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DETERMINING PEDO-ECOLOGICAL FACTORS OF A PHYTOCENOSIS COMPLEX (ŞINTEREAG, THE VALLEY OF ŞIEU)

by I. Puia, P. Guş

As an aftermath to the studies performed along the pedological and vegetational charting (scale 1: 2ooo) in the district of Bistriţa-Năsăud, namely at Sintereag, on the field called "Patachiuz", there have been investigated an inlay of phytocenosis comprising twelve local variants of lawns named after the predominating species:

1. Festuca pratensis - Trifolium pratense;
2. Festuca pratensis;
3. Agrostis stolonifera;
4. Puccinellia distans;
5. Carex distans, Carex vulpina;
6. Puccinellia distans + Triglochin maritima;
7. Agropyron repens;
8. Phragmites communis;
9. Triglochin maritima + Agrostis stolonifera + Phragmites communis;
1o. Bolboschoenus maritimus;
11. Schoenoplectus tabernaemontani;
12. Heleocharis palustris.

The distribution of the variants is shown in Fig.1.

The vegetation mosaic is surrounded by variants of Festuca pratensis, and respective Festuca pratensis - Trifolium pratense. The number of species that enters the floral composition of the two variants is close (22-24), but esentially differs the abundance and domination of the same species within the variants and the participation percentage of groups of species, as well. (Tab.1).

By analysing the pedo-ecological characteristics (Tab.2) of profils 1 and 7, one can see marked trophic differences in the two soils. Thus, the soil on which appears the variant with Festuca pratensis - Trifolium pratense (profil 7), is excessively supplied with mobile P_2O_5 and very well with mobile K_2O, very rich in humus(o-1o cm) and total nitrogen. The soil of the variant with Festuca pratensis

Tab.1

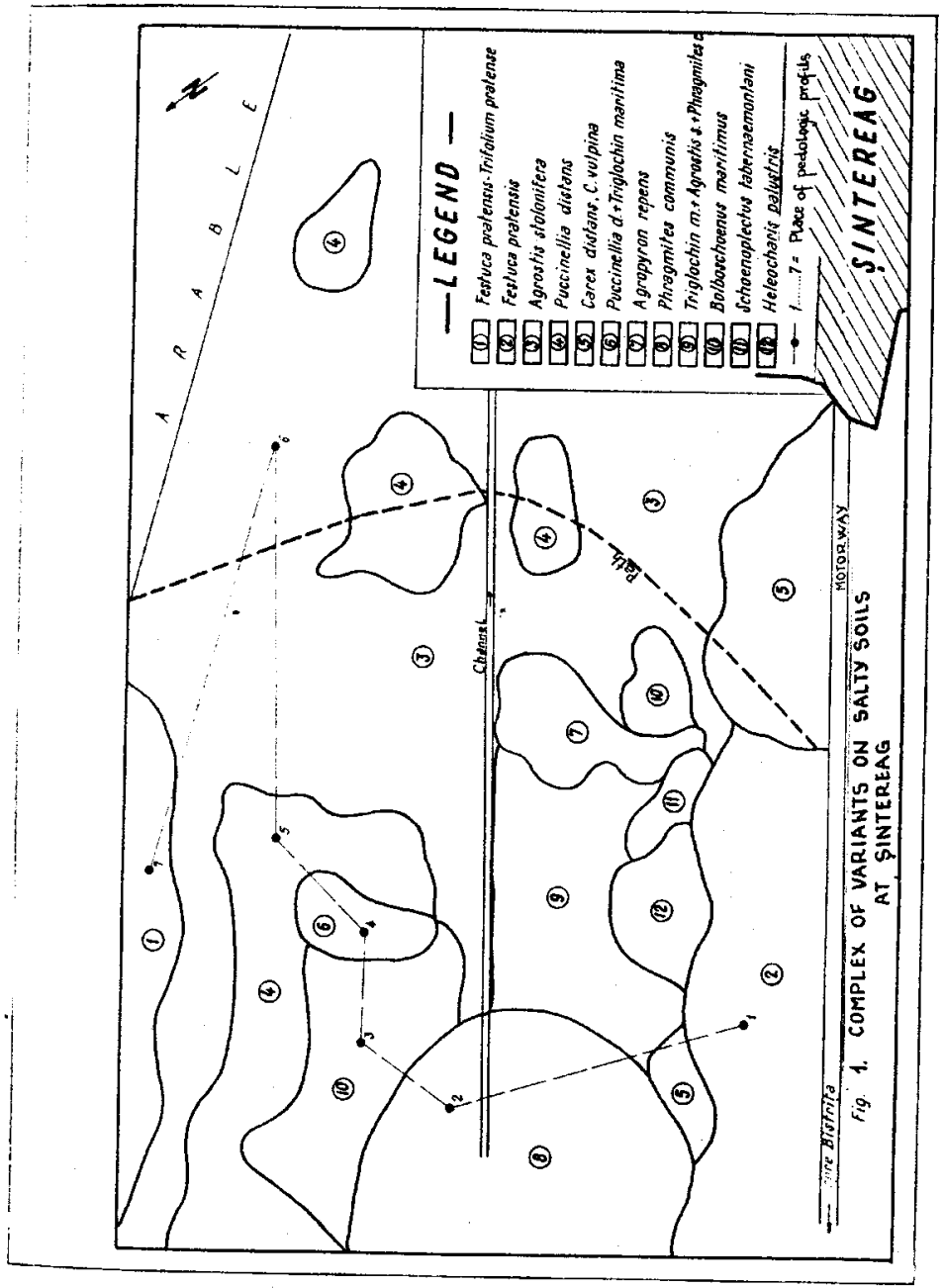
Participation of certain species and group of species in the variants with: Festuca pratensis and Festuca pratensis - Trifolium pratense

Current number	Specification	Variant with: Festuca pratensis (A - D)	Festuca pratensis-Trifolium pratense (A - D)
1.	Agrostis stolonifera	1	.
2.	Alopecurus pratensis	.	+
3.	Dactylis glomerata	.	2
4.	Festuca pratensis	4 - 5	3
5.	Poa pratensis	1 - 2	+
6.	Trifolium hybridum	+ - 1	.
7.	Trifolium pratense	+	2 - 3
8.	Trifolium repens	1	+ - 1
9.	Achillea millefolium	+	2
1o.	Cirsium canum	+ - 1	.
11.	Triglochin maritima	+	.
	Gramineae %	85	53
	Leguminosae %	6	27
	Diverse species %	9	19

is poorly supplied with mobile P_2O_5, well with K_2O and is rich in humus and total nitrogen; poor salinity is evidenced by Triglochin maritima.

We mention that the inner drainage of the soil with the variant of Festuca pratensis is poorer than that with Festuca pratensis - Trifolium pratense. In the first variant, Agrostis stolonifera and Cirsium canum indicate an increased water and clay content of the soil.

The increase in soil humidity is shown by variants with Carex distans, C. vulpina that appear well individualized or even co-dominant with Festuca pratensis. However, it is well known that Festuca pratensis has a somewhat larger ecological spectrum inasmuch as the factor humidity is concerned, being available in almost all mesophilic variants.



Physical and chemical characteristics of soil under the variants complex

Tab. 2

Analysed profile	Horisons genetic	Depth (cm)	Humus %	N total %	Mobile P_2O_5 mg/100 g soil	Mobile K_2O mg/100 g soil	pH	$CaCO_3$ %	Clay %	Total salts %	Salinity degree	Soluble salts me/100 g soil: Anions Cl^-	SO_4^-	HCO_3^-	Cations Na^+	K^+	Ca^{++}	Mg^{++}	Type of salinity[x]
1	Amsc	0-6	3.95	0.238	3.0	19.1	7.42	0.4	39.5	0.168	low	0.60	0.80	0.84	1.04	0.03	0.77	0.40	D
	Asc	20-30	3.44	0.204	2.0	19.5	7.80	0.4	41.1	0.141	low	0.60	0.60	0.86	1.28	0.03	0.40	0.20	D
2	Tgcsc	0-20	4.84	0.254	5 7	33.5	7.90	0.5	62.4	0.374	medium	3.80	1.06	1.02	4.71	0.03	1.00	0.20	C
	Grsc	40-50	2.38	0.134	6.3	22.4	8.50	0.8	45.7	0.454	low	4.60	1.38	1.22	6.08	0.05	0.06	0.00	C
e	Tgcsc	0-20	5.47	0.295	5.9	37.9	7.90	1.1	64.4	0.364	medium	3.78	0.70	1.22	4.20	0.05	1.00	0.40	B
	AGsc	30-40	3.21	0.175	3.9	34.0	8.16	0.8	65.8	0.416	low	4.60	1.06	1.12	5.32	0.07	0.90	0.20	B
4	Gsa	5-10	2.39	0.135	3.3	22.8	7.28	0.3	57.1	1.000	high	13.4	0.26	0.52	11.1	0.03	2.60	0.60	A
	Gsc	40-50	-	-	1.9	16.2	7.40	0.2	43.1	0.746	medium	11.0	0.26	0.56	9.3	0.03	2.00	0.20	A
5	Amsa	0-20	5.39	0.282	2.3	14.2	7.80	0.2	43.5	1.007	high	14.6	0.80	0.80	14.3	0.03	2.00	0.00	A
	AGsc	20-40	2.94	0.158	2.1	13.4	7.88	0.3	38.4	0.740	medium	10.2	0.53	0.66	9.9	0.03	0.95	0.05	A
7	Amsc	5-15	5.30	0.295	1.7	12.2	7.50	0.3	44.8	0.361	medium	3.60	0.80	0.70	4.23	0.01	0.50	0.30	A
	Asc	30-40	2.81	0.145	2.6	15.1	7.70	0.2	39.9	0.266	low	2.60	0.53	0.68	3.29	0.02	0.40	0.00	B
	Am	0-10	5.34	0.278	20.0	39.5	6.30	-	28.3	-	-	-	-	-	-	-	-	-	-
	A	30-40	2.39	0.149	20.0	31.0	6.70	-	30.2	-	-	-	-	-	-	-	-	-	-

[x] A = chloride
B = chloride-bicarbonatic
C = chloride-sulphate-bicarbonatic
D = bicarbonate-sulphate-chloridic

Small areas but ve.y well outlined are those with the variants Heleocharis palustris and Schoenoplectus tabernaemontani.

Cluster with Agropyron repens show up on single spots of more drained forms of microrelief, on soil of poor alkaline reaction (pH = 7.8), shallow salinity (total salt content = 0.208 %).

Judging the results of soil analyses from profiles 2 and 3, on which the variant with Phragmites communis is developing and respective the variant with Bolboschoenus maritimus, we have established a similitude in the properties of the soils, that is, the chemical characteristics and the total salt contents, as well. There are diferences with the type of salinity: the soil having the variant with Phragmites communis is chloride-sulphate-bicarbonatic and, in the variant with Bolboschoenus maritimus is chloride-bicarbonatic. This would lead to the conclusion that not only the mineralisation degree influences the establishment of one variant or other but the type of salinity, too (Tab.2).

The number of species that participates in the composition of the two variants is small. Two species, Phragmites communis and Bolboschoenus maritimus have absolute participation in the first, respective in the second variant. In both cases the Leguminosae are missing and the participation of the Gramineae differs essentially (Tab.3).

The passing from a medium salinity of soil (0.360 % in profils 3) to a high salinity (1.007 - 1.000 % in profil 5) is marked by the very clear separation limit between the variant with Bolboschoenus maritimus and that with Puccinellia distans. In the salinity interval mentioned, where the humidity regimen varies too, the passing between the two variants is done by means of phytocenoses with Puccinellia distans + Triglochin maritima. The two dominant species within the variant are disposed as follows; the first towards the variant with Puccinellia distans and Triglochin maritima towards the variant with Bolboschoenus maritimus; in the middle of the cluster, they are codominant. The number of species that forms the variant with Puccinellia distans + Triglochin maritima is very small (4), covering 85-95 %. The identified species within the variant are the following:

Puccinellia distans	4 - 5
Juncus gerardi	+
Plantago cornuti	+ - 1
Triglochin maritima	2

Tab.3

Participation of species and the groups of species in the variants with Phragmites communis and Bolboschoenus maritimus

Current number	Specification	Variant with: Phragmites communis (A - D)	Bolboschoenus maritimus (A - D)
1.	Agrostis stolonifera	+ - 1	+ - 1
2.	Glyceria aquatica	+	.
3.	Phragmites communis	4 - 5	.
4.	Poa pratensis	+	.
5.	Atriplex hastata	.	+
6.	Bolboschoenus maritimus	(+)	5
7.	Polygonum amphibium	+	.
8.	Potentilla anserina	+	+
9.	Triglochin maritima	+ - 1	+
	Gramineae %	78	2
	Leguminosae %	-	-
	Diverse species %	2	85

Within the frame of vegetation mosaic, the variant with Agrostis stolonifera, respective the variant with Puccinellia distans occupy large areas.

The physical and chemical characteristic of the soil (profils 5 and 6, in tab.2) are closely related in both variants; and so the relief conditions and the depth of phreatic waters (0.5o-1.oo m), too. The only pedo-ecological factor that differs and establishes the conditions for the differentiation of the two variants is the contents of salts. In the case of the variant with Agrostis stolonifera, the total contents in salts in the soil is medium (o.361 %) in the first 15 cm, and in the variant with Puccinellia distans, total contents in salts is very high (1.oo7 %). The mineralisation type at surface is in both cases chloride. In depth, in the variant with Agrostis stolonifera the type of mineralization is chloride-bicarbonatic.

Differences are noticeable with the participation of groups of species, too. Thus, in both variants, the Gramineae participate in a proportion of 83-84 %; other species 1o % in the variant with Agrostis stolonifera and 2 % in the variants with Puccinellia distans.

The Leguminosae being present in a proportion of 4 % in the variant with Agrostis stolonifera; they are missing from the variant with Puccinellia distans.

Of the Leguminosae species, there have been identified the following: Lotus tenuis noted with AD = + - 1 and, Trifolium repens noted AD = 1.

Some of the quantitative and qualitative indexes of the main variants in the vegetation complex, are given in Tab.4.

Tab.4

Some quantitative and qualitative indexes of the main variants in the complex

Variant with:	Dried matter c/ha	N total %	P %	K %	Ca %	Rough cellulose
Festuca pratensis - Trifolium pratense	49.5	2.41	o.351	2.65	1.23	24.18
Festuca pratensis	47.1	1.41	o.239	2.o3	o.73	26.o3
Agrostis stolonifera	26.3	2.o8	o.249	1.52	o.28	24.82
Puccinellia distans	15.o	2.17	o.277	1.8o	o.2o	21.61
Puccinellia distans - Triglochin maritima	14.o	1.56	o.266	1.74	o.16	26.4o
Phragmites communis	46.3	2.oo	o.288	2.o8	o.24	31.47
Bolboschoenus maritimus	14.2	2.49	o.214	2.o6	o.34	25.38

Conclusions:

The excellent trophic and humidity conditions (good internal drainage) and the complete lack of salts set the conditions to the establishment of the variant with Festuca pratensis - Trifolium pratense, to the detriment of the variant with Festuca pratensis. This denotes that Trifolium pratense is more sensitive to the excess of humidity and salts.

The prolongation of excesive humidity periods on soils with clay contens over 4o % is correlated with the establishment of the variants Carex distans, C. vulpina.

On the background of a humidity excess, completed with addition of salts, the variants 3, 4, 6, 8, 9, 1o, 11, 12, are established.

The presence of one or another of these variants is determined by the degree of mineralization (total contents in salts) and the type of salinity.