

18. Tamura K., Dudley J., Nei M. & Kumar S. (2007) MEGA4: Molecular Evolutionary Genetics Analysis (MEGA) software version 4.0. *Molecular Biology and Evolution*, 24(8), 1596-1599.
19. Van Berloo R., Hutten R.C.B., Van Eck H.J., Visser R.G.F. (2007) An online potato pedigree database resource. *Potato Research*, 50, 45-57: <http://www.plantbreeding.wur.nl/potatopedigree/>

LATVIJAS KARTUPEĻU ĢENĒTISKO RESURSU RAKSTUROJUMS AR DNS MOLEKULĀRO MARĶIERU PASPORTIZĀCIJAS METODI

Zhuk A., Veinberga I., Skrabule I., Ruņģis D.

Molekulārus marķierus, tai skaitā vienkāršus DNS sekvences atkārtojumus (SSR, no angl. val. - Simple Sequence Repeat), plaši izmanto dažāda augu materiāla identifikācijai, ģenētiskās daudzveidības noskaidrošanai, gēnu banku kolekciju uzturēšanai, augu selekcijas programmās elitāro alēļu skrīningam un materiāla apmaiņas kontrolēšanai, kā arī ploīditātes pakāpes paredzēšanai, ģenētisko karšu konstruēšanai, evolucionāros un populāciju pētījumos. SSR marķieru augsts polimorfisma līmenis ļauj atšķirt pat tuvi radniecīgas šķirnes.

Kartupeļu (*Solanum tuberosum* L. subsp. *tuberosum*) šķirnes (59) reģistrētās Latvijas Augu Ģenētisko Resursu katalogā tika izpētītas ar SSR molekulāriem marķieriem. Tika identificēti astoņi īpaši polimorfī marķieri no 15 marķieru grupas un tie izmantoti visas kartupeļu šķirņu kolekcijas raksturošanai. Tika veikta katras šķirnes raksturojošo molekulāro nospiedumu noteikšana (molekulārā pasportizācija), ģenētisko distanču aprēķināšana un filoģenētiskās analīzes. Divi šķirņu pāri tika identificēti vienādi pēc visiem lokusiem, pārējās šķirnes var atšķirt ar četrus marķieru molekulāriem nospiedumiem. Tika analizēta līdzīgu šķirņu klasteru veidošanās, izmantojot dažādus datu apvienošanas principus un analīzes metodes. Ģenētiskās daudzveidības palielināšanās atrasta nesen selekcionēto kartupeļu šķirņu grupā, salīdzinot tās ar pagājušā gadsimta sākumā veidotajām šķirnēm. Efektīvo molekulāro marķieru metožu izmantošana Latvijas šķirņu identifikācijai un radniecības pakāpes noskaidrošanai uzlabos turpmāku kartupeļu šķirņu kolekciju uzturēšanu, izplatīšanas kontroli, kā arī selekcijas materiāla atlasī.

POSSIBILITIES TO GROW OATS FOR FOOD IN LATVIA

Zute S., Gruntiņa M., Maļeckā S.

State Stende Cereals Breeding Institute, Dižstende, Talsu region, Latvia, LV-3258, phone: +37163292289, e-mail: sanita.zute@stendeselekcija.lv

Abstract

In order to improve the nutrient content of oat food products, there is a need for good quality grains. In our study, 15 oat varieties grown in a field trial (2005-2007) at the State Stende Cereals breeding Institute and 78 oat samples collected from different farms in Latvia were analysed for volume weight, 1000 grain weight, husk content, crude protein and fat. The grain processing enterprise *Rīgas Dzīrnavnieks* Ltd has determined the criteria of oats for food. The grains have to have a volume weight higher than 480 g l⁻¹ and husk content below 250 g kg⁻¹. Results of the experimental trial showed that these demands are accessible. The grain volume weight ranged from 480 to 518 g l⁻¹, 1000 grain weight from 33.7 to 38.4 g, the husk amount from 206 to 312 g kg⁻¹. However, only four of 15 analysed oat varieties met the standards requested for food quality. The analyses of oat samples collected from farms showed generally lower grain quality than the analysed grain samples from experimental fields. Thus, to obtain oat quality under farming conditions is more difficult than under experimental conditions.

Key words: oats, grain quality, volume weight, husk amount

Introduction

Grain products are among healthy foodstuffs needed for humans. Oats, due to their particular biochemical composition, are considered ideally suited for the production of dietary products. Oat grains are characterized by a balanced composition of essential amino acids, high unsaturated fat content, the presence of β -glucane, vitamins and antioxidants (Beķeris *et.al.*, 2001). The production of high quality foodstuffs is possible due to high quality raw material – grain. In oats, not only the biochemical but also the economic indices of grain, such as volume weight, TKW and husk content are important as the quality of oat products obtained from each ton of purchased grain is dependent on them (Richards, 1990). The optimal values of these indices are fixed by each grain processing enterprise. Thus, e.g., in Germany grain processing enterprises have declared the following requirements for oat grain: volume weight $>530 \text{ g l}^{-1}$, 1000 grain weight $>27 \text{ g}$, husk content $<26\%$ (Grasmann *et.al.*, 1995). In Latvia as well the oat grain processors have minimal requirements regarding purchased grain quality indices. They are: volume weight $>480 \text{ g l}^{-1}$ and husk content $<25\%$ (<http://www.rigas-dzirnavnieks.lv>). The results of different studies have confirmed that yield and quality indices in grain vary with the season, location and varieties (Meyer *et al.*, 1996.) Obtaining higher grain yields per hectare is in the farmers' interests. To reach the goal, improved oat varieties and optimal growing technologies are searched for in each region. Research results show that correlative relationships between the productivity of crop varieties and grain quality indices are low as estimated by grain processors (Meyer *et al.*, 1996; Zute *et al.*, 2002). Oat varieties which are plastic in changing climatic conditions and capable of ensuring both stable yields and corresponding grain quality from year to year are most popular among oat breeders. In 2005, researchers from the State Stende Cereals Breeding Institute in collaboration with the grain processing enterprise *Rigas Dzirnāvnieks* Ltd started a joint research project to clarify which oat varieties should be recommended for growing in Latvia and which technological elements ought to be applied in oat cultivation to satisfy both the farmers and the processors of oats.

The information presented in the paper was obtained in the following way: firstly, analysing the quality indices of the oat varieties registered in the Latvian Plant Variety List and, secondly, inspecting oat production farms and estimating the quality of the produced grain.

Materials and Methods

The results obtained in oat variety trials were analysed. These trials were conducted in selection plant rotation of the State Stende Cereals Breeding Institute in 2005, 2006 and 2007. The following 15 oat varieties were evaluated: the Latvian oat varieties 'Laima', 'Stmara', 'Stendes Liva', 'Arta' and 'Stendes Dartā', the Swedish oat varieties 'Freja', 'Belinda', 'Selma', 'Margaret', the German 'Vendela', 'Hecht', 'Jumbo' and 'Aragon', and the Russian oat variety 'Kirovec'. Variants – test varieties were laid out in four replications according to the standard method. 'Laima' (most widely cultivated in the production sowings in Latvia) was the standard variety. Trial plots were established as follows: standard variety plot after five test varieties' plots. The recorded plot area was 10 m^2 .

Growing conditions: sod-podzolic soils (WRB – Eutric Podzovisols), well cultivated moraine loamy sand soil with pH_{KCl} of 5.4 – 6.6 in arable layer, and 16 – 25 g kg^{-1} organic matter, previous crop – potatoes.

Fertilization was carried out before sowing. The mineral fertilizer *Kemira NPK 18:9:9* was incorporated into the soil; nitrogen active ingredients $60 \text{ kg ha}^{-1} \text{ N}$ were applied. Weed control was done by harrowing twice (prior to the seed germination stage and at the tillering stage of plant development) and spraying with herbicide *granstar* – 12 g ha^{-1} . Sowing was performed in optimal conditions. Oats were harvested using the grain harvester Sampo – 130. Phenological observations were done on the field. On plots the harvested grain yield was weighted and expressed at 14% moisture. After harvesting the oat grain was dried and cleaned using the cleaning machine *Mini Petkus* (size of the sieve mesh: $12.0 \times 1.9 \text{ mm}$). During the winter period, at the laboratory of Grain technology and agro-chemistry of the Institute the economic value and technological properties of the grain were analysed: husk content (g kg^{-1}), volume weight (g l^{-1}), 1000 grain weight (g), crude protein (g kg^{-1}), crude fat (g kg^{-1}) and starch content (g kg^{-1}).

In 2007, 78 samples of oat grain were collected from crop production farms. These crop production farms were chosen from different regions of Latvia. Oat breeders presented information regarding

the main indices characterizing crop management: the name of the oat variety, the timing of sowing and harvesting, the previous crop, applied fertilizer rates and plant protection measures, etc. Grain was sampled after harvesting and free from first treatment transported to the Institute. At the laboratory of Grain technology and agro-chemistry of the Institute the economic value and technological properties of the grain were analysed.

Ms Excel ANOVA and correlation analysis was used for data processing.

Results and Discussion

Oat variety trial seeds of the oat varieties developed in Latvia and registered in the Latvian Plant Variety List as well as promising lines offered by oat breeders from other countries were seeded. The goal of this trial was to observe the stability of the productivity level and oat grain quality indices in test varieties from year to year. The test varieties significantly differ in their productivity level, the biochemical composition of the grain and the value of their agronomic traits. In Latvia, the agro-climatic conditions in the vegetation period of plants significantly differ from year to year. This is demonstrated by productivity fluctuations in oat varieties over a period of years. In this trial from 2005 till 2007, when applied crop management measures provided maximum and equal growing conditions there resulted a productivity variation in oat varieties ranging from 2.88 ('Vendela') to 17.38% ('Kirovec') (Table 1). A medium-high coefficient of variation (> 10%) was shown by the oat varieties 'Arta', 'Freja', 'Jumbo' and 'Aragon'. Compared to the standard variety 'Laima', all these oat varieties matured by 3 to 5 days earlier. Oat breeders' long-term observations indicate that oat varieties having a shorter vegetation period are more sensitive to different stress factors during the growing period than late-maturing oat varieties.

In variety testing, higher 3-year average yields of oat grain were obtained from the varieties 'Margaret', 'Belinda', 'Laima' and 'Stendes Darta'. The average productivity of all these test varieties exceeded 6 t ha⁻¹. This corresponds to the yield level showed by the standard variety 'Laima'. The lowest grain yields were recorded for the oat varieties 'Arta', 'Stendes Liva' and 'Kirovec', respectively 3.84, 4.57, and 5.35 t ha⁻¹. Such results are correspond to the yield potential of these oat varieties. When estimating the average productivity level reached in each trial year, it was observed that the lowest oat grain yield was attained in 2007 – on the average 5.24 t ha⁻¹ or respectively by 0.71 and 0.59 t ha⁻¹ lower than in the years 2005 and 2006 (Figure 1).

Table 1. Grain yield of oat in variety trials, 2005 – 2007

Varieties	Grain yield, t ha ⁻¹ , average for 2005-2007			CV* between years
	Min-max	Mean	+/- Laima	
Laima	5.86 – 6.56	6.27	0.00	5.82
Arta	3.38 – 4.16	3.84	-2.43	10.60
Stendes Līva	4.46 – 4.72	4.57	-1.70	2,91
Stmara	5.48 – 5.91	5.62	-0.65	4,41
Stendes Dārta	5.71 – 6.72	6.08	-0.15	8.71
Kirovec	4.33 – 6.15	5.35	-0.92	17.38
Freja	5.18 – 6.16	5.87	-0.40	10,17
Belinda	5.88 – 6.28	6.27	0.00	6.07
Selma	5.22 – 5.8	5.52	-0.75	5,26
Hecht	5.30 – 6.15	5.87	-0.40	8.46
Margaret	5.71 – 6.66	6.29	0.02	8,12
Vendela	5.76 – 6.07	5.88	-0.39	2.83
Triton	5.15 – 6.08	5.71	-0.56	6.31
Jumbo	5.08 – 6.32	5.69	-0.58	10,91
Aragon	5.52 – 6.75	6.04	-0.23	10,51
LSD _{0,05}		0.222		

*CV – coefficient of variation

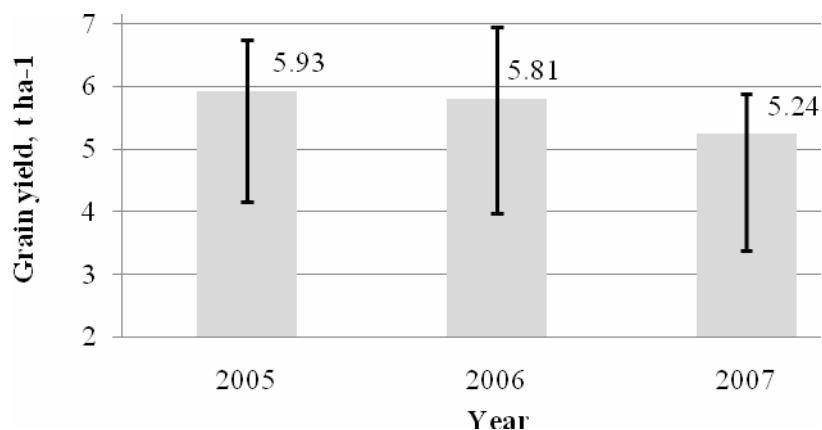


Figure 1. Grain yield of oat, min, max and average in the trial, t ha⁻¹, 2005-2007

In 2007 warm and dry weather conditions in the last part of April – at the tillering stage of oats – were favourable for frit fly (*Oscinella frit*) infestation. This insect caused serious damage to 40 - 75% of the oat plants. Though sufficient moisture in the subsequent period of vegetation contributed to the tillering and regrowth of oat plants, nevertheless this stress resulted in smaller grains, lower volume weight, and a higher proportion of husk in the yield of grain.

In the trial, the 3-year average volume weight of the oat grain corresponded to the minimal requirements of the grain processors – 480 g l⁻¹ (Table 2). The grain processors prefer to purchase grain of a high volume weight. The trial results confirmed that the oat grain having the highest volume weight (on the average > 510 g l⁻¹) could be obtained from the test varieties ‘Aragon’, ‘Triton’, ‘Arta’ and ‘Kirovec’. However, it should be noted that the yield characterizing quality indices varied from year to year. Though for the volume weight from year to year the coefficient of variation was low – from 2.4 (‘Freja’) up to 7.3 (‘Stendes Līva’), in 2007 the grain volume weight of six oat test varieties was below 480 g l⁻¹. They included the oat varieties ‘Margaret’ and ‘Belinda’ which were most productive that year.

Husk content in grain yield is also a trait the variation coefficient which was comparatively low from year to year. For oat varieties included in the trial it ranged from 1.1 (‘Jumbo’) up to 7.4% (‘Stmara’). The value of this trait was largely due to variety genotypes. In the trial, during all the test years, the oat varieties ‘Arta’, ‘Freja’, ‘Margaret’, ‘Vendela’ and ‘Jumbo’ were characterized by the lowest husk content in the grain yield, i.e. < 250 g kg⁻¹ or 25% from grain the yield.

In Latvia, the 1000 grain weight is not estimated when purchasing food grain, however a higher product outcome is obtained with coarse-grained oats. Research results show that frequently oat varieties characterized by the highest grain volume weight had a medium- high 1000 grain weight (e.g., ‘Arta’, ‘Kirovec’, ‘Laima’, ‘Stendes Dārta’), but for the most coarse-grained oat variety ‘Hecht’ the 1000 grain weight was 41.31g on a 3-year average. A positive and significant correlation was established between the grain husk content and the 1000 grain weight (correlation coefficients respectively $r=0.594$, 0.539 and 0.584 , $r_{crit}=0.486$) for all oat varieties included in the trial in the years 2005, 2007 and on the average for all the three trial years. In this trial significant correlative coherence was not established between grain volume weight and 1000 grain weight, grain volume weight and husk content in yield as well as between the above mentioned quality parameters and grain yield. It shows that indices of traits were more dependent on the peculiarities of genotype of each variety and not on mutual trends in the trial. Out of all test varieties included in this trial, ‘Arta’, ‘Vendela’, ‘Freja’ and ‘Jumbo’ were most suitable to meet the requirements of grain processors. In these oat varieties comparatively low husk content and high grain volume weight were concurrently found. In the most productive oat varieties ‘Laima’ and ‘Aragon’ the 3-year average husk content somewhat exceeded the minimum defined by grain processors.

Table 2. Testing results of oat grain quality, 2005 – 2007

Oat varieties	Volume weight, g l ⁻¹ ± sd		1000 grain weight, g ± sd		Husk, g kg ⁻¹ ± sd	
	Average	2007	Average	2007	Average	2007
	2005 - 2007		2005 - 2007		2005 - 2007	
Laima	503.7 ± 1.56	487.0	35.41 ± 2.56	38.32	253.7 ± 7.2	262.0
Arta	513.3 ± 2.06	490.5	35.10 ± 0.59	35.77	211.5 ± 12.6	221.0
Stendes Līva	489.0 ± 3.61	450.0	36.78 ± 1.36	38.18	246.7 ± 10.7	259.0
Stmara	492.0 ± 1.91	47.20	35.37 ± 1.49	36.72	263.6 ± 20.2	254.0
Stendes Dārta	506.7 ± 1.21	484.0	34.91 ± 2.67	37.29	261.50 ± 16.9	257.0
Kirovec	511.0 ± 1.87	494.0	36.05 ± 1.37	37.24	251.4 ± 11.1	261.0
Freja	504.0 ± 1.22	498.0	35.95 ± 2.76	39.00	243.8 ± 9.4	240.0
Belinda	486.3 ± 2.31	463.0	38.93 ± 1.64	40.46	270.2 ± 22.0	295.0
Selma	508.3 ± 2.08	490.0	38.08 ± 1.60	37.48	263.1 ± 10.0	273.0
Hecht	495.3 ± 1.45	481.0	41.31 ± 2.21	43.86	330.6 ± 5.7	337.0
Margaret	479.3 ± 3.24	443.0	37.34 ± 1.23	38.59	236.2 ± 9.7	247.0
Vendela	499.7 ± 2.04	477.0	37.56 ± 1.64	39.34	227.0 ± 9.8	230.0
Triton	516.3 ± 1.91	509.0	39.49 ± 3.51	43.53	255.4 ± 11.2	259.0
Jumbo	496.0 ± 3.21	475.0	38.88 ± 1.66	38.81	247.2 ± 2.9	244.0
Aragon	518.0 ± 2.15	500.0	38.69 ± 3.08	42.10	269.0 ± 9.0	269.0
Average	-	480.8	-	39.11	-	259.3

In the inspected grain production farms the total area sown to oat occupied 1934 hectares out of which 79 samples of grain were collected. The greatest number of grain samples was obtained for the oat variety 'Laima' (48 samples or 60.7%), 'Kirovec' and 'Vendela' (6 samples for each variety), 'Selma' (5 samples), and 'Freja' (4 samples). The rest of the varieties, such as 'Līva', 'Aragon', 'Ivory', and 'Cval' were represented by one or two samples of grain. The quality indices of the cultivated oat grain varied widely. This was seen best when analysing grain samples of one oat variety – that of 'Laima' (Table 3). Overall the grain volume weight in 90% of the oat grain samples was above 480 g l⁻¹. However, it should be observed that this parameter was determined after fine grain separation. The outcome of grain ware production (above 1.9 mm sieve) varied from 43.8 to 90.3%. Grain husk content below 250 g kg⁻¹ was determined only in 36 samples of grain or 46% of the samples. As for 1000 grain weight, great differences were also observed between grain samples, i.e. from 31.1 to 43.7 g. The results of the trial lead to the conclusion that growing conditions (meteorological, soil, etc.) and crop cultivation technology applied in the farms had played a decisive role in the assurance of grain quality indices.

Table 3. Quality characteristics of oat grain samples collected in farms, 2007

Varieties	Number of samples	Values	Volume weight, g l ⁻¹	Husk, g kg ⁻¹	1000 grain weight, g
Laima	48	Mean	518.8	252.5	36.71
		Min-max	441 - 566	231 - 307	31.09 – 40.40
Kirovec	6	Mean	518.7	255.2	37.47
		Min-max	490 - 551	234 - 272	35.16 – 39.39
Vendela	6	Mean	513.0	225.0	40.83
		Min-max	477 - 534	208 – 259	38.76 – 43.74
Selma	5	Mean	518.6	252.0	37.45
		Min-max	499 - 543	241 - 270	34.67 – 39.98
On average in samples	79	Mean	517.6	249.3	37.51
		Min-max	441 - 566	208 - 307	31.09 – 43.74

Estimating the mutual interaction of traits, the correlative relationship was studied choosing the results of the analysis of the oat variety 'Laima' because it had the greatest number of collected grain samples – 48. First of all, the correlative relationship was found to be between the grain yield of oats and economically significant indices: volume weight, husk content and 1000 grain weight.

Calculations showed that in 2007, in the production sowings of the oat variety 'Laima', significant and positive correlation was established between the grain yield and volume weight, but significant and negative correlation was established between the total grain yield and the husk content, respectively $r = 0.385$ and $r = -0.317$, if $n = 48$ and $r_{0.05} = 0.292$. Each of these traits affected the productivity indices of the oat variety respectively by 15 and 10% ($R^2 = 0.149$ and $R^2 = 0.101$). Though the obtained correlation coefficient was medium-low, yet it showed a tendency, that providing higher productivity levels, improvement in grain quality indices – husk content and volume weight would be possible thus meeting the requirements of the grain processors. When delivering grain for analysis, oat producers furnished information regarding crop management measures in farms. Analysing the effects of sowing time, the previous crop and the total rates of the nitrogen fertilizer on the values of previously analysed indices, several significant correlative relationships were established: the later in spring sowing was performed (from the first part of April till the first part in May), the lower the yield, and with this the lower resultant grain volume weight and higher husk content. This correlative relationship is affirmed by the calculated correlation coefficients as seen in Table 4.

Table 4. The correlative relationship between agronomic traits and the components of growing technology in the oat variety 'Laima'

Correlative relationship	n	r	$r_{0.005}$	R^2
Grain yield : Husk amount	43	-0.317	0.301	0.100
Grain yield : Volume weight	43	0.386	0.301	0.149
Grain yield : Sowing time	41	-0.329	0.310	0.108
Grain yield : Nitrogen rate	37	0.513	0.321	0.263
Grain yield : Previous crop	39	0.333	0.315	0.111
Husk amount : Volume weight	48	- 0.321	0.284	0.103
Husk amount : 1000 grain weight	-48	-0.265	0.284	0.071
Husk amount : Sowing time	41	0.353	0.310	0.125
Volume weight : Previous crop	39	0.345	0.315	0.119
Volume weight : Sowing time	41	0.297	0.310	0.088
Volume weight : 1000 grain weight	48	-0.187	0.284	0.035
Volume weight : Nitrogen rate	37	0.299	0.321	0.089

The oat productivity level in farms was closely related to the applied nitrogen fertilizer rate ($r = 0.513$). Grouping of previous crops chosen by farms also showed that a medium-close but significant correlative relationship was established between the oat yield and the previous crop ($r = 0.333$). Higher yields of grain were attained from fields with grasses, potatoes, buckwheat and rape as the previous crops, but lower yields from fields with winter wheat, rye and barley as the previous crops. An analogous correlative relationship was also established between the grain volume weight and the previous crop.

Conclusions

The results of oat variety trials conducted in Stende from 2005 to 2007 suggest that the grain quality indices in the 'Arta', 'Freja', 'Jumbo' and 'Vendela' oat varieties most closely correspond to the requirements of the grain processors, i.e., the volume weight of oat grains in all the three test years exceeded 480 g l^{-1} and the husk content in the yield did not exceed 250 g kg^{-1} .

Stable and high grain yields during the trial years were provided by the tested oat varieties 'Laima', 'Aragon', 'Vendela' and 'Margaret', i.e., the 3-year average productivity of these oat varieties exceeded 6 t ha^{-1} .

The 3-year investigation with 15 oat varieties show, that observing unified growing technologies significant and stable correlative relationships were not established between grain volume weight, husk content and the total grain yield. It shows that the indices of the traits were more dependent on each genotypic expression in a definite year and not on common tendencies in the trial.

Analysis of the collected grain samples of the oat variety 'Laima' showed that grain higher in volume weight and lower in husk (correlation coefficients respectively $r = 0.386$ and $r = - 0.317$ ($r_{0.05} = 0.301$)) were obtained in the fields with the highest grain yield. Hence, also the measures used in crop management which had a significant effect on the grain yield of oats are valued as being important to produce grain high in volume weight and low in husk. Farm inspection in 2007

showed that these economically significant indices were affected by sowing time, the previous crop and the total nitrogen fertilizer rate.

References

1. Beķers M., Grūbe M. ... [u.c.] (2001) Auzas kā funkcionālo uzturlīdzekļu izejviela //Pārtikas un uztura attīstības virzieni nākotnē: zinātniski praktiska konference. – Jelgava, PTF, -7.-11.
2. Gransmann W, Vorwerck K (1995) Oat milling, processing and storage. In: R.W.Welch (ed): The oat crop.production and utilization.- London: Chapman and Hall, 371 – 408.
3. Graudu kvalitāte /http:www.rigas-dzirnavnieks.lv/main.phl?id=3&sid=29&l=lv
4. Richards M. C. (1990) Factors affecting the quality of oats//Aspects of Applied Biology. Cereal Quality II, Scotland, UK, 25, 79-90.
5. Meyer D., Zwingelbey H. (1996) Verarbeitungseigenschaften von inlaendischen Hafersorten//Getreide, Mehl and Brot. 50, 333-337.
6. Zute S. Gruntina M. (2002) Grain yield of oat and different factors influencing it under growing conditions of Latvia// Agriculture:research works of biometrical sciences, Agronomy, Lithuanian Institute of Agriculture, Lithuania, Akademija, 71-77.

IESPĒJAS IZAUDZĒT PĀRTIKAS AUZAS LATVIJĀ

Zute S., Gruntiņa M., Maļeckā S.

Kvalitatīvu pārtikas produktu ražošanai ir nepieciešamas labas kvalitātes izejvielas – graudi. Ražošanas procesā svarīgi ir ne tikai graudu bioķīmiskie, bet arī saimnieciskie rādītāji – ražība, tilpummasa, TKW, plēkšņainība. Pārtikas produktu ražotāji ir norādījuši, ka iepērkot graudu minimālai tilpummasai jābūt lielākai par 480 g l⁻¹, plēkšņainība zemāka par 250 g kg⁻¹ graudu. Sadarbībā ar A/S *Rīgas Dzirnāvnīeks* Stendē veic pētījumus par pārtikas produktu ražošanai svarīgu rādītāju uzlabošanas iespējām Latvijā audzētām auzām. Pētījumā analizē Latvijas augu šķirņu katalogā reģistrēto auzu šķirņu kvalitātes rādītājus institūtā iekārtotos izmēģinājumos un novērtē ražošanas saimniecībās izaudzēto graudu kvalitāti.

No 2005. līdz 2007. gadam Stendē šķirņu salīdzinājumā vērtēja 15 Latvijā audzētas auzu šķirnes. Izmēģinājumos vidējais auzu šķirņu ražības līmenis variēja no 4.2 līdz 6.8 t ha⁻¹, graudu tilpummasa – no 480 līdz 518 g l⁻¹, 1000 graudu masa – no 33.7 līdz 38.4g, plēkšņainība – 206 līdz 312 g kg⁻¹. Tikai četrām no pārbaudē iekļautajām auzu šķirnēm graudi atbilda pārtikas produktu ražošanas standartprasībām, t.i., ‘Arta’, ‘Freja’, ‘Jumbo’, ‘Vendela’.

Saimniecībās ievāktos graudu paraugus kvalitātes rādītāji bija ievērojami zemāki nekā izmēģinājumos. Graudu ražības un kvalitātes rādītāji variēja atkarībā no saimniecībā pielietotās agrotehnikas. Pēc 2007. gada apsekojuma rezultātiem korelatīvās sakarības parādīja, ka graudu raža, tilpummasa un plēkšņainība ir rādītāji, kas ir ne tikai savstarpēji saistīti, bet arī būtiski atkarīgi no sējas laika, priekšauga un slāpekļa mēslojuma normas.

RESULTS FROM EVALUATION OF THE OAT VARIETY ‘STENDES DARTA’

Zute S., Gruntiņa M., Maļeckā S.

State Stende Cereals Breeding Institute, Dižstende, Talsu rajons, Latvija, LV-3258

phone: +371 3220287, e-mail: sanita.zute@stendeselekcija.lv

Abstract

The new oat variety ‘Stendes Darta’ (line No. L 28650) has been developed at the State Stende Cereals Breeding Institute. The variety is registered by the Plant Protection Service of Latvia (No. A-8 since 27.12.2004) and included in a catalogue of Plant varieties both of Latvia and EU in 2005. It is recommended for food and feed production.

The oat variety is a result of hybridisation and repeated selection work. During five consecutive years (1999 – 2003), this variety gave a significantly greater yield of grain than the standard variety ‘Laima’ (+ 0.44 t ha⁻¹, $RS_{0.05} = 0.21$ t ha⁻¹). On the average, line L 28650 was one to two days earlier, had higher lodging resistance (+ 2 points), and was more resistant to loose smut (on