DRY MATTER VARIABILITY AND QUALITY IN SOME PERSPECTIVE POPULATIONS OF SOME *AGROSTIS* SPECIES

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ABSTRACT

Important goals in forage grass breeding are improvement in forage yield and quality. The objective of this study was the examination of dry matter variability of autochtonous populations of three species from the genus *Agrostis* L. in order to choose the best ones for creating cultivars. Since we have not had domestic cultivars of these species so far, and it is known that they can be used for various purposes like cutting and grazing and having good quality, this research is made reasonable in many ways. The present results refer to the variability of genetic potentiality of the dry matter production in the year of usage. They refer to the basic parameters of quality on the chosen families originating from 14 populations of colonial bentgrass, *Agrostis capillaris* L., 22 populations creeping bentgrass, *Agrostis stolonifera* L. and 7 families originating from redtop, *Agrostis gigantea* Roth. With all the three species, the most productive family, with statistically significant higher yield, present the initial material for creating the first cultivars in our country.

KEYWORDS

Populations, colonial bentgrass, creeping bentgrass, redtop, dry matter, quality, cultivars

INTRODUCTION

The species from genus *Agrostis* L. are widely grown in different temperate zones of the world, but in our country they can be found both in the lowest valley areas and the highest mountain ones (Tomic, 1994). In volume 8 of Serbian Flora, (SANU, 1970), there have been described 6 species. Those species which were used for this research have practical importance, including forage production, quality and utilization. Genetic variability of drymatter production of the studied autochohtonous populations of Serbian flora (Tomic, 1995), present a base for creating new cultivars of these species, because their production is on the same level as other quality grasses which are intensively grown on sown grasslands in hilly-mountainous areas. These species are mostly used as turf grasses (Beard, 1973; Turgeon, 1985). In our country, these species present the basis of many natural associations, which justifies this research. New cultivars should be an improved population with the highest dry matter yield and good quality. They will be founding place in the areas where they are already adapted and make the base of pasture and grassland production.

MATERIALS AND METHODS

The collected populations from natural habitats of Serbian flora were determined according to the Descriptor of forage grasses (Tyler et al. 1985), and have been published in the paper Tomic (1994). After the first phase of morphological and cytogenetical examination, 43 out of 99 populations were chosen from the three mentioned species for the breeding grasses: 14 populations of colonial bentgrass *Agrostis capillaris* L., 22 populations creeping bent grass *Agrostis stolonifera* L. and 7 families originating from redtop *Agrostis gigantea* Roth. The seed produced from mother plants, in 1993, was sown in dense rows the following year, in random order, in 5 repetitions of the main of 5m^2. In the next year the production of green and dry matter of two crosses were determined. The obtained results have been statistically analysed for variance and significance in differences determined by an LSD test in relation to the average yield of all the populations. In the samples from the second cut, with a higher than average dry matter yield, the content of crude protein and crude fiber was determined by standard laboratory analysis and the quantity of crude protein was measured in the most productive populations.

RESULTS AND DISCUSSION

Table l shows the determined production of the families originating from the 43 populations of three species of genus *Agrostis* L, in the second year of utilization for both cuts and in total, the content of crude fiber and the calculated quantity of crude protein.

By examining genetic potentiality of dry matter production from two cuts (all species are in our ecological conditions the latest earring formed), they get the first cut only in the second part of June, and totally and in the second vegetation year, a statistically very significant difference was determined between the families from the same species and among the three examined species.

Out of 14 families of colonial bentgrass, 10 had a higher average dry matter yield, and the total for both cuts was between 7.788-10.868 t ha^{-1}. Similar results were found for the same species, also from two cuts and two year average, by Karlsen (1988) with mountain populations in northern Norway. With these species the content of crude protein was in the interval of 8.39-10.92%, crude fiber between 24.96-32.30%, and yield of 605.51 kg ha^{-1} of crude proteins with families from hilly populations 1.08 from Jastrebac (850m a.s.l.)

A significantly higher yield was gained with 12 families from 22 populations of creeping bentgrass, and the range of dry matter was 6.593- 11.363 t ha^{-1} (family from population 3.03 valley from 125m a.s.l. and 3.42 mountain population from 1250m a.s.l.). The content of crude protein was from 9.03-14.22%, crude fiber from 25.59-30.66% and the highest production of crude protein from 646 kg ha^{-1} with the family origin from the population 3.21 from hilly meadow in Aleksandrovac.

With the 7 examined families of the species redtop, the dry matter yield ranged from 7.850-10.266 t ha^{-1} , and with 4 families the yield was above the average level. The content of crude proteins was between 9.92-11.75%, the content of crude fiber from 30.89-32.25% and the highest yield of crude protein of 801.70kg ha^{-1} with family order from the populations 4.06 of valley meadow in Lomnica near Krusevac which was the most productive Tomic at al. (1989) sowed that the average dry matter yield over four years of utilization at the 1200m a.s.l. redtop,were 7.67t ha^{-1} for the redtop cultivar Jabeljska.

Since we deal with perennial species, the genetic variability of potentiality of production will be determined in the next two years. The best families will be chosen as a new component for creation of the cultivars of the three species from genus *Agrostis.*

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Table 1
Dry matter variability production for two cuts and total, content of crude protein percent (CP), crude fiber (CF) ,and yield of crude protein in 14 populations of *A.capillaris*, 22 of *A.stolonifera* and 7 of *A.gigantea* in 1995.

No.	Population	1.st cut t^{-1} ha	2.nd cut t^{-1} ha	total t^{-1} ha	Rang	C P %	C F %	CP kg $^{-1}$ ha
1	1.01	4.734	4.160	8.903				
2	1.03	3.808	4.530	8.328*	25	10.34	28.54	468.40
3	1.08	2.985	5.545	8.530**	21	10.92	29.58	605.51
4	1.13	3.788	5.348	9.136**	15	9.87	30.42	527.85
5	1.14	5.480	5.048	10.528**	3	9.03	30.59	455.83
6	1.18	5.745	3.998	9.743**	6	9.87	30.05	394.60
7	1.20	3.680	4.834	8.523**	22	9.71	32.30	470.26
8	1.24	4.318	5.658	9.976**	5	8.81	30.33	498.47
9	1.25	4.200	3.798	8.088				
10	1.26	4.223	4.987	9.201**	12	8.39	30.54	417.65
11	1.27	3.482	4.478	7.906				
12	1.28	4.045	5.435	9.480**	9	9.97	24.96	541.87
13	1.29	6.240	4.628	10.868**	2	8.71	27.41	403.10
14	1.33	2.883	4.915	7.788				
15	3.02	2.983	4.573	7.736				
16	3.03	3.223	3.370	6.593				
17	3.04	3.565	5.498	9.063**	17	9.81	27.65	539.35
18	3.05	3.498	4.560	8.058				
19	3.07	3.973	3.935	7.908				
20	3.08	3.330	4.660	7.990				
21	3.09	3.458	4.854	8.303*	26	10.44	26.29	505.82
22	3.11	5.130	3.328	8.458**	23	9.03	27.35	300.51
23	3.13	4.905	3.978	8.833**	18	12.07	25.59	480.14
24	3.14	3.853	4.170	8.023				
25	3.17	5.290	4.140	9.430**	10	11.18	27.74	462.85
26	3.18	3.913	5.588	9.501**	8	10.34	28.88	577.80
27	3.19	4.365	4.735	9.100**	16	11.65	29.79	551.63
28	3.21	4.856	4.543	9.408**	14	14.22	24.48	646.01
29	3.23	2.818	4.825	7.643				
30	3.24	4.035	3.933	7.968				
31	3.26	5.333	3.823	9.156**	13	12.07	30.37	461.43
32	3.27	4.165	3.980	8.145				
33	3.28	4.068	4.103	8.171				
34	3.33	4.933	4.403	9.366**	11	10.08	29.69	475.52
35	3.39	4.308	4.125	8.433**	24	12.12	30.66	499.95
36	3.42	6.353	5.010	11.363**	1	11.39	30.52	570.64
37	4.04	4.320	4.475	8.795**	19	11.18	30.89	500.31
38	4.05	2.970	4.925	7.895				
39	4.06	3.443	6.823	10.266**	4	11.75	31.21	801.70
40	4.13	3.395	4.455	7.850				
41	4.17	3.800	4.185	7.985				
42	4.19	4.365	5.143	9.508**	7	9.76	32.25	501.96
43	4.20	4.173	4.600	8.773**	20	9.92	31.85	456.32

Significant LSD* 0.05=0.235 LSD** 0.01= 0.311 1.01 - 1.33 families from populations *A.capillaris*, 3.02 - 3.42 from populations *A.stolonifera*, 4.04 -4.20 from populations *A.gigantea*