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Rice in Russia is grown in several regions: in the Far East (Primoriye) and in the European part of the country, that is in Krasnodar and Stavropol territories, Astrakhan and Rostov areas, republics of the Northern Caucasus (Adygeya, Dagestan, Kalmykia). Over 70% Russian rice is grown in Krasnodar territory and the main rice research potential is concentrated there. Rice Research Institute was founded in Krasnodar in 1931 (now All-Russian Research Institute of Rice). It has become a coordinating center of rice research in Russia. Breeding of new rice varieties, development of new technologies of rice growing, improvement and creation of new agricultural machines and equipment have always been main objectives of Russian rice scientists.

By the middle of the 80-ies new rice varieties Spalchik, Liman, Kulon, Slavyanetz of intensive type and other were bred. Their yield potential was 8 – 9 t/ha. At the same time intensive technology of rice growing was developed and introduced. It had acquired priority status. It was admitted as an invention and patented in a number of countries (Bulgaria, Hungary, Romania, Cuba, Iran, France, Italy, and Morocco), license for the use of this technology was acquired by Hungary. Application of the new agronomy methods in combination with new varieties allowed producing in 1992 from 6.0 to 6.5 t/ha rice grain at the best rice farms of Krasnodar territory with average 5.02 t/ha, while average rice yield Russia was 4.0 t/ha. But the following years were characterized by worsening of the economical situation. Disparity of fuel and agricultural product prices resulted in reduced ability of farms to buy sufficient amounts of rice elite seeds of new varieties, mineral fertilizers and pesticides. This violation of rice growing technology caused considerable reduction of rice yield of intensive varieties. Rice growing became unprofitable and sown areas under rice were reducing.

In order to prevent collapse of the enterprise, rice scientists and agronomists tried to find methods of improving costs efficiency of rice growing. Within relatively short period (5-6 years) this objective was reached.

First, rice breeders completed breeding programs for creation of new varieties that practically do not require pesticides: Sprint, Pavlovsky, Kurtchanka, Rapan, Leader. Rice plants of such varieties as Sprint and Leader are fast growing at the first stages of development and they emerge through water layer of 20-25 cm. Weeds of *Panicum spp*. do not survive under this layer. This allows avoiding application of herbicides against grasses. New rice varieties require lower rates of mineral fertilizers, including nitrogen, thus making these varieties more attractive compared to Spalchik, Kulon, Liman.

Yields of these new varieties are high enough (Table 1).

Table 1. Agronomic features of new rice varieties

Variety	Vegetation period, days	Plant height cm	Plant height cm	Yield, t/ha
Sprint	90	95	9	6.5
Pavlovsky	116	85	8	9.0
Kurtchanka	119	80	8	8.7
Rapan	116	80	6	8.5
Leader	120	90	9	9.2
Spalchik (standard)	116	80	4	7.8

High productivity of Russian rice varieties Pavlovsky and Kurtchanka was confirmed by ecological trials in France in 1998 (Table 2).

Table 2. Yield of rice varieties in ecological tests in France (Clement, 1998)

	Variety	Plant height cm	Growth rates grade	Yield t/ha
1	Pavlovsky	85	8	8.74
2	Helene	95	6	8.43
3	Kurchanka	85	8	8.07
4	RT 107-18	75	5	7.73
5	95 R 175	70	6	7.27
6	95 R 36	75	6	6.92
7	Cigalon	70	6	6.58
8	Aguirre	75	6	6.21
9	Balilla	95	4	6.02

Russian rice varieties are characterized by higher growth rates compared to other European varieties. Growth rate attribute of the rice plant is closely connected to its yield, that is why Russian breeders pay special attention to it.

Introduction of new varieties has resulted in practically complete rejection of fungicide application in rice fields and reduces by 60-70 % use of herbicides against grasses. It has led to reduction of costs of rice production and improvement of ecological situation in rice growing areas.

Second, energy saving technology of rice growing has been theoretically based and tested. The main principle of this technology is usage of ploughs without moldboards. Specialized agricultural machines have been designed and produced at the Krasnodar plant “RISMASH”. The technological complex consists of specialized plough, harrow and highly productive sowing machine with spreader which is able to sow up to 50 ha a day. This sowing machine can be used both for rice sowing and spreading granular mineral fertilizers. These machines allow reducing number of runs on the rice field thus saving energy consumption and improving quality of soil preparation.

Third, designers and engineers have completed rice combine harvester of new generation SKD-7 “Kuban”. It has shown good results not only in Russia but also in the Ukraine, Kazahstan and even Australia. At the International Competition in Australia in 1994 the combine harvesters “Kuban” got the first place and was awarded a “Diamond Star” prize.

Energy saving technology of rice growing allows also reducing labor costs more than twice (Table 3).

Table 3. Efficiency of new rice growing technology (Zayarsky, 1997)

Type of works	Labor expenses, man-hour/ha	
	traditional technology	new technology
Soil tillage	6.31	6.31
Application of mineral fertilizers	0.48	0.24
Sowing	1.30	0.09
Harvesting (two stage harvesting):		
cutting	0.75	0.54
thrashing	2.50	1.20
Total:	11.6	5.32

Rice yield in Krasnodar territory in 1998 was 4.2 t/ha. In a number of farms the level of 6.0 t/ha was overcome with economic costs reduced compared to 1992.

In 1999 rice-sown areas in Krasnodar territory reached 122,000 ha, which is 20% increase compared to 1997. Yield forecast for the 1999 is good and this allows Russian rice growers looking forward with optimism.