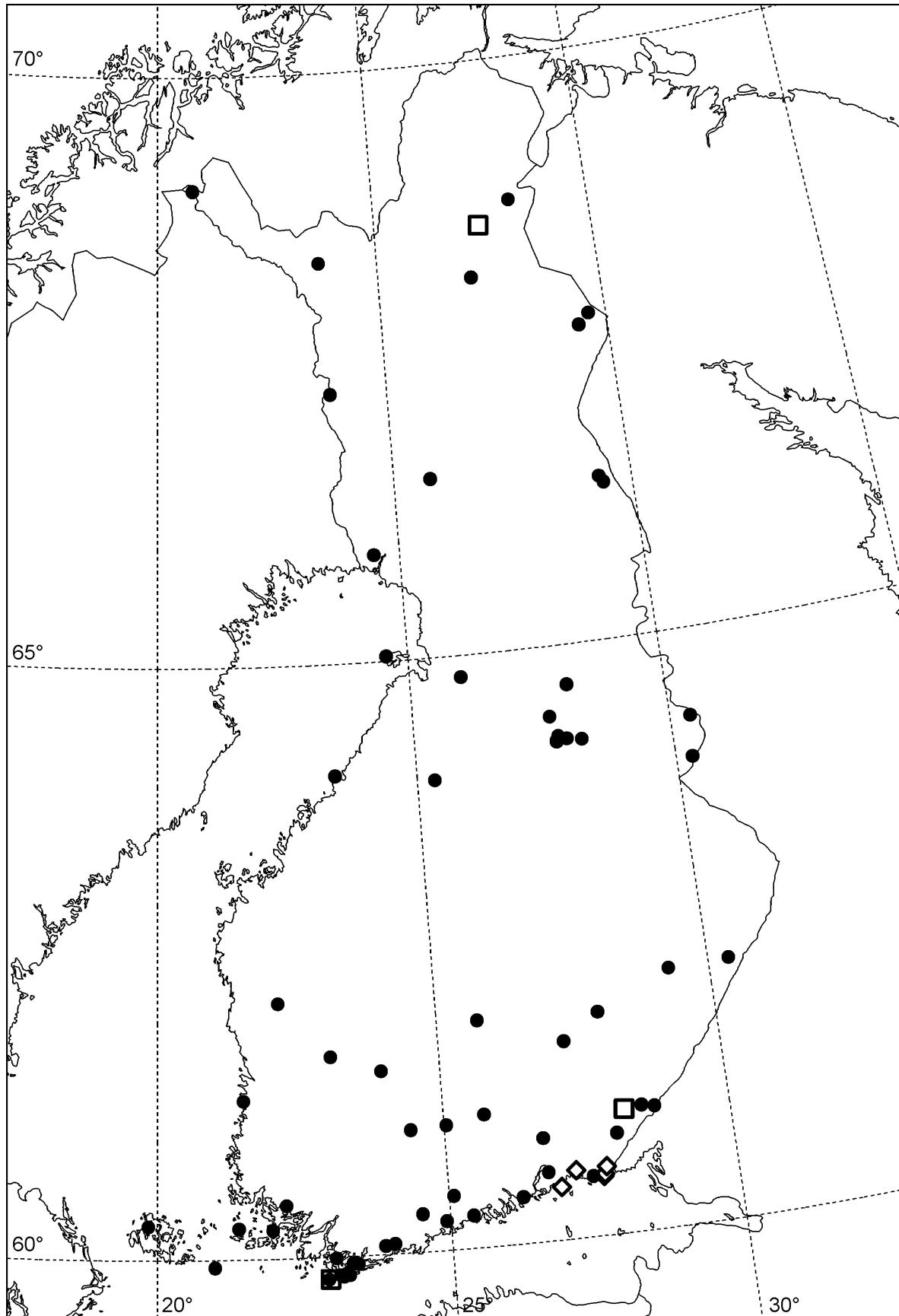


Fig. 1: Locations of sampling sites for light-trapping in Finland. Filled circle = hanging trap; square = ground trap; diamond = upward-directed trap

(Delphacidae), Achilidae, Caliscelidae, Cicadidae, Membracidae and Ulopinae, Megophthalminae, Dorycephalinae (Cicadellidae). An overview table of sampled species, individual numbers, species frequency and some remarks is given in the Appendix. In addition, *Peuceptylus coriaceus* (Fn.), *Anaceratagallia venosa* (Fcr.), *Alebra wahlbergi* (Boh.), *Kybos virgator* (Rib.), *Paluda flaveola* (Boh.) and *Diplocolenus bohemani* (Zett.), were found in Finnish light traps previously.

The between-site variation of the captures was considerable. Specimen numbers ranged from 30 to 13,000 per trap and year, and species numbers from 10 to 90. The variation was not decisively affected by use of different bulbs, as already pointed out by Leinonen *et al.* (1998), but rather by a combination of the geographic position of the site, the trap design and the selected collecting habitat. The species numbers were highest in the south, which reflects the general trend of decreasing species numbers in south-north direction. This trend was also affirmed by analysing the capture of one normal hanging light trap situated in the Sebez National Park close to the Lithuanian and Belorussian border in the Russian oblast of Pskov. Here the annual capture reached 67,000 specimens belonging to 100 species. Amongst these were thirteen species not recorded from the Finnish trap network: *Euides basilinea* (Germ.), *Hyledelphax elegantula* (Boh.), *Javesella obscurella* (Boh.), *Aphrophora salicina* (Gz.), *Macropsis fuscinervis* (Boh.), *Cicadella lasiocarpae* Oss., *Alebra neglecta* W.Wg., *Kybos rufescens* (Mel.), *Edwardsiana ishiddai* (Mats.), *E. plebeja* (Edw.), *Cicadula frontalis* (H.-S.) and *Limotettix sphagneticus* Em.

However, the specimen captures in Finland were highest in the eastern part of central Finland where adult-hibernating members of Empoascini were very abundant. The most interesting combination was ground-traps in xerothermic habitats. For instance three ground-traps on the airfield of the town Lappeenranta in southeastern Finland produced some 7,700 specimens belonging to 90 species of which >80 % were non-arboricolous.

Rare species in the captures included some definite surprises; 14 species new to Finland were recorded: *Macropsidius sahlbergi* (Fl.), *Macropsis scutellata* (Boh.), *Vilbasteana oculata* (Ldb.), *Edwardsiana lanternae* (W.Wg.), *Fagocyba carri* (Edw.), *Typhlocyba quercus* (F.), *Balclutha arbenana* Dlab., *Scleroracis identicus* Tish., *Laburrus impictifrons* (Boh.), *Metalimnus steini* (Fieb.), *Paralimnus zachvatkini* Em., *Parapotes reticulatus* (Hv.), *Mongolojassus bicuspidatus* (J.Sb.) and *Calamotettix taeni-*

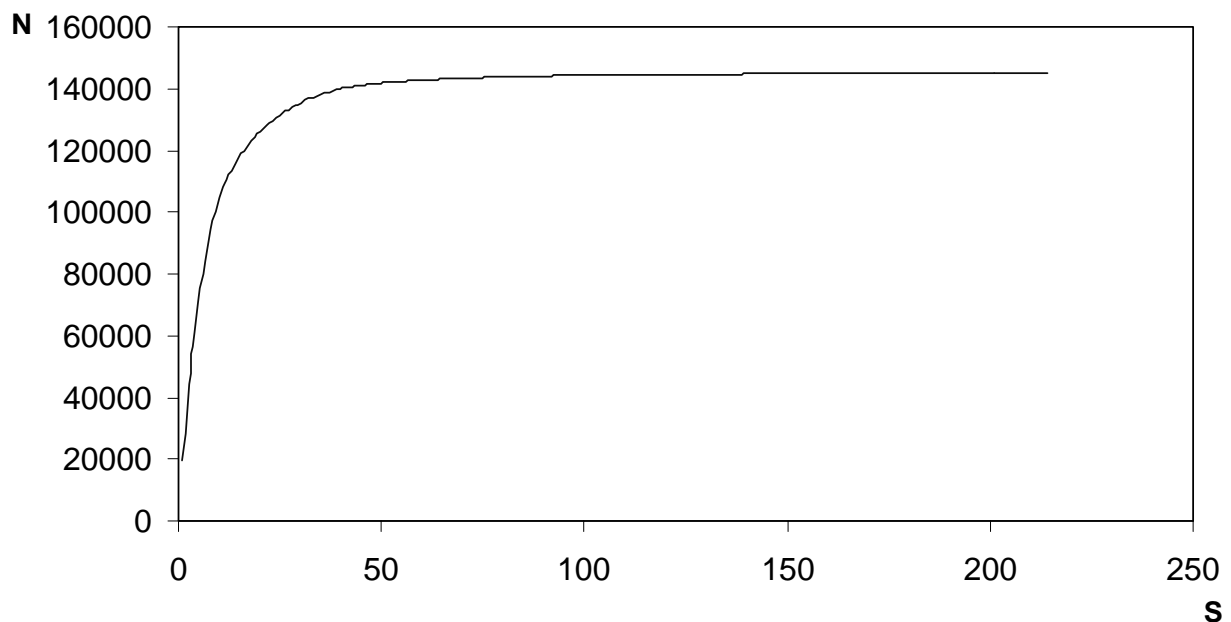


Fig. 2: Cumulated relationship between numbers of individuals (N) and species (S) of Auchenorrhyncha in Finnish light traps

atus (Horv.). Nine of these species have not been captured through any other method in Finland to date. The captures also revealed that a few of them – *T. quercus* (F.), *B. arbenana* Dlab. and *C. taeniatus* (Hv.) are widely distributed in southern and central Finland (see also Albrecht *et al.* 2003). Noteworthy were also single females of hygrophilous species in xerothermic habitats, notably *Erotettix cyane* (Boh.), *Paramesus obtusifrons* (St.), *Athysanus quadrum* Boh., *Cosmotettix edwardsi* (Ldb.), *Calamotettix taeniatus* (Hv.) and *Delphax crassicornis* (Pz.).

The test in the woodland of Noux revealed two activity peaks (Figs. 3, 4, 5). The first, between 22.00-24.00 p.m., was clearly dominated by ♂♂, the second, between 02.00-04.00 a.m., by ♀♀. It would suggest that males are highly active and flying before midnight in search of females. This could explain why light captures have a beneficial sex ratio for identification purposes. The mating peak appears to take place after midnight when the nocturnal activity drops. After this, females start in early dawn to fly in search of new suitable sites for oviposition. This may explain, why females of species living in small-scaled fragmented biotopes and making long nocturnal oviposition flights, are intercepted by light traps in abnormal habitats.

An interesting fact is, that the periodical nocturnal distribution of Auchenorrhyncha in the test differed from that of true bugs (Heteroptera), which showed a more even periodical distribution with slightly higher captures at dusk and dawn, and from that of moths (Macrolepidoptera), showing a pronounced normal distribution with a peak at midnight.

4. Conclusions

The use of light traps, preferably with different design, must be regarded as a good complementary method for mapping species distribution of Auchenorrhyncha over large areas. The two-year sampling resulted in 14 new species records for Finland and more than 500 new provincial records. The method has both restrictive and beneficial properties. Restrictions include a poor coverage of predominantly brachypterous species, such as delphacid planthoppers, and the possibility to link the captured species to host plants (sometimes even habitats). The advantages include a better sex ratio for identification (at least in Typhlocybinae), and high individual numbers of species which are under-represented in the sweep-net, because

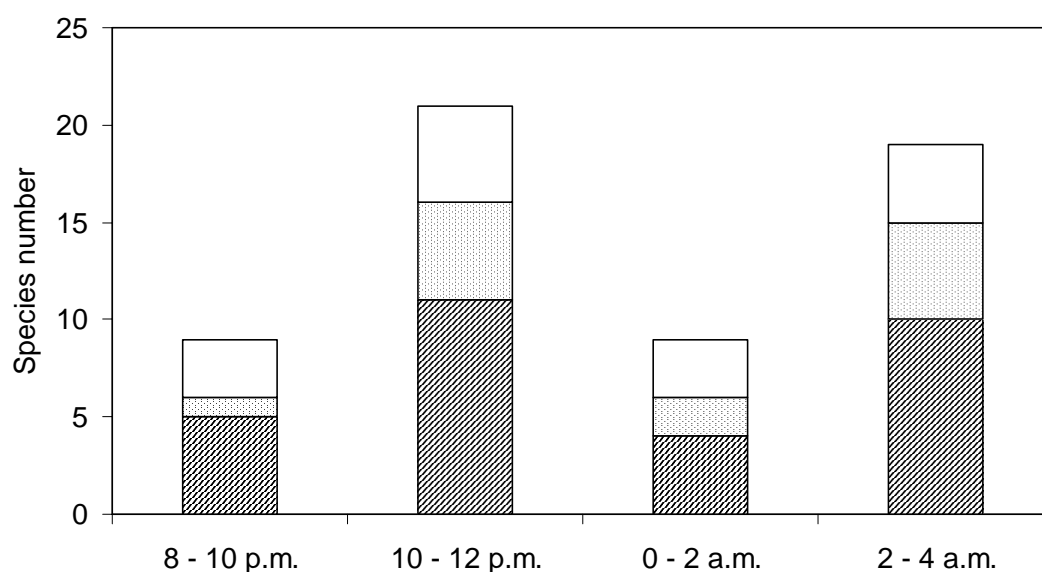


Fig. 3: Periodical distribution of Auchenorrhyncha species in the test field of the National Park of Noux, southern Finland. Hatched = Typhlocybinae, stippled = Deltocephalinae, white = other groups. $S_{\text{total}} = 32$

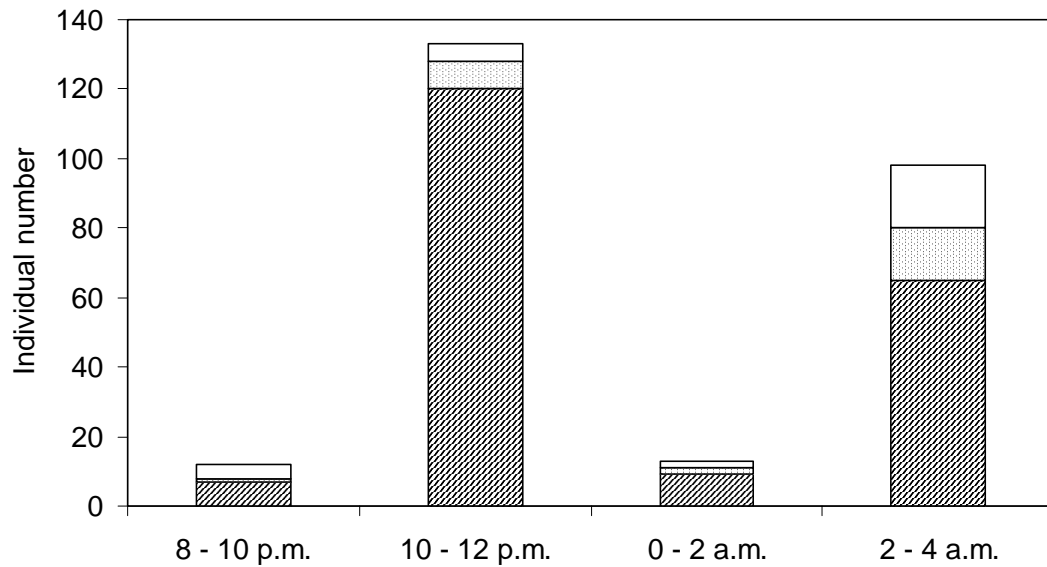


Fig. 4: Periodical distribution of Auchenorrhyncha specimens in the test field of the National Park of Noux, southern Finland. Hatched = Typhlocybinæ, stippled = Deltocephalinae, white = other groups. $N_{\text{total}} = 256$

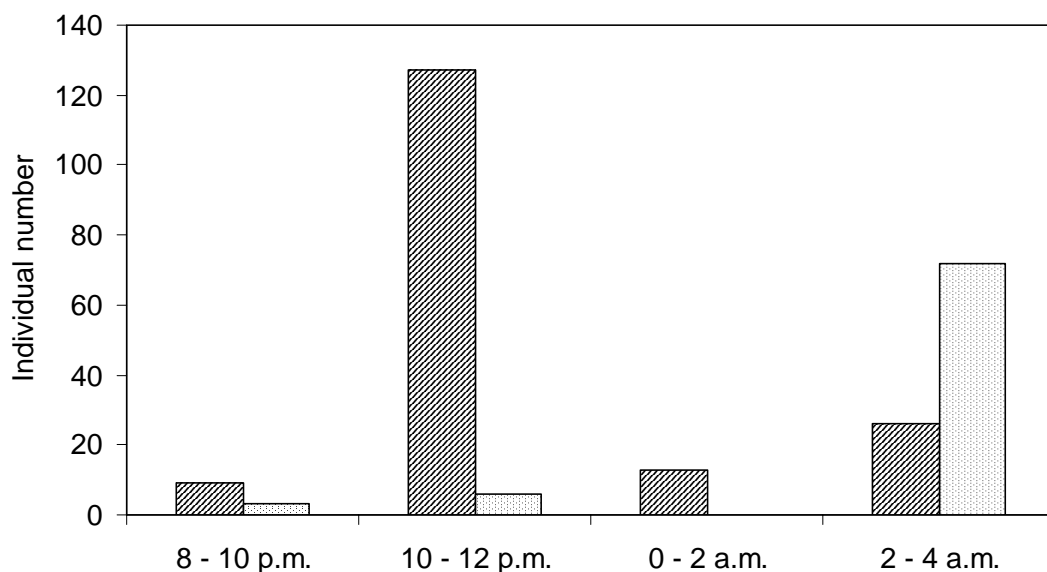


Fig. 5: Periodical distribution of Auchenorrhyncha specimens in the test field of the National Park of Noux, southern Finland. Hatched = ♂♂, stippled = ♀♀. $N_{\text{total}} = 256$

they live high up in tree canopies or in tufts of graminoids. This study for the first time shows that a large number of species is active at night, some may even be called truly nocturnal, and that there might be differences in periodicity of many species caused by mating behaviour and subsequent dispersal. These nocturnal activity peaks of plant- and leafhoppers certainly require future attention, not least because there are potential implications for pest control.

Acknowledgements

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Table Appendix: Overview of light-trapped Auchenorrhyncha species in Finland. N = number of specimens, Fq = frequency (number of recording sites). Systematics and nomenclature combined after Holzinger *et al.* (2003), Nast (1972, 1987), Ossiannilsson (1978, 1981, 1983)

Taxon	N	Fq	Remarks
<i>Kybos smaragdula</i> (Fn.)	19,769	64	
<i>Empoasca ossiannilssoni</i> Nuort.	16,309	15	
<i>Empoasca kontkaneni</i> Oss.	15,160	39	
<i>Edwardsiana menzibieri</i> Zachv.	9,841	31	
<i>Macrosteles laevis</i> (Rib.)	9,832	23	
<i>Macrosteles sexnotatus</i> (Fn.)	9,024	31	
<i>Edwardsiana geometrica</i> (Schrk.)	7,316	51	
<i>Edwardsiana alnicola</i> (Edw.)	6,850	26	
<i>Alnetoidia alneti</i> (Dhlb.)	6,269	43	
<i>Cicadula ornata</i> (Mel.)	4,518	40	
<i>Edwardsiana sociabilis</i> (Oss.)	3,245	9	
<i>Edwardsiana bergmani</i> (Tull.)	2,598	49	
<i>Wagneripteryx germari</i> (Zett.)	2,579	42	
<i>Fagocyba cruenta</i> (H.-S.)	2,384	37	all f. <i>douglasi</i> Edw.
<i>Empoasca vitis</i> (Göthe)	2,340	54	
<i>Balclutha arbenana</i> Dlab.	1,727	18	new to Finland and Europe (cf. Albrecht <i>et al.</i> 2003)
<i>Batracomorphus allionii</i> (Turt.)	1,710	1	
<i>Eurbadina pulchella</i> (Fn.)	1,642	40	
<i>Linnavuoriana sexmaculata</i> (Hardy)	1,462	51	
<i>Edwardsiana rosae</i> (L.)	1,403	24	
<i>Edwardsiana prunicola</i> (Edw.)	1,202	16	mostly f. <i> barbata</i> Rib.
<i>Javesella pellucida</i> (F.)	1,094	32	only macropterous
<i>Kybos butleri</i> (Edw.)	1,068	13	
<i>Spudotettix subfuscus</i> (Fn.)	1,048	54	
<i>Limotettix striola</i> (Fn.)	981	37	
<i>Populicerus populi</i> (L.)	898	30	
<i>Edwardsiana salicicola</i> (Edw.)	827	2	
<i>Lebradea flavovirens</i> (Gill. & Bak.)	807	30	
<i>Kybos populi</i> (Edw.)	805	19	
<i>Sagatus punctifrons</i> (Fn.)	771	18	
<i>Aphrophora pectoralis</i> (Mats.)	670	18	
<i>Hesium domino</i> (Reut.)	559	14	
<i>Populicerus laminatus</i> (Fl.)	487	29	
<i>Idiodonus cruentatus</i> (Pz.)	475	16	
<i>Elymana sulphurella</i> (Zett.)	467	32	
<i>Balclutha punctata</i> (F.)	428	44	
<i>Scleroracis corniculatus</i> Marsh.	396	17	may include 2 species in Finland
<i>Edwardsiana soror</i> (Lnv.)	386	17	
<i>Chlorita paolii</i> Oss.	360	4	
<i>Typhlocyba quercus</i> (F.)	300	12	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Cicadella viridis</i> (L.)	281	19	
<i>Oncopsis flavicollis</i> (L.)	224	31	

Taxon	N	Fq	Remarks
<i>Allygus mixtus</i> (F.)	207	29	
<i>Sonronius binotatus</i> (J.Sb.)	176	19	
<i>Zygina tiliae</i> (Fn.)	171	27	
<i>Thamnotettix confinis</i> (Zett.)	160	19	
<i>Tremulicerus tremulae</i> (Estl.)	158	16	
<i>Macrosteles cristatus</i> (Rib.)	150	12	
<i>Paralimnus phragmitis</i> (Boh.)	140	13	
<i>Oncopsis tristis</i> (Zett.)	128	17	
<i>Laodelphax striatella</i> (Fn.)	106	21	only macropterous
<i>Kybos lindbergi</i> (Lnv.)	106	5	
<i>Linnavuoriana decempunctata</i> (Fn.)	106	26	
<i>Verdanus abdominalis</i> (F.)	97	16	
<i>Balclutha boica</i> W.Wg.	91	4	
<i>Aguriahana stellulata</i> (Burm.)	86	12	
<i>Calamotettix taeniatus</i> (Hv.)	85	15	new to Finland (cf. Albrecht <i>et al.</i> 2003) and northern Europe
<i>Platymetopius undatus</i> (De G.)	79	3	
<i>Erzaleus metrius</i> (Fl.)	77	16	
<i>Zygina ordinaria</i> (Rib.)	73	21	
<i>Ribautiana ulmi</i> (L.)	72	10	
<i>Aphrodes makarovi</i> Zachv.	71	9	<i>sensu</i> Tishechkin (1998)
<i>Metidiocerus elegans</i> (Fl.)	70	12	
<i>Aphrophora alni</i> (Fn.)	67	16	
<i>Eupteryx cyclops</i> Mats.	65	8	
<i>Edwardsiana frustrator</i> (Edw.)	61	3	
<i>Iassus lanio</i> (L.)	57	5	
<i>Laburris impictifrons</i> (Boh.)	57	1	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Erotettix cyane</i> (Boh.)	50	7	
<i>Doratura stylata</i> (Boh.)	50	4	brachypterous
<i>Ophiola paludosa</i> (Boh.)	50	12	
<i>Eupteryx atropunctata</i> (Gz.)	49	3	
<i>Philaenus spumarius</i> (L.)	44	6	
<i>Edwardsiana crataegi</i> (Dgl.)	44	4	all f. <i>frogatti</i> Bak.
<i>Planaphrodes bifasciata</i> (L.)	43	5	
<i>Grypotes puncticollis</i> (H.-S.)	43	8	
<i>Oncopsis alni</i> (Schrk.)	42	7	
<i>Eupteryx calcarata</i> Oss.	42	6	
<i>Zygina nigratarsis</i> Rem.	42	14	
<i>Cicadula flori</i> (J.Sb.)	42	7	
<i>Zygina flammigera</i> (Fcr.)	40	13	
<i>Psammotettix confinis</i> (Dhlb.)	39	6	
<i>Empoasca apicalis</i> (Fl.)	35	3	
<i>Kybos strigilifer</i> (Oss.)	34	3	
<i>Forcipata citrinella</i> (Zett.)	33	16	
<i>Chlorita viridula</i> (Fn.)	33	1	
<i>Macrosteles lividus</i> (Edw.)	32	5	
<i>Zygina rosea</i> (Fl.)	30	13	

Taxon	N	Fq	Remarks
<i>Rhopalopyx vitripennis</i> (Fl.)	30	3	
<i>Idiocerus stigmatalis</i> Lew.	28	7	
<i>Balclutha rhenana</i> W.Wg.	28	11	
<i>Macrosteles fieberi</i> (Edw.)	28	5	
<i>Neophilaenus exclamationis</i> (Thbg.)	26	4	
<i>Kybos sordidulus</i> (Oss.)	25	5	
<i>Aphrodes bicincta</i> (Schrk.)	23	1	<i>sensu</i> Tishechkin (1998)
<i>Idiocerus lituratus</i> (Fn.)	22	5	
<i>Eurhadina concinna</i> (Germ.)	22	7	
<i>Vilbasteana oculata</i> (Ldb.)	21	2	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Linnavuoriana intercedens</i> (Lnv.)	20	4	sympatric with and distinct from <i>L. decempunctata</i> (Fn.)
<i>Scleroracus identicus</i> Tish.	20	1	described only recently (Tishechkin 2003); new to Finland; nymphs collected on <i>Artemisia campestris</i>
<i>Oncopsis planiscuta</i> (Thoms.)	19	3	
<i>Allygidius commutatus</i> (Fb.)	19	9	
<i>Aguriabana pictilis</i> (St.)	18	10	
<i>Anoscopus flavostriatus</i> (Don.)	17	6	
<i>Doliotettix lunulatus</i> (Zett.)	17	7	
<i>Sonronius dahlbomi</i> (Zett.)	16	3	
<i>Eupteryx notata</i> Curt.	14	3	
<i>Cicadula intermedia</i> (Boh.)	14	5	
<i>Cixius distinguendus</i> Kbm.	13	7	
<i>Cicadula quinquenotata</i> (Boh.)	13	6	
<i>Oncopsis subangulata</i> (J.Sb.)	12	5	
<i>Populicerus confusus</i> (Fl.)	12	6	
<i>Colladonus torneellus</i> (Zett.)	12	1	
<i>Macrosteles alpinus</i> (Zett.)	11	4	
<i>Elymana kozhevnikovi</i> (Zachv.)	11	2	
<i>Oncopsis avellanae</i> Edw.	10	7	new to Finland, swept from <i>Alnus glutinosa</i>
<i>Zonocyba bifasciata</i> (Boh.)	10	2	
<i>Mongolojassus bicuspidatus</i> (J.Sb.)	10	1	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Agallia brachyptera</i> (Boh.)	9	7	
<i>Eurhadina kirschbaumi</i> W.Wg.	9	3	
<i>Psammotettix dubius</i> Oss.	9	3	
<i>Delphax crassicornis</i> (Pz.)	8	5	only macropterous
<i>Macropsidius sahlbergi</i> (Fl.)	8	1	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Idiocerus herrichii</i> Kbm.	8	4	
<i>Evacanthus interruptus</i> (L.)	8	4	
<i>Athysanus argentarius</i> Metc.	8	3	
<i>Scleroracus decumanus</i> Kontk.	8	2	
<i>Psammotettix alienus</i> (Dhlb.)	8	3	
<i>Cosmotettix caudatus</i> (Fl.)	8	6	

Taxon	N	Fq	Remarks
<i>Javesella dubia</i> (Kbm.)	7	2	only macropterous
<i>Macropsis infuscata</i> (J.Sb.)	7	5	
<i>Macrosteles variatus</i> (Fn.)	7	6	
<i>Macustus griseus</i> (Zett.)	7	3	
<i>Streptanus marginatus</i> (Kbm.)	7	5	
<i>Paramesus obtusifrons</i> (St.)	7	5	
<i>Anaceratagallia ribauti</i> (Oss.)	6	2	
<i>Notus flavipennis</i> (Zett.)	6	6	
<i>Graphocraerus ventralis</i> (Fn.)	6	2	
<i>Scleroracus transversus</i> (Fn.)	6	1	
<i>Euscelidius schenckii</i> (Kbm.)	6	2	
<i>Euscelis distinguendus</i> (Kbm.)	6	2	
<i>Planaphrodes trifasciata</i> (Fcr.)	5	1	
<i>Edwardsiana lanternae</i> (W.Wg.)	5	4	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Edwardsiana ulmiphagus</i> Wls. & Clr.	5	1	from Finland previously reported as <i>E. hippocastani</i> (Edw.)
<i>Eupteryx origani</i> Zachv.	5	1	
<i>Cicadula persimilis</i> (Edw.)	5	4	
<i>Pithyotettix abietinus</i> (Fn.)	5	4	
<i>Streptanus aemulans</i> (Kbm.)	5	4	
<i>Arocephalus punctum</i> (Fl.)	5	1	
<i>Psammotettix pallidinervis</i> (Dhlb.)	5	1	
<i>Arthaldens pascuellus</i> (Fn.)	5	4	
<i>Xanthodelphax flaveola</i> (Fl.)	4	2	only macropterous
<i>Neophilaenus lineatus</i> (L.)	4	4	
<i>Anoscopus albifrons</i> (L.)	4	2	
<i>Zygina rosicola</i> (Cer.)	4	1	
<i>Cicadula quadrinotata</i> (F.)	4	3	
<i>Scleroracus russeolus</i> (Fn.)	4	4	
<i>Cixius cunicularius</i> (L.)	3	3	
<i>Pentastiridius leporinus</i> (L.)	3	1	
<i>Stiroma affinis</i> Fb.	3	1	brachypterous
<i>Macropsis cerea</i> (Germ.)	3	2	
<i>Eupteryx signatipennis</i> (Boh.)	3	1	
<i>Eupteryx tenella</i> (Fn.)	3	1	
<i>Zygina rubrovittata</i> (Leth.)	3	2	
<i>Macrosteles viridigriseus</i> (Edw.)	3	1	
<i>Streptanus sordidus</i> (Zett.)	3	3	
<i>Psammotettix nodosus</i> (Rib.)	3	3	
<i>Cosmotettix costalis</i> (Fn.)	3	2	
<i>Cosmotettix edwardsi</i> (Ldb.)	3	3	
<i>Stiroma bicarinata</i> (H.-S.)	2	2	brachypterous
<i>Chloriona glaucescens</i> Fb.	2	2	only macropterous
<i>Megadelphax sordidula</i> (St.)	2	1	macropterous
<i>Muellerianella brevipennis</i> (Boh.)	2	2	only macropterous
<i>Populicerus albicans</i> (Kbm.)	2	1	
<i>Stenidiocerus poecilus</i> (H.-S.)	2	1	

Taxon	N	Fq	Remarks
<i>Evacanthus acuminatus</i> (F.)	2	2	
<i>Fagocyba carri</i> (Edw.)	2	1	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Zygina hyperici</i> (H.-S.)	2	1	
<i>Zygina suavis</i> (Rey)	2	2	
<i>Macrosteles nubilus</i> (Oss.)	2	2	
<i>Doratura homophyla</i> (Fl.)	2	1	brachypterous
<i>Cicadula saturata</i> (Edw.)	2	1	
<i>Athysanus quadrum</i> Boh.	2	1	
<i>Stictocoris picturatus</i> (C.Sb.)	2	1	
<i>Paralimnus zachvatkini</i> Em.	2	1	new to Finland and northern Europe
<i>Metalimnus formosus</i> (Boh.)	2	2	
<i>Psammotettix poecilus</i> (Fl.)	2	2	
<i>Sorboanus assimilis</i> (Fn.)	2	2	
<i>Stenocranus major</i> (Kbm.)	1	1	
<i>Stenocranus minutus</i> (F.)	1	1	
<i>Delphax pulchellus</i> (Curt.)	1	1	macropterous
<i>Unkanodes excisa</i> (Mel.)	1	1	macropterous
<i>Javesella discolor</i> (Boh.)	1	1	macropterous
<i>Lepyronia coleoptrata</i> (L.)	1	1	
<i>Oncopsis appendiculata</i> W.Wg.	1	1	
<i>Pediopsis tiliae</i> (Germ.)	1	1	
<i>Macropsis fuscula</i> (Zett.)	1	1	
<i>Macropsis scutellata</i> (Boh.)	1	1	new to Finland
<i>Batysmatophorus reuteri</i> J.Sb.	1	1	
<i>Dikraneura aridella</i> (J.Sb.)	1	1	
<i>Micantulina micantula</i> (Zett.)	1	1	
<i>Empoasca pteridis</i> (Dhlb.)	1	1	
<i>Arboridia parvula</i> (Boh.)	1	1	
<i>Balclutha calamagrostis</i> Oss.	1	1	
<i>Macrosteles horvathi</i> (W.Wg.)	1	1	
<i>Macrosteles septemnotatus</i> (Fn.)	1	1	
<i>Rhopalopyx adumbrata</i> (C.Sb.)	1	1	
<i>Parapotes reticulatus</i> (Hv.)	1	1	new to Finland (cf. Albrecht <i>et al.</i> 2003)
<i>Metalimnus steini</i> (Fb.)	1	1	<i>sensu</i> Anufriev & Emeljanov (1988); new to Finland
<i>Psammotettix excisus</i> (Mats.)	1	1	
<i>Jassargus allobrogicus</i> (Rib.)	1	1	
<i>Jassargus flori</i> (Fb.)	1	1	
<i>Sorboanus xanthoneurus</i> (Fb.)	1	1	
<i>Mocuellus collinus</i> (Boh.)	1	1	