

## Variability and correlations of some investigated traits of perennial ryegrass populations

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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 stable 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) |      |
|-----------|----------------|------|-------------------|------|-----------------------|------|-------------------|------|
|           | $\bar{X}$      | 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

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