



A Potential of the Ukrainian Grain and Seed Market of Cereals

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Odessa, Ukraine



■ **Plant Breeding and Genetics Institute of the National Academy of Agricultural Sciences of Ukraine is one of the leading centers of agricultural science in Ukraine.**

■ **It has developed from a small plant breeding station which became a research institute in April 1912.**




■ The research activity of the Institute is aimed at developing new methods of plant breeding, the principles of biochemical genetics, genetics of quantitative characters and resistance of agricultural crops to unfavourable environments and diseases; developing the methods and ways of increasing seed quality; developing highly productive and of high quality varieties and hybrids of winter bread and durum wheat, winter and spring barley, maize, sunflower, soybean, pea, chickpea, sorghum, alfalfa and mushrooms.





■ The research work at the Institute is carried out at 12 departments and 8 laboratories by the staff of 428 employees, including 105 researches which are represented by 11 Doctors of Science and 56 PhDs.



■ To succeed in the plant breeding the staff of the Institute carries on the extensive theoretical studies.

The genetics of the most important characters is studied.

The methods of increasing the genetic variation are worked out for the crops under breeding, in order to develop a new initial breeding material.

The nature of plant frost and winter hardiness, draught and heat tolerance and resistance to the widely spread diseases is studied under field conditions.

■ **Plant Breeding and Genetics Institute** has 4 experimental farms with about 20.000 hectares of arable land at its disposal which annually produce over 10000 tons of certified seed for seed and grain producers.





- Since the foundation of the Institute over 380 new varieties and hybrids have been developed. During 2006-2010 37 varieties of bread and durum wheat, 12 varieties of winter and spring barley, 24 hybrids of maize, 27 hybrids of sunflower and 12 varieties of cultivated medicinal mushrooms have been released.
- All these varieties were widely grown in Ukraine and other Republics of former Soviet Union. At present in Ukraine they are annually grown on the area around 4 millions hectares.



■ In 2010 175 varieties and hybrids developed at the Institute were in the Ukrainian State Register of Plant Varieties.

■ The wheat varieties developed at Plant Breeding and Genetics Institute are characterized by high productivity, grain and seed quality, complex resistance to diseases, frost hardiness, drought and heat tolerance.



New programs of wheat breeding for grain quality **at the Plant Breeding and Genetics Institute**

- **Extra-high breadmaking quality.**
- **Biscuit wheat.**
- **Waxy wheat.**
- **Black wheat.**
- **Wheat varieties for bioethanol production.**
- **Forage wheat.**

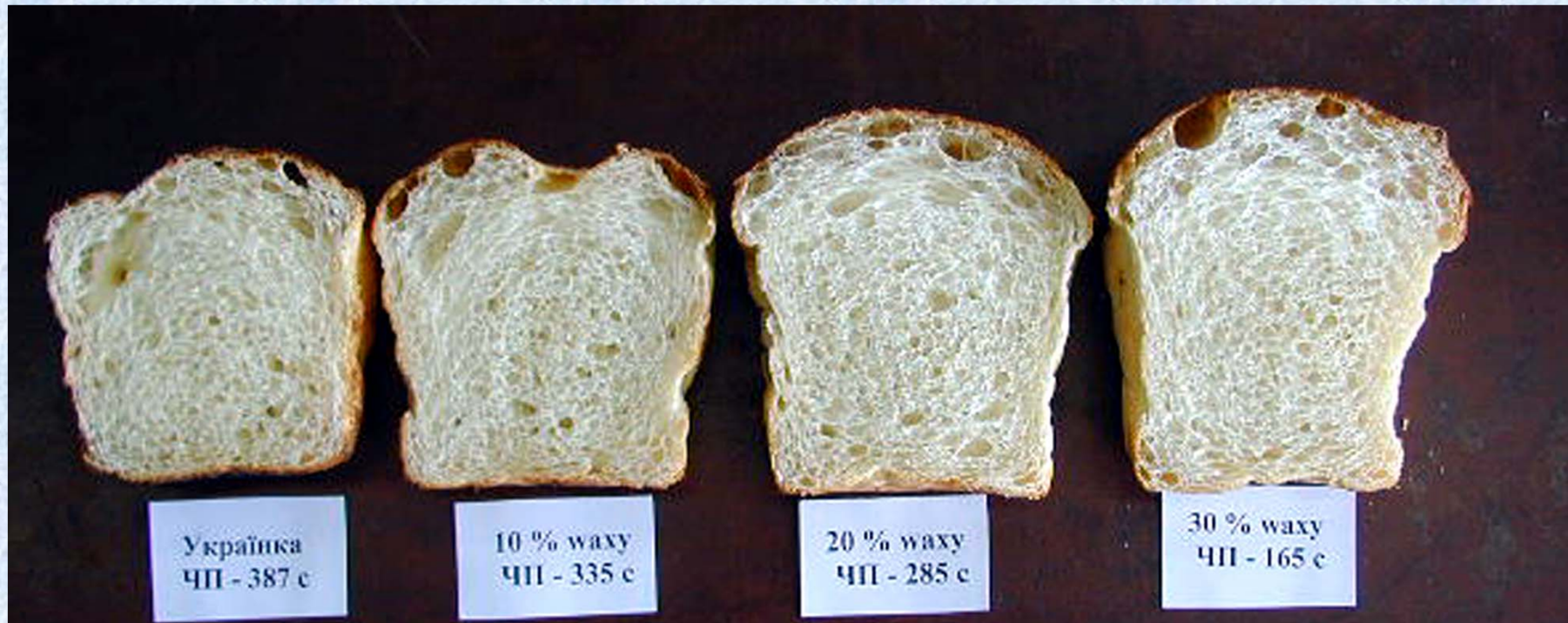
Improvement of flour with strong gluten and a high falling number by adding waxy wheat flour

0%

10%

20%

30%



Development of an initial material for breeding wheat varieties of high grain quality

Extra-strong wheat – initial material

- 1). Use of Glu-B1 77+8 allele (of *Red River 68* type, Mexico)
(spontaneous tandem duplication - a transcription level)
- 2). Use of Glu-B1 77+8 allele (of *Glenlea* type, Canada)
(spontaneous mutation – a translation level)
- 3). Use of Glu-A1x2*b allele (of *Bankuti 1201* type, Hungary)
(Ser → Cys spontaneous point mutation)
- 4). Use of LMW-Glu-3 and HMW-Glu-1 allelic locuses
(introgressions from wide crosses)
- 5). Use of Glu-D1x5 and Glu-A1x2* transgenes
(transgene triple expression)
- 6). Use of HMW-Glu-1 allelic locuses for dough extensibility

Grain yield and indices of grain quality of winter bread wheat varieties developed at different research institutes of Ukraine (2006-2010)

Research institute	No of varieties tested	Yield, t/ha	Protein content, %	Sedimentation, ml	Flour strength, a. v.	Bread value, point
Plant Breeding & Genetics Institute (Odessa)	37	6.90±16	12.5±2.0	68±26	372±100	4.6±0.7
Crop Farming Institute of the South Region (Kherson)	3	5.89±4	12.6±0.5	56±6	246±51	4.7±0.2
Donetsk Institute of Farming Agriculture	5	6.45±5	12.1±0.6	48±7	213±39	4.5±0.2
Institute of Plant Physiology & Genetics NASU (Kiev)	4	6.58±4	12.3±1.0	40±8	199.5±63	4.1±0.4

**Grain yield ability, frost hardiness, protein content
and resistance to principal diseases of some winter bread wheat varieties
developed at Plant Breeding & Genetics Institute (Odessa)**

Variety	Yield, t/ha	Frost hardi ness, %	Protein content %	Resistance to principal diseases , points						
				Brown rust	Yellow rust	Stem rust	Powdery mildew	Septori osis	Fusario sis	Stinking smut
Al'batros odes'kyi	6.27	68.7	12.6	4	4	3	4	5	4	3
Kuial'nyk	6.43	46.3	12.4	4	4	3	4	4	4	3
Kniagynia Ol'ga	8.33	73.7	13.2	7	7	7	8	6	6	9
Vykhovanka	8.54	78.2	13.4	8	9	7	8	6	7	9

Ukrainian wheat grain is known to be in great demand on world market. Nowadays Ukraine supplies the grain to over 80 countries. The fact indicates that Ukraine is a well-known, reliable and one of the leading participants of world grain market.

Among other things that will promote further expansion of Ukrainian wheat grain export to the foreign countries is increasing of a seed export potential of Ukrainian wheat varieties.

Recent amendments to the Ukrainian legislation and the government measures, that were aimed at an adaptation of Ukrainian seed production to the international requirements, enabled Ukraine to get the necessary preconditions for successful integration into the international seed community.

Ukraine has the necessary prerequisites for seed business with foreign countries

- ***membership of Ukraine in the United Nations***
- ***membership of Ukraine in the World Trade Organization (WTO)***
- ***accession of Ukraine to the International Union for the Protection of New Varieties of Plants (UPOV)***
- ***membership of Ukraine in the International Seed Federation (SIF)***
- ***membership of Ukraine in the International Seed Testing Association (ISTA)***
- ***accession of Ukraine to the OECD Seed Schemes***

**In 2009 and 2010 Ukraine produced
20.9 and 16.8 millions metric tons of grain respectively**

Wheat seed production in Ukraine, metric tons (on average for the last 5 years)

Crop	Seed category			Total
	Pre-Basic Seed	Basic Seed	Certified Seed	
Winter wheat	24807	316524	590526	931857
Spring wheat	267	14168	42518	56953

The Structure of the State Register of Plant Varieties Eligible for Certification and Distribution in Ukraine (1991-2010)

Year	Total	Number of		% of	
		Ukrainian Varieties	Foreign Varieties	Ukrainian Varieties	Foreign Varieties
1991	1895	890	1005	47	53
2007	3637	2594	1043	71	29
2008	4484	3075	1409	69	31
2009	4584	2836	1748	62	38
2010	6347	3727	2620	59	41

Number of Wheat Varieties Released by Ukrainian Research Institutes in 2006-2010

Crop	Research institute	Number of varieties
Winter bread wheat	Plant Breeding & Genetics Institute (Odessa)	37
	V. N. Remeslo Mironovka Wheat Institute	13
	Sugar Beet Institute (Kiev)	10
	V. Ya. Yuriev Institute of Crop Production (Kharkov)	9
	Crop Farming Institute of the South Region (Kherson)	5
	Donetsk Institute of Farming Agriculture	5
	Institute of Crop Farming (Chabany, Kiev Region)	3
	Ternopol' Institute of Farming Agriculture	1
	Cherkasy Institute of Farming Agriculture	-
Winter durum wheat	Plant Breeding & Genetics Institute (Odessa)	8
	V. Ya. Yuriev Institute of Crop Production (Kharkov)	2
	Crop Farming Institute of the South Region (Kherson)	2
Spring bread wheat	V. Ya. Yuriev Institute of Crop Production (Kharkov)	2
	V. N. Remeslo Mironovka Wheat Institute	2
	Інститут землеробства	1
Spring durum wheat	V. Ya. Yuriev Institute of Crop Production (Kharkov)	3
	V. N. Remeslo Mironovka Wheat Institute	1

Analysis of the State Register of Plant Varieties of Ukraine Winter bread wheat (2006, 2010)



Analysis of the State Register of Plant Varieties of Ukraine

Spring bread wheat (2006, 2010)



**Total Winter Wheat Seed Sales Volume
of Plant Breeding & Genetics Institute
in Ukraine in 2006-2010, metric tons**

2006	2007	2008	2009	2010	TOTAL
8538.4	6735.5	6528.7	6456.3	6775.2	35034.1

**In 2010 Plant Breeding & Genetics Institute sold abroad 995 tons
of pre-basic and basic seed
(to Russia – 12 varieties, to Moldova – 7 varieties,
to Uzbekistan – 2 varieties, to Turkey – 4 new varieties for testing)**

**Export of wheat seed of Ukrainian varieties, tons
(according to the issued certificate of conformance)**

Crop	2005	2006	2007	2008	2009	2010
Winter wheat	2457.7	-	1454.3	1194.8	286.2	1513.5

**Import of wheat seed to Ukraine, tons
(according to the issued certificate of conformance)**

Crop	2005	2006	2007	2008	2009	2010
Spring wheat	90	162.1	197.8	142.3	40	31.2
Winter wheat	-	-	-	-	784.9	784,9



■ **Plant Breeding and Genetics Institute is closely connected with scientific institutions of different countries: the USA, France, Germany, Mexico, Hungary, Turkey, Russia, Moldova, Thailand, China, Uzbekistan.**

On the basis of bilateral agreement with plant breeding institutions and seed companies of those countries we carry on joint breeding and research programs for many crops.

An excellent example of that is our long-term cooperation with Turkish company the Marmara Un Sanayii A.Ş. on testing, registration, seed production and sale in Turkey of winter bread wheat varieties developed at our institute.

Over the last 7 years Marmara tested around Turkey our 13 wheat varieties, and in 2010 we passed them 4 new varieties for testing, and 2 of them are biscuit wheat.

2004-2006			
1	Odes'ka 267	10	Selyanka
2	Luzanivka odes'ka	11	Al'batros odes'kyi
3	Nikoniia	12	Kuial'nyk
4	Victoriia odes'ka	13	Dal'nyts'ka
5	Syrena o odes'ka	2010	
6	Panna	14	Misiia odes'ka
7	Krasunia odes'ka	15	Epokha odes'ka
8	Ukrainka odes'ka	16	Oksana (biscuit wheat)
9	Znahidka odes'ka	17	Biliava (biscuit wheat)





Two of our wheat varieties, Krasunia odes'ka and Syrena odes'ka, were officially registered in Turkey some years ago.

Since 2004 Marmara almost annually have been buying from us elite seed of our wheat varieties.

Since 2008 Marmara has begun selling the certified seed of our wheat varieties in Turkey.

In 2008 and 2009 Marmara sold respectively 1546 and 3365 tons of those varieties seed and 600 tons of variety Al'batros odes'kyi seed in 2009. Data on seed sales in 2010 we expect to receive from Marmara in March 2011.

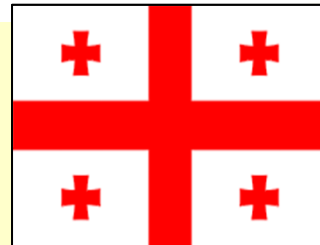
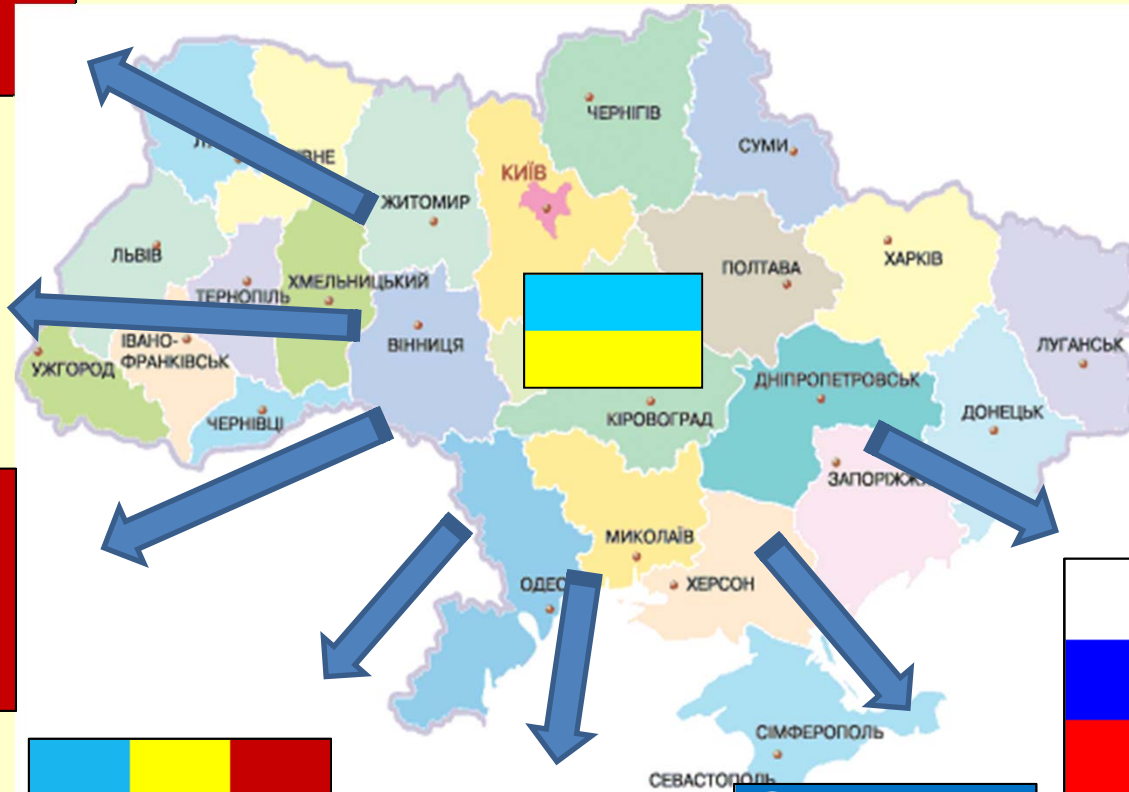
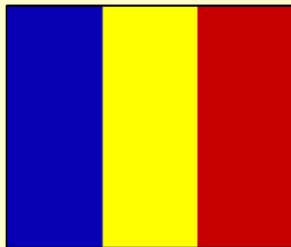
We are going to extend and deepen this cooperation.

Eight PBGI's varieties of bread wheat and 2 varieties of durum wheat have been registered and grown in Russian Federation and Republic of Moldova.

In January 2010 46 Ukrainian wheat varieties were included in the OECD List of Varieties Eligible for Certification, and among them 30 winter bread wheat, 3 spring bread wheat, 7 winter durum wheat, and 6 spring durum wheat varieties.

Out of these varieties 20 winter bread wheat and 7 winter durum wheat varieties were developed at our institute.

Bread wheat





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**THANK YOU FOR
YOUR ATTENTION**