RESEARCHE ON SOIL EROSION ON SAND DUNES IN THE SANISLAU AREA, SATU MARE COUNTY

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Abstract

Erosion is defined as the process of removing and removing soil particles or aggregates through water, wind, or other agents. This process can be natural or accelerated by human activity. Depending on local conditions and climate, erosion may be; slow or rapid. In pedology insist on accelerated erosion, or man-made erosion. Erosion can be: the surface; of the depth and the nature of the erosion factors may be: water erosion; wind erosion; anthropic erosion.

The present paper presents the intensity of the erosion phenomenon on sandy soils in the perimeter of Sanislau, Satu Mare county, the impact on the soil and the environment as well as the technical solutions for reducing the damages produced

Key words: erosion, sandy soil, climate, precipitation, dune, environment, impact, solutions.

INTRODUCTION

The studied territory is located in Sanislau com. Of Satu Mare County, in the western part of it. It is bordered in the northern part with the commune of Ciumesti, to the north-east with the Municipality of Carei, to the east with Petresti commune, to the south by com Piscolt, and to the western part with Hungary Contry (fig.1). Sanislau commune consists of the following localities; Sanislau, Horea and Marna, these are part of the Carei Plain and Nirului Plain, so in Careia Plain there is Marna and about 30% of the north - eastern part of Sanislau and Horea and 70% of Sanislau are found in the Nirjah (Munteanu et al, 2009).

The town center is located in Sanislau and is 54 km away from Satu Mare and Muni Carei at 17 km. The total area of Sanislau commune is 7477.84 ha of which 4798.00 ha is agricultural land and 730 ha is unproductive land (Table 1).

Of the total agricultural land area about 70% is occupied by the sandy soil (sandy soil) Psamosol, respectively 3358 ha, and on the rest of the surface 30%, 1440 ha we meet: Chernozems, Eutricambosoluri, Luvosoluri and Gleiosoluri (Florea et al, 2012). The characteristic saliva material in the Nirvana Plain is formed by the sands, in which the argil-ferrous strips of a brown-red coloration appear at a depth between 0.5-4.00 m and then disappear, non-carbonate on the dunes, and in the interdunctures and the sectors implanted are carbonated and predominantly gills, and at the

same time we meet locally compact layers (ortsand strips) formed under the influence of the waters of the willow (Florea et al, 1998).

The studied territory falls within the climatic sector of the Western Plain. The climate is temperate - continental - moderate with a warmer heat regime, with early spring and moderate precipitations, which are part of the climate formula C. fb X. The average annual temperature is 9.75 ° C, the warmest month being in the month July with an average of 20.8 ° C and the coldest month of the year is January with an average of - 2.9 ° C. Annual average rainfall is 559 mm, the most abundant are March - April, and the poorest in precipitation are July - August

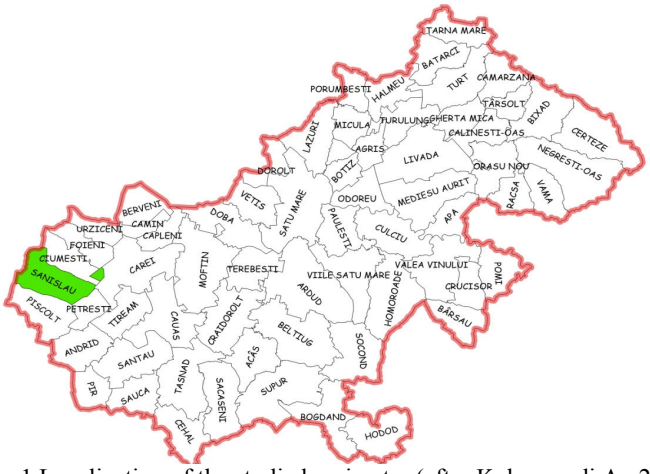

Fig. 1 Localization of the studied perimeter (after Kokenyesdi A., 2018)

Tabel 1

How to use the land in the village of Sanislau

Crt. No	Land use	Surface (ha)	%
1	Arable	3820,00	79,62
2	Pastures	651,00	13.57
3	Meadows	236,00	4, 92
4	Vine	76,00	1,58
5	Orchard	15,00	0,31
6	Total agricultural	4798.00	100.00
7	Total unproductive	730,00	100.00

MATERIAL AND METHOD

The sand dunes that are the subject of the research are located in the Nirvana Plain, where the old pleistocene and Holocene beams have been eroded and covered with wind-resurfaced sands forming a complex of dunes (high and low) which are oriented to the north-east and south - west (Fig. 2.3). The deposition and sedimentation of the dunes has taken place at

different times, especially in a climate with high humidity and abundant vegetation (Vranceanu et al, 2016). Nir's field has a generally valiant appearance marked by positive relief forms (dunes) with absolute altitudes between 130-150 m, also slightly depressed areas and abandoned whites. The dune orientation is perpendicular to the prevailing wind direction, with a width of 150 - 200 m (Vranceanu et al, 2016). The distance between the dunes is 200 to 1500 m. The height of the dunes is varied between 10 - 20 m.

Wind deflation is manifested especially during the seasons (spring and autumn), but also in the cold season when in the absence of a layer of snow the soil is vulnerable to wind intensification, plus the lack of protection curtains affecting the dunes sand especially high (high dunes) which are devoid of woody or grassy vegetation (Brejea, 2017).

Increasing the vulnerability of soils to degradation processes caused by inappropriate agricultural practices is one of the most important factors, especially through the use of predominantly agricultural pedological resources (Domuta et al, 2011). Massive deforestation, destruction of fruit and wine plantations, excessive grazing, etc., act in a negative way on soil quality. The physico-chemical characteristics of Psamosol in Sanislău are presented in Tables 2 and 3

Fig.2. Low dune from the Sanislau area

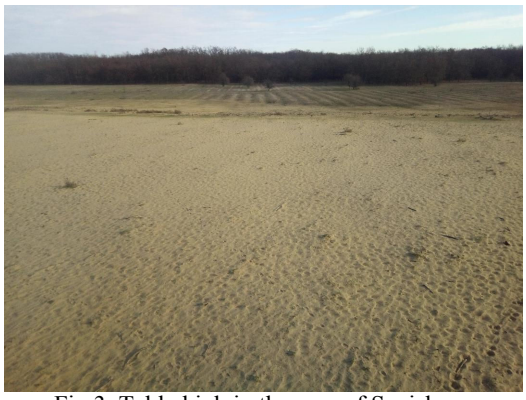

Fig.3 .Table high in the area of Sanislau

Fig.4. Sandy soil profile (Psamosol)

Tabel 2

The physical characteristics of Psamosol in Sanislau

Crt. No	Horizon	Amp	Ao	Bv	BC	Cn
1	Apparent density, g / cm3	1,57	1,59	1,62		
2	coarse sand 2 - 0.2 mm	27,55	30,45	35,73	36,14	38,95
3	fine sand 0.2-0.02 mm	64,08	61,74	57,19	55,26	59,24
4	Dust 0.02 -0.002mm	3,41	3,58	3,96	2,25	1,71
5	clay <0.002	4,96	4,23	3,12	3,54	2,01
6	physical clay <0.01mm	5,64	4,95	4,27	4,86	4,05
7	Total porosity,%	55	53	45		
8	Texture	N	N	N	N	N
9	Hygroscopicity coefficient	2,42	1,86	1,20	1,63	0,98

Tabel 3

The chemical characteristics of Psamosol in Sanislau

Crt. No	Horizon	Amp	Ao	Bv	BC	Cn
1	Depth cm	0-22	22-41	41-72	72-115	115-170
2	pH in H2O	5,54	5,31	5,77	6,60	6,69
3	Humus	1,15	0,52	0,24		
4	Total nitrogen	0,065	0,026			
5	CaCO3	0	0	0	0	0
6	P(AL),ppm	23	16	6		
7	K(AL),ppm	85	44	31		
8	Ah(Kappen),me/100g	0	0	0	0	
9	SB(Kappen)me/100g	8,51	5,54	3,76		
10	Na+ me/100g	0,76	0,49	0,53	0,51	0,46
11	K+ me/100g	0,07	0,06	0,08	0,12	0,21
12	Ca2+ me/100g	7,59	5,02	3,21	4,54	6,05

RESULTS AND DISCUSSION

To prevent and combat wind and water erosion in sandy areas - notably on sand dunes existing in the Sanislau area of Satu Mare County, some measures must be taken into account; a certain structure of crops, in order to maintain the soil covered as much as vegetal carpet; practicing successive crops; the reduction of soil works and, in particular, the failure to carry out autumn fields; no mechanized work on sandy soils in strong wind conditions; setting up protection curtains; planting of fruit trees and grapevine; restoration of the grassy carpet by reanimation; Manure manure in optimal doses to increase the humus reserve in the soil by using half-fermented organic fertilizers applied at short intervals(1-2 years) and green fertilizers in successive crops prohibiting the use of sand in construction to avoid the formation of loan holes; the afforestation of the areas heavily affected by wind or water erosion, or the maintenance under the forest of those areas with high risk of deflation and strict monitoring thereof; observing the season, grazing time and rotation on the parcels, for the restoration of the grassy carpet.

Fertilization of sandy soils involves the systematic administration of fertilizers with N P K (N as nitrocalcium or ammonium nitrate on sandy soils with carbonates, P as superphosphate or phosphoric acid activated on acidic sandy soils); Application of N and K fertilizers should be done in order to reduce the losses by deep washing and to avoid super-fertilization. In the case of sandy soils with carbonates, the occurrence of chlorosis in susceptible plants is possible.

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