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LONGICORNS (*COLEOPTERA, CERAMBYCIDAE*) OF WARSAW AND MAZOVIA

ABSTRACT

There are 109 longicorn species known from Mazovia. Within the administrative boundaries of Warsaw 88 species were recorded, including 80 species in suburbs and 25 species in urban green areas of other regions. Urban pressure eliminates firstly polyphages, oligo- and monophages associated with coniferous trees, and also the species the larvae of which live in tree trunks. No significant differences were found in the proportion of adults between the species feeding on bark and wood, and those feeding on nectar and pollen. Longicorns of urban green areas consist of the species tolerant of habitat humidity, numerous or locally abundant in Mazovia, established in this region for a long time. Also the proportion of thermophilous species with south-Euro-Siberian and Euro-Caucasian ranges is higher in the town than in non-urban areas. Only one synanthropic pest species, *Hylotrupes bajulus*, occurred occasionally in the town.

INTRODUCTION

Intense coleopterological studies in Warsaw and surroundings have been conducted since the second half of the 19th century. Such distinguished collectors worked in this sphere as Hildt [14, 15], Mączyński [47], Tenenbaum [51, 55—58], Ciszkiewicz [5, 6], and Bartoszyński. Also at present many entomologists work in these areas. Apart from carabids, longicorns are one of the best known families of beetles. The literature on the occurrence of this family in Mazovia consists of 58 positions [1—6, 8—27, 29—31, 33—45, 47—58, 60—63]. Many unpublished materials are in the collection at the Institute of Zoology PAS in Warsaw (collections of Tenenbaum, Ciszkiewicz, and Bartoszyński as well as materials collected recently). To illustrate the intensity of entomological studies in Warsaw surroundings, it may be noted that 51 longicorn species are recorded from such a small area as the reserve „Bielany wood" (130.35 ha), now situated within the administrative boundaries of Warsaw. They account for 46.8% of all the cerambycid species recorded from Mazovia.

There were 109 species recorded from Mazovia. However, 26 of them have not been recorded since 1925, thus their occurrence needs confirma-

tion. Some of them can be extinct in this terrain as a result of forest destruction during the war, and also because of an improper forest management. This is particularly the case of *Rhagium sycophanta, Pyrrhidium sanguineum* and *Purpuricenus kaehleri*. Also *Cerambyx cerdo* seems to be heavily threatened. On the other hand, 9 species new to Mazovia were found in the present study and, in addition, the occurrence of 4 very rare species such as *Obrium cantharinum, Anisarthron barbipes, Oplosia fennica,* and *Pogonocherus hispidulus,* known from single stands so far, has been confirmed (Tab. 9). These facts indicate that the knowledge of this group is not sufficient, though the literature and collections are rich.

The check-list of the species occurring in the urban green areas of Warsaw is based mainly on the materials collected in 1974—1978 by workers of the Institute of Zoology PAS, in the studies entitled "The effect of urban pressure on the fauna of Warsaw". Major premises of the study, description of the habitats and methods, are presented in separate preliminary contributions [7, 28, 32, 59]. There were only 7 species recorded in urban parks and 4 species in housing estates. The other species of urban green areas are taken from the literature [15, 17, 18, 21, 24, 47, 53, 61] and earlier collections of the Institute of Zoology PAS.

The objective of the paper was to set up the data known so far on the occurrence of this group of insects in Mazovia, and to analyse comprehensively the effect of urban pressure on it.

SPECIES COMPOSITION

So far 118 longicorn species are known from Mazovia on the basis of the literature and museum collections. Out of this number, only 109 are considered by the present authors as belonging to the natural fauna of this area. The other were either wrongly identified or derived from different zoogeographical regions of Poland (mountain or northern species), or carried from abroad with timber. The species deleted from the check-list of the fauna of Mazovia are set up below.

The species wrongly identified

Cyrtoclytus capra [14]

The general distribution of this species in Poland suggests that its occurrence in Mazovia is not probable. It is the more so that the author himself quotes the stand out of Poland only (the region of Witebsk) in a later paper [15].

Agapanthia dahli [15].

The description in the quoted paper and the fact that *A. villosoviridescens,* a frequent species in Mazovia, is not included, indicate that the data concern the latter species.

Stenostola dubia [15].
This species occurs in southern Poland and was often mistaken for *S. ferrea*. All data from Mazovia refer to the latter species.

The species carried over and not established under the natural conditions of Mazovia

Tragosoma depsarium [15].
Rhagium bifasciatum [37].
One specimen without date, labelled „Młociny" in the collection of Tenenbaum.
Acmaeops marginata [15, 47].
Semanotus undatus [15].
Monochamus sartor [15].
Nathrius brevipennis [8, 21].
Warsaw, Zoological Museum, now the building of the Institute of Zoology PAS, July 1932, 3 specimens. This pest of stored products has not been established so far.

There are 93 longicorn species recorded from Warsaw. When the transported species (Tab. 9) have been deleted, this number is reduced to 88 species, accounting for 80.7% of the cerambycids of Mazovia. Such a high figure is due to the fact that in the administrative boundaries of Warsaw there are almost all habitat types occurring in Mazovia. On the other hand, the *Coleoptera* of the Warsaw basin are relatively well known, which has already been noted. In the peripheral areas of Warsaw, called suburbs in this paper and including woods and loosely built areas, 80 longicorn species were recorded. They account for 74.2% of the fauna of Mazovia and for 94.0% of the fauna of Warsaw.

In the urban green areas 25 species were recorded excluding *Leptura rubra* and *Necydalis maior* as visiting species. In particular types of urban green areas there were:

— in urban parks (parks, cemeteries, etc.) 22 species (20.2% of the fauna of Mazovia and 25.0% of the fauna of Warsaw);

— in the green areas of housing estates 3 species (excluding *Leptura rubra;* 2.8 and 3.2% respectively);

— in the centre of the town 4 species (excluding *Necydalis maior;* 3.7 and 4.3% respectively).

These figures characterize well the proportion of xylophages in urban green areas, this being a very important group for the functioning of forest biocoenoses. This problem will be discussed below.

The check-list of longicorns occurring in Mazovia and Warsaw is given in Table 9. The species rare and new to Mazovia are set up in the appendix.

ZOOGEOGRAPHICAL ANALYSIS

The *Cerambycidae* of Mazovia belong to such zoogeographical elements [7] as cosmopolitan, Holarctic, Palaearctic, European, Euro-Siberian, boreal, submediterranean, South-Euro-Siberian, and, within the last group, Euro--Caucasian. Both Mazovia and the urban green areas are predominated by Palaearctic and European elements.

The proportion of the other groups does not exceed 10%. There are no distinct differences between Mazovia and the suburbs of Warsaw for the reasons noted above. The comparison of the proportion of particular zoogeographical elements in suburbs and urban green areas shows that the increasing urban pressure is followed by an increase in the proportion of south-Euro-Siberian and Euro-Caucasian elements (from 6.25 to 12%). Also the proportion of European species increased, while the proportion of Palaearctic species dropped. The proportion of Euro-Siberian species was maintained at a more or less similar level (8—9%). This group, however, was completely eliminated from the green areas of housing estates and from the centre of the town.

The species with small ranges such as boreal and submediterranean were not represented in urban green areas (Tab. 1). The increase in the proportion of rather thermophilous species, with south-Euro-Siberian and Euro--Caucasian ranges, is an effect of one of the factors of urban pressure, namely, microclimatic changes. These changes consist of an increase in the amplitude of air humidity variations at a simultaneous decrease in the average humidity, and also of an increase in average temperatures in urban areas as compared with non-urban terrains [32].

Tab. 1. Proportions of zoogeographical elements in longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Zoogeographical element	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Cosmopolitan	2	1.8	1	1.25	1	4.0	1	4.5	—	—	1	25.0
Holarctic	3	2.8	3	3.75	—	—	—	—	—	—	—	—
Palaearctic	35	32.1	28	35.0	7	28.0	7	31.8	1	33.3	—	—
European	42	38.5	32	40.0	12	48.0	9	40.9	—	—	3	75.0
Euro-Siberian	8	7.4	7	8.75	2	8.0	2	9.1	—	—	—	—
South-Euro-Siberian	4	3.7	2	2.5	1	4.0	1	4.5	1	33.3	—	—
Euro-Caucasian	6	5.5	3	3.75	2	8.0	2	9.1	1	33.3	—	—
Boreal	2	1.8	—	—	—	—	—	—	—	—	—	—
Submediterranean	7	6.4	4	5.0	—	—	—	—	—	—	—	—

ECOLOGICAL ANALYSIS

In most of terrestrial ecosystems of the temperate and tropical zones, a large part of plant organic matter is stored in the form of wood. Recycling of this material stored for years is possible due to such decomposers as xylophages. Longicorns are one of the most important groups of xylophages and in this relation the so-called cerambycid-phase of wood decomposition can be distinguished. The activity of successive longicorn communities goes from loosening bark and destruction of the peripheral parts of wood, to a complete breakdown of trunks, stumps, and branches. In particular stages of wood decomposition, the larvae of longicorns are accompanied by insect larvae of other orders *(Lepidoptera, Hymenoptera)*, other families of *Coleoptera*, etc. When the decomposition of wood is sufficiently advanced, soil saprophages take over the role of true xylophages. Due to their action, the substrate can be subjected to humification processes in soil.

Only a small group of longicorn species feed on materials other than wood during their larval development. These are species of the genera *Agapanthia* Serv. and *Phytoecia* Muls., and also *Oberea erythrocephala*. They live on shoots of herbaceous plants such as *Boraginaceae, Compositae, Urticaceae, Euphorbiaceae, Umbelliferae*, etc. Some cerambycids live in soil and they feed on grass roots (genera *Evodinus* Lec. and *Dorcadion* Dalm), as well as on dead remains of twigs, leaves, acorns, etc. *(Vadonia livida)*.

HABITAT PREFERENCE

Since longicorns are mostly xylophages, they inhabit plant communities with a large proportion of trees and shrubs, thus first of all forests. Some species occupy shrubs scattered over crop fields, forest edges and single roadside trees.

The most important factor limiting the occurrence of some species is humidity. On the basis of the classification developed by Starzyk for longicorns inhabiting the Niepołomice Forest [46], which is a little modified here, the following categories are distinguished: the species associated with wet woodlands (bog pine forests, alder swamps, carrs, and wet sites in forests of other types), the species associated with dry and moist forests (light coniferous forests, oak forests and oak-hornbeam forests), the species tolerant of moisture conditions, and the species of unknown moisture requirements (very rare).

The only group the proportion of which has increased in the urban green areas as compared with the suburbs, are the species tolerant of moisture conditions, thus with a large range of ecological tolerance. The proportion of hygrophilous species was maintained at a similar level along the from natural habitats to parks. This group is completely eliminated from the green areas of housing estates and from the centre of the town.

The proportion of the species occurring in dry biotopes decreased in parks, while it distinctly increased in the green areas of housing estates and in the centre of the town (Tab. 2). The occurrence of some hygrophilous species in parks, although urban habitat is much overdried, is probably possible due only to the presence of wet sites on the lower terrace of the Vistula in the Łazienki park.

Tab. 2. Proportions of groups with different moisture preferences in longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Group	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Tolerant	25	22.9	20	25.0	9	36.0	8	36.4	—	—	1	25.0
Xerophilous	47	43.1	36	45.0	10	40.0	8	36.4	3	100.0	3	75.0
Hygrophilous	18	16.5	14	17.5	4	16.0	4	18.2	—	—	—	—
Unknown	19	17.4	10	12.5	2	8.0	2	9.1	—	—	—	—

FOOD HABITS

Longicorns can be classified into several ecological groups according to the food habits of their larvae, considered along the description of the biological role of this family in forest ecosystems. Three thropic groups have been distinguished: xylophagous (together with the species feeding on live wood), phytophagous, living in stems of herbaceous plants, and saprophagous soil species. The proportion of these groups changed little along the gradient from Mazovia through suburbs to urban green areas. The proportion of the species living in herbaceous plants slightly increased at the expense of xylophagous species. Phytophages, however, did not occur in urban areas except for parks. In the housing estates only two groups were recorded, xylophages and soil saprophages, and in the centre of the town only xylophages occurred (Tab. 3).

Though there were no significant changes in the proportion of the three trophic groups between the suburbs of Warsaw and the housing estates, significant changes were observed in the trophic structure within the group of xylophages, which is most important. According to the host tree, they can be classified into the polyphages associated with coniferous and broad-leaved shrubs and trees, oligo- and monophages associated with coniferous shrubs and trees, oligo- and monophages associated with broad-leaved shrubs and trees, and finally, the group of species of unknown biology (*Cortodera femorata, C. humeralis*, and *Strangalia pubescens*).

Tab. 3. Proportions of trophic groups in larval longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Group	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Xylophages	100	91.7	72	90.0	22	88.0	19	86.4	2	66.7	4	100.0
Phytophages feeding on herbs	8	7.3	7	8.75	2	8.0	2	9.1	—	—	—	—
Soil saprophages	1	0.9	1	1.25	1	4.0	1	4.5	1	33.3	—	—

According to the place of grazing by larvae, the following groups can be distinguished: the species grazing in the wood of trunks, stumps, and larger branches; the species grazing in the wood of thinner branches (less than 10 cm in diameter); those grazing in the wood of trunks and twigs; and the species of unknown biology.

The proportions of oligophages associated with coniferous trees dropped in urban green areas, the groups of polyphages and monophages associated with coniferous trees were completely reduced. It is related to the fact that the number of coniferous trees is reduced in parks and, what is most important, native species are replaced by foreign decorative species. In this situation the proportion of oligo- and monophages associated with broad-leaved trees and shrubs increased. The proportion of these two groups increased at the same rate (Tab. 4).

Tab. 4. Proportions of groups with different ranges of food specialization in longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Group	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Polyphages of coniferous and broad-leaved trees and shrubs	10	10.0	9	12.5	—	—	—	—	—	—	—	—
Oligophages of coniferous trees	18	18.0	12	16.7	2	9.1	2	10.5	—	—	1	25.0
Monophages of coniferous trees	3	3.0	1	1.4	—	—	—	—	—	—	—	—
Oligophages of broad-leaved trees and shrubs	55	55.0	39	54.2	15	68.2	12	63.2	2	100.0	3	75.0
Monophages of broad-leaved trees and shrubs	11	11.0	9	12.5	4	18.2	4	21.1	—	—	—	—
Unknown	3	3.0	2	2.8	1	4.5	1	5.3	—	—	—	—

The proportion of species the larvae of which feed on the wood of trunks dropped almost by half in the urban green areas, while the proportion of the group grazing in branches increased (Tab. 5). This tendency is better pronounced in parks than in the whole urban green area. Economic and technical consequences of these changes will be discussed at the end of the paper.

Adult forms can be divided into 4 trophic groups. Most of adult longicorns of the Mazovian Lowland feed on dead wood and bark. This group also includes the species feeding on the bark and phloem of live twigs, and on leaves. The second group consists of melliphages, living on

Tab. 5. Proportions of groups with different diet in xylophagous longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Diet	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Xylem of trunks, stumps and thick branches	46	46.0	34	47.2	6	27.3	4	21.1	—	—	3	75.0
Phloem and xylem of thin branches	40	40.0	29	40.3	14	63.6	14	73.7	2	100.0	—	—
Xylem of trunks and twigs	11	11.0	7	9.7	1	4.5	—	—	—	—	1	25.0
Unknown	3	3.0	2	2.8	1	4.5	1	5.3	—	—	—	—

nectar and pollen of flowers. Some of them can also feed on dead wood which is a substrate for symbiotic bacteria and fungi occurring in their alimentary canal (e.g. *Leptura rubra*). The third group is made up of the species whose adults graze on herbaceous plants. The fourth group contains *Cortodera humeralis* and *C. femorata*, the biology of which is not known: thus, they cannot be included to any of the groups quoted above.

The proportion of melliphagous species in the urban green areas was similar to that in the suburban and non-urban areas (Tab. 6). This indicates that it is not the reduction of food resources for adults (elimination of dicotyledonous plants from lawns as a result of the introduction of grassy monocultures) that is responsible for the elimination of most longicorns from the town, but the transformation of food resources for larvae. The most important factors here are the introduction of foreign trees and shrubs to parks, as well as the removal of old trees and dead wood, carried out as a part of cultivation treatments.

ABUNDANCE AND EXPANSIVENESS

The number of individuals, as well as expansiveness, stability, or recessiveness of the species are very important criteria of defining its role in

Tab. 6. Proportions of trophic groups in adult longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Group	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Grazing on xylem, phloem, bark and leaves	61	56.0	44	55.0	14	56.0	12	54.5	2	66.7	3	75.0
Melliphages	33	30.3	23	28.75	8	32.0	7	31.8	1	33.3	1	25.0
Mixed diet	5	4.6	4	5.0	1	4.0	1	4.5	—	—	—	—
Phytophages on herbs	8	7.3	7	8.75	2	8.0	2	9.1	—	—	—	—
Unknown	2	1.8	2	2.5	—	—	—	—	—	—	—	—

the biocoenosis. According to these features, longicorns can be classified into various groups. They are distinguished on the basis of field observations and laboratory-reared larvae, still they are highly subjective. As many as 50 longicorn species of the Mazovian Lowland are considered as sporadic, and 29 as scarce. Thus, the group of very rare and rare species, including one species of unknown numbers (*Gracilia minuta* [55]), consists of 80 species which account for 73.4% of all the longicorns of Mazovia. This percentage dropped to 52% on the transition from the suburban areas to the urban areas, the proportion of sporadic species being particularly low (Tab. 7). There was an increase, however, in the proportion of common species occurring abundantly or locally abundant.

A great majority of the longicorns of Mazovia can be classified as stable species (70%). The group of expansive species includes *Leptura rubra* and *Pogonocherus fasciculatus*, the number of which increased in recent years

Tab. 7. Proportions of groups with different abundances in longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Group	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Locally abundant	19	17.4	17	21.25	9	36.0	9	40.9	2	66.7	1	25.0
Numerous	10	9.2	10	12.5	3	12.0	3	13.6	1	33.3	—	—
Scarce	29	26.6	25	31.25	8	32.0	6	27.3	—	—	2	50.0
Sporadic	50	45.9	28	35.0	5	20.0	4	18.2	—	—	1	25.0
Unknown	1	0.9	—	—	—	—	—	—	—	—	—	—

due to an increasing proportion of pines in forest cultures, as well as *Chlorophorus varius* and a synanthropic species, *Hylotrupes bajulus*. The group of recessive species (14 species) and the species of unknown expansiveness (14 species) involve all the species not recorded in the second half of the 20th century, as also *Ergates faber* and *Cerambyx cerdo*. To the group of recessive species, 5 threatened species are included: *Rhagium sycophanta, Cerambyx cerdo, Pyrrhidium sanguineum, Purpuricenus kaehleri*, and *Saperda punctata*. The suburban areas are characterized by a higher proportion of expansive and stable species, as compared with Mazovia, while the proportion of the recessive species and those of unknown expansiveness dropped. The proportion of recessive species in the urban green areas increased to 16% as 4 recessive species were recorded there *(Acmaeops collaris, Stenocorus quercus* [15], *Strangalia pubescens* [15] and *Cerambyx cerdo)*. It is, however, probable that the occurrence of these species is restricted to the transitional habitats between urban woods and tree stands in parks. In the green areas of housing estates and in the centre of the town only stable species and one synanthropic expansive species were recorded (Tab. 8).

Tab. 8. Proportions of groups with different expansiveness in longicorns of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Group	Mazovia		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks		Housing estates		Town centre	
	N	%	N	%	N	%	N	%	N	%	N	%
Expansive	4	3.7	4	5.0	1	4.0	1	4.5	—	—	1	25.0
Stable	77	70.6	64	80.0	20	80.0	17	77.3	3	100.0	3	75.0
Recessive	14	12.8	6	7.5	4	16.0	4	18.2	—	—	—	—
(threatened)	(5)	(4.6)	(2)	(2.5)	(1)	(4.0)	(1)	(4.5)		(—)		(—)
Unknown	14	12.8	6	7.5	—	—	—	—	—	—	—	—

DISCUSSION

There are 25 longicorns species recorded from the urban green areas. Four of them have probably been eliminated from the town. Also a very rare species, *Anisarthron barbipes*, one specimen of which is known from Warsaw [15], is considered as a representative of the fauna typical of urban green areas, as the main host plant of this species is the horse-chestnut (*Aesculus hippocastanum* L.), common in the parks of Warsaw. There were no foreign species (not recorded from natural habitats of Mazovia) in the urban green areas, introduced with new species of decorative trees and shrubs.

The group of synanthropic species living in timber includes at present only one species. *Hylotrupes bajulus* [24, 61]. The other species (*Criocephalus rusticus*, *C. tristis*, and *Leptura rubra*) are only occasionally met and have no economic importance. It may be expected that further reduction of timber as building material will be followed by the elimination of this group. Other synathropic species, such as *Gracilia minuta* and *Nathrius brevipennis*, are pests of basket-works. So far, however, only sporadic occurrence of *N. brevipennis* was noted, thus this group is not of economic importance now.

CONCLUSIONS

The elimination of a large number of longicorn species from urban green areas indirectly indicates that matter cycling in urban ecosystems is disturbed. It is dangerous not only from the point of view of the urbicoenosis functioning, but also because it can create serious technical and economic problems concerning the exchange of underground pipes of different kinds, covered with roots of dead stumps. Since the species whose larvae live in the wood of trunks and stumps are firstly eliminated, the processes of wood decompositon are much delayed in urban green areas.

The longicorns of urban green areas can be characterized as follows. These are mainly species living in branches of broad-leaved trees and shrubs. They are tolerant of moisture conditions, and abundant or locally abundant in Mazovia. These are also stable species in relation to anthropogenic changes in the habitat.

The main factors of urban pressure limiting their occurrence are cultivation treatments in urban parks. The removal of old trees and dead wood, as well as the introduction of foreign decorative trees and shrubs, belong to most important of them. The introduction of grassy monocultures (reduction of food resources for melliphagous adult forms) is of smaller importance. Microclimatic changes in urban habitats account for an increase in the proportion of thermophilous longicorns with south-Euro-Siberian and Euro-Caucasian ranges, and also for an increase in the proportion of the species tolerant moisture conditions. An interesting phenomenon is that the number of hygrophilous species in urban parks is considerably less limited than the number of species associated with dry biotopes.

THE SPECIES RARE AND NEW TO THE FAUNA OF MAZOVIA

In the present paper 9 species have been recorded not known in the Mazovia Lowland so far. Their stands are set up below, together with other, rarely met species. The evidential specimens of all these species are kept in the collection of the Institute of Zoology PAS in Warsaw, if no other place has been indicated.

THE SPECIES NEW TO MAZOVIA

Leptura inexpectata Jans. et Sjöb.
Kampinos Forest (Strzeleckie Meadows), June 1976, 1 specimen, leg. et coll. K. Łoś.

Vadonia livida (F.)
Very common, in this paper classified as locally abundant, recorded from Kampinos Forest, Radziejowice, Bulkowo near Pułtusk, suburbs of Warsaw (Bielany, Młociny, Białołęka Dworska), urban green areas (Łazienki park, Praga park, housing estates Wierzbno and Grochów), and others.

Tetropium castaneum (L.).
Kalinowo near Ostrów Mazowiecka, Warsaw (in an apartment, February 1937) — undoubtedly carried over.

Tetropium fuscum (F.).
Warsaw-Morysinek, under bark of a cut down spruce; Warsaw (in an apartment, February 1937) — carried.

Mesosa nebulosa (F.).
Kampinos Forest (Debły), Warsaw-Bielany.

Acanthoderes clavipes (Schrank).
Rybienko near Wyszków, 10 July, 1954.

Exocentrus punctipennis Muls.
Bielany, Morysinek (suburbs of Warsaw). Adults reared from twigs of oak (*Quercus* sp.) and bird-cherry (*Padus avium* Mill.).

Menesia bipunctata (Zoubk.).
Kampinos Forest (Dziekanów Leśny, Sadowa), Bulkowo near Pułtusk, Warsaw-Bielany.

Phytoecia nigricornis (F.).
Kampinos Forest (Dziekanów Leśny) and Warsaw-Młociny, 2 specimens ex coll., K. Łoś; Piaseczno, Grodzisk Mazowiecki-Piaskowa, Piaski Szwedzkie (Praga), Warsaw-Wola Cemetery (Orthodox). Reared (Grodzisk Mazowiecki) from the golden-rod (*Solidago virga-aurea* (L.)).

RARE SPECIES. NEW STANDS IN MAZOVIA

a. Unpublished materials, collected in the first half of the 20th century (ex coll. Tenenbaum and Ciszkiewicz), not recorded in this study. These species, together with 23 others, are classified as recessive or of unknown expansiveness.

Rhagium sycophanta (Schrank) [47].
Piaseczno, 21 June, 1906, Warsaw-Bielany.

Acmaeops collaris (F.) [15].
Warsaw-Marymont, Saska Kępa, Targówek, 1 specimen in each (May-June), Warsaw, Frascati street, 19 May, 1923, 3 specimens on flowers. The species included to urban fauna.

Pyrrhidium sanguineum (L.) [15].
Piaseczno, Warsaw-Saska Kępa.

Xylotrechus rusticus (L.) [15].
Dęblin, Natolin, (July).

b. Rare species, also collected after 1945. In this paper they are classified as stable in Mazovia.

Grammoptera variegata (Germ.) [15, 47, 55, 56].
Chojnów, Ruda on the river Narewka near Skierniewice, Radziejowice near Mszczonów, Kampinos Forest (Debły, Łubiec, Zamczysko, Łuże, Łomna-Las). Adults reared from branches and major branches of oak.

Grammoptera ustulata (Schall.) [15].
Kampinos Forest (Debły).

Cerambyx cerdo L. [10, 15, 21, 33, 36, 39, 41, 47, 51].
Warsaw-Bielany (last observation from June 1974), Kaskada park. A recessive, threatened species, in urban green areas only in the transitional zone from urban wood to park.

Obrium cantharinum (L.) [15].
Kampinos Forest (Dziekanów Leśny), 16 July, 1972, 1 specimen caught by a light UV trap, leg. T. Plewka, coll. A. Jasiński.

Anisarthron barbipes (Schrank) [15].
Milanówek, Kampinos Forest (Dziekanów Leśny), 17 July, 1966, 1 specimen caught during alfalfa mowing, leg. T. Plewka, coll. A. Jasiński.

Xylotrechus antilope (Schönh.) [15, 21, 55].
Warsaw-Bielany.

Clytus tropicus Panz. [15, 47].
Warsaw-Bielany.

Chlorophorus varius (Müll.) [15, 21, 47].
Warsaw-Białołęka Dworska, Warsaw-Żerań (Piekiełko), second half of July. Several-year observations show that it is an expansive species in Mazovia.

Oplosia fennica (Payk.) [15].
Radziejowice near Mszczonów (oak-hornbeam forest and a park), Nieborów near Warsaw, Kampinos Forest (Debły). Larvae reared from lime and oak branches. Occurs in urban green areas.

Anaesthetis testacea (F.) [15, 47].
Warsaw-Saska Kępa, Warsaw-Wawer. In the latter case, an adult was reared from a pupa found on 21 April in an oak (*Quercus* sp.) branch.

Pogonocherus hispidulus (Pill.) [15].
Bulkowo near Pułtusk, adults reared from larvae found in trunks of spindle-tree (*Evonymus* sp.) and lime (*Tilia* sp.).

Exocentrus adspersus Muls. [15].
Warsaw-Bielany, adults several times reared from larvae found in branches and small trunks of oaks (*Quercus* sp.) on the upper Vistula terrace.

Stenostola ferrea (Schrank) [15].

Radziejowice near Mszczonów, Żbików near Pruszków, Warsaw-Łazienki park.

STANDS OF SOME OTHER SPECIES IN WARSAW

In addition, stands of some abundant or locally abundant species occurring in Warsaw are listed here:

Grammoptera ruficornis (F.).

Bielany, Ursynów, Łazienki. Adults reared from twigs of spindle-tree (*Evonymus* sp.) and hazel (*Corylus avellana* L.), also from alder buckhorn (*Frangula alnus* Mill) and rowan (*Sorbus aucuparia* L.) (Kampinos Forest, Radziejowice near Mszczonów), always from more or less wet places.

Allosterna tabacicolor (Deg) [15].

Bielany, Warsaw (without more detailed data), Łazienki.

Rhopalopus macropus (Germ.) [15, 47, 53].

Bielany, Cemetery of Soviet Soldiers, allotments and green areas of the housing estate Rakowiec (Warsaw-Ochota). Adults reared from larvae found in branches and trunks of hazel (*Corylus avellana* L.), in branches of Norway maple (*Acer platanoides* L.), box-elder (*Aeer negundo* L.), apple (*Malus domestica* Borb.), and pear (*Pirus communis* L.).

Exocentrus lusitanus (L.) [15].

Młociny, Ursynów, Łazienki park, Saxon Garden, Cemetery of Soviet Soldiers.

Tetrops praeusta (L.) [15, 47].

Młociny, Bielany, Miedzeszyn, Grochów, Botanical Garden, Frascati street, Cemetery of Soviet Soldiers, allotments and green areas of the housing estate Rakowiec (Ochota).

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Tab. 9. Check list of *Cerambycidae* species occurring in Warsaw and Mazovia

No.	○ — literature data ● — proved literature data + — unpublished data ? — doubtful information ! — brought with timber Species	Mazovia	Warsaw				
			suburban areas	parks	green areas in housing estates	town centre	other sampling areas
1	2	3	4	5	6	7	8
1	*Ergates faber* (L.)	●	+!	–	–	+!	○
2	*Prionus coriarius* (L.)	●	●	–	–	–	–
—	*Tragosoma depsarium* (L.)	–	–	–	–	○!	–
—	*Rhagium bifasciatum* F.	–	+!	–	–	–	○!
3	*Rhagium sycophanta* (Schrank)	+	●	–	–	–	–
4	*Rhagium mordax* (Deg.)	+	●	–	–	–	–
5	*Rhagium inquisitor* (L.)	●	●	–	–	–	+
6	*Rhamnusium bicolor* (Schrank)	●	●	–	–	○	–
7	*Stenocorus meridianus* (L.)	●	●	–	–	–	–

1	2	3	4	5	6	7	8
8	*Stenocorus quercus* (Gotz)	○	–	○	–	–	–
9	*Akimerus schaefferi* (Laich.)	○	–	–	–	–	–
10	*Gaurotes virginea* (L.)	●	–	–	–	–	–
—	*Acmaeops marginata* (F.)	○!	–	–	–	–	–
11	*Acmaeops pratensis* (Laich.)	–	○	–	–	–	–
12	*Acmaeops collaris* (F.)	○	●	+	–	–	–
13	*Cortodera femorata* (F.)	●	+	–	–	–	+
14	*Cortodera humeralis* (Scjall.)	●	●	–	–	–	–
15	*Grammoptera variegata* (Germ.)	●	○	–	–	–	–
16	*Grammoptera ustulata* (Schall.)	●	○	–	–	–	–
17	*Grammoptera ruficornis* (F.)	●	+	+	–	–	–
18	*Allosterna tabacicolor* (Deg.)	●	●	+	–	–	+
19	*Leptura rufipes* Schall.	○	○	–	–	–	–
20	*Leptura maculicornis* Deg.	●	●	–	–	–	–
21	*Leptura rubra* L.	●	●	–	+	–	–
22	*Leptura sanguinolenta* L.	○	–	–	–	–	–
23	*Leptura inexpectata* Jans. et Sjöb.	+	–	–	–	–	–
24	*Vadonia livida* (F.)	+	+	+	+	–	–
25	*Strangalia nigripes* (Deg.)	○	–	–	–	–	–
26	*Strangalia quadrifasciata* (L.)	●	●	–	–	–	–
27	*Strangalia maculata* (Poda)	●	○	–	–	–	–
28	*Strangalia aethiops* (Poda)	●	○	–	–	–	–
29	*Strangalia melanura* (L.)	●	+	–	–	–	–
30	*Strangalia bifasciata* (Mull.)	●	●	–	–	–	–
31	*Strangalia nigra* (L.)	●	–	–	–	–	+
32	*Strangalia revestita* (L.)	○	○	–	–	–	–
33	*Strangalia pubescens* (F.)	○	–	○	–	–	–
34	*Strangalia attenuata* (L.)	+	●	–	–	–	–
35	*Necydalis maior* L.	●	●	–	–	+	–
36	*Necydalis ulmi* Chevr.	○	–	–	–	–	–
37	*Spondylis buprestoides* (L.)	●	●	–	–	–	+!
38	*Nothorhina punctata* (F.)	○	–	–	–	○!	–
39	*Criocephalus rusticus* (L.)	●	●	–	–	+!	○!
40	*Criocephalus tristis* (F.)	●	–	–	–	+!	●!
41	*Asemum striatum* (L.)	●	+	–	–	–	–
42	*Tetropium castaneum* (L.)	+	–	–	–	–	+!
43	*Tetropium fuscum* (F.)	–	+	–	–	–	+!
44	*Cerambyx cerdo* L.	○	●	+	–	–	–
45	*Gracilia minuta* (F.)	○	–	–	–	–	–
46	*Obrium cantharinum* (L.)	●	–	–	–	–	–
47	*Molorchus umbellatarum* (Schreb.)	●	+	○	–	–	–
48	*Molorchus minor* (L.)	●	○	–	–	–	–
—	*Nathrius brevipennis* (Muls.)	○!	–	–	–	●!	–
49	*Aromia moschata* (L.)	●	●	○	–	–	–
50	*Anisarthron barbipes* (Schrank)	+	–	–	–	○	–
51	*Hylotrupes bajulus* (L.)	●	+	○	–	+	●
52	*Rhopalopus clavipes* (F.)	–	○	–	–	–	–
53	*Rhopalopus macropus* (Germ.)	–	●	●	+	–	–
54	*Rhopalopus femoratus* (L.)	○	–	–	–	–	–
—	*Semanotus undatus* (L.)	–	–	–	–	–	○!
55	*Callidium violaceum* (L.)	●	+	–	–	–	+!

1	2	3	4	5	6	7	8
56	*Pyrrhidium sanguineum* (L.)	+	+	–	–	○!	–
57	*Phymatodes testaceus* (L.)	●	●	–	–	·!	●!
58	*Phymatodes alni* (L.)	●	●	–	–	–	–
59	*Xylotrechus rusticus* (L.)	●	–	–	–	○!	–
60	*Xylotrechus arvicola* (Oliv.)	–	○	–	–	–	–
61	*Xylotrechus antilope* (Schönh.)	○	●	–	–	–	–
62	*Clytus tropicus* Panz.	–	●	–	–	–	–
63	*Clytus arietis* (L.)	●	●	–	–	–	–
—	*Cyrtoclytus capra* (Germ.)	–	?	–	–	–	–
64	*Plagionotus detritus* (L.)	●	●	–	–	–	+!
65	*Plagionotus arcuatus* (L.)	●	●	–	–	–	+!
66	*Chlorophorus varius* (Müll.)	●	+	–	–	–	–
67	*Chlorophorus herbstii* (Brahm.)	+	●	–	–	–	–
68	*Anaglyptus mysticus* (L.)	●	+	–	–	○	–
69	*Purpuricenus kaehleri* (L.)	●	–	–	–	–	–
70	*Lamia textor* (L.)	+	●	–	–	–	+
71	*Monochamus galloprovincialis* (Oliv.)	●	○	–	–	–	+!
72	*Monochamus sutor* (L.)	●	–	–	–	+!	+!
73	*Monochamus saltuarius* Gebler	○	–	–	–	–	–
—	*Monochamus sartor* (F.)	●!	+!	–	–	○!	–
74	*Mesosa curculionoides* (L.)	○	●	–	–	–	–
75	*Mesosa nebolosa* (F.)	+	+	–	–	–	–
76	*Oplosia fennica* (Payk.)	+	–	○	–	–	–
77	*Anaesthetis testacea* (F.)	●	●	–	–	○!	○!
78	*Pogonocherus hispidulus* (Pill.)	+	–	–	–	–	○
79	*Pogonocherus hispidus* (L.)	●	+	○	–	–	–
80	*Pogonocherus fasciculatus* (Deg.)	●	+	+	–	○!	●!
81	*Pogonocherus decoratus* Fairm.	○	●	–	–	+!	–
82	*Pogonocherus ovatus* (Goeze)	○	○	–	–	–	–
83	*Acanthoderes clavipes* (Schrank)	+	–	–	–	–	–
84	*Acanthocinus griseus* (F.)	●	○	–	–	●!	●!
85	*Acanthocinus aedilis* (L.)	●	●	–	+!	–	●!
86	*Liopus nebulosus* (L.)	●	●	+	–	+!	–
87	*Exocentrus adspersus* Muls.	○	+	–	–	–	–
88	*Exocentrus punctipennis* Muls.	–	+	–	–	–	–
89	*Exocentrus stierlini* Ganglb.	–	○	–	–	–	–
90	*Exocentrus lusitanus* (L.)	●	+	+	–	–	–
—	*Agapanthia dahli* (Richter)	–	?	–	–	–	–
91	*Agapanthia villosoviridescens* (Deg.)	+	●	–	–	–	–
92	*Agapanthia cardui* (L.)	–	○	–	–	–	–
93	*Saperda carcharias* (L.)	●	+	–	–	–	–
94	*Saperda populnea* (L.)	●	●	○	–	–	–
95	*Saperda scalaris* (L.)	●	●	–	–	–	+!
96	*Saperda punctata* (L.)	○	–	–	–	–	–
97	*Saperda octopunctata* (Scop.)	○	–	–	–	–	–
98	*Saperda perforata* (Pall.)	●	–	–	–	–	–
99	*Menesia bipunctata* (Zoubk.)	+	+	–	–	–	–
100	*Oberea oculata* (L.)	●	●	○	–	–	–
101	*Oberea linearis* (L.)	●	○	–	–	–	–
102	*Oberea erythrocephala* (Schrank)	●	–	–	–	–	–
103	*Stenostola ferrea* (Schrank)	+	–	+	–	–	–

1	2	3	4	5	6	7	8
—	*Stenostola dubia* (Laich.)	?	–	–	–	–	–
104	*Phytoecia coerulescens* (Scop.)	–	○	–	–	–	–
105	*Phytoecia nigricornis* (F.)	+	+	+	–	–	–
106	*Phytoecia icterica* (Schall.)	–	○	–	–	–	–
107	*Phytoecia pustulata* (Schrank)	●	●	–	–	–	–
108	*Phytoecia virgula* (Charp.)	●	●	+	–	–	–
109	*Tetrops praeusta* (L.)	●	●	+	+	–	–

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KÓZKOWATE (*COLEOPTERA, CERAMBYCIDAE*) WARSZAWY I MAZOWSZA

STRESZCZENIE

W ramach badań terenów zielonych aglomeracji warszawskiej przeprowadzono analizę występowania kózkowatych w zieleni miejskiej — parkach, osiedlach i centrum miasta. Stwierdzono występowanie 25 gatunków chrząszczy z tej rodziny wobec 109 notowanych z całego obszaru Mazowsza i 88 z terenów aglomeracji warszawskiej (w granicach administracyjnych).

Z opracowania wyłączono gatunki zawleczone na obszar Niziny Mazowieckiej i Warszawy wraz z drewnem budulcowym, opałowym lub o innym przeznaczeniu, oraz gatunki zalatujące na teren Warszawy, a także gatunki notowane dotychczas na podstawie błędnych oznaczeń.

Stwierdzono, obok trzykrotnie mniejszej liczby gatunków w zieleni miejskiej w porównaniu z terenami podmiejskimi Warszawy, także określone zmiany strukturalne w tym zespole. Zaobserwowano znaczny spadek udziału procentowego polifagów oraz oligo- i monofagów drzew i krzewów iglastych w ogólnej liczbie gatunków przy odpowiednim wzroście udziału oligo- i monofagów drzew i krzewów liściastych. Stwierdzono także spadek (blisko o połowę) udziału gatunków rozwijających się w pniach drzew na korzyść gatunków rozwijających się w gałęziach. Obserwowane zmiany wskazują na duże zaburzenie cyklu obiegu materii i energii w ekosystemie miejskim, bowiem kózkowate jako ksylofagi odgrywają istotną rolę we włączaniu w ten obieg trudno rozkładalnego drewna.

Zasadniczym czynnikiem ograniczającym presji urbanizacyjnej w stosunku do kózkowatych zieleni miejskiej jest przebudowa bazy pokarmowej larw. Spowodowały ją zabiegi pielęgnacyjne prowadzone w zieleni miejskiej (usuwanie starodrzewu i posuszu) oraz wprowadzanie do uprawy parkowej nowych, obcych gatunków drzew i krzewów ozdobnych. Jak wykazano, wprowadzenie monokultur trawiastych na trawnikach miejskich (redukcja bazy pokarmowej imagines gatunków mellitofagicznych) miało mniejsze znaczenie.

Przesuszenie klimatu miejskiego spowodowało wzrost udziału ciepłolubnych gatunków o zasięgach południowo-eurosyberyjskim i eurokaukaskim wśród kózkowatych zieleni miejskiej, oraz gatunków obojętnych w stosunku do wilgotności środowiska — interesujące jest jednak zachowanie się w zieleni miejskiej typu parkowego kilku gatunków wilgociolubnych.

Zespół kózkowatych zieleni miejskiej charakteryzuje się następującymi cechami — są to gatunki licznie lub masowo lokalnie występujące na Mazowszu, jednocześnie stabilne w stosunku do zmian środowiska wywołanych gospodarką ludzką.

Z grupy gatunków synantropijnych notuje się obecnie sporadycznie na terenie Warszawy jedynie *Hylotrupes bajulus*. Z grupy szkodników magazynowych zarejestrowano trzykrotnie zawleczenie *Nathrius brevipennis*, brak jest w związku z tym przesłanek do zaliczenia tego gatunku do stałych szkodników na terenie Warszawy.

ДРОВОСЕКИ (*COLEOPTERA, CERAMBYCIDAE*) ВАРШАВЫ И МАЗОВИИ

РЕЗЮМЕ

Из Мазовии известно 109 видов *Cerambycidae*. В пределах административных границ варшавской агломерации констатировали 88 видов, а на городских зеленых территориях — 25 видов. Под влиянием урбанистического пресса уступают прежде всего полифаги, а также олигофаги и монофаги хвойных деревьев и виды, личинки которых развиваются в стволе дерева. Не наблюдали существенных различий в процентном содержании имаго, питающихся корой и древесиной, и видов-меллитофагов под влиянием урбанизационного пресса. Сообщество дровосеков городской зелени состоит из видов с широким диапазоном терпимости по отношению к влажности среды, многочисленных или местами массовых в Мазовии, с давно устабилизированным распространением в этом регионе. По сравнению с внегородскими территориями в городе наблюдали также рост процентного соотношения термофилов с южно-европейско-сибирским и европейско-кавказким ареалом. Из группы синантропных видов, вредителей хозяйства спорадически встречался *Hylotrupes bajulus*.