

Breeding wheat for high quality in Croatia

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Abstract

North eastern part of Croatia belongs to the Panonic region with semiarid climate. The region is suitable for growing high quality wheat. However, after W.W.II all wheat breeding effort was concentrated on disease resistance, semi dwarf stature and high grain yield. Semi dwarf stature and high yield introduced by Italian wheat germplasm, were accompanied with soft, low quality kernel characteristics. In spite of the fact that three quality classes are declared on Croatian wheat market, due to insufficient wheat production, all wheat grain, with no regard of quality, was sold as a first class wheat. Therefore, for a long period breeding for milling and breadmaking quality did not receive sufficient attention. However, in that period some quality improvement was achieved by introducing Russian germplasm: first 'Bezostaja-1', and later 'Kavkaz'. High yielding, semi dwarf cultivars with improved quality characteristics based on mentioned germplasm were released as follows: 'Tena' (1973), 'Sivka' (1981), 'Pitoma' (1983), 'Zitarka' (1985) and 'Marija' (1988). All the cultivars mentioned belong to B1, eventually A2, or some of them even A1 quality group, it means they are just average to good bread making wheats. Some further improvement in quality was achieved with cultivars. Ana (1988) and Demetra (1991). They belongs to A2 , eventually A1 quality group. As a result of selection based on HMW Glu subunits composition, and introduction of germplasm developed by V. A. Johnson and P. J. Mattern, significant improvement in bread making quality was achieved recently. By crossing with high protein, high lysine wheat line NE7060 a number high yielding, and at the same time high quality wheat lines were selected. Some of them were released recently ('Cerera' and 'Gorica', 1993) belonging to A1 quality group. Last year released cultivar. Divana (1995) is the best quality bread wheat ever grown on Croatian fields. It is bred by reselection from wheat line NE7060 76Y335. Its grain yield per unit area is lower than that of other wide spread, high yielding cultivars in Croatia. But, if we look for yield of flour, or yield of bread per unit area, 'Divana' is significantly superior to other cultivars. Its characteristics are shown in comparison with Croatian official standard for quality: cultivar. Zitarka. (Tab. 1) 'Divana' is absolutely superior in all the quality characteristics, and is very attractive for milling and baking industry, primarily for improving the baking characteristics of wide spread, high yielding, but low quality wheats, as well as for producing special high quality semolina and flour. The yielding ability of 'Divana' is lower, but its yield stability over different environments is excellent. It needs lower inputs (lower seeding rate, less fertilizers and less disease protection) and still with its grain yield of about 5.5 t/ha significantly over yields the Croatian state average wheat yield of about 4 t/ha. In 1985 the co-operative recurrent selection program was started and performed for five years supported by USDA. The program is now continued, and its main objective is high grain yield with improved milling and baking quality. Till now three cycles of recurrent selection have been completed. Wide genetic variation achieved is the guaranty for the success in future selection for combined traits.

Key words: wheat, bread making quality, wheat breeding, Croatia.

Tab. 1. Average grain yield and bread making characteristics for cv. Divana in comparison with cv. Zitarka - standard for quality in R. Croatia

| Trait | Divana | Zitarka (Check) |
|----------------------|--------|-----------------|
| Grain yield (t/ha) | 5.4 | 6.2 |
| Hectolitre wt. (kg) | 80.6 | 79.4 |
| TKW(g) | 43.4 | 40.4 |
| Grain protein (%) | 16.52 | 14.03 |
| Sedimentation (ccm) | 63.0 | 38.0 |
| Vet gluten (%) | 40.2 | 31.4 |
| Flour extraction (%) | 72.9 | 65.3 |

