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Analysis of the live weight and the gain of lambs from the flock of Ile de France breed according to genealogical lines

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SUMMARY

The aim of this study was to analyse the live weight and the gain of lambs from the flock of Ile de France breed in the Institute of Animal Science - Kostinbrod according to genealogical lines. The study was conducted with 702 breeding lambs during the period 2009-2015. The lambs were divided into six groups according to their origin: the first group - ram 3015, second - 3127, third - 3323, fourth - 3459, fifth - 70368 and sixth - 70375. The live weight was measured in 345 male and 357 ewe lambs born as single (238) and twins (464). 2808 measurements of the live weight were made at birth, 10, 30 and 70 days of age and average daily weight gain was calculated between 10-30 and 30-70 days.

The obtained information was assessed by the methods of variation statistics using EXCEL, 2003 statistical package.

The male lambs of line 3459 born as single had lower live weight and lower

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2009-2015
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3015, - 3127,
3323, - 3459,
70368 - 70375.
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10-30 30-70 .
EXCEL, 2003.
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 :

average daily gain between 10-30 days compared to other lines, whereas the male lambs of the line 70375 born as twins had lower live weight at birth, 10 and 30 days of age.

The female lambs of line 70 375 born as single had lower live weight at birth, 30 and 70 days of age and the female lambs of the line 3127 born as twins had lower live weight at 70 days of age and average daily gain between 30-70 days. Despite of the existing significant differences between some of the studied traits, no clear differentiation between the lines was observed in this study.

Key words: Ile de France, genealogical lines, live weight, average daily gain

INTRODUCTION

The Ile de France flock in the Institute of Animal Science - Kostinbrod, has been started in 2003, through import of purebred animals and a second import of male breeding stock in 2007. Line breeding has been carried out in the flock. For the years 2004-2008 the genealogical structure of the flock was estimated (Ivanova and Raicheva, 2015). This is necessary to be done in order to analyse the direction of the selection process and the levels of the performance traits.

Studies on the effect of the season of lambing, type of birth and sex on the live weight and gain of the lambs during acclimatisation and later have been conducted in the flock (Raicheva and Ivanova, 2005; Raicheva and Ivanova, 2010). Grading of the weight gain of the male and female lambs with different type of birth has also been developed (Ivanova et al., 2006; Raicheva et al., 2007). The effect of the ration on the lamb development (Shindarska et al., 2011), consolidation of breeding and increase of fertility (Metodiev and Raicheva, 2008; Metodiev et al., 2010) has been examined.

The aim of the study was to

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 (Ivanova et al., 2006; Raicheva et al., 2007).
 (Shindarska et al., 2011)
 (Metodiev and Raicheva, 2008; Metodiev et al., 2010).

702 .

2009-2015 .

(3015, 3127, 3323, 3459, 70368
70375).

345 . 357 .

(464 .). (238 .)

- 3015, - 3127,

- 3323, - 3459, -

70368 - 70375.

2808 .

30 70 , 10,

10-30 30-70 .

EXCEL, 2003.

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1.

5.28 kg - 5.88 kg.

3127

3323

70375 (P<0.05). 10

-

3127, -

3459 (P<0.05).

analyse the live weight and the weight gain in the Ile de France lambs from the flock of the Institute of Animal Science-Kostinbrod according to the genealogical line.

MATERIAL AND METHODS

The study was carried out with a total of 702 breeding lambs of the Ile de France flock in the Institute of Animal Science-Kostinbrod in the period 2009-2015. The lambs belong to six genealogical lines started by rams imported from France (3015, 3127, 3323, 3459, 70368 and 70375). The live weigh was measured in 345 males and 357 female lambs born as single (n=238) and twins (n=464). The lambs were divided in 6 groups according to their origin: first group - from ram 3015, second - 3127, third - 3323, fourth - 3459, fifth - 70368 and sixth - 70375. 2808 measurements of the live weight were done in the lambs at birth, at the age of 10, 30 and 70 days, and the average daily gain was calculated between 10th-30th and 30th-70th day.

Data were statistically evaluated through EXCEL, 2003.

The significance of the differences between the means of the examined traits was assessed by t-criterion of Student.

RESULTS AND DISCUSSION

The results for the live weight and the average daily gain of the male lambs born as single are presented in Table 1. The live weight at birth of the lambs from this group varied within 5.28 kg and 5.88 kg. Significantly higher live weight was observed in the lambs of lines 3127 and 3323 when compared to the ones of line 70375 (P<0.05). At 10 days of age, the highest live weight was recorded in the lambs of line 3127, which was significantly higher than the one of the lambs belonging to line 3459 (P<0.05). The live weight at birth and 10 days of age of the

10 - male lambs born as single from the same flock in a previous study for the years 2004-2008 showed similar values (Ivanova and Raicheva, 2015). The lowest live weight at the age of 30 and 70 days was exhibited in the lambs of line 3459 in comparison to the weight of all the male lambs born as single (P<0.001) (Figure 1), as well as to that of the progeny of lines 3127, 3323 and 70368 (P<0.05; P<0.01) (Table 1). In our previous study (Ivanova and Raicheva, 2015), the live weight at the age of 30 days in male single lambs varied between 14.68 kg and 15.71 kg, while at 70 days the live weight in the present study was considerably lower, which could be explained by the nutrition of the animals. The average daily gain between 10 and 30 days was the lowest in the lambs of line 3459 compared to the lines 3127, 3323 and 70368 (P<0.05; P<0.01). On the other hand, significant differences in the weight gain between 30 and 70 days were not detected (Table 1). When compared to the earlier study, the average daily gain between 10 and 30 days, and 30 and 70 days exhibited lower values and did not correspond to the requirements for this category of the breed (UPRA, 1991).

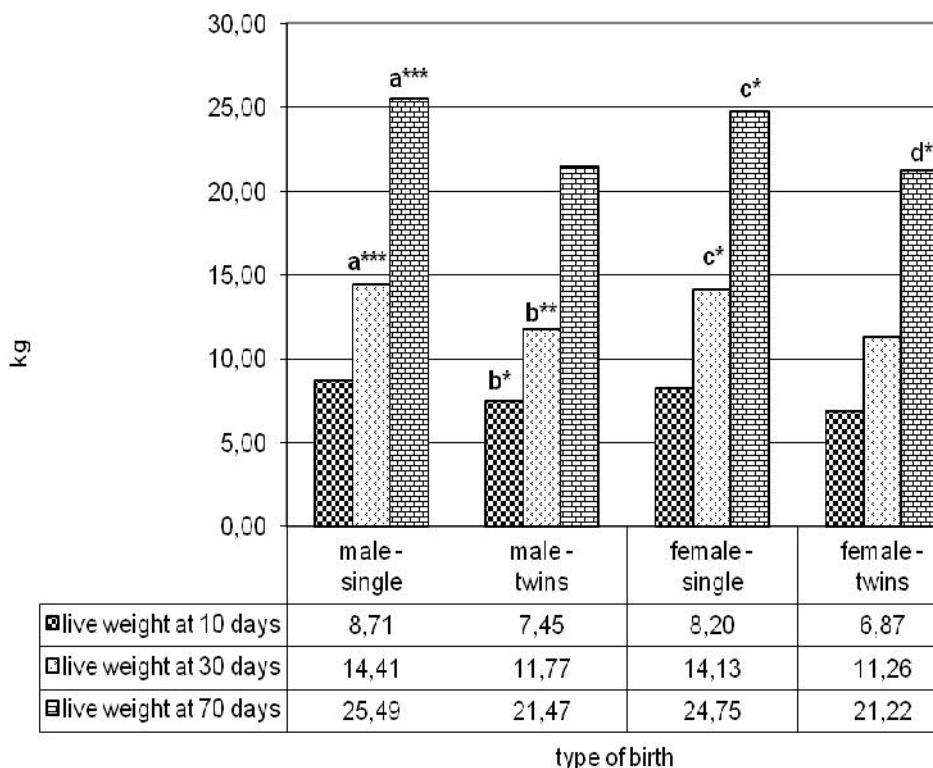
2004-2008 (Ivanova and Raicheva, 2015).
 30 70 3459
 (P<0.001) (1), 3127,
 3323 70368 (P<0.05; P<0.01) (1).
 (Ivanova and Raicheva, 2015),
 30
 (14.68 kg - 15.71 kg), 70
 10-30
 3459
 3127, 3323 70368 (P<0.05; P<0.01)
 (1).
 10-30 30-70
 (UPRA, 1991).

1.

Table 1. Weight and gain of single born male lambs at different ages

Traits	3015 Genealogical line n = 15		3127 n = 34		3323 n = 29		3459 n = 8		70368 n = 20		70375 n = 21		Sign.
	X	SE	X	SE	X	SE	X	SE	X	SE	X	SE	
	1		2		3		4		5		6		
Live weight at birth, kg	5.71	0.207	5.88	0.169	5.70	0.128	5.48	0.297	5.73	0.199	5.28	0.167	2>6* 3>6*
Live weight at 10 days, kg	8.78	0.407	8.93	0.234	8.79	0.240	7.80	0.415	8.79	0.318	8.48	0.303	2>4*
Live weight at 30 days, kg	13.89	0.623	15.12	0.418	14.63	0.373	12.13	0.563	14.69	0.589	13.90	0.579	2>4** 3>4** 5>4*
Live weight at 70 days, kg	23.49	1.250	26.99	0.843	25.04	0.590	22.06	0.811	26.56	0.969	25.42	1.055	2>1* 5>1* 5>4** 2>4** 3>4*
Average daily gain 10-30 days, kg	0.256	0.020	0.307	0.016	0.294	0.013	0.216	0.024	0.295	0.021	0.264	0.019	2>4* 3>4** 5>4*
Average daily gain 30-70 days, kg	0.240	0.026	0.297	0.019	0.260	0.012	0.249	0.025	0.295	0.021	0.288	0.018	NS

Note: Significant at: * - P<0.05; ** - P<0.01; NS - not significant



. 1.

, n= 702

Fig. 1. Live weight of the lambs at different ages according to the sex and type of birth, n= 702

Note: Significant between the average values on the studied traits from fig. 1 and the tables: a – tab. 1; b – tab. 2; c – tab. 3; d – tab. 4 at * - $P < 0.05$; ** - $P < 0.01$; *** - $P < 0.001$.

4.57 kg - 5.09 kg (2).
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 3127
 3459
 70368 70375 ($P < 0.05$; $P < 0.01$). 10
 30 -
 70375 ($P < 0.05$; $P < 0.01$).
 , 10 30
 (Ivanova and Raicheva, 2015). 10
 30 -

The live weight at birth of the male twin lambs varied within the range 4.57 kg - 5.09 kg (Table 2). Significantly higher live weight was observed in the lambs of lines 3127 and 3459 when compared to those of lines 70368 and 70375 ($P < 0.05$; $P < 0.01$). At the age of 10 and 30 days the lowest live weight was displayed by the lambs of the line 70375 ($P < 0.05$; $P < 0.01$).

The live weight at birth, at 10 and 30 days of age of this category of lambs of the same flock showed similar results in the previous study (Ivanova and Raicheva, 2015). At the age of 10 and 30 days the lowest live weight was observed in the

70375
(P<0.05; P<0.01) (1).
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(Ivanova
and Raicheva, 2015).

lambs of line 70375 when compared to the weight of all the twin lambs (P<0.05; P<0.01) (Figure 1). The average daily gain between 30 and 70 days is significantly lower in the lambs of line 3127 than it was in the lines 3015 and 70375 (P<0.05; P<0.01) (Table 2). In comparison to the previous study, the average daily gain between 30 and 70 days showed close values (Ivanova and Raicheva, 2015).

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Table 2. Weight and gain of twins born male lambs at different ages

Genealogical lines	3015 n = 29		3127 n = 57		3323 n = 36		3459 n = 27		70368 n = 39		70375 n = 30		Sign.
	X	SE	X	SE	X	SE	X	SE	X	SE	X	SE	
Traits	1		2		3		4		5		6		
kg													2>5**
Live weight at birth, kg	4.79	0.159	5.09	0.091	4.98	0.145	5.08	0.150	4.66	0.115	4.57	0.128	2>6** 4>5* 4>6*
10 , kg													2>6**
Live weight at 10 days, kg	7.03	0.247	7.47	0.170	7.12	0.197	7.22	0.174	8.73	1.652	6.74	0.150	4>6* 1>6*
30 , kg													2>6**
Live weight at 30 days, kg	11.86	0.303	12.15	0.277	11.67	0.299	11.69	0.244	11.98	0.346	10.91	0.250	4>6* 5>6*
70 , kg													NS
Live weight at 70 days, kg	22.23	0.410	21.13	0.503	21.09	0.548	21.63	0.703	21.65	0.743	21.50	0.559	NS
10-30 , kg													NS
Average daily gain 10-30 days, kg	0.241	0.013	0.232	0.010	0.221	0.010	0.223	0.011	0.243	0.013	0.210	0.011	NS
30-70 , kg													1>2* 6>2**
Average daily gain 30-70 days, kg	0.260	0.007	0.225	0.010	0.235	0.012	0.247	0.016	0.245	0.014	0.269	0.013	1>2* 6>2**

Note: Significant at: * - P<0.05; ** - P<0.01; NS - not significant

3.
4.92 kg - 5.62 kg.
3459 70375 (P<0.05).
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and Raicheva, 2015).
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70375

The results that we obtained for the live weight and the average daily gain of the female lambs born as single are presented in Table 3. The live weight at birth of the lambs of this group was within the range of 4.92 kg – 5.62 kg. Significant difference existed between lines 3459 and 70375 (P<0.05). The live weight at birth and at 10 days of age of the female lambs born as single of the same flock in the earlier study showed similar values (Ivanova and Raicheva, 2015). The lambs of line 70375 had lower live weight at the age of 30 and 70 days in comparison to all the female lambs born

(P<0.05) (1),
 3323 70368 (P<0.05) (3).
 10-30
 (UPRA, 1991),
 30 70 - .
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as single (P<0.05) (Figure 1), as well as the offspring of the lines 3323 and 70368 (P<0.05) (table 3). The average daily gain between 10 and 30 days responded to the requirements of this category of the breed (UPRA, 1991), while that measured between 30 and 70 days was lower.

Table 3. Weight and gain of single born female lambs at different ages

Traits	3015 n = 13		3127 n = 29		3323 n = 20		3459 n = 5		70368 n = 31		70375 n = 13		Sign.
	X	SE	X	SE	X	SE	X	SE	X	SE	X	SE	
	1		2		3		4		5		6		
kg Live weight at birth, kg	5.33	0.195	5.49	0.186	5.37	0.174	5.62	0.344	5.18	0.187	4.92	0.152	4>6*
10 , kg Live weight at 10 days, kg	7.97	0.350	8.32	0.276	8.50	0.294	7.78	0.601	8.34	0.279	7.53	0.419	NS
30 , kg Live weight at 30 days, kg	13.48	0.563	14.21	0.479	14.59	0.440	13.76	0.805	14.68	0.503	12.70	0.663	3>6* 5>6*
70 , kg Live weight at 70 days, kg	24.06	1.138	24.17	0.622	25.04	0.611	25.20	2.523	26.08	0.889	22.94	0.673	3>6* 5>6*
10-30 , kg Average daily gain 10-30 days, kg	0.276	0.026	0.295	0.015	0.305	0.015	0.299	0.024	0.315	0.017	0.258	0.020	NS
30-70 , kg Average daily gain 30-70 days, kg	0.265	0.026	0.256	0.011	0.261	0.013	0.286	0.057	0.285	0.016	0.256	0.013	NS

Note: Significant at: * - P<0.05; NS - not significant

4.
 4.47 kg - 4.95 kg.
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 3459
 3015,
 70368 70375 (P<0.05; P<0.01). 10
 70375 -
 70368 (P<0.05).

The results for the live weight and the average daily gain of the female lambs born as twins are shown in Table 4. The live weight at birth of the lambs of this group was within the range of 4.47 kg - 4.95 kg. Significantly higher live weight was observed in the lambs of line 3459 compared to lines 3015, 70368 and 70375 (P<0.05; P<0.01). At the age of 10 days line 70375 showed significantly higher live weight than line 70368 (P<0.05).

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Table 4. Weight and gain on twins born female lambs at different ages

Traits	3015 n = 28		3127 n = 58		3323 n = 43		3459 n = 35		70368 n = 45		70375 n = 37		Sign.
	X	SE	X	SE	X	SE	X	SE	X	SE	X	SE	
	1		2		3		4		5		6		
Live weight at birth, kg	4.56	0.104	4.74	0.088	4.67	0.116	4.95	0.099	4.47	0.123	4.68	0.092	4>1** 4>5** 4>6*
Live weight at 10 days, kg	6.67	0.205	7.03	0.140	6.81	0.194	6.86	0.215	6.62	0.159	7.11	0.186	6>5*
Live weight at 30 days, kg	11.30	0.241	11.26	0.220	10.97	0.290	11.09	0.374	11.68	0.313	11.22	0.268	NS
Live weight at 70 days, kg	22.58	0.612	20.12	0.387	21.07	0.469	21.59	0.661	20.99	0.552	22.03	0.358	1>2*** 1>3* 4>2* 6>2***
Average daily gain 10-30 days, kg	0.230	0.010	0.211	0.008	0.208	0.009	0.224	0.012	0.253	0.012	0.207	0.008	5>2** 5>3** 5>6**
Average daily gain 30-70 days, kg	0.282	0.015	0.221	0.009	0.261	0.013	0.255	0.016	0.232	0.010	0.270	0.007	1>2*** 1>5** 3>2** 4>2* 6>2*** 6>5**

Note: Significant at: * - P<0.05; ** - P<0.01; *** - P<0.001; NS - not significant

10 and Raicheva, 2015).
70 3127 3323,
3015, 3459 70375 (P<0.05; P<0.001).
3015 (P<0.05) (1).
(Ivanova and Raicheva, 2015), 70 (20.16 kg - 23.02 kg).
10-30 70368 3127, 3323 70375 (P<0.01) 30-70 -
3127 70368 (P<0.05; P<0.01; P<0.001).
(UPRA, 1991).

The live weight at birth and at the age of 10 days of the female twin lambs did not differ considerably from the previous study (Ivanova and Raicheva, 2015). The live weight at 70 days of age of the lambs belonging to the lines 3127 and 3323, which were close, was significantly higher than that of the lines 3015, 3459 and 70375 (P<0.05; P<0.001). When compared to the weight of all the female twins, the ones of line 3015 had significant advantage (P<0.05) (Figure 1). In the earlier study (Ivanova and Raicheva, 2015), the live weight of the 70 days old animals of the examined category was similar (20.16 kg - 23.02 kg). The average daily gain between 10 and 30 days was the highest in the lambs of line 70368 compared to lines 3127, 3323 and 70375 (P<0.01), while the gain between 30 and 70 days displayed the lowest values in the lines 3127 and 70368 (P<0.05; P<0.01; P<0.001).

These values of the average daily gain of the female twins were not within the range of the breed (UPRA, 1991).

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3127	,		
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CONCLUSIONS

The male lambs of line 3459 born as twins had lower live weight and average daily gain at 10th -30th day compared to the rest of the lines, while the male twins of line 70375 had lower live weight at birth at the age of 10 and 30 days.

The female lambs of line 70375 born as single had lower live weigh at birth, at the age of 30 and 70 days, whereas the ones of the line 3127 born as twins had lower live weight at the age of 70 days and gain between 30th and 70th day.

Despite the significant differences in some of the examined traits, no clearly defined differentiation between the lines was observed.

/ REFERENCES

1. **Ivanova, T. and E. Raicheva**, 2015. Wool production and some wool properties from ewes from Synthetic population Bulgarian milk. *Bulg. J. Agric. Sci.*, 21(5), 1076-1079.
2. **Ivanova, T., E. Raicheva and N. Metodiev**, 2006. Score Estimation of Gain of Male Lambs from Ile De France Breed in Bulgaria. *Bulg. J. Agric. Sci.*, 12: 607-611.
3. **Metodiev, N. and E. Raicheva**, 2008. Study on fertility of sheep breed Ile de France. In: Proceedings of the scientific conference "Traditions and Modernity in veterinary medicine", University of Forestry, Sofia, 48-54 (Bg).
4. **Metodiev, N., N.Todorov and E. Raicheva**, 2010. Sexual activity and use of non-hormonal methods for synchronization of fertility and increasing litter size of ewes from the Ile de France breed. *Journal of Animal Science*, XLVII(3), 15-23 (Bg).
5. **Raicheva, E. and T. Ivanova**, 2005. Effect of lambing, type of birth and sex on the live weight and the gain of Ile de France lambs. *Journal of Animal Science*, XLII(5), 222-226 (Bg).
6. **Raicheva, E. and T. Ivanova**, 2010. Live weight and gain at sheep from Ill de France breed according to some factors. *Journal of Animal Science*, XLVII(5), 10-15 (Bg).
7. **Raicheva, E., T. Ivanova, E. Kistanova and N. Metodiev**, 2007. Score estimation of gain of female lambs from Ile de France breed in Bulgaria. *Arhiva Zootechnica*, vol.10, 78-82.
8. **Shindarska, Z., N. Metodiev and E. Raicheva**, 2011. Effect of application of feeding by norms of lambs from Ile de France breed. *Arhiva Zootechnica*, 1, 35-40.
9. UPRA Ile de France, 1991. UNGL. Officially information brochure. December, 1991.

SWOT

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SWOT analysis of beekeeping in the Ruse region

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SUMMARY

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The development of SWOT analysis of beekeeping in the Ruse region is preceded by SWOT analysis of beekeeping in Bulgaria based on studies of the international, domestic and sectoral business environments. The present study focuses mainly on the analysis of the state of beekeeping in the Ruse region and its potential for development. The dimensions, structure and conjuncture of its regional markets have been analysed, and as a result its strengths and weaknesses are determined. The opportunities and threats, the strengths and weaknesses have been identified based on the SWOT analysis of Bulgarian beekeeping, and through SWOT analysis at regional level - the strengths and weaknesses of beekeeping in the Ruse region. The complex results of the SWOT analyses are synthesized in the SWOT matrix of beekeeping in the Ruse region.

Key words: beekeeping, Ruse region, regional business environment, SWOT analysis

INTRODUCTION

Simultaneously with the ongoing processes of globalization, which

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(Lyubenov, 2017a),

(Lyubenov and Angelova, 2017).

- penetrates more slowly and harder in agriculture, there are also opposing
- processes of regionalization and localization, which lead to an increase in the demand for local bee products. These
- trends require the development of marketing and other strategies for regional markets in order to develop the production potential of the region. The basis for the development of different regional strategies is the SWOT analysis at regional level, thus we will explore the regional business environment of beekeeping in the Ruse region.

- After the SWOT analysis of the Bulgarian beekeeping done by the author, it is possible and logical to carry out a SWOT analysis of one of its administrative and territorial districts – the Ruse district. Therefore the present study is aimed at establishing the state of beekeeping in the Ruse region and defining its strengths and weaknesses, opportunities and threats, i.e. SWOT analysis.

MATERIAL AND METHODS

- Materials from international and national institutions, branch organizations and the authors' own research based both on secondary (Lyubenov, 2017a) and primary sources of information (Lyubenov and Angelova, 2017) are used as a database.

- Information is also used from regional structures, branch organizations and own observations for beekeeping in the Ruse region. Information from the different levels has been compared and subjected to critical analysis, which has allowed access to better quality regional information. The research methods used include the complex combination of induction, deduction, grouping, comparison, analysis, synthesis, etc.

RESULTS AND DISCUSSION

The state of beekeeping in the Ruse region and its development potential are analysed. The size, structure and conjuncture of its regional markets have been studied and its strengths and weaknesses have been determined. The complex results of the two SWOT analyses are synthesized in the SWOT matrix of beekeeping in the Ruse region.

SWOT
SWOT

State of beekeeping in the Ruse region

The Ruse region is characterized by very favourable natural, geographic and economic conditions for the development of beekeeping. Significant transport and cross-border corridors pass through the region and facilitate the access to international markets. The rich vegetation that allows the production of honey, the well-developed plant breeding, and the low degree of industrial, agricultural, and other pollutants provide good conditions for development and organic beekeeping. With regard to the altitude, which is one of the determining factors for practicing economically efficient beekeeping and achieving high yields - up to 200 meters, the Ruse region has excellent conditions - the average altitude is about 120 meters and the relief is mostly flat. There are excellent opportunities for practicing conventional and organic beekeeping and producing high quality honey and bee products.

According to data from the Regional Food Safety Directorate (RFSD) - Ruse, the total number of registered bee colonies in the Ruse region in 2015 is about 43,000 distributed in 1185 beekeeping farms of different sizes – see Table 1. From the data we can establish that the number of professional farms with more than 150 bee colonies in the Ruse region amounts to 75 with a relative share of 6.3%, which is higher than the one at national level – 5.4%. The next group of 390 semi-professional farms has a share of 32.9%, which is significantly higher than the one

	200	
120		
		() -
	2015	43
000	1185	
1.		
	150	
75	6,3%,	
5,4%.	390	
32,9%,		

(43 000*30 = 1 290),
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 10%
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 (Lubenov, 2017b).
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 25% (Petrov, 2016).
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(43,000 * 30 = 1,290), taking into account that regional statistics covers fewer beehives.

The analysed data shows that the Ruse region accounts for about 10% of the domestic production of bee honey, respectively a similar share of the realized economic effect of pollination - 10% of 1 billion BGN/year are 100 million BGN/year, which also determines the potential of the regional markets for bee products (Lubenov, 2017b). By analogy, beekeeping in the Ruse region has a biological, production and market potential corresponding to 10% of the national indicators of the sector – see Table 2. This allows forecasting the potential of regional factor and resource markets through the defined potential of the regional bee markets for about 66 million BGN.

If we also add the consumer markets that were not considered, and the fact that the calculations are at minimum prices and quantities, the total potential of the regional markets for bee products in the Ruse region reaches 100 million BGN/year.

The registered farmers in the Ruse district under measure 11 "Organic beekeeping" and measure 214 "Agroecology" are more than 100 farms in total. This is less than 10% of farms, but about 25% of bee colonies in the region (Petrov, 2016).

Therefore, the relative share of organic bee colonies in the region is higher than that at domestic level. Organic beekeeping in the Ruse region is concentrated mainly in the group of professional farms – keeping more than 150 bee colonies.

It develops dynamically and sustainably thanks to the appropriate natural resources and the financial incentives

- provided by the Rural Development Program and the National Beekeeping Program.

Both at domestic level and in the Ruse region there are a large number of unregistered beekeeping farms. Beekeeping farms in the region are struggling daily with problems such as bee poisoning from plant protection activities in plant breeding, the stealing of beehives, bee diseases and pests. The undeveloped pollination market in Bulgaria and the region has led to a weak development of mobile beekeeping – less than 2%. Both for Bulgaria and Ruse, varroaosis is the most common disease affecting the yields, and the measures to treat it influence the quality of bee honey, especially in organic beekeeping. A problem is the lack of unity and representativeness of the beekeeping organizations both at domestic and regional level – the Ruse district.

2%.

2.

Table 2. Biological, production and organizational market potential of Bulgarian beekeeping and beekeeping in the Ruse district

Bee products	Yield kg/piece	Quantities tons (no.*)	Prices BGN/kg (no.*)	Domestic markets million BGN/year	Regional markets million BGN/year
Honey	25 (0.6)	15 000	5	75	7,5
Beeswax	0.3	300	10	3	0,3
Propolis	0.2	200	50	10	1
Pollen	3	3 000	25	75	7,5
Parchment	2	2 000	50	100	10
Royal jelly	0.3	300	500	150	15
Sucker larvae	1	1000	40	40	4
Bee venom	0.004	4	40 000	160	16
Queen bees	-	200 000*	25*	5	0,5
Pollination	-	1 000 000*	40*	40	4
Total				658	65,8

The local authorities and institutions, as well as the local beekeeping branch structures play an important role for the development of beekeeping in the Ruse region and overcoming its problems. An active local and regional policy to promote organic plant breeding and to designate large areas solely for organic farming will increase the environmental performance indicators of these areas and will enable the practicing of organic beekeeping.

The expansion of organic plant breeding will significantly extend the territorial opportunities for practicing organic beekeeping as it eliminates the threat of pesticide contamination and bee poisoning. The governmental institutions and branch organizations need to unite and develop common policies for this sector.

Considering the larger sizes of beekeeping farms in the Ruse region compared to the same at domestic level, as well as their greater specialization in organic production, we can assume that the markets for bee products in the region are predominantly organizational. Mainly honey is produced, which is then sold as raw material, which does not provide high added value for beekeeping farms from the Ruse region. The main buyers at organizational markets are wholesalers who determine the price and buy even the organic honey and other bee products at the prices of their conventional analogues.

Even the large beekeeping farms in the region do not have the necessary quantity of bee products and competences to go out on international markets where they can realize much higher prices.

In the first quarter of 2017, the average monthly salary of the employees under labour and employment relationship in the Ruse region is 814

2017

mainly offered directly by their producers at the sites of production, on the farmers' market in Ruse, as well as on many municipal and other markets, mixed and specialized shops. Modern trade with honey and bee products, despite the fact that it is targeting mass sales and price reductions, occupies a relatively small share of the regional consumer markets due to a lack of confidence in the methods of processing and packaging of foreign bee products. The realization of honey and bee products in the public catering sector is also negligible, but it has considerable potential that has not yet been developed and absorbed. The branding of bee products produced in the region for consumer markets is at a relatively low level.

SWOT

SWOT Analysis of Beekeeping in the Ruse District

The identified strengths and weaknesses of Bulgarian beekeeping and the one in the Ruse region, as well as the opportunities and threats arising from the business environment can be taken into consideration when developing the new National Beekeeping Program NBP 2020-2022 and the new Rural Development Program after 2020.

2020-2022

2020

SWOT

The developed SWOT analyses can help determine the competitive advantages of beekeeping in Bulgaria and in the Ruse region, which on the one hand is important for the regional development and coordination with the agrarian policy, and on the other hand for better market realization at international, domestic and regional level of the produced honey products and services. Making these analyses will allow the mastering of the potential of beekeeping to a greater extent, outlining the directions of its development, and overcoming the obstacles and threats.

We will analyze the four main types of interaction between the strengths – S

(strengths – S)
 (weaknesses – W)

(opportunities – O)
 (threats – T)

•

(S₁, S₂, S₃, S₅)

(1, 2, 3, 4),

(S₆)

(6).

(S₄)

(S₅)
 (S₆)

(6)

(5).

;

•

(S₁, S₂, S₃, S₄, S₅, S₆),

(2)

(1)

(4),

and weaknesses – W of the beekeeping farms in the Ruse region, the opportunities – O and threats – T of the business environment:

• *Strengths and Opportunities* – the high quality conventional and organic bee products (S₁, S₂, S₃, S₅) can be realized not only on organizational markets where prices are lower, but also on local markets (O₁, O₂, O₃, O₄), which have lower logistics costs and higher prices. The presence of cross-border corridors and other infrastructure (S₆) allows for cross-border cooperation and direct sales on the Romanian and other neighbouring local markets (O₆). Access to educational and innovation institutions – two higher education institutions and an institute of the Academy of Agriculture, credits and subsidies (S₄), production of unique regional beekeeping products (S₅) and the availability of infrastructure (S₆) form a cross-border cooperation environment (O₆) and potential for establishing and developing a beekeeping cluster, including a cross-border one (O₅). The strengths of the beekeeping farms in the Ruse region will allow them to take advantage of the opportunities offered by marketing strategies for regional and other markets;

• *Strengths and Threats* – despite the presence of a number of strengths (S₁, S₂, S₃, S₄, S₅, S₆), which provide greater competitiveness for beekeeping farms in the Ruse region than the domestic ones, successful countermeasures towards global competitors and substitutes (T₂) requires co-operation between them in order to achieve greater competitiveness. The presence of threats such as diseases, poisoning, theft of beehives (T₁) and normative limitation of the opportunities for direct realization of bee products on regional and neighbouring markets (T₄) require the establishment of stronger branch organizations of beekeepers in

(6)

(5) (3)

(1), (2), (3), (4), (5), (6)

(W₁)

(W₂)

(W₃), (W₄)

(W₅)

(1), (2), (3), (4), (5), (6)

the region, for legislative and other changes in these risk areas. Rural depopulation and labour shortages in the region (T₆) call for the introduction of new technologies and organization of beekeeping farms. The greater volatility and falling prices of bee products (T₃) and shrinking regional markets (T₅) require building their own regional markets and diversifying farms. The strengths of beekeeping farms in the Ruse region do not fully protect them from threats, which requires cooperation, diversification, new technologies and organization;

• *Weaknesses and Opportunities* – the poor diversification and orientation to regional markets and supply of raw materials for export (W₁) do not allow making use of many of the opportunities associated with regional markets (O₁, O₂, O₃, O₄). The small regional scale of the markets for bee products (W₃), the poorly developed and depopulating region (W₂) and the underdeveloped rural tourism (W₅) require significant investment for their development (O₂), as well as imposing the honey from the Ruse region on the local markets as a healthier alternative to global sweeteners (O₃). The underdeveloped partnership between beekeepers, branch organizations, educational institutions and agribusiness (W₄) makes it harder to create a beekeeping cluster (O₅). The low level of use and creation of intellectual, innovative, branded and regional bee products (W₅) hampers the opportunities for differentiating them from global competitors. The weaknesses of the beekeeping farms in the Ruse region considerably hinder the realization of most of the opportunities, which is why investments are needed for the development of local markets, api-tourism and branding of regional bee products;

• *Weaknesses and Threats* – overcoming threats such as diseases, poisoning and theft of beehives (T₁), strong competition from global

10%

(2),
(4),
(3)
(5)
(3).
(W₄),
(W₅),
(W₆).

competitors and substitutes for bee honey (T₂), as well as administrative constraints for the direct realization of bee products on local and other markets (T₄) require well-developed branch organizations, production and marketing cooperatives of beekeeping farms in the region, which is actually their weakness (W₄) that they have to overcome. The greater volatility and falling prices for regional products (T₃) call for diversification of beekeeping farms from the Ruse region. The construction of a regional brand for bee products requires overcoming the low level of use and creation of intellectual and innovative products (W₅), which to some extent will limit the volatility and the fall in prices (T₃). The shrinking local markets (T₅) require investing in the development of their own brands and in short supply chains for bee products – rural tourism and api-tourism (W₆). The weaknesses of beekeeping farms in the region prevent them from adapting to threats, so they need to cooperate with one another, to integrate into the supply chain, and to diversify.

As we have already pointed out, the relationship between the strengths of beekeeping farms in the Ruse region and the opportunities of the regional environment is a priority for their future development, respectively for the development of marketing and other strategies at regional level. It is also important to analyse how this interconnection can be used to overcome the weaknesses of beekeeping farms in the Ruse region, and global and regional threats. This analysis will allow determining the strategic orientation of bee farms from Ruse region by using their strengths to realize the opportunities, overcome the weaknesses and mitigate the threats.

The main *strengths* of beekeeping in the Ruse region are that it provides about 10% of the total domestic production of conventional and organic

honey, but with higher productivity and quality, respectively, at lower cost. The region has excellent and unique natural and geographical conditions for the production of regional bee products, foods, drinks, and api-tourism. There is an infrastructure with cross-border transport corridors and a domestic stock exchange giving access to domestic, regional and international markets. In the district of Ruse there are educational and research units - two higher schools with agrarian orientation and the Institute of Agriculture and Science of Seeds at Obratsov chiflik and at the Academy of Agriculture.

The favourable *opportunities* are related to the growing demand for regional bee products, foods, drinks and services such as pollination and api-tourism. Imposing regional honey on local consumer markets and short supply chains as a healthier alternative to global sweeteners and substitutes such as sugar, aspartame and others. There are also favourable opportunities for cross-border cooperation and direct sales on the Romanian and other local markets neighbouring the region. There are very good conditions for production cooperation, joint marketing and building of own local organizational and consumer markets for bee products.

To overcome their *weakness*, beekeeping farms in the Ruse region have to diversify and to switch from raw materials to bee products with high added value. It is necessary to establish local organizational and consumer markets and short supply chains for regional bee products. The beekeeping farms in the region need to improve their partnerships with branch organizations, educational and research units, for production and marketing cooperation to achieve competitiveness at global, domestic and regional levels. It is necessary to create and establish a recognizable regional brand of bee products.

The mitigation of threats directs the beekeeping farms from the Ruse region towards cooperating to achieve greater price and non-price competitiveness over global competitors and substitutes for bee honey exports on international markets. They need to integrate with local processors, traders, hotels and restaurants to improve access to regional markets. It is necessary to diversify in the direction of regional bee products with high added value, to mitigate price volatility on regional markets and to improve profitability. Beekeeping farms in the region have to establish strong branch unions, to improve the legislation related to beekeeping, to reduce the poisoning and theft of bee hives, to counteract to diseases and pests, and to introduce new technologies.

3. SWOT

Table 3. SWOT Analysis of beekeeping in the District of Ruse

/ Strengths:	/ Opportunities:
<ul style="list-style-type: none"> • S₁ - ; S₁ better natural and geographic conditions for the production of high quality conventional and organic bee products compared to the general ones for the sector; • S₂ - 25% 21% ; S₂ higher number of professional beekeeping farms specializing in organic production - more than 25% for the region compared to more than 21% for the country; • S₃ 5 - 10% ; S₃ the region is in the top 5 in the country in production and yield of organic and conventional honey - about 10% of the domestic production; • S₄ - ; S₄ access to subsidies, financial credits, institutions for education and innovation - two higher schools, units of the Academy of Agriculture; • S₅ (), ; S₅ production of unique regional bee products (foods and drinks), queen bees, api-tourism; • S₆ 	<ul style="list-style-type: none"> • O₁ (), ; O₁ increasing demand for regional bee products (foods and drinks), queen bees, pollination, api-tourism, etc., as well as their conventional, organic, online and offline markets; • O₂ ; O₂ development of regional markets and short supply chains for bee products, api-tourism, mobile beekeeping, etc.; • O₃ - ; O₃ imposition of regional bee honey on local consumer markets as a healthier alternative to global sweeteners - sugar, aspartame, etc.; • O₄ ; O₄ beekeeping is a generator for the development of many local markets; • O₅ ; O₅ favourable environment and potential for the creation and development of a beekeeping cluster, also a cross-border one; • O₆

<ul style="list-style-type: none"> • S₆ existence of cross-border transport corridors, national stock exchange, port and other infrastructure. 	<ul style="list-style-type: none"> • O₆ cross-border cooperation and direct sales on the Romanian and other local markets neighbouring to the region.
/ Weaknesses:	/ Threats:
<ul style="list-style-type: none"> • W₁ exports of bee products as raw materials, very low diversification and poor orientation towards regional markets; • W₂ the District of Ruse is the administrative centre of the North Central Region, which is one of the least developed in the EU with aging and depopulated small settlements; • W₃ small regional market with poorly developed local offline and online markets for conventional and organic bee products; • W₄ underdeveloped partnership between beekeepers, branch organizations, educational institutions and agribusiness, clustering, etc.; • W₅ underutilization and creation of intellectual, innovative, branded and regional bee products; • W₆ underdeveloped rural tourism and mobile beekeeping. 	<ul style="list-style-type: none"> • T₁ danger of entering new pests and diseases of plant and bees, poisoning and theft of beehives in the region; • T₂ strong price and non-price competition from global substitutes and competitors of regional honey, which is the main product of beekeeping in the Ruse region; • T₃ existence of a gray sector, greater volatility and falling prices of regional bee products; • T₄ Ordinance 26 restricts the direct realization of bee products on local markets and other regions of the country; • T₅ shrunken local markets in the Bulgarian-Romanian cross-border region - one of the poorest in the EU; • T₆ rural depopulation and labour shortage in the Ruse region.

CONCLUSIONS

- As a result of the theoretical and a
- priori analysis of the state of beekeeping
- in the Ruse district, conclusions can be
- made in the following main directions:

- **Firstly**, regarding the state of
- beekeeping in the Ruse region:

- • The Ruse district has an average
- altitude of about 120 meters, rich
- vegetation appropriate for the production
- of honey, and a low degree of industrial,
- agricultural, and other pollutants, thus
- providing good conditions for the
- development of organic beekeeping and
- the production of high quality honey and

bee products. Important transport corridors pass through the region, giving access to international markets;

- Beekeeping from the Ruse region is more professionally oriented and with a higher average yield compared to the domestic one – about 30 kg/bee hive. The district of Ruse provides about 10% of the domestic production of honey and a proportional economic effect from pollination – 100 million BGN/year. The local markets are at a level which is 8 times lower than their potential development potential;
- Organic beekeeping in the district of Ruse is concentrated mainly in the group of professional farms with more than 150 bee colonies. The number of organic bee colonies is more than 1/4 of those in the region. Mainly honey is produced, which is sold as raw material and does not provide a high added value for the beekeeping farms in the region;
- The consumer markets for bee honey in the Ruse region are from 2 to 3 million BGN/year and the organizational ones for about 3.6 million BGN/year or a total of about 6.6 million BGN/year. The regional markets for bee products exceed 8 million BGN/year, due to the lack of consideration of the markets for other bee products. The branding of regional bee products for their consumer markets is at a relatively low level.
- Alternative to the labour-intensive and low-efficient production of honey in the Ruse region are the pollen, the parchment, the sucker larvae, the royal jelly, and the bee venom. The economic potential of bee products such as bee venom, royal jelly, parchment, etc. is large but requires a strategic orientation towards the right markets;
- Beekeeping in the Ruse region has a potential corresponding to 10% of the domestic one. The potential of the regional organizational markets for bee products is about 66 million BGN/year, respectively the potential of regional factor

bee products. Important transport corridors pass through the region, giving access to international markets;

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66 million BGN/year. The maximum potential of the regional markets for bee products is 100 million BGN/year.

SWOT analysis (Table 3) shows that the main success factors for beekeeping farms in the Ruse region are analogous to the domestic level but with a pronounced regional specificity:

- *Co-operation* – joint marketing to achieve competitiveness on international, domestic and regional markets; creating innovative, branded, and unique local bee products for a recognizable regional brand of bee products;
- *Integration* – to the regional markets of means for production and regional markets and short supply chains for bee products, also by building their own ones to improve market access;
- *Diversification* – reorientation from raw materials to high value-added regional bee products; offering services such as api-tourism and pollination to mitigate the effects of the volatility on the markets for bee products.

The Ruse region has a very large biological, productive, educational and innovation potential in beekeeping for the realization of which marketing and other strategies are needed.

markets and means of production is also 66 million BGN/year. The maximum potential of the regional markets for bee products is 100 million BGN/year.

Secondly, the developed SWOT analysis at regional level (Table 3) shows that the *main success factors* for beekeeping farms in the Ruse region are analogous to the domestic level but with a pronounced regional specificity:

- *Co-operation* – joint marketing to achieve competitiveness on international, domestic and regional markets; creating innovative, branded, and unique local bee products for a recognizable regional brand of bee products;

- *Integration* – to the regional markets of means for production and regional markets and short supply chains for bee products, also by building their own ones to improve market access;

- *Diversification* – reorientation from raw materials to high value-added regional bee products; offering services such as api-tourism and pollination to mitigate the effects of the volatility on the markets for bee products.

The Ruse region has a very large biological, productive, educational and innovation potential in beekeeping for the realization of which marketing and other strategies are needed.

/ REFERENCES

1. **Lyubenov, L.**, 2017a. Desk research on the strategies of the grain and the beekeeping sectors. Proceedings of the University of Ruse "A. Kanchev ", Ruse, ISSN 1311-3321 (Bg).
2. **Lubenov, L.**, 2017b. Potential of Bulgarian beekeeping. Round table, Potential for Development of the Agricultural Markets in Bulgaria, Svishtov (Bg).
3. **Lyubenov, L. and E. Angelova**, 2017, Research on the strategies of Bulgarian agricultural farms. Economic Thought, Sofia, vol. 6, ISSN 0013-2993 (Bg).
4. **Petrov, M.**, 2016. State of conventional and organic beekeeping in Bulgaria and the Ruse region. Student's Scientific Session, Ruse, ISSN 1311-3321 (Bg).
5. <https://www.dunavmost.bg>, 28.05.2017 (Bg).
6. www.nsi.bg, 2017 (Bg).

2000

12, 4000

Analysis of the pork production in Bulgaria after the year 2000

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SUMMARY

An analysis was performed of the pork production in Bulgaria in the period 2000-2014. In the year 2000 the pork production was the lowest in the south-western region - 4.817 thousand tonnes, and highest (11.66 thousand tonnes) in the north-western region. The yield of pork carcass has been relatively parallel through the years in all regions, without large amplitudes in the values. The north-eastern region made an exception in the period 2006-2008, as from relatively moderate, it turned into a centre of the produced quantity of carcass meat with 22.95 thousand tonnes in 2007. The highest number of slaughterhouses was registered in 2000 – 262, and the lowest one (66) was in 2010, 2012, 2013 and 2014. The highest number of animals and the largest amount of meat was produced in the slaughterhouses in 2014. The lowest values of these two indicators characterize 2001 – 536 thousand pigs and 31.85 thousand tonnes, respectively. The most pigs were slaughtered in the farms in 2006 – 494.8 thousand pigs, and in 2014 only 159 thousand pigs. The highest number of slaughtered animals in

2006 . – 1056.6 . . 2011

2014 . : , (S)EUROP

Zhelyazkov (2008) . Otouzbirov and Malamova (2007)

(S)EUROP.

(Otouzbirov and Zhelyazkov, 2008).

2000

Bulgaria was from 2006 – 1056.6 thousand pigs. After 2011 there has been certain stability in meat production, despite the insignificant decrease of the indicators in 2014.

Key words: pig breeding, pork, carcass weight, production, (S)EUROP

INTRODUCTION

Pig breeding is a sector which takes a significant place in the production of red meat in Bulgaria. In the last several years, however, there has been a continuous drop in the number of the farms breeding pigs, and the livestock population has decreased more than five times. A number of factors can be pointed out for this unfavourable trend – limited land for the production of own feed, lack of training of farmers, etc.

Otouzbirov and Zhelyazkov (2008) according to Malamova (2007) defined the high cost price of the production and the expensive feed as the most significant difficulties in the pork production sector.

After our country joined the European Union, the field had to start applying the European system for grading of slaughterhouse pig carcasses (S)EUROP. This leads to a significant improvement of the selection process, and, subsequently, to an increase of the productive and slaughterhouse qualities of the pigs, but at the same time it will increase the price of the pork to the end user (Otouzbirov and Zhelyazkov, 2008).

To increase the profitability and to become more competitive on the market, pig farmers have to focus more on increasing the effectiveness of the production and the sustainability of the sector.

The purpose of this development is to make an analysis of the pork production in Bulgaria in the period after the year 2000.

(2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015),

(MAF, 2013),

(2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015).

MATERIAL AND METHODS

The analyzed material consisted of data from the bulletin of the Agrostatistics Department of Ministry of Agriculture and Food (MAF) (2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015), National Strategy for stable development in Agriculture in Bulgaria in 2014-2020 (MAF, 2013), as well as Annual Report on the Status and Development of Agriculture in the period from 2001 to 2015.

RESULTS AND DISCUSSION

Figure 1 presents the activity of the pork slaughterhouses by region. According to the map of the social and economic regions of Bulgaria, the country is divided into 6 regions – North-western (including the area of Vidin, Vratsa, Lovech, Montana and Pleven), Northern Central (incl. Veliko Tarnovo, Gabrovo, Silistra, Razgrad and Ruse), North-eastern (incl. Varna, Dobrich, Targovishte and Shumen), South-eastern (incl. Burgas, Sliven, Yambol, and Stara Zagora), South-western (incl. Blagoevgrad, Kyustendil, Pernik, and Sofia) and Southern Central region (incl. Pazardzhik, Plovdiv, Smolyan, Haskovo, and Kardzhali).

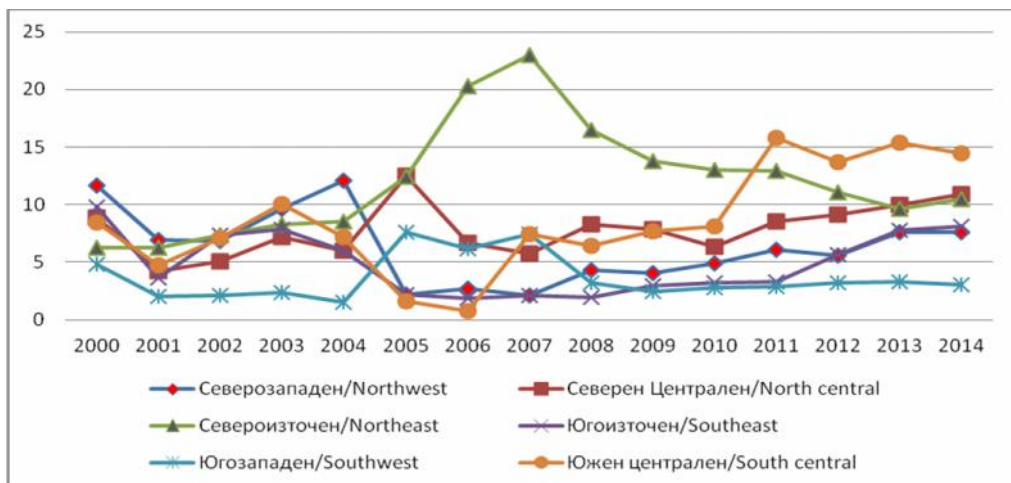


Fig. 1. Pork production in carcass weight by region (thousand tones)

2000	-	
	- 4.817	11.65
2005		2007
2006-2008		
2007		
21		16
2011		
2000		
	- 262	(2).
625		
48.75		
	(31.85),
2005		88

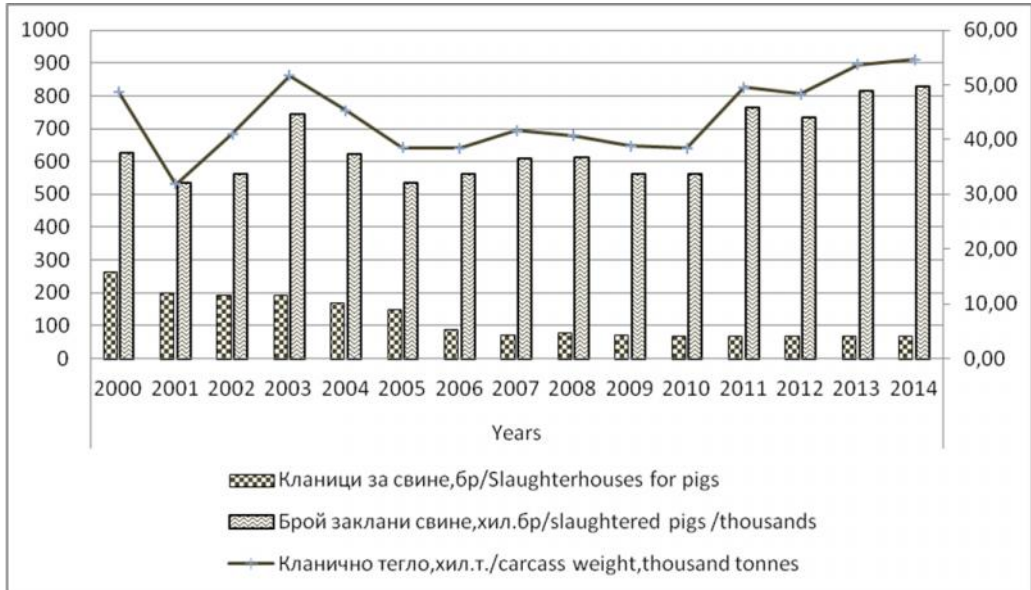
In the year 2000, South-western region was the one with the lowest amount of produced pork – 4.817 thousand tonnes, and the North-western was the one with the highest – 11.65 thousand tonnes. In the process of studying it was established that with the exception of the three-year period from 2005 to 2007, the region of Blagoevgrad, Kyustendil and Sofia remains on the last place in production.

It is noticeable that the yield of carcass pork has been relatively parallel through the years for all regions, without large amplitudes in the values. The only exception was the North-eastern region in the period 2006-2008, as from relatively moderate, it turned into a centre for the produced quantity of carcass meat. In 2007, the area around Varna, Dobrich, and Shumen surpassed the region of Burgas, Sliven and Yambol with almost 21 thousand tonnes and the South-western and Southern Central regions with almost 16 thousand tonnes. Since 2011, Southern Central has been the region with the highest production of pork, followed by the Northern Central and North-eastern. The lowest amount of meat has been produced in the South-west region, as the trend has been constant for the last five years.

In 2000 the number of slaughterhouses producing pork was the highest 262 (Figure 2). The total number of slaughtered pigs was almost 625 thousand with acquired carcass weight of 48.75 thousand tonnes. A drop in all three indicators was observed in the following year – the number of the slaughterhouses and the slaughtered pigs was reduced, and the amount of the acquired meat reached its minimum (31.85 thousand tonnes), due to the lower live weight at the slaughtering. In the next two calendar years there was an increase in the number of the slaughtered animals and in the carcass weight from them. The pigs slaughtered in slaughterhouses in 2005 were with around 88 thousand

15% ,
2005 - 533.8 . .

fewer compared to the previous year, and the acquired meat was with around 15% less. Practically, the number of the pigs slaughtered in slaughterhouses for the entire analysed period was the lowest in 2005 - 533.8 thousand pigs.



2.
Fig. 2. Activity of the slaughterhouses

2006 2010
2008 , 611.7
2010 2007,
2011
203
11
2012
2014
(2015),

From 2006 to 2010 the number of slaughterhouses gradually decreased, the number of pigs slaughtered in them increased until 2008 when it reached 611.7 thousand pigs, and then started to decrease again. The carcass weight was highest in 2007, and lowest in 2010. In 2011, the negative trend, typical for the previous four - five years, ended – the number of pigs slaughtered in slaughterhouses increased with 203 thousand pigs, and carcass meat with 11 thousand tonnes, compared with the previous year. After the slight decrease in the activity of the slaughterhouses in 2012, a gradual increase followed in the three discussed indicators. Although slightly, according to the data of the Agrostatistics Department of the Ministry of Agriculture, Food and Forestry (2015, at the end of 2014, the number of animals,

(2015),

2012

5

2001-2003

2004 2006

2001

2004 69%

2006 123%

(3).

2006

21

2001

2014

159

336

2006

(Otouzbirov and Zhelyazkov, 2008).

slaughtered in slaughterhouses and the amount of the acquired meat reached the highest values. According the authors of Agricultural report (2015), one of the factors leading to stabilization of the pig-farming sector is the scheme for state aid, which started in 2012, for support of the realization of the voluntary commitments for pig welfare, for a period of 5 years. The granted subsidies cover costs, connected to the commitments.

After an insignificant increase in the number of slaughtered pigs in the farms in the period 2001-2003, from 2004 to 2006 the increase in this indicator was sharper. In comparison to 2001, the number of slaughtered pigs in 2004 was 69% higher, and in 2006 the increase was with 123% (Figure 3). The highest amount of carcass meat was produced in farms in 2006 – 39.23 thousand tonnes, which was almost 21 thousand tonnes more, compared to 2001. After 2006, there is a trend towards a decrease in both indicators. The analysis of the activity of the farms breeding pigs showed that the lowest number of slaughtered pigs was in 2014 – only 159 thousand pigs. This value was with almost 336 thousand pigs lower compared to the pigs slaughtered in farms in 2006.

The lowest carcass weight of the entire analysis period was registered in the last observed year. Generally, the meat produced in the farms is not sold on the market but it is used for the needs of the households or it is given to the workers as remuneration (Otouzbirov and Zhelyazkov, 2008). According to the authors, this considerable yield cannot be classified and actually evaluated, nor can it be included in the complete scheme for traceability of the meat and the products from it.

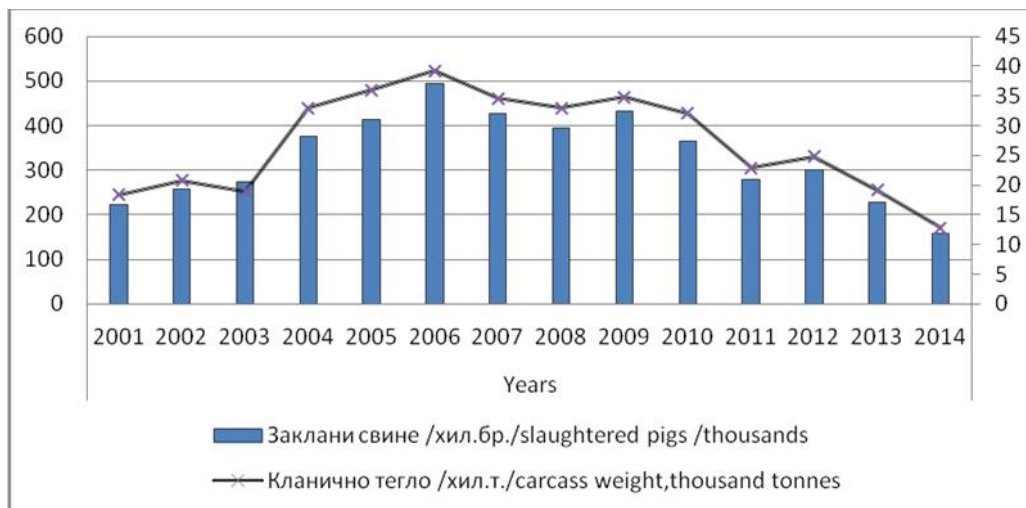


Fig. 3. Slaughtered pigs /thousands/ and carcass weight (thousand tonnes) in farms



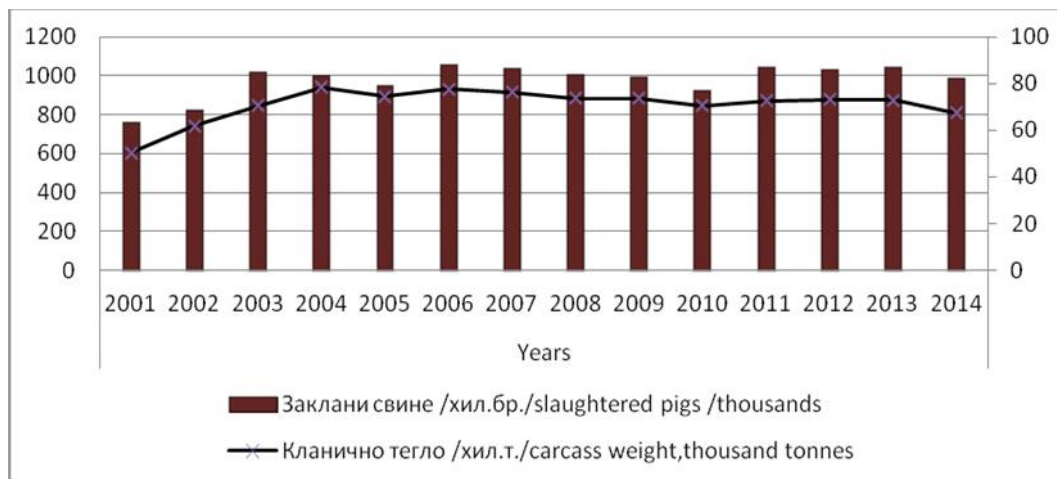
Figure 4 presents the summarized production of pork in Bulgaria, which includes number of slaughtered pigs and the produced meat in slaughterhouses and farms. After the temporary increase in both indicators in the first three years of the period, in 2005 there was a slight decrease – with approximately 5 % in the slaughtered animals and the carcass weight compared to the previous year. In the next four years, the increase in the number of slaughtered animals was more notable than in the produced meat, as in 2010, a new drop was registered in the studied indicators, which, nevertheless did not reach the levels from 2001 and 2002. Most animals were slaughtered in 2006 – 1056,6 thousand pigs. During the same year the quantity of the produced meat reached the level of 2004 when this indicator reached its peak for the past 15 years. The slaughtered animals in 2010 were 925 thousand pigs which was 70 thousand pigs less compared to 2009.

The decrease in the quantity of the produced meat compared to the previous year was within 5 %. Certain stability in the production of meat has been

5%. 2011

established after 2011, despite the insignificant decrease of the indicators in 2014.

2014



4. Fig. 4. Production of pork in Bulgaria

CONCLUSIONS

In the year 2000 the pork production was the lowest in the south-western region – 4.817 thousand tonnes, and highest (11.66 thousand tonnes) in the north-western region. The yield of pork carcass has been relatively parallel through the years in all regions, without large amplitudes in the values. The north-eastern region made an exception in the period 2006-2008, as from relatively moderate, it turned into a centre of the produced quantity of carcass meat with 22.95 thousand tonnes in 2007.

The highest number of slaughter-houses was registered in 2000 – 262, and the lowest one (66) was in 2010, 2012, 2013 and 2014. The highest number of animals and the largest amount of meat was produced in the slaughter-houses in 2014. The lowest values of these two indicators characterize 2001.

The most pigs were slaughtered in the farms in 2006 – 494.8 thousand pigs, and in 2014 only 159 thousand pigs.

2000 - 4.817 (11.66)

2006-2008 22,95 2007

2000 - 262, (66) 2010, 2012, 2013 2014

2014

2001

2006 - 494,8 2014 159

2006	-	- 1056,6
2011	.	,
2014	.	.

The highest number of slaughtered animals in Bulgaria was from 2006 – 1056.6 thousand pigs. After 2011 there has been certain stability in meat production, despite the insignificant decrease of the indicators in 2014.

/ REFERENCES

1. **Malamova, N.**, 2007. Expected effects of EU implementation on the development of the meat and meat processing industry IJSS, 2, 17-24 (Bg).
2. **Ministry of Agriculture and Food**, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015. Annual Report on the Status and Development of Agriculture, Sofia (Bg).
3. **Ministry of Agriculture and Food**, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015. Agrostatistics. Activity of slaughterhouses in Bulgaria to 1-st of November (Bg).
4. **Ministry of Agriculture and Food**, 2013. National Strategy for stable development in Agriculture in Bulgaria in 2014-2020, Sofia, pp. 183-197 (Bg).
5. **Otoubirov, R. and G. Zhelyazkov**, 2008. Quality assessment and traceability on the pork market. *Management and Sustainable Development*, 21(3-4), 140-143 (Bg).