Porcine Research

Re-enrichment of the swine world: rebuilding a so-believed lost breed - the Black Mangalitza (*Sus scrofa domesticus*)

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Abstract. Previous literature mentioned the existence of four colors of Mangalitza breeds. Through the declaration of Black Mangalitza as an independent breed, the Mangalitza breeds palette that can be verified by historical data is complete. This, enriches the living heritage of the Carpathian Basin animal husbandry and expands agro-biodiversity as well. The future goal concerns the increase of the number of sows involved in breeding to exceed 1,500 individuals, thus bringing the breed out of the endangered category.
Key Words: breed recovery, endangered breed, extinction, fat-type breed, pork.

Introduction. In the last few decades, the gastronomical preferences of humans seem to rediscover and reevaluate neglected rustic resources, offering new opportunities for saving old breeds, not only for the sake of conservation but also for the improvement of the consumers' health, through the well-known "Slow food" trend, and for alleviating the environmental issues (Petrescu-Mag 2009).

In general, the breed is an important source of variation for fatty acid composition of pork meat (Zhang et al 2007). In this context, researchers evidenced that against the modern breeds, the Mangalitza meat contains a higher percentage of dry matter and a more favorable fatty acid (Holló et al 2003; Zăhan et al 2010, 2019; Nistor et al 2012; Parunovic et al 2012a, 2015; Migdal et al 2018). It has to be mentioned that rearing system significantly influences the carcass traits (Parunovic et al 2012b).

The Mangalitza swine is a breed of domestic pig formed in the Carpathian Basin and mostly reared in Hungary. It is spelled "Mangalica" in Hungarian, "Mangalitsa" in the United Kingdom or "Mangalitza" in the United States. The breed was actually developed by crossbreeding the Szalonta type swine and Bakonyi breeds with the European wild boar and the Serbian Šumadija breed. Mangalitza is a "lard-type" swine breed with marbled and flavorful meat. Its meat and the products made from it (sausages, salami, ham, bacon) are not only tastier, but also slightly healthier than that of modern (industrial) pig breeds. This is due to the fact that Mangalitza fat has a better unsaturated and saturated fatty acids ratio (Tóth et al 2009).

Unsaturated fatty acids are considered to be healthier since they do not increase the blood cholesterol level (DiNicolantonio & O'Keefe 2018).

According to Tóth et al (2009), in an experiment concerning the main production traits (feed uptake, weight gain and feed conversion) and carcass performances (slaughter weight and meat proportion), the Hungarian Large White × Hungarian Landrace (HLW×HL) hybrids showed higher performances than the Mangalitza pure breed (MAN). In contrast, the MAN individual's loin and ham had significantly higher dry matter, crude protein and crude fat content. In MAN's meat, significantly higher Fe, Cu and Zn content were found than in HLW×HL, but the amount of P was higher in the HLW×HL subjects. A significantly higher proportion of PUFA was found In the meat and backfat samples of the pigs; however, in MAN samples, the n-6/n-3 ratio was significantly lower than in HLW×LW.

In the Carpathian Basin, the Mangalitza (fat-type breed) has been the most popular breed since the middle of the 19th century. However, the breed nearly went extinct in the 1970's due to changing dietary habits and breeding of modern industrial pig breeds (Egerszegi et al 2003).

The Mangalitza breed breeding stock has had a sinuous evolution over time (Table 1 & 2; Figure 1). According to the Hungarian Mangalitza Breeders Association (http://www.moe.org.hu/hu), in 1955 the Mangalitza breeding stock counted 18,000 certified sows, which in ten years decreased to 243 certified individuals (to 1.3%), and in the next five years continuously decreased to 35-40 registered sows (0.2%). But in 1994, after 68 years, for the second time in history, the Hungarian Mangalitza Breeders Association was formed with twenty members, including six breeders, at the Faculty of Agricultural Sciences – University of Debrecen, Hungary. Due to this initiative, in 2008, the association counted 150 members, which already worked with 8,600 certified sows.

Table 1

Number of breeding sows in Hungary between 1927-2001 (Egerszegi et al 2003)

Year	*Red Mangalitza*	*Swallow-Belly Mangalitza*	*Blond Mangalitza*	*Total*	*Reference*
1927	-	-	-	1,000	
1930	-	-	-	1,920	
1935	-	-	-	6,500	
1940	-	-	-	20,000	
1943	-	-	-	30,000	
1955	-	-	-	17,691	Baltay 1983
1959	-	-	-	4,091	
1965	-	-	-	922	
1970	-	-	-	243	
1975	-	-	-	34	
1980	-	-	-	244	
1988	46	61	222	329	
1989	64	73	201	338	
1990	62	62	224	348	
1991	66	28	128	222	
1992	43	25	175	243	
1993	31	32	138	201	
1994	28	20	106	154	Zengö 1997;
1995	20	18	170	208	OMMI 2002
1996	38	42	266	346	
1997	32	46	315	393	
1998	39	60	299	398	
1999	50	64	491	605	
2000	75	74	616	765	
2001	179	145	1001	1,325	

"-" No data available; OMMI-National Institute for Agricultural Quality Control.

Table 2

Mangalitza stock in Europe (Egerszegi et al 2003)

Year	*Red Mangalitza*	*Swallow-Belly Mangalitza*			*Blond Mangalitza*	*Mangalitza*	*Mangalitza*
	Germany	*Switzerland*	*Austria*	*Germany*	*Germany*	*Yugoslavia*	*Romania*
1983	-	-	-	-	-	-	500
1992	-	80	-	-	-	-	-
1994	-	125	-	-	-	-	30
1996	-	105	-	-	-	-	34
1997	50	105	-	45	60	-	-
1998	32	-	-	63	48	-	-
1999	29	-	70	55	43	19	-
2000	45	-	-	80	45	-	-
2001	-	182	-	-	-	-	-
Reference	EAAP	EAAP	GEH	EAAP	EAAP	DAD-IS	EAAP

"-" No data available EAAP – European Association of Animal Production; GEH – German Safeguard Society of Ancient and Endangered Domestic Animal Breeds; DAD-IS – Domestic Animal Diversity Information System.

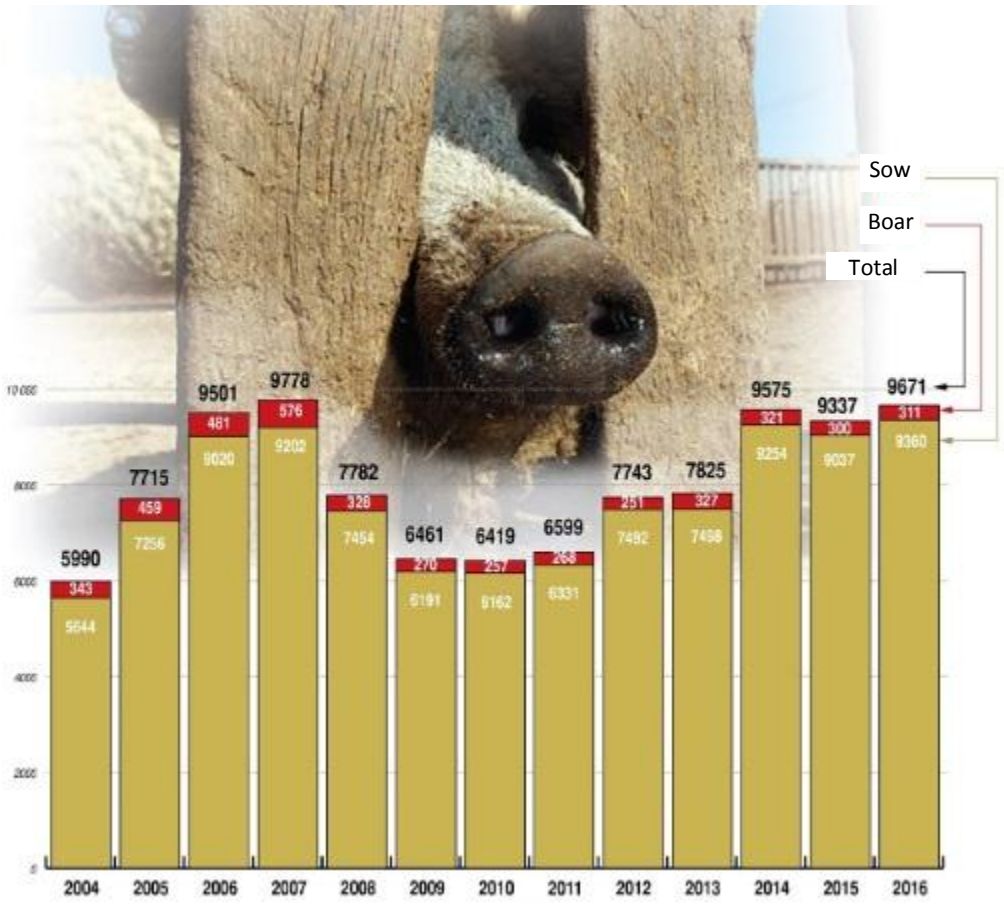

Figure 1. The registered Mangalitza breeding stock of Hungary 2004-2016 (Source: http://www.moe.org.hu/hu).

The Black Mangalitza. The Black Mangalitza (Figure 2) was more largely spread over the Hungarian Transdanubian region (from the Danube to West). Its ancestors were the Croatian Black, also called "Napoli Pig", which was often crossed with Mangalitza, and therefore, it preserved the morphology of Mangalitza and became black colored. In 1885 a fatting trial was conducted at Quarry, where the Black Mangalitza reached a lower daily gain, but a higher final weight, and it was also more resistant to diseases than its Blond Mangalitza relative. Although it was bred in considerable herds in the past, the Black Mangalitza was considered extinct in 1970, when the last specimens were last seen at the Serbian Danube islands (Tóth & Hartman 2007; Botha et al 2014).

Figure 2. Black Mangalitza (Kistermelők Lapja 2019/9).

Fortunate discovery, breed reconstruction. An associate professor of the University of Debrecen, Szabó Péter, found in 1998 a Black Mangalitza individual at Szank, Bács-Kiskun County, Hungary, which was believed an extinct breed. According to Prof. Szabó Péter, this individual was a mutation carrier, which was inherited from generation to generation, and finally segregated and inherited the color. The mentioned individual was bred with Swallow-Belly specimens. In 2005, a few individuals were already presented at OMÉK, Hungary (Hungarian National Agricultural and Food Industry Fair) (Figure 3 & 4), when the reconstruction program was already in progress, with 40 sows. In 2007, some financial considerations affected in such manner the Black Mangalitza reconstruction project that the livestock had to undergo liquidation. Fortunately a young breeder from Hajdúszoboszló, Hungary, purchased a lot of 40 individuals. In 2013, the young breeder contacted Prof. Szabó Péter because he had to liquidate its breeding stock, also due to a financial crisis. Then, Prof. Szabó Péter and its team purchased back more than 10 individuals and a few more piglets from other two breeders. Therefore, in 2013, the Black Mangalitza reconstruction program was launched for the second time (the first one took place in the last millennium, 1860-1890), with 20 sows and 6 hogs. In the upcoming 4 years, 150 kindlings were registered with over 1,000 obtained piglets. In 2017, the breeding stock consisted of 300 sows and 40 hugs, the whole stock being divided in 8 genealogical lines. According to Prof. Szabó Péter, the recorded prolificacy of the reconstructed Black

Mangalitza is 8.24 piglets, which is 2 units higher compared to the other Mangaliza breeds (Blond, Red, Swallow-Belly).

Figure 3. Black Mangalitza breeding boar (https://www.nak.hu/).

Figure 4. Black Mangalitza breeding sow (https://www.nak.hu/).

In order to establish the true genetic value of the Black Mangalitza stock, pedigree control and population genetic tests were performed in May-June 2017. The results of DNA microsatellite studies indicated a marked difference between the three Mangalitza breeds and the black Mangalitza specimens. Swallow-bellied and black mangalitza were found to be genetically closest to each other, however, the difference between them was significant. A variety of specific alleles was found in Black Mangalitza, confirming the separation of Swallow-Bellied and Black Mangalitza. With purposeful breeding work, the genetic distance could be increased, so the Black Mangalitza could be reconstructed as a separate breed (http://www.allattenyesztok.hu).

In June 2019, the Ministry of Agriculture of Hungary recognized the Black Mangalitza as an independent breed and added it to the list of protected native breeds, through an amendment to the Animal Husbandry Decree, which was published on 6th February 2020 (Magyar Közlöny 19/2020). This way, all the four historical Mangalitza breeds are saved for the future generations.

In January 2020, the breeding stock consited of 222 sows and 59 hogs of Black Mangalitza. With this stock, the threat level of the breed is slightly above critical, but it is still endangered (http://www.allattenyesztok.hu).

Genetic differentiations of three Mangalitza breeds (Blond, Red, Swallow Belly) were evidenced by Zsolnai et al (2006, 2013). The genetic relationships among the Mangalitza swine breeds in farms at different geographical locations have been studied by ten microsatellite markers (S0005, S0090, S0101, S0155, S0355, S0386, SW24, SW240, SW857, SW951), in order to characterize the population and to serve as a scientific basis for management practices (Zsolnai et al 2006). The mentioned research enhances the point of view that the three Mangalitza populations can not be handled as color varieties of Mangalitza; Swallow-Belly, Blond and Red are indeed separate breeds.

Zsolnai et al (2013) have selected a few molecular markers among 62k single nucleotide polymorphisms (SNP) capable to distinguish Blond, Swallow-belly and Red Mangalitza pigs at 95% probability. Another 54 SNPs have also been selected for identification and parentage testing, where the probability of identity was one to hundred trillion (Table 3).

Table 3

Pairwise genetic distances (Fst) of Mangalitza breeds (Zsolnai et al 2013)

	Swallow-Belly	*Blond*
Blond	$0.064^{m}/0.062^{SNP}$	-
Red	$0.099^{m}/0.091^{SNP}$	$0.095^{m}/0.075^{SNP}$

^{m} – values obtained by microsatelit markers, ^{SNP} - values obtained by SNP markers.

Rasztik (2011) conducted an expanded analysis concerning the Mangalitza breed mitochondrial polymorphism, where the author encountered difficulties in identifying the Mangalitza breed against the wild boar samples, based on a mitochondrial DNA sequence, but insignificant differences were also found between the Mangalitza and some modern breeds. Analyzing the literature, this fact may be due to some crossings (with modern breeds) meant to improve the breed productive performances. Figure 5 emphasizes very accurately the created complex kinship between swine breeds due to cross breeding. The phylogenetic tree (Figure 5) gives the answer concerning the mitochondrial based differentiation of the Mangalitza breed toward the European wild boar, where the European swine breed samples almost perfectly fit the wild boar samples obtained from inside the continent. A more conclusive fact is that the samples obtained from the Iberian Peninsula, which ensure a relative geographical isolation, can be easily identified/differentiated from the inland samples, but also highlight a high kinship with the local wild boar samples.

Oroian & Petrescu-Mag (2014) also confirmed that the Mangalitza breed had wild boar ascendants.

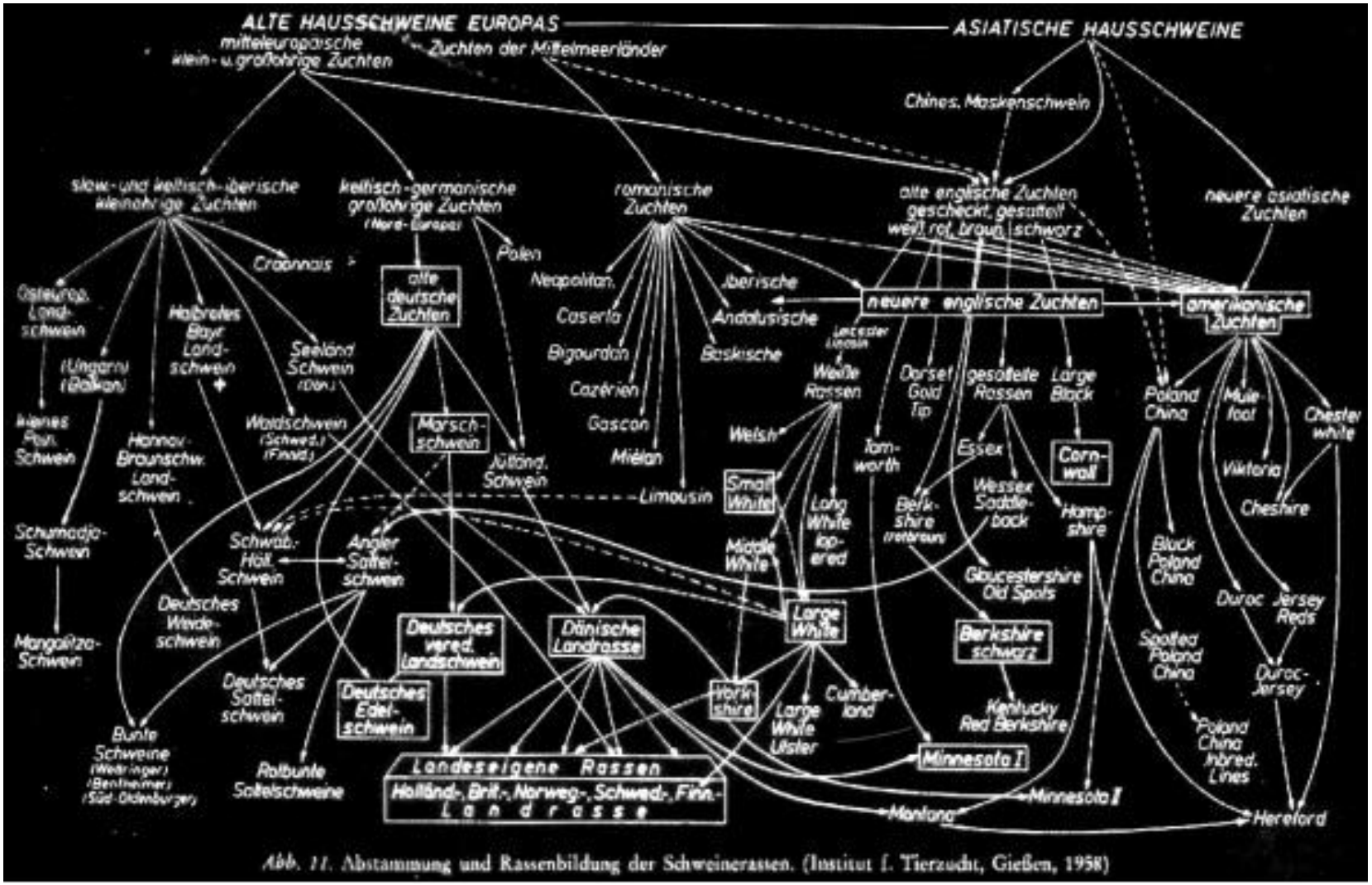

Abb. 11. Abstammung und Rassenbildung der Schweinerassen. (Institut f. Tierzucht, Gießen, 1958)

Figure 5. The network interconnection concerning breeds development is well showed by the building and origins of the swine breeds elaborated in the Animal Science note of the Giessen University (Rasztik 2011).

As previous experiments showed, the pure breed Mangalitza breeding can not compete with the modern breeds; in order to achieve cost-effective performances, both in terms of production and reproduction traits, some hybridization schemes are recommended as Tables 4 & 5 suggest. In this regard, although Black Mangalitza hybrids were not produced and tested so far, considering the breed ascendants, its future valorization behind pure breed stock, breeding will be also carried out through hybridization as it was for its predecessors (Blond, Red and Swallow Belly Mangalitza).

Table 4

Mangalitza pure breed and its hybrids fattening performances
(Source: https://agraragazat.hu)

Genotype	*Weight after 90 days fattening (kg)*	*Fattening days up to 115 kg (Days)*	*Initial weight (kg)*	*Net weight gain (g day^{-1})*	*Total feed consumed (kg)*	*Feed conversion (g kg^{-1})*
DanBred	114.5	90	28.2	958.9	252.0	2,920
Mangalitza x Duroc	84.9	147	30.5	574.8	341.0	4,036
Mangalitza x Pietrain/Hampshire	87.9	139	31.1	603.5	346.1	4,125
Mangalitza	66.0	230	-	350.0	-	4,320

Table 5

Reproductive performance of pure- and crossbred Mangalitza (Szabó 2002)

Trait	*Blond*	*Mangalitza Swallow-Belly*	*Red*	*Mangalitza total*	*Duroc x Mangalitza*	*Mangalitza x Cornwall*
No. of litter	71	74	110	255	41	45
Litter/year	1.90	1.81	1.86	1.86	1.86	1.80
Litter size	6.66	6.64	6.83	6.73	7.60	7.43
Rearing (%)	88.0	88.9	87.6	88.0	87.5	92.3
Pigs/sow/year	11.13	10.68	11.12	11.0	14.14	12.35

Research concerning swine reproduction biology, including the Mangalitza breed specificities (Hettig et al 2011, 2012; Varo-Ghiuru et al 2011a,b; Zăhan et al 2011, 2014) are so vast that even if a breed, strain or line would be endangered by genetic instability due to inbreeding or low breeding stock, the genetic material preservation will allow to maintain specific features until scientists will be able to develop a new conservation strategy. This kind of concern arisen when, according to Zăhan et al (2009), genetic imbalance was evidenced in some Mangalitza populations in Romania, using microsatellite markers, but high population variability also was observed, without the risk of genetic drift.

Conclusions. Although the Black Mangalitza breed's population is slightly above the endangered level, the conservation program's future goal is to further increase the number of female individuals and to establish closely unrelated lines, so that the number of sows bred will come to exceed 1,500 individuals, thus pulling the breed out of the endangered category. An additional target is to eliminate inbreeding and its adverse effects, in order to safely maintain the population, on the long term.

References

Botha M., Oroian I. G., Petrescu-Mag I. V., Gavriloaie C., 2014 Mangalitsa: the recovery of a rustic genetic heritage. Porc Res 4(2):30-36.

DiNicolantonio J. J., O'Keefe J. H., 2018 Effects of dietary fats on blood lipids: a review of direct comparison trials. Open Heart 5:e000871. doi:10.1136/openhrt-2018-000871

Egerszegi I., Rátky J., Solti L., Brüssow K.-P., 2003 Mangalica - an indigenous swine breed from Hungary (Review). Archiv fur Tierzucht 46(3):245-256

Hettig A., Botha M., Miclea V., Zăhan M., Roman I., Miclea I., Varo-Ghiuru F., Orlovschi D., 2012 Approaches in swine germplasm preservation: the effect of different cryoprotectant concentrations on immature oocyte vitrification. Porc Res 2(1):4-10.

Hettig A., Miclea V., Zăhan M., Roman I., Miclea I., Botha M., Rusu A., Varo-Ghiuru F., 2011 Vitrification of immature swine oocytes by the SSV technique using different concentration of cryoprotector and exposure time. Bulletin USAMVCJ 44(1):396-400.

Holló G., Seregi J., Ender K., Nürnberg K., Wegner J., Seeger J., Holló I., Repa I., 2003 A mangalica sertések húsminőségének, valamint az izom és a szalonna zsírsavösszetételének vizsgálata. Acta Agraria Kaposvariensis 7(2):19-32.

Migdal L., Radovic C., Zivkovic V., Gogic M., Migdal A., Migdal W., 2018 Characterization of meat traits and fatty acids profile from Swallow-Belly Mangalitsa, Moravka pigs and their crossbreeds. Annals of Warsaw University of Life Sciences – SGGW, Animal Science 57(4):365–378.

Nistor E., Bampidis V., Pentea M., Prundeanu H., Ciolac V., 2012 Nutritional quality of pork produced by Mangalitsa breed. Scientific Papers: Animal Science and Biotechnologies 45(2):386–389.

Oroian I. G., Petrescu-Mag I. V., 2014 Mangalitsa breed returns to homeland. Porc Res 4(1):19-21.

Parunovic N., Petrovic M., Djordjevic V., Petronijevic R., Lakicevic B., Petrovic Z., Savic R., 2015 Cholesterol content and fatty acids composition of Mangalitsa pork meat. Procedia Food Science 5:215-218.

Parunovic N., Petrovic M., Matekalo-Sverak V., Radojkovic D., Vranic D., Radovic C., 2012a Cholesterol and total fatty acid content in *m. longissimusdorsi* of Mangalitsa and Swedish Landrace. Acta Alimentaria 41(2):161-71.

Parunovic N., Petrovic M., Matekalo-Sverak V., Trbovic D., Mijatovic M., Radovic C., 2012b Fatty acid profile and cholesterol content of m. longissimus of free-range and conventionally reared mangalitsa pigs. South African Journal of Animal Science 42(2):101-113.

Petrescu-Mag R. M., 2009 Promoting the Slow food concept for a better Common Agriculture Policy and Environmental Protection. AAB Bioflux 1(2):51-52.

Rasztik V., 2011 Mitokondriális polimorfismusok kiterjesztett vizsgálata a mangalica sertásfajtában. BSc Thesis, Szent István University, Budapest, Hungary, 38 p.

Tóth P., Hartman T., 2007 A mangalica sertés tartása. Környezetvédelmi, Környezetgazdalkodasi felőoktatásért Alapítvány, Gödöllő, Hungary, 63 p.

Tóth T., Boros C., Zsédely E. Virág G., Schmidt J., 2009 A Magyar Nagyfehér x Magyar Lapály és a Szőke Mangalica húsának táplálkozásbiológiai értéke biotartási és -takarmányozási körülmények között. Állattenyésztés és Takarmányozás 58(6):549–563.

Varo-Ghiuru F., Miclea V., Miclea I., Zăhan M., Hettig A., Cârlea L., 2011a The influence of ascorbic acid and alpha-tocopherol in the Mangalitza boar semen cryopreservation media. Bulletin USAMVCJ 68(1-2):444.

Varo-Ghiuru F., Miclea V., Miclea I., Zăhan M., Hettig A., Cârlea L., 2011b The effect of lutein added in the Mangalitza boar cryopreserved semen media. Bulletin USAMVCJ 68(1-2):443.

Szabó P., 2002 Alternatív sertésfajták szaporodásbiológiai eredményei [Theriogenological results of alternative pig breeds]. In: Innováció, a tudomány és a gyakorlat egysége az ezredforduló agráriumában, Debrecen, pp. 97-102. [In Hungarian].

Zăhan M., Hettig A., Miclea I., Roman I., Miclea V., Vintilă I., 2011 Mangalitsa germoplasm preservation using immature oocyte vitrification in SOPS. Bulletin USAMVB Timisoara 44(1):474-477.

Zăhan M., Miclea V., Hettig A., Miclea I., Raica P., Roman I., 2010 The use of molecular and biochemical markers in Mangalitsa breed characterization. Bulletin USAMVCJ 67(1-2):452-455. Zăhan M., Miclea I., Nagy A., Copolovici L., 2019 Comparison

between Mangalitsa and Mangalitsa x Duroc hybrids meat quality. Porc Res 9(1):21-25.
Zăhan M., Moldovan C., Dascăl A. S., Hettig A., Miclea I., Orlovschi D., Miclea V., 2014 Boar sperm preservation by freeze-drying. Porc Res 4(1):1-6.
Zăhan M., Raica P., Miclea V., Miclea I., Renaville R., Duterme O., Mihăilescu M., Nagy A., 2009 Results concerning genetic characterization of mangalita breed using microsatellite markers. Bulletin USAMVB Timisoara 42(1):136-140.
Zhang S., Knight T. J., Stalder K. J., Goodwin R. N., Lonergan S. M., Beitz D. C., 2007 Effects of breed, sex, and halothane genotype on fatty acid composition of pork longissimus muscle. Journal of Animal Science 85(3):583-591.
Zsolnai A., Radnoczy L., Fesus L., Anton I., 2006 Do Mangalica pigs of different colours really belong to different breeds? Arch Tierz Dummerstorf 49(5):477-483.
Zsolnai A., Szántó-Egész R., Anton I., Tóth P., Micsinai A., Rátky J., 2013 Mangalica fajták genetikai távolsága, elkülönítésük nukleotid polimorfizmust mutató DNS markerekkel. Magyar Állatorvosok Lapja 135(5):303-307.
*** http://www.allattenyesztok.hu/aktualis/hirek/vagyalombol-valosag-elismert-fajta-lett-a-fekete-mangalica
*** Kistermelők Lapja 2019/9
*** http://www.moe.org.hu/hu
*** https://agraragazat.hu/hir/hibrid-volegennyel-javitottak-a-mangalica-utodokat/
*** https://www.nak.hu/tajekoztatasi-szolgaltatas/mezogazdasagi-termeles/101262-a-fekete-mangalicaval-bovult-a-vedett-oshonos-mezogazdasagi-haszonallatok-kore
*** Magyar Közlöny 19/2020, Állattenyésztés részletes szabályairól szóló 45/2019. (IX. 25.) AM rendelet (a továbbiakban: 45/2019. (IX. 25.) AM rendelet) módosításáról szóló 1/2020. (II. 6.) AM rendelet (a továbbiakban: AM rendelet), mely módosítás a korábban kihaltnak hitt ősi sertésfajtánknak, a fekete mangalicának a védett őshonos mezőgazdasági állatfajtává történő nyilvánítását deklarálja.

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