Variability and Correlations of Some Investigated Traits of Perennial Ryegrass Populations

D. Sokolovic
Institute Serbia, Serbia

S. Ignjatovic
Institute Serbia, Serbia

Z. Tomic
Institute for Animal Husbandry, Serbia

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Variability and correlations of some investigated traits of perennial ryegrass populations

D. Sokolovic[1], S. Ignjatovic[1] and Z. Tomic[2]
[1]*Institute Serbia, Center for forage crops Krusevac, Trg rasinskih partizana 50, 37000 Krusevac, Serbia, Email: vojasoko@ptt.yu,* [2]*Institute for animal husbandry, 11080, Beograd-Zemun*

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Introduction Perennial ryegrass (*Lolium perenne*) is one of the most important perennial forage grasses for temperate climates. It is a highly productive grass with the highest nutritive value (Sokolović *et al*., 2002). In Serbia, breeders have developed perennial ryegrass cultivars with high stabile yield and quality with different times of maturity and resistance to drought and frost. The initial breeding material were usually wild populations (Charmet *et. al*., 1996) with high variability and adaptability. These characteristics lend themselves for selection of superior genotypes. But breeding for some important agronomic traits may influence others. This relationship between traits and breeding population variability is the objective of this article.

Materials and methods Perennial ryegrass populations originating from the Serbian flora were investigated in a second breeding cycle. The trial was designed in a space - plant design (60x60cm). Time of tillering (days after April 01.), plant height, top internode length and dry matter yield (DMY) were assessed over three years. Traits are shown as three year-mean values. Variability (coefficients of variations (%)) and coefficients of correlation between traits were determined.

Results The earliest population is Kopaonik, but it has lowest DMY (Table 1). The population with the best breeding characteristics is Jastrebac. It has highest yield with medium tillering date and height. Coefficients of variations are between 6 and 20%, except for DMY (29-46%), but they are lower in comparison with the first breeding cycle (over 50%) (Sokolović *et al*., 2003). Correlations between time of tillering and plant height and internode length are significant and negative (Table 2), whilst DMY was not significantly affected by tillering date. Humphreys (1989) reported that time of tillering greatly affected DMY per plant (0.86). Plant height was positively correlated with internode length and DMY. Plants with longer internodes had lower DMY (r = -0.24).

Table 1 Means and variability of perennial ryegrass populations properties

Trait	Tillering date		Plant height (cm)		Internode length (cm)		DMY (g per plant)	
Population	$\bar{x}$	CV	$\bar{x}$	CV	$\bar{x}$	CV	$\bar{x}$	CV
Jastrebac	49.6	8.7	74.5	10.4	20.3	19.9	137	29.7
Kopaonik	44.9	6.9	73.7	10.9	24.7	15.3	109	41.6
Divci	51.2	7.7	75.1	12.3	19.5	18.5	131	45.8
Lomnica	51.4	9.5	70.0	14.8	20.3	19.5	112	39.7
Goč	50.0	9.2	72.4	14.1	22.4	16.9	129	42.3
Vlasina	47.8	5.9	74.1	10.1	23.5	18.5	129	40.6
Javor	47.1	11.3	75.3	12.9	26.2	17.8	121	46.4
Radočelo	53.0	7.9	71.0	13.4	20.9	18.0	123	39.6

Table 2 Correlations between traits

	Tillering date	Plant height	Internode length	DMY
Tillering date				
Plant height	-0.65			
Internode length	-0.86	0.30		
DMY	0.35	0.49	-0.24	

Conclusions Lower coefficients of variations were estimated, but variability necessary for breeding was maintained within populations. The Jastrebac population had the highest average DMY per plant and contains the most promising genotypes. Late genotypes had lower heights and internode lengths, whilst DMY was not influenced significantly by date of tillering (time of maturity). Breeding for early genotypes may cause inferior plant height and internode length. Increasing internode length had a negative impact on DMY, whilst taller plants showed higher DMY.

References

Charmet, G., F. Balfourier, C. Ravel, D. Leconte, B. Debote, J.C. Vezine, C. Astier, & G. Leau, (1996): Study of a French collection of natural populations of perennial ryegrass. *Fourrages,* 146, 107-121.

Humphreys, M.O. (1989): Assessment of perennial ryegrass (*Lolium perenne* L.) for breeding. II. Components of winter hardiness. *Euphytica*, 41, 99-106.

Sokolović, D., Z. Tomić, S. Ignjatović, G. Šurlan-Momirović, & T. Živanović, (2002): Genetic variability of perennial ryegrass (*Lolium perenne* L.) autochthonous populations. II. Dry mater yield and chemical composition. *Grasslands Science in Europe*, 7, 92-93.

Sokolović, D., Z. Tomić, and Z. Lugić, (2003): Dry matter yield components of perennial ryegrass (*Lolium perenne* L.) populations. *Grasslands Science in Europe*, 8, 126-130.