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ANALYSIS OF GAME MEAT PRODUCTION

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Abstract: *Game meat (wild meat) is constantly present in the European meat market, but a limited number of consumers are interested in its consumption, given the unique characteristics of meat from wild animals. Game meat production in Europe decreased almost 9 times in 2020, reaching a total production of about 13.5 thousand tons, while nationally there was a growing trend until 2017 when it recorded production of 4,544 tons, an increase of 12% compared to 2005. The purpose of this paper is to analyze the total production of game meat in national, European, and EU countries, as well as the analysis of the import and export of game meat from Romania, Europe, and the EU. The data used are provided by the International Food and Agriculture Organization (FAO) database, on the basis of which the mentioned indicators were analyzed.*

Keywords: *Game meat, Romania, Total Production, Import, Export*

JEL classification: C10, Q10, Q23

INTRODUCTION

Game meat, according to the publication Food Safety magazine, represents that category of meat that "*is from non-domesticated, free-ranging wild animals and birds that are either legally hunted for personal consumption or reared, slaughtered, and commercially left for food.*" (Food Safety Magazine, 2014)

Meat flavor is a very important attribute that contributes to the sensory quality of meat and meat products, although the sensory quality of meat includes aroma, taste, and ortho-nasal and retro-nasal appearance, as well as juiciness and other textural attributes, with emphasis on the first row put on flavor. Species, age, gender, anatomical location of muscles, diet, harvesting conditions, packaging and storage, as well as cooking affect the flavor of venison. Very little research is available on the factors that influence the flavor of wild and free-range meat. Factors that determine the overall quality of meat include its microbiological safety, production practices (animal welfare), in addition to health status (intramuscular lipid content and composition), and sensory profile (aroma, taste, and overall quality of the animal's diet) (Barendse, W., 2014).

However, many consumers will still prefer meat products from domestic animals. However, consumers judge the quality of game meat based on criteria similar to those established for commercial meat products derived from domestic species (Hoffman, L. C., & Wiklund, E., 2006). In addition, consumer's expectations of game meat quality may be affected by their personalities, beliefs, attitudes, experiences, and past exposures. These expectations influence how consumers actually perceive the quality of game meat and, consequently, their experience of eating game meat (Jesus S. M, et al., 2018). Game meat and meat products are often perceived as having a very dark color. Consumers regularly perceive darker meat as lower quality because they prefer meat that is not extremely dark (Jeremiah, L. E, et al. 2000).

In recent years, there has been a notable increase in the popularity of wild game meat among consumers. This has led to the emergence of a growing number of emerging markets for this type of meat in many developed countries, including Europe. However, the expansion of these markets is

often hindered by the lack of a well-developed supply chain. The profitability of a supply chain would depend on the willingness of consumers to buy these products (Maria E. M., et al. 2019). Most of the existing literature on game meat consumption is primarily descriptive and focuses on non-European countries such as Africa and Australia.

Consumer health consciousness has led to greater demand for leaner and lower-cholesterol meats, in turn sparking new interest in suitable alternatives to traditionally farmed meat products. Game meat could meet the needs of today's consumers as an alternative to meat from domestic animals, because it is characterized by very good chemical composition, with a low-fat content (an optimal ratio of unsaturated and saturated fats), high protein content, and protein composition as well as a distinctive taste and aroma (Neethling J., et al., 2016). In general, from the available scientific evidence, it can be concluded that there is a higher level of protein in game meat, being a low-fat alternative to chicken, beef, or pork.

MATERIALS AND METHODS

In the present paper, the production of game meat was analyzed. The quantitative analysis of the data related to the total production as well as the import and export of game meat both worldwide and at the level of Europe and the European Union, data obtained from the Food and Agriculture Organization (FAO) was carried out.

In addition, based on the data provided by the Food and Agriculture Organization (FAO), a forecast of game meat production in Romania was made, for the next period, until 2025, with the help of the SPSS software, through the Forecasting function and the Expert Modeler method.

RESULTS AND DISCUSSION

In countries with deep-rooted hunting traditions and environmental conditions favorable to hunting, game meat could become an alternative to meat produced by intensive animal husbandry.

In most European countries, game meat is mainly derived from red deer, roe deer, wild boar, wild rabbit, and wild birds of various species. A common trait that characterizes meat from wild animals is represented by a series of characteristics that have a positive impact on the health and functioning of the human body, being the result of its nutritional composition (proteins, unsaturated fatty acids, vitamins, macro, and microelements) in comparison with meat from domestic animals (Strazdina, V. et al., 2013). Game meat is perceived as a prestigious and sophisticated food, and the game market is still a niche, difficult for consumers to reach.

Although the high nutritional value of hunting meat has been documented, its consumption in Europe remains at a low level (Meltzer H.M et al., 2013). In Europe, the production of hunting meat has decreased almost 9 times in 2020, reaching a total production of about 13.5 thousand tons, compared to the first year analyzed, 2005 when there was a production of 129 thousand tons (Table 1). However, the consumption of game meat is very unequal among populations, in general, in Europe, only 2-4% of the population regularly consumes this type of meat (Meltzer H.M et al., 2013).

Worldwide, however, an upward tendency in hunting meat production between 2005-2010 is observed, followed by a considerable decrease in the next 3 years. In 2020, there was an amount of 1,950 thousand tons of meat, about 5% less than in 2017, when the maximum period was registered. (Table 1).

Table 1 - Total production of game meat (thousands of tons)

Year \ Region	World	Europe	UE
2005	1717.75	129.00	114.29
2006	1768.85	129.91	116.17
2007	1804.26	138.06	124.20
2008	1860.98	140.83	126.58
2009	1890.56	140.95	126.99
2010	1895.44	139.54	125.40
2011	1959.15	138.97	125.10
2012	1975.82	137.23	123.90
2013	1986.75	135.36	121.89
2014	1999.75	130.01	116.82
2015	2043.32	117.46	104.47
2016	2042.40	125.92	113.36
2017	2049.55	123.65	110.19
2018	1948.68	13.33	-
2019	1945.32	13.60	-
2020	1950.40	13.56	-

Source: www.FAO. Org (Accessed on 20.09.2022)

At the level of the European Union, no data were found for the period 2018-2020, but follows the same trend, descending production, since 2005, when about 114.2 thousand tons of meat occurred, decreasing by 4% in 2020 recording about 110 thousand tons (Table 1).

Its organoleptic characteristics could be a reason for the reduced consumption of game meat, as well as its hygiene conditions, sometimes the hygienic-sanitary conditions required are difficult to maintain.

Table 2 - Total game meat production at EU level (tons)

Country	An												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*
Germany	60000	65000	67000	70000	70000	70839	69456	67361	66983	62963	51691	60546	58400
Sweden	16116	14382	15180	16242	16726	16871	18317	18309	18050	17098	16331	16381	16062
Poland	10000	11000	13000	13000	13000	10000	10000	9863	9192	8894	8759	8351	8103
Spain	7061	7000	7500	7448	7372	7250	7200	7200	7200	7053	6801	6819	6786
Austria	6700	5700	6500	6400	6200	6500	6200	7100	6400	6400	6600	6900	6700
Romania	4074	4200	4300	4217	4189	4100	4100	4233	4390	4456	4506	4508	4544
Portugal	4240	4242	4250	4235	4191	4212	4205	4198	4191	4181	4157	4169	4164
Denmark	3100	3000	3000	3000	3629	3530	3523	3500	3456	3594	3454	3404	3404
Czechia	2000	900	1100	1151	900	1122	1100	1200	1220	1196	1197	1200	1200
Luxembourg	447	408	435	494	392	400	350	363	307	402	397	395	400
Cyprus	440	236	336	292	289	473	548	473	401	473	481	591	327
Lithuania	115	97	98	105	102	100	100	100	100	110	100	100	100

Source: www.FAO. Org, (Accessed on 20.09.2022), *The latest data on meat production at the level of EU countries.

According to FAO data, in 2017 at the head of the ranking in terms of hunting meat, Germany is found, with a total quantity of 58 400 tons, followed by Sweden with 16 062 tons, and Romania in 6th place with a production of 4 544 tons (Table 2). According to a study published by the German Federal Institute for Risk Assessment (BfR), it is claimed that in Germany, on average,

people enjoy one to two meals containing 200 to 400 grams of the game every year. The meat is mainly from wild boar, deer, deer, and deer. However, intense consumers of hunting meat, such as hunter families and acquaintances, eat up to 60 and more meals containing game meat every year (Bundesinstitut für Risikobewertung, 2018). All the analyzed states register decreases in the production of hunting meat, but the highest decreases are recorded in the Czech Republic and in Cyprus, so that from 2000 tonnes and 440 tonnes respectively in 2005 a production of 1200 tonnes and 327 respectively. tons in 2017, representing a decrease of 40% and 26% respectively (table 2). In the case of Poland, there is also a reduction of the herds in 2017, by 19% compared to 2005.

In Romania, a tendency of growth is observed until 2017, when there was a production of 4 544 tonnes, represent the maximum of the analyzed period, being an increase of 12% compared to 2005. Of the total production obtained at the European Union level. The product obtained in Romania represents only 4% (Table 2).

At the level of Europe, the import of hunting meat presents a downward trend, as a whole, registering a small decrease in 2020 when the value of imports was 297.07 thousand dollars, 24% less, compared to 2019. It is observed that The value of the import of hunting meat from 2020 is 43% lower than the one registered in 2010 (Figure 1).

From a quantitative point of view, the import of hunting meat, at the level of Europe, recorded an upward trend, with a small amount of quantity in 2020, when 70.4 thousand tonnes imported, about 10% less Compared to the previous year, 2019. Regarding, as a whole, the imported quantity was 15% more compared to 2010. (Figure 1).

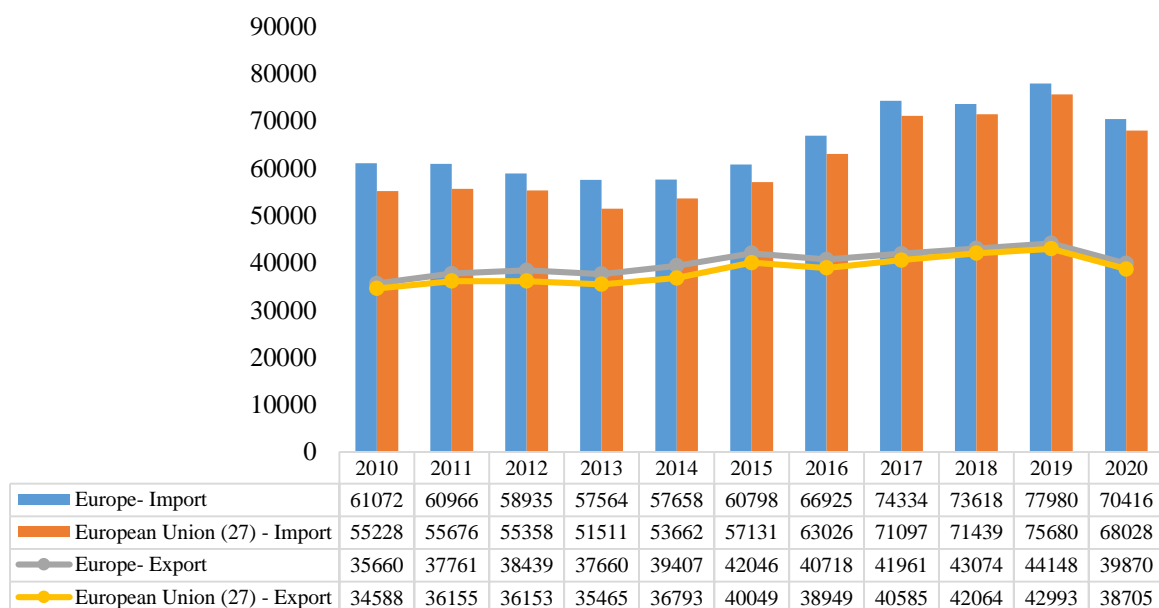


Figure 1 – Evolution of import and export of game meat (tons)

Source: www.FAO.Org

The export of game meat, at the level of Europe, shows an upward trend, as a whole, registering a small decrease in 2020 when the value of exports was 23,004 thousand dollars, 25.7% less, compared to 2019. It is observed that the value of game meat imports in 2020 is approximately 27% times lower than that recorded in 2010. From a quantitative point of view, the highest value was recorded in 2019, approximately 44148 tons, by 10.7% more than in 2020.

At the EU-27 level, the import of game meat shows an upward trend, as a whole, registering a small decrease in this case as well in 2020 when the value of imports was 286.32 thousand dollars, 24% less, compared to the year 2019. It is observed that the value of the import of game meat in 2020 is 36% lower than that recorded in 2010. From a quantitative point of view, the import of game meat, at the level of Europe, registered an upward trend, as a whole, with a slight decrease in the amount in 2020, when 68.02 thousand tons were imported, about 10.1% less than the previous year, 2019. The largest amount of game meat imported to the EU level in 2019 was 75,680 thousand tons, equivalent to 378.6 thousand dollars.

Regarding the export of game meat from the EU-27, an upward trend can be observed, from a quantitative point of view, in 2020, a total of 38.7 thousand tons were exported, 12% more than the first year analyzed, 2010. From a value point of view, the situation is a little different, that is, an oscillating train is recorded, but in 2020 game meat was exported in the total value of 224.6 thousand dollars, which represents a decrease of 26.1% compared to the previous year, when it was exported in the amount of 304.3 thousand dollars.

Starting from an increase in the domestic production of game meat correlated with an increase in quantities, the forecast of the total production of game meat in Romania until the year 2025 was realized. In the year 2000, approximately 3780 tons of game meat were produced.

Therefore, observing the upward trend of the evolution of total game meat production, a model was created in which its evolution was predicted in the following period, until the year 2025. According to the model, in the year 2025, Romania could produce up to 4904 tons of game meat, which would mean 29.7% more compared to the year 2000 (Figure 2).

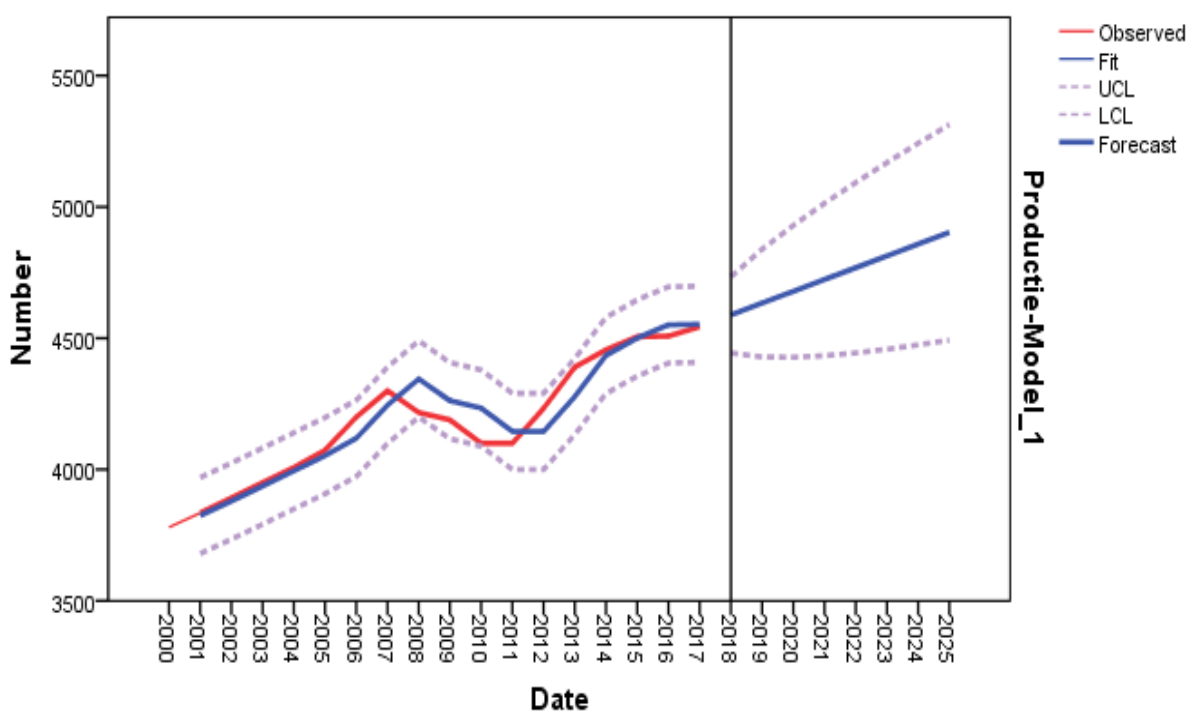


Figure 2 - Forecasting of the total production of game meat in Romania, until 2025 (tons)

Source: own representation in SPSS

It is known that game meat differs from the other types of meat available on the market due to its specific taste (Hutchison, C.L. et al., 2010). As game meat is largely derived from wild animals, it is difficult to maintain a stable level of meat parameters, because the taste and nutrient composition

of the game meat is mainly influenced by the species, age, gender, state of health, and the animal's diet (Hoffman, L.C., et. al., 2007).

CONCLUSION

Following the results obtained, it can be concluded that the world production of game meat shows a slightly upward trend during the analyzed period, while at the European level a slight decrease is recorded. However, venison is still perceived as a sophisticated food and the venison market is still a niche, difficult for consumers to reach.

Regarding the production of game meat obtained at the level of the European Union, Germany is at the top of the ranking, followed by Sweden and Poland. At the national level, there was an upward trend, registering an increase of 12% in 2017 compared to 2005. Of the total production obtained at the level of the European Union, the production obtained in Romania represents only 4%.

Analyzing the evolution of imports at the European level, it is concluded that the import of game meat in 2020 is 15% higher than that recorded in 2010, while the amount exported is 11% higher in 2020. Finally, starting from on the premise of increasing the domestic production of game meat, following the forecast made with the help of the SPSS application, it is concluded that in 2025 Romania could produce up to 4904 tons of game meat, which would mean 29.7% more compared with the year 2000.

In the context of a limited number of studies related to the subject of game meat, further research should be carried out in the field of demand for this type of meat, with special attention paid to the quality of game meat. Given that food safety is very important to consumers, there is a need for extensive information activities to reduce their concerns about game meat. This may contribute to the increase in demand for this type of meat as an alternative to frequently consumed meat.

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