THE INFLUENCE OF MINERAL AND ORGANIC FERTILISATION ON THE AVERAGE DRY MATTER YIELD OF PERMANENT GRASSLAND FROM BANAT (ROMANIA) HILL REGION

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Abstract: *In this study the objective was to determine the dry matter content of the permanent grasslands under the influence of mineral and organic fertilizers. Experimental field is located on a low hill meadow used as permanent grassland in Fibiş village (Timis County). In the year 2011 the average of the annual rainfall amount is 484 mm. On the season, the precipitation is rich in summer (30.7%), followed by spring (25.1%), fall (23.9%), and winter with less precipitation (20.3%). The experimental field was organized by setting 10 fertilisation variants (3 organic,3 mineral and 3 organic – mineral fertilisation variants) and a control non-fertilised variant. Every studied variant has three replicates. The data are collected during 2010-2012 period. The analyzed samples were weighed in the field using a portable electronic. Determination of dry matter was achieved by drying stove method.This method is based on determining the loss of mass by heating at a temperature of 105 º, until constant mass. The protocol was done according to the method AOAOC 93015 (Edition 15/1990). Resides obtained after drying in the oven is the amount of forage dry matter. Statistically speaking, the dry matter yields highly significant positive results in organic fertilization variant fertilized with sheep manure 40 tons per hectare(V3). The organo-mineral fertilization have results very significant at the variant fertilized with 20 t sheep manure / ha + 50 kg / ha N + 50 kg / ha P_2O_5 + 50 kg / ha K_2O (V7). The chemical fertilization have results very significant at the variant fertilized with (100 +100) kg/ha N 50 kg / ha P_2O_5 50 kg/ha 50 kg /ha K_2O (V10). The dry matter yields need long time researches, to provide sustainable results*

***Key words*:** dry matter, permanent grasslands, fertilisation

INTRODUCTION

Fibiş village is situated in the northeast of Timis County and is situated along the county road DJ 691 Timisoara - Lipova has the following geographical coordinates 45 º 58 '25 "N and 21 º 25' 19" east longitude. Common bond with the county is assured by railway linking Radna Timisoara (Lipova) via Fibiş.The village is bordered by the commune Maşloc to E-SE, S Pişchia territory, the territory of Ortisoara the V territory of Sagu (Arad county) to V-NV, Maşloc in N. commune commune territory covers a total area of Fibiş 5,318,950 ha of agricultural area is 5,058,180 ha.

MATERIAL AND METHOD

Determination of the dry matter content was performed by the method of drying the.drying stove.This method is based on determining the loss of weight by heating at 105 ° until constant weight. (Popescu *et al.*, 1986). Protocol was done according to the method AOAOC 93015 (Edition 15/1990). Residue was obtained after drying in the oven is the amount of forage dry matter. Expression of moisture and dry matter content is in procent (%). (GERGEN, 2004)

RESULTS AND DISCUSIONS

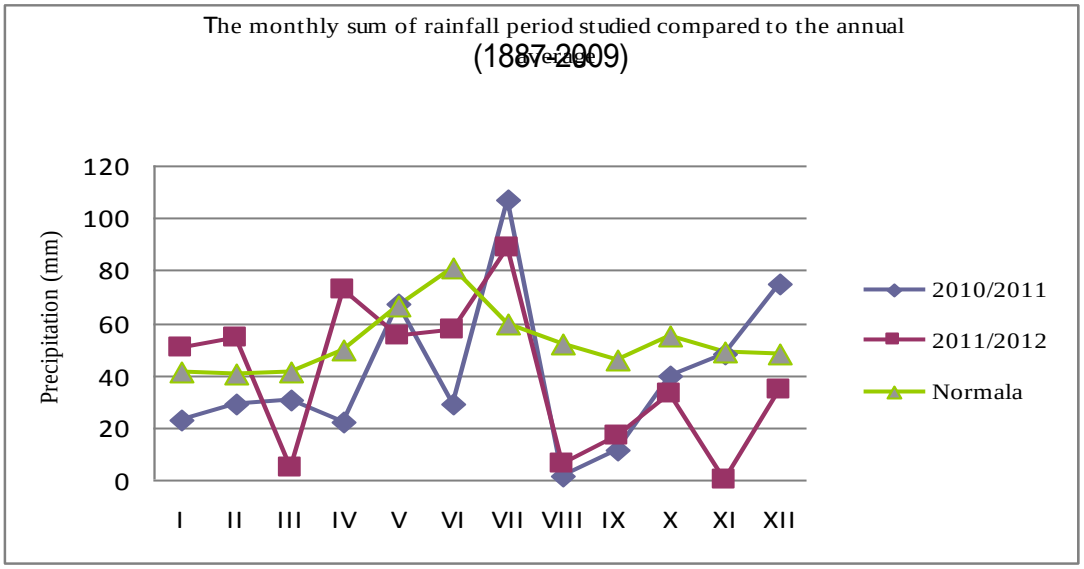
Based on observations made by the Institute of Meteorology and Hydrology in Timisoara to parse the meaning of precipitation in relation to the requirements of agriculture in specific periods, during October 2010 - September 2012. The analysis of rainfall data from the 2011-2012 crop year, that the whole was a dry year.

Rainfall between September to October to give some idea of soil moisture, the dry significance both in 2010 and in 2011.

Amounts of water fallen in the cold season (November-March) reserves of soil water having special significance for water supply permanent pastures during the spring and summer the optimal significance.

Quantities of water from rainfall recorded in the Hills Lipovei lows in September and October to optimum range from November to March (fig 1). In April of 2011 we have a significance, dry "and in April of 2012 have meaning, surplus"

During the two-year period studied (May-July) fell on average 200 mm hovering optimal limit water needs of plants.



Fi.g 1.The monthly sum of rainfall period period studied to the multiannual average (1887-2009)

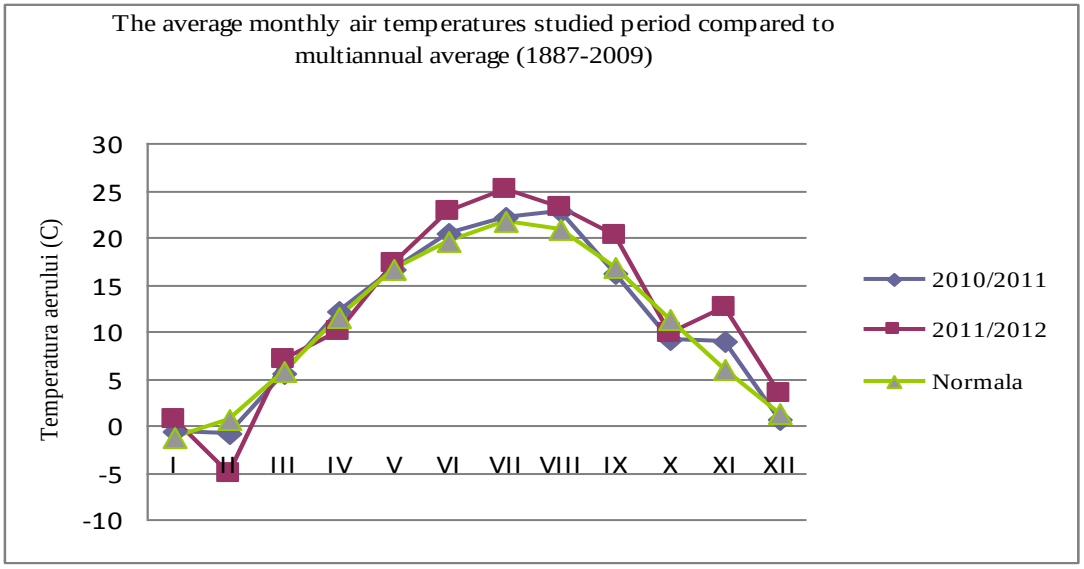


Fig. 2. The average of air temperatures of studied period compared to the multiannual average (1887-2009)

At first sew in 2011 (table 1) under organic fertilization on dry matter production growth is significantly distinct from organic fertilization doses of 20 t / ha sheep manure (V2) and 60 t / ha sheep manure (V4) and fertilized with 40 t / ha farmyard sheep (V3) is just significant.

Chemical fertilization on dry matter production increase is very significant to variants (V8, V9) and the solution was applied to the maximum dose (V10) increase in dry matter production is significant.

Mixed fertilization only production variant fertilized with 20 t sheep manure and N_{50} + P_{50} + K_{50} kg / ha (V7) is very significant and the other two variants fertilized mixed productions (V5, V6) are only statistically significant.

Table 1

Influence of fertilization on dry matter production of permanent grassland used for hay (scythe I Fibiş, 2011)

No.	Variants	t/ha D.M	%	Difference t/ha D.M	Signifi-cance
1	V1 – control variant	3,14	100,00		Mt
2	V2 - 20 t sheep manure	5,01	159,83	1,88	**
3	V3 - 40 t sheep manure	4,46	142,19	1,32	*
4	V4 - 60 t sheep manure	5,01	159,72	1,87	**

5	V5 - 20 t sheep manure + P_{50}	4,72	150,58	1,59	*
6	V6 - 20 t sheep manure+ P_{50} + K_{50}	4,25	135,49	1,11	*
7	V7 - 20 t sheep manure + N_{50} + P_{50} + K_{50}	6,31	201,17	3,17	***
8	V8 - N_{100} + P_{50} + K_{50}	6,75	215,20	3,61	***
9	V9 - N_{150} + P_{50} + K_{50}	5,58	177,79	2,44	***
10	V10 - $N_{100+100}$ + P_{50} + K_{50}	5,16	164,61	2,03	**
DL 5% =1,18 t/ha D.M.					
DL 1% =1,61 t/ha D.M					
DL 0,1% = 2,19 t/ha D.M					

Sewing the second in 2011 (table 2), the increase in dry matter production under organic fertilization is significantly fertilized with the highest dose (V4) of organic fertilizer and organic fertilized the other two variants (V2, V3) production are statistically insignificant.

In chemical fertilization increase production of dry matter in the variant fertilized with N_{150} + P_{50} + K_{50} (V9) is distinctly significant and the variant fertilized with the lowest dose (V8) increase is only significant and the variant fertilized with dose chemical output (V10) allowance production is insignificant.

During fertilization mixed production increase dry matter is fertilized with 20 t manure of sheep / ha + 50 kg / ha N + 50 kg / ha P_2O_5 + 50 kg / ha K_2O (V7) significantly distinct and the other two variants fertilized mixed (V5, V6) growth is insignificant.

Table 2

Influence of fertilization on dry matter production of permanent grassland used for hay (scythe II Fibiş, 2011)

No.	Variants	t/ha D.M	%	Difference t/ha D.M	Signifi-cance
1	V1 – control variant	1,73	100,00	-	Mt
2	V2 - 20 t sheep manure	2,32	133,85	0,59	-
3	V3 - 40 t sheep manure	2,11	121,92	0,38	-
4	V4 - 60 t sheep manure	2,76	159,23	1,03	*
5	V5 - 20 t sheep manure + P_{50}	2,61	150,38	0,87	-
6	V6 - 20 t sheep manure + P_{50} + K_{50}	2,38	137,31	0,65	-

7	V7 - 20 t sheep manure + N_{50} + P_{50} + K_{50}	3,22	185,96	1,49	**
8	V8 - N_{100} + P_{50} + K_{50}	2,83	163,08	1,09	*
9	V9 - N_{150} + P_{50} + K_{50}	2,94	169,62	1,21	**
10	V10 - $N_{100+100}$ + P_{50} + K_{50}	2,57	148,08	0,83	-
DL 5% = 0,87 t/ha D.M.					
DL 1% = 1,19 t/ha D.M.					
DL 0,1% =1,62 t/ha D.M.					

At first sew in 2012 (table 3), organic fertilization on dry matter production increases the positive results from unfertilized but are all statistically insignificant.

Chemical fertilization on dry matter production growth is fertilized with N100 + P50 + K50 (V8) and the variant significantly (V9) by increasing the dose of nitrogen N50 increase in dry matter production is significant. When applying the maximum dose (V10) dry matter production increase is statistically insignificant.

In mixed fertilization, dry matter production growth is all three versions (V5, V6, V7) insignificant.

Table 3

Influence of fertilization on dry matter production of permanent grassland used for hay (scythe I Fibiş, 2012)

No.	Variants	t/ha D.M	%	Difference t/ha D.M	Signifi-cance
1	V1 – control variant	4,28	100,00	-	Mt
2	V2 - 20 t sheep manure	5,37	125,55	1,09	-
3	V3 - 40 t sheep manure	5,66	132,24	1,38	-
4	V4 - 60 t sheep manure	5,28	123,29	1,00	-
5	V5 - 20 t sheep manure + P_{50}	5,57	130,22	1,29	-
6	V6 - 20 t sheep manure + P_{50} + K_{50}	5,63	131,46	1,35	-
7	V7 - 20 t sheep manure + N_{50} + P_{50} + K_{50}	6,53	152,65	2,25	-
8	V8 - N_{100} + P_{50} + K_{50}	7,04	164,49	2,76	*
9	V9 - N_{150} + P_{50} + K_{50}	7,77	181,54	3,49	**
10	V10 - $N_{100+100}$ + P_{50} + K_{50}	6,80	158,88	2,52	*

DL 5% = 2,50 t/ha D.M
DL 1% = 3,44 t/ha D.M
DL 0,1% = 4,68 t/ha D.M

Sewing the second in 2012 (table 4) increase in dry matter production under organic fertilization is very significant only version that was applied moderate dose of sheep manure (V3).

Chemical fertilization and mixed in the dry matter production increase at the variants were applied to maximum dose is very important.

Mixed fertilization with 20 t manure + P50 + K50 (V6), dry matter production growth is insignificant, the variant which applied the maximum dose is highly significant (V7) and the variant fertilized with the low dose of organic fertilizer (V5) dry matter production increase is significant.

Table 4

Influence of fertilization on dry matter production of permanent grassland used for hay (scythe II Fibiş, 2012)

No.	Variants	t/ha D.M	%	Difference t/ha D.M	Signifi-cance
1	V1 – control variant	0,58	100,00	-	Mt
2	V2 - 20 t sheep manure	1,04	178,74	0,46	**
3	V3 - 40 t sheep manure	1,21	208,62	0,63	***
4	V4 - 60 t sheep manure	1,06	183,33	0,48	**
5	V5 - 20 t sheep manure + P_{50}	0,92	158,05	0,34	*
6	V6 - 20 t sheep manure + P_{50} + K_{50}	0,79	136,21	0,21	-
7	V7 - 20 t sheep manure + N_{50} + P_{50} + K_{50}	1,25	215,52	0,67	***
8	V8 - N_{100} + P_{50} + K_{50}	0,99	170,69	0,41	**
9	**V9 - N_{150} + P_{50} + K_{50}**	0,98	168,97	0,40	**
10	**V10 - $N_{100+100}$ + P_{50} + K_{50}**	1,14	196,55	0,56	***
DL 5% =0,29 t/ha D.M					

DL 1% =0,40 t/ha D.M
DL 0,1% =0,55 t/ha D.M

CONCLUSIONS

In the first two years of research the results increase dry matter varies from year to another and from this reason, we need long time researches, to provide sustainable results.

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