MICROCLIMATE EXAMINATIONS IN THE AUTUMN ASPECT OF CYNODONTI-POËTUM ANGUSTIFOLIAE (RAPAICS 26) SOÓ 57 OF THE MAROS DAM

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Zusammenfassung: *(Mikroklimauntersuchungen im herbstlichen Aspekt von Cynodonti-Poëtum angustifoliae (Rapaics 26) Soó 57 des Maros Schutzdammes)* — Es kann auf Grund unserer auf den nördlich und südlich exponierten Aussenböschungen des west-östlich liegenden Abschnitts von Maros Schutzdamm durchgeführten synekologischen Untersuchungen festgestellt werden, dass:
1. Die Zusammensetzung der Vegetation, sowie das über dem Substrat ausgebildete Mikroklima sind von dem Ton-, bzw. tonigen Lehmboden mit hohem Stillwassergehalt in bedeutendem Masse beeinflusst worden.
2. Der in dem Mikroklima der Aussenböschungen nördlicher und südlicher Exposition auftretende Unterschied nimmt parallel mit der Abnahme der Sonnenhöhe zu. Der Ablauf der Temperaturveränderungen ist auf den Böschungen südlicher Exposition schneller.
3. Auf den Dammböschungen südlicher Exposition ist die Veränderung des Spezieskombinationen der Grasassoziationen den extremeren Standortverhältnissen zufolge stärker.
4. Auf den Dammböschungen nördlicher Exposition sind das *Arrhenatherum elatius* und die *Festuca pratensis* sdie dominanten Spezies und auf den Südlichen das *Cynodon dactylon* und die *Poa angustifolia*.

Summary: On the basis of our synecologic examinations carried out on the part of the Maros dam whose slope is of northern or southern exposure, it can be ascertained that:
(1) The composition of vegetation as well the microclimate consolidated above the substratum are influenced in a high degree by a clay, resp. clayish mud soil of high dead water content.
(2) The difference between the microclimates of dam slopes of northern and southern exposure increases parallelly with the decrease of sun height. The change in temperature takes place faster on a slope of southern exposure.
(3) On dam slopes of southern exposure the change of the species combinations of grass associations is of higher degree owing to the more extreme surface soil conditions.
(4) On the dam side of northern exposure the *Arrhenatherum elatius* and the *Festuca pratensis* are the dominant species, while on the southern one the *Cynodon dactylon* and *Poa angustifolia*.

The dams laid out for averting the danger of inundation by rivers have developed peculiar plant associations. On these objects projected above the flat level of the Lowlands the ecologic conditions differ sharply from those in their enviromment. The composition of flore developed on them is first of all influenced by the exposition. Thus the production of organic matter by plant stocks developed on the dams is influenced in a considerable degree by radiation and microclimatic conditions depending upon the exposition.

The purposes of our investigations are follows:

a) To determine first of all the degree of the microclimatic differences in several aspects among the soil factors influencig the composition of grass cover on dam sectors of different exposure.

b) *To clear the special way of soil development on dams.*

c) *To reveal the phytocenologic regularities of dam grass along the M a r o s developed as a result of different ecologic effects, to trace the way of its succession, and to recognize exactly the synecologic demands of the single association components.*

On this basis suggestions may be presented concerning the solution of the manifold tasks of a problem more and more urgent in our days, i. e., of the biologic dam defence affording an increased stability against inland waters.

This is the more reasonable as the agricultural demand, the high organic matter production, as well can be ensured by the grass associations, that mean a more efficacious and lasting dam defence than any concrete or stone covering.

By realizing our programme we want, as well to make a contribution to the realization of the International Biologic Programme (examination of the production of natural plant associations as a function of radiation and temperature). Our topics are connected with the plan of the scientific cooperation of socialist countries (Comecon), as well.

I. Material and method

1. Characterization of the dam along the Maros

The place of our investigations has been sector VII. of the dam in the inundation area at the left bank of Maros, in the region of the village Deszk. Its construction began in 1886, its operations were proceeding in 1895. Its material is mainly the mud, resp. sandy clay from the borrowpits at the side of the inundation area.

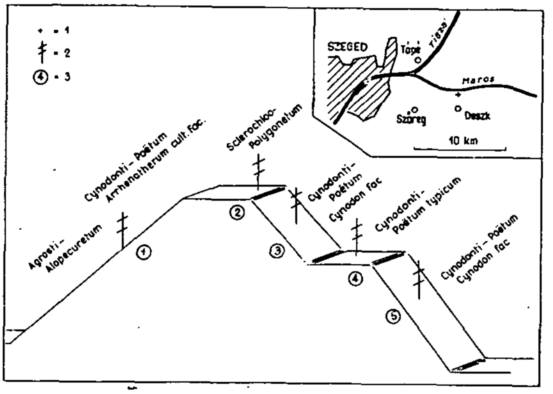
Its direction is east-western, the angle of its slope is 40°. In the examined part the side of northern exposition lies towards the river Maros, its slope being continuously formed. Its southern side is interrupted, 6 m from its edge, by a three m broad berm. 20 m from the base of dam was a sowing of yellow corn in the time of our investigations. 40 m from the northern slope, however, a later older trees is running along the dam.

The protective dam has been covered, since it was built, by a grass vegetation, set for its biologic defence, and changed during the 60—80 years passed and depending mainly upon the direction of exposure into different types of *Cynodonti-Poetum angustifoliae*, and soit does not meet the practical requirements in its present shape.

2. Methods of examination

In the chosen area microclimate examinations were carried out in August, resp. September 1966. The development of grass cover has, anyhow, been examined since the beginning of the vegetation period. At choosing the time of observations we have preferred clear, calm days.

Fig. 1. District of investigations and placing of microclimate stations
1 = area of investigations and its environs, 2 = microclimate stations, 3 = mark of microclimate stations.



The microclimate stations have been settled at right angles to the length of dam (Fig. 1). Thus we could obtain a complete cross-section of the microclimate of dam from the data of the five stations. The air temperature was measured with mercury thermometers placed horizontally, in a height of 10 cm above the soil and 30—35, 100, 150 and 180 cm depending upon the height of plant association. The mercury bags of the thermometers were defended from the immediate solar radiation by a cardboard half-cylinder covered with tinfoil sheets.

For measuring soil temperature, three mercury thermometers were used in every station, placed 2, 5, and 10 cm deep.

For measuring atmospheric humidity, Assmann's aspiration psychrometers were used in stations 1, 2, and 3, placed 50 cm high.

The intensity of illumination on the northern and southern sites of dam and on its crown was determined with selenium photo-electric Lux-meters.

The microclimate examinations were carried out August 1—2 and September 30 1966, observed in every half hour. There were recorded the visual observations, as well, concerning the macroclimate: sunshine, shape of clouds, direction and speed of wind, as well the accidental precipitation (dew).

Our informations about the humidity conditions of soil were based on pattern material got from a depth of 10, 20, and 60 cm in the neighbourhood of the microclimate stations April 21st and September 30th. The soil patterns were dehydrated in driers on 105 °C till getting a standing weight, and the water content was given in the weight percentage of dry soil.

The loss, resp. evaporation of soil humidity is considerable both from the point of view of vegetation and from that of microclimate and its process shows a close connection with the physical structure of soil. Therefore, it was important to determine also the granular composition. Among the different possible procedures, the most practicable results may be expected from the hydrometric determination, we have applied therefore that. It is a kind of depositing procedures where the deposition of soil suspension is measured with a gravimeter in definite periods.

For analyzing the vegetation, we have kept on with systematic phytocenologic observations in the area of the single microclimate stations already from the spring aspect. Thus the interaction between the grass cover and the microclimatic conditions could be measured exactly.

II. Review of results

1. Characterization of the macroclimatic conditions of the area

For valuating the microclimatic conditions of an area, the macroclimate, too, must be taken into consideration. According to the statement of R. WAGNER, namely, the microclimate is a result of interaction of the atmosphere and substratum.

The macroclimatic data used for characterization are obtained from the climatic station of the Institute of Climatology of the Attila József University. The data concerning temperature, humidity and duration of insolation from April till October in the vegetation period of 1966 are summed up in Table 1. Apart from the monthly mean values also the averages of several years and, in case of temperature, also the minima and maxima are indicated.

The monthly mean temperature has indicated a major difference from the fifty years average in April (+2 °C) and October (+4,6 °C), at any rate, the —1,4 °C difference of July, the month preceding immediately the first measuring of the microclimate, being considerable, as well. In the other months, the mean temperature is nerly identic with the average of many years.

The relative vapour content of atmosphere is the greatest in April, the smallest in June and July: the deviation from the average of thirty years (1901—1930) is the most considerable (—11 per cent) in May.

The duration of insolation was maximal in June, the number of days without sunshine is few: from April till October altogether eight.

The precipitation shows a rain maximum in June, exceeding the average

Table 1.

Months		April	May	Juny	July	August	September	Oktober
Atmospheric temperature C°	Maximum	24.2	27.0	30.1	30.8	32.9	29.1	26.7
	Minimum	0.9	6.6	6.8	11.2	9.3	7.3	2.5
	Monthly average temperature	13.7	17.3	20.0	21.3	21.4	17.8	16.7
	50 years average	11.7	17.2	20.4	22.7	21.7	17.7	12.1
	Difference	+2.0	+0.1	—0.4	—1.4	—0.3	+0.1	+4.6
Atmospheric humidity per cent		75	58	63	64	63	65	70
	30 years average	70	69	69	64	68	72	79
	Difference	+5	—11	—6	—	—5	—7	—9
Duration of insolation	Days without sunshine	1	2	—	1	—	—	4
	Monthly middle (hours/day)	6.4	9.6	9.1	9.5	9.6	8.0	5.8
	Precipitation mm	54.8	46.4	106.2	81.5	27.5	14.1	35.3
	40 years average	50	65	69	52	51	50	56
	Difference	+4.8	—18.6	+37.8	+29.5	—24.5	—35.9	—20.7

of forty years (1901—1940) in June with + 37,8, in July with + 29,5 mm. On the other hand, in September the lack of precipitation is considerable: — 35,9 mm.

The amount of soil moisture is determined first of all by temperature and precipitation conditions. The most part of the April precipitation: 50,5 mm from 54,8, fell in the period preceding the date of the first examination (April 21st) of soil humidity. As a consequence of the plenty of precipitation and low temperature, of course, in April there wasn't any major deviation either between the single stations or between their different soil levels. The examination of the soil water content in September took place, however, after a warm and rainless period.

2. Characterization and microclimatic conditions of the observing stations

Station 1.

In a section of its soil unearthed in 70 cm depth — although in the course of the dam building the single layers got upon one another by chance — the so-called coarse silt fraction of 0.050—0.010 mm diameter, which is anyway characteristic of the alluvial deposit of the Maros, is dominating. From the point of view of gras cover and of the developing microclimate, the upper 20 cm is the most important. The ten cm layer near the surface is the most fixed part of the section where the percentage of the clay fraction with a granule diameter smaller than 0,005 mm is 30 (Fig. 2).

Flora. The "ecologic advantages" of the northern exposure have made possible the development of a well-grown, multi-levelled dam grass-land. As a result of favourable soil conditions, even species demanding care have survived for more decades after their plantation and their succession towards the lowland dry meadows of natural origin *(Festucion sulcatae)* became slower. The closing of their stock, particularly on the upper and middle hayfield level, is, however, minimal: 40—60 per cent. It is very similar phytocenologically to the species combination of the slopes of similar exposition of the Tisza dams.

The distribution of the species combination according to levels, and its cover change according to the aspects, are as follows (Table on the other side).

Microclimate. We may attempt to characterize it in first approximation with data of the daily average values. The daily average values of soil and atmospheric temperature concerning the microclimatic stations, the conditions of illumination, the relative atmospheric vapour content and vapour pressure are summed up in Tables 2, 3, and 4. According to our August measurements, the daily average value of the atmospheric temperature does not show any considerable deviation as compared with those measured at the other stations. More considerable differences were found but at the September investigations, as a consequence of the lower position of Sun. Then the atmospheric temperature was the lowest on the northern slope. E. g., in a height of 10 cm it was 5 °C lower than on the southern side.

The same can be ascertained concerning the soil temperature, as well, where in September in a depth of 2 cm we measured 6° lower values on the slopes of northern exposure.

In station 1, in August at noontime, the intensity of illumination was about three times, in September about fifteen times weaker than on the slopes of southern exposure. This difference may have a great influence not only

	May 28.		September 30.	
	average height of plants cm	p. c. of cover-age	average height of plants cm	p. c. of cover-age
Upper grass level:				
Festuca pratensis	68	21	21	15
Arrhenatherum elatius	97	18	87	25
Dactylis glomerata	75	2	70	1
Bromus inermis	82	1	70	1
Middle grass level:				
Poa angustifolia	65	5	50	6
Lathyrus tuberosus	44	1	35	1
Eqisetum arvense	36	1	25	1
Carex hirta	32	1	20	1
Lower grass level:				
Medicago lupulina	27	2	30	1
Valerianella locusta	12	1	—	—
Convolvulus arvensis	42	1	—	—
Achillea collina	15	1	38	1
Lamium purpureum	12	1	—	—
Daucus carota	20	1	60	8
Vicia angustifolia	7	1	32	1
Myosotis micrantha	14	2	—	—
Viola arvensis	14	1	—	—
Veronica arvensis	12	1	—	—
Lathyrus silvestris	18	1	36	1
Moss level:				
Camptothecium lutescens	4	15	4	20

on the microclimatic conditions but it may be of decisive effect on the species combination and organic-material production of the grass cover, as well. The increase of the intensity of illumination has namely a stimulating effect on the intensity of photosynthesis but within certain limits, its further increase causes a decrease wich is different at the particular plant species.

The influence of the southern and northern expositions on the plant stocks was examined ba Kausch-Heil on railway-embankments. They obtained similar results concerning the species combination of the developed plant associations: on embankment sides of northern exposure rather mesophilous species, on southern side rather those of steppe character were found.

Their detailed results concerning the atmospheric and soil temperature are indicated in the isoplete graphs of Fig. 2.

Table 2.

Station	August 1—2. 1966.							
	Temperature of atmosphere					Temperature of soil		
	10 cm	Height of plants	100 cm	150 cm	180 cm	2 cm	5 cm	10 cm
1.	21,5	21,6	21,4	21,2	21,5	21,8	21,5	21,2
2.	22,8	22,2	21,2	21,5	21,4	21,2	21,6	21,6
3.	22,4	21,7	21,7	21,5	20,9	—	23,3	23,4
4.	21,8	21,4	21,4	21,3	21,3	21,0	20,8	21,0
5.	21,4	20,9	20,9	21,2	20,9	21,3	21,6	—

Station	September 30. 1966.							
	Temperature of atmosphere					Temperature of soil		
	10 cm	Height of plants	100 cm	150 cm	180 cm	2 cm	5 cm	10 cm
1.	20,4	23,5	23,3	23,2	23,4	15,0	14,0	—
2.	25,6	23,5	22,7	23,1	22,9	17,1	16,9	16,5
3.	25,5	24,4	23,5	23,6	23,3	21,7	—	18,1
4.	25,6	24,4	23,4	23,2	23,1	18,1	16,5	16,2
5.	27,1	24,4	23,9	23,4	23,1	19,5	—	17,6

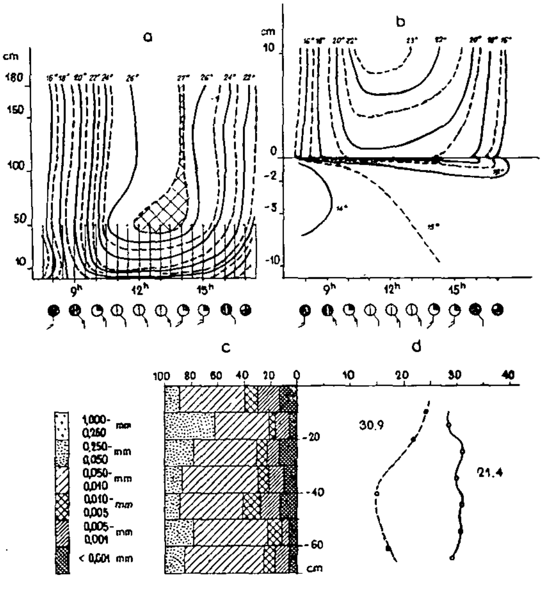


Fig. 2. Microclimate station 1.
a = izoplates of air temperature, b = izoplates of air and soil temperature, c = soil fractions in percent, d = water content of the soil in percent.

Station 2.

Its soil is similar to the former one, its humidity conditions show, however, considerable differences. First of all in the surface layers where it is more than 5 per cent lower compared to station 1.

Its flora is of transitional character between the sides of northern and southern exposures. One of the associations that developed on the strongly beaten soil of the dam crown is of low species number, of low closing, and adhering closely to the substratum: *Sclerochloo-Polygonetum.* Its dominating species are: *Sclerochloa dura, Polygonum aviculare, Cynodon dactylon, Lolium perenne.* Height of plants is 4—10 cm. The other association is the *Cynodonti-Poetum angustifoliae,* dominating the southern dam slope in the period of August and September. Besides the facies forming *Cynodon dactylon* with few *Poae angustifoliae.*

Microclimate: The daily average temperature shows a transition between the two slopes concerning both the temperature of soil and that of atmosphere. A major difference could be observed in the atmospheric layer near the soil where the soil surface covered by plants but in a low degree grew considerable warm.

The intensity of illumination was here the greatest in August in the early hours, from early forenoon it was equal to that on the southern side, the after 11 o'clock it was smaller than that on the southern slope.

Station 3.

Its soil: is of looser structure than that on the northern side, its layer near the surface contains 10 per cent lower clay fraction, and the mud fractions dominate (50—60 per cent). The distribution of the different soil fractions is indicated in Fig. 3.

Flora. Compared to the northern side, an extremely great difference can be observed. The dam-grass combination developed by sowing after the building of dam has changed so much by the extremely xerothermic soil conditions that none of the sowm species could be found in the upper third part of the southern side. The succession enduring for several decades has led to a secondary grass association of the lowland soils of meadow and loess origin, the *Cynodonti-Poëtum angustfoliae.*

This association consists but of two grass levels with a lot of ephemerous *Chenopodietea* and *Secalietea* elements. The closing of this dam grass takes place only in the middle of summer when the *Cynodon dactylon dominates* alone. It forms a dense network with its subterranean sprout system, contributing in a high degree to the drying up of the upper soil layers.

Microclimate: The daily average temperature of the area of station was nearly equal to that of the northern side even near the soil surface in August. At the end of September, however, it was already considerable higher than that. Tha daily average temperature of the layer near the soil surface was 6,7 °C higher than that on the northern side.

Extreme ecologic conditions are shown by the intensity of illumination of the southern dam slopes: it is in August three times, in September fifteen times higher at noontime than on the slopes of northern exposure.

The microclimatic conditions contributed in a high degree to the formation of a low soil humidity, especially in the September of dry climate.

	May 28		September 30	
	average height of plants cm	p. c. of coverage	average height of plants cm	p. c. of coverage
Middle grass level:				
Cynodon dactylon	36	15	28	60
Hordeum murinum	48	2	—	—
Lepidium draba	32	5	20	2
Capsella bursa-pastoris	42	3	—	—
Papaver dubium	65	3	—	—
Poa angustifolia	38	1	46	1
Melandrium album	48	1	60	1
Erigeron canadensis	5	1	72	5
Lower grass level:				
Geranium pusillum	23	10	—	—
Calepina irregularis	25	7	—	—
Convolvulus arvensis	30	5	18	1
Erodium cicutarium	30	2	5	1
Myosotis micrantha	23	3	—	—
Polygonum aviculare	5	1	20	1
Holosteum umbellatum	15	1	—	—
Lamium amplexicaule	20	1	—	—
Valerianella locusta	15	5	—	—
Setaria glauca	—	—	32	15
Moss level:				
Camptothecium lutescens	3	5	3	8

The isopletes of the temperatures of soil and atmosphere are indicated in Fig. 3.

Station 4.

Its soil is nearly of the same physical structure as that of station 3 placed above it. In the layers lying near the surface 15—20 per cent is the fine sand (0,250—0,050 mm ∅), 20 per cent is the clay fraction dominated by coarse clay (0,005—0,001 mm ∅). A major difference was found in the humidity content of soil. The layers below 20 cm have dried up in a high degree until September, their water content was 10—15 per cent. The layers near the surface have, however, been unusually wet. This may first of all be explained by the fact that at summer showers the precipitation raining quickly in a large amount can ooze in the soil of a slope of 40 degrees but to a certain extent, instead it is gathering running on that horizontal berm, raising considerable the humidity content of the upper soil layers.

This higher water content is reflected in the external habit of vegetation, as well. While the grass cover on the upper dam section diminishes its life activity at the end of September, growing straw-yellow, the grass covering the berm goes on being green.

Table 3.

Datum	Time	Station 1.	Station 2.	Station 3.
Aug. 1st 1966.	17^{30}	2 000	2 650	2 350
	18	1 250	1 700	1 250
	18^{30}	400	450	450
Aug. 2nd 1966.	6^{30}	5 800	40 000	3 300
	7	7 500	7 000	4600
	7^{30}	12 000	10 500	7 500
	8	12 500	16 250	12 500
	9^{30}	11 250	33 500	31 000
	10	12 500	33 000	—
	10^{30}	14 500	23 500	42 000
	12	15 500	41 000	50 000
Sept. 30th 1966.	13^{30}	2 650	8 100	41 500
	14	990	2 150	3 700
	14^{30}	1 900	7 500	2 775
	15	2 250	4 250	12 750

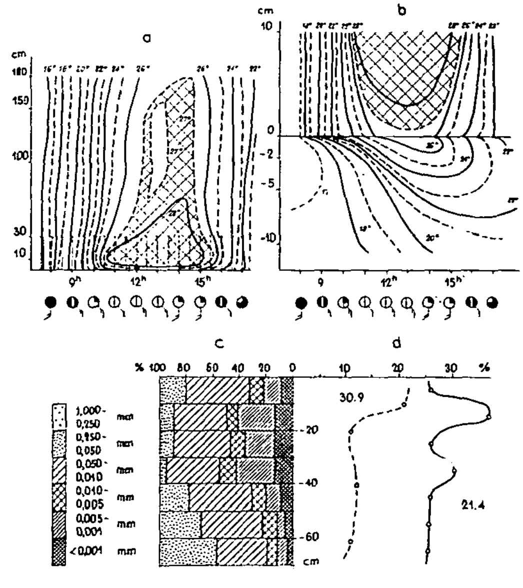


Fig. 3. Microclimate station 3.
a = izoplates of air temperature, b = izoplates of air and soil temperature, c = soil fractions in percent, d = water content of the soil in percent.

Table 4.

Datum of observation		Station 1. Vapour pressure	Station 1. Humidity per cent	Station 2. Vapour pressure	Station 2. Humidity per cent	Station 3. Vaopur pressure	Station 3. Humidity per cent
Aug. 1st 1966.	19^{30}	15,9	95	15,9	93	15,7	95
	20	15,1	93	15,4	91	15,5	96
	20^{30}	15,0	100	15,7	99	15.2	98
Aug. 2nd 1966.	7^{30}	17,0	87	16,8	83	15,8	81
	8	17,7	82	17,1	86	16,4	78
	8^{30}	18,7	83	16,2	74	16,4	77
	9	19,0	80	18,2	76	18,3	77
	9^{30}	18,0	70	16,1	61	15,9	64
	10	17,8	68	15,7	59	16,8	67
	10^{30}	18,2	70	19,3	75	18,8	74
	11	17,6	66	17,0	63	17,6	67
	11^{30}	21,6	85	21,1	85	19,0	80
	12	20,4	72	19,3	68	16,4	59
	12^{30}	20,4	69	21,2	71	19,2	65
	13	19,8	74	19,5	72	19,2	70
	13^{30}	20,9	74	18,7	65	18,9	67

Flora. In the aspect of early summer the *Poa angustifolia* is dominating and the *Cynodon dactylon* begins to spread. The number of the ephemerous weed species is high here too. Thus this cenosis can be considered a variant of the *Cynodonti Poëtum angustifoliae typicum* becoming weedy. In the autumn period the high species number diminishes strongly. The advance of the *Cynodon* can be resisted only by the *Poa angustifolia.* Apart from them, the species *Convolvulus arvensis, Verbena officinalis, Setaria, Melandrium* and *Erigeron* repeat regularly.

The height of the single species is, as a result of the favourable water supply, considerable greater than in station 3.

The *Cynodon,* e. g., reaches an average height of 28 cm in the above place, and 35 cm here. The distribution of the occuring species according to levels is as follows:

Microclimate: The daily average value of the atmospheric temperature does not show any major difference as compared with that of station 3. Details are described in Table 2, and the conditions of soil and atmosphere temperatures in Fig. 4, in isopletes.

	May 28		September 30	
	average height of plants cm	p. c. of coverage	average height of plants cm	p. c. of coverage
Middle grass level:				
Poa angustifolia	72	35	60	15
Bromus mollis	65	4	50	1
Lepidium draba	37	1	30	1
Carex vulpina	36	2	40	1
Melandrium album	70	4	65	2
Cynodon dactylon	30	5	35	50
Verbena officinalis	32	1	48	3
Setaria glauca	5	1	55	3
Lower grass level:				
Convolvulus arvensis	18	2	40	3
Polygonum aviculare	3	1	8	1
Geranium pusillum	24	15	—	—
Lithospermum arvense	46	1	—	—
Valerianella locusta	14	3	—	—
Veronica hederifolia	8	1	—	—
Lamium purpureum	16	1	—	—
Calepina irregularis	28	2	—	—
Erodium cicutarium	30	5	5	1

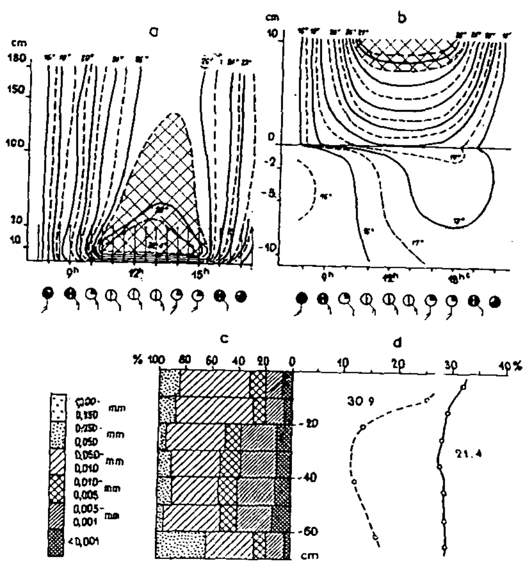


Fig. 4. Microclimate station 4.
a = izoplates of air temperature, b = izoplates of air and soil temperature, c = soil fractions in percent, d = water content of the soil in percent.

Station 5.

Its soil. It is the fixest in the examined dam section. Its fraction that can be cleared of mud is 95 per cent in the layer near the surface, and of that more than 40 per cent belongs to the clay fraction. The soil becomes of looser structure only below 40 cm where the ratio of fine sand grows gradually above 30 per cent. Although the soil humidity in the upper 15 cm is more than 5 per cent greater than in the upper section of similar slope angle (station 3), its positiv influence on the vegetation is insignificant, owing to the great dead water content of the soil.

The precipitation water flowing on the slope gathers in this zone of dam, so the soil humidity appearing near the surface in spring and autumn may easily be explained.

Its flora is similar to the vegetation conditions of the upper dam region (station 3). There appear also here the xerothermic species combinations of the association *Cynodonti-Poëtum angistifoliae*. In their combination the greater soil water content is not reflected because of the higher dead water content. The composition of grass cover has changed only so that number and complete cover of the ephemerous species is considerably lower than in the environment of station 3.

Its microclimate: The daily average atmospheric temperature is similar to that in the other stations of the southern slope at the end of summer. In autumn, however, a heat surplus of about 2 °C appears. This can be attributed mainly to the effect of the warm air streaming there from the adjacent agricultural areas. (Cf. details in Fig. 5).

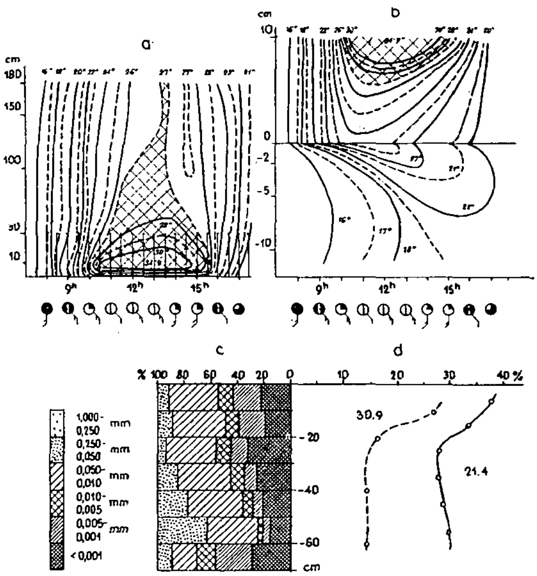


Fig. 5. Microclimate station 5.
a = izopletes of air temperature, b = izoplates of air and soil temperature, c = soil fractions in percent, d = water content of the soil in percent.

III. Summary of results.

Our synecologic examinations carried out on the protective dam of the Maros are comprising the species combination, zonation of dam grass, changes in the physical structure of its soil, humidity conditions, measurement of the microclimatic conditions in the dam zones of different level height and exposure in the summer and autumn aspects. The results of our investigations are summed up as follows:

1. Although at building the dam its material was digged out of layers lying in highly different depths of the borrow-pit, today there aren't any major differences any more between the soil profiles of its zones. The fraction of their inundation mud soil that can be cleared of mud changes between 70—85 p. c., thus its fixation corresponds to that of argillaceous mud, resp. clay. A result of that is their high dead water content that exerts a considerable influence on the composition of vegetation as well on the microclimate formed above the substratum.

2. It can be ascertained on the basis of microclimatic examinations performed in five stations along the dam section that the intensity of illumination is seasonably changing on the sides of northern and southern exposure, as well on the dam crown, depending upon the position of the sun and the spaciousness.

In summer, in the morning hours, the intensity of illumination on the northern side is greater than on the southern one, and the intensity of illumination on the southern side surpasses that on the northern side but after the late morning hours. From September, however, the intensity of illumination is the greatest on the southern side through the whole day.

The relative vapour content is influenced by the different expositions but at noontime.

The difference concerning the soil and atmospheric temperatures is but of a small extent at a higher position of the Sun as a function of exposition. At a lower position of the Sun however, on the dan slopes of southern and northern exposure, in the temperature of 2 cm soil and 10 cm air the difference gets to 7 °C, in a daily average value. The course of change in the temperature is the fastest on a slope of southern exposure.

The extreme values of atmospheric temperature are formed on the northern slope above the plant stock, on the southern slope, however, and on the dam crown they are rather in the plant stock. The temperature conditions of the plant stock are therefore influenced by the motion of air the most considerably on the dam crown and southern slope.

3. As a consequence of the different microclimatic conditions, developed by the effect of exposition, grass associations are formed on the dams that are separated sharply from one another.

On the upper section of the dam side southern exposure *Cynodonti-Poëtum angustifoliae* grass develops, dominating species being the *Cynodon dactylon*. On the middle berm section of the southern slope the facies *Poa angustifolia* of the same association appears. On the lower section of the dam side of southern exposure the flora is similar to that of the upper section.

It may be ascertained that on the slope zones of dams of southern exposure, owing to the extreme soil conditions, the change of species combinations of the grass associations is of a high degree. It is, however, much smaller on the slope zones of northern exposure. Here several species, sown before more decades, have maintained their dominating role up to our days. Such mesoflious species are the *Arrhenatherum elatius, Festuca pratensis.*

These examinations have proved to be suitable for studying the succession of the original culture grass, sown originally since the building of the protective dam, in the direction of the natural grass associations, in the function of the ecologic — first of all microclimatic — effects of different degrees. This effect is considerable, and so it is reasonable that the zones of the grass associations of the Maros dam are in a lot of respects similar to the grass associations of the protective dam of Tisza, resp. to their zonal arrangement in a similar exposition.

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