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The Nebrodi Black Pig: socio-economic analysis and perspectives (opportunities) of development

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Abstract. In recent years, breeding of Nebrodi Black Pigs is taking increasingly an own identity, abandoning that secondary role which saw it as income support and use of marginal areas of the farm. This push to production is due to increased attention and request that the consumer gives to local typical products of excellence. Although registered farms in ANAS are only 36, they are estimated at least a hundred. An exploratory research was conducted, then, on a sample of 36 farms. It provided the first socio-economic data (50% owned firms, average age of 49 years and 83% upper-middle level of education, etc.), farm size and territory (75% farms situated in the mountain, and 95% of those with wooded areas, etc.), and farm management (management of mating and birth, born pigs and period of weaning, feeding and veterinary care, etc.). Besides, results concerning the different farm productions, both farmers (annual production of pigs) and farmers-processors (type of processing and marketing), which represent the 33% of the farm sample under investigation and obtain a better economic performance, are reported. Finally, strategies that farmers hope to apply at the market for better utilization of local typical products and territory development are shown.

Keywords. Nebrodi Black Pig – Socio-economic analysis – Territory development.

Le Porc Noir des Nebrodi : Analyse socio-économique et perspectives de développement

Résumé. Pendant ces dernières années, l'élevage des porcs noirs des Nebrodi a assumé de plus en plus sa propre identité, en abandonnant le rôle secondaire qui le voyait comme un soutien du revenu et comme une utilisation des zones marginales de l'exploitation. Ce moteur de la production est dû à une plus grande attention et une demande accrue des consommateurs concernant les produits d'excellence du terroir. Bien que les entreprises enregistrées dans l'Aire N.S.A. ne soient que de 36, on en a estimé au moins une centaine. Une enquête a donc été effectuée, sur un échantillon de 36 élevages qui ont fourni les premières données d'ordre socio-économique (50% des entreprises sont de la propriété de l'éleveur, qui a un âge de 49 ans en moyenne et parmi lesquels 83% ont un niveau d'instruction moyen-supérieur, etc.); de dimensionnement des exploitations et du territoire (75% des exploitations sont situées en montagnes et 95% de celles-ci en zones boisées, etc.), et de gestion de l'exploitation (gestion de l'accouplement et de la naissance, porcelets nés, période de sevrage, alimentation, soins vétérinaires, etc.). Le travail rapporte également les résultats concernant les différents produits de la ferme, à la fois pour les éleveurs (production annuelle de porcs) et pour les éleveurs-transformateurs (type de transformation et de commercialisation), qui représentent 33% de l'échantillon des entreprises sous enquête et obtiennent un meilleur résultat économique. Enfin, on montre les stratégies que les agriculteurs souhaiteraient appliquer sur le marché pour une meilleure utilisation des produits du terroir et pour le développement local.

Mots-clés. Porc Noir des Nebrodi – Analyse socio-économique – Développement local.

I – Introduction

The ancient civilization of peasants and shepherds of Nebrodi is reflected in numerous handicrafts. The food products find their highest expression in dairy products as the canestrato

cheese, the pecorino cheese, the provola cheese and the ricotta cheese and the famous cold meats made with meat from Nebrodi Black Pig. In recent decades the influence of globalization on animal production systems has led to a loss of biodiversity. From this awareness society has moved to a rediscovery of ancient production systems of the indigenous breeds considering the influences of the environment in which they have developed and adapted.

The Nebrodi Black Pig, added to the list of native species in danger of extinction, has very ancient origins and until recently was only a supplementary income business. Marginal areas, not otherwise used as pasture or arable areas, represented by the forests and the Mediterranean scrub, were the primary source of food. The pigs belonging to this breed live in the wild in the densest and most inaccessible woods of mountainous areas of Nebrodi, where they reproduce in their natural state, and because of their characteristics are well adapted to harsh environmental conditions of the territory, where other races would have difficulties to adapt.

The Nebrodi Park, established in 1993, represents, together with the Park of Etna, Alcantara and Madonie, the largest protected area of Sicily with its 85,587 ha, and includes the most important and extensive woodlands in Sicily (Fig. 1). Half of the woodland consists of coppice, and the other by tall trees. The most important tree species are represented by *Fagus sylvatica* (the extreme southern limit of diffusion area), *Quercus cerris* and *Quercus suber*. There are also some formations of *Quercus ilex*, *Taxus baccata*, *Ilex aquifolium* and important lacustrine and rocky environments.

The livestock system of Nebrodi is characterized by mixed farming (cattle, sheep, goats, horses, pigs, etc.) bred in the wild, native species, inaccessible terrain, lack of roads, common grazing and transhumance in some periods of the year. In this context, livestock, agricultural and health management are difficult to implement. In addition, the "livestock Nebrodi system" is a natural and unique symbiosis of factors in which ancient indigenous germplasm, environment and type of nutrition are the basis for the production of excellent local products highly demanded by consumers.

The preciousness and uniqueness of the meat and the typical and natural products derived from the Nebrodi black pig, recognized by consumers, has led by about twenty years, some farmers to change the type of breeding black pigs. Favouring this rise in the market, and in order to increase the number of animals bred and to better organize the chain of production, they tried to optimize the outdoor rearing, using the forest areas at farms' disposal and intervening in feeding by additions during periods of shortage of natural foods. This type of farming evokes the concept of animal welfare and is in line with consumers' demand for those products derived from "stress free" animals. Although the black pig has a slow growth compared to other commercial breeds, the organoleptic characteristics of its meat and fat, used to produce processed meats such as hams and cold meats, are particularly appreciated by consumers.

The products of the forest, in fact, give the meat of these animals qualities of high value, and the increased interest and awareness of farmers to their genetic heritage, has meant that the black pig became a slow food presidium and for its fresh meat was asked the DOP award. Although we said above, the farms registered in the "National Swine Breeders Association" (ANAS), in 2009, appear to be about 40, but they are estimated to be at least a hundred in the territory of Nebrodi (Fig. 2). As shown in Fig. 2, the black pig farming is mainly located in the province of Messina (61.5%). We also remark that in the province of Benevento, there is the presence of a group of Nebrodi black pigs, exclusively for research purposes, belonging to the Consortium for the Testing, Spreading and Application of Innovative Bio-techniques (CONSDABI). The purpose of this survey is to provide information about socio-economic holdings of the Nebrodi Black Pig from a perspective of development of this zootechnic sector.

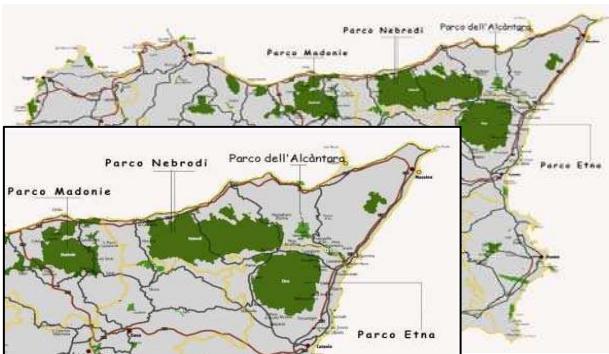


Fig. 1. Parks in Sicily.

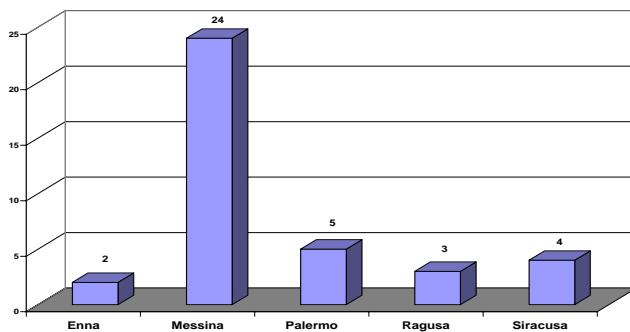


Fig. 2. Diffusion of farms of Nebrodi's Black Pig in Sicily.

II – Materials and methods

The survey involves 36 farms of Nebrodi's Black Pig located in municipalities of Sinagra, Mirto, Militello Rosmarino, S.Fratello, Longi, Frazzànò, Ucria, Castell'Umberto, Tortorici, Alcara Li Fusi, Naso, Caronia, Floresta, Capizzi and S. Lucia del Mela. A large part of them are located within the protected area of the Nebrodi Park (Fig. 3).



Fig. 3. Georeference of farms and area of Nebrodi Park.

The recognition of socio-economic aspects of the sample involved was obtained through an interview to the Nebrodi black pig farmers.

The structured interview consists of the following areas of investigation:

- (i) Data about the breeder (the kind of farming management: property, tenancy and mixed; age and school level).
- (ii) Data on companies and territory (size, location and presence of wooded areas and / or pasture).
- (iii) Data about farm management (pig shelters, management of reproduction, age at the time of slaughter, feeding, medical support, production and marketing).
- (iv) Data about the needs / demands of the farmers (enhancement of products and technical assistance).

III –Results

1. Data on farmers

The details obtained show that the sample farms are 50% owned by the farmers themselves, that their average age is 45.3 years about and that 83% of them have a middle or upper school education level (Fig. 4). From these data it would seem that in this area, the age may be considered an indicator of greater experience and accountability, arousing an interest to undertake the breeding of Nebrodi Black Pigs, in people having a fairly good school level.



Fig. 4. Distribution of farms by management, age and schooling.

2. Data on the farms and the territory

The analysis shows that 50% of farms are small dimension, localized in the mountains and characterized by the presence of woodland and pastures (Table 1).

The distribution of vegetation in the territory of Nebrodi, includes hills with oaks, chestnut trees and Mediterranean scrub, and mountain areas where, in addition to previous species, there are also turkey oak, beech and holm-oak. In grazing areas, the predominant species are composed largely of wooded and arable areas with prevalence of hay, oats, vetch, barley and field beans, that are used in the farm. The sample of 36 farms is formed as following: 10 farms have only forest areas, 3 farms only grazing areas and 23 farms both forest and grazing areas. Farms with forest areas in their territory are 33 (91.6%: 23 with pastures and 10 with just forest areas). In the 23 farms with woods and pastures has been analyzed the distribution of the prevalence of

these areas, noting that for most farms have forest areas (Table 2). Concerning the extension of the surface, small farms with wooded areas (73%) prevail. Finally, farms having pastures in their territory are 26 (23 with forests and 3 with pastures only). There are many farms having not very extensive pastures.

Table 1. Distribution of farms by size, location and presence of forests and pastures.

Farm size	%	Slope	%	Presence of wooded areas and/or pasture	%
1 - 25 ha	50	Mountain	75	Farm with wood and pasture	64
26 - 50 ha	22	Hill	16	Farm with only wood	28
51 - 75 ha	6	Plain	6	Farm with only pasture	8
>75	22				

Table 2. Prevalence and size of farms with forests and pastures

Farms with mixed areas	
Prevalence of forest	40%
Equity between forest and pasture	30%
Prevalence of pasture	6%
Farms with wood for area classes	
1-25 ha	73
> 25 ha	27
Farms with pastures for area classes	
1-25 ha	73
> 25 ha	27

3. Farm management

The results show that more than half of the farms provides farrowing sows with the presence of shelters or even with specific pig shelters called "Zimme", and in most cases there is not any programmed mating. The litter occurs mainly indoors in individual pens, but there are also farms in which the parturition occurs outside (Fig. 5).

The number of piglets born for each sow is about 9, but the mortality percentage observed is around 16%, especially in farms where the sows litter occurs outside. Usually piglets are weaned between the 35th and the 60th day, and the average reproductive life of sows is 5.4 years (Table 3).

The scatter plot (Fig. 6) shows that the modal value on the slaughter age is about 12 months, and that the weight of the pig is about 70-110 kg., depending on the type of farming and on the type of nutrition.

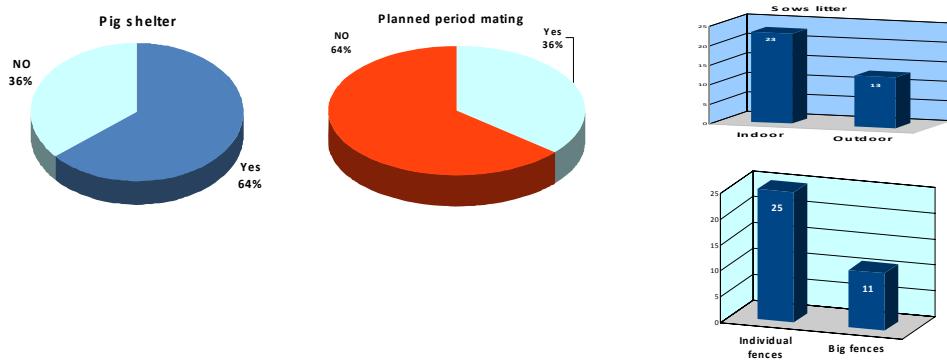


Fig. 7. Presence of pig shelters, mating and parturition

Table 3. Number of piglets born and mortality, age of weaning

Variable	Average	Mode	SD
Piglets born/sow	8.7	8	0.24
Pigletys death rate (%)	15.97	10	1.6
Sow slaughtering (years)	5.4	5	2.46
	No. of farms	%	
Age of weaning			
Between 30 and 50 days	14	39	
About 60 days	14	39	
Between 90 and 120 days	5	14	
No weaning	3	8	

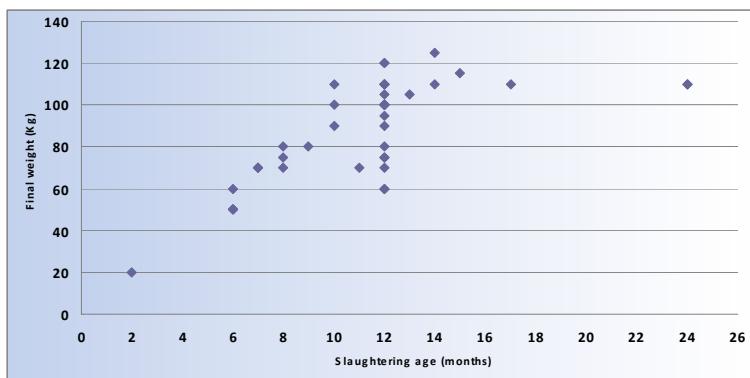


Fig. 6. Age of slaughter and final weight.

4. Feeding system

The composition and origin of food is varied and depends on the availability of the farm, on forest areas destined for the use of pasture, on different periods of the year, and on the years with higher or lower production of natural food in the forest. All farms having forest areas at their disposal allow to the animals to graze with the products of the forest and undergrowth. When no food is available for grazing (in winter with snow-covered land, or in summer), pigs are fed on cereals and cereal-based commercial feed. The natural diet of pasture consists mainly of acorns, chestnuts, and products of the Mediterranean scrub. When the integration is realized, it is composed by grains such as barley, germinated barley, field beans, bran, corn and grain. These are given either whole or ground, depending on availability of millstones in the farm. The commercial foods, specially formulated and balanced by category, are composed by mixed cereals and can be both ground and pellets. There is a small percentage of farms, which create their own composition of feed always based on field bean, barley, wheat, corn, carob, bran, supplemented with minerals.

5. Veterinary support

Only one farm uses vaccination against colibacillosis for mortality in piglets, and two carry out preventive vaccination against Aujeszky's disease.

The hardiness, the resistance against diseases and adverse climatic conditions, the state of extensive breeding allow almost all farms do not have serious health problems excluding skin, lung and gastrointestinal parasitic infestations, and rare infectious problems to respiratory system.

6. Production and marketing

The production activity of the farms is 47.5% only directed to breeding with sale of weaned piglets or pigs at the end of the finishing stage. While 8.3% of the farms carries out both breeding farm and processing.

The marketing is carried out following different models:

(i) "Long-chain":

Breeder -> traders of animals -> slaughter -> butchers -> seller of fresh product at retail.

In this case the farmer does not address the handling of animals in first person.

Breeder -> slaughter -> butchers -> seller of fresh product at retail.

In this case the farmer addresses the handling of animals and sells them.

(ii) "Medium chain":

Breeder - transformer -> slaughter <-> farmer - processor -> distribution.

In this case the transformer - farmer relies on other professional figures in the marketing and distribution.

(iii) "Short chain":

Breeder - transformer -> slaughter <-> breeder - transformer - the seller

In this case the farmer, being transformer, becomes also a seller of his products.

However, some of these transformers are also sellers of their products in accommodation structures (restaurants, specialty shops with tasting, etc.)

With regard to the revenues obtained, the 69.4% represented by the long-medium chains' model, believes that it is not sufficient or just sufficient, while the 27.7%, represented by the short chains' model, is quite satisfied with own economic productivity.

7. Demands of farmers

Strategies for better enhancement of products. The near unanimity of the interviewed farmers think that is important the creation of a PDO and to be membership of a consortium for development. All respondents agree on the request of a better publicity, diffusion and knowledge of Nebrodi black pig, both at regional and national field. They remark also the need to inform the consumer about the organoleptic characteristics of the products and about high quality of the raw materials used, in order to improve the marketing through a widespread distribution.

Technical assistance. About 72% of farmers would like to have more assistance in the management of breeding, specifically concerning the quality and the quantity of food, the decrease of mortality, in addition to a better health care. 10% also requires technical assistance to improve and refine their processing techniques of the products.

IV – Conclusions

This survey is a description of the of Nebrodi black pig breeding provided by the farmers themselves. The farming system used is mainly a semi-wild type by using the forest resources more in finishing period. The breeding of the Nebrodi Black Pig is a closed-cycle type. The most of respondents is only responsible of the breeding (88%) and relies to other professional figures to the processing and sale of products. It is clear the importance of a suitable health management, that would allow the increase in productivity and would ensure to obtain safe products for the protection of consumers' health, as required by the farmers themselves.

The awareness about the preciousness and uniqueness of the meat and products derived from natural and typical Nebrodi black pig, is associated with the firm conviction that the various phases of the production chain can not be approximately carried out. In this regard, the farmers interviewed emphasize this need due to their awareness about a lack of their organizational structure. In addition, the demand for environmental quality by citizens continues to grow and is becoming even more qualified and functional. In fact, the citizen, as a consumer, adapts its behaviour concerning rural tourism and gourmet or the purchase of agricultural food and products or handicrafts, on the bases of the information received about the environmental quality of territories. European consumers also require high quality food products made using production systems compatible with environmental, landscape and genetic resources conservation. In this regard, traditional foods produced by local farms and traditional practices, that can help to achieve these goals, can have significant effects on innovation and added value for rural societies. In conclusion, the breeding of Nebrodi black pig, is an opportunity for regional development through environmental protection, soil conservation and preservation of biodiversity. In summary, through an innovation, respectful of tradition, young generation can be encouraged limiting the unstoppable phenomenon of rural exodus.

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