Zoometric rates, reproductive and productive parameters of the Apulo-calabrian swine, obtained in breeding certified by ANAS Calabria

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ABSTRACT - The purpose of the present paper was to examine the morphological aspects, reproductive and productive performance of Apulo-calabrian swine bred in Calabria in order to acquire a descriptive framework as a basis for further intervention phases.

Key words: Swine breeding, Apulo-calabrian swine, Zoometric rates.

Introduction - The growing understanding in the sector towards the problems linked to the reduction in biodiversity and the reclamation and safeguarding of small high quality enterprises, together with the increased attention of modern consumers towards the qualitative aspects of food products, have, in part, revolutionised the zootechnical sector, encouraging numerous breeders to invest in local breeds, a precious source of genetic variability which at the same time fosters the return to traditional breeding methods characterised by their sustainability. From a Calabrian zootechnical context, the last decade has seen renewed interest in autochthonous breeds and, in particular, the Apulo-calabrian swine breed, previously known as Nero Calabrese. This medium-sized autochthonous breed with black skin and coat (with the exception of the presence of small socks on the forelimbs and large socks on the hind limbs) is characterised by a pronounced maternal instinct in the sow and a marked sexual vigour in the boar. It is an excellent grazer, noticeable for its remarkable frugality and feeding versatility and is particularly suitable for wild or semi-wild management. It produces an excellent quality of meat that is mainly used for transformation into the production of typical regional *salami* and cold cuts, including DOP branded products (*Salsiccia*, *Soppressata*, *Capocollo* and *Pancetta*). Very little data has emerged from literature within the sector regarding the Calabrian black pig as it is generally only of interest at a local level. The aim of the present research is to examine the morphometric, reproductive and productive aspects of this interesting Calabrian breed in order to provide an initial descriptive platform that can provide a useful contribution for further possible phases of intervention.

Material and methods - The research involved each of the 26 farms in Calabria enrolled in the Apulo-calabrian swine Register. Biometric parameters were recorded on 24 mature boars weighing between 160 and 220 kg, selected from available boars. The present research did not include sows as the majority of these were pregnant or in lactation and therefore unsuitable for measuring. With the help of the Lydtin measuring stick, nonius and tape measure, the following measurements were taken: height at withers, thoracic height, ground-sternum height, body length, thoracic width, thorax circum-

ference, breast width, rump width, shin-bone circumference, shin-bone length, head length and forehead width at orbits. The following ratios were calculated based on the biometric data: conformation index, thoracic height index, ground-sternum height index, thoracic index, side conformation index of torso, dactyl-chest index, cephalic index and compactness index (Balasini, 1995). For the reproductive parameters the following measurements were taken on 60 sows: weight and age at first mating, farrowing interval, litters/year, litter size and number weaned/sow. On the basis of age at first mating, sows were grouped into five classes (I, II, III, IV, V) from a minimum age of 251 days with an interval between classes of 45 days. With regard to productive parameters, measurements were taken of the weight of 110 piglets eight days after birth and the average daily weight gain (ADG) of 95 weaned piglets, 60 young growing pigs and 60 growing pigs. ADG was also recorded during the finishing period of 5 barrows, castrated before weaning, from 5 farms from different production areas and subjected to a 60-day period of pre-finishing during which each subject was kept in adjacent enclosed areas of approximately 50m^2 and subjected to a common feeding plan. During the 120-day finishing phase the animals were kept together in an enclosed area of approximately 400m^2 and given barley, maize and fava-based feed offered as meal, complemented with acorns and chestnuts from local markets, depending on the season. The dressing out percentage was taken on subjects kept without food for 36 hours. The SAS (2000) software package was used for statistical elaboration, and data relating to reproductive parameters were analyzed using the following model: $Y_{ij} = \mu + A_i + \varepsilon_{ij}$; where Y is the single observation; μ is the general mean; A is the age effect (i = I, II, III, IV, V) and ε is the error.

Table 1. Biometric parameters measured on 24 boars

Biometric parameters (cm)	Min	Max	Mean	SD	VC%
Height at withers	76	100	87.77	7.73	8.81
Body length	110	137	123.33	7.97	6.46
Thoracic height	37	61	48.99	6.12	12.50
Ground-sternum height	31	46	38.73	4.42	11.40
Thorax width	38	48.5	42.04	4.16	9.90
Breast width	32	45	36.5	3.93	10.77
Thorax circumference	119	166	142.27	13.73	9.65
Shin-bone circumference	18	30.5	24.07	3.72	15.44
Shin-bone length	8.5	16.5	11.7	2.23	19.10
Rump width	25	40	30.5	4.81	15.78
Forehead width at orbits	14.5	18	16	1.18	7.38
Head length	32	47.5	36.47	3.53	9.69

Table 2. Calculated zoometric indices

Zoometric index	Min	Max	Mean	SD	VC %
Conformation index	77.36	100.42	87.14	6.69	7.68
Thoracic height index	47.44	64.89	55.75	4.10	7.36
Side conformation index of torso	30.96	46.56	39.70	3.99	10.05
Dactyl-chest index	14.75	21.71	16.90	1.97	11.64
Thoracic index	21.71	102.70	85.49	8.65	10.11
Ground-sternum height index	35.11	52.56	44.20	4.08	9.24
Cephalic index	36.84	52.94	44.16	4.61	10.44
Compactness index	1.73	3.14	2.27	0.44	19.19

Results and conclusions - Table 1 shows the results of the biometric measurements carried out, while Table 2 shows the zoometric indices calculated on 24 boars. It is noticeable that almost all the variables studied have rather modest VC values. The highest values were found for shin-bone length with 19.1% and the compactness index with 19.19%, the variability of which was, in our opinion, influenced more by the different weights of the boars rather than the different height at withers which, with a VC of 8.81%, was directly unaffected by the higher variability of shin-bone length (19.1%). Indeed, the latter was largely compensated by the variability in thoracic height (12.5%). Rump width and shin-bone circumference also evidenced higher variability than the other parameters, 15.78% and 15.44%, respectively. The least variable was

body length with a VC of 6.46%, followed by thorax circumference and width, both with variability percentages of just over 9%, contrasting with results found by other authors in non-Mediterranean breeds (Barba Capote *et al*., 1998). A general assessment of the zoometric indices reveals that the mature male reproducer of the Apulo-calabrian breed is generally medium-sized, dolichocephalic (see cephalic index) and belongs to the dolicho-brachymorphic sub-type (see conformation and thoracic indices). For reproductive parameters (Table 3), comparison of age classes did not reveal significant differences for litter size and number of weaned/sow, while sows of classes II and III had fewer litters/year than those of classes I and V. Similar behaviour was observed for the farrowing interval which was significantly longer with sows in age classes II and III compared to those of I and V. Weight at first mating was significantly diverse between class V and classes I, II and III. Piglet weight eight days after birth (Table 4) evidenced modest variability (VC 6.76%), while the ADG of suckling piglets displayed a high degree of variability (VC 60.69%) which can be explained by the high degree of competition that occurs among suckling piglets in this phase of suckling to claim the most productive nipple. Indeed, in the weaned piglet phase, ADG variability diminishes considerably (15.54%). The ADG of young growing pigs and growing pigs was also variable (VC 37.24% and 32.63%, respectively). Conversely, for barrows at the finishing phase, ADG was much more homogenous (VC 19.04%). The five slaughtered pigs had a mean live weight of 157 kg, 132.8 kg carcass weight and a dressing out percentage of 84.47%, with variability coefficients of 3.10%, 4.68% and 3.43%, respectively. In conclusion, the present research into Apulo-calabrian swine reared in Calabria has highlighted the following: a) that the boars examined can be assigned to the dolicho-brachymorphic sub-type (4 hams) (Marchelli *et al*., 2000); b) that the performance of sows shows no significant differences in litter size and number of weaned/sow, in spite of the different classes of age at first mating; c) that the ADG of young growing pigs and growing pigs is somewhat non-homogeneous; d) that the dressing out percentage was satisfactory with little variability.

Table 4. Piglet weight eight days after birth (kg) and ADG (kg) of productive categories

Productive category	N		Min	Max	Mean	SD	VC (%)
Piglet (eight days after birth)	110	weight	2.36	2.8	2.58	0.17	6.76
Suckling piglets (< 8kg)	95	ADG	0.074	0.293	0.155	0.094	60.69
Weaned piglets (8-35kg)	“	“	0.251	0.424	0.326	0.051	15.54
Young growing pigs (36-60kg)	60	“	0.067	0.600	0.329	0.123	37.24
Growing pigs (61-110kg)	“	“	0.200	0.800	0.388	0.127	32.63
Barrows at finishing (120d)	5	“	0.378	0.617	0.486	0.092	19.04

Table 3. Comparison between the five classes of age at first mating

Reproductive parameters	I	II	III	IV	V
Weight at first mating (kg)	79.86^{b}	87.5^{b}	89^{b}	96.67^{ab}	110^{a}
Farrowing interval (d)	158^{b}	196^{a}	198^{a}	171^{ab}	146^{b}
Litters/year	2.31^{a}	1.87^{b}	1.87^{b}	2.25^{ab}	2.5^{a}
Litter size	8.14	8.67	8.00	8.67	9.00
Number of weaned/sow	6.71	5.17	5.67	4.00	8.00

Different letters on the same line: P<0.05

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