



Food and Fodder Value of Triticale Varieties Under the Conditions of Kyrgyzstan

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Abstract

The aim of this study was to determinate of food and fodder values of some winter triticales varieties in region of Chuy in Kyrgyzstan. In the study, three winter triticale varieties (Alesha and Missim), a facultativ wheat variety (Jamin) and a winter barley variety (Manas) used. The study carried out as field expertiment in Chuy Reginon in Kant province in the seed and breeding experimental fields of MIS Agricultural Co-operative as methods of SVT (State Varieties Test Methods) in 2010-2012 years. According to result of the study, higher yield obtained from two varieties of triticale (Alesha and Missim) than facultative wheat and winter barley varieties.

Keywords: *triticale, cereals, food, forage, yield, varieties.*

Kırgızistan Koşullarında Bazı Tiritikale Çeşitlerinin Gıda ve Yem Olarak Değerlendirilmesi

Özet

Bu çalışma, bazı kışlık tiritikale çeşitlerin Kırgızistan Çüy bölgesinde gıda ve yem olarak kullanımını ortaya koymak amacıyla yapılmıştır. Çalışmada üç kışlık tritikale çeşidi (Alloşe ve Missim), bir fakültatif buğday çeşidi (Camin) ve bir kışlık arpa çeşidi (Manas) kullanılmıştır. Bu çalışma 2010-2012 yıllarında Çüy bölgesi Kant ilçesinde MİS Tarım Kooperatifi İslah ve Tohumculuk Deneme alanlarında SVT (State Varieties Test Method) metoduna göre tarla denemesi şeklinde yürütülmüştür. Çalışmanın sonuçlarına göre, iki tritikale çeşidinin (Alloşe ve Missim) verimi fakultatif buğday ve kışlık arapa çeşitlerinin verimlerinden daha yüksek olmuştur.

Anahtar sözcükler: *tirikikale, thal, yield, gıda, yem, çeşit*

1. INTRODUCTION

Expansion of triticale crops and introduction into the production as a high-yielding domestic variety, opens huge reserves of an increase of high-quality fodder and food grain. The wide circulation of triticale worldwide has occurred owing to high productivity, unpretentiousness in cultivation (stability to illnesses and drowning, high winter hardiness and drought resistance, unpretentiousness to fertility and the predecessor), a little bit raised in comparison with wheat to a content of lysine and versatilities in use. Grain of cereal cultivars, including triticale is an important source of fibers of a psychogenesis. Grain cereal cultivars provide over 60 % of the general gathering fibers and play an important role in a nutrition of human being. In the Kyrgyz Republic triticale basically used as a forage directed - in feeding animals. It is poorly studied use of triticale grain in the baking industry and confectionery production. Triticale as a forage directed crop has the valuable features.

At definition of parameters of a model variety on green weight approaches technological ripeness has fundamental importance. According to the model of grain forage triticale variety, at such variety of a plant should be with well leaf stalks not less than 30 - 35 %, productivity of green weight 80 tons from 1 hectare and more, grain 6 ton from 1 hectare, height of plants 180 cm, quantity of grains in an ear 45 pieces, weight of 1000 grains 45 grams, productivity of bush 4,2 stalks, a harvest index of 30 %, a content of a crude protein in grain 14,0.

2. RESULT and DISCUSSION

Crop breeders of “MIS” LTD in collaboration with CIMMYT and ICARDA scientists have developed 2 high-yielding triticale varieties adaptable to local condition. The variety “Alesha” and “Missim” can be used for production of grain and silage as well. At present these varieties are grown by farmers in Chuy province.

On studying efficiency, productivity, and an assessment of technological properties of grain of a domestic triticale variety Missim the following has shown our experiences: In autumn triticale variety Missim ripe for 3-4 days before a standard variety of wheat Djamin and a standard variety of barley Manas (table 1). By results of the structural analysis of plants the raised grain efficiency of Missim variety is shaped due to: productive bush – 2,6 stalks on a plant; weights of grain from the main ear - 2,8 grams; weights of grain from a plant - 6,8 grams; numbers of grains from the main ear - 61,5 pieces and weights of 1000 grains-43,0 grams. To the result of productivity Missim variety has shown high results under the production conditions in 2012.

So, in Open Joint-Stock Company "MIS" in Chuy Oblast, Issyk-Ata region on the area of 12 hectares it was received on 3,7 tons of grain from hectare, that is 1,22 tons more than the average productivity of wheat on the given branch of Open Joint-Stock Company "MIS". These results of cultivated Missim variety under the production conditions allow to make the conclusion about its genetic fitness to various soil-climatic conditions, where is Missim variety is the universal adapted variety to various ecological zones of cultivation and can provide good productivity in a combination with high technological quality of grain.

Table 1. Features of triticale variety Missim the predecessor long-term grasses, MIS, 2010 -2012 year.

Feature	Variety			NSR ₀₅
	Missim	Wheat Djamin	Barley Manas	
Heading date	16.05	20.05	19.05	
Height of the plant, cm.	110	95	80	5,63
Productive bush, pieces.	2,6	2,7	2,5	0,25
Length of main ear, cm.	10,1	11,0	10,0	0,75
Number of ears in the ear, pieces.	29,6	29,1	30,8	1,64
Number of grains in the ear, pieces.	61,5	58,5	53,7	5,70
Weight of 1000 grains, gram	45,4	39,5	43,2	3,41
Weight of grain from main ear, gram	2,8	2,3	2,3	0,40
Weight of grain from the plant, gram	7,3	6,2	5,7	0,54
Yield, tons from 1 hectare	8,1	7,3	6,7	6,2

Triticale varieties Alesha and Missim under the state registry of varieties and hybrids of the plants admitted to use in the territory of the Kyrgyz Republic are recommended to use since 2005, as varieties of a fodder direction. At a baking assessment triticale on wheaten technology, its model provides creation of varieties with the raised content of fiber in grain (up to 14 %) and gluten (up to 28 %) the first group of quality, with volume of baked bread 750 ml and porosity for 4 points.

Variety Missim possesses well enough baking qualities: the content gluten in grain varies from 17 up to 21 %. From our researches follows that studied triticale varieties have various validity to backing quality (Table 2).

Table 2. Technological characteristics of triticale grain variety Missim , Open Joint-Stock Company «MIS» Long-term grasses , 2010-2012 year.

Feature	Missim	Alesha	Fluctuation from Alesha
Protein content, %	12,0	11,5	+ 0,5
Gluten content, %	21,4	18,5	+ 2,9
General Backing quality evaluation, points	4,0	3,0	+ 1

As it is known, it is very difficult to combine a high content lysine grains triticale with baking qualities and consequently at definition of parameters of baking qualities of a flour from grain triticale paid attention to the basic technological properties (tab. 3). Therefore in scientific devices of laboratory department of Plant production of the Humboldt University of the city of Berlin definition number of sedimentation (a degree of swelling gluten flours) and numbers of falling units is executed.

We have applied a method of Greens at definition of number sedimentation, that is based on scoping of a flour in solutions of weak organic acids. To study falling number have applied a procedure of Swedish researcher Hagberga which is based on definition of time of falling special plunge to weight at 990 with the rye flour talker.

The above-named procedures are recognized in the Europe and allows to estimate baking qualities of a flour most quickly and effectively.

Table 3. Parameters of baking quality of grain domestic breed

Name of winter grain crop	Dry content, %	Nitrogen, %	Carbon, %	Moisture, %	Falling numbers, seconds	Sedimentation (swelling index, gluten content)
Winter barley «Manas»	89,54	2,512	46,074	10,46	388	Not detected
Winter triticale «Alesha»	89,76	2,899	45,772	10,24	295	9
Winter triticale «Missim»	89,29	2,357	45,691	10,71	248	20

Here, the number of falling units and more parameters of sedimentation, the above baking qualities of a flour (table.3) is shown. On these technological parameters the flour of a triticales variety Missim shows the best baking quality, that is checked up by a batch and tasting of bread.

Apparently from table 3, activity of enzymes amylase a complex in a flour of triticales Missim the highest (248 sec), behind it the flour of a variety Alesha (295 sec) will proceed, and then winter barley Manas (388 sec). If the difference of falling number in the plunge to weight of a flour of both triticales varieties make 47 sec whereas between triticales variety Missim and winter barley Manas 93 sec, i.e. almost twice slower falls of plunge.

Thus, flours from a triticales variety Missim on parameters of sedimentation (20 ml) and to number of falling units (248 sec) are quite suitable for bread backing, especially for mix with rye bread. Flavored rye-triticales bread positively influences ability to live of an organism of the person.

Results of our researches give basics to consider the prospect of triticales cultivation of Missim variety for food objectives. Feasibilities of triticales marketing, in connection with growth of demand for the black rye and rye mixed bread in the market of the grocery of Kyrgyzstan which is giving great opportunity for further marketing. Here it is necessary to note that triticales surpasses a rye on baking qualities. The special attention is deserved with use of mixtures of a flour triticales and wheat. Their mixing in the ratio 1:1 positively influences to geologic properties of the test: farinograms come close to clean wheat, and mixtures under optimum conditions of a batch give the volume of bread practically equal to volume of bread from wheat.

Thus our wheat has given poor quality of gluten, i.e. the fifth class with $IDK > 115$ units when qualitative of bread from such wheat you will never receive. If to a flour of such poor-quality wheat to add 20 % of a triticales flour the level of its quality increases up to a level of the third class. That is why gluten becomes elastic - 60-70 units IDK , and it's already gluten of I - II groups of the quality, recommended for bread backing. If from a poor-quality flour it is impossible to bake bread from such mixtures of a flour (wheat+triticales) turns out bread in volume more than 600 milliliters that speaks about high force of a flour. We should introduce such technological reception in a baking production.

On physical appearance, color of a crumb bread from triticales variety Missim is close to wheat, possesses high aromatic and flavoring properties, and wheat-triticales mixture makes an excellent bread. Besides triticales variety Missim is possible to make wide use of grain in the confectionery industry for a batch of gingerbreads and cookies. For example, grain of triticales variety Missim has a high content carotene pigments that provides the way to use a flour from triticales in the confectionery production, excepting application of chemical dyes. How the grain of triticales variety Missim is natural "dye" carotene which gives yellowish color to a flour and it will be also saving of means, and it is useful to an organism of people with its pro vitamin A.

At the moment, when all rye flour for a batch of diet rye bread is exported from Russia, the value of a domestic flour triticales Missim variety gets strategic food value, in bread backing, and in the confectionery production. This important point should be considered as decision grain and a to solve food problem of the country and it is necessary to expand sharply triticales crops.

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