

Big game meat production in Hungary: A special product of a niche market

Wild ungulate populations are increasing throughout in Europe, with a consequent increase in harvests and availability of their meats (Apollonio et al. 2010; Ramanzin et al. 2010). It is widely known that game meat/venison is not produced under standard conditions like in animal husbandry (Winkelmayer et al. 2011). Accordingly, it is particularly important to reveal the effects of the different keeping and feeding technologies on venison quality, as well as the variability of the most relevant meat quality parameters that can depend on the foods consumed by the wild animals. The purpose of this paper is to evaluate the trends of available meat from big game in Hungary, and to show the issues related to the increasing availability.

During the last 50 years the composition of the Hungarian

hunted fauna showed huge changes. Small game populations declined in a considerable extent and the importance of brown hare, ring-necked pheasant, grey partridge and water-fowl species has seriously diminished. At the same time, big game populations and harvest showed marked and continuous increase: the range of red deer, roe deer and wild boar increased and their population sizes and harvests reached unprecedented levels (Csányi and Lehoczki, 2010). After 2000, approximately 250-300 thousand big game animals (red deer, fallow deer, roe deer, mouflon, and wild boar) had been shot annually (Table 1).

Game management in Hungary is based on a well-organised hunting-system that relies on the *Act LV/1996 of game conservation, management and hunting*. The

purpose of the Hungarian legislation is to consider the interests of the landowners, the conservation of game species and their habitats, other sectors managing natural resources (agriculture and forestry) as well as the interests of nature conservation. Actually, >55000 Hungarian citizens are hunting and an additional 20-30000 foreign hunters visit Hungary annually (Csányi and Lehoczki, 2010).

The legal framework of game conservation, game management, and hunting including venison distribution are regulated in Act LV/1996. Specific and detailed issues related to the implementation of the Act are provided in Decree No. 79/2004. (V. 4.) of the Minister of Agriculture and Rural Development, as well as in Decree No. 43/2011. (V. 4.) of the Minister of Rural Development (food hygiene conditions of handling

Decade	Average harvest in the decade	Change of average harvest*	Number of hunters	Change of the hunter number	Harvest/hunter
Big game harvest					
1960-1969	21,492	1.0	19,284	1.0	1.11
1970-1979	80,452	3.7	25,318	1.3	3.18
1980-1989	101,995	4.7	33,124	1.7	3.08
1990-1999	116,391	5.4	45,275	2.3	2.57
2000-2011	221,666	10.3	54,535	2.8	4.06
Small game harvest					
1960-1969	686,214	1.0	19,284	1.0	35.58
1970-1979	1,341,326	2.0	25,318	1.3	52.98
1980-1989	1,244,280	1.8	33,124	1.7	37.56
1990-1999	845,233	1.2	45,275	2.3	18.67
2000-2011	636,646	0.9	54,535	2.8	11.67

* Change compared to the average of the 1960-1969 decade

Table 1. Changes in big game harvest, small game harvest, and the number of hunters between 1960 and 2011 in Hungary. The magnitude of changes are expressed on the bases of the decadal averages.

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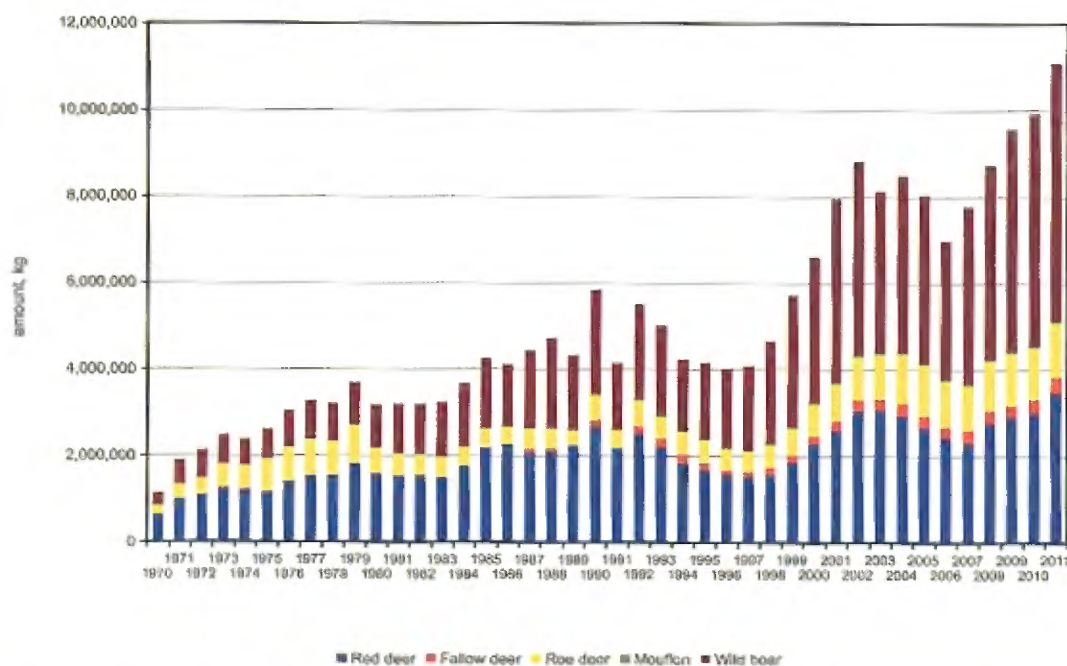


Figure 1. The changes in the amount of big-game meat produced between 1970 and 2011, kilograms (Source: National Game Management Database)

and distribution of hunted animals). It is obligatory to apply the relevant provisions of the European Parliament in case of Decree No. 43/2011 (178/2002/EC, 2075/2005/EC, 1069/2009/EC), and Act XLVI of 2008 on the Food Supply Chain and on Control and Supervision of the Food Supply Chain, as well. This regulation establishes the EC Regulation 852/2004 (29 April 2004) on the hygiene of foodstuffs, and the EC Regulation 853/2004 (29 April 2004) laying down specific hygiene rules for foods and animal origin.

Regarding the handling of harvested game animals and the requirements of food hygiene the Decree No. 43/2011. (V. 4.) of the Minister of Rural Development is especially important. Careful inspection of game before killing and post mortem examination of carcass and organs, as well as the strict adherence to certain rules of good hygiene practice along the food chain ('from forest/field to fork') are necessary to assure that all quality traits are preserved and that game meat is not a risk to the

consumer (Winkelmayer et al. 2011). According to EU regulations, game management units selling game to wholesalers or game processing companies, are responsible for meat safety and traceability. Any wild game has to be inspected by a "trained person" before being transferred to the "approved game handling establishment". This person must be able to ascertain abnormal behaviours in the living animal and pathological changes caused by disease, environmental contamination or other factors, which may affect human health. Once the carcass arrives at the approved game handling establishment, it is inspected by a veterinarian and, if relevant, further analyses may be conducted (Ramanzin et al. 2010; Winkelmayer et al., 2011).

According to the official game management statistics, in the 2011/2012 hunting year harvest of 47,700 red deer, 11,717 fallow deer, 93,146 roe deer, 3,485 mouflon, and 128,863 wild boar were reported by the hunting units. The annual hunting bag totalled ca. 285,000 individual

big game and more than 500,000 small game. Animals are not only hunted for valuable trophies, but also for their meat for consumption. As a consequence of the changes in the game populations the composition of the game meat produced changed in the last 50 years (Table 2). Traditionally the meat of big game species were exported to western European markets and the domestic market was not developed. Passing about 10 thousand tons of available venison to Hungarian customers has not been solved in the last decades.

The available game meat is directly related to the number of animals shot in each year. This is clearly reflected in the changes of the amount of game meat and the total meat produced between 1960 and 2011 (Figure 1). Meanwhile in the 1960s the total amount of game meat was much less than 2000 tons, it reached 4000 tons by the mid-1980s. Fast increase of the total game meat production started in 1998 and this is still continues to these days. Analysing the proportions of the meat of the five big game species

Year	Big game harvested (individuals)						Big game meat (1000 kg)					
	Red deer	Fallow deer	Roe deer	Mouflon	Wild boar	Total	Red deer	Fallow deer	Roe deer	Mouflon	Wild boar	Total
1960	3,800		3,700		3,900	11,400	128		105		88	321
1961	4,700		4,700		4,200	13,600						
1962	5,400		5,300		5,212	15,912						
1963	5,431		9,442		5,602	20,475						
1964	5,394		7,668		4,707	17,769						
1965	6,500		7,931		5,192	19,623	241		14		73	328
1966	6,700		9,400		5,800	21,900						
1967	6,700		12,060		7,100	25,860						
1968	6,804		14,980		8,203	29,987						
1969	8,135	395	18,206	297	7,342	34,375						
1970	9,061	659	19,613	166	8,992	38,491	630		204	4	291	1,129
1971	11,869	470	25,910	130	12,076	50,455	984		353	2	565	1,904
1972	14,429	758	29,434	138	13,945	58,704	1,100		385	2	665	2,152
1973	15,993	1,185	45,122	328	14,288	76,916	1,264		537	5	692	2,498
1974	15,410	958	40,794	391	12,895	70,448	1,228		531	7	614	2,380
1975	16,642	1,420	54,337	583	14,050	87,032	1,163		751	10	695	2,619
1976	18,020	1,375	59,720	664	17,150	96,929	1,409		778	11	851	3,049
1977	19,157	2,143	62,424	1,043	18,906	103,673	1,542		816	15	893	3,266
1978	19,072	2,591	61,341	818	19,018	102,840	1,559		765	12	882	3,218
1979	22,710	2,221	72,251	1,119	20,729	119,030	1,813		896	16	977	3,702
1980	19,617	1,585	51,143	960	20,241	93,546	1,589		585	13	986	3,173
1981	19,216	1,326	46,171	886	23,242	90,841	1,536		506	11	1,140	3,193
1982	19,769	1,169	42,649	896	24,620	89,103	1,557		462	12	1,154	3,185
1983	22,275	1,683	43,672	854	33,780	102,264	1,493		470	10	1,268	3,241
1984	23,268	2,380	41,302	1,179	34,101	102,230	1,766		426	18	1,472	3,682

Table 2. Number of big game harvested (individuals) and game meat produced (1000 kg) between 1960 and 2011

Sources and notes: National Game Management Database for number of animals harvested; Game meat data set in bold and italics were data published by Tóth (2005) as exports by MAVAD Inc., all other data were published in annual game managements statistics; between 1960 and 1990 red deer and fallow deer venison were pooled in the statistics; empty cells represent data not available;

marked changes can be identified (Figure 2). In the 1970s >50% of the game meat was produced by red deer shooting and 20-30% was wild boar meat. Roe deer shared with 30% of the total game meat production. Although all of the big game species increased during the last half century, their contribution was not different to the game meat production. The share of red deer venison decreased to around 30% and wild boar increased >50%. The proportion of roe deer ranges between 15-20%.

By the end of the 1990s the export of the large amount of wild boar meat and red deer venison became difficult on international markets, especially that domestic markets did not exist and pricing of game meat was not adapted to the potential Hungarian consumers.

However, the demand for healthy, affordable and available venison could be important (Anonymous, 2003). It may increase the revenues of game management, and it might contribute to the development of quality of life of rural populations and attractiveness of the country. Until 2011 the opportunities of the game management units to sell the game meat in small amounts on the domestic market was limited. Practically the domestic use consisted only the hunters' share. The wholesalers, the meat-processing and meat-packing companies were producing for the international markets. The more liberal rules introduced in 2011 diversified the market channels and allowed the direct connection of the game management units (producers) and the consumers (individuals). This

has made possible to increase the Hungarian market and the increase of the domestic consumption of big game meat. In spite of the positive changes, the domestic market has not been assessed yet and the specific characteristics of this niche market is not known.

During the last half century the total amount of game meat produced showed >10-fold increase. One of the difficulties of the game meat market is the fluctuating production and the dependence on management efforts to control big game populations (Figure 1). As it was already mentioned the total amount sharply increased between 1997 and 2002, and after a decline it increased again between 2007 and 2010. This pattern is clearly connected to the introduction of a shooting quota system in order to

Year	Big game harvested (individuals)						Big game meat (1000 kg)					
	Red deer	Fallow deer	Roe deer	Mouflon	Wild boar	Total	Red deer	Fallow deer	Roe deer	Mouflon	Wild boar	Total
1985	29,831	3,394	41,535	1,469	35,774	112,003	2,201		424	22	1,617	4,264
1986	31,268	3,555	38,653	1,500	35,751	110,727	2,270		399	23	1,428	4,120
1987	27,186	2,880	34,000	1,654	34,675	100,395	2,074	94	460	30	1,784	4,441
1988	27,422	2,455	33,367	1,915	40,219	105,378	2,092	80	451	35	2,069	4,726
1989	30,515	3,367	36,313	2,353	40,908	113,456	2,229		354	35	1,722	4,340
1990	35,240	4,621	41,494	2,976	46,672	131,003	2,688	150	561	54	2,401	5,854
1991	36,749	6,205	44,005	2,812	43,768	133,539	2,186		405	29	1,532	4,152
1992	32,787	6,463	42,512	2,408	42,895	127,065	2,507	184	591	43	2,173	5,498
1993	29,959	7,456	37,606	2,568	42,851	120,440	2,201	201	503	49	2,065	5,020
1994	23,943	6,493	38,801	1,803	33,451	104,491	1,846	189	521	32	1,658	4,246
1995	21,825	5,462	37,890	2,344	34,979	102,500	1,690	154	511	42	1,777	4,174
1996	20,428	4,389	35,423	2,080	35,053	97,373	1,561	120	484	30	1,825	4,021
1997	19,692	4,652	34,481	1,464	38,126	98,415	1,508	131	473	25	1,956	4,093
1998	20,105	5,460	37,894	2,002	48,481	113,942	1,574	158	527	33	2,378	4,670
1999	24,184	5,480	44,437	2,615	58,368	135,084	1,867	162	604	44	3,047	5,724
2000	28,912	5,976	52,754	2,332	67,745	157,719	2,267	185	736	39	3,378	6,605
2001	34,048	6,652	61,851	2,674	88,297	193,522	2,603	207	856	44	4,251	7,961
2002	41,708	9,004	72,479	3,723	93,964	220,878	3,043	261	983	61	4,474	8,822
2003	41,640	6,553	76,599	2,536	72,109	199,437	3,083	247	1,024	50	3,741	8,145
2004	39,095	7,563	85,646	2,488	77,207	211,999	2,935	290	1,141	48	4,097	8,510
2005	35,178	7,252	89,567	2,377	70,325	204,899	2,657	261	1,193	49	3,880	8,039
2006	30,814	6,807	80,409	1,952	56,544	176,526	2,431	239	1,070	43	3,202	6,984
2007	32,734	7,768	79,264	2,246	83,776	206,788	2,317	278	1,035	46	4,103	7,779
2008	34,996	8,255	85,887	2,531	83,661	215,330	2,763	284	1,151	50	4,490	8,738
2009	37,809	9,646	89,532	2,710	99,444	239,141	2,888	293	1,204	52	5,134	9,572
2010	39,161	8,884	88,288	2,986	100,936	240,255	2,990	334	1,190	56	5,362	9,932
2011	45,759	9,702	92,880	3,001	116,258	267,600	3,482	363	1,249	58	5,957	11,109

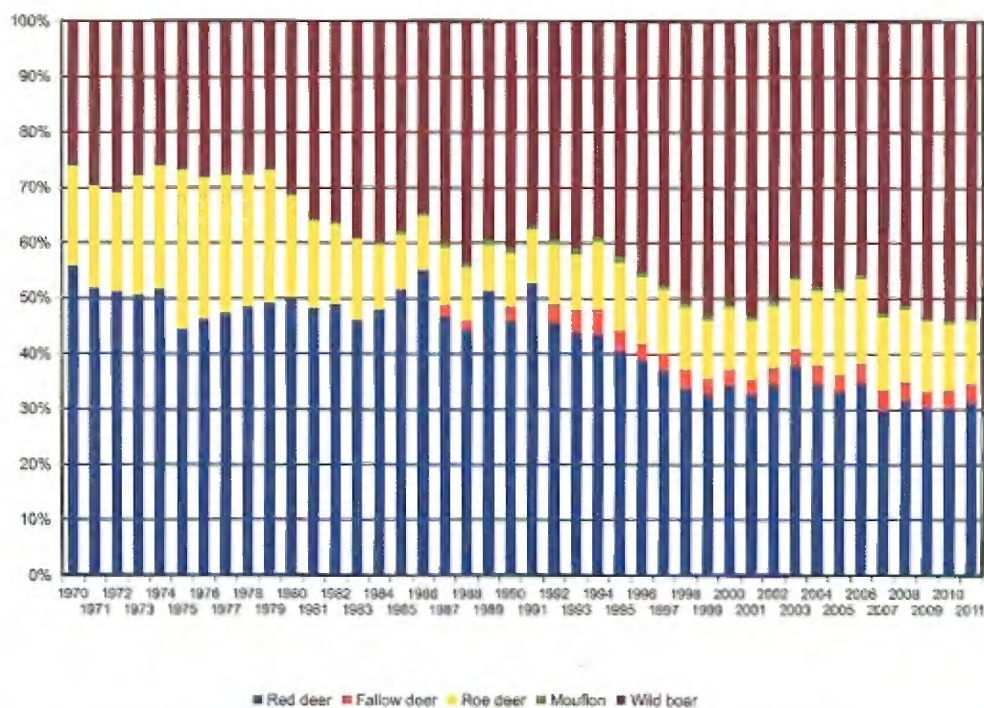


Figure 2. The proportional share of the five big-game species in the total game meat produced between 1970 and 2011 (Source: National Game Management Database; until 1990 red deer and fallow deer venison were pooled in the statistics)

reduce big game populations to more tolerable levels (and the damages attributed to them). At the same time the meat share of the five big game species shows considerable differences (**Figure 2**).

Game meat and venison are products of nature, healthy foods used primarily locally or delivered not too distant markets. Big game meats generally have a low fat content, although with a certain variability associated with sex, hunting season, age and physiological conditions, and a favourable fatty acid composition. In general, they are darker, less tender and characterised by a more intense and peculiar flavour than meats from domestic animals. However, these properties also show a great inter- and intra-specific variability (Ramanzin et al. 2010). Risks for the consumer associated with contaminants (heavy metals, radionuclides, organochlorine pesticides) and zoonoses are considered to be low. It can be said in general that venison is low in fat and carbohydrate and rich in protein, micro- and macro elements, as well as vitamins. The fat-content of roe-deer is almost one-tenth that of beef, while roe-deer meat contains 450 times more B₁ vitamin than beef (Vörös, 2009). Therefore, game meat can and should be promoted as an excellent component of almost any healthy nutrition plan (Lugasi, 2006).

Consumers rate venison as a special food and venison can be a part of local business through local restaurants, hotels and rural tourism, and it can directly improve the livelihoods of families living there. The size of the potential home-market is about 2.5 million people, or one-third of the adult population in Hungary. However, the majority of consumers do not know the beneficial nutritional properties of venison.

The dominance of wild boar and red deer can clearly be attributed to their increasing populations and bags, and also there are the heaviest

of the hunted species. It would be very important to direct the meat produced by red deer and wild boar hunting to the domestic market. Both big game species in Europe reached never seen peaks of population numbers and reduction of their populations requires sustained hunting pressures (Apollonio et al. 2010). Based on this fact, it can be predicted that the hunting bag of the wild boar and red deer will remain on high levels and the prices on the foreign markets stay depressed on the long-term.

The Institute for Wildlife Conservation (Szent István University) started a research program to assess the various aspects of game meat production, meat quality and markets in Hungary. In order to stabilize the Hungarian game meat market and the improve the food-chain security we propose the following actions:

- Monitoring of game meat production and the full channel of the food processing.
- Establishment of a system of game meat quality standards and assurance with special reference to the effects of habitat conditions and game feeding.
- Comparison of the game meat originating from the wild and produced on game farms and in fenced areas (hunting gardens)
- Monitoring of game diseases and zoonosis and the potential food safety issues related to game meats.
- Establishment of a network of accredited laboratories prepared for the analyses of the increased amount of game meat being sold on the domestic market.
- Set up of a gen bank in order to provide a basis for the protection of the wild origin/purity of game meats and their products on the market.

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References

- Anonymous** (2003): Vadhúspiac az EU-ban. GfK Hungária Piackutató Intézet tanulmánya. 52pp.
- Apollonio M., Andersen R., Putman R.** (eds.) (2010): European ungulates and their management in the 21st century. Cambridge University Press, Cambridge
- Csányi, S. and Lehoczkí, R.** 2010. Ungulates and their management in Hungary. Pages 291-318 in: Apollonio, M., Andersen, R. and Putman, R. (Eds.) Ungulate management in Europe in the XXI century. Cambridge University Press, Cambridge
- Lugasi, A.** (2006): A vadhúsok szerepe a táplálkozásban tekintettel kémiai összetételükre és egyes élelmiszer-biztonsági szempontokra. *A hús*, 2006/2: 85-90.o.
- Ramanzin, M., Amici, A., Casoli, C., Esposito, L., Lupi, P., Marsico, G., Mattiello, S., Olivieri, O., Ponzetta, M. P., Russo, C. és Marinucci, M. T.** 2010. Meat from wild ungulates: ensuring quality and hygiene of an increasing resource. *Italian Journal of Animal Science*, 9: e61
- Tóth, S.** 2005. A hirnév kötelez. *Vadászat és vadgazdálkodás Magyarországon 1945-1990*. Nimród Alapítvány, Budapest, 359pp.
- Vörös, G.** (2009): Amit tudnunk kell a vadhúsról. In: Pechtol J. (szerk.) *Vadászévkönyv 2009*. 106-114.
- Winkelmayer, R., Stangl, P.-V. and Paulsen, P.** 2011. Assurance of food safety along the game meat production chain: inspection of meat from wild game and education of official veterinarians and 'trained persons' in Austria. Pages 245-258 in: P. Paulsen, A. Bauer, M. Vodnansky (Eds.) *Game meat hygiene in focus*. Wageningen Academic Publishers, Wageningen