

Development Tendencies of Deer Breeding Sector in Latvia

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Abstract. Deer breeding is a relatively new and progressive sector in the world. Deer breeding in the world has been developed for the past 30 years, though in Latvia this period is twice shorter. However Latvia has enough land areas – both unutilised agricultural areas and forest areas, where deer breeding could be developed, thus promoting employment in rural areas and improvement of the environment and landscape. The research analyses the present situation and development tendencies in Latvian deer breeding sector. Deer breeding comprises four periods of development.

The research identifies the main regulatory enactments governing in the sector, and the key coordination and supervision institutions. It was concluded that the Wild Animals Breeding Association founded in 2000 plays a significant role in the deer breeding sector development.

In Latvia between 2004 and 2009 the number of deer farms has increased 2.3 times, thus accounting for 70 farms breeding more than 7000 deer. At the end of 2009 the total enclosed areas or enclosures in deer parks were 8873 ha and the increase of deer parks size during the period analysed has influenced the increase of the number of breeding animals. In 2009 the average animal density on one farm in Latvia was 0.8 animals per 1 ha of an enclosed area, which corresponds to the standards of extensive breeding. Applying the intensive approach of deer breeding it is possible to increase the number of deer at least 7 times in the existing enclosed areas, thus establishing a basis for future development of the sector.

Key words: deer breeding, deer parks, animals, farms.

Introduction

Unconventional animal husbandry sectors along with the generally accepted animal husbandry sectors have become more important in Latvia. Breeding of wild animals including deer breeding is one of the most perspective, potentially export capable, and boosting unconventional animal breeding sectors. Latvia is rich in agricultural and forest land resources applicable for deer breeding in parks and there is sufficiently acceptable genetic material of deer for the sector development. According to the data of the Central Statistical Bureau on the survey of rural farms structure in 2007, when the total sample comprised 58.0 thousand rural farms, the unutilised agricultural areas covered 155.1 thousand ha. According to the forest monitoring data of the State Forestry Research Institute "Silava" on April 1, 2008 the area of agricultural land overgrown with trees and shrubs covered 163.46 thousand ha and the utilised agricultural area complying with forest criteria made 142.59 thousand ha (Latvijas Lauksaimniecība un lauki, 2009). Hence it is essential to draw the unused resources into an appropriate circulation and changing economic conditions, while several conventional agricultural sectors incur losses. Therefore it is necessary to pay more attention and support to the development of unconventional sectors. Deer breeding is an alternative to a traditional animal husbandry, and it may be established as a certain market segment promoting employment in rural areas as well as ensuring tidy and beautiful environment.

In Latvia deer breeding is less popular than conventional animal husbandry. Seventy farms practised deer farming in 2009. In deer breeding animal keeping conditions are similar to wildlife.

Deer live outside throughout the year and they are kept in small herds in enclosed territories or pasture-grounds; such farms are called as deer parks.

The world practice in deer breeding similar to animal husbandry applies the approach of intensive and extensive breeding. At the time being mostly the approach of extensive breeding (farming) is applied in Latvia (SDAA, 2009).

Deer breeding farms in Latvia specialise in three main spheres – breeding of pedigree breeds, meat production, and trophy animals for hunting. Not infrequently farms choose the fourth sphere of activities – tourism, which is successfully combined with the afore-mentioned spheres (SDAA, 2009; Paeglītis D. etc., 2006). Meat production is considered as the main source of income in deer breeding (Paeglītis D. etc., 2006; Tuckwell C., 2003; Fletcher J., 1989), although several authors have mentioned that trophy hunting is the most profitable activity of farms (Holst A, 2002). Thus the development of this sphere of the sector should be viewed as perspective in Latvia.

So far there have been few studies on the sector of deer breeding in Latvia, hence it is essential to ascertain the situation in the sector and its future perspectives alongside the conventional agricultural sectors. Therefore the **research aim** is to describe the situation in the sector of deer breeding in Latvia.

The **tasks** set to implement the research aim are as follows:

- 1) to study historical development of deer breeding in Latvia and identify development stages for deer breeding;
- 2) to describe regulatory enactments of the sector and responsible institutions;

- 3) to analyse the main characteristic indicators of the sector.

Statistical data and information provided by the State agency "Lauksaimniecības datu centrs" (Agricultural Data Centre - LDC), unpublished information of Latvian Wild Animals Breeders Association (SDAA), publications of Latvian and foreign researchers, conference materials, and interviews with sector specialists were used to complete the research tasks.

For the purpose of the study the research methods included a monographic descriptive, abstract-logical, analysis, and synthesis methods as well as graphical, data grouping, and time-series methods.

Results and discussion

1. Historical development of deer breeding sector in Latvia

Deer breeding as agricultural sector is a relatively new and progressive sector in the world. Deer breeding has been developed for the past 20-30 years in many countries of the world. In 2008-2009 the leading positions of deer breeding were held by New Zealand with 1.5-1.8 million deer (Deer Industry New Zealand, 2009), the USA - 0.26 million (Anderson D.P., 2007), Australia - 0.2 million (McRae T.B. et. al., 2006), and Canada - 0.1 million deer (Statistics Canada, 2009). In Europe deer breeding is developed in Germany (FEDFA, 2009) and the United Kingdom (BDFa, 2009), however lately deer breeding has started to develop in Poland and other countries.

The development of deer breeding in Latvia may be divided into several periods, based on the studies of some authors (G.Skriba, D.Paeglītis):

1. Historical period - wild deer appeared in the territory of Latvia approximately 8 000 years ago. The number of deer reached their maximum 5000-6000 years ago, though later they started to disappear. The development of deer breeding in the 19th century was determined by the fashion governing in Europe to arrange menageries. At the beginning of the 19th century animals were imported from Poland, the Carpathian Mountains and the Caucasus for the establishment of deer parks. Sixteen deer parks existed in Latvia between 1850 and 1900, since it was thought that deer could not survive in the wild. However during the rebellion of 1905 a large number of imported deer broke free and reproduced, so creating populations of wild animals. Wild deer population incurred damages as well as deer parks were destroyed during the two World wars. In Latvia between 1963 and 1985 deer were imported from the USSR forestries, and the newly-born deer calves from Kurzeme region forests were replaced to other regions of Latvia for a targeted deer breeding in wild (Skriba G., 1995a, 1995b, 1995c).
2. Early period - after restoration of the second independence of Latvia in 1991, entrepreneurs were interested in deer breeding for commercial purposes. The first deer parks were established in 1994.

3. Middle development period - turn of the 20th and 21st century with the largest activity in the establishment of deer parks observed for the period of 1999-2004, as 23 new deer parks started their commercial activities (Paeglītis D. etc., 2006). The year 2000 is marked as milestone in the development of deer breeding in Latvia, when Latvian Wild Animals Breeders Association was founded due to the merging of 18 supporters of deer breeding idea and existing owners of deer parks. Support aids, mainly for the construction of fences and buildings, available through the Special Accession Programme for Agriculture and Rural Development (SAPARD) essentially impacted the establishment and development of deer parks.

4. Stable development period started from 2004 with the accession of Latvia to the European Union (EU). The EU Structural Funds financing was available during this period. Consequently the number of deer parks has increased up to 70 parks compared with 2000, when approximately 30 deer parks were established in Latvia and 21 licences were issued for keeping wild animals in captivity.

In Latvia deer breeding farms are not targeted only at meat production, but they also ensure hunting and representation activities. Thus deer parks provide animals appropriate both for hunting and sightseeing - deer with large and pronged horns.

Probably the most multiform choice of deer for selection is available in Latvia (Fletcher J, 2008). Latvia is among those few countries, where animals for deer parks are imported from very many countries and territories - Germany, Poland, Belarus, Kaliningrad, the Czech Republic, Hungary, the United Kingdom, Austria, Romania, the Netherlands, and Sweden. Hence, opening broad opportunities for selection, and genetic improvement of the present breeds and development of new breeds, since the imported animals comprise both vigorous animals with large and pronged horns and more peaceful and bigger in the muscular mass animals. Thus there are possibilities to develop both excellent trophy and meat deer herds. The purchase of breed material from abroad was partly financed through the state subsidies for the period of 2005-2008 (Noteikumi par valsts atbalstu ..., 2005, 2006, 2007, 2008).

2. Regulatory enactments of the sector and participatory institutions

The hierarchy of laws and regulations in Latvia is broken down in several levels, which also refer to the sector of deer breeding:

- 1) laws of the Republic of Latvia;
- 2) the Cabinet Regulations of the Republic of Latvia;
- 3) regulatory enactments published by institutions/ organisations/enterprises.

By importance the regulatory enactments might be divided into two large groups - general enactments, which relate to the agricultural sector

on the whole and specific enactments, which shall be observed by the breeders of wild animals. Only the main regulatory enactments binding to entrepreneurs of the deer breeding sector are analysed hereafter.

Deer breeding farms in Latvia are included into the number of wild animal breeders. Pursuant to Section 13 of the Animal Protection Law wild animals, including deer that are kept in enclosed areas for the acquisition of products of animal origin or for the purposes of species selection shall also be considered to be agricultural animals kept for farming purposes (Dzīvnieku aizsardzības likums, 1999). Thus general regulatory enactments of animal husbandry and also several specific regulatory enactments governing breeding of wild animals are binding to deer breeding farms.

The purpose of Veterinary Medicine Law is to regulate the prevention and combating of infectious animal diseases, veterinary medical practice, the circulation of products of animal origin, veterinary control of the import and transit of animal products and products of animal origin, and determine the rights and obligations of the state and local government institutions as well as of individual entities in this field. The law prescribes that the observance of veterinary and circulation of products requirements shall be supervised and controlled by the Food and Veterinary Service (PVD) (Veterinārmedicīnas likums, 2001).

The law "On Supervision of the Handling of Food" is binding to deer breeders, since meat production is one of business sectors of deer breeding. The purpose of the law is to ensure handling of food, which is qualitative and harmless to human health, life and the environment, the elimination of risks, the promotion of trade and the protection of the interests of consumers. The law applies to the handling of all forms of food and any food undertaking and natural entity involved in it (Pārtikas aprites uzraudzības..., 1998).

The Cabinet Regulations No. 180 of April 15, 2003 "Procedure for Keeping Wild Animals Envisaged for the Use of Meat Production or Pedigree Breeding in Enclosed Territories" shall be mentioned in the group of specific enactments. The regulations prescribe the procedure for keeping wild animals envisaged for the production of meat or breeding in enclosed territories or deer parks (Dzīvnieku izcelsmes produktu..., 2003).

Products of organic farming are becoming more popular among inhabitants, as people are willing to consume food of organic origin. Animals of the deer family and the products derived therefrom may be sold with the reference "Organic farming", if the animals have been born on an organic farm and have been reared in accordance with the requirements set for organic farms. The procedure for circulation of animals of the deer family and the products derived therefrom in organic farming is prescribed by the Cabinet Regulations of the Republic of Latvia No. 1204 of October 20, 2009 "Procedure for the Circulation of Animal Products and Products Derived Therefrom, which are not Regulated by Directly Applicable Legal Acts of the European Union

Regarding Organic Farming" (Dzīvnieku un no tiem...,2009).

The Ministry of Agriculture is the main institution responsible for the sector, which is also the leading state administration institution in the sectors of agriculture, forestry, and fishery (ZM nolikums, 2003). The Ministry of Agriculture is the supervisory authority for the afore-mentioned Food and Veterinary Service, which ensures the observance of veterinary and circulation of products requirements in Latvia (PVD, 2009). The Ministry of Agriculture supervises also the State agency "Lauksaimniecības datu centrs" (Agricultural Data Centre), which ensures registering of herds and animals, registering of stands and other functions based on the requirements of the Law on Breeding and other regulatory enactments (LDC, 2009b).

Nevertheless the Ministry of Agriculture delegates several functions to public organisations of the sector. Thus the Wild Animals Breeders Association, which has received the status of a pedigree animal breeding association, coordinates breeding of wild animals in enclosed territories and breeding activities. The Wild Animals Breeders Association implements the functions prescribed by the Law on Breeding – keeps the studbook of pedigree deer, certifies breeding bulls, carries out attestation of farms rearing pedigree animals as well as organises auctions of animals, import of animals, implements projects, and deals with promotion of the sector in the country (Ciltsdarba likums, 1998). In 2008 there were 5 international workshops organised on evaluation of animal value for breeding and testing of their capacity for work, which were carried out in different regions of Latvia with the participation of owners of the existing farms and other interested persons. On August 21-24 an international conference "Farm Management and Quality of Products in Deer Farming" was organised at Sigulda, where participants got acquainted with progressive farm management and production methods in the world practice enabling Latvia's deer farmers to improve production methods and thus also the quality of products and consequently improving their competitiveness on the local and European market (Latvijas Lauksaimniecība un lauki, 2009).

According to the data provided by Latvian Wild Animals Breeders Association in 2008 nine farms had prolonged the status of breeding entities, of which only 8 farms after inspections and assessment got their status prolonged as red deer breeding farms as well as they received "Certificates of Red Deer Breeding Farms" (Latvijas Lauksaimniecība un lauki, 2009).

Within the implementation of the Pedigree Breeding Programme an active work has been carried out on red deer pedigree breeding programme, identification and evaluation of breeding stags and other animals (hides, calves and young animals) on pedigree breeding farms. The Pedigree Breeding Programme for Fallow Deer for 2009 – 2013 has been developed as well as the procedure for recording of fallow deer and regulation for attestation of fallow deer breeding and breeding animal evaluation programme on breeding farms.

Table 1

**Characteristic indicators on the number of deer and deer parks in Latvia
for the period of 2004-2009**

No.	Indicators/years	Unit of measurement	2004	2005	2006	2007	2008	2009*	2009**
1.	Deer parks	number	30	41	46	48	52	54	70
2.	Chain increase rate	%	x	36.7	12.2	4.3	8.3	3.8	29.6
3.	Base increase rate	%	x	36.7	53.3	60.0	73.3	80.0	133.3
4.	Deer	number	747	980	1645	3187	4960	5651	7170
5.	Chain increase rate	%	x	31.2	67.9	93.7	55.6	13.9	26.9
6.	Base increase rate	%	x	31.2	120.2	326.6	564.0	656.5	859.8
7.	Average number of deer per one deer park	number	25	24	36	66	95	105	102
8.	Chain increase rate	%	x	-4.0	49.6	85.7	43.7	9.7	-2.1
9.	Base increase rate	%	x	-4.0	43.6	166.6	283.1	320.3	311.4

* at the beginning of 2009, ** on December 1, 2009

Source: authors' calculations according to the data of LDC 2009a and SDAA, 2009

3. Main indicators characterising the sector in Latvia

Several indicators will be analysed to characterise the deer breeding sector – number of farms, number of members joined the Wild Animals Breeders Association, number of animals and their density, area of deer parks, and other indicators. The increase rates for the mentioned indicators will be calculated to study trends of the changes in Latvia for the period of 2004-2009. The calculations are based on the time series analysis, i.e. statistical indicators in a successive weight row, which numerically display the process of changes of a phenomenon within a certain time period. Three types of time series are applied in practice:

- time series of absolute values – their levels contain absolute values;
- time series of relative values – their levels contain relative values;
- time series of mean values – their levels contain mean values (Balabka N., 2008). The present research focuses on the time series of relative values, which expressively depict the main changes, occurred in the sector of deer breeding.

According to the way of calculation, time series contain the following indicators:

- **chain indicators** – show the rate of changes from one period to another period within the analysed period;
- **base indicators** – show the final results of all changes impacted the rows levels compared with the period assumed as a base period (Balabka N., 2008).

The increase rate shows a share by which the level of respective row has increased or decreased in relation to the previously achieved level.

Legend – $t_{m(b, ch)}$

According to N. Balabka (2008), indicators may be calculated according to the following equations:

$$a) \text{ chain (\%)} \quad t_{m(ch)} = (\Delta_{m(ch)} / Y_{m-1}) \times 100 \quad (1);$$

$$b) \text{ base (\%)} \quad t_{m(b)} = (\Delta_{m(b)} / Y_{v1}) \times 100 \quad (2);$$

where

$\Delta_{m(b, ch)}$ – absolute increase, characterising the increase (decrease) of a series level within a certain time period;

y_{m-1} – previous level of a time series;

y_1 – initial (first) level of a time series.

Data and calculations included into Table 1 will be used for the solution of the third research task.

The calculations included into Table 1 allow drawing several conclusions and interpretations:

- the number of deer parks has increased 2.3 times within the analysed period, i.e. from 30 farms in 2004 up to 70 farms at the end of 2009; thus the average annual increase equals to 6.7 farms. The most rapid increase in the number of farms is observed at the beginning of the analysed period, when in 2005 the number of farms has increased by 11 units compared with 2004, while at the end of 2009 the increase accounts for 14 farms;
- in 2009 the number of deer 9.6 times exceeds the number of deer in 2006. An especially fast increase of deer was seen in 2007, when the number of deer increased almost twice compared with the previous year. The number of animals has substantially grown also in 2006 and 2008;
- annually the number of deer has increased by 1000 animals on average. The issue of large number of licences in 2004 for keeping wild animals in captivity and growing interests of entrepreneurs towards this sector explain the increase of the number of deer within the analysed

Table 2

Indicators characterising the area of deer parks and animal density in Latvia for the period of 2004-2009

No.	Indicators/years	Unit of measurement	2004	2005	2006	2007	2008	2009*	2009**
1.	Area of deer parks	ha	1600	3850	4520	5615	7235	8020	8873
2.	Chain increase rate	%	x	140.6	17.4	24.2	28.9	10.9	10.6
3.	Base increase rate	%	x	140.6	182.5	250.9	352.2	401.3	454.6
4.	Average area of 1 deer park	ha	53.3	93.9	98.3	117.0	139.1	148.5	126.8
5.	Chain increase rate	%	x	76.1	4.6	19.0	18.9	6.7	-14.7
6.	Base increase rate	%	x	76.1	84.2	119.3	160.9	178.5	137.7
7.	Average density of deer per 1 ha	number	0.5	0.3	0.4	0.6	0.7	0.7	0.8
8.	Chain increase rate	%	x	-45.5	43.6	55.7	21.0	2.5	14.4
9.	Base increase rate	%	x	-45.5	-21.7	21.9	47.6	51.3	73.1

* at the beginning of 2009, ** on December 1, 2009

Source: authors' calculations according to the data of LDC 2009a and SDAA, 2009

period. Besides the experience is accrued, and gradually market for venison develops as well as deer parks attract tourists;

- in general the increase rate related to the number of animals exceeds the increase rate related to the number of deer parks within the analysed period more than 6 times, thus showing the growth and intensification of the sector;
- the average number of deer per one deer park has increased more than 4 times during the period analysed and amounts to 102 deer in 2009. It means that farms expand and become more competitive. The average decrease in the number of deer per one deer park was observed in 2005 compared with the previous year and also in 2009.

Unfortunately it is impossible to provide an unequivocal assessment on the number of animals in all deer parks of Latvia due to several reasons:

- there is no single data registering system or data base, where all the data on situation in deer parks are collected and updated;
- owners of deer parks having not joined the Wild Animals Breeders Association are not willing to provide information on their economic activities. Despite the unadjusted market of deer breeding production, farms outside the Wild Animals Breeders Association consider them as rivals and disclosure of any information from their part is impossible;
- process of animal counting is hindered, thus only approximate data are available.

The ability of farms to cooperate and thus solve issues significant for the sector unitedly and efficiently is a significant growth indicator of the sector. In 2009 the Wild Animals Breeders Association united 26 members engaged in breeding of red deer, fallow deer, wild boars, moufflons, roes, chamois, rambling-horns goats, yaks, and other wild animals. Consequently 37% of farms engaged

in wild animal breeding have joined the Wild Animals Breeders Association, thus representing a quite high indicator of organisation of these farms. In 2009 twenty-six deer parks with the total enclosed area of 8000 ha and 7500 wild animals of different breeds have been completely established within the Association. Out of 7500 wild animals of different breeds 66% are red deer, 12% – fallow deer, 6% – moufflons, 6% – wild boars, and 10% are animals of other breeds. Thirty completely established deer parks breeding deer operate outside the Association, however information on the number of animals and their breeds are rather controversial. Currently 14 wild animal parks are unfinished or in the process of establishment.

Deer breeding sector is a multifunctional agricultural sector, which is proved by the wide spectrum of economic activities. Out of 54 farms registered at the beginning of 2009 twelve farms are engaged in meat production, animal breeding, hunting and tourism, while six farms are engaged in meat production, animal breeding and tourism. Fourteen farms breed deer only for meat production and hunting, there are also farms specialising in animal breeding and tourism. Only few farms have narrow specialisation: 3 farms are engaged only in animal breeding, 5 farms – in meat production, 2 farms – in hunting, and 3 farms are engaged in tourism.

The number of deer in farms registered in the Wild Animals Breeders Association has increased from 800 animals in 2004 up to 5800 animals (6.7 times) at the end of 2009.

The figures on the area of deer parks and density of deer as well as the chain and base increase rates of these indicators are shown in Table 2.

According to the information included into Table 2:

- between 2004 and 2009 the area of deer parks has increased 5.4 times, i.e. more than twice

exceeding the increase rate related to the number of deer parks and 1.8 times lagging behind the increase rate related to the number of deer (Table 1);

- at the end of 2009 total enclosed areas or pasture-grounds in deer parks covered 8873 ha, of which 3160 ha were forest land areas (SDAA, 2009);
- the area of deer parks has considerably (2.4 times) increased in 2005 compared with the previous period, while a relative smooth area growth is observed for other years. The availability of the EU Structural Funds financing after Latvia's accession to the EU explain the situation;
- the increase of average area of deer parks conform to the increase rate of the number of deer parks within the analysed period (Table 1).

According to the Wild Animals Breeders Association data in 2005 the area of enclosed territories in deer parks increased sharply – 2.4 times, while the growth of number of deer was not so fast, thus deer density per one hectare decreased by 46%. The actual number of animals will increase only within the next years, since the establishment of a deer park is a time and capital consuming activity.

It is indispensable strictly to follow the well-being requirements of deer breeding to ensure high quality of venison. Enclosed areas are classified into 2 areas: intensive and extensive breeding areas (Dzīvnieku izcelsmes produktu ..., 2003).

Intensive breeding areas cover meadows and cultivated pastures with a small underwood territory, where 7 grown-up red deer or 14 grown-up fallow deer without additional feeding may be kept per one hectare of meadow in summer. The researches of the Research Institute "Sigra" show (Miculis J. etc., 2008) that according to the content of nitrogen in the excrements it is possible to keep up to 11 red deer or 22 fallow deer per one hectare.

Extensive breeding pasturing areas shall cover forest land areas with the meadow not less than 1/7 of the whole pasturing territory, where 1 red deer or 2 fallow deer are allowed to be kept per one hectare.

In Latvia deer parks are established traditionally with the approach of extensive farming. Animal density does not reach 1 animal per 1 ha of enclosed area. The density of animal number has essentially increased for the period of 2005- 2009, i.e. from 0.3 to 0.8 animals per 1 ha of enclosed area (Table 2).

Consideration of the present number of animals and area of enclosed territory leads to the conclusion that it is possible to increase the number of deer in the present enclosed areas at least 7 times applying intensive breeding approach in deer breeding sector.

Conclusions

1. Deer breeding is a relatively new and progressive sector not only in Latvia, but also in the world, which has been developing for the past 20-30 years. The leading position of deer breeding is held by New Zealand, where the

number of deer 6-8 times exceeds the number of deer bred in the USA and Australia.

2. In Latvia deer breeding has developed during the past 15 years, since the first deer parks were established only in 1994. Therefore the development of deer breeding sector in Latvia may comprise 4 periods. In Latvia the sector may be considered as stable and growing from 2004.
3. In compliance with the Animal Protection Law deer that are kept in enclosed areas for the acquisition of products of animal origin or for the purposes of species selection shall also be considered to be agricultural animals kept for farming purposes. Thus general regulatory enactments of animal husbandry and also several specific regulatory enactments governing breeding of wild animals are binding to deer breeding farms.
4. The Ministry of Agriculture is the main coordinating institutions of deer breeding sector as well as of any other agricultural sector. Individual specific spheres are supervised by the Food and Veterinary Service and the Agency "Lauksaimniecības datu centrs" (Agricultural Data Centre), while the Wild Animals Breeding Association implements particular functions prescribed by the Law on Breeding.
5. At the end of 2009 there were 70 farms registered in Latvia and engaged in deer breeding in deer parks, of which 26 farms are the members of the Wild Animals Breeding Association. Total number of deer in the Wild Animals Breeding Association member farms equals to 5800 deer, totally 7170 deer have been registered in Latvia. The number of deer breeding farms has increased by 40 farms or 2.3 times between 2004 and 2009. The number of deer in the Wild Animals Breeding Association member farms has increased by 5000 animals or 6.7 times during the same period. It shows an even and targeted development of a deer breeding sector.
6. Total area of enclosed territories or pasture-grounds in deer parks at the end of 2009 covered 8873 ha, of which 3160 ha are forest land areas. The largest increase of the pasture-ground areas was observed in 2005, here the availability of the EU Structural Funds financing that mainly determined the growth of deer number of explain the situation.
7. Animal density per one farm is 0.8 animals on one hectare of enclosed area, which conforms to the requirements of extensive breeding. Applying the approach of intensive breeding it is possible to increase the number of deer at least 7 times in the existing enclosed areas. It is a future perspective for the sector development excluding additional capital investment.

Bibliography

1. Anderson D.P., Frosch B.J., Outlaw J.L. (2007) // *Economic Impact of the United States Cervid Farming Industry*. Agricultural and Food Policy Centre, Department of Agricultural

- Economics, APFC Research Report 07-4, Texas A&M University, August 2007. Available at: <http://www.texashuntfish.com/app/wildlife-resources/20899/Economic-Impact-of-the-United-States-Cervid-Farming-Industry;jsessionid=14829572053B7F7BC7A6CBF84E5F9841>. Viewed on December 12, 2009.
2. Balabka N. (2008) Prognozēšanas iespējas uzņēmējdarbībā (Forecasting Possibilities in Business). Available at: [http://www.balabka.lv/index.html/RVT/Ekonomikas%20nodalja/Uznieemeejdarbiibas.kom.pak.maac/\(7.2.teema\)Prognozeeshanas.apreekjini.pdf](http://www.balabka.lv/index.html/RVT/Ekonomikas%20nodalja/Uznieemeejdarbiibas.kom.pak.maac/(7.2.teema)Prognozeeshanas.apreekjini.pdf). Viewed on: January 10, 2010.
 3. *Ciltisdarba likums* (Law on Breeding). Latvijas Republikas (LR) likums. Pieņemts 02.04.1998., publicēts: Latvijas Vēstnesis, 106 (1167), 21.04.1998., spēkā ar 05.05.1998. Available at: <http://www.likumi.lv/doc.php?id=47840>. Viewed on: September 12, 2009.
 4. Deer Industry New Zealand (2009) // Available at: <http://www.deernz.org/n5.html>. Viewed on: October 24, 2009.
 5. *Dzīvnieku aizsardzības likums (Animal Protection Law)*. Latvijas Republikas (LR) likums. Pieņemts 09.12.1999., publicēts: Latvijas Vēstnesis, 444/445 (1904/1905), 29.12.1999. Available at: <http://www.likumi.lv/doc.php?id=107353&from=off>. Viewed on: September 12, 2009.
 6. *Dzīvnieku izcelsmes produktu ieguvei vai sugas selekcijai izmantojamo savvaļas dzīvnieku turēšanas kārtība iežogotās platībās* (Procedure for Keeping Wild Animals Envisaged for the Use of Meat Production or Pedigree Breeding in Enclosed Territories). Latvijas Republikas Ministru kabineta (MK) 2003.gada 15.aprīļa noteikumi Nr.180. Publicēts: Latvijas Vēstnesis, 60 (2825), 17.04.2003., spēkā ar 18.04.2003. Available at: <http://www.likumi.lv/doc.php?id=73996>. Viewed on: September 15, 2009.
 7. *Dzīvnieku un no tiem iegūto produktu aprites kārtība, kas nav regulēta Eiropas Savienības tieši piemērojamos tiesību aktos par bioloģisko lauksaimniecību* (Procedure for the Circulation of Animal Products and Products Derived Therefrom, which are not Regulated by Directly Applicable Legal Acts of the European Union Regarding Organic Farming). Latvijas Republikas Ministru kabineta (MK) 2009. gada 20.oktobra noteikumi Nr.1204. Rīga (prot. Nr.72 24.§), spēkā ar 24.10.2009. Available at: <http://www.likumi.lv/doc.php?id=199560>. Viewed on: October 30, 2009.
 8. Fletcher J., (1989) Deer Farming in Europe. In: *Wildlife Production Systems*. Hudson R.J., Drew K.R. and Baskin L.M. (ed.). Cambridge University Press, 1989., pp. 323-334.
 9. Fletcher J., (2008) Personīga intervija (Interview) 21.-24. 08.2008. Starptautiskā konferencē "Fermu menedžments un produkcijas kvalitāte briežkopībā" Siguldā.
 10. Holst A. *Optimal Harvesting Strategies in Fallow and Red Deer Production*. Examenarbete 227. Institution for husdjursgenetik, Sveriges Lantbruksuniversitet, 2002, pp. 20-21.
 11. *Latvijas Lauksaimniecība un Lauki 2009 (Latvia Agriculture and Rural Areas)*, LR Zemkopības ministrija, Rīga, 2009, 65.lpp.
 12. McRae T.B., Cox R.J., Watson G.K. (2006) // *Situation Analysis of the Australian Venison Industry*. AFBM Journal, Volume 3, No. 1. Available at: http://www.mur.csu.edu.au/faculty/science/saws/afbmnetwork/afbmjournal/volume3/number2/AFBMJournal_v03_n02_08_TimMcRae_et_al.pdf. Viewed on: December 30, 2009.
 13. Miculis J., Paeglītis D., Timbare R., Karklina V. // *Briežu ražotais kūtsmēslu daudzums un to ķīmiskais sastāvs (Amount and Content of Manure Produced by Deer)* // Starptautiska konference "Fermu menedžments un produkcijas kvalitāte briežkopībā" Sigulda, Latvija, 21.-24.08.2008., konferences materiāli.
 14. *Noteikumi par valsts atbalstu lauksaimniecībai 2005.gadā un tā piešķiršanas kārtību (Regulations on State Support for Agriculture and Procedure for Granting Support in 2005)*. Latvijas Republikas Ministru kabineta (MK) 2005. gada 25.janvāra noteikumi Nr.70, Publicēts: Latvijas Vēstnesis, 27 (3185), 17.02.2005./ zaudējis spēku Available at: <http://www.likumi.lv/doc.php?id=101766&from=off>. Viewed on: October 7, 2009.
 15. *Noteikumi par valsts atbalstu lauksaimniecībai 2006.gadā un tā piešķiršanas kārtību (Regulations on State Support for Agriculture and Procedure for Granting Support in 2006)*. Latvijas Republikas Ministru kabineta (MK) 2006. gada 3. janvāra noteikumi Nr.21, Publicēts: Latvijas Vēstnesis, 14 (3382), 24.01.2006. /zaudējis spēku. Available at: <http://www.likumi.lv/doc.php?id=126343&from=off> Viewed on: October 7, 2009.
 16. *Noteikumi par valsts atbalstu lauksaimniecībai 2007.gadā un tā piešķiršanas kārtību (Regulations on State Support for Agriculture and Procedure for Granting Support in 2007)*. Latvijas Republikas Ministru kabineta (MK) 2007.gada 23.janvāra noteikumi Nr.78, Publicēts: Latvijas Vēstnesis, 26 (3602), 14.02.2007. Available at: <http://www.likumi.lv/doc.php?id=152955&from=off>. Viewed on: October 7, 2009.
 17. *Noteikumi par valsts atbalstu lauksaimniecībai 2008.gadā un tā piešķiršanas kārtību (Regulations on State Support for Agriculture and Procedure for Granting Support in 2008)*. Latvijas Republikas Ministru kabineta (MK) 2008.gada 22.janvāra noteikumi Nr.41, Publicēts: Latvijas Vēstnesis, 15 (3799), 29.01.2008. Available at: <http://www.likumi.lv/doc.php?id=169917&from=off>. Viewed on: October 7, 2009.
 18. Paeglītis D., Dusalijeva I., Flečers Dž., Skriba G. // *Staltbriežu audzēšana un*

- selekcija (Breeding and Selection of Red Deer)*. Rīga: SDAA, 2006. – 10., 30. lpp.
19. *Pārtikas aprites uzraudzības likums* (On Supervision of the Handling of Food). Latvijas Republikas (LR) likums. Pieņemts 19.02.1998., publicēts: *Latvijas Vēstnesis*, 60/61 (1121/1122), 06.03.1998., spēkā ar 20.03.1998. Available at: <http://www.likumi.lv/doc.php?id=47184>. Viewed on: October 1, 2009.
 20. *Pārtikas veterinārais dienests (Food and Veterinary Service) (PVD)* (2009). Par PVD. Available at: http://www.pvd.gov.lv/lat/aujg_izvline/par_pvd/. Viewed on: December 12, 2009.
 21. Savvaļas dzīvnieku audzētāju asociācija (Wild Animals Breeding Association) (SDAA) (2009) nepublicētā informācija.
 22. Skriba G.(1995a) Staltbriežu senatne (History of Red Deer). *Medības.Makšķerēšana.Daba*. Nr.1. 22.-23. lpp.
 23. Skriba G.(1995b) Staltbrieža otrreizēja atgriešanās (Second Return of Red Deer). *Medības.Makšķerēšana.Daba*. Nr.3. 7.lpp.
 24. Skriba G.(1995c) Pirmie briežu dārzi Latvijā (First Deer Parks in Latvia). *Medības.Makšķerēšana.Daba*. Nr.9. 36.-40.lpp.
 25. *Statistics Canada* (2009). Livestock and Aquaculture, on-line resource. Available at: http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&SP_Action=Result&SP_TYP=4&SP_ID=25653&SP_Mode=2&SP_Chunk=51,25&SP_Sort=01&SP_Mode=2. Viewed on: October 13, 2009.
 26. The British Deer Farmers Association (BDFA) (2009) Available at: <http://www.bdfa.co.uk/deerfarminginfo.php>. Viewed on: December 12, 2009.
 27. The British Deer Farmers Association (BDFA), (2009) Available at: <http://www.bdfa.co.uk/deerfarming/hsMtwQb4.pdf>. Viewed on: October 24, 2009.
 28. The Federation of European Deer Farmers Associations (FEDFA) (2009), Member states. Available at: <http://www.fedfa.com/germany.htm>. Viewed on: December 12, 2009.
 29. Tuckwell C.(2003)// *The Deer Faming Handbook*. Australian government, Rural Industries Research and Development Corporation, RIRDC Publication No. 03/029., Canberra, 2003.
 30. VA Lauksaimniecības datu centrs (Agricultural Data Centre) (LDC) (2009a), On-line resource. Available at: http://pub.ldc.gov.lv/pub_stat.php. Viewed on: December 13, 2009.
 31. VA Lauksaimniecības datu centrs (Agricultural Data Centre) (LDC) (2009b), History. Available at: <http://www.ldc.gov.lv/?u=lv/vesture>. Viewed on: December 13, 2009.
 32. *Veterinārmedicīnas likums* (Veterinary Medicine Law). Latvijas Republikas (LR) likums. Pieņemts 26.04.2001., publicēts: *Latvijas Vēstnesis*, 75 (2462), 16.05.2001. spēkā ar 01.07.2001. Available at: <http://www.likumi.lv/doc.php?id=20436&from=off>. Viewed on: December 10, 2009.
 33. *Zemkopības ministrijas nolikums (Statutes of the Ministry of Agriculture)*, Latvijas Republikas Ministru kabineta (MK) 2003.gada 29.aprīļa noteikumi Nr.245, Rīga, Available at: <http://www.zm.gov.lv/index.php?sadala=1635&id=1398>. Viewed on: January 5, 2010.