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PRODUCTIVITY INVESTIGATION OF TWO TYPES OF MEADOWS IN THE VISTULA VALLEY

I. GEOBOTANICAL DESCRIPTION AND PRIMARY PRODUCTION

(Ekol. Pol. 19 : 93–106). The study contains a comparative presentation of the results of studies on the geobotanical characters and primary production of two different types of meadows. Attention is drawn to the considerable differences between the meadows in respect of habitat conditions, floristic composition, production value, domination of species and dynamics of plant biomass formation during the growing season. These meadows belong to two associations: *Stellario-Deschampsietum* (order *Molinietalia*) and *Arrhenatheretum medioeuropaeum* (order *Arrhenatheretalia*).

INTRODUCTION

Studies of a complex character in which specialists in different scientific fields participate must also include elaborations of the naturalistic aspects of the habitats examined. The best type of such elaborations are gebotanical descriptions. Vegetation, inseparably linked by ties of continuous inter-action with the complex of habitat factors, forms the best exponent of the other elements of the biogeocenosis, and it is for this reason that I have drawn attention primarily to vegetation. This publication is mainly factual in character. In addition to selected questions of geobotany it includes a short comparative prasentation of results relating to primary production.

Geobotanical description of the meadows examined

The studies were carried out in three meadow associations near Warsaw. The first community is included in the composition of the Strzeleckie Meadows complex, which is situated in the northeast part of the Kampinos Forest in the Laski forest administration district. The association in which we are interested in the Strzeleckie Meadows (indicated by the symbol „Strzeleckie Meadows") was identified as the *Stellario-Deschampsietum* association (Traczyk 1966). The remaining meadows (given the abbreviated names „Kazuń I" and „Kazuń II") are situated in the vicinity of Kazuń Nowy (Nowy Dwór Mazowiecki administrative district). They constitute an almost identical type of meadow, similar to the *Arrhenatheretum medioeuropaeum* association. The systematic position of these meadows is given below:

Strzeleckie Meadows
Association: *Stellario-Deschampsietum* Freitag 1957
Alliance: *Molinion coeruleae* W. Koch 1926
Order: *Molinietalia* W. Koch 1926
Class: *Molinio-Arrhenatheretea* Tx. 1937

Kazuń I and Kazuń II
Association: *Arrhenatheretum medioeuropaeum* (Br. – Bl. 1919) Oberd. 1952
Alliance: *Arrhenatherion* Pawł. 1928
Order: *Arrhenatheretalia* Pawł. 1928
Class: *Molinio-Arrhenatheretea* Tx. 1937

The Strzeleckie Meadows association – as can be seen from the abovebelongs to the group of wet meadows (order *Molinietalia*), and the other two meadows at Kazuń to fresch meadows with optimum humidity (order *Arrhenatheretalia*). On the basis of the systematic appurtenance alone it is possible to draw conclusions as to the scale of differences which must occur between the communities of the Strzeleckie Meadows and those of the meadows at Kazuń. The latter – as previously stated – belong to the same association and therefore the ecological relations as a whole will be similar, and in many respects almost identical. I shall therefore concentrate attention on the differences between the *Stellario-Deschampsietum* community from the Strzeleckie Meadows and *Arrhenatheretum medioeuropaeum* from the Kazuń meadows, taking the latter as a uniform type of community. These differences will relate to many characters such as floristic composition, soil and geological relations, genesis and directions of development, type of cultivation, problems connected with productivity etc. Some of these questions will be given incidental treatment only, either because they have been discussed in detail by other specialists or on account of their being of little use to the other groups of research workers.

The Strzeleckie Meadows include a complex of associations with a joint area of about 66 ha. They are surrounded on all sides by forest. They are thus typical forest meadows formed when the natural associations were felled. The maedow associations are now represented by: 1) bog associations (order *Phragmitetalia*), 2) acid sedge marsh meadows (order *Caricetalia fuscase*) and 3) wet meadows (order *Molinietalia* cf. Traczyk 1966). It is this latter community, similar to the association *Stellario-Deschampsietum*, which formed an object of study for several years. The Strzeleckie Meadows were for a long time used for grazing and were mowed once a year. A stop was put to this in 1965, and a few years later they were included in the protected nature reserve. These meadows are situated on what is known as terrace II, also called the dune terrace (Kaczorowska 1926, J. Kobendza and R. Kobendza 1957). This terrace forms the main body of the Kampinos Forest and is seperated from terrace I (subject to flooding) (Kazuń Meadows) by a step about 3 m high. Different types of podzolized and bog soils have formed on the substratum of dune and river sand. The soils of the *Stellario-Deschampsietum* association belong to the black hamus soils formed from river sand (cf. Czerwiński 1971). The relatively high level of groud water is maintained for the greater part of the year. Inundation or partial flooding seldom occurs, and then only in spring after heavy rainfall. The *Stellario-Deschampsietum* association was created as the result of felling moor forests and marsh mixed forests which at one time dominated together with bog associations, in this area.

Unlike the Strzeleckie Meadows, the meadows at Kazuń developed on the most recent accumulation terrace of the Vistula, which runs parallel to the river hed. Before it was raised to its present elevation this terrace was periodically covered by flood water. On account of the fertile silt soils the whole of terrace I (accumulative) was deprived of forests a long time ago and taken oven for agriculture and meadow culture. Alluvial forests would be the natural potential associations here, particularly the association *Fraxino-Ulmetum*, smull remaining areas of which can still be found here. The meadows on terrace I occupy a fairly considerable area and are maintained on account of their high production and its value as fodder. They develop on mineral soils of the heavy brown silt type, or medium heavy and dusty strongly gleized soils (Czerwiński 1971 I refer to the paper by Czerwiński included in this same collection). The level of ground water is far below that in the Strzeleckie meadows. The differences between the meadows Kazuń I and Kazuń II consist mainly in the different agrotechnical operations carried out there. The structure of the herb layer and botanical composition indicate that agrotechnical operations (harrowing, rolling) were carried out there many years ago and a good mixed grass mixture sown, which was not the case in the Kazuń II meadows.

PRIMARY PRODUCTION

The harvesting method, similar to grassland management methods, was used for assessing total primary production. A total of 30 circular samples measuring 0.1 m^2 were taken at random in patches of the three meadows examined in early spring. During the period of maximum development of the herb layer (end of July – beginning of August) 30 samples were mown on the Strzeleckie Meadows. The vascular plants from these were sorted into dead and green parts, and then these into species. Mosses formed a seperate category of biomass. The segregated material was dried at a temperature of 85°C for 48 hours, and then weighed with accuracy to 0.01 g. The production of vascular plants calculated on this basis was 196.4 g/m^2 (Tab. I). Strictly speaking this

Production of vascular plants in the *Stellario-Deschampsietum* (Strzeleckie Meadows)

Tab. I

Species	Biomass in g/m^2	%
1. *Carex fusca* + *C. panicea*	79.08	40.0
2. *Festuca rubra*	21.06	10.7
3. *Deschampsia caespitosa*	17.68	8.9
4. *Potentilla erecta*	9.99	5.1
5. *Ranunculus acer*	9.28	4,7
6. *Poa pratensis*	7.94	4.0
7. *Comarum palustre*	6.66	3.4
8. *Lathyrus pratensis*	5.63	2.9
9. *Ranunculus repens*	4.64	2.4
10. *Galium uliginosum*	4.22	2.1
11. *Filipendula ulmaria*	4.12	2.1
12. *Lotus uliginosus*	3.42	1.7
13. *Holcus lanatus*	2.76	1.4
14. *Plantago lanceolata*	2.21	1.1
15. *Leontodon hispidus*	2.19	1.1
16. *Stellaria palustris*	2.11	1.1
17. *Festuca pratensis*	1.69	0.9
18. *Rumex acetosa*	1.66	0.9
19. *Mentha arvensis*	1.64	0.9
20. *Potentilla anserina*	1.28	0.6
21. *Ophioglossum vulgatum*	1.14	0.6
22. *Lychnis flos-cuculi*	0.84	0,5
23. *Daucus carota*	0.81	0.5
24. *Geum rivale*	0.77	–
25. *Anthoxanthum odoratum*	0.75	–
26. *Veronica chamaedrys*	0.52	–
27. *Vicia cracca*	0.52	–

Tab. I (cont.)

Species	Biomass in g/m²	%
28. *Prunella vulgaris*	0.31	–
29. *Epilobium palustre*	0.28	–
30. *Agrostis canina*	0.27	–
31. *Lythrum salicaria*	0.26	–
32. *Trifolium pratense*	0.19	–
33. *Parnasia palustris*	0.12	–
34. *Sagina nodosa*	0.12	–
35. *Cardamine pratensis*	0.11	–
36. *Ajuga reptans*	0.05	–
37. *Ranunculus flammula*	0.03	–
38. *Cerastium vulgatum*	0.01	–
	196.4	

is not production but the maximum standing crop of live plant biomass. Moss production was estimated as 280 g/m². Taken jointly the approximate production value for the community in the Strzeleckie Meadows would be 476.4 g/m². A similar method was used for taking plant biomass from two patches of meadow in Kazuń (Kazuń I and Kazuń II), with this difference, however, that samples were taken 3 times during the periods that the meadows were mown by farmers. The first mowing took place on June 20th 1968 and gave a yield of 435.4 g/m² from the Kazuń I meadows and 426.3 g/m² from the Kazuń II meadows. The second mowing (on August 28th) gave corresponding values of 110.6 and 130.4 g/m². Finally the third mowing (November 5th) yielded 18.1 g/m² and 28.5 g/m².

Taken altogether the three mowings of Kazuń I meadows gave production of 564.1 g/m² and 585.3 g/m² from Kazuń II. Tables II and III give the joint values of the three mowings and the percentage of biomass formed by different species[1].

In addition 30 samples were taken at approximately monthly intervals during the period from April to November in the Strzeleckie Meadows and Kazuń I meadows in order to trace the development of vegetation. By taking these series of samples eight times it was possible to discover the maximum standing crops of plants, the dynamics of increase of plant biomass and the formation and disappearance rate of dead mass (Fig. 1).

The maximum standing crop of green biomass in the Kazuń I meadows is maintained for a relatively short time, usually from mid-June to mid-July, being

[1] The names of plants are given after Szafer, Kulczyński, Pawłowski 1967.

Production of vascular plants in the *Arrhenatheretum* (Kazuń I)

Tab. II

Species	Biomass in g/m²	%
1. *Dactylis glomerata*	119.729	21.5
2. *Festuca pratensis*	117.996	21.2
3. *Holcus lanatus*	57.446	10.3
4. *Trifolium pratense*	36.306	6.5
5. *Phleum pratense*	33.717	6.0
6. *Alopecurus pratensis*	29.263	5.2
7. *Lolium perenne*	22.536	4.0
8. *Trifolium repens*	17.169	3.1
9. *Poa trivialis*	15.670	2.8
10. *Phalaris arundinacea*	12.539	2.2
11. *Agrostis alba*	11.906	2.1
12. *Arrhenatherum elatius*	11.506	2.1
13. *Poa pratensis*	10.639	1.9
14. *Lathyrus pratensis*	10.250	1.8
15. *Plantago lanceolata*	9.697	1.7
16. *Anthoxanthum odoratum*	8.670	1.5
17. *Trifolium dubium*	7.880	1.4
18. *Taraxacum officinale*	7.319	1.3
19. *Carex hirta*	5.389	–
20. *Cerastium vulgatum*	4.746	–
21. *Ranunculus acer*	2.680	–
22. *Festuca rubra*	2.637	–
23. *Bromus racemosus*	2.387	–
24. *Chrysanthemum leucanthemum*	1.585	–
25. *Bromus mollis*	0.946	–
26. *Medicago lupulina*	0.417	–
27. *Daucus carota*	0.367	–
28. *Equisetum arvense*	0.736	–
29. *Lysimachia vulgaris*	0.300	–
30. *Leontodon hispidus*	0.270	–
31. *Ranunculus repens*	0.196	–
32. *Rumex acetosa*	0.194	–
33. *Achillea millefolium*	0.187	–
34. *Veronica chamaedrys*	0.171	–
35. *Lotus uliginosus*	0.133	–
36. *Carum carvi*	0.180	–
37. *Vicia cracca*	0.117	–
38. *Prunella vulgaris*	0.033	–
39. *Plantago maior*	0.007	–
Others	0.147	–
	564.063	

Production of vascular plants in the *Arrhenatheretum* (Kazuń II)

Tab. III

Species	Biomass in g/m²	%
1. *Festuca pratensis*	189.850	32.4
2. *Holcus lanatus*	183.729	31.4
3. *Trifolim pratense*	24.626	4.2
4. *Alopecurus pratensis*	21.598	3.7
5. *Poa pratensis*	19.674	3.4
6. *Anthoxanthum odoratum*	17.418	3.0
7. *Lathyrus pratensis*	15.795	2.7
8. *Ranunculus acer*	14.788	2.5
9. *Trifolium repens*	13.451	2.3
10. *Festuca rubra*	9.392	1.6
11. *Lolium perenne*	8.276	1.4
12. *Poa trivialis*	7.806	1.3
13. *Medicago lupulina*	7.429	1.3
14. *Plantago lanceolata*	7.084	1.2
15. *Carex hirta*	5.953	1.0
16. *Equisetum arvense*	5.253	–
17. *Daucus carota*	4.651	–
18. *Phleum pratense*	4.646	–
19. *Dactylis glomerata*	4.010	–
20. *Agrostis alba*	3.415	–
21. *Bromus mollis*	2.581	–
22. *Carum carvi*	2.321	–
23. *Taraxacum officinale*	2.003	–
24. *Achillea millefolium*	1.902	–
25. *Trifolium dubium*	1.772	–
26. *Rumex acetosa*	1.188	–
27. *Arrhenatherum elatius*	0.929	–
28. *Lotus uliginosus*	0.814	–
29. *Ranunculus repens*	0.335	–
30. *Chrysanthemum leucanthemum*	0.218	–
31. *Cerastium vulgatum*	0.195	–
32. *Veronica chamaedrys*	0.129	–
33. *Lysimachia nummularia*	0.125	–
34. *Deschampsia caespitosa*	0.119	–
35. *Leontodon hispidus*	0.073	–
36. *Vicia cracca*	0.030	–
37. *Lychnis flos-cuculi*	0.014	–
38. *Geranium pratense*	0.003	–
39. *Ranunculus auricomus*	0.003	–
Others	1.695	–
	585.293	

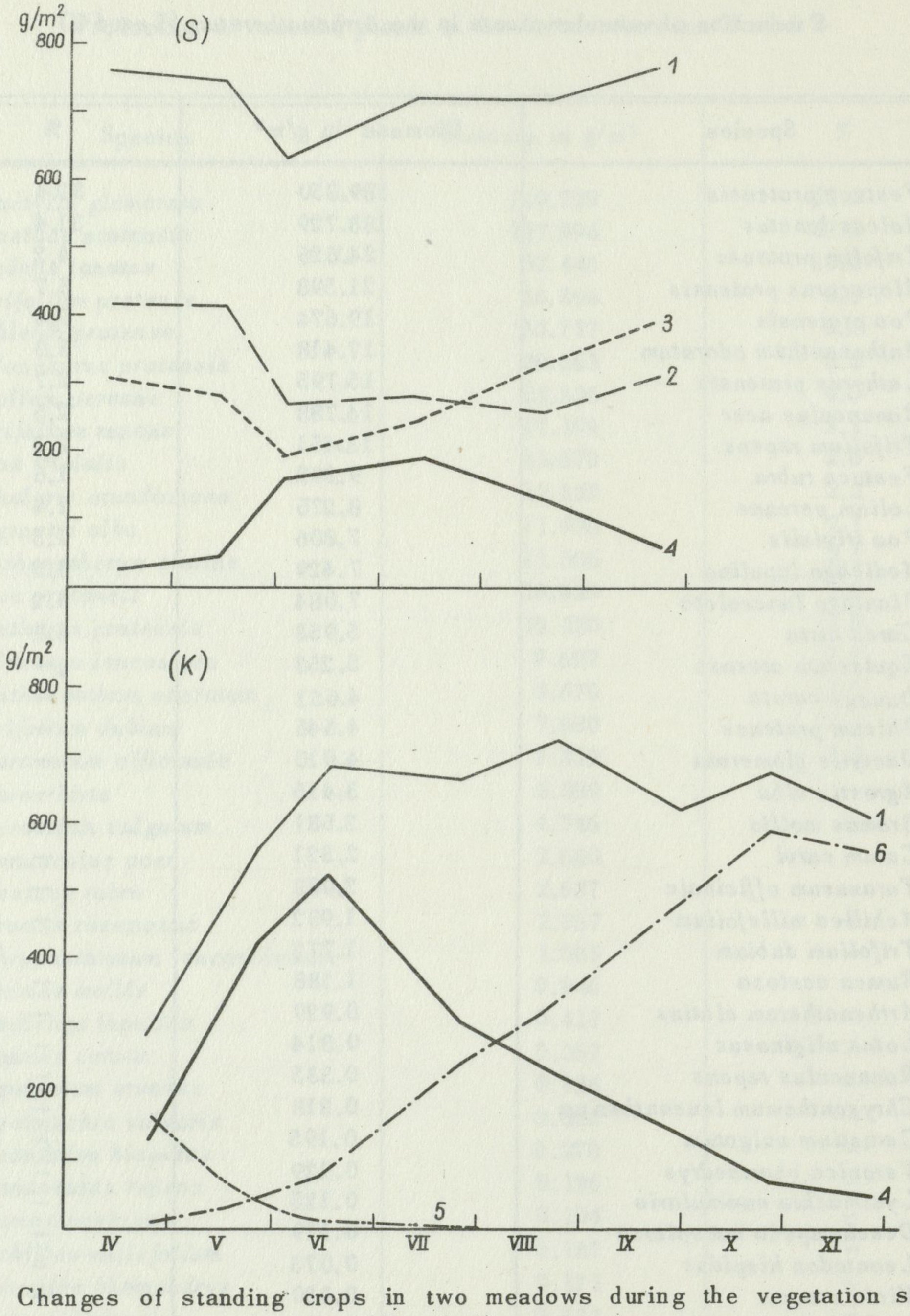

Fig. 1. Changes of standing crops in two meadows during the vegetation season (in g/m²)

1 – total biomass, *2* – mosses, *3* – dead material, *4* – green material, *5* – dead material from previous year, *6* – dead material from current year

distinctly lower at the end of July (sharp drop of line 4 on Fig. 1–*K*). In the Strzeleckie Meadows this state lasts a fairly long time, from the end of June to the end of August (curve *4* on Fig. 1–*S* is more extended). The peak devolop-

ment of the herb layer in these meadows occurs at different periods. In the Strzeleckie Meadows it falls at the end of July and beginning of August, but at Kazuń at the end of June. It is not only the habitat conditions (colder, wetter soil) but primarily the latter attainment of production peaks of such dominants as *Carex fusca*, *C. panicaea*, *Deschampsia caespitosa* and *Festuca rubra* which retards the development of the herb layer in the Strzeleckie Meadows (Tab. I). The dominations species in the Kazuń I meadows are chiefly *Dactylis glomerata* and *Festuca pratensis* (nearly 43% of production), which attain peak biomass at the end of June. *Festuca pratensis* and *Holcus lanatus* are the decided dominants (nearly 64% of production in the crop obtained from Kazuń II meadows). *Dactylis glomerata* – the dominant in the herb layer of the Kazuń I meadow (119.7 g/m²) – plays only an insignificant role in Kazuń II meadow (4 g/m²). It is possible to trace the percentage of species in production of these meadows by means of the data given in Tables I, II, III. The number of dominants is usually limited in each meadow to 2–3 species while the percentage of production they from is from 50–60% (Tab. IV).

Participation of dominat species in the productivity
(data in percentages)

Tab. IV

Species	Strzeleckie	Kazuń I	Kazuń II
Carex fusca + *C. panicea*	40	–	–
Deschampsia caespitosa	9	–	–
Festuca rubra	11	+	2
Dactylis glomerata	–	21	+
Festuca pratensis	–	21	32
Holcus lanatus	1	10	31
Total	60	52	63

In addition to the different dominating species the percentages formed by characteristic groups of species in biomass production differ. In the association of the Strzeleckie Meadows species typical of humid habitats, belonging to the order *Molinietalia*, clearly predominate (56%), as do species of the class *Molinio-Arrhenatheretea* (29%). In the Kazuń meadows the percentage of species belonging to the class *Molinio-Arrhenatheretea* is far higher (Kazuń I – 59%, Kazuń II – 86%), but is it the complete absence of humid habitat species of

sedge associations of the order *Caricetalia-fuscae* and the minimum percentage of species of the order *Molinietalia* (Tab. V), which are striking. No sedges or bryophytes are found in the plant biomass of the Kazuń meadows, whereas these clearly predominate in the Strzeleckie Meadows (Tab. VI).

Participation of characteristic groups of species in the productivity

Tab. V

Groups of species \ Meadows	Strzeleckie		Kazuń I		Kazuń II	
	g/m²	%	g/m²	%	g/m²	%
Caricetalia fuscae	9.3	5.0	–	–	–	–
Molinietalia	110.8	56.0	0.4	0.1	0.9	0.2
Arrhenatheretalia	–	–	189.4	34.0	40.2	6.8
Molinio-Arrhenatheretea	56.4	29.0	333.9	59.0	502.4	85.3
Condominant species	19.9	10.0	40.4	7.0	45.4	7.7
Total	196.4	100.0	564.1	100.0	588.9	100.0

Participation of sedges, grasses, papilionaceous and others dicotyledonous in the productivity

Tab. VI

Groups of plants \ Meadows	Strzeleckie		Kazuń I		Kazuń II	
	g/m²	%	g/m²	%	g/m²	%
Sedges	79.1	40	–	–	–	–
Grasses	52.1	26	473.4	85	473.5	81
Papilionaceous	9.8	6	63.9	11	63.9	11
Others dicotyledonous	55.4	28	19.7	4	47.9	8
Total	196.4	100.0	557.0	100.0	585.3	100

There are particularly marked differences in the ratio of dead and green parts during the period of maximum development of the herb layer. The percentage of green biomass in the Kazuń meadows exceeds dead mass by about 5–7 times, whereas in the Strzeleckie Meadows the percentage of dead mass is even greater than that of green mass (Fig. 1 and 2).

These relations are primarily the result of the completely different way in which the meadows are utilized. In the greater part of the crop not mown by man remains in the ecosystem and dies. Consequently at the beginning of the growing season the amount of dead plant masse exceeds the amount of green

mass by more than 10 times. Although the disappearance rate of dead mass increases gradually as temperature rises, even in high summer the amount of dead mass does not fall below 50% of the initial state. It may therefore be said that retention of dead mass in the Strzeleckie Meadows is always very high (Fig. 1). On repeatedly mown meadows (Kazuń I and II) the plant mass is collected by man two or three times a year. The residue of plant mass in autumn is relatively small and begins to decompose rapidly in spring. By high summer the amount of dead mass from the previous year has almost completely disappeared (Fig. 1–*K* curve 5).

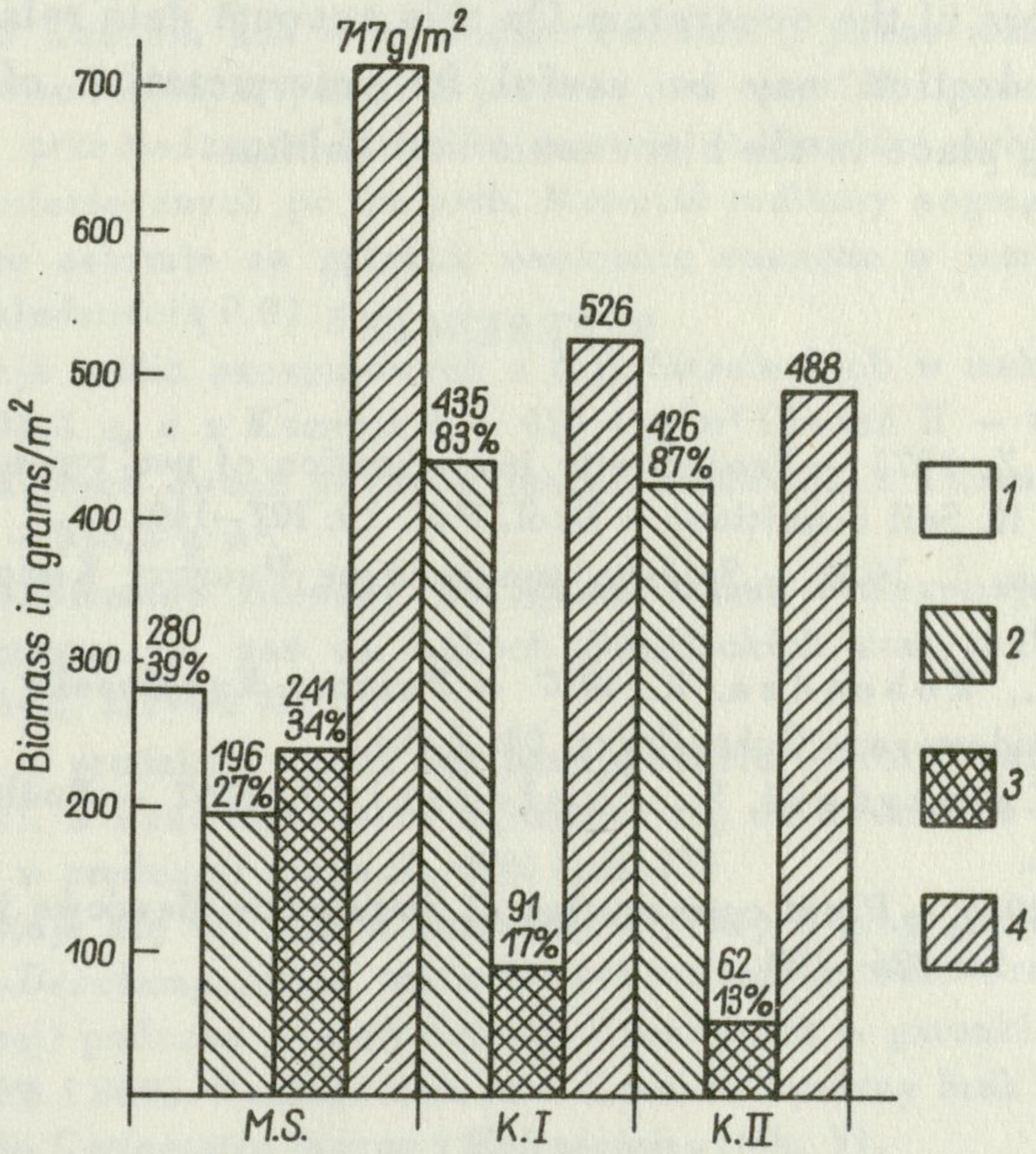

Fig. 2. Standings crops of green herbs, dead herbs, mosses and total biomass in the peak growing period of vegetation (in g/m²)

1 – mosses, *2* – green herbs, *3* – dead herbs, *4* – total biomass

The structure of the meadow herb layer differs as a result of the different way in which the meadows examined are utilized. The continuously persisting mass of dead plants and the decided predominance of bryophytes in the herb layer biomass of the unmown Strzeleckie Meadows create completely different protection and microclimatic conditions for animals from those in the Kazuń meadows.

The total amount of biomass in the Strzeleckie Meadows is distinctly higher than in the Kazuń meadows, while the herb plant production is far lower.

Similarly the species composition and fodder value of hay from these two types of meadows differ greatly.

In the Strzeleckie Meadows the fodder value of the hay is very low, only 2.7 points, whereas this value is 5.6 for Kazuń II and 7.2 for Kazuń I, maximum index being 8 points.

The above comparison of selected parameters point to the outstanding differences in the formation of vegetation and primary production depending on the type of meadow, their management and utilization. The structure of vegetation, growth, dying and disappearance of plant mass, depending on a large number of changing habitat factors, exert an important influence on other trophic layers of the ecosystem. On this account data relating to geobotany and primary production may be useful for interpretation of the complicated phenomena taking place in the biocenosis and habitat.

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BADANIA PRODUKTYWNOŚCI DWÓCH TYPÓW ŁĄK W DOLINIE WISŁY

I. CHARAKTERYSTYKA GEOBOTANICZNA I PRODUKCJA PIERWOTNA

Streszczenie

Celem pracy było dokonanie krótkiego, porównawczego zestawienia wyników z zakresu charakterystyki geobotanicznej, a zwłaszcza produktywności pierwotnej pomiędzy dwoma odmiennymi typami łąk.

Badania przeprowadzono wprawdzie w trzech płatach łąk: w płacie zespołu *Stellario-Deschampsietum* (Łąki Strzeleckie) oraz w dwóch płatach zespołu *Arrhenatheretum medioeuropaeum* (Kazuń I i Kazuń II), jednakże podobieństwo dwóch ostatnich zbiorowisk było tak duże, że ograniczono się głównie do analizy różnic pomiędzy łąkami z Kazunia I (łąki zagospodarowane) i Łąkami Strzeleckimi (łąki rezerwatowe).

Zespół *Stellario-Deschampsietum* z Łąk Strzeleckich porasta gleby mało żyzne,

wilgotne, zaliczane do typu czarnych ziem murszastych, powstałych z piasku rzecznego. Łąki te położone są na tzw. tarasie wydmowym, stanowiącym główny trzon Puszczy Kampinoskiej (Kaczorowska 1926, Kobendza J. i Kobendza R. 1957). W przeciwieństwie do nich – łąki w Kazuniu zasiedlają najmłodszy akumulacyjny taras Wisły, położony około trzech metrów poniżej tarasu wydmowego. Powstały one przez wyrąb lasów łęgowych (zwłaszcza płatów zespołu *Fraxino-Ulmetum)* i zajmują żyzne gleby typu brunatnych mad ciężkich (lub średnio ciężkich), pylastych i silnie oglejonych (Czerwiński 1971).

Do oceny ogólnej produkcji pierwotnej zastosowano metodę żniwną zbliżoną do metod łąkarskich. Wczesną wiosną w płatach łąk rozmieszczono po 30 losowych prób kolistych o powierzchni 0.1 m² każda. W maksymalnym rozwoju runi wykoszono masę roślinną z prób. Na Łąkach Strzeleckich maksimum to przypadło na koniec lipca – początek sierpnia, w Kazuniu zaś – na koniec czerwca (I pokos rolników). Na łąkach Kazuń ścięto dodatkowo rośliny z tych prób jeszcze dwa razy (28 lipca oraz 5 listopada).

Ponadto w celu prześledzenia dynamiki rozwoju roślinności pobierano z tych łąk w odstępach około miesięcznych po 30 prób. Materiał roślinny segregowano na części martwe i żywe, a te ostatnie na gatunki; następnie suszono w temp. 85°C przez 24 godz. i ważono z dokładnością 0,01 g.

Globalna produkcja roślin naczyniowych z Łąk Strzeleckich w maksymalnym stanie biomasy wyniosła 196,4 g, a z Kazunia I – 435,4 g/m² (Kazuń II – 426,3 g/m²). Przy uwzględnieniu dodatkowych dwóch pokosów łączna produkcja z Kazunia równałaby się 564,1 a z Kazunia II – 585,3 g/m².

Maksymalny stan biomasy zielonej na łąkach Kazuń I utrzymuje się stosunkowo krótko (fig. 1–*K*, krzywa 4), zaś na Łąkach Strzeleckich stan ten rozciąga się na kilka miesięcy (fig. 1–*S*, krzywa 4).

Udział gatunków w produkcji trzech łąk podają tabele I–III. W każdym zbiorowisku dominują inne gatunki, a ilość dominatów ogranicza się do dwóch lub trzech gatunków. Natomiast ich udział w produkcji sięga 50–60% (tab. IV).

Odmiennie kształtuje się też udział charakterystycznych grup gatunków w produkcji biomasy. W *Stellario-Deschampsietum* wyraźnie przeważają gatunki z rzędu *Molinietalia* (56% produkcji ogólnej) podczas gdy na Łąkach Kazuńskich – gatunki z klasy *Molinio-Arrhenatheretaea* (59% i 86%). Ponadto uderza w Kazuniu wyraźny brak turzyc i mszaków oraz gatunków z rzędu *Caricetalia fuscae* i *Molinietalia* (tab. V).

Udział biomasy zielonej w maksymalnym stanie biomasy przewyższa 5–7 razy masę martwą (łąki Kazuń), zaś na Łąkach Strzeleckich stan masy martwej jest nawet większy od zielonej (fig. 1 i 2). Stosunki te są wynikiem zupełnie odmiennego użytkowania tych łąk. Ogólnie można stwierdzić, że retencja masy martwej na łąkach rezerwatowych, jakimi są Łąki Strzeleckie, jest zawsze bardzo duża (fig. 1). Na łąkach wielokośnych masa roślinna zbierana jest dwa lub trzy razy w roku i tylko niewielka pula masy nadziemnej pozostaje jesienią w ekosystemie. Z puli tej ilość masy martwej szybko ulega rozkładowi w roku następnym (fig. 1–*K*, krzywa 5).

W związku z różnym sposobem użytkowania badanych łąk, odmienna jest struktura roślinności, warunki schronienia oraz warunki mikroklimatyczne.

Ogólny stan biomasy na Łąkach Strzeleckich jest wyższy niż na kazuńskich, natomiast produkcja roślin naczyniowych dużo mniejsza. Wynika to z dużego udziału części martwych oraz mchów w ogólnej puli biomasy roślinnej.

Wartość paszowa siana z Łąk Strzeleckich jest bardzo niska i wynosi 2,7 podczas gdy w Kazuniu I aż 7,2 przy maksymalnym wskaźniku 8 punktów.

Powyższe krótkie omówienie różnic w kształtowaniu się stosunków roślinnych i produktywności pierwotnej w porównywanych łąkach może być, jak sądzę, przydatne do interpretacji skomplikowanych zjawisk zachodzących w biocenozie i siedliskach badanych łąk.

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