In Omsk State Agrarian University a world-class project
under the guidance of Hamit Koksel, professor of Istinye University

Title: «Enhancement of wheat nutritional value through genetic improvement, application of optimal production technologies and improved processing quality»

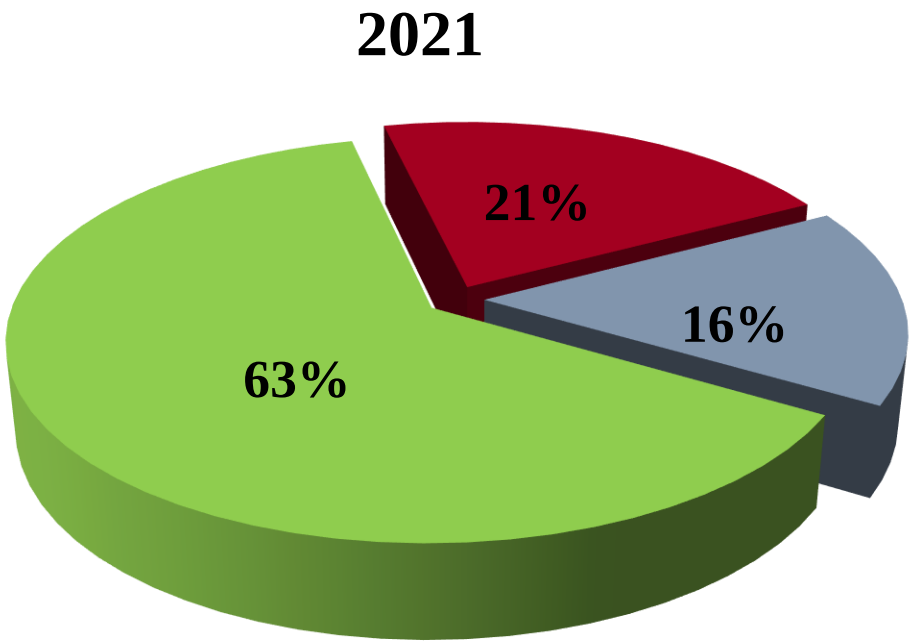
Project goal:

Improvement of functional properties and nutritional value, technological quality of wheat grain produced in Russian Federation

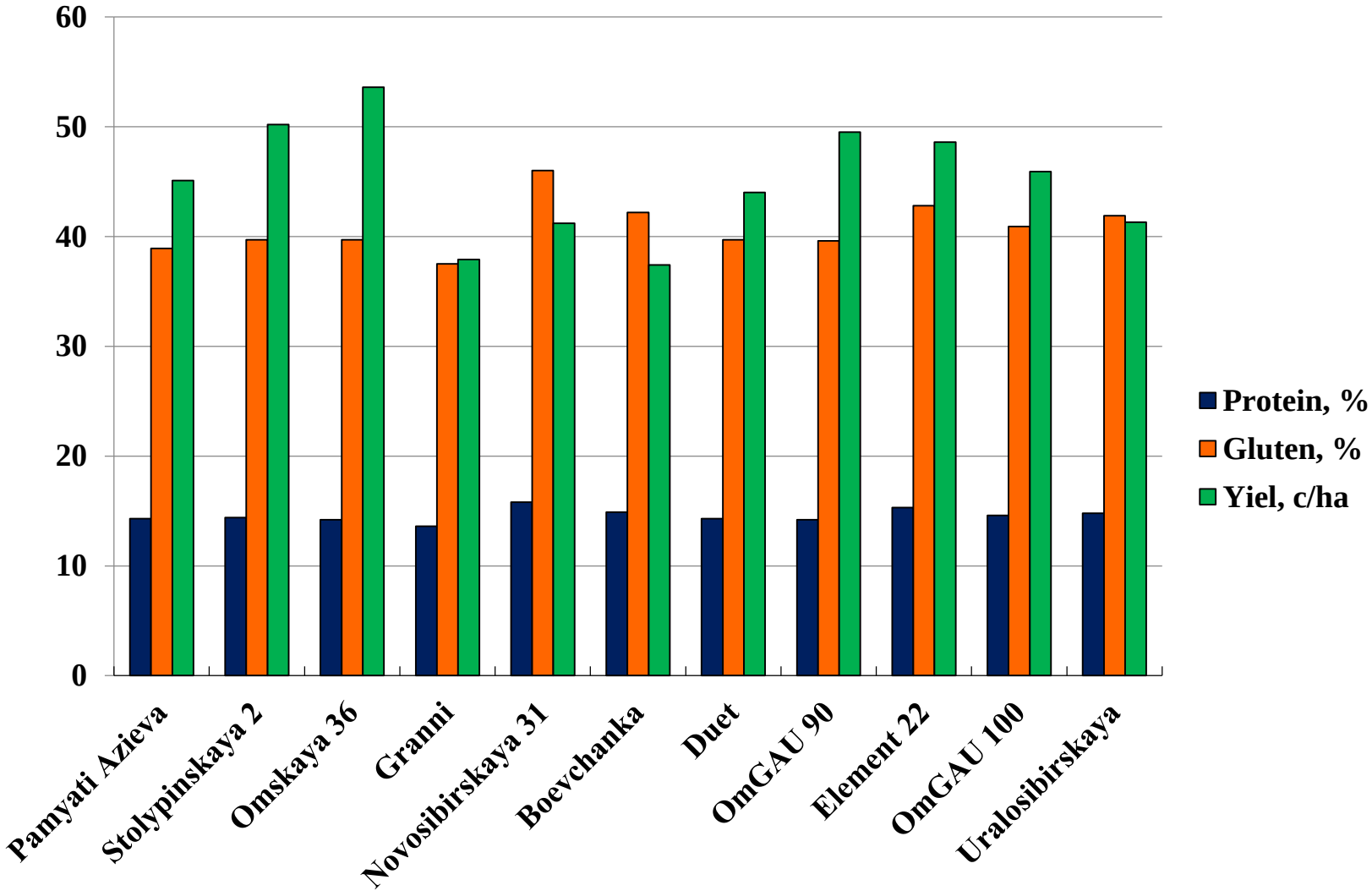
Project: Ministry of Science and Higher Education of the Russian Federation
(Agreement No. 075-15-2021-534, May 28 2021)

In Western Siberia, more than 10 million tons of high-quality wheat grain are produced annually, of which up to 50% is exported (the countries of Central Asia, Middle East, and China)

Quality traits	Valuable wheat	Filler	Weak wheat
Protein,%	12.5	11.0	8.0
Gluten,%	25.0	22.0	16.0
Falling number, sec.	200	150	120
Hectoliter weight, kg/hl	73	71	68
Vitreousness,%	45	40	-



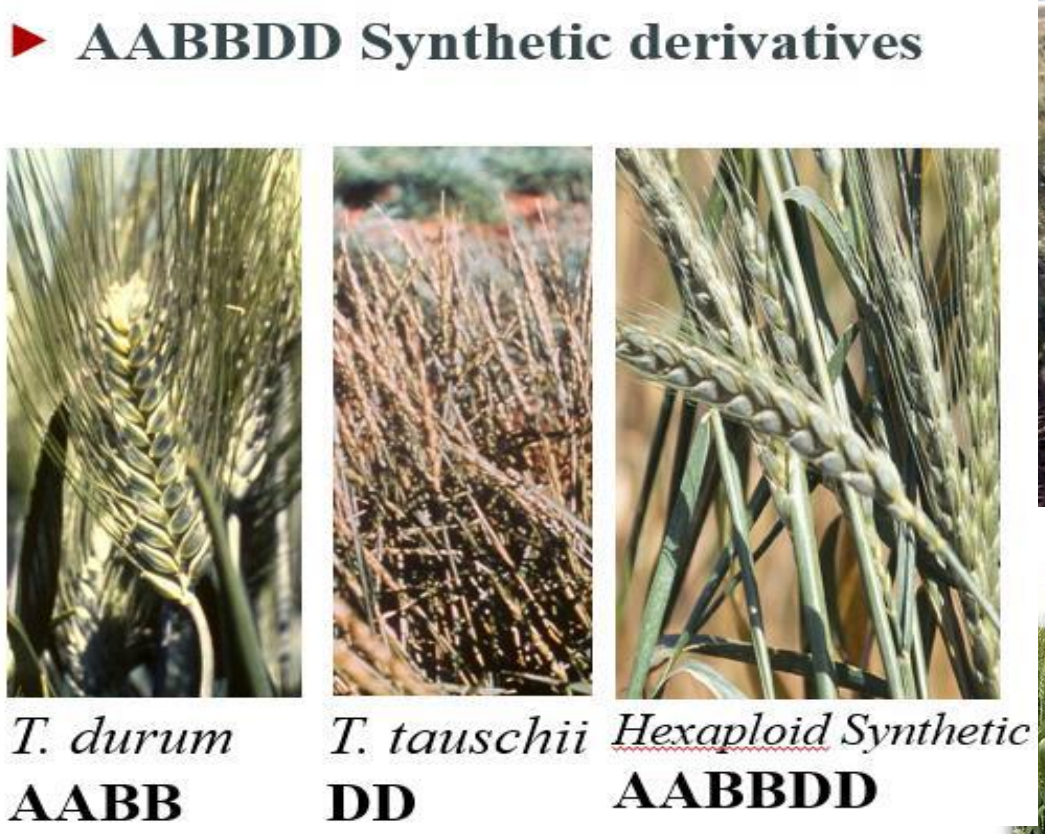
Yield of spring bread wheat varieties cultivated in Western Siberia in the forest-steppe zone: 5-6.5 t/ha & in the steppe zone: 3-4.5 t/ha

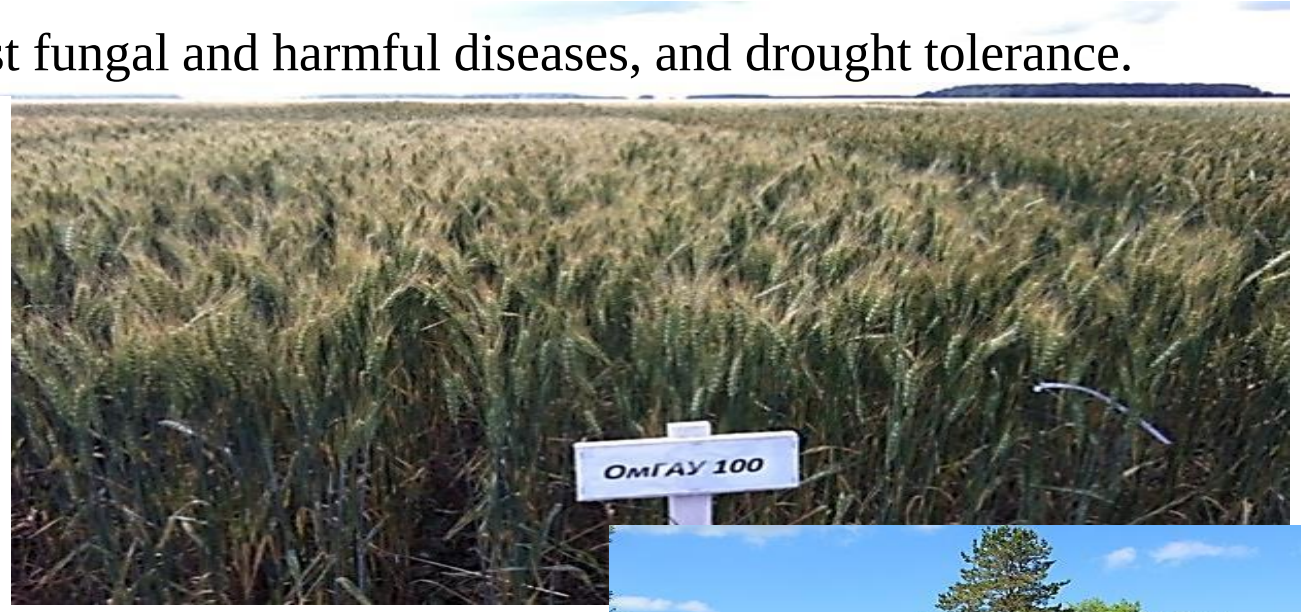


Innovations for organic grain production

1. Received patents and included in the State Register of 3 varieties: for cultivation in region of Western Siberia, varieties of the late maturity group **Element 22** and **OmGAU 100**; for Ural and Western Siberia regions of the Russian Federation, variety of early maturity group **Stolypinskaya 2**.
2. In 2021, for Western Siberia region two varieties included in the State Register: medium maturity group - **Silantiy** and early maturity group - **Niva 55**.

- Varieties have complex resistance to the most fungal and harmful diseases, and drought tolerance.

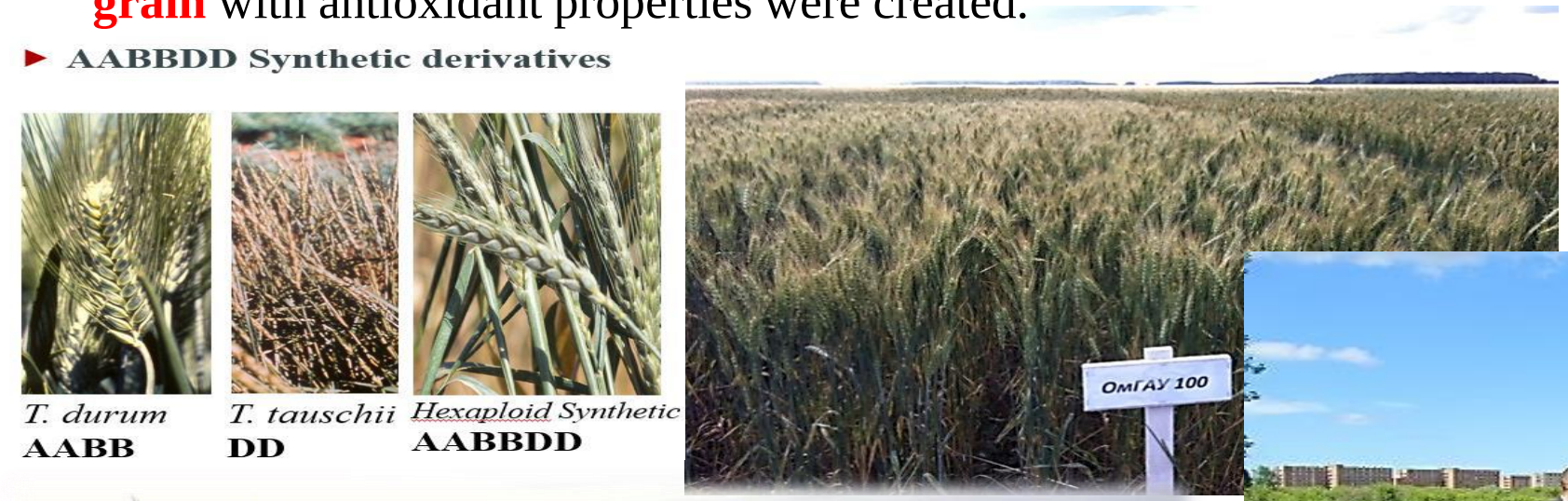




Innovations for organic grain production

2.

- Yield potential of varieties: **6-7 t/ha** with fertilizer, and **4-4.5 t/ha** without fertilizer and means of chemical protection.
- Varieties of spring wheat are useful for cultivation according to the technology of ecological farming without chemical means of crop protection. Yield increase above standards without fertilizers and chemical treatments from 0.7 to 1 t/ha. On the basis of these varieties **“colored-grain” analogues with purple, blue, and black grain** with antioxidant properties were created.



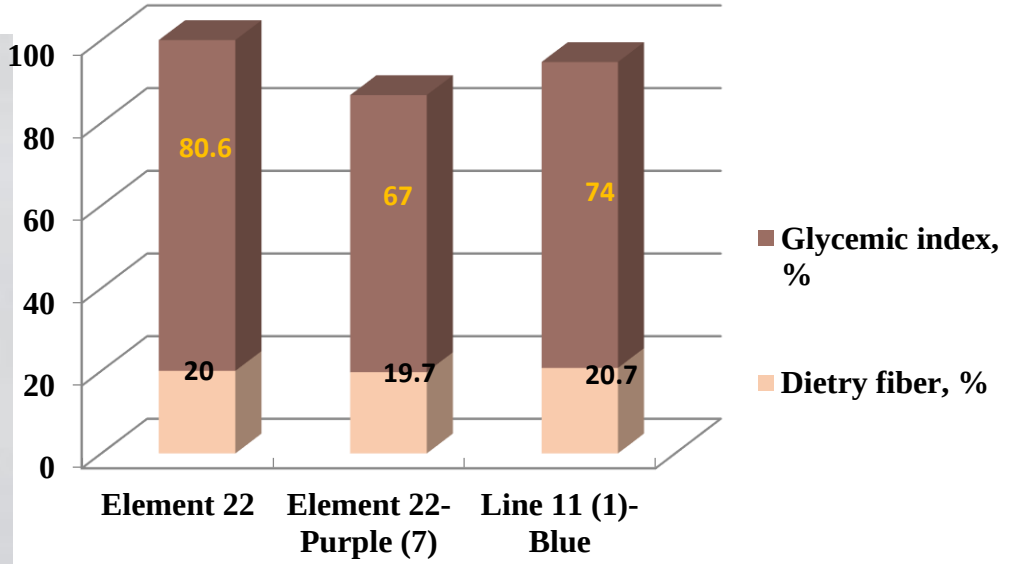
"Colored" and wild wheat for functional food

1. Variety EF 22 with antioxidant properties for functional food with purple grain was transferred to State Variety Trial in 2021.

2. In 2022, the state register includes a variety of naked grain emmer Balda - for the production of dietary cereals with functional properties.

3. Established a line of spelled with purple grains

for the production of cereals with antioxidant properties.

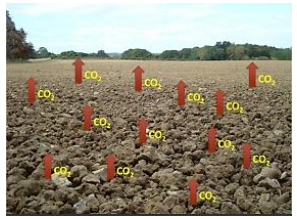


Dietary fiber content and glycemic index of bread samples from whole grain flour

Large-grained wheatgrass variety Sova as alternative to perennial wheat

Dual purpose - for grain and hay.
The term of use **without reseeding is up to 7 years**.
Grain yield **1 t/ha**; **hay 7–7.5 t/ha**.
"Healthy bread": the protein content in the grain is 19-20%, in comparison with wheat bread there are more essential amino acids; 2 times more **Omega-3** fatty acids; 5 times more calcium; 10 times more **folic acid**; high antioxidant activity, **dietary fiber**.

Paradigm shift



Soil erosion. loss of fertility. Emissions of greenhouse gases into the atmosphere. Carbon taxes.

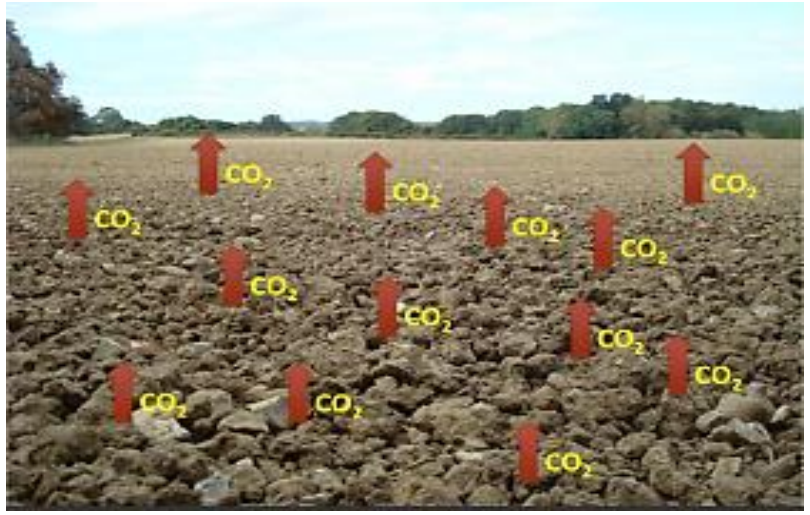
Preservation of soil fertility Accumulation soil carbon. Emission of carbon vouchers

Variety Sova in JSC «Niva» Pavlogradskiy region, 2020

Large-grained wheatgrass variety Sova as alternative to perennial wheat

Paradigm shift

High resistance to drought (roots up to 2 m) complex resistance to diseases. Crops of perennial couch grass of the gray variety Sova **accumulate carbon - 3.7 t/ha per year**. **Introduced into the State Register of Breeding Achievements** in 2020 for cultivation in all regions of the Russian Federation



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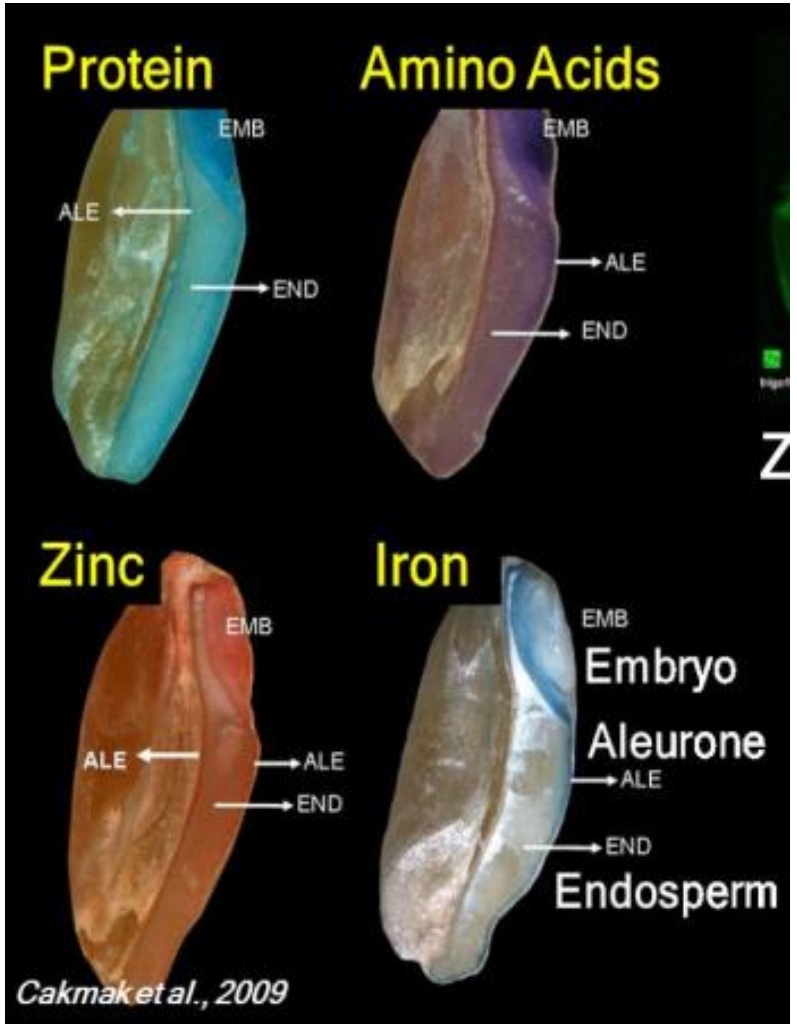
Enrichment of wheat with zinc and iron - biofortification

The predominance of bread in the diet and the lack of meat leads to a lack of trace elements

HarvestPlus
Better Crops · Better Nutrition

«Harvest Plus» program aims to enrich wheat with vitamins and microelements
(https://www.harvestplus.org/what-we-do/crops)



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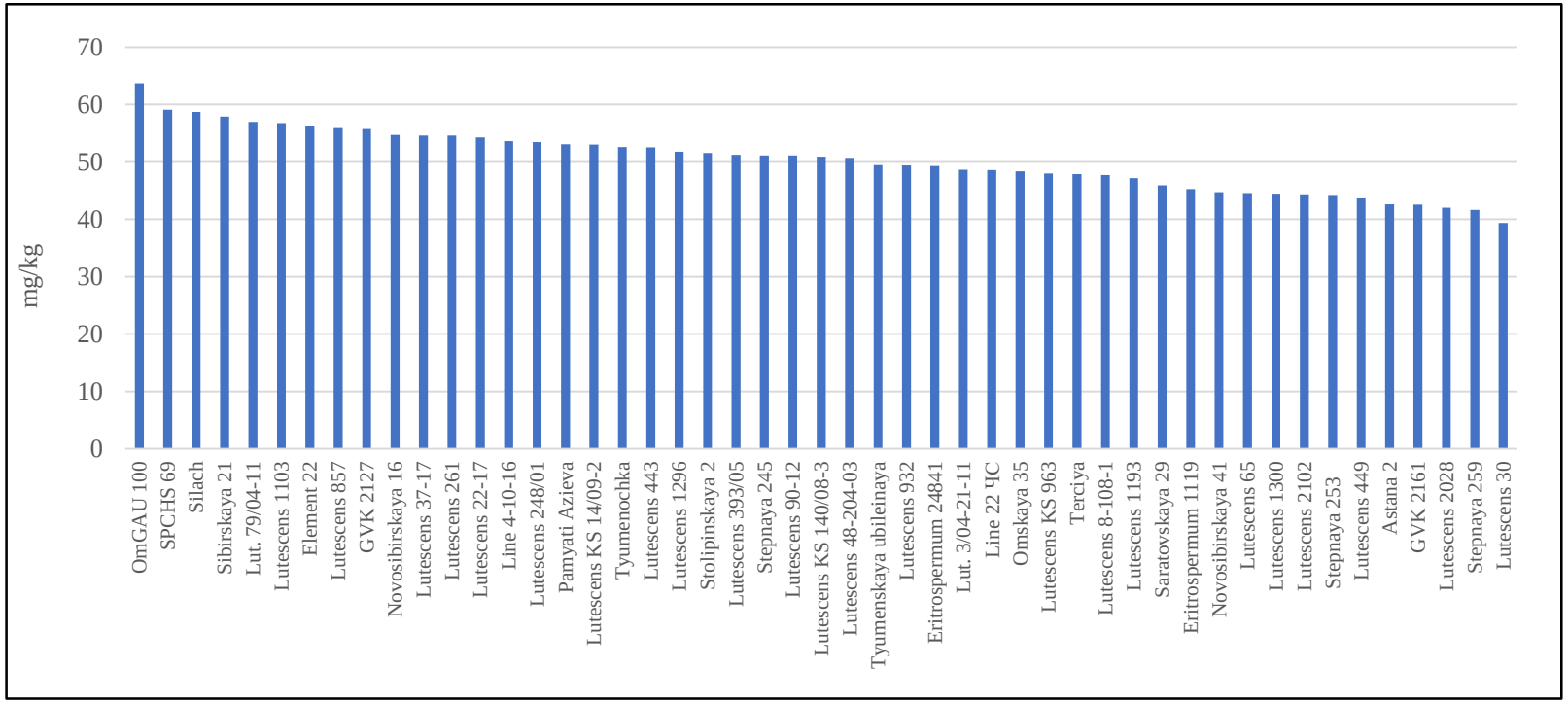

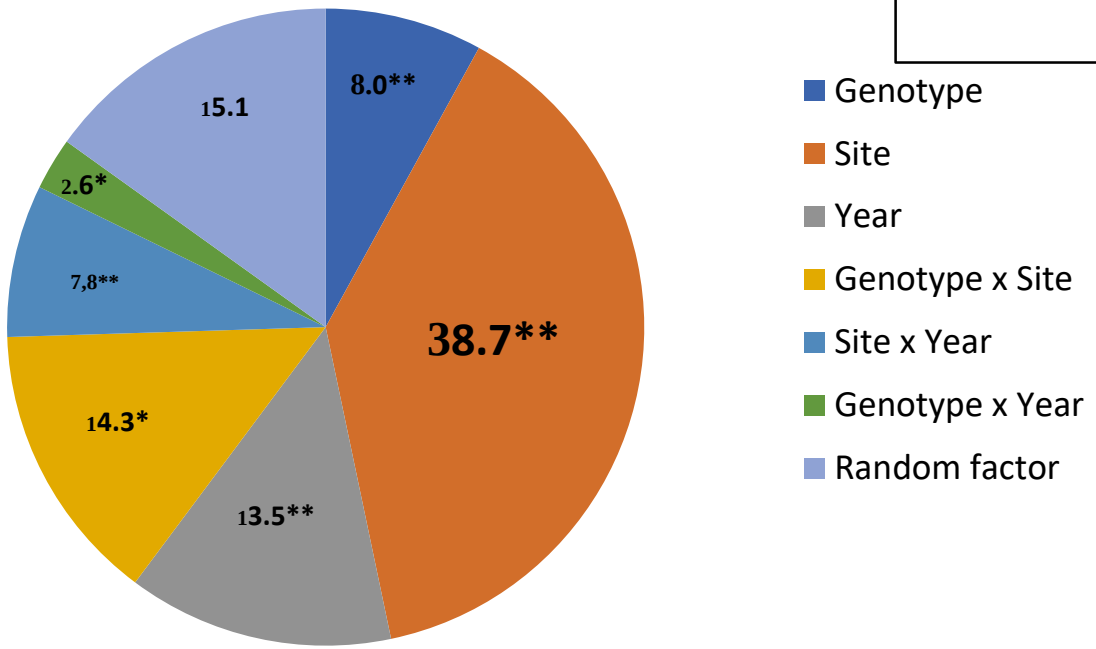

At Omsk State Agrarian University; varieties and a collection of synthetics, wild relatives and landraces of wheat with a high content of zinc, iron, and other useful trace elements in grain were developed

Conclusion

The evaluation results of the grain quality of spring bread wheat varieties cultivated in Western Siberia indicate about high potential of the region for the production of organic grain for milling and baking as well as for functional food.

variety of spring bread wheat Stolypinskaya 2

variety of spring bread wheat Silantiy

variety of spring bread wheat OmGAU 100