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**PHYTOSOCIOLOGICAL CLASSIFICATION OF HABITATS
 OF THE FAUNA OF WARSAW SURROUNDINGS**

ABSTRACT

The aim of the paper is to classify terrestrial habitats of the fauna of Warsaw surroundings, on the basis of the vegetation diversity analysis. Abiotic environment is classified according to soil moisture and fertility. A scheme for the classification of the abiotic habitat was obtained by setting up and analysing the diversity of potential plant communities in the region. The obtained scheme of habitat variability was a basis to show the site amplitude for plant communities of various types.

PROBLEMS AND PURPOSE

In faunistic studies, like in floristic ones, an adequate description of living conditions for a given species is of great importance. The knowledge of habitat conditions enables us not only to get a deeper insight into the ecology of a species but also to analyse faunistic data from the point of view of the spatial distribution of various species, to analyse their relation to definite environmental factors, or to recognize the patterns of their grouping. Since the spatial structure of the biosphere is largely formed by the vegetation, classification of animal habitats can be based on plant diversity, as the vegetation

- reflects conditions of the abiotic environment (climate, water relations, soil type, and others); in addition, it consists of immobile organisms, thus easy to observe;
- forms specific environmental conditions through the modification of primary features of the abiotic environment (e.g. overshadowing, modification of air humidity and temperature, formation of humus), and also through its existence itself (e.g. providing shelters);
- provides food for animals.

Ecosystems are habitats for most of animal species. Spatial form of terrestrial ecosystems is due to plant communities (phytocoenoses). Thus it can be accepted that a uniform classification of animal habitats, based on the diversity of plant communities, will show a relatively large range of

applicability. Certainly, such a classification cannot be used in all cases. First of all, it cannot be used in terrains without vegetation, thus it cannot be used to characterize the habitats of animals living in buildings. Moreover, it cannot be used to characterize the habitats of animal parasites, and in some other cases.

As these considerations show, the aim of the present paper is to classify plant communities as the basic component of animal habitats.

MAIN FACTORS RESPONSIBLE FOR PLANT DIVERSITY

Many factors are responsible for typological and spatial differentiation of the vegetation. They can be classified into following groups: climatic-historical factors causing regional differences between groups of habitats; site factors resulting from local differentiation of the Earth surface; dynamic-successional factors; biocoenotic factors, and factors external in relation to the habitat (e.g. anthropogenic pressure), disturbing or opposing the natural processes of plant development.

The state of vegetation at any point of the Earth is a result of the joint action of all these factors, in particular cases some of them being more or less important. Below it will be discussed to what degree the effects of the particular factors mentioned above are taken into account in the classification of plant cover for the needs of faunistic studies.

Climatic and historical factors responsible for macrogeographical plant variety are taken into account by limiting the classification to a definite region. It is assumed that the plant diversity of this region is sufficiently uniform.

The classification of habitats in the present paper covers the region of central Poland and, more precisely, the areas where beech, spruce and fir do not grow under natural conditions. In this area there are no calcareous rocks, which to some extent determines also the diversity of plant communities.

The terrain satisfying these criteria is approximately delimited by the line Bydgoszcz–Grudziądz–Mława–Łomża–Siemiatycze — state frontier — Chełm–Puławy–Radom–Łódź–Konin–Bydgoszcz. On the basis of the physico-geographical division of Poland developed by Kondracki [3, 4], it can be accepted that the present classification is valid for the following meso-regions: 314.72, 314.73, 314.82, 314.83, 315.21–24, 315.26, 315.35, 315.36, 315.55, 315.57, 318.14, 318.15, 318.61–67, 318.71–79, 318.83–86, 318.91–98, 845.11–16. It should be noted that it is strictly valid for such regions as the North-Mazovian Lowland (318.6), Central-Mazovian Lowland (318.7) and South-Podlasiian Lowland (318.9).

Among factors determining the state of vegetation and related to differences in site conditions, soil fertility and soil moisture are considered in the present paper.

The remaining factors influencing the vegetation are considered jointly, through their effects on the vegetation structure. It has been assumed that it is less important whether a plant community is developed as a result of succession or under the pressure of external factors transforming the vegetation. The important thing is the character of the community from the point of view of its structural specificity. Consequently, plant communities have been classified into a number of basic types according to their physiological-structural features, and within these types, plant communities controlled by different factors have been distinguished.

SCHEME FOR THE DIVERSITY OF HABITATS OF PLANT COMMUNITIES

As it is known, the specificity of a plant community depends on many factors related to site conditions such as soil fertility and occurrence of particular nutrients in it, soil moisture and water relations, microclimate, and others [14, 15]. It is shown that soil fertility and water relations are most important among them. These factors can be considered as two independent variables, to which the whole diversity of plant communities in a given region can be related. A classification of the so-called habitat forest types [13] is a practical application of this approach. It can be well correlated with phytosociological diversity of plant communities and, in particular, of forests [10].

In the present paper, habitats are classified according to gradients of soil fertility and moisture, it is in the case of the forest classification mentioned above. However, this is not an *a priori* classification but an inductive one. The following procedure was followed. It has been assumed that the specificity of the habitat is best reflected by the diversity of stabilized (climax) communities. A check list has been prepared of natural climax communities or the so-called potential plant communities [16] of Warsaw surroundings, using phytosociological-cartographical descriptions [7, 8]. Then, the ecological amplitude of particular species was determined in relation to soil fertility and moisture, basing this on the phytosociological literature. Finally, the main site factors were classified, according to phytosociological variety of natural plant communities. This classification is presented in Fig. 1.

Six classes of soil moisture and five classes of soil fertility were distinguished. This is in accordance with similar classifications for other regions [2].

The following classes of the site fertility were distinguished:

A — extremely oligotrophic sites, corresponding to the class of coniferous forests in the forest typology. Under regional conditions, this habitat consists of sites on loose sands (genetically belonging to dune sands, outwash sands, diluvial river sands, and others) and also on raised bogs. In mineral soils of these sites distinct podzolization processes occur. The pH of upper soil layers varies from 3 to 4.5.

- B — light mesotrophic sites, corresponding to the class of mixed coniferous forests in the forest typology. The substratum can be made up of coarse sandy soils or of the poorest sandy loam soils, or of the peat of transitional moors. The podzolization processes in mineral soils are weakly marked. pH about 5.
- C — heavy mesotrophic sites, corresponding to the class of mixed deciduous forests in the forest typology. They usually occur on sandy loam soils and rich sand and gravel soils, also on fens. Soil pH 5.5—6. On rather dry sites the dominant soil processes are brownging or lessivage.
- D — eutrophic sites, corresponding to the class of deciduous forests in the forest typology. They are generally associated with fine soil types and also with richest fens. Soil pH usually neutral.
- E — extremely eutrophic sites, occurring on richest soil types such as boulder clay, clay, fine alluvial soil. Soil pH brown oil, black turf soil, browning alluvial soil neutral or weakly alkine.

The classification according to soil moisture involves the following classes:

- I — extremely dry sites. In the region concerned these may be sites on loose, generally dune sands, without or with a very thin humus layer. Water-table is very deep, water-holding capacity at minimum.
- II — slightly moist sites. Here there are included sites not influenced by ground waters or stagnant rain waters, since they are well drained. Thus these are sites with a washing type of economy. Soil water-holding capacity is low but conspicuously higher than in the preceding class. Habitats on sand or gravel soils are more frequent here than those on loam soils.
- III — moist sites. Here are included sites not influenced by ground waters, but because of a poorer drainage or due to a high water-holding capacity water is not a limiting factor to plants. Such moisture conditions can occur in different soil types.
- IV — moderately wet sites. These sites are influenced by ground waters, which is reflected by gley processes in the upper horizons of the soil profile. Usually some hydrophilous plants grow there. On these sites water-table is at a depth of several ten centimetres, only periodically higher.
- V — wet sites. These are sites where ground waters (occasionally surface waters) have a major effect on soil processes. Water-table is usually near to the soil surface (a dozen or so centimetres deep) and only during the periods of drought it can drop to a depth of 40—50 cm. During wet periods water-table can rise above the soil surface for a short time. Here also riverine sites are included, flooded each year. Plant communities covering these sites are largely dominated by hydrophilous species.
- VI — swamp sites. For a substantial part of the year they are submerged (often from autumn through early summer), and consequently peat-

forming processes occur there. The soil of the sites of this category is various kinds of peat.

As it can be seen from Fig. 1, the classification of sites according to two factors does not separate natural plant communities completely; in some "squares" more than one community can fall. However, this is the simplest possible classification for practical use.

Soil moisture and fertility are considered to be independent variables. But it has been shown that in fact they are not quite independent. The type of soil, usually conditioning fertility, can also influence water relations. Figure 1 shows that the main direction of the variability in plant communities follows the diagonal of the scheme—from poor and rather dry sites to fertile and wet sites. It should be noted that in the region under study they are no fertile and dry sites. Such sites can be found in other regions of Poland, on calcareous rocks.

PHYSIOGNOMICAL-FORMATIONAL CLASSIFICATION OF PLANT COMMUNITIES

As it has already been stated, dynamic-successional processes on the one hand, and external factors on the other, account for differences in vegetation in particular places, even under identical abiotic conditions. The physiognomical-formational classification reflects the differences in vegetation, caused by these factors. The following plant communities have been distinguished: natural forests, transformed forests, clearings, scrub, xerothermal grasslands, short-herb or shrublet communities of seminatural character, meadows and pastures, weed communities in grain crops, weed communities in root crops, orchards and vegetable crops, ruderal plants, and urban green areas.

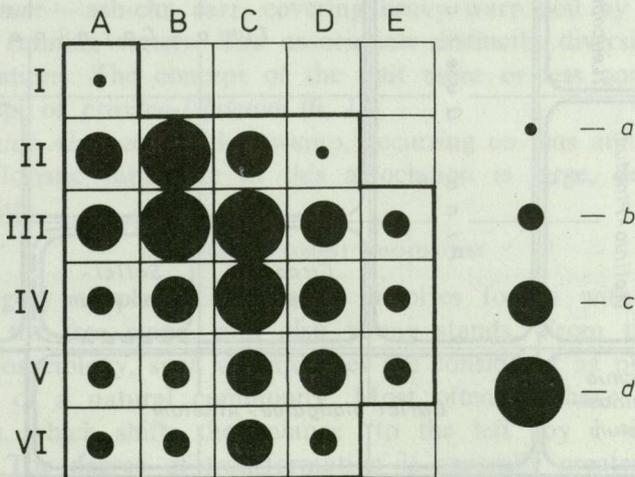


Fig. 1. Frequency of the occurrence of sites.

a — rare, b — rather uncommon, c — common, d — very common.

The variety of plant communities in each of the vegetation types will be analysed in detail in relation to the site classification based on moisture and fertility conditions. The distinguished types of plant communities generally represent so-called syntaxonomic units, or phytosociological units of the classification of plant communities developed by Braun-Blanquet [1]. The syntaxonomic approach in this paper generally after W. Matuszkiewicz [9].

NATURAL FOREST COMMUNITIES

The classification of natural forest communities into associations is presented in Figure 2. They include:

Cladonio-Pinetum — dry pine forest with a large proportion of epigeal lichens.

For the concept of the unit see [11, 12]; synonyms: *Leucobryo-Pinetum cladonietosum* and *Peucedano-Pinetum cladonietosum* [9].

	A	B	C	D	E
I	<i>Cladonio-Pinetum</i>				
II	<i>Peucedano-Pinetum</i> (<i>Leucobryo-Pinetum</i>)	<i>Pino-Quercetum</i>	<i>Potentillo-Quercetum</i>		
III			<i>Tilio-Carpinetum</i>		
IV	<i>Molinio-Pinetum</i>				<i>Ficario-Ulmetum</i>
V			<i>Circae-Alnetum</i>	<i>Salici-Populetum</i>	
VI	<i>Vaccinio uliginosi-Pinetum</i>		<i>Carici elongatae-Alnetum</i>		

Fig. 2. Variety of natural forest communities.

Peucedano-Pinetum — subcontinental moist pine forest. It occurs in northern parts of the region (North-Mazovian Lowland, Warsaw basin, Płock basin, Toruń basin, Chełm-Dobrzyń Lake District), and in eastern parts (Polesie Podlaskie). In the narrow sense [11] it corresponds to *Peucedano-Pinetum typicum* [9] and to regional forms of *Vaccinio myrtilli-Pinetum* [12].

Leucobryo-Pinetum — suboceanic moist pine forest, replacing the preceding association in the southern part of the region. A concept similar to that of the preceding association.

Molinio-Pinetum — wet pine forest. The association characterized like the *Pinus-Molinia* community [11]; corresponds to *Leucobryo-Pinetum molinietosum* and *Peucedano-Pinetum molinietosum* [9], and to *Vaccinio myrtilli-Pinetum molinietosum* [12].

Vaccinio uliginosi-Pinetum — bog pine forest on peat [9, 11, 12].

Pino-Quercetum — oak-pine mixed forest. The association with a very large site amplitude [9, 12], diversified into subassociations, mainly according to the soil moisture.

Potentillo-Quercetum — xerothermal oak forest, generally occurs on gravel mounds of morainic origin. The association with a relatively narrow site amplitude.

Tilio-Carpinetum — oak-lime-hornbeam forest. It can grow on sites of different types, so it is diversified into many subassociations. The regional concept of the association [9, 12] corresponds to the regional forms of *Quercu-Carpinetum* in the large sense.

Circaeo-Alnetum — alder-ash carr, covering a little marshy valleys of small water ways [6, 9, 12].

Salici-Populetum — willow-poplar carr, occurring on sandy alluvial soils in flood plains of large rivers [6, 12]. Synonym — *Salicetum albo-fragilis* [9].

Ficario-Ulmetum — ash-elm carr, covering heavy warp soil by large rivers or small running waters. The association distinctly diversified in two subassociations. The concept of the unit more or less corresponds to the concept of *Fraxino-Ulmetum* [9, 12].

Carici elongatae-Alnetum — alder swamp, occurring on fens and transitional moors. Floristic variability of this association is large, depending on soil fertility.

TRANSFORMED FOREST COMMUNITIES

This category of plant communities involves forests with a changed structure of the tree stand, and also young stands. From the point of view of phytosociology, such communities are considered as phases of the degeneration of a natural community. Most often we have to do with pine cultures, which shifts the balance “to the left” by 1—2 classes of site fertility. The degree of transformation is generally greater for young stands than for older ones, and it also increases for successive generations of the pine stand in a given place.

When the tree stand is thinned, the floristic composition is usually shifted "up" for moist sites and "down" for wet sites. Figure 3 shows the site amplitude of more common tree species. On this basis it can be determined which stands can be met on particular site types.

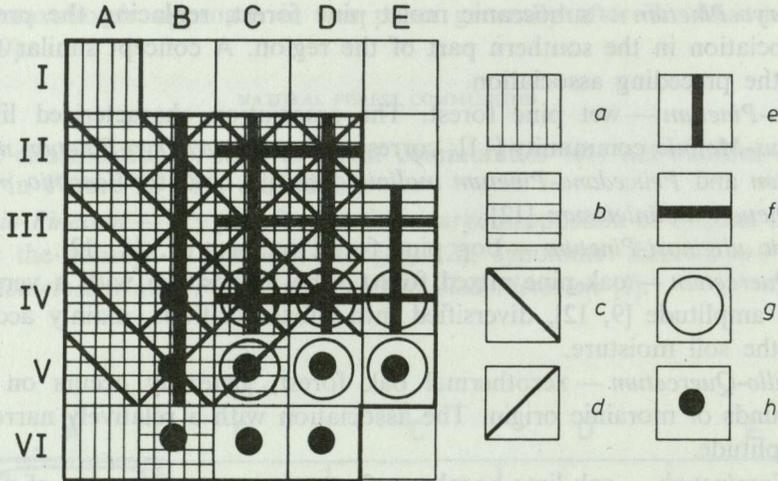


Fig. 3. Species diversity of tree stands in forest cultures.

a—Scots pine (*Pinus silvestris*); b—birches (*Betula verrucosa*, *B. pubescens*); c—Norway spruce (*Picea excelsa*); d—aspen (*Populus tremula*); e—oaks (*Quercus robur*, *Q. sessilis*); f—small-leaved lime (*Tilia cordata*); g—ash (*Fraxinus excelsior*), elms (*Ulmus* sp.), poplars (*Populus* sp.) except for aspen (*Populus tremula*); h—alder (*Alnus glutinosa*)

FOREST CLEARING COMMUNITIES

Clearing communities are short-lasting stages of plant regeneration soon after cutting trees off. In the series of secondary succession, they precede some kinds of scrub communities. The variety of clearing communities is presented in Figure 4.

SCRUB COMMUNITIES

Phytosociological diversity of scrub communities is shown in Figure 5. Shrubby vegetation is the successional stage most often developing into different forest communities. Dynamic relationships between scrub communities and corresponding forest communities are usually readily seen in their floristic composition. From the point of view of economy, scrub communities are generally wastelands.

XEROTHERMAL GRASSLAND COMMUNITIES

Xerothermal grasslands are defined as the communities of herbaceous plants which generally do not form close sward, associated with dry and well insolated sites. A relatively large proportion of these communities can

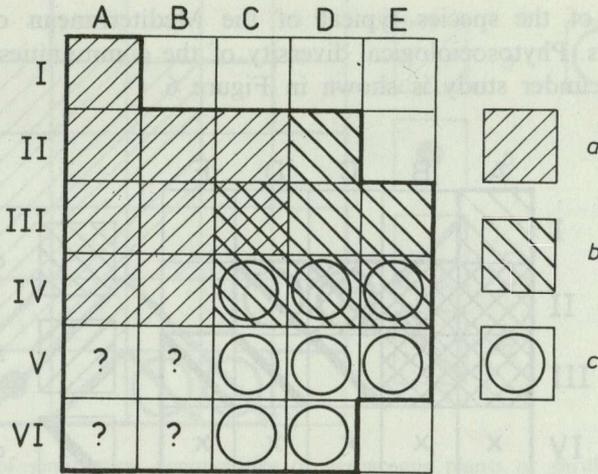


Fig. 4. Variety of clearing communities.

a — *Epilobio-Senecionetum* and other associations of the alliance *Epilobion angustifolii*, class *Epilobietea angustifolii*; b — communities of the alliance *Fragarion vescae* (= *Atropion belladonnae*), class *Epilobietea angustifolii*; c — communities of the suballiance *Alliarion*, alliance *Eu-Arction*, class *Arthemisietea* (e.g. *Eupatorietum cannabini* association)

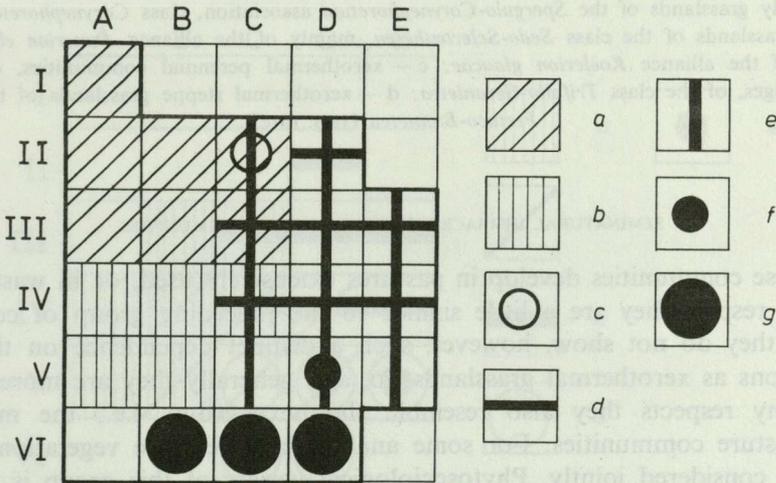


Fig. 5. Variety of scrub communities.

a — open *Sarothamnus scoparius* scrub on wasteland and juniper (*Juniperus communis*) scrub; b — open *Frangula alnus* scrub on clearings and forest wasteland; c — xerothermal scrub of forest edges or mid-field, belonging to the alliance *Berberidion*, order *Prunetalia*, class *Quercio-Fagetea*; d — scrub of forest edges or mid-field, of the *Carpino-Prunetum* association, alliance *Rubion subatlanticum*, order *Prunetalia*; e — shrub communities on old clearings, of the *Rubo-Salicetum caprae* association (alliance *Sambuco-Salicion*, order *Prunetalia*); f — riverine willow scrub of the *Salicetum triandro-viminalis* association, class *Salicetea purpureae*; g — swamp willow scrub of the *Salicetum pentandro cinereae* association, class *Alnetea glutinosae*

be made up of the species typical of the Mediterranean or Pontic-Pannonian regions. Phytosociological diversity of the communities of this group in the region under study is shown in Figure 6.

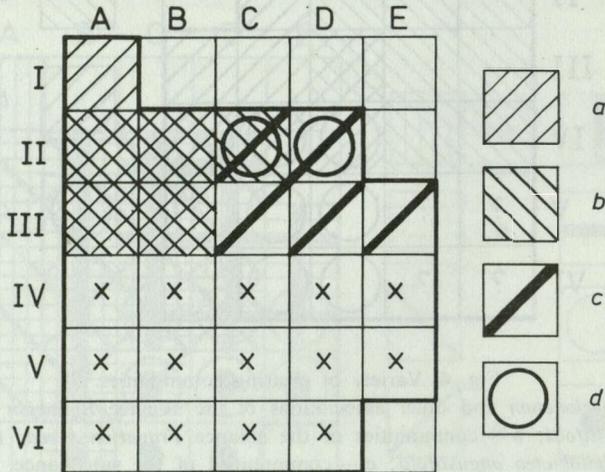


Fig. 6. Variety of xerothermal grassland communities.

a — sandy grasslands of the *Spergulo-Corynephorum* association, class *Corynephoretea*; b — sandy grasslands of the class *Sedo-Scleranthetea*, mainly of the alliance *Armerion elongatae*, rarely of the alliance *Koelerion glaucae*; c — xerothermal perennial communities, often at forest edges, of the class *Trifolio-Geranietea*; d — xerothermal steppe grasslands of the class *Festuco-Brometea* (very rare!)

SEMINATURAL HERBACEOUS AND SHRUBLET COMMUNITIES

These communities develop in pastures extensively used, or in wasteland. In this respect they are a little similar to the preceding group of communities; they do not show, however, such a distinct dependence on thermal conditions as xerothermal grasslands do, and generally they are more close. In many respects they also resemble the next group, i.e., the meadow and pasture communities. For some analyses all the three vegetation types can be considered jointly. Phytosociological variety of this group is shown in Figure 7.

MEADOWS AND PASTURES

These are grassland communities permanently mown or grazed by livestock. They develop distinct sward. Generally they are fertilized and from time to time even ploughed and sown with desirable plant species. These communities are of great economic importance. Their phytosociological diversity is shown in Figure 8.

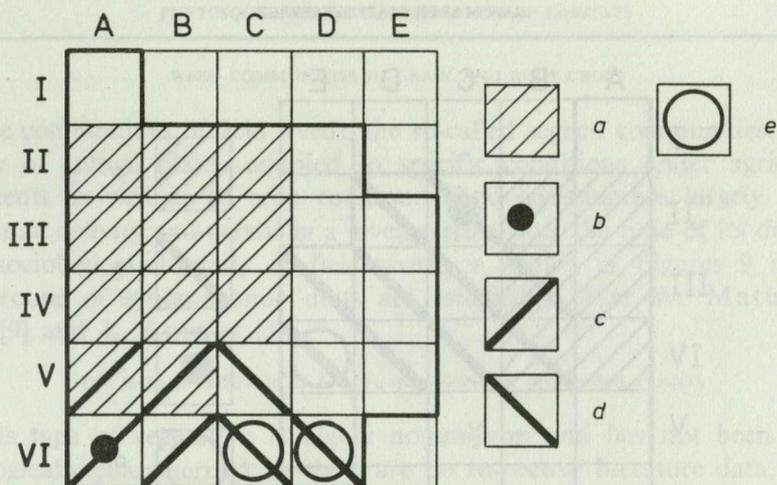


Fig. 7. Variety of seminatural communities of herbaceous plants or shrublets, growing in extensively utilized places.

a — heaths of the class *Nardo-Callunetea* (mainly *Arctostaphylo-Callunetum* association); b — communities of raised bogs of the class *Oxycocco-Sphagnetetea* (mainly *Sphagnetum medio-rubelli* association); c — acidophilous short-sedge meadows of transitional moors, of the order *Scheuchzerietalia palustris*, class *Scheuchzerio-Caricetea fuscae*; d — short-sedge meadows of transitional moors, of the orders *Caricetalia fuscae* and *Caricetalia devallianae*, class *Scheuchzerio-Caricetea fuscae*; e — communities of tall sedges covering fens, of the alliance *Magnocaricion*, class *Phragmitetea*

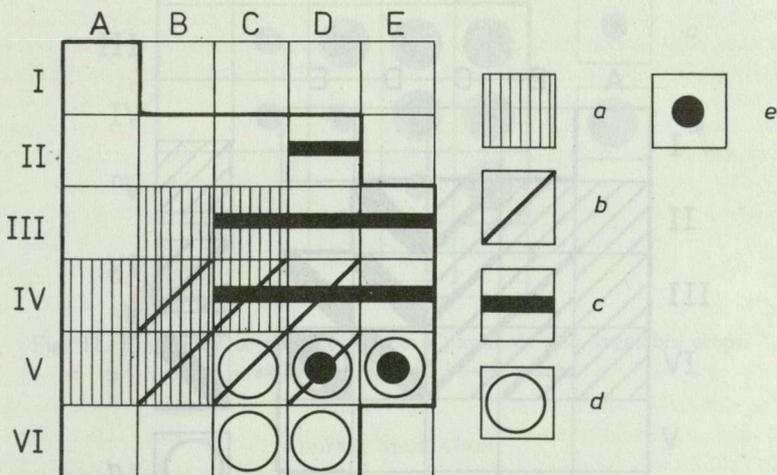


Fig. 8. Variety of meadow and pasture communities.

a — poor meadows and pastures dominated by *Nardus stricta*, of the alliance *Nardo-Galion*, class *Nardo-Callunetea*; b — unfertilized meadows, mown once a year, of the alliance *Molinion*, class *Molinio-Arrhenatheretea* (e.g. *Molinietum medioeuropaeum* or *Junco-Molinietum* associations); c — fertile meadows and pastures of the order *Arrhenatheretalia*, class *Molinio-Arrhenatheretea* (e.g. *Arrhenatheretum elatioris* association); d — wet meadows mown several times a year, of the alliance *Calthion*, order *Molinietalia*, class *Molinio-Arrhenatheretea*; e — meadow and pasture communities in river flood plains, of the alliance *Agropyro-Rumicion* *crispi*, class *Plantaginetea maioris* (e.g. *Rumici-Alopecuretum* association)

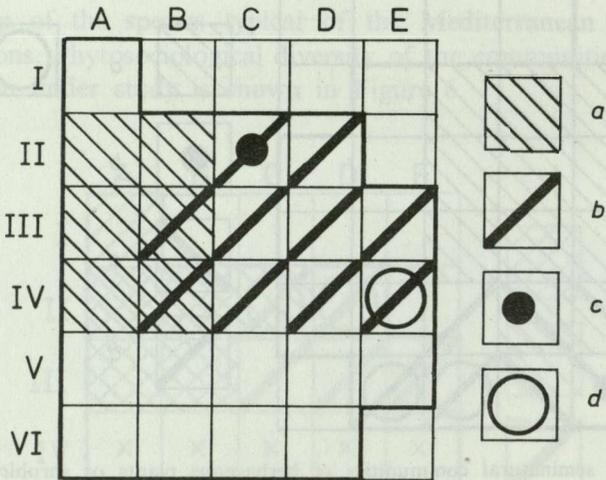


Fig. 9. Variety of weed communities in grain crops.

a — *Teesdaleo-Arnoseridetum minimae* (= *Arnoserido-Scleranthetum*) association of the alliance *Arnoseridion minimae*, class *Secalietea*; b — *Vicietum tetraspermae* association of the alliance *Aphanion*, class *Secalietea*; c — *Papaveretum argemones* association of the alliance *Aphanion*; d — *Euphorbio-Melandrietum* (= *Vicietum tetraspermae*, variant with *Melandrium noctiflorum*) association of the alliance *Aphanion*

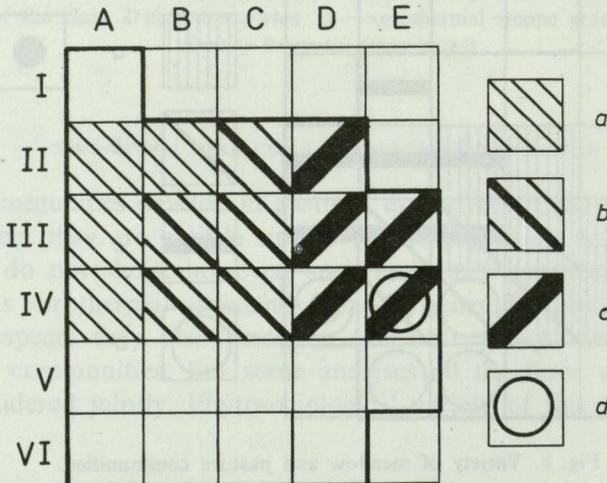


Fig. 10. Variety of weed communities in roots crops.

a — *Digitarietum ischaemi* association of the alliance *Panico-Setarion*, class *Chenopodieta*; b — *Spergulo-Echinochloëtum* (= *Echinochloo-Setarietum*) association of the alliance *Panico-Setarion*; c — *Lamio-Veronicetum polittae* association of the alliance *Eu-Polygono-Chenopodion*, class *Chenopodieta*; d — *Oxalido-Chenopodietum* association of the alliance *Eu-Polygono-Chenopodion*

WEED COMMUNITIES IN GRAIN AND ROOT CROPS

The communities of field weeds, the so-called segetal communities, consist mainly of annual plants adapted to specific conditions under agricultural treatments as well as to crop rotation. Weed communities largely depend on human activity and persist in a given terrain over the time of its duration. Phytosociological diversity of field weeds is shown in Figures 9 and 10. The groups of syntaxonomic units are established after W. Matuszkiewicz [9] and J. Kornaś [5].

ORCHARDS, VEGETABLES AND PLANTATIONS OF PERENNIAL PLANTS

This type of vegetation is highly nonuniform and has not been phytosociologically characterized, as there are no respective literature data. It was only possible to determine the frequency of its occurrence on particular site types, relying on the author's own experience (Fig. 11).

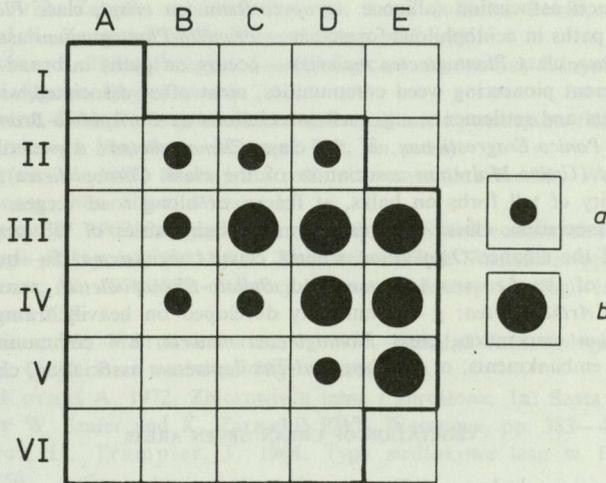


Fig. 11. Frequency of the occurrence of orchards and vegetable crops.
 a — rather unfrequent, b — frequent

RUDERAL VEGETATION

Ruderal communities develop in various situations where the effect of man is pronounced but not consciously directed towards vegetation control. Thus ruderal plants usually grow near buildings, at fences (mainly in villages), along roadsides, balks, on rubbish heaps, in heavily trampled areas, etc. Ruderal communities generally consist of perennial plants, often photophilous and nitrophilous. They are greatly variable in space so that several syntaxonomic units can be met within a small area. Phytosociological diversity of ruderal vegetation is shown in Figure 12.

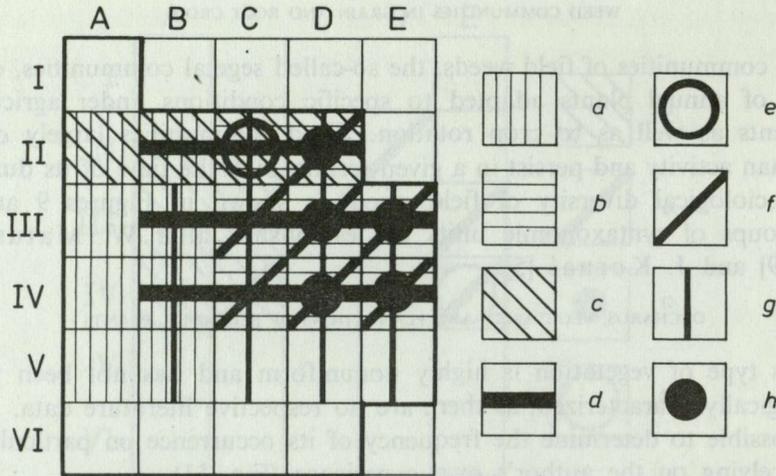


Fig. 12. Variety of ruderal plant communities.

a — *Juncetum macri* association (alliance *Agropyro-Rumicion crispi*, class *Plantaginetea maioris*) — occurs on paths in acidophilous forests; b — *Prunello-Plantagineteum* association (alliance *Polygonion aviculare*, class *Plantaginetea maioris*) — occurs on paths in broad-leaved deciduous forests; c — different pioneering weed communities, most often associated with railway tracts, road embankments and settlements, e.g. such associations as *Corispermum-Brometum*, *Sisymbrium sophiae*, or *Panico-Eragrostietum*, of the class *Chenopodietea*; d — nettle community at fences in villages (*Urtico-Malvetum* association of the class *Chenopodietea*), and also nitrophilous community of tall forbs on balks, at fences, or along road verges, of the *Tanacetum-Arthemisietum* association, class *Arthemisieteae*; e — communities of tall perennial plants on insolated sites, of the alliance *Onopordion acanthi*, class *Arthemisieteae*; f — burdock communities near farms, of the *Leonuro-Arctietum* and *Balloto-Chenopodietum* associations, alliance *Eu-Arction*, class *Arthemisieteae*; g — community developed on heavily trampled sites, of the *Lolio-Plantagineteum* association, class *Plantaginetea maioris*; h — community developed on rubbles and clay embankments, of the *Senecioni-Tussilaginetum* association, class *Chenopodietea*

VEGETATION OF URBAN GREEN AREAS

To this category belong different types of cultivated plants, mainly decorative, such as lawns, tree rows, hedges, etc. The vegetation of allotments should not be included here, neither ruderal plants growing in towns, nor natural parks, i.e., similar to the forest of a corresponding type. At such an approach, any phytosociological characteristics of the urban green cannot be given. This vegetation can only be characterized by the type of cultivation treatments or by the species composition.

CONCLUSIONS

The general conclusion of this contribution is that the possibility to determine habitat conditions for animals on the basis of phytosociological plant diversity increases in direct proportion to the spontaneous develop-

ment of vegetation. The more natural character of the vegetation, the better it reflects the specificity of the site and, what is more, contributes to a larger degree to landscape shaping.

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FITOSOCJOLOGICZNA KLASYFIKACJA SIEDLISK FAUNY OKOLIC WARSZAWY

STRESZCZENIE

Celem opracowania jest klasyfikacja lądowych siedlisk zwierząt na podstawie fitosocjologicznej analizy zróżnicowania roślinności. Opracowana klasyfikacja może mieć zastosowanie w badaniach faunistycznych w centralnej Polsce, przede wszystkim w regionach: Nizina

Północnomazowiecka, Nizina Środkowomazowiecka i Nizina Południowopodlaska, a także na przyległych terenach.

Zbiorowiska roślinne podzielone zostały na 12 głównych typów, w oparciu o kryteria fizjonomiczno-formacyjne. Wydzielono: naturalne zbiorowiska leśne, zbiorowiska leśne przekształcone, zbiorowiska porębowe, zarośla, murawy, półnaturalne zbiorowiska zielne i krzewinkowe, zbiorowiska łąk i pastwisk, zbiorowiska chwastów upraw zbóż, zbiorowiska chwastów upraw roślin okopowych, roślinność sadów i upraw warzyw, zbiorowiska ruderalne oraz roślinność zieleni miejskiej. W obrębie tych typów przedstawiono zróżnicowanie roślinności na najważniejsze jednostki syntaksonomiczne oraz podano ich wymagania w stosunku do siedliska abiotycznego.

Zróżnicowanie warunków siedliska abiotycznego sprowadzone zostało do dwu zmiennych, wilgotności i żyzności gleby, co umożliwiło przeprowadzenie prostej klasyfikacji siedlisk roślinnych. Klasyfikację siedlisk na klasy wilgotności (na rysunkach oś pionowa) i żyzności (na rysunkach oś pozioma) uzyskano przez zanalizowanie zróżnicowania naturalnych zbiorowisk leśnych czyli tzw. potencjalnych zbiorowisk roślinnych regionu [8, 17]. Obraz tego zróżnicowania przedstawia fig. 1.

Uproszczona klasyfikacja siedlisk zbiorowisk roślinnych podobna jest do klasyfikacji siedlisk stosowanej w leśnictwie [10, 13], a także do analogicznych prób dokonywanych w innych regionach [2]. Schemat zróżnicowania siedliska abiotycznego w warunkach lokalnych może być stosowany do analizy wymagań poszczególnych zbiorowisk roślinnych każdego z wyróżnionych uprzednio fizjonomiczno-formacyjnych typów roślinności (fig. 1 oraz 3—12).

Roślinność dobrze odzwierciedla zróżnicowanie środowiska abiotycznego i równocześnie sama jest ważnym składnikiem przestrzeni geograficznej, stąd określenie warunków występowania poszczególnych gatunków zwierząt poprzez ustalenie specyfiki zbiorowiska roślinnego, w którym one żyją, jest nie tylko poprawne teoretycznie lecz również możliwe praktycznie.

ФИТОСОЦИОЛОГИЧЕСКАЯ КЛАССИФИКАЦИЯ БИОТОПОВ ФАУНЫ ВАРШАВЫ

РЕЗЮМЕ

Целью обработки является классификация наземных биотопов фауны в окрестностях Варшавы на основании анализа дифференциации растительного покрова. Произвели типологию абиотической среды, принимая в качестве ведущих факторов — влажность и плодородие почвы. Схему классификации абиотической среды получили путем сопоставления и анализа потенциальных растительных сообществ региона. Полученная схема изменчивости биотопов составляла основу для представления амплитуды растительных сообществ разных типов, по биотопам.