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Apulo-Calabrese Pig

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Abstract

The aim of the present chapter is to present history and current status of Apulo-Calabrese pig breed, one of the local pig breeds investigated in the project TREASURE. Apulo-Calabrese breed is one of the Italian autochthonous pig breeds. Its origin dates back to the Roman times, but it suffered a drastic decline during the past century and the recovery started in the 1990s. A herd book for this breed was established in 2001, but its performances and products are practically untapped. There are 45 registered farms with around 500 breeding sows and 100 boars. Apulo-Calabrese pig is characterised by black coat colour. On average sows of Apulo-Calabrese pig breed have 1.7 litters per year with 6.9 piglets. Regarding growth performances, the potential of Apulo-Calabrese pigs in ad libitum conditions of feeding is high (≈ 762 g/day in middle fattening stage) although information on feed intake and feed nutritional value was scarce, which limits the evaluation of growth potential. Data on body composition, carcass traits and meat and fat quality are scarce. The present review gives a first insight into this local pig breed.

Keywords: traditional European breed, TREASURE, productive traits, phenotype, Italy

1. History and the current status of the breed (census)

The Apulo-Calabrese is a breed of black domestic pig from Calabria, in Southern Italy [1]. Census of the Apulo-Calabrese pig breed is presented in **Figure 1**. Presently, there are 45 registered farms of Apulo-Calabrese pigs with about 489 breeding sows and 93 boars in the latest available status (August 2015 [2]). From the historical point of view, already in pre-Roman times, the migratory flows from Central Italy to the South favoured the spread of pig breeding along the Apennine ridges [3]. The Apulo-Calabrese breed is, therefore, a swine population that has been established over the centuries and has spread with the transhumance of the flocks on the road routes dating back to Roman times [3]. In the past century, black coat pigs, capable of using poor food resources, were present along the Apennine foothills. The abandonment of the lands and the uncontrolled introduction of cosmopolitan breeds provoked a rapid decline of this breed too, until, eventually in the 1990s, a recovery action started [3, 4]. The conservation programme has progressively been consolidated, and the herd book was established in 2001 [5].

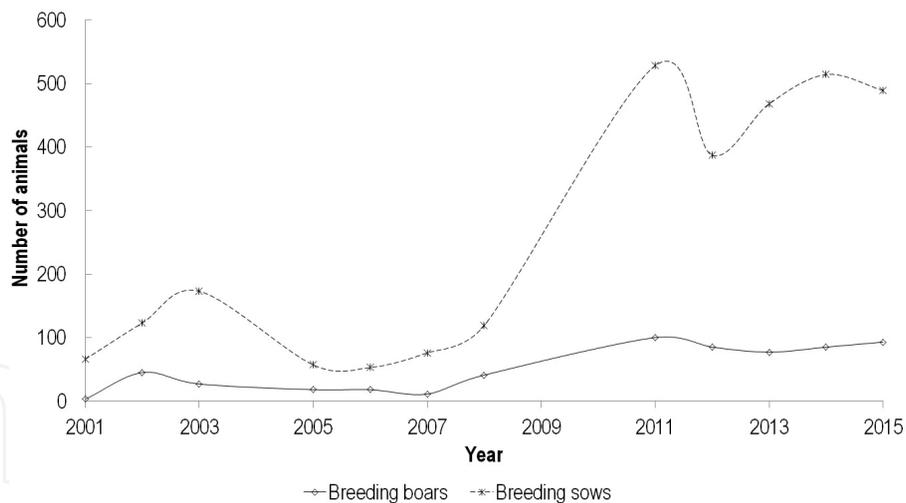


Figure 1. Census of Apulo-Calabrese pig breed, presenting a number of sows and boars per year, starting with the year of heard book establishment.

2. Exterior phenotypic characteristics

The Apulo-Calabrese pig breed morphology information is summarised in **Table 1**. It is medium- to small-sized breed with plain black coat colour (**Figures 2 and 3**). The bristles are black, straight, robust and longer in the dorsal region even if white spots on the lower extremities of the legs are allowed [3, 5]. Long and thin snout with a straight head profile, droopy ears projected forwards and a straight tail [3, 5]. Not less than ten nipples normal and well pronounced [5].

Measurement (average)	Adult male	Adult female
Body weight (kg)	150	130
Body length ¹ (cm)	130–145	130–142
Head length (cm)	32–48	32–48
Ear length	Large	Large
Chest girth (cm)	120–134	125–133
Height at withers (cm)	72–82	71–79
Number of teats	13	13

¹Measured from the tip of the nose to the starting point of the tail.

Table 1. Summary of morphology information on Apulo-Calabrese pig breed.



Figure 2. Apulo-Calabrese sow with piglets.



Figure 3.
Apulo-Calabrese boar.

3. Geographical location and production system

The Apulo-Calabrese breed is present in the southern regions of Italy with the primary concentration of herds in Calabria, Basilicata and Lazio. The breed has been recovered by a regional agricultural development company, which had kept a few animals in a structure located in the municipality of Acri in the province of Cosenza. A not insignificant quantity of Calabrian black pigs was always present in the area of Polsi (Aspromonte) where it is still grazed-free, fed mainly with acorns and chestnuts. Currently, the breed has a recovery, albeit slow, thanks to some small Calabrian pig farms, mostly family-run, with the relative production of its precious sausages. The breed is maintained mainly by peasant farming system using the agroforestry practices. Most of the animals are kept continuously confined, and the basic heat protections are available even if the housing parts are not completely climate controlled.

4. Organisations for breeding, monitoring and conservation

The Italian Pig Breeders Association (ANAS) is responsible for monitoring the breeds, controlling the “registry” that represents the tool for the conservation of breeds not interested in a national selection scheme. The activity is aimed at the conservation of the breed with particular regard to the maintenance of genetic variability while promoting economic exploitation. A private association (Associazione Nero di Calabria) founded with the aim of enhancing, promoting and protecting the products and breeders of the Apulo-Calabrese is also present. The association also aims to expand the culture and tradition of all those typical products of Calabria derived from the transformation of the black pig. In January 2007 the “Consortium for the protection of Calabria PDO cured meats”, a nonprofit organism that carries out functions of protection, control, promotion, development, customer information and general interests for Calabria PDO-cured meats, was also established (**Table 2**).

Name of organisation	Address	Web address
Associazione Nazionale Allevatori Suini (ANAS)	Via Lazzaro Spallanzani 4, 00161 Rome, Italy	www.anas.it
Associazione Nero di Calabria	C.da Taverna snc, 87,040 Paterno Calabro (CS), Italy	—

Table 2.
Contact details of breeding organisation for Apulo-Calabrese pig breed.

5. Productive performance

5.1 Reproductive traits

The basic data obtained on reproductive traits in this review are presented in **Table 3**. The average age of sows at the first parturition varies from 13 to 23.5 months of age [1, 10], whereas, according to ANAS heard book data, age at culling is 52.3 months [2]. Sows of Apulo-Calabrese pig breed have 1.2–2.2 litters per year [1, 7, 9, 11] with 6.1–8.0 piglets [2, 6, 7, 11] of approximately 1.0 kg live body weight [1, 6, 11, 13]. Stillborn percentage of piglets varies from 6.2 to 7.1% [2, 6, 11], whereas piglet mortality rate until weaning in the considered studies ranged from 8.6 to 20.8% [2, 6, 7, 11]. Duration of lactation is prolonged in comparison to modern intensive systems (to 40 days [11]), which leads to a longer farrowing interval (171–300 days [1, 7, 9, 11]) but variable piglet weaning weight (3.4–8.1 kg [11, 13]).

5.2 Growth performance

The basic data on growth performance obtained in this review are presented in **Tables 4** and **5**. Due to big differences between studies with regard to the live weight range covered, we defined the stages for growth performance as lactation (regardless of how long it was), growing stage (from weaning to approximately 30 kg live body weight) and early, middle and late fattening stages estimated between approximately 30 and 60 kg, 60 and 100 kg and above 100 kg live body weight, respectively. Sometimes, the source provided only the overall growth rate for the whole fattening stage (defined as overall) or even from birth to slaughter (defined as birth–slaughter, which is often calculated from the data given on live weight and age of pigs). It should also be noted that a big part of the collected studies simulated practical conditions of the production systems used and that only a smaller part of the studies aimed at evaluating the breed potential for growth. In the considered studies, a daily gain in the early growing stage that corresponds to lactation period varied from 134 to 155 g/day [9, 11]. Generally, growing and fattening stages are characterised by slower growth, but also high variability, especially in fattening stage, among studies can be observed. The average daily gain in growing stage was approximately 280 g/day, whereas in overall fattening stage, it ranges from 300 to 706 g/day [1, 9, 11, 14]. In the context of the evaluation of growth performance, it is also of interest to observe the extreme values, because it can be assumed that the maximum figures exhibit the growth potentials of Apulo-Calabrese pigs in ad libitum conditions of feeding (≈ 762 g/day in middle fattening stage [14]).

The information on feed intake and feed nutritional value were reported only in one study conducted on Apulo-Calabrese pigs, which limits the evaluation of their growth potential. Average daily feed intake reported was 2.2 kg/day in early fattening stage and 3.6 kg/day in the late fattening stage (declared as ad libitum feeding [14]).

5.3 Body composition and carcass traits

The basic data obtained in this review with some of the most commonly encountered carcass traits that could be compared are presented in **Table 6**. Pigs of the Apulo-Calabrese breed were slaughtered at approximately 336 days of age [14] and 149 or 175 kg live weight [1, 14]. Approximately 81.1% dressing yield [1, 14] and only 44.8% lean meat content (SEUROP classification [14]) is reported in Apulo-Calabrese pigs. Accordingly, relatively high backfat thickness of 68 mm at the withers and 48 mm at the level of the last rib was measured [14]. No other data providing measurements of muscularity were found in considered studies.

Reference	Sow age at the first parturition (mth)	Litters per sow per year	No. of piglets alive per litter	Piglet live weight (kg)	Stillborn per litter (%)	Mortality at weaning (%)	Piglet weaning weight (kg)	Duration of lactation (d)	Farrowing interval (d)	Sow age at culling (mth)
[1]	13.0	1.2	—	0.6	—	—	—	—	300	—
[2]	—	—	6.3	—	6.2	8.6	—	—	—	52.3
[6]	—	—	6.1	1.0	7.1	13.2	—	—	—	—
[7]	—	1.3	8.0	—	—	20.8	—	—	281	—
[8]	—	—	—	—	—	—	—	—	—	—
[9]	—	2.2	—	—	—	—	—	—	174	—
[10]	23.5	—	—	—	—	—	—	—	—	—
[11]	—	2.1	7.1	1.3	6.3	19.9	8.1	40.1	171	—
[12]	—	—	—	—	—	—	—	—	—	—
[13]	—	—	—	1.2	—	—	3.4	—	—	—

No. = number, mth = month, d = days.

Table 3.
Summary of collected literature data on reproduction traits in Apulo-Calabrese pig breed.

Reference	Feeding	No. of animals	ADG lactation ¹	ADG growing ²	ADG fattening ³				ADG birth-slaughter
					Early	Middle	Late	Overall	
[1]	—	—	—	—	—	—	—	300	—
[9]	—	95	155	326	329	388	486	359	—
[11]	—	200	134	229	297	298	220	277	247
[14]	Ad lib	72	—	—	733	762	608	706	—

No. = number; ADG = average daily gain in g, Ad lib = ad libitum feeding regime.

¹ADG in a period of lactation regardless of how long it was.

²ADG in a growing period estimated from weaning to approximately 30 kg live body weight.

³ADG in a period of fattening is reported for early, middle and late fattening stages estimated between approximately 30 and 60 kg, 60 and 100 kg and above 100 kg live body weight, respectively. Sometimes, the source provided only the overall growth rate for the whole studied period (in that case defined as overall).

Table 4.

Summary of collected literature data on growth performance in Apulo-Calabrese pig breed.

Reference	Feeding	CP content of feed (%)	No. of animals	ADFI fattening ¹			
				Early	Middle	Late	Overall
[14]	Ad lib	15	72	2.2	3.3	3.6	3.1

No. = number; ADFI = average daily feed intake in kg/day, Ad lib = ad libitum feeding regime, CP = crude protein.

¹ADFI in a period of fattening is reported for early, middle and late fattening stages estimated between approximately 30 and 60 kg, 60 and 100 kg and above 100 kg live body weight, respectively, and as the overall daily feed intake for the whole studied period.

Table 5.

Summary of collected literature data on average daily feed intake (in kg/day) in Apulo-Calabrese pig breed.

Reference	No. of animals	Final age (d)	Final BW (kg)	Hot CW (kg)	Dressing yield (%)	Lean meat content (%)	Backfat thickness (mm)	
							S ¹	At withers
1 [1]	—	—	175	140	80.0	—	—	—
2 [14]	72	336	149	122	82.2	44.8	48	68

No. = number; BW = body weight, CW = carcass weight.

¹S backfat thickness measured according to ZP method (above gluteus medius muscle (mm)).

Table 6.

Summary of collected literature data on body composition and carcass traits in Apulo-Calabrese pig breed.

5.4 Meat and fat quality

Data on meat and fat quality in Apulo-Calabrese pigs are missing, the only information found was measurements of pH in longissimus muscle. The pH at 45 min and 24 h *post-mortem* were 6.30 and 5.85, respectively, measured in 40 animals slaughtered at 149 kg [14].

6. Use of breed and main products

Apulo-Calabrese pigs are used to enhance poor food showing rusticity and adaptability to grazing, with the good maternal ability for the sow. This breed of

pigs adapts very well to outdoor breeding both with extensive and semi-extensive systems, feeding on acorns, chestnuts, tubers and roots that can be found in the wooded areas where it is bred. The breed is currently fully market-oriented interesting both regional and national markets. The most famous product derived from Apulo-Calabrese is the “soppressata” which derives from the meat of the ham and shoulder, the “capocollo” obtained from the top of the boned loin and with a layer of about 3–4 mm of fat and the lard derived from the dorsal part. Other relevant products are the black pudding mixed with chocolate and the “nduja of Spilinga”, an exceptional type of soft spread and very spicy salami. As for Apulo-Calabrese pig, it is among those authorised for the production of the four PDO-cured meat products, salsiccia, soppressata, Pancetta and Capocollo di Calabria, all certified by the “Consortium for the protection of Calabria PDO cured meats”.

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References

- [1] FAO. The Domestic Animal Diversity Information System [Internet]. Available from: <http://dad.fao.org/> [Accessed: 19 July 2017]
- [2] ANAS Database, Gallo M. Personal Communication; 2015
- [3] ANAS. Apulo-Calabrese Standard di razza [Internet]. 2013. Available from: <https://bit.ly/2yZOyvX> [Accessed: 4 April 2018]
- [4] Bigi D, Zanon A. Atlante delle razze autoctone: Bovini, Equini, Ovicapri, Suini allevati in Italia. Milan, Italy: Il Sole 24 Ore Edagricole; 2008
- [5] Ministero delle Politiche Agricole Alimentari e Forestali. Strutture Zootecniche (Dec. 2009/712/CE— Allegato 2—Capitolo 2) (in Italian). [Internet]. 2013. Available from: <http://www.anas.it/Normative/Norme001.pdf> [Accessed: 4 April 2018]
- [6] Gallo M, Buttazzoni L. Ruolo del Registro anagrafico per la conservazione dei tipi genetici autoctoni. In: Nanni Costa L, Zambonelli P, Russo V, editors. Proceedings of the 6th International Symposium on the Mediterranean Pig; 11-13 October 2007; Messina, Capo d'Orlando, Italy. Bologna, Italy: AlmaDL; 2008. pp. 429-434. DOI: 10.6092/unibo/amsacta/2513
- [7] Leenhouders JI, Merks JWM. Suitability of traditional and conventional pig breeds in organic and low-input production systems in Europe: Survey results and a review of literature. *Animal Genetic Resources/ Resources génétiques animales/ Recursos genéticos animales*. 2013;53:169-184. DOI: 10.1017/S2078633612000446
- [8] Maiorano G. Swine production in Italy and research perspectives for the local breeds. *Slovak Journal of Animal Science*. 2009;42:159-166
- [9] Micari P, Racinaro L, Sarullo V, Carpino S, Marzullo A. Zoometric rates, reproductive and productive parameters of the Apulocalabrian swine, obtained in breeding certified by ANAS Calabria. *Italian Journal of Animal Science*. 2009;8:519-521
- [10] Bozzi R. TREASURE Survey WP 1.3, Personal Communication; 2015
- [11] Cosentino E, Morano F, Cappuccio A, Freschi P. Zootechnical performances of Calabrese pigs reared in free range management. *Italian Journal of Animal Science*. 2003;2:403-405
- [12] Franci O, Pugliese C. Italian autochthonous pigs: Progress report and research perspectives. *Italian Journal of Animal Science*. 2007;6:663-671. DOI: 10.4081/ijas.2007.1s.663
- [13] Franci O, Gandini G, Madonia G, Pugliese C, Chiofalo V, Bozzi R, et al. Performances of Italian local breeds. In: Ollivier L, Labroue F, Glodek P, Gandini G, Delgado JV, editors. *Pig Genetic Resources in Europe*. Wageningen, Netherlands: EAAP Publication, Wageningen Press; 2001. p. 151
- [14] Rossi A, Ferrari P, Bossio MB, Monaco F, Fusaro A. Impiego di materie prime non Ogm nell'allevamento dei suini di razza Calabrese. *Rivista di Suinicoltura*. 2008;49:73-78