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PRODUCTIVITY AND NUTRITIONAL VALUE OF SOME *FESTUCA* SPECIES IN MOLDOVA



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Introduction

The ecosystems with herbaceous perennials play a part in water conservation, protecting the soil from erosion and enriching it with humus. Traditionally, perennial plants of the family *Poaceae* Barnhart are known to provide food and shelter for various species of animals, birds and insects, and are of high socio-economic value, being used to produce building materials and handicrafts, and, in recent years, they have been more commonly used as a source of different types of biofuels, raw material for the circular economy, and as cover crops and ornamental plants in open spaces in vineyards, orchards and recreational land.

On a global and regional level, the species of grasses in the genera *Festuca* L. are quite common in the floristic composition of permanent and temporary grasslands. In Romania, the genus *Festuca* is represented by 32 species and the flora of Republic of Moldova are 8 species of genus *Festuca* (Marușca, 1999; Negru, 2007).

The goal of this study was to evaluate the productivity and nutritional value of the green mass and prepared hay from local ecotype of *Festuca* species: tall fescue *Festuca arundinacea* Schreb., meadow fescue *Festuca pratensis* Huds., red fescue *Festuca rubra* L., Wallis fescue *Festuca valesiaca* Schleich. ex Gaudin as feed for livestock

MATERIALS AND METHODS

The local ecotype of tall fescue *Festuca arundinacea*, meadow fescue *Festuca pratensis*, red fescue *Festuca rubra*, Wallis fescue *Festuca valesiaca*, collected seeds from spontaneous flora of Central Zone of Republic Moldova and grow in mono culture in National Botanical Garden (Institute), served as subjects of the research. The samples were collected in the first cut, early flowering stage. The harvested plants were chopped into 1.5-2.0 cm small pieces, with a laboratory forage chopper; the dry matter content was detected by drying the samples to a constant weight, at 105° C. The prepared hay was dried directly in the field. For chemical analyses, the plant samples were dried in a forced-air oven at 60° C, then milled in a beater mill equipped with a sieve with mesh diameter of 1 mm. Some of the main biochemical parameters were assessed: crude protein (CP), ash, acid detergent fiber (ADF), neutral detergent fiber (NDF) and acid detergent lignin (ADL), total soluble sugars (TSS), digestible dry matter (DDM), digestible organic matter (DOM) were determined by the near infrared spectroscopy (NIRS) technique using the PERTEN DA 7200 NIR analyzer. The concentration of hemicellulose (HC), cellulose (Cel), total digestible nutrients (TDN), Relative Forage Quality (RFQ), digestible energy (DE), metabolizable energy (ME), net energy for lactation (NEI) were calculated according to standard procedures.



RESULTS AND DISCUSSIONS

Table 1. Some biological peculiarities and the productivity of the studied *Festuca* species

Species	Plant height, cm	Yield, t/ha		Content of leaves and inflorescence in fodder, %
		Fresh mass	Dry matter	
<i>Festuca arundinacea</i>	109	42.5	10.2	62.2
<i>Festuca pratensis</i>	89	38.9	10.4	67.0
<i>Festuca rubra</i>	63	20.6	7.0	53.0
<i>Festuca valesiaca</i>	39	16.3	5.7	56.4

Table 2 The biochemical composition and the feed value of the green mass of the studied grasses

Indices	<i>Festuca arundinacea</i>	<i>Festuca pratensis</i>	<i>Festuca rubra</i>	<i>Festuca valesiaca</i>
Crude protein, g/kg DM	107	124	86	92
Crude fibre, g/kg DM	354	315	397	424
Minerals, g/kg DM	89	3	75	86
Acid detergent fibre, g/kg DM	388	339	414	446
Neutral detergent fibre, g/kg DM	666	574	664	738
Acid detergent lignin, g/kg DM	34	30	45	55
Total soluble sugars, g/kg DM	122	108	118	40
Cellulose, g/kg DM	354	309	369	391
Hemicellulose, g/kg DM	278	235	250	292
Digestible dry matter, g/kg DM	607	651	513	492
Digestible organic matter, g/kg DM	555	601	468	443
Total nutrients, g/kg DM	591	646	562	527
Relative Forage Quality	87	110	83	70
Digestible energy, MJ/ kg	11.64	12.20	11.27	10.84
Metabolizable energy, MJ/ kg	9.56	10.01	9.25	8.90
Net energy for lactation, MJ/ kg	5.57	6.13	5.27	4.91

Table 3 The biochemical composition and the nutritive value of the hay from the studied grasses

Indices	<i>Festuca arundinacea</i>	<i>Festuca pratensis</i>	<i>Festuca rubra</i>	<i>Festuca valesiaca</i>
Crude protein, g/kg DM	100	122	75	85
Crude fibre, g/kg DM	393	350	414	430
Minerals, g/kg DM	89	80	105	95
Acid detergent fibre, g/kg DM	427	385	434	444
Neutral detergent fibre, g/kg DM	720	621	739	754
Acid detergent lignin, g/kg DM	35	34	56	58
Total soluble sugars, g/kg DM	55	102	94	26
Cellulose, g/kg DM	372	351	378	386
Hemicellulose, g/kg DM	292	236	305	310
Digestible dry matter, g/kg DM	544	590	484	462
Digestible organic matter, g/kg DM	471	541	442	423
Total digestible nutrients, g/kg DM	548	595	540	528
Relative Forage Quality	74	93	71	68
Digestible energy, MJ/ kg	11.09	11.68	11.00	10.85
Metabolizable energy, MJ/ kg	9.10	9.59	9.02	8.91
Net energy for lactation, MJ/ kg	5.13	5.61	5.04	4.93

Table 4 The biochemical composition and nutritional value of silage from studied grasses

Indices	<i>Festuca arundinacea</i>	<i>Festuca pratensis</i>
pH index	4.05	4.11
Organic acids, g/kg DM	36.7	39.6
Total acetic acid, g/kg DM	6.7	10.0
Total butyric acid, g/kg DM	1.3	0
Total lactic acid, g/kg DM	28.7	29.6
Acetic acid, % of organic acids	18.3	25.3
Butyric acid, % of organic acids	3.5	0
Lactic acid, % of organic acids	78.2	74.7
Crude protein, g/kg DM	106	130
Crude fibre, g/kg DM	380	320
Minerals, g/kg DM	105	91
Acid detergent fibre, g/kg DM	400	339
Neutral detergent fibre, g/kg DM	690	562
Acid detergent lignin, g/kg DM	19	24
Total soluble sugars, g/kg DM	74	84
Cellulose, g/kg DM	381	315
Hemicellulose, g/kg DM	290	223
Digestible dry matter, g/kg DM	680	650
Digestible organic matter, g/kg DM	614	610
Total digestible nutrients, g/kg DM	578	646
Relative Forage Quality	82	112
Digestible energy, MJ/ kg	11.46	12.32
Metabolizable energy, MJ/ kg	9.41	10.12
Net energy for lactation, MJ/ kg	5.43	6.13

CONCLUSIONS

The dry matter productivity of the studied local ecotype *Festuca* species varied from 5.7 t/ha *Festuca valesiaca* to 10.4 t/ha *Festuca pratensis*. A higher concentration of crude protein and a lower content of structural carbohydrates was found in the fodders from *Festuca pratensis* plants.

The local ecotype of tall fescue *Festuca arundinacea*, meadow fescue *Festuca pratensis*, red fescue *Festuca rubra*, Wallis fescue *Festuca valesiaca* are suitable for grassland restoration, the creation of temporary grasslands and the harvested mass may be used as fodders for livestock.

The collected seeds from studied *Festuca* species local ecotype may be served as initial material for selecting, breeding and implementing new grass cultivars.

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