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Varietal plant breeding for adaptive rice growing in Russia

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Traditionally, Russian rice growing, which started in 30's, was based on 1 or 2 varieties in each region. It is also typical for Krasnodar Territory, the main rice growing region in Russia.

Thus, before 1980 four varieties were introduced into production of the Territory, but annually, variety Krasnodarsky 424 occupied 90-93 % of the total sown areas. Vegetation period of the variety was 120-125 days, plant height was 110-115 cm, yield potential was up to 10 t/ha.

Since 1980 short-stem varieties were introduced into production; among them variety Spalchik occupied the largest areas (up to 70-80 % in region). Its vegetation period was 117-120 days, plant height was 80-90 cm, yield potential was up to 12 t/ha, yield index was up to 0.60. Under the conditions of intensive technogene system of rice growing the average yield of the variety was up to 4.5-5.1 t/ha in region and 300-350 kg of active ingredient of mineral fertilizers were applied per each hectare.

At the beginning of 90's the priorities in breeding and in varietal application changed because of transition to market economy and non-subsidized agricultural production. In 1994 eleven varieties were introduced into production and 15 varieties were introduced into production in 1997. But quantity increase of varieties, which differentiated a little by morphological and biological characters, didn't increase the yield and in 1997 it decreased up to 2.7 t/ha; it happened so because of deterioration of economic situation, because of 3 times decrease of application rate for mineral fertilizers and 4-6 times decrease of products for weed and disease control.

At present, we introduced rice growing technologies, which need small costs. Liman is the best variety for such conditions. It is a short stem variety, its yield potential is up to 11 t/ha, it is blast resistant it can be used for cultivation by non-herbicide technology (when we obtain the shoots from water layer); it responds well to average application rate of mineral fertilizers. The share of this variety in sowings (58 % in 2000) will decrease because of widening areas for such new varieties as Regul, Rapan and Leader. Regul is used for cultivation by power saving technologies: the shoots from water layer are thick, it doesn't need high application rate for mineral fertilizers, it is lodging resistant, it has prolonged kernel; but Liman is more resistant to blast.

Variety Leader has been released especially for non-pesticide cultivation technology; it's shoots from water layer are 20-25 cm long. It needs 40-50 % less of mineral fertilizers than Liman.

Rapan is substantially different variety, as compared to above mentioned 2 varieties. It's yield potential is up to 12 t/ha, the vegetation period is 120 days, it is lodging resistant variety, it reimburses high application rates of mineral fertilizers. It is recommended for cultivation by technology of water escape after obtaining shoots and by herbicide application.

As recent investigations showed, the existing varietal diversity is not enough for maximum and effective usage of soil, climatic and agro-economic conditions of rice growing regions in Russia.

From 20 to 22 varieties are necessary for Krasnodar Territory, taking into consideration its microzones and different economic levels of farms; among such varieties there should be early maturity varieties (the vegetation period is 100-105 days), cold resistant varieties for early April sowing, salt-resistant varieties, with high blast resistance, etc. We carry out breeding work in this direction.

It was developed the system of rational use of varietal diversity in the form of varietal complexes and succession of varieties in crop rotation.

Besides state varietal tests, the network of ecological varietal tests was organized for study of the varieties, for determination of their importance in production.

Achievements in breeding cannot be efficiently used in production without reliable seed production system; thus, we widen the breeding and also renew seed production system.