Protection of Biodiversity in the Agriculture:

Endangered Animal Breeds and Plant Varieties in Estonia

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REVERSE Project

REVERSE is an European Interregional Cooperation Programme INTERREG IVC project. The interregional cooperation programme enables the regions of Europe to share knowledge and experience in various areas of life.

The objective of REVERSE project is to promote the conservation of biological and landscape diversity in Europe by identifying the relevant successful actions and encouraging their implementation in various European regions. In the course of the project, the project partners related to the conservation of natural and cultivated biodiversity exchange and introduce their experiences. The partners are regional authorities and public establishments, which have for a long time been involved in the protection of biological and landscape diversity. They work on varied and complementary subjects such as *in situ* conservation of species, gene banks, the preservation of indigenous breeds, old varieties and gene pool, the management of natural and industrial landscapes, the regional strategies for the conservation of biodiversity (ecological corridors, green belts, etc.), the local legislation for the protection of biodiversity, environmental education, *etc*.

The project focuses on three key topics:

- Agriculture, food production and biodiversity,
- Tourism and biodiversity,
- Land development and biodiversity.

The project will last 3 years (January 2010-December 2012). The project has 14 partners from seven European countries (France, Italy, Spain, Germany, Greece, Slovakia and Estonia). Estonia is represented in the project by the Estonian University of Life Sciences.

Estonia is involved in the two topics of the project:

- Agriculture, food production and biodiversity,
- Land development and biodiversity.

Each partner country participating in the project has to introduce the country's best practices, implemented within the key topics of the project. Estonia as a project partner has introduced to the wider public, what has been done for the conservation of old breeds and varieties. We have participated in the workshops to prepare a framework document for the European Commission on the further steps necessary in that field. The awareness events organized within the project have a practical value. As a result of the project, related publications will be devised.

This publication shares with the reader the best practices of Estonia related to the preservation of biodiversity in the agriculture, paying the special attention to old varieties and breeds as a valuable gene pool in need of preservation and conservation. The old varieties and breeds are well adapted to natural conditions and valued in today's plant and animal breeding, as well. In addition, the old varieties and breeds have a valuable place in our cultural heritage as long-term companions of our ancestors. The management methods accompanying today's intensive agriculture decrease the diversity of varieties and breeds.

The results of the project help to inform the wider public of the importance of biodiversity. The examples of best practices will provide an opportunity to study from the experiences of other countries and encourage applying them in practice. The publication aims to raise the people's awareness of the value of agriculture-related biological and landscape diversity.

Representatives of the partners of REVERSE project at a seminar on tourism and biodiversity in Samaria National Park, Crete Island, November 2010.

Agriculture and Biodiversity

Biodiversity comprises all forms of life and different ecosystems on the Earth, i.e. the abundance of the plants, animals, fungi, microorganisms and their habitats. Of all the wealth in the world, biodiversity is one of the most important ones. Man increasingly values a clean and diverse environment. We more and more pay attention to healthy and diverse eating and highly value a rest in beautiful surroundings. We wish to preserve all of this for our children and grandchildren.

The connections of agriculture and biodiversity are expressed on several levels. The bigger is the diversity of species, breeds, varieties and genes, the richer is our environment. The old breeds and varieties carry the information of old customs and traditions, land cultivation methods and eating habits into today. Thus, the preservation of old breeds and varieties is important not only agriculturally, but also culturally. The indigenous local breeds have had an important position also in today's breeding, to improve the fertility and tenacity of breeds. At the same time the old varieties and breeds are often less productive, compared to today's ones and are mostly used in small-scale farming. Today's farms also have, besides food-production, a role of a carrier of the rural cultural heritage and the agricultural landscapes are an integral part of our heritage culture. At the same time, the agricultural landscapes provide habitats for many species. The smaller is the biodiversity of agricultural landscapes, the more vulnerable is agriculture itself.

Endangered Indigenous Breeds and Varieties and Support Scheme for Raising Them in Estonia

According to the Food and Agriculture Organization (FAO), several indigenous animal breeds in the world are endangered and many have already disappeared. Each week two animal breeds become extinct in the world.

Estonian indigenous breeds have evolved by being long affected by local natural conditions and human activity. Old breeds are usually more durable and more disease-resistant than new ones, but often less productive. The low production level is often decisive, why the number of animals is small, as in the conditions of intensive production, each invested unit is important and must express in the volume of production. However, there are also good practices, which show, that the endangered breeds can also be raised in the conditions of regular production.

According to the FAO classification, the Estonian Native cattle, the

Endangered animal breeds by the numbers

Breed	Population figure	
	Year 2006	Year 2012
Estonian Native horse	760	950, including about 450 mares
Tori horse	490	450, including about 330 mares
Estonian Heavy Draught	105	80, including about 60 mares
Estonian Native cattle	500	700, including about 500 cows
Estonian quail	x	9500

** An overview of the evaluation of Axis II of the Estonian Rural Development Plan 2007-2013 according to the data of Report 2009.*

Estonian Native horse and the Tori horse are among the endangered and preserved breeds and the Estonian Heavy Draught in the category of breeds in a critical condition.

According to the report 2011 of the Rural Development Plan, populations of endangered breeds in Estonia have increased, compared to an earlier period.

Estonia has applied agri-environmental support schemes to preserve and increase biodiversity since Year 2000. The breeders of the Estonian Native horse started to receive animal-based national-level subsidies in 2002, when the raising of 559 Estonian Native horses was supported. In 2005, the subsidies were applied within the Rural Development Plan 2004-2006. The subsidies were given for raising 939 Estonian Native horses and the payment comprised EEK 2550 (EUR 163) per a horse.

Raising the Estonian Native cattle was started to be supported since Year 2000. The subsidies were introduced for raising the Estonian Native cattle, Tori horse and Estonian Heavy Draught within the Rural Development Plan 2004-2006 in 2005, when aid was given for 595 Estonian Native cattle, 388 Tori horses and 96 Estonian Heavy Draughts. Quail raising has been supported both earlier and in the funding period 2007-2013 and after that it is planned to continue funding through national-level breeding subsidies.

The subsidies are paid for the animals, which have been entered in the herd book or studbook and the register of agricultural animals. In the case of Estonian Native cattle, both the parents and grandparents shall be entered in the main part of the herd book of the Estonian Native cattle. In the case of payments for Estonian Native horses, Estonian Heavy Draughts and the universal Tori Horse, the same requirements are applied to the studbook. Subsidy receiver is obligated to keep the animal in one's household for at least five years.

The annual payment for an animal is EUR 186.62 in the case of the Estonian Native horse and Tori horse and EUR 199.82 in the case of the Estonian Heavy Draught. The annual payment for raising the Estonian Native cattle is EUR 196,21 for a bovine. The subsidy for raising the Estonian Native horse, the Tori horse and the Estonian Heavy Draught partially compensates for the annual upkeep costs, as it is not economically useful to raise these horse breeds, unlike other horse breeds. The subsidy for keeping the Estonian Native cattle partially compensates for the smaller productivity of the Estonian Native cattle, compared to the productivity of other dairy cattle.

Estonian Native horse

The Estonian Native horse is a breed of ancient ancestry, no exact data are available on its origin. It belongs to the Northern forest-horse group. The local feeding and keeping conditions and the harsh natural selection has made it small, tough and undemanding.

The oldest records of the Estonian Native horse date back to the 11th century. There is no breed-specific colour of the Estonian Native horse and so they are found in quite a broad spectrum of colours. As an aboriginal token, the Estonian Native horse has a dark stripe on the back and croup. The Estonian Native horse is good-natured, cheerful and lively, but still sufficiently peaceful to be used in equine tourism.

The Estonian Native horse is remarkable for its unassuming manner and good feed utilisation and can spend the winter in the open air. Today the Estonian Native horse is a universal small horse that can be used as a children's riding horse and a family and tourism horse.

The Estonian Native horse has been entered in the FAO list of endangered breeds since 1993 and in the list of endangered breeds of agricultural animals pursuant to the Directive No. 118 of 8 December 2005 of the Estonian Minister of Agriculture (RTL 2005, 120, 1876).

The preservation and breeding of the Estonian Native horse is conducted by the Estonian Native Horse Breeders Society, which also keeps the studbook and performs performance checks. The activities of the society are supported by the Estonian Native Horse Conservation Society, established in Year 2000, which organizes information activities and publishes the journal *Oma Hobu* (´Your Horse´).

Tihuse tourist and horse-breeding farm is located in the village of Hellamaa, Muhu municipality (Muhu island) and has a herd of 300 Estonian Native horses, which is the largest in Estonia. The horses together with Hereford cattle manage the pastures of the farm situated in the coastal areas of the island. As a result, the landscapes are well tended.

Tihuse farm is well-known both among the islanders and elsewhere in Estonia, but also outside Estonia. The farm has a dignified and long history, which dates back to the 18th century. The farmer Martin Kivisoo is a vivid person with great knowledge and remarkable communication skills, who continues the work of its ancestors by raising the Estonian Native horses. Martin Kivisoo characterizes the Estonian Native horse as a very sensitive animal, who seeks contact with people.

The farmer of Tihuse Farm says that the Estonian Native horse helps to preserve the connection with the previous generations.

Once the horse was man's inseparable companion in farm chores and everyday life. Today the horse's role in society and as a man's companion has altered. It has been well thought over at Tihuse, how to bring people and horses together again. Riding fans can practice harness sport and riding on the farm. Sidecar routes over the beautiful Muhu Island have been devised. The riding fans are offered various riding routes. A study trail of prehistoric culture has been established. According to Martin Kivisoo, it is possible to sense the power of the past at Tihuse, to cope in today's landscape with changed symbols. The activities of the farm are constantly developed.

Tori horse

Breeding the Tori horse is closely related with the Tori Horse Breeding Farm, founded in 1856. In the first decades, the Estonian Native horse was bred in the Tori Horse Breeding Farm, but as the outcomes did not satisfy the needs of agriculture, it was started to cross various imported breeds with each other. The best results were yielded by Hetman, a crossbred stallion bought from Poland. Hetman became the ancestor of the Tori horse and the establisher of the first breeding line. Thus, the Tori horse has evolved through complex novel crossbreeding. The Tori horse has a lively temper, a good nature and a strong pulling desire. The horse is undemanding and puts well up with local feed.

Physiologically and economically, the Tori Horses are fast ripening. It is possible to make them work and start to use them as breeding horses at the age of three. The young horses are easily teachable. The horses are tenacious at medium and heavy work and have good work skills at light draughts and rides, too. The Tori horses have shown good draught will and strong draught power at the competitions of maximum tractive power. They can be used as workhorses up to the age of 20-23.

Today two horse types are being bred within the breed: the older type or universal Tori horse and the Tori riding horse. Their preservation and breeding programme aims to preserve and breed the Tori breed horses, the unity of both the breed type and descendence of which shall last. The subsidies are paid to the breeders of universal Tori horses only.

In Lääne County, in the historic Rootsi village, in Topi farm, the Vaan family raises Tori horses, meat cattle and grain. Their farm is a multi-functional production farm. The farmer Aldo Vaan is a biologist and has worked as a teacher for a long time. As an active person, he participates in the work of the management boards of Estonian Horse Breeders' Society and Estonian Beef Breeders Association.

Aldo Vaan started to establish a farm on the former lands of his family in the early 1990-s. In the farmstead returned to him, only the dwelling house and granary had preserved. After that the farm has been constantly developed: new animal houses and other supplementary buildings have been built and a museum exhibiting local history and lore has been created.

Over time, the Tori horses have become the favourite animals of the family. The Vaans' horse herd with over 30 animals is highly valued and the farm's long-term work with the Tori horses has been acknowledged by the Estonian Horse Breeders' Society. As a good sign of consistency, the farmer's son has taken over the reins in the stud farm.

Besides agricultural production, tourists have been thought about, too. They can stay overnight and ride on the farm and enjoy the nature and silence on the beautiful banks of Kasari River.

The Tori horses of Topi farm have concurrently several roles – to maintain the grasslands by the River Kasari and to care for the preservation of an endangered breed.

Estonian Heavy Draught

The Estonian Heavy Draught is stout and has a strong constitution, well-developed muscles and a strong skeleton. The very calm animal has been mostly bred by crossbreeding the Ardennes Horse imported from Sweden and Belgium and the local horses. Today the main breeding and preservation method of the breed is purebred breeding together with entering crossbreeding. The related breeds used in the breed are the Swedish Ardennes, the Belgian Ardennes, the Soviet Heavy Draught and the Lithuanian Heavy Draught horse. The studbook was started to be kept in 1922. Up to 1953, the breed was called the Estonian Ardennes.

Estonian Heavy Draught horses have a calm temperament, they are energetic and good-natured. The young horses frequently become adult before the third year of life already. The fertility of the Estonian Heavy Draught is lower than the one of the Tori and Estonian Native horses. The horses' average life span is 22-25 years in the normal keeping conditions. As to colours, the percentage of bay horses is increasing.

In Kõpu Village, Pärnu County, Enn Rand is keeping a horse-breeding biased tourist farm in the farm of his ancestors. His Maria Farm, established in 1920 with 20 hectares of land has increased to 150 hectares by today. Through ages, horses have been in the farm. During the last 20 years, both sheep and meat cattle have been kept, but horse keeping has been still stuck to. The farm has its own pastures and grasslands.

One reason for raising horses is long-term family traditions. Upon restoring the farm, the farmer found a way to continue the traditions of horse breeding through tourism development. According to Enn Rand, the Estonian Heavy Draught well meets the needs of equine tourism with its calm character and solid attitude.

Maria Farm presently has 21 horses. Besides tourism, breeding is engaged to some extent. It has also been acknowledged – a mare raised in the farm has been honoured with the title of the best young Estonian Heavy Draught animal.

The Estonian Heavy Draught horse with its peaceful temperament and strong build is an excellent companion in equine tourism.

Estonian Native cattle

The Estonian Native cattle is unique because it has been bred from a local aboriginal breed and a number of breed-specific signs have survived through ages. The Estonian Native cattle may be regarded as the cultural heritage of Estonian people, but the numbers of the Estonian Native cattle are dangerously small.

The systematic breeding of the Estonian Native cattle was started in 1910, already, when the Western Finncattle bulls were introduced in breeding. Before that, aboriginal cattle with a very small milk performance were kept with an aim of mostly getting manure. The aboriginal cattle were characterized by their small measurements: the withers height 109–113 cm (on the average 111,5 cm) and the body weight 200–300 kg.

In 1914, it was started to enter the Estonian Native cattle in herd books, to develop cattle keeping. The aim of registering pedigree cattle was the selection of better brood animals and to collect the data on their descendence, performance abilities and other qualities.

The Estonian aboriginal cattle had a small build, low body-weight, underdeveloped muscles, low legs and multicoloured coats. According to performance checks, there were 233 Estonian Native cows in Estonia (the average annual milk production 1619 kg) in the Years 1920-1921.

The Estonian Native Cattle Breed Society, founded in 1920, set the objective of breeding the Estonian Native cattle to use the existing local cat-

tle with various looks to breed a hardy and tough individual, meeting the local conditions. The aim was to improve the animals' productive skills but to preserve the high milk fat content, characteristic to the breed. Upon breeding, the polledness and colour of the animals, which had to remain whitish red was focused on. Research of the herds was organized and it was continued to buy the breeding material from Finland. The local aboriginal herd of cattle was intensely improved with different bovine breeds. As a result, the main bodily measurements of Estonian Native cattle increased and the animals became larger and sturdier.

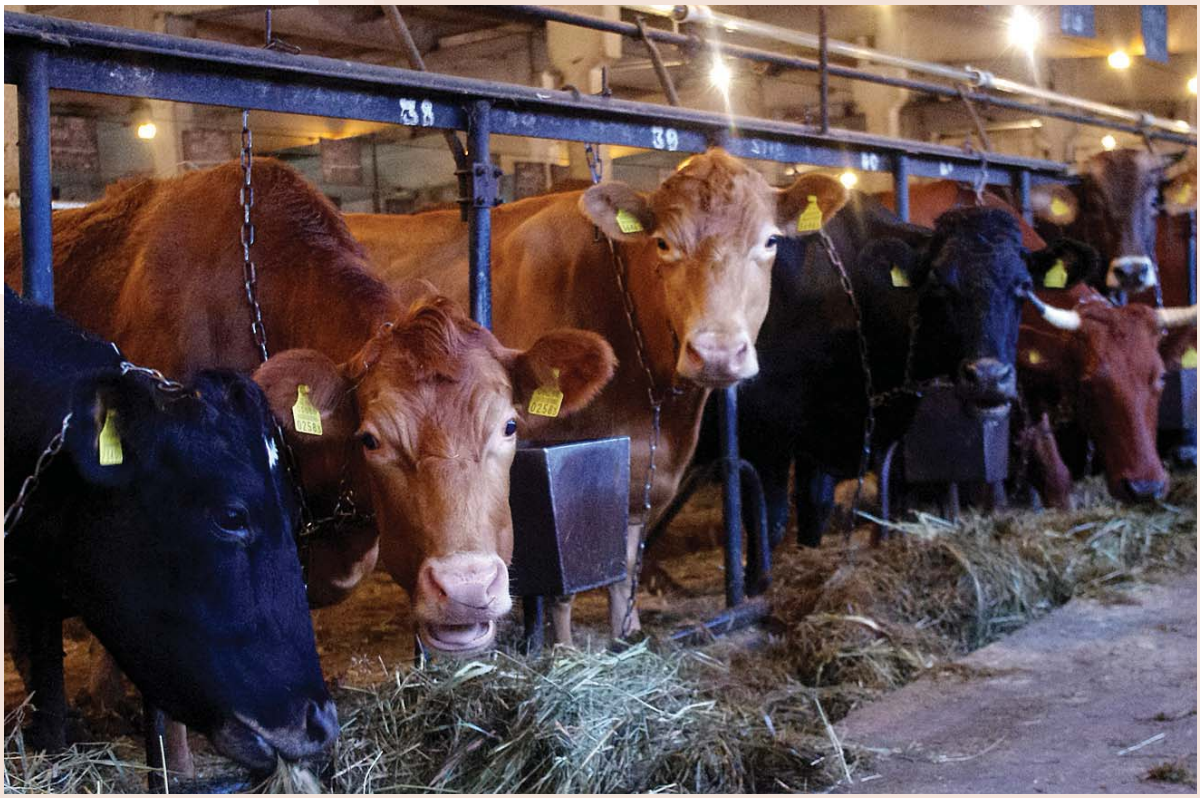
Due to the purposeful selection of breeding animals and the long-term use of Western Finncattle, the former local aboriginal cattle have been evolved into whitish red (there are other colours as well) polled cattle, whose body-weight is 430-480 kg, known as the Estonian Native cattle. The milk yield has improved and the milk is characterized by a high protein, fat and sugar content. The renneting properties of the milk are good.

The Estonian Native cattle is in the FAO list of endangered species since 1993 and is included in the list of endangered animal breeds in Estonia (RTL 2005, 120, 1876). The subsidy paid to endangered breeds has kept the numbers of the Estonian Native Cattle stable.

Raising the Estonian Native cattle in production conditions is not very common today. Large-scale herds of the Estonian Native cattle are held rather owing to a sense of mission, to continue a long-term work of our ancestors. The activity of the Commercial Farming Association Mereranna is a good example of keeping the Estonian Native cattle side by side with modern breeds. The producer acting in Kaarma municipality, Saaremaa island, has long-term experience in this field. The Estonian Native cattle have been among the cattle since the era of the association's predecessor, Kaarma kolkhoz.

There are three bovine breeds in the herd of the association: Red cattle (684 animals), Holstein cattle (40 animals) and Estonian Native cattle (36 animals). According to the President of the association Urmas Lehtsalu, the Estonian Native cattle are very capable animals within the general herd. They have a firm character, are slightly obstinate, hold together and stand up for each other.

The last years' production figures show that the Estonian Native cattle do



Besides preserving the Estonian Native cattle, the Commercial Farming Association Mereranna has an important role of the improver of local employment and a keeper of rural life.

not considerably lag behind the other breeds by their productivity. According to the figures of 2010, the 31 Estonian Native cows produced an average of 6477 kg of milk, which contained 4.41% fat and 3.38% protein. The total protein and fat produced by the herd was 5010 kg. Mereranna Estonian Native cows produce more milk than the Estonian Native cows on the average. In 2011, the average annual yield was 7600 kg per cow.

In 2011, the society received a silver wandering cup of the best breeder of Estonian Native cattle. According to the Estonian Native Cattle Breed Society, the farm is one of the most capable Estonian Native cattle farms in the field of feeding, breeding and documentation management, as well. Consistent performance checks help to preserve the breed better and breed it more productively, because the data on the health, feeding and milk of the animals are recorded.

The poorer milk yield of the Estonian Native cattle is compensated by agricultural subsidies, as the expenditure on the animal keeping is high. The keepers of the Estonian Native cattle entered in the herd book are paid EUR 196.21 annually for raising endangered breeds for a female calf and cow over six months of age.

In Saaremaa, Kaarma municipality, the herd of Estonian Native cattle of Uustla farm is growing under the hand of a tough island-woman Liia Sooäär. The farmer Liia Sooäär started organic farming in early 1990. Organic farming was not especially practised in Estonia, then, but special trainings gave her confidence to perform environmentally friendly production.

The conviction to start to deal with Estonian Native cattle arrived after thorough consideration. Estonian Native Cattle Breed Society, restored in 1989, was looking for people willing to deal with Estonian Native cattle as an endangered breed. First Liia Sooäär bought two Estonian Native heifers and later she bought more animals. The herd also increased due to cooperation with Saaremaa slaughterhouse at the expense of rejected animals taken there. When poorer cows are mated with good bulls, it is possible to produce a better next generation. 15 animals were saved in the cooperation with the slaughterhouse.

Keeping Estonian Native cattle is lifework and a mission for Liia Sooäär. She does not seek a great profit with it, but keeping Estonian Native cattle as an endangered breed in an organic way refreshes her spirit and gives a meaning to her life.

Today there are more than 30 predominantly light beige animals, the annual milk yield of which is 5872 kg per cow. Even 7000 kg of yield a year has been received from the best animal, which is remarkable for this breed. In the last ten years Uustla farm has sold 23 cows and 20 bulls for breeding.

The animals of the herd have been repeatedly presented with various awards. The most famous cow in the herd, Ürdi, has been selected as the most beautiful cow of the county for four times. In 2010, Liia Sooäär received the silver wandering cup of The Best Estonian Native Cattle Farmer.

Today milk is sold both to the dairy industry and the local village farm store. The local village farm store uses it for making organic butter and creamy ice cream. The milk of Estonian Native cattle has a very good ratio of fat, protein and milk sugar, which is very suitable for producing cheese. By comparison, usually 10 kg of milk yields an average of 1 kg of cheese, in the case of Estonian Native cattle, the same amount of milk yields an average of 1.3 kg of cheese.

Estonian quail

Estonian quail is the only locally bred breed of farm fowl in Estonia. Breeding started in 1966, when the first quails were brought in Estonia. The Estonian quail of meat and egg type was recognised as a breed in 1988. Today the individual performance checks of Estonian quails are performed and a preservation and breeding programme is conducted. Breeding of Estonian quails is supported through the agricultural breeding subsidies.

The quail is the smallest farm animal. Estonian quail has a short, plump body, a short tail and blurred ochre brown plumage with dark brown stripes. The bodyweight of a male bird is approximately 172 g. The female birds are bigger than the males, their bodyweight is nearly 190 g. The spread of quail breeding is based on the high dietary qualities of both the eggs and meat. A quail egg weighs 7-14 g and contains 13.1% protein, 11.2% fat and 1.1% minerals. The cooked and smoked quail eggs can keep in a refrigerator for up to three months.

Local plant varieties

Pursuant to international treaties, the countries have an obligation to guarantee the preservation of the genetic resource of agricultural crops and fruits and berries of local origin. The cultivation of seeds of agricultural crops is often based on imported crop varieties that are insufficiently adapted to the local growth condition. The local varieties, better adapted to the local condition are often discarded due to their low yields. Breeding of new varieties and improving of varieties already bred and used are based on healthy initial material, containing the genetic information, which is valuable, disease-resistant and has a high yield-potential. The plant breeding of agricultural crops, fruits and berries in Estonia is performed by Jõgeva Plant Breeding Institute and Polli Horticultural Research Centre of Estonian University of Life Sciences.

The old local agricultural crops and fruit varieties are our cultural heritage. They usually do not have an economic value and they are not of interest to large-scale producers, as they cannot compete yield-wise with modern varieties. However, they could be used as garden crops and in small-scale production. To guarantee the preservation of indigenous varieties, it would be practical to support the growing of them. Presently only the growing of Sangaste rye is supported.

Sangaste rye

Sangaste rye is the best known of Estonian old local plant varieties and the only one, the growers of which are paid national subsidy. Rye is a part of Estonian national culture, as the dark rye bread has had a dignified place on our table for a long time. Winter rye Sangaste is one of the oldest grain varieties, bred by Sangaste Manor owner Count Friedrich Georg Magnus von Berg (1845–1938) in Year 1875. Due to its excellent winter hardiness and large grain, the variety has been widely used upon breeding new rye varieties. Sangaste is the oldest known grain variety

In favourable growth conditions, the stalk of Sangaste rye can grow up to over two metres in height.

in Europe that is presently grown.

Sangaste rye has been awarded at several world exhibitions. The variety was awarded with a gold medal on the Paris world exhibition in 1889 and both the rye variety Sangaste and the grain-cleaning machine of Count Berg were awarded the first prize in the US Agricultural Exposition in Chicago, in 1893. In 1912, Sangaste Manor was acknowledged as the best agricultural centre of Russia.

Compared to today's rye varieties, Sangaste has a taller stalk, which increases lodging risk and makes harvesting more difficult, therefore, it has been tried to breed the variety to be short-stalked. Sangaste rye is used in breeding in Jõgeva Plant Breeding Institute. The yield of Sangaste is nearly 15% smaller, compared to present-day varieties, at the same time the sown area of the winter rye has gown almost three times over a couple of years, being 303 hectares in 2009 and amounting to 882 hectares in 2011.

Pursuant to Regulation (EC) No1698/2005 of the European Council, the growers of Sangaste rye shall receive support from the European Agricultural Fund for Rural Development (EAFRD). Only the agricultural producers with a valid environmentally friendly farming or organic production obligation may apply for support. The land covered with the support shall be entered in the Register of Agricultural Support and Field Massifs. The applicant shall have to sow only the certified seed of the winter rye Sangaste and shall be obliged to grow the variety at least on five hectares during five years. The rate of support paid for growing local plant varieties is EUR 32.28 per a hectare a year in the case of the winter rye variety Sangaste.

A rye-growing promoter Hans Kruusamägi, known as the King of Rye (on the right) by the monument of F. G. M. von Berg in Sangaste. Presently Hans Kruusamägi is growing Sangaste rye on 400 hectares. Rye is used for several purposes in the farm, including for making beer and vodka.

The objective of the support is to avoid the extinction of the winter rye Sangaste, to ensure the preservation of valuable genetic material and the supply of seed material necessary of growing local varieties. The measure helps to preserve genetic diversity, keep the cultural heritage and follow environmentally friendly farming methods.

Importance of the Preservation of Agricultural Genetic Material

The partner countries have introduced within REVERSE project, in addition to the breeds and varieties already protected, the genetic resource of species the support does not cover yet, but the gene pool preserved up to now is invaluable and that should be definitely preserved. In Estonia, Estonian Native sheep and several old fruits and vegetables deserve mentioning. The diversity of species related to our agriculture is becoming poorer, as high-yield new breeds and varieties are preferred. However, to breed new varieties and breeds and to improve the existing ones, the indigenous gene pool is needed.

Estonian native sheep

Sheep have lived in Estonia at least for 4500 years and are one of the oldest livestock here. Estonian native sheep are spread all over Estonia, but are better preserved on the islands and on the coast. Estonian native sheep are very special in all Europe, as they are genetically farther from cultured breeds, thus they are more indigenous than the other native Nordic sheep.

Estonian native sheep have adapted to the local condition for millenniums; they well endure the local climate, excess moisture and cold weather. They optimally use the food found in the nature, lamb without problems, know, how to defend their offspring, and produce excellent wool. By their character, Estonian native lambs are gentle, wiry, stress-proof and undemanding as to the feeding and keeping conditions. They match to all types of pasture and are good landscape maintainers.

Estonian native sheep have a small size, a short triangle tail, narrow woolless head and thin bare legs. Of aboriginal signs, it has preserved horns, teat-like formations on the neck, a short neck, a dual coat (with an inner and an outer layer), high fertility, a tendency to make a lamb-

ing nest and strong maternal instinct. By their colour, native sheep may be white, black, brown, grey or multicoloured. Their appearance may be very diverse. The native sheep's wool staple has a high quality and beautiful shades of colour.

The native sheep is economically universal and useful animal, as all its produce are equally well usable. The artisans appreciate native sheep as producers of high-quality white and colourful wool. The native sheep's fur has a high quality, too. The native sheep's meat is tasty and is used in restaurants. Native sheep are irreplaceable landscape gardeners on semi natural communities, where cultured breeds do not last.

Studies on genetics and origin of Estonian native sheep conducted several years ago proved that the situation of Estonian native sheep is not hopeless yet. The genotype of Estonian Native sheep differentiated from cultured breeds and the great number of genetic groups indicated at a considerably great genetic variety. The four larger genetic groups differentiated, named by the origin of sheep: Kihnu (the largest group), Hiiu, Saare and Ruhnu native sheep.

Anneli Ärmpalu-Idvand is preserving biodiversity by raising Estonian native sheep of Kihnu line on coastal meadows of Manilaid islet. The meadows would grow over without grazing. Consequently, the habitats of many plant species, birds and insects would disappear. Estonian native sheep of Kihnu line are quite numerous in Estonia already, well kept and have a definite distinctive appearance. The Non-Profit Association The Kihnu Island Estonian Native Sheep Breeders' Society has functioned since 2007.

Indigenous breeds can be used upon breeding cultured breeds and breed improvement as genetic variations, which have been best adapted to the given environmental conditions. Estonian Native sheep have not been bred or improved. Thus, it is possible to breed local wiry and disease-resistant animals both for landscape maintenance, wool animals and meat animals on the basis of the preserved populations of Estonian native sheep.

Estonian native sheep is not recognised as a breed today and there-

fore no endangered breed subsidies is paid for raising it but it is definitely worth preservation as a genetic resource of local origin. The abundance of native sheep have constantly decreased in Estonia, their keeping and preservation only lasts thanks to few enthusiasts. The largest populations of Estonian native sheep are on the islands of Kihnu and Ruhnu, smaller flocks are on the islands of Saaremaa and Hiiumaa and in South-Estonia. To preserve the Estonian native sheep, the Preservation and Breeding Society of Estonian Native Sheep has been created. The objectives of the society are to converge the animals with still preserved clear distinctive characteristics of Estonian native sheep from indigenous native sheep raisers into sustainable preservation flocks, and to introduce these animals in Estonia and abroad and save the Estonian native sheep as a carrier of Estonian material culture from the danger of extinction.

By protecting Estonian native sheep, we honour the heritage of our ancestors, keep alive our national culture and handicraft and preserve semi-natural communities. It is still possible to save our indigenous breed from extinction, but the preservation of the genetic resource preserved to today would need support.

Taavi and Imbi Jäetma raise Estonian native sheep at Sae farm in Uuri village on the bank of Pärlijõgi River at the western end of Lahemaa National Park. The basic flock has been formed on the basis of Estonian native sheep still preserved in and gathered from the islands of Kihnu and Ruhnu, South- and Western Estonia and the islands of Saaremaa and Hiiumaa. There are 50 ewes and a few rams. The gene research conducted with UNESCO funds and directed by Estonian Fund for Nature in 2006 showed that the majority of sheep in Sae farm are from all described Estonian native sheep lines: Kihnu, Ruhnu, Hiiu and Saare.

The sheep in the pastures of Sae farm are guarded by Maremmano livestock guardian dogs.

Estonian native sheep are diligent grass and brush cutters with multicoloured and multilayer wool. Imbi has manually spun yarn in eight different tones and many semitones. All yarn tons are original, no yarn is died. The yarn made of Estonian native sheep wool is soft and does not prickle the skin.

The Non-Profit Association MuhuMaaLammas raises Estonian Native Sheep on Muhu island. Small and wiry Estonian native sheep are the best for maintaining the alvars with vulnerable soil and poor grass growth. Presently there are twenty sheep from different lines of Estonian native sheep in the flock, but the flock is increasing fast. The non-profit association is committed to helping to preserve the Muhu disappearing alvars and large dry meadows, by valuing the tough Estonian native sheep in their indigenous landscapes. According to genetic studies, all sheep of the flock are the offspring of Estonian native sheep. The animals are diligent grass and brush cutters, their wool is valuable and meat delicious. Due to their small size and slow growth, they are not of interest for large-scale production, but thanks to their toughness and undemandingness, they suit well for landscape maintenance, as they prefer to stay in the open in winter, too, in the mild maritime climate.

Sass, Estonian native ram of Kihnu line (on the left) and Palli, Estonian native ram of Ruhnu line. Presently Palli makes happy the ewe flock of the Non-Profit Association MuhuMaaLammas and maintains the alvars of Muhu island.

Old fruits and berries

The Commission of Gathering, Preserving and Assessing of the Genetic Resources of Agricultural Field Crops has proposed to supplement the list of plants and crops receiving national subsidy for growing local varieties of the Rural Development Plan with the following agricultural field crops, fruits and berries:

The broad bean *Jõgeva* (1956) – suits for growing both for beans and green crop, the seeds suit both for human consumption and several mixed fodder mixes. The bean variety Jõgeva is the first and up to today only bean variety of Estonia and deserves more attention due to its uniqueness.

The field pea *Mehis* (1981) suits for growing both for beans and green crop, the seeds have a very good taste and are ideal for making pea soup. The present production capacities by no means meet the consumers' demand. →

The potato *Ando* (1973) – a potato with excellent culinary properties, highly valued and awarded. The potato has been used as a parent of several local breeds in the plant breeding.

The white clover *Jõgeva* (1960) – a variety with good winter resistance. The seed growing of the variety largely depends on the weather, therefore it is not possible to produce the seed each year. →

The apple *Tallinna pirnõun* ('pear-apple of Tallinn') – the oldest variety originating from Estonia, used in the 19th century already. Its advantages are winter resistance and a very good taste. The variety is not included in the list of varieties suggested for reproduction, therefore it should be encouraged to plant it in the gardens.

The pear *Kägi bergamott* – a winter resistant pear variety with smaller tasty fruit, there are no stone cells in the flesh. →

The cherry *Kõljala helepunane* ('the light-red of Kõljala') (1961) – a sour cherry variety with poor qualities (a small pale fruit, poor taste, colourless juice). As the variety grows on its own roots, has good winter resistance and a relatively high yield, it suits for growing in the local climate.

The plum *Pärnu sinine* ('the blue of Pärnu') (1957) – self-sterile, with a small fruit and low yield, but grows on its own roots, has good winter resistance and a pleasantly tasting fruit. The ancestor of the variety is Liivimaa punane lihtploom.

The black currant *Anneke* (1932) – a berry variety with modest yield, but excellent taste qualities.

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