



SEMINAR

ENVIRONMENT FRIENDLY FOOD PRODUCTION SYSTEM: REQUIREMENTS FOR PLANT
BREEDING AND SEED PRODUCTION

SCIENTIFIC REPORT

Analytic observations of seminar scientific work according toward objectives

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EU 6th Framework Programme for the Research and Technological development (2002-2006) in the thematic priority “Food quality and safety” used as an instrument for specific support activities (SSA) State Stende Plant Breeding station (Latvia) was worked out the project “Environment friendly food production system: requirements for plant breeding and seed production” (ENVIRFOOD).

The central event of the project was the 4-day seminar, where plant breeders, specialists of variety testing, seed control institutions, representatives from Ministries of Agriculture and specialists of Adviser services, agronomists and seed producers from the Baltic States (Estonia, Latvia, Lithuania) discussed the problems regarding implementation of EU regulations of 2092/91, 1257/1999 and 1452/2003 in the Baltic States. All of those regulations are connected with development of organic agriculture and implementation of certain requirements in European Union.

Participants from eight states took part in the seminar. With experience in the breeding of new varieties, their evaluation and seed production for organic management system introduced experts from Germany, Denmark, the Netherlands and Italy. Sector specialists gathered information and analysed current situation in the Baltic States and compared it with situation in other European countries.

Compiled reports about specific requirements, achievements, problems and prospects of organic crop breeding, variety testing, seed production in the EU in general and in the Baltic States in particular are published in the Proceeding book/CDROM “Environment friendly food production system: requirements for plant breeding and seed production” and disseminated (available on the website http://www.orgprints.org/5190/01/ENVIRFOOD_2005.pdf).

Report includes analytic observations of seminar scientific work based on the publications included in the proceeding book according toward objectives:

1. Organic plant breeding.
2. Organic variety testing.
3. Organic seed production.
4. Organic food and feed quality.
5. Exposition of organic food products.

1. Organic plant breeding

Problems and prospects of organic breeding in the EU

During the seminar **ECO-PB president Dr. Edith T. Lammerts van Bueren** reported about achievements, problems and strategies in plant breeding for organic farming and discussed the perspectives in a short-term, middle-long and long-term for organic cereal production. The first step is to develop adequate organic seed production of conventionally bred varieties. More attention is needed to deal with seed-borne diseases through resistant or tolerant varieties, adapted seed treatments and threshold values. To enhance the chance of release of better suitable varieties on the market, it is important to adapt the protocols of official variety testing procedures. The step to special breeding programs for organic cereal varieties is a more long-term approach and is very costly. Some conventional breeding companies are interested in producing varieties for low-input and organic conditions. Some specialized organic plant breeders in Switzerland (www.peter-kunz.ch) and Germany (www.darzau.de) have established breeding programs for

winter wheat, spelt and barley varieties, but little attention has yet been given to the other cereals. With the limited organic acreage, a major constraint of organic breeding programs will be costs (Lammerts van Bueren E. T. and Osman A.M., pp.9-14).

Current situation, problems and prospects of crop breeding for organic farming in Baltic States

Organic farming has shown increasing popularity in Baltic States during recent years. In 2004, area under organic cultivation take 46 000 ha (5,5 %) in Estonia (Tamm I., pp.58-63), 43 902 ha (1,8 %) in Latvia (Drozdovska L., pp. 42-45), 42 961 ha in Lithuania (Leistrumaite A., pp.103-108). Nevertheless, the possible amounts of organic breeding will be limited due to the little share of organic farming in total agriculture.

According to the long-term national agricultural development strategy, the area under organic farming should account for about 15% of the total cultivated area by the year 2015. Due to this, the question of the kind of varieties organic farmers should be using becomes increasingly important. Are the varieties used in the conventional agriculture also suitable for use in organic management? What kind of specific traits should be varieties used in organic agriculture have?

During seminar about the current situation in the plant breeding for organic agriculture in the Baltic States reported **I. Tamm (Estonia), I. Skrabule (Latvia) and V. Ruzgas (Lithuania)**.

In the Baltic States organic farmers are using varieties bred out for conventional agriculture at the present time. A number of varieties of cereals, pea, winter rape, potatoes have been recommended for organic farmers. These varieties are on the National List of Recommended Varieties. Some of them are of local origin, and others are included to the list from abroad (Tamm I., pp. 58-63; Juciuviene S., Almantas G. pp. 73-75).

The recommendations for the selection of varieties to organic farmers on the basis of conventional trials could only be an initial solution. The suitability of existing conventionally bred varieties for organic agriculture can be evaluated reliably only under organic conditions.

To clarify the opinion of plant breeders from **Latvia** regarding field crop breeding for organic farming, the inquiry was carried out (Skrabule I., pp. 54-58). The answers were received from 19 breeders currently involved in crop breeding work. The received answers indicated, that plant breeders have thought about this problem. **The great majority of respondents were sure, that breeding was necessary for organic farming in Latvia.** Plant breeders from Estonia and Lithuania agreed with this opinion, too.

Opinion of crop breeders about **most important and essential traits in breeding for organic conditions** was compiled. All breeders were sure, that resistance to most dangerous diseases and pests was important for future organic varieties. Crop breeders considered that yield formation traits were more significant than quality determining traits, but both trait groups were assessed as important. Less attention was paid to morphological traits, however some of them (plant type, plant leaves shape, etc.) could be crucial in competitiveness with other plants or in plant nutrient uptake. High intensity of plant nutrient uptake, fast emergency, suitability to variety mixes was considered as significant for organic farming.

Breeders from Lithuania and Estonia stated that organic farming systems should be supplied with varieties better adapted for the new conditions that arise due to the new approach to plant management. This includes a greater need for varieties contributing higher yield stability, in organic

farming the character competitiveness against weeds, nutrient efficiency and tolerance to diseases are in the choice of variety of much higher importance than in traditional farming (Ruzgas V., pp. 63-65; Tamm I., pp. 58-63).

How great is Latvian breeder investment in undertaking breeding for organic farming? A half of respondents have acquainted themselves or have started acquainting themselves with scientific literature findings on this theme from Internet, books, scientific issues, etc. One third of breeders have taken part in scientific conferences, workshops and other international activities connected with organic breeding. Those people are informed and involved in ongoing processes in the Europe and the world. More than half of breeders (67%) have been involved in crop variety suitability testing for organic farming. Some of respondents-breeders have started evaluation of selection criteria, some – the breeding evaluation in organic field and one has started assessment of breeding material according evaluated selection criteria. These activities are dependent only on breeder's own initiative and enthusiasm yet (Skrabule I., pp.54-58).

First varieties adapted to organic farmers should be selected much earlier since farmers cannot afford to wait for 10 or more years (plant breeding takes 10-12 years) (Ruzgas V., pp. 63-65).

Latvian field crop breeders are able to begin breeding of several crops for organic farming. Some contribution has been done in this direction. To Latvian Council of Science a new project is submitted for the years 2006 –2010: **“Creating of well adapted crop varieties by using traditional and biotechnological methods for conventional and organic farming”**. This project is accepted, but insufficient financially therefore financial support is significant for future work.

In Estonia at the Jõgeva PBI to better satisfy the needs of organic farmers for adapted varieties will be planned:

- testing the listed varieties under organic conditions,
- testing the local varieties under organic trials,
- starting limited breeding programs for organic farming.

In Lithuania breeding time strategy can be divided into two parts:

- selection of promising lines and breeding numbers from existing germplasm,
- development of new lines from special crosses, including old type varieties in crossing programs by combining them with the new material, generally more resistant to diseases.

The start of breeding programs for organic farming in the Baltic States depends a lot on finding necessary financing.

Round - table workshop in plant breeding. (Leader Dr. V. Ruzgas, Lithuania). Work group was established consisting of 24 participants.

The main topics were discussed:

- Genetic resources as initial material for variety development. New plant species, which can be used in and improved for organic agriculture.
- Organic and conventional breeding schemes: differences and similarities.
- The most important traits of varieties intended for organic farming - what problems should be solved *via* variety improvement.
- High quality of agricultural production and organic farming: do they match?
- The potential growing area of organic plant varieties: regional or global?
- Multiplication of new varieties for organic agriculture, collaboration with seed industry and farmers.

- International cooperation and collaboration, scientific programs under national, regional and EC 7th Framework umbrella.

Foundation for the future collaboration network of the Baltic States in organic plant breeding

1. Participants of network are:

- Jõgeva Plant Breeding Institute (Estonia),
- Estonian Agricultural University (Estonia),
- Priekuli Plant Breeding Station (Latvia),
- Stende Plant Breeding Station (Latvia),
- Latvia University of Agriculture (Latvia),
- Lithuanian Institute of Agriculture (Lithuania),
- Lithuanian University of Agriculture (Lithuania).

2. The program for further collaboration in organic plant breeding.

Scientific program for collaboration include:

- Exchange of genetic material that is especially adapted to organic/low-input agriculture.
- Developing recommendations for breeding procedures for organic farming.
- Standardization of market sets and exploration of traits important for organic farming.
- Developing crop genotypes with end-use quality suitable for organic farming.

3. Annual activities

Partly this collaboration program for cereal breeding has been started already in the year 2005, but more will be developed in the next years.

Annual International seminar and field meeting of Field Crop Breeders of the Baltic States will be held in 2006 at the Lithuanian Institute of Agriculture, then in other scientific institutions.

The main aim of annual meetings will be exchange with information, discuss and analyze the joint work regarding to organic plant breeding.

Collaboration with other Member States in the subject of organic plant breeding

1. Taking part in the organization committee of Joint Organic Congress 2006 (www.organic-congress.org) with the task to organize the Session 5.1. "Requirements for environment friendly plant breeding and seed production".
2. Participation since 2005 by wheat breeder V. Strazdina from Stende Plant Breeding Station and barley breeder L. Legzdina from Priekuli Plant Breeding Station (both Latvia) in the Cost Action: "Sustainable low-input cereal production: required varietal characteristics and crop diversity" (Acronym SUSVAR 860, www.cost860.dk). During the seminar the coordinator of this project Dr. Hanne Ostergard asked Estonian and Lithuanian plant breeders to take part in this project.
3. During realizing project ENVIRFOOD the contacts are established with Prof. Carlo Leifert – the coordinator of project QualityLowInputFood (www.qlif.org). The collaboration will be possible established in future.
4. Participation (Priekuli Plant Breeding Station from Latvia and Estonian Organic Farming Foundation from Estonia) in 6th Framework SSA project: "Opening Channels of Communication between the Associated Candidate Countries and EU in Ecological Farming (acronym CHANNEL, www.channel.uni-corvinus.hu).

5. Ph.D. research and training possibilities in the organic farming at the Wageningen University Sandwich Fellowship. The fellowship is meant for countries of Eastern Europe (included Baltic States) and outside Europe. The application can be done once per year - in January. The participants from Agricultural Universities of the Baltic States were acquainted with this possibility.

2. Organic Variety testing

Expert from Germany Dieter Ruecker reported about experience and current problems of variety testing for organic farming system. He emphasised that the same rules of variety testing apply for varieties for conventional as well as organic production and there are three basic intentions for variety testing: variety protection, variety registration, and variety recommendation. Variety protection is principally in the interest of the breeder. Only protected varieties enable the breeder to earn a return on investment in plant breeding. Testing for variety registration and variety recommendation are means of consumer protection. The testing is supposed to make sure that the farmer receives varieties with high quality and superior performance. Testing for variety protection and variety registration is done on the basis of EU legislation but testing for variety recommendation takes place in the framework of national systems with little or no harmonisation between the member states.

D. Ruecker pointed it is necessity to take into account in order to receive protection a variety has to fulfil the following conditions: distinctness, uniformity, stability, novelty, and variety denomination.

National laws on variety protection are based on the international UPOV-Convention. UPOV defines common rules for variety protection that are followed by all states having signed the Convention. In the European Union it is possible to apply for EU protection at the Common Plant Variety Office (CPVO) that is valid in all EU member states. Alternatively, breeders can apply for national protection that is only valid in one member state. EU protection becomes more and more popular.

While breeders can choose between EU protection and national protection, variety registration is a national affair. The national variety offices in the member states are in charge of variety registration. The member states notify the EU Commission of their registration decisions and by publication of the variety names in the Official Journal of the European Union the varieties can be marketed throughout the European Union.

Varieties must have value for cultivation and use (VCU). The characteristics usually examined in VCU testing are yield, quality and resistance to diseases or abiotical stress. According to D. Ruecker one of the problems for organic production regarding to VCU – organic varieties must also prove in this test, but usually the testing is not done under organic growing conditions. Even though these varieties may have a special value for organic production they may not be able to prove this under official testing conditions. It is because organic production represents a limited share of total plant production in the European Union. Consequently, there are only few variety trials under organic growing conditions.

The main problems for varieties for organic production may arise:

- if varieties for organic production do not comply to classical UPOV standards. Especially uniformity may cause problems.

The whole international protection system for plant breeding (UPOV) is based on the approach of distinctness, uniformity and stability (DUS). If there is not sufficient uniformity of the varieties, distinctness between varieties cannot be safeguarded. There will be no protection. This will be a problem for the breeders of organic varieties as they will not be able to earn a return on their investment in plant breeding and variety development.

- if varieties for organic production cannot prove VCU and are not registered, because they are not tested under organic growing conditions.

According to D. Ruecker this problem could be solved - either the ranking of the varieties is the same under conventional and organic testing conditions or special VCU testing has to be conducted under organic growing conditions. (Ruecker D., pp. 22-24).

During the seminar the current situation in the VCU system in the Baltic States was compiled as well as the research regarding to variety testing suitable for organic farming was analysed.

In Latvia VCU testing for agricultural crops currently is doing accordingly to approved VCU methods for conventional agriculture. Testing for suitability of varieties for organic agriculture has been started in 2004. Eighteen varieties of four crops: oat, spring barley, spring turnips rape and potato were tested for yield ability, maturity, lodging and disease resistance and quality in VCU for organic agriculture. Testing has been done at four test sites on the certificate organic crop rotation fields at the Latvia University of Agriculture (LUA) Skriveri Research center (Skriveri), LUA Study and Reserch Farm "Vecauce", Priekuli Plant Breeding station and State Stende Plant Breeding station (Kalinina S., Jegorova V., Katanenko S., pp. 66-71).

The field experiments were established at the Priekuli Plant Breeding station during 2003 to 2004 for evaluating suitability of rye varieties to organic farming. The most important traits for organic farming were evaluated in this study – winter hardiness, number of ear-bearing tillers per m², disease resistance, time of heading and maturity, crude protein content, falling number, 1000 kernel weight (Kokare A., Kronberga A., pp.90-92).

During the years 2003-2004 the Agency of the Latvia University of Agriculture (LUA), Research Institute of Agriculture established experiments in organic farming fields in Skriveri. The aim was to clarify most suitable legume and forage grass varieties and their mixtures for organic seed production (Jansone B., Sparnina M., Rancane S., pp.93-96) and applicability of 6 spring barley, 4 oat, 2 winter rye, 4 winter triticale, 2 spring turnip rape varieties for organic farming conditions (Vigovskis J., Svarta A., Jermuss A., pp.100-103)

The suitability of potatoe varieties for organic farming was evaluated in certified organic field in Priekuli, Vecauce and Skriveri. Two medium early potatoe varieties and four medium late varieties (all from Latvia) were included in the trials (Skrabule I., Gaile Z., Vigovskis J., pp.96-99).

Spring barley varieties recommended by breeders as suitable for growing under organic farming conditions were tested (2003-2004) and examined by following traits: yield, grain quality, plant height, the length of vegetation and infection with diseases (Legzdina L., Bleidere M., Praulina O., Gaile Z., Vigovskis J., Svarta A., pp.108-109).

At the State Stende Plant Breeding station eight winter wheat varieties were tested on certified organic field. Grain yield, disease resistance, 1000 kernel weight, crude protein were evaluated. (Strazdina V., Opmane Z., pp.109-111).

In Estonia official variety testing was conducted under conventional farming conditions as normal agricultural practice. The plant characteristics important in organic farming were not observed because of lack of interest. The organic farming tests for varieties were made to a small extent by some interest groups of people. In these trials the amount of used varieties was small. In the official VCU trials testing takes usually two years. In Estonia 30 % of testing costs are

covered by applicants and other 70 % by the State Budget. The overall decisions of acceptance for National List are based on evaluation of yield, disease susceptibility, growth characteristics and quality. The plant characteristics like recovery from mechanical harrowing, tiller stage, speed of closing the crop canopy etc., which are observed in organic farming are not assessed in these trials.

Estonian Agricultural University and Centre of Ecological Engineering have made the first year variety research under organic farming for such cereal crops: winter rye, oats, barley and spring wheat. Varieties evaluation trials are arranged also in the organic farms situated in different Estonian regions, where organic farming is more developed.

The main tasks in the future are:

- to give an official status for organic VCU testing,
- together with breeders and organic researchers develop the organic variety testing protocols
- organize one organic VCU trial site to get information about varieties, which are most suitable for growing in Estonia (Lauk T., Loper I., pp. 71-73).

In Lithuania State Plant Varieties Testing Center is an official institution responsible for the maintaining the Lithuanian National List of Plant Varieties and for protection of new plant varieties in Lithuania in compliance with the Law on Seed Cultivation and the Law on Plant Variety Protection of the Republic of Lithuania. The Centre is an independent authority under the supervision of the Ministry of Agriculture.

VCU trials in Lithuania are conducted in 9 plant varieties testing stations located in 3 different nature and climatic zones. Normal duration of VCU tests is 2 years, and 3 years for winter crops and perennial grasses.

Lithuanian State Plant Varieties Testing Center is carrying out also investigations in the conditions of organic farming at the Stations located in Kaunas, Pasvalys, Plunge, Silute, Vilnius and Utena for field crops: spring barley, oat, spring wheat, winter wheat rye, field pea, potato, legume grasses and timothy.

Varieties of spring cereals were evaluated depending on harvest of grains, weight of 1000 grains and percentage of proteins in grains. Content of gluten and lesion of septorium of plant leaves is evaluated in spring barley additionally. Varieties of winter cereals were evaluated according the following main rates: harvest of grains, height of plants, weight of 1000 grains, and resistance to winter hardiness. Winter wheat was evaluated regarding percentage of proteins and content of gluten.

The main tasks in the future:

- to continue tests on identification of most suitable varieties for organic farming,
- to enter suitable varieties in the Common catalogue with the remark 'organic variety'. (Juciuviene S., Almantas G., pp. 73-75).

In order to select the most suitable cereal varieties, research by the organic farm of Agroecology Centre was carried out in cooperation with Kaunas Plant Varieties Testing Centre. There were 43 cereal varieties tested: 18 of winter cereals and 25 of summer cereals (Sliesaravicius A., Rutkoviene V., Pekarskas J., pp. 86-90).

The first variety testing for organic farming at the Lithuanian institute of Agriculture was conducted during the 1997-1999 period at the Lithuanian Institute of Agriculture. The testing involved more than 157 varieties in low-input conditions without fertilizers and agro-chemicals of which 29 varieties were recommended for organic. These varieties are characterised by high yielding capacity and quality, disease tolerance, lodging resistance. During the year 2004, 18

Lithuanian-registered varieties of winter cereals were evaluated for organic agriculture. (Leistrumaite A., pp.103-108).

The round table workshop in variety testing (Leader Lauk T., Estonia)

Work group was established consisting by 23 participants.

The main problem-questions in the round table discussion regarding to variety testing were:

- Which organic growing systems are representative and should be used for the variety testing: a farm with good management, experimental stations, farms with much animal manure etc.?
- Which traits/characteristics are absolutely necessary to be tested in organic growing systems? Growing characteristics, quality traits? Can conventional farm practice reveal relevant resistance/tolerance characteristics towards diseases and how to measure weed competitiveness? Are new assessment methods needed for variety trials under organic conditions?
- Will the economic gain be large? Who is going to pay?
- What numbers of 'organic' varieties are expected to be included in such a testing? Are these organically bred or bred for organic farming conditions?
- About methodology of testing for different crops (cereals, potatoes, grasses etc.)
- Law system regarding to including organic varieties in the both National and Common EU catalogues,
- Necessity of research about quality (safety, tasty, nutrition quality) of organic products in comparison with products grown in the conventional conditions.
- Who will pay for organic varieties trials,
- Choice the varieties for organic farming – argumentation.

Set up of recommendations for the adoption of a variety Testing system applicable to organic farming in the next future in the Baltic States:

1. The official State Variety Testing institutions must accept responsibility or supervision on organic varieties VCU testing.
2. Organic VCU tests must be carried out in the certified organic fields.
3. The necessity to evaluate and supplement present VCU varieties testing protocols with the traits essential for organic agriculture.
4. The necessity to promote the collaboration between official State Variety Testing institutions of the Baltic States in the organic varieties VCU testing.

Participants of seminar have to make a decision about necessity to organize special work group consisting of variety testing services specialists including representatives from Ministries of Agriculture and Associations of Organic Agriculture organizations for promoting the collaboration between official State Variety Testing institutions of the Baltic States in the organic varieties VCU testing and implementation of these recommendations.

3. Organic seed production

With the start of the year 2004 the regulation 1452/2003 came into force in EU. The main point in the procedural rules and criteria relating to that derogation is the obligation for the member

states of the EU to set up a computerized data base in order to make the availability to organic seed transparent to anybody requiring organic seed. Today in the 15 old EU Member States one has to realize that:

- not each of those countries has established an organic seed database as required by EU law,
- great differences between the national databases exist,
- several databases miss the basic criteria (Wilbous K.-P., pp.24-27).

The situation regarding to harmonisation of EU regulation 2092/91 and 1452/2003 in the Baltic States are the same as in all EU countries now. The current derogation allows for the use of non-organic seed when the supply of organically grown material runs out. General derogation in Latvia and Lithuania until January 1, 2006, but Estonia farmers have to ask already now permission to use non-organic seed from organic certification authority.

With the help of questionnaire is clarified **organic seed use** in Latvia (Gaile Z. and Evelone V., pp.76-80). According to data the situation is different: one and the same farm sometimes use home-saved seed for some crops, certified organic – for some other and certified conventional – for any other. Important is question about quality of seed. Data showed that 57 % of home saved seed are of unknown quality. Only 28 % of farms for some crops they had used double certified seed – certified according to Seed Circulation Law of Latvia and regulation of Cabinet of Ministers on Seed Growing and Seed Trade and grown in organically certified field. It is not said in regulations that organic seed must be only double certified organic and due to this situation in Latvia seems not so bad in terms of organic use however home saved seed is tested at unsatisfactory level, and it could affect ill results of organic production.

What about organic seed supply in the market of the Baltic States? Up to now in Latvia, Seed Growers and Seed Producers Register held only 14 organic seed producers. In Latvia since 2004 information on organic seed supply in the market is available in database. Only in Latvia it is demanded by Seed Law to provide information on definite dates. After the seminar Latvian colleagues offer experience for other 2 countries and our Seed Law in English will be sent to them.

There is a large gap between the quantities of organic seed and propagation material ever produced in the Baltic States. Organic and conventional farmers do not grow the same choice of varieties. There is need for a dialogue between producers and seed industry. Seed producers need assistance in reducing the uncertainty of organic production by identifying varieties and strategies that will provide a greater possibility of producing high quality seed.

Unfortunately only small amount of information about seed supply is available in databases of the Baltic States now. Necessary quantities of organic seed based upon the acreage of organic production in Estonia in 2004 shows that demands of seed for all field crops are insufficient (Aavola R, Bender A., pp. 81-86). For instance, in Estonia no data is found in the seed database regarding to availability of organic seeds (total demand of cereals 1205 t). In Latvia, there is offered only 8 t barley (demand 233 t), 3 t oats (demand 326 t). In Lithuania only grass seed market is fully provided (1000 t) and there is offer also for partly meeting of demand of Latvia's grass seed market. Lithuanian farmers are active in this question and work of organic seed production has already started there.

Connection possibilities of Baltic Organic seed databases with other databases in Europe:

-At present in the Baltic States there are no data to write into EU such very good and completed databases – we have to return to this topic some years later.

- To make links in every country's database of the Baltic States to other two databases.

Opinion of the largest seed companies in Latvia about their future prospects regarding to organic seed business is different. Part of them are not planning to start produce biological seed in the nearest future due to the following reasons:

- Seed business is unstable in Latvia for conventional seed,
- No certainty about stable demand of reasonable quantities,
- Biological seed could be more expensive than conventional.

However there are seed companies in Latvia that are ready to start cognise of the need for such a seed for the season 2006 looking for co-operation partners among our organic farmers as well as among organic seed companies abroad. A part of them are not thinking about organic seed offer due to non-demand before. All of these seed companies are ready to import organic seed on customers' request. The same situation is also identified in Estonia and Lithuania.

Demand creates offer and situation that qualitative organic seed is not utilized by all the farmers. One of the **main reasons of the lack of organic seed demand in the Baltic States** is that organic farmers have insufficient education in terms of seed quality importance. The most of the farm holders are not demanded high school or university level education in agriculture. They are obtained only the first level certificate in agriculture. There are some of the educational opportunities for farmers of the Baltic States to get to know about importance of quality seed and ways how to produce it.

In Latvia there are two main possibilities to obtain such knowledge:

- Chapter "Organic seed multiplication and seed turnover" is included into elective study course for students of the Faculty of Agriculture of the Latvia University of Agriculture.
- Study course "Professional perfection education in organic agriculture" including chapter "Organic seed production" is organized by the Latvian Rural Advisory and Education Centre.

In Lithuania the learning course programmes on 4, 8, 24, 56 or 120 hours training for organic seed growing are organized.

In Estonia there is no specific training on organic seed growing. Therefore this is the topic that needs yet more work in the future in all the Baltic States.

The second reason of the lack of demands is that organic farmers are short in funds and cannot buy double certified organic seed. According to seminar seed production group discussion opinion of seminar reasonable is 35 % higher price, twice or triple higher price is not allowable.

The round table workshop in seed production (Leader Gaile Z., Latvia)

Work group was established consisting by 23 participants.

The main problem-questions in the round table discussion regarding to variety testing were:

- Size of organic seed production and seed market in the Baltic States,
- Procedure to get permission to use conventional seed in organic farming;
- Problem with seed borne diseases in organic seed multiplication schemes;
- Organic seed databases in the Baltic countries;
- Connection possibilities of Baltic Organic seed databases with other databases in Europe;
- Legal bases for providing information of organic seed to database;
- Possibilities to close the organic production chain;
- Action plan for development of organic seed production in the Baltic States.

A set of recommendations for development of organic seed production in the Baltic States in order to provide development of certified organic seed market in the Baltic States:

- Organic farmer must use organic seed! If there are derogations, farmers will use these derogations forever.

- Import of small quantities of B or C category seed and activity from our organic farmers' part to go into seed multiplication business themselves and in co-operation with seed companies produce seed of suitable varieties. It is needed and possible to involve organic farmers in multiplication of organic seeds.
- Rules for organic seed production must be prepared.
- Necessity to make own ANEX 1 for each country.
- Organic seed must be complying with minimal national quality standards. Need to include definitions on seed health in the criteria for the list of available organic seed, as well as put more focus on the control of seed borne diseases.
- Development of active used databases - demand and supply will support itself this process.
- Urgent demand for improved cooperation and communication between growers and seed producers.
- For improving the qualification of organic seed producers and organic seed production experts the special training programmes need to be established.

4. Organic food and feed quality

One of essential objectives in organic farming is to produce healthy food products of a high quality. Food production system is tending those that are more environment and welfare friendly, and which have lower requirements for inputs.

During the seminar the impact of **current organic management practices** on different crop (cereals, potato, grasses, tomato) quality was reported.

In Lithuania winter wheat cultivars grown without mineral fertilizers versus conventional and intensive fertilization were examined. Average grain yield of the three cultivars over three years at zero fertilization amounted to 68% and that of protein yield per ha 62% of the conventionally fertilized wheat. The grain protein concentration close to 10% obtained at zero fertilization suggests that the amount of soil nitrogen was adequate, while grain gluten content below 22%, and white flour/dough stability of 2-4 min. indicated poor baking quality (Masauskiene A., pp. 27-33).

On purpose to select the most suitable cereal varieties for organic farming research was carried out in Lithuanian University of Agriculture, in the organic farm of Agroecology Centre in 2004. Estimated 18 of winter cereal and 25 summer cereal varieties were differed by yield and quality. Summer wheat varieties accumulated significantly more proteins and showed twice as high sedimentation indicators. The research results revealed the most suitable varieties with good yield and grain quality for organic farming (Sliesaravicius A., Rutkoviene V., Pekarskas J., pp.86-90). Assessed 18 varieties of winter cereals under organic farming conditions in the Lithuanian Institute of Agriculture some varieties were distinguished by high grain quality for practical use in organic farming (Leistrumaite A., pp. 103-108).

Lithuanian-bred red clover varieties are characterized by a high productivity, resistance to diseases in adverse agro-climatic conditions, different growth rhythm. They can be grown in crop rotations and grasslands in various mixtures with grasses and fully meet the growing needs of intensive and ecological contemporary animal production (Svirskis A. pp.131-134).

In Estonia in the Department of Field Crops of the Estonian Research Institute of Agriculture the factors influencing the quality of spring wheat were studied for a long time (1993-2003). The quality indicators depend not only on varieties, but also to some extent on weather conditions. The protein and gluten content was higher when the year was sunny, dry and warm. Protein content of ecologically grown spring wheat of 6 different varieties was over 11.3% in 33 cases among 42 trials

carried out in 11 years, the highest being 15.3%. In the same trials the gluten content was over 22.3% in 32 cases. These indicators let us assume that ecologically grown spring wheat meets the requirements of food wheat quality sufficiently (Ilumae E., pp.117-119).

In Latvia variety testing of winter and spring cereals has been established in State Stende Plant Breeding Station. The 3-year results (2002-2004) of 8 winter wheat varieties testing could lead to the conclusions that local varieties of mid-intensive type such as 'Krista' and 'Sakta', characterized with good winter hardiness, grain yield and stable quality were suitable for growing under organic conditions (Strazdina V., Opmane Z., pp.109-111).

Suitability of four winter rye varieties ('Kaupo', 'Duoniai', 'Valdai', 'Voshohod 1') to organic farming, influence of different sowing rate and biopreparation 'BioMikss' on rye variety 'Kaupo' were evaluated in Priekuli Plant Breeding Station (Latvia). No significant influence of sowing rate and treatment with 'BioMikss' was observed on the yield and quality of grain. The best varieties for organic farming were 'Kaupo' and 'Valdai' (Kokare A., Kronberga A., pp.90-92).

In Latvia in organic conditions different by vegetation period potato varieties were evaluated by yield, quality and resistance to diseases and more suitable were recommended for growing and processing (Skrabule I., Gaile Z., Vigovskis J., pp.96-99; Vigovskis J., Svarta A., Jermuss A. pp. 100-103).

Nontraditional plant species and forms interested by the view of quality as the food or feed

Dr. Legzdina L. (Latvia) introduced with hulless barley as potential new cereal for food and feed, which is probably still underestimated in Europe. Several studies show the positive influence of hulless barley food products on human health; it can be utilized in many different food products. The use of hulless barley for feeding of animals in organic farming may be preferable, because the availability of protein supplements of organic origin may be problematic; farmers will be able to produce higher quality feed on their own farm.

Dr. Svirskis A. (Lithuania) introduced with findings of selected nontraditional plants: amaranth, proso millet, and soybean in Lithuanian conditions. There are many possibilities to expand these plants into ecological farms for food, fodder and energy production in Baltic countries. Cultivation and management peculiarities of these plants in order to increase the yield need further and more comprehensive investigation.

Akk E. and Ilumae E. (Estonia) reported about growing of *Camelina sativa* – oil plant of cruciferous family, used mostly for industrial purpose – making biodiesel fuel, paints and linoleum together with other plant oils. This crop is suited for growing in ecological crop rotation for decreasing the infection level of cereal root rot. In addition, the *Camelina* bring by the long taproot the nutrients from the lower soil layers to the upper ones, which are well assimilated by the following crops, thereby increasing their quality.

The quality of organic products and food is strongly examined by State Food and Veterinary services in all the Baltic Countries. There is implement system for the evaluation and management of pesticide residues, microbial contamination of raw material and foodstuffs and for other contaminants in plant products.

Means for defining and improving nutritional value, quality and safety of organic cereals

Plant breeding has important role in the total food chain. During the evaluation procedure in the plant breeding process it was possible to select plant genotypes with quality indices according to the requirements of end uses of this product. Research findings confirm that crop quality depends greatly on crop management system and variety genotype.

The main strategies to improve the quality and ensure safety include:

- using principles of organic agriculture, strongly taking into account crop rotation;
- investigation of genetic resources;
- creation of new selection material taking into account high resistance to diseases and pests, high efficiency of nutritional uptake;
- carrying out further selection of adapted lines and varieties including food analytic and nutritional experimental surveys;
- performing more research and pilot studies for assessing the relations between growth dynamics and the adaptation to ecological environmental and quality aspects.

5. Exposition of organic food products

During the seminar exposition of organically farmed products was organized.

The aim of exposition was:

- to show results of organic management practices for different types of food,
- to show successful marketing by small and medium enterprises.

Organic market in Estonia is just at the beginning stage and could grow faster if processing would be developed. The increase of amount of products and the development of processing opens the supermarkets for organic products where people could buy more easily. The participants of the seminar were acquainted with statistical data of the Estonian Institute of Conjunction. According to the data 54 % of Estonians prefer to buy food products from supermarkets, 25 % - from small stores, 15 – from markets, 4 % - from warehouses and only 2 % - from farms. Survey data of organic farmers about preferable marketing channels showed that above 70 % of farmers sold their products directly from own farms. About 50 % of farmers deliver products to client home, but 20 to 30 % of farmers the preference as one of the organic marketing channel gave processor, buyer, school, reseller, market and hospital. Very small number (about 5 %) of survey organic farmers own products offer through fair, public catering and supermarket.

In Estonia in 2004 only 6 **organic processors** were registered but only two of them were really active. In 2005 new processors certified - *Cibus-kama* and *Viljaveski mill*. For processors such as *Pajumae farm* and *Arke* certification is in process now. In Estonia there is organized producers' co-operative *Easti Maheliha*, which is selling organic farmers products in Tallinn market. Enterprise *Õkosahver* offers boxes with fresh vegetables from organic farms to residents of biggest cities – Tallin and Tartu. They distributed also importing organic products from Germany and France in the supermarkets. The state label for organic products in Estonia is “Mahemärk”.

Latvian organic products are labeled with state label “Latvian Ecoproduct”. In the exposition the following organic producers presented their labeled organic products:

- Organic farm “Laukgaļi” – chicken, eggs.
- Cooperative of organic agriculture “Ķeipenes society of dairy producers” – milk, milk products, cheese.
- Bakery “Zelta klingēris” – bread, breadstuff.
- Cooperative of organic agriculture “Zaubes kooperatīvs” – beef.

These enterprises offered own products also for cooking some of meals in the mealtime of seminar participants.

Unfortunately in the Baltic States at present due to lack of processing enterprises many of products are sold as conventional. Organic farmers are interested in the development of processing. Their main disincentive problems are:

- deficiency of investments,
- excessively strong requirements for small processors,
- insufficient skills and knowledge.

The attitude of seminar auditory to food in general and especially to organic products was evaluated. The information from 39 questionnaires was compiled and disseminated.

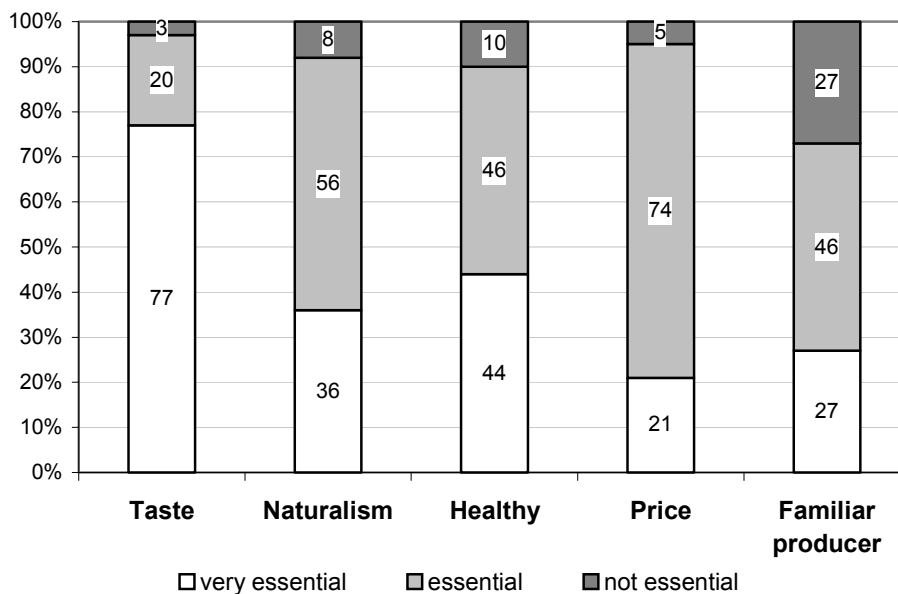


Fig. 1. Criteria used in choosing the food products by respondent in general (% of respondents)

Analysis of questionnaire shows that respondents are taking into account all offered criteria - taste, naturalism, healthy, price and familiar producer chosen food products (Fig.1). However, 77 % of respondents think that the taste of a product is the most essential criteria in choosing the food products followed by healthy, naturalism, familiar producer and product price. Questionnaire shows that the product price is not essential only for 5 % of respondents, but for 74 % it is essential and for 21 % very essential. Over the half (56 %) of respondents attach high importance for product's naturalism and as well for being healthy (46 %). Less attention nevertheless considerable they paid to producer of products and their identification.

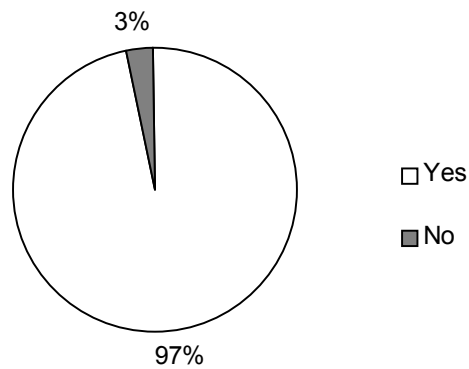


Fig.2. Usage of organic products by respondents

97 % of all respondents are using organic product in their food (Fig.2).

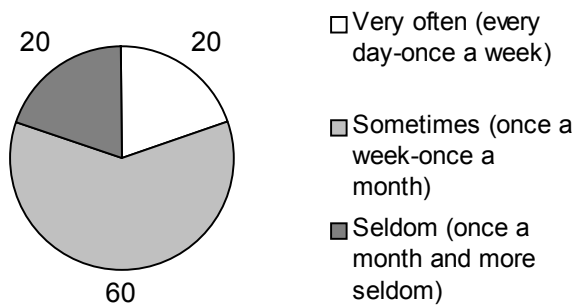


Fig.3. Frequency of organic product usage by respondents

Analysis of frequency of organic products in daily usage by consumers shows that 20 % of respondents use these products very often – every day to once a week (Fig. 3.). According to questionnaire results most of respondents (60 %) use organic products less frequently than once a week.

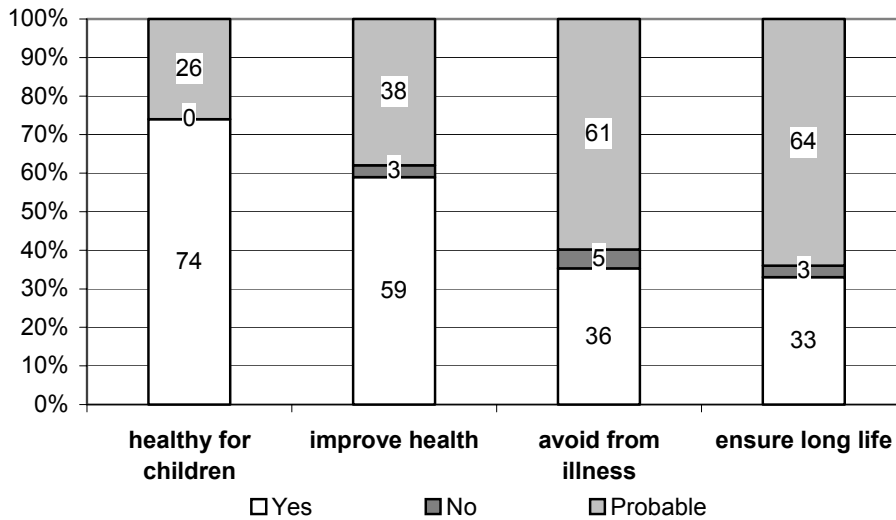


Fig. 4. Respondents’ opinion regarding to preference of organic products

According to respondent’s opinion 74 % of them think that these products are the most preferable for health of children and over the half (59 %) of respondents also attach them importance in the health improvement (Fig. 4). Nevertheless about two thirds of respondents (61-64 %) are not certain about the role of organic products in avoiding from illness and ensuring longer life. A small part of respondents (3-5 %) think that there is no special preference of organic products to people’s health.

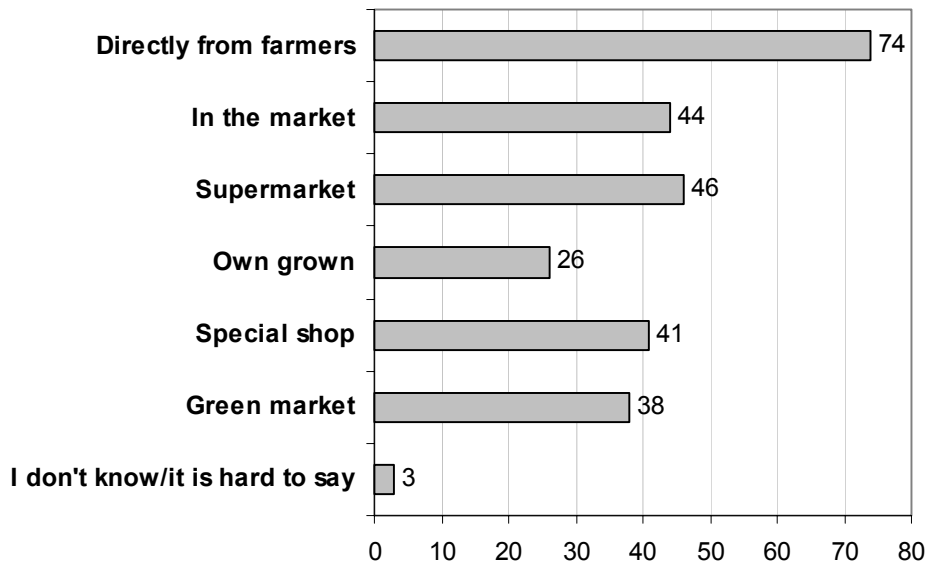


Fig. 5. Respondents’ opinion about possible purchase places of organic products

There were evaluated also respondent's opinion about possible purchase places of organic products (Fig. 5). Most of answers (74 %) discover that the most appropriate purchase place of organic products is directly from farmers. The good purchase place of organic products in accordance to respondent's opinion would be markets (44 %) and supermarkets (46 %), special shops (41 %) as well as Green market (38 %). 26 % of respondents think that they select more own grown products for usage.

For tasting producers from the Baltic States offered 14 different organic products.

Latvia – cow's milk and cheese, goat's milk and cheese, curds, two kinds of bread and different breadstuffs, eggs from quail, honey and beef, different herbal tea.

Estonia - four kinds of yoghurt, two kinds of curds, breakfast cereals snacks, soft cheese with garlic, different herbal tea and honey.

Lithuania – different herbal tea, honey, bread, different breadstuffs, mashed fruits.

According to questionnaires, design of packing, visual look of product, taste of product and competitiveness in the market were evaluated (Table 1). There were used three estimation scores: 3-very good, 2 – middle, 1 – necessary to improve.

Table 1

Evaluation results of organic products from the Baltic States in total by participants of seminar

Estimation trait	Percentage of given estimation scores, %		
	3	2	1
Design of packing	45	45	10
Visual look of products	70	21	9
Taste of products	53	34	13
Competiveness in the market	53	36	11

According to results design of packing of organic products presented during the seminar mainly got very good and middle estimation (for both 45 % of given estimation scores). 10 % from total given estimations show that a part of products need in the future improvement in design of packing.

Visual look of products is estimated as very good – 70 % of given scores were related to this estimation. Nevertheless there is possibility still to improve visual look of some of organic products - 9 % of total estimation scores indicate to necessity to improve their visual look.

Estimation of the taste of organic products gave the following results: 53 % of totally given scores indicate that the taste of organic products is very good, but 34 % of given scores – middle.

The greatest number of estimation scores (53 %) given by participants showed that organic products are competitive in the market. 36 % of all estimations indicated that competitiveness in the market offered products is middle. For some products competitiveness in the market remains one of the problems to be solved.

Concept of marketing development of organic products

For successful integration of organic products in the common market it is necessary:

- establish the producers' cooperatives,
- develop advertising and sale promotion actions using different mass media,
- promote wholesale trade and retail trade systems,

- develop distribution channels of organic products-direct selling, specialized shops, net of restaurants, café and canteens.