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In 1941 the scientist breeder V.E. Pisarev received the first triticale from crossing winter wheat with winter rye and winter rye, which was the source of further crosses.

Triticale is a new botanical genus, obtained by combining chromosomal complexes of two different genera - wheat and rye.

This is the only culture that has no analogues in nature.





Nutritional value of grain

Содержание, % на сухое вещество

Культура	Белков	Углеводов				липи- дов	зола
		Крахмала	Сахаров	Некрахмальных полисахаридов			
				Целлюлоз	Гемицел- люлоз, пектинов и др.		
Пшеница	10-20	60-75	2-3	2-3	6-9	2-2,5	1,5-2,2
Рожь	8-14	58-66	1,9-3,5	1,8-3,2	8-15	1,7-3,5	1,7-2,3
Тритикале	11-23	49-57	2,5-3	2-3	7-11	3-5	1,8-2,2

The amino acid composition of triticale protein is closest to the “ideal” one. One of the most important amino acids is lysine, which is often lacking in protein. The content of lysine in the grain of triticale is 15 - 30% higher than in the grain of wheat.

**Grain is used in the baking, confectionery, brewing and alcohol industries.
Triticale - a promising source of industrial getting starch.**





Frost
resistance is
higher than
that of winter
wheat



resistance to
fungal and
viral diseases



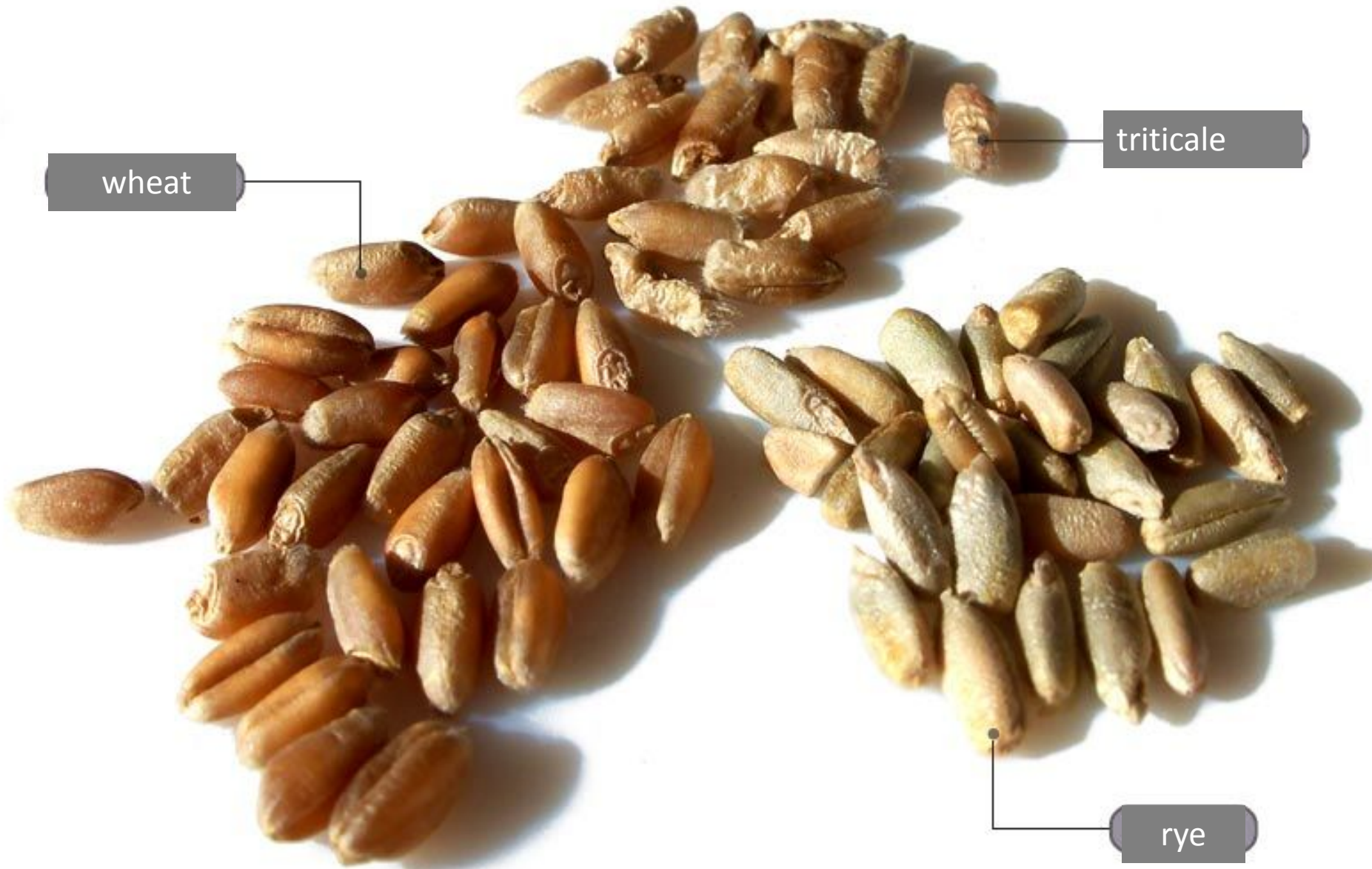
reduced
requirements
for soil fertility



wheat

triticale

rye



Usage

Use of triticale for human consumption has not yet become widespread. Although triticale flour and products are available commercially (namely in specialty markets such as health food stores), this availability is limited. It comes in several forms including whole berry, flakes, and flour. Whole triticale can be cooked and used in a variety of dishes. Quality evaluations have shown triticale grain inferior to wheat for milling and baking, making large-scale commercial baking not feasible. Triticale flour is low in gluten, and bread made from it alone is heavy. For that reason, it is usually combined half-and-half with wheat flour. If mixed with wheat or rye flour, triticale flour can be used to make a number of breads and pastries. In developing countries, triticale flour is often mixed with wheat flour during wheat shortages. It is of course important that the crop is not infected with ergot, as this is highly toxic to humans.

Most triticale production is used for animal feed. It offers better amino acid balance, lysine content, and higher protein, particularly important for swine and poultry.

The bread-making characteristics of flour made from early strains of triticale were discouraging, although bread quality could be improved by addition of dough conditioners. However, bread of good quality has been made from recent triticale selections. Bread baked commercially with 65% of wheat flour blended with 35% of triticale stoneground wholemeal was first marketed (as 'Tritibread') in the United States in 1974.

Triticale flour has been tested extensively in Poland for bread making. The best results, using a blend of 90% triticale flour plus 10% of rye flour, were obtained with a multiphase (preferment, sour dough) process in which the preferment was made with the rye flour (10% of the total flour) with water to a preferment yield of 400%, and a fermentation time of 24 h at 28–29°C. The sour formulation used triticale flour (50% of the total flour) with 1%–2% of yeast (on total flour basis), and water to give a sour yield of 200%. This was fermented for 3 h at 32°C. The rest of the triticale flour was then added, with salt at 1.5% on flour wt., and water, to give a dough yield of 160%–165%, and then all ingredients were fermented for 30 min at 32°C. The loaves were baked at 235–245°C (Haber and Lewczuk, 1988). Bread made from all-triticale flour has been shown to stale more rapidly than all-wheat bread.

Bread made from 50:50 or 75:25 blends of triticale flour and wheat flour had higher specific volumes (4.8; 4.9 mL/g) than the bread baked from all wheat flour (4.4 mL/g); no deleterious effect on crumb characteristics, viz. grain and texture, resulted from the admixture of triticale flour (Bakhshi et al., 1989).

Triticale grain can be milled into flour by the same milling process as used for wheat or rye. Research has shown that breads can be baked from triticale flours provided that adjustments in formulation, mixing, and fermentation are made from those used in the production of white bread. Yeast level is increased, the fermentation temperature is lowered, and fermentation and proofing times are shortened. The high α -amylase activity of most triticale flours requires fermentation adjustments. Dough mixing is critical, since triticale flours do not have the same quality of gluten as wheat flour. The production of breads of low specific volume from triticale flours, as they are produced in many developing countries, creates less of a problem than production of the high-volume white bread.

The overall bread-making quality of newer triticale cultivars is considerably better than that of earlier ones, but it is still somewhat inferior to that of bread wheat of the same protein content due to a deficiency in protein quality, as reflected by a lower percentage of gluten compared to bread wheat.

Triticale flour can be used to some extent in the production of cakes, biscuits, tortillas, and other soft wheat products since triticale basically performs like a soft wheat. Layer cakes of acceptable quality can be produced from 100% triticale flour after proper chlorine treatment of the flour. Formulations of layer cakes from blends of triticale–wheat flour, ranging from 20% to 50% triticale, and additional emulsifier in the formulation produced cakes equal to or significantly larger than the soft wheat control cakes without additional emulsifier.

Triticale flours gave significantly smaller biscuit diameters and top-grain scores than biscuits baked with soft wheat flours. The biscuit-baking performance of flours from certain triticale cultivars may be improved, however, by increasing emulsification in the dough system, to equal or exceed soft wheat standards without additives.

Triticale pancake and waffle mixes have appeared on supermarket shelves. They are indistinguishable in appearance from those made with wheat flour, but differ in flavor and taste. Protein concentrates and starch have been prepared from triticale. Whole-grain triticale has been used to make bulgur.

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