

## GRASSLAND PRODUCTIVITY IN THE INFERIOR HYDROGRAPHIC BASIN OF MOTRU RIVER

Teodor MARUȘCA<sup>1</sup>, Daniel RĂDUȚOIU<sup>2</sup>, Monica Alexandrina TOD<sup>3</sup>,  
Marcela M. M. DRAGOȘ<sup>4</sup>

**Abstract.** *The permanent grasslands of the lower basin of Motru river are particularly valuable, expressed in phytodiversity and productivity. The average number of cormophyte species is 117 in the 12 associations with 116 surveys. The most species were found in the associations Festucetum rupicolae (191), Festuco rubrae - Agrostetum capillaris (168) and Festucetum valesiaco-rupicolae (143 species). The participation of forage species in the grassy carpet reaches 66%, directly influencing productivity. The average production of forage green mass (GM) was evaluated at 10.31 t/ha with a pastoral value (PV) of 52.1 which can provide 4390 liters of cow's milk in 160 days grazing season from grass alone. The most valuable are grassland of the association Trifolio repenti - Lolietum perennis in the grassland of this river, which have a production of over 25 t/ha GM and 93 PV index. The most degraded are the grassland in the Caricetum hirtae association with almost 1 t/ha GM and 6 PV index. At the phytosociological alliance (habitat) level, the production of cow's milk was established, which is almost 7700 liters per hectare in Trifolio repenti - Lolietum perennis with a loading of 1.73 LU/ha, association imitated and cultivated with improved varieties on the surfaces throughout western Europe with good humidity.*

**Keywords:** Motru basin, pastoral value, grass and milk production, grasslands

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### 1. Introduction

In addition to determining and classifying the vegetation units of permanent meadows, it is necessary to know their productivity, without which the optimal load with animals and other technological measures cannot be established [2].

In our literature on the vegetation cover of grasslands, carried out by geobotanists, as a rule phytocenological units were outlined and classified and in very few cases determinations of production and forage quality were carried out [13].

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<sup>1</sup>PhD Eng. Teodor MARUȘCA, Grassland Research-Development Institute-Brașov, Romania, Full member of the Academy of Romanian Scientists (E-mail: maruscat@yahoo.com).

<sup>2</sup>Prof. PhD Daniel RĂDUȚOIU, University of Craiova, Dolj County, Romania, (E-mail: radutoiudaniel@yahoo.com).

<sup>3</sup>PhD Monica Alexandrina TOD, Grassland Research-Development Institute-Brașov, Romania, (E-mail: monica.tod@pajisti-grassland.ro).

<sup>4</sup>PhD Marcela M. M. DRAGOȘ, Grassland Research-Development Institute-Brașov, Romania, (E-mail: marcela.dragos@pajisti-grassland.ro).

Determination of production carried out in fenced spaces in case of use by grazing the grasslands is quite difficult and very expensive.

The collected forage samples are further subjected to laboratory analyses to determine the quality for determining the animal rations.

With the development of a new method for evaluating the grasslands productivity based on floristic survey, it is possible to evaluate it with much lower expenses and satisfactory results [4].

Based on long-term stationary research, evaluation coefficients of milk production in the grazing season were established based on the index of pastoral value [3, 5, 11].

Until now, 19 more important stations in the hills and plains of our country have been evaluated in a first approximation [7].

The present work is a continuation of the application of grassland productivity evaluation methods based on floristic survey and pastoral value index for more accurate establishment of production and fodder quality, simultaneously with their generalization.

## 2. Materials and Methods

The doctoral thesis entitled "Flora and vegetation of the Inferior Hydrographic Basin of Motru", prepared and supported in 2005 by biologist Iulian Costache under the guidance of Prof. Vasile Ciocârlan, University of Bucharest, Faculty of Biology, whose grassland productivity is less known [1] presented an overview of practical vegetation is as follows:

### ***MOLINIO - ARRHENATHERETEA* Class Tx.1937**

Ord. *MOLINIETALIA* Koch 1926

Al. *Calthion* R Tx 1937

1. As. *Scirpetum sylvatici* Schwick 1944

Al. *Agrostion stoloniferae* Soó (1933) 1971

2. As. *Caricetum hirtae* Soó 1927

- *cirsietosum creticae* subas.prov.

3. As. *Agrostetum stoloniferae* (Ujvarosi 1941) Burduja et al. 1956

4. As. *Poëtum silvicolae* Buia et al.1959

5. As. *Festucetum pratensis* (Soó 1938) 1955,1069

6. As. *Poëtum pratensis* Răv.,Căzăc. și Turenschi 1956

7. As. *Agrostetum caninae* Harg 1941

Ord. *ARRHENATHERETALIA* Pawlowski et al. 1928

Al. *Cynosurion cristati* R Tx.1947

8. As. *Festuco rubrae - Agrostetum capillaris* Horvat 1951

9. As. *Trifolio repenti - Lolietum perennis* Krippelova 1967, Resm.

- Pop et al.1967  
**Clasa *FESTUCO – BROMETEA*** Br.-Bl.& R. Tx. in Br.-Bl.1949  
 Ord. *FESTUCETALIA VALESIIACAE* Br.-Bl.& R. Tx. in Br.-Bl.1949  
 Al. *Festucion valesiaca* Klika 1931  
 10. As. *Festucetum valesiaco-rupicolae* Csürös & Kovács 1962  
     - *botriochoetosum* (Kovács 1962, Resmeriță 1965), Pop,  
     Cristea, Hodișan, Gergely 1968  
 11. As. *Festucetum rupicolae* Burduja & al. 1956  
 12. As. *Medicagini-Festucetum valesiaca* Wagner 1940

The working method has been described in several papers in which was evaluating the grasslands productivity located in some hydrographic basins published in these annals, so we will not return to them [8, 9, 10, 12].

For those who wish to apply the new method of evaluating productivity based on floristic survey, we also recommend other papers which have a wide circulation and more quotes [4, 6].

### 3. Results and Discussions

The grasslands in the inferior basin of the Motru River, classified into 2 classes, 3 orders, 4 alliances and 12 associations, are located between 110 - 380 m altitude on mostly sunny exposures, on flat terrain up to an inclination of 30 degrees (Table 1).

**Table 1.** General data regarding seasonal and vegetation grasslands conditions

No.	Vegetal association	Surveys (no)	Altitude (m)	Exposition	Inclination (degree)	Plant species (no)	Cover %
<b>Al. <i>Calthion</i></b>							
1	<i>Scirpetum sylvatici</i>	5	150-250	Plan	0	78	100
<b>Al. <i>Agrostion stoloniferae</i></b>							
2	<i>Caricetum hirtae</i>	10	150-300	Plan, N,E	0-20	106	100
3	<i>Agrostetum stoloniferae</i>	9	130-300	Plan, E	0-20	107	100
4	<i>Poëtum silvicolae</i>	11	120-300	Plan, SW	0-5	103	100
5	<i>Festucetum pratensis</i>	12	120-300	Plan, SW	0-5	130	100
6	<i>Poëtum pratensis</i>	10	110-180	Plan	0	69	100
7	<i>Agrostetum caninae</i>	7	120-250	N,NW,NE	10-15	118	100
<b>Al. <i>Cynosurion cristati</i></b>							
8	<i>Festuco rubrae - Agrostetum capillaris</i>	11	250-380	Plan,N,SW,W,NE,NW	0-20	468	100
9	<i>Trifolio repenti - Lolietum perennis</i>	6	150-250	Plan, E,SW	0-20	75	100

Al. <i>Festucion valesiaca</i>							
10	<i>Festucetum valesiaco-rupicolae</i>	10	150-320	S,E,SE,SW,N	10-30	143	93
11	<i>Festucetum rupicolae</i>	14	150-300	N,NE,NW,E, S,SE	0-15	191	94
12	<i>Medicagini-Festucetum valesiaca</i>	11	150-260	W,SW,SE	10-20	113	88
<b>TOTAL – AVERAGE</b>		<b>116</b>	<b>110-380</b>	<b>All</b>	<b>0-30</b>	<b>117</b>	<b>98</b>

In these seasonal conditions, an average number of 117 cormophyte plant species were identified with a 98% land cover.

The most species were recorded in the association *Festucetum rupicolae* (191sp.), followed by *Festuco rubrae* - *Agrostetum capillaris* (168) and *Festucetum valesiaco-rupicolae* (143 species).

A smaller number of taxons were found in the associations *Poëtum pratensis* (69 sp.), *Trifolio repenti* - *Lolietum perennis* (75) and *Scirpetum sylvatici* (78 sp.).

In general, the very high phytodiversity of the 116 floristic surveys in the area under study can be noted.

A fairly good situation is represented by the participation of 66% of species with forage value, with direct influence on the production of green mass (GM) and pastoral value (PV) (Table 2).

**Table 2.** Grass carpet structure, pastoral value and the green forage mass production of the grassland associations

No	Grassland Association	Species structure (%)		Pastoral value		Green mass production	
		Forage	Harmfu	ind.	%	t/ha	%
<b>Al. <i>Calthion</i></b>							
1	<i>Scirpetum sylvatici</i>	12	88	6.6	13	1.26	12
<b>Al. <i>Agrostion stoloniferae</i></b>							
2	<i>Caricetum hirtae</i>	8	92	5.9	11	0.83	8
3	<i>Agrostetum stoloniferae</i>	85	15	64.9	125	14.15	137
4	<i>Poëtum silvicolae</i>	85	15	74.4	143	14.23	138
5	<i>Festucetum pratensis</i>	76	24	83.2	160	20.45	198
6	<i>Poëtum pratensis</i>	89	11	78.1	150	14.87	144
7	<i>Agrostetum caninae</i>	76	24	51.7	99	7.68	74
<b>Al. <i>Cynosurion cristati</i></b>							
8	<i>Festuco rubrae</i> - <i>Agrostetum capillaris</i>	84	16	64.0	123	10.04	97
9	<i>Trifolio repenti</i> - <i>Lolietum perennis</i>	97	3	93.0	179	25.86	250
<b>Al. <i>Festucion valesiaca</i></b>							
10	<i>Festucetum valesiaco-rupicolae</i>	23	70	13.4	25	1.55	15
11	<i>Festucetum rupicolae</i>	80	14	44.1	85	8.12	79
12	<i>Medicagini-Festucetum valesiaca</i>	77	11	45.9	87	4.63	45
<b>Average</b>		<b>66</b>	<b>32</b>	<b>52.1</b>	<b>100</b>	<b>10.31</b>	<b>100</b>

Thus, the average production of green mass, 10.31 t/ha is one of the highest evaluated for the plains and hills area.

The highest green mass production was in the association *Trifolio repenti - Lolietum perennis* (25.86 t/ha), followed by *Festucetum pratensis* with (20.45 t/ha).

The lowest green mass production was in the association of *Caricetum hirtae* (0.83 t/ha) and *Scirpetum sylvatici* (1.26 t/ha).

The pastoral value indices are directly proportional to the forage production of green mass being 83 - 93 PV for the most valuable associations and 5.9 - 6.6 PV for those with degraded grass carpet.

With a PV of 52.1 these associations are considered average in terms of forage quality.

Based on the PV index and the coefficient of conversion into animal production at the level of phytosociological alliances (habitats), for about 160 days of grazing it is 98, being possible to evaluate cow milk production (Table 3).

**Table 3.** Grasslands animal loading and cow milk production in 160 days of grazing season

The alliance	Green mass average production(t/ha)	Optimal loading LU/ha	Pastoral value average (ind)	Milk production	
				Litre/ha	%
<i>Calthion</i>	1.26	0.12	6.6	650	16
<i>Agrostion stoloniferae</i>	12.04	1.15	59.7	5,890	133
<i>Cynosurion cristati</i>	17.95	1.73	78.9	7,690	175
<i>Festucion valesiacae</i>	4.77	0.46	34.5	3,380	77
<b>Average</b>	9.01	0.87	44.8	4,390	100

Thus, 4,390 liters/ha of cow's milk can be achieved on average, with variations from 650 l/ha in the *Calthion* alliance to 7,690 l/ha in the *Cynosurion* alliance.

Achieving these animal productions can be achieved with an average loading of 0.87 LU/ha with variations from 0.12 LU/ha in *Calthion* with 1.26 t/ha GM and 1.73 LU/ha in *Cynosurion* with a production of 17.96 t/ha GM with high forage value.

By comparison, the grasslands in the Motrului Basin are much more productive than those evaluated in the Râmnicului Sarat Basin [12].

Motru grassland's have a 30% higher average GM production and a 10% higher PV index, which allows for a 19% better LU/ha animal load compared to Râmnicul Sărat.

These data will be used to develop the second approximation for evaluating the grasslands productivity of plains and hills in our country.

### **Conclusions**

- (1). The grasslands in the inferior basin of Motru are particularly valuable, both in terms of phylodiversity with 117 species of cormophytes on average per association and productivity with 10.31 t/ha GM and 52.1 PV index.
- (2). At the phytosociological alliance level, equivalent to the EU habitat, the average milk production was assessed at 4,390 liters per hectare.
- (3). The highest milk production was in the *Cynosurion* alliance (7,690 L/ha) and the lowest in *Calthion* (650 L/ha), 12 times lower.
- (4). The obtained data are used to draw up pastoral arrangements and economic efficiency calculations.

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