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in

De Pedro E.J. (ed.), Cabezas A.B. (ed.).
7th International Symposium on the Mediterranean Pig

Zaragoza : CIHEAM

Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 101

2012

pages 117-124

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=00006665>

To cite this article / Pour citer cet article

Bonanzinga M., Franci O., Cappè F., Sirtori F., Crovetto A., Esposito S., Pugliese C. **The breeding of the main local pig breeds in Mediterranean Europe.** In : De Pedro E.J. (ed.), Cabezas A.B. (ed.). *7th International Symposium on the Mediterranean Pig*. Zaragoza : CIHEAM, 2012. p. 117-124 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 101)



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The breeding of the main local pig breeds in Mediterranean Europe

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Abstract. The study reports the results of a survey on 7 local pig genetic types: Nero Siciliano in the Nebrodi territory of Sicily (Italy), Cinta Senese in Tuscany (Italy), Nero di Parma and Mora Romagnola in Emilia Romagna (Italy); "Nustrale" pig in Corsica (France); Greek pig (Greece). This study complements the analysis of a swine production characterized by strong territorial aspect as that of the improved pigs of Plana de Utiel-Requena, Valencia region (Spain). The paper reports statistics of technical and management aspects of the farms such as: farm size, land use, productive and reproductive parameters, marketing techniques. The comparison among breeds shows a substantial homogeneity of land use and a close link with the territory, although there are different levels of the rearing extensivity. In almost all cases the reproduction activity is the most critical element, as well as critical is the high variability of weights and slaughter age present in almost all areas under study. It is difficult to compare the several commercial strategies for selling products because they are characterized by very different levels of self-consuming. Niche production and high quality are the only elements common to all the surveyed farms.

Keywords. Local pig – Territorial survey – Farms features – Biodiversity.

Élevage des principales races de porc dans l'Europe méditerranéenne

Résumé. L'étude indique les résultats d'une enquête portant sur 7 types génétiques de porc local : Nero Siciliano dans le territoire de Nebrodi en Sicile (Italie), Cinta Senese en Toscane (Italie), Nero di Parma et Mora Romagnola en Émilie-Romagne (Italie) ; "Nustrale" porc de Corse (France) ; Porc grec (Grèce). Cette étude complète l'analyse d'une production porcine caractérisée par une forte dimension territoriale comme celle du porc amélioré de Plana de Utiel-Requena, région de Valence (Espagne). Le document montre des statistiques sur les aspects techniques et de gestion des exploitations agricoles, tels que: taille des exploitations, utilisation des terres, paramètres de production et de reproduction, techniques de marketing. La comparaison entre les races montre une homogénéité substantielle de l'utilisation des terres et un lien avec le territoire, bien qu'il existe différents niveaux d'extensification. Dans presque tous les systèmes, la reproduction est l'élément le plus critique, ainsi que la grande variabilité de poids et l'âge d'abattage présents dans presque toutes les réalités étudiées. Il est difficile de comparer plusieurs stratégies commerciales pour la vente des produits parce qu'ils sont caractérisés par plusieurs niveaux d'autoconsommation. La production de niche et de haute qualité sont les seuls éléments communs à toutes les exploitations étudiées.

Mots-clés. Porc local – Enquête territoriale – Caractéristiques des exploitations – Biodiversité.

I – Introduction

The Qubic project, funded by the EU with the MED program has the aim to verify the breeding of 7 genetic types of local pigs, in different areas of the European Union belonging to Mediterranean Regions. The partners involved in this project come from different countries: 3 Italians (Regione Sicilia, ARSIA-Regione Toscana, SSICA- Regione Emilia-Romagna), a Spanish partner (AINIA-Valencia), a Greek partner (INA-certh-Thessaloniki) and two French partners (INRA-Corsica and Chambre du Drome).

II – Materials and methods

1. Animals

Six types of local pigs have been examined. Four reared with extensive techniques:

- 1) *Nero Siciliano* in the Monti Nebrodi area (Sicily, Italy)
- 2) *Suino “Nustrale”* in Corsica (France)
- 3) *Cinta Senese* in Tuscany (Italy)
- 4) *Greek Pig* (Greece)

Two reared with semiextensive techniques:

- 5) *Mora Romagnola* in Romagna (mainly in province of Ravenna) (Italy)
- 6) *Nero di Parma* in province of Parma (Italy)

It was also carried out an analysis (with the aim of comparison) on pigs reared under intensive techniques for high quality production with strong territorial value:

- 7) Improved pig (Large-White, Landrace, Pietrain, White Belgian) in *Plana de Utiel-Requena* (Valencian Region, Spain)

Nero Siciliano

The “*Nero siciliano*” is mainly present in eastern Sicily, in the province of Messina, on Nebrodi mountain, so this breed is also called “*Suino nero dei Nebrodi*” (Chiofalo *et al.*, 2007). The *Nero* pig has black skin, where strong black bristles, that can reach about 10 cm long, are implanted on neck, withers, back, loins. The rearing system of *Nero Siciliano* is mostly outdoors fed barley and field beans but a small number of subjects is also held in free range system fed natural vegetation of the undergrowth. There are 111 farms that rear this breed with a total of 644 sows and the Qubic survey was conducted on a sample of 36 farms.

Nustrale

The “*Nustrale*” pig breed is the local pig breed of the Corsican Island and it is present on the whole island (Casabianca *et al.*, 2000). The regional breeders association (created in 1998) works very close to the association constituted (in 2001) to apply for a PDO for high quality cured meat products. The rearing system is extensive and based upon the use of local resources like pasturelands, chestnuts and acorns. The products are processed in a traditional way and often sold by the farmer himself. The breed was officially recognized in 2006 by the national authorities, which allows mentioning it as mandatory in the PDO specification.

The survey concerned 23 farms located in Corsica.

Cinta Senese

The “*Cinta Senese*” pig breed is native of Tuscany and it is farmed in the Region since immemorial time (AA.VV., 2004). This breed has black skin with a white belt on withers and front legs. Currently, its rearing is expanding both in the Region and outside; during the 80s, the breed has been threatened of extinction because of the strong competition of improved genotypes. The rearing of this breed is always outdoors on pastures and/or forest land with different levels of extensification and animal load. The farming system varies from full free range to a more rational system that includes the use of shelters during the reproduction period. Official reports show the presence of 147 farms in Tuscany with a total of 1220 sows. The Qubic survey concerned a sample of 36 farms with approximately 681 sows, which represent more than one half of the total number of the reared sows.

Greek Pig

The Greek pig is a domestic breed, that looks like the wild boar and it survives in the northern

areas of Greece. The rearing of this breed is at present in expansion whereas, during the 80s, the breed has been threatened of extinction because of the strong competition of improved genotypes and the crossbreeding with the wild boar. The dominant colour of this breed is black, but animals can be black-brown, brown with white grooves as well as black with white spots. They live generally on free range, grazing on oak-forests. Currently the number of sows is 350 units, distributed in 10 farms. The survey covered all farms located in Thessaly, C. Macedonia and Western Thrace.

Mora Romagnola

"*Mora Romagnola*" was widespread in the province of Forlì and Ravenna, but also throughout the Romagna (Tassone and Fortina, 2003). The name "Mora" was codified in 1942 and it is due to its colour, dark brown tending to black. The salient morphological feature of the breed is the coat with pigmented skin (black or dark grey) on the back and in external areas of the limbs, while abdomen and inner faces of forearm and thigh are rosy. It presents black and tan coat with long bristles with divided and reddish tip. Today there are 46 farms registered in the herdbook with approximately 450 animals (300 females and 150 males). The survey covered 23 farms almost located in province of Ravenna.

Nero di Parma

The "*Nero di Parma*" pig is the result of a recovery project which began in the early 90's. The work of selection and study of morphological aspects resulted in the reconstruction of the genetic hybrid "Nero di Parma" (Sabbioni *et al.*, 2009). From the 90's some breeders join together in a Consortium and developed, together with institutional bodies, a trademark to identify products derived from meat of "*Nero di Parma*" pig. The rearing of this breed is semiextensive and at present there are 841 females and 45 males registered. The survey concerned 20 farms in the Parma Province.

Improved pig of *La Plana de Utiel-Requena*

In this Spanish region take place an industrial type of pig breeding with a strong specialization of the various productive sectors so that in 114 farms, only 92 of them carry on fattening stage and 12 are multipliers or breeders. The employed breeds are: Large White, Landrace, Pietrain, Belgian White and the goal is to produce a light weight pig (about 110-120 kg), for fresh consumption and for the production of typical products of Requena. This production involves the use of natural products like lemon, orange, cinnamon, etc. In this situation the farm size, measured as number of sows, refers to classes that are completely different from those used for the local pig system because of only 20% of the surveyed farms raises less than 50 sows (representing only 1% of the total sows) and another 20% (57% of total sows) is in the class between 1500-2500 sows.

2. Monitoring

The project involved a detailed monitoring of the activity of the farms, of the production environments in which they operate, of the transformation phase and the enhancement of products and issues concerning the marketing of various productions. The survey was conducted on a sample of representative farms allowing to analyze the situation of reared breeds identified in a well-defined territory, which usually corresponds to the native area and / or maximum spreading area.

III – Results and discussion

The analysis of the parameters measured during the visits conducted in the various farms, allows some reflections to highlight the common or distinctive aspects. While postponing the

consideration of individual reports for a more precise and detailed analysis of different situations. These are the main results obtained:

1. Farm size

The summary of data on Table 1 shows a remarkable homogeneity among the realities analyzed with regard to farm size, measured by the average number of sows. They are always realities based on a limited number of breeding pigs, with 30-40% of those managing less than 5 sows. One exception is the reality of the "Nustrale" pig, having a greater presence of medium-sized farms (6-50 sows). It is noteworthy to point out, in the case of the Cinta Senese in Tuscany (Bonanzinga et al. 2007) and Mora Romagnola in the province of Ravenna, the presence of large farms (at least for the local pig breeds), which indicates a tendency to move towards economies of scale. Also the reality of the Greek Pig production appears oriented towards medium-sized herds, with almost half of the farms with more than 100 sows.

As a comparison with the actual production of local pig breeds, it can be reported what emerges from the report on the Plana de Utiel-Requena.

Table 1. Distribution (%) of herds in dimensional classes on the basis of number of sows. In parenthesis the incidence of sows on the total

	Herd size (no. of sows)			
	1-5	6-15	16-50	> 50
Extensive rearing				
<i>Nero Siciliano</i>	37	33	30	
<i>Cinta Senese</i>	29(6)	38(17)	21(23)	12(54)
<i>Nustrale</i>	4 (1)	52(33)	44(66)	
<i>Greek pig</i>	10	10	30	50
Semiextensive rearing				
<i>Nero di Parma</i>	42(13)	42(45)	16(42)	
<i>Mora Romagnola</i>	37(7)	48(40)	10(23)	5(30)

2. Land use

The surveyed herds can be attributed to three types of rearing techniques: extensive, intensive and semi-extensive. The extensive type is the most representative and it is realized for *Nero dei Nebrodi*, *Nustrale*, *Cinta Senese* and *Greek Pig* breeds. In this case, there are medium- large herds, that often includes areas used for grazing pigs. The widespread presence of oak and chestnut, also allows the use of grazing for food. Sometimes the continuous presence of pigs within the wooded areas caused erosion and damages to plant roots. In these cases it is desirable to have a more rational management of these areas, pointing to the rotation of grazing areas and reducing the animal loading by excluding all the breeding animals and in the most critical cases also the lean pigs from grazing in the wood. As regards the semiextensive rearing, the concerned breeds are *Nero di Parma* and *Mora Romagnola*.

The farms have relatively small areas, the surface for grazing is present in a very small proportion and there are some open spaces for pig breeding.

3. Reproductive activity

Regarding reproductive activity, in most cases the number of weaned piglets was around 5-7 and the weaning age was around 60 days for the extensive farms. The considered breeds are

rustic breeds and therefore their reproductive performance reflect the characteristics of these animals, usually not improved and therefore less productive.

Data obtained from breeds reared with semi-extensive techniques do not differ much from those of free range, while the improved pig from the Plana de Utiel-Requena highlight reproductive performance in line with the European standards for industrial pig breeds (2.42 birth / sow / year with an average of 20.5 piglets weaned) (Table 2).

Table 2. Reproductive performance

	Litter size		Births/sow/ year	Weaned/sow/ year
	Born alive	At weaning		
Extensive rearing				
<i>Nero Siciliano</i>	8.97	7.54		
<i>Cinta Senese</i>	6.82	6.16	1.59	9.80
<i>Nustrale</i>	6.87			
<i>Greek pig</i>	8.10	5.30	2.00	10.60
Semiextensive rearing				
<i>Nero di Parma</i>	7.40	5.41	1.35	7.30
<i>Mora Romagnola</i>	8.31	6.52	1.75	11.4
Intensive rearing				
<i>Pig of Plana de Utiel-Requena</i>	10.90	8.45	2.42	20.50

4. Productive parameters

The production of local breeds shows a wide variability of weights and slaughter ages. This variability is present within each farm, between farms within the same breed (because of production decisions and management) and between local breeds in relation to the intrinsic characteristics of growth, maturation and body size. It's very interesting the comparison of local breeds with the pig farming of Plana de Utiel-Requena which has a well-defined production target (light weight pigs), using improved pigs (standard rearing conditions) with the aim of meet the economic logic of the market that requires growth rates well calibrated and standardized.

Therefore, in this case age and slaughter weight do not fluctuate too much and the most frequent production is focussed on a pig weighing in the range of only 5 kg.

Regarding breeds reared in extensive conditions, it's possible to make some remarks and to establish a differential framework, as shown in the summary presented in Table 3.

The *Cinta Senese* breed is the one that achieves the highest slaughter weight (150 kg) which allows a good production of hams (Bonanzinga *et al.* 2007). *Nero dei Nebrodi* and *Nustrale* show an almost identical situation, reaching an average slaughter weight of 110-115 kg that guide the production mainly to various types of salami. Finally, the *Greek pig*, slaughtered at a very light weight (70 kg), is intended for fresh consumption, because in Greece there isn't a real tradition of processed pig meat products.

Regarding the breeds reared in semi-extensive conditions, the slaughter weight is significantly higher than that for animals reared in extensive conditions and varies from 160 kg for *Mora Romagnola* to 190 kg for *Nero di Parma*.

With these characteristics of carcasses it's possible to make all the types of productions following processing techniques typical of the native area especially ham, coppa, pancetta, etc.

Finally, in La Plana de Utiel-Requena pig production is addressed to lightweight pig (approximately 115 kg) at an average age of slaughtering of 6.5 months. The production is directed to the processing industry while a small percentage is intended for fresh consumption.

Table 3. Age and weight of slaughter

	Age (months)	Slaughter weight (Kg)
Extensive rearing		
<i>Nero Siciliano</i>	18	115
<i>Nustrale</i>	18	110
<i>Cinta Senese</i>	18	150
<i>Greek pig</i>	10	70
Semiextensive rearing		
<i>Nero di Parma</i>	17	190
<i>Mora Romagnola</i>	16	160
Intensive rearing		
<i>Pig of Plana de Utiel-Requena</i>	6.5	110

5. Destination of the products

The situation of commercial products of the 6 local pig breeds is extremely variable and it is hard to give an overview of the various trade flows (Table 4).

Table 4. Destination of the products

	Self Use	Direct sale/ restaurant	Butchers/ traders	Industry
Extensive rearing				
<i>Nero Siciliano</i>	3	97		
<i>Cinta Senese</i>	5	43	22	30
<i>Nustrale</i>	1	90	9	
<i>Greek pig</i>		58	32	10
Semiextensive rearing				
<i>Nero di Parma</i>		37	58	5
<i>Mora Romagnola</i>		23	20	57
Intensive rearing				
<i>Pig from Plana de Utiel-Requena</i>			18	82

Even if all of them are niche production, the share of auto-consumption is very low, reaching the peak in *Cinta Senese* (5%). Direct selling is possibly the most widespread method of marketing, particularly in the realities of *Greek Pig* (58%), of *Nustrale* pig, where it reaches more than 90%, and of *Nebrodi Black pig*, where it is the only commercial channel. For the other breeds also, however, the direct selling represents a good slice of the market (43% in the *Cinta Senese*, 37% in *Nero di Parma*, 23% in *Mora Romagnola*) and it often occurs with direct sales to private individuals or to agro-touristic farm going side by side together types of commerce such as restaurants, butcheries and shops. For the commercial realities of these last three breeds, however, it is also an ongoing a relationship with the processing industry that is being developed especially for *Mora Romagnola* and *Cinta Senese*. This last breed begun to direct

the product towards few large Companies and GDO which are capable of enhancing the product, ensuring wide distribution anyway. The light pigs produced in the *Plana de Utiel-Requena*, however, has a commercial destination far less complex following the normal channels of industrial production which are the processing industry and butchers.

IV – Conclusions

The Qubic European project allowed to compare, for the first time, all the genetic types of native pig breeds of the Mediterranean Basin Area, except for the Iberian swine that for bureaucratic reasons has not been included in the Qubic project yet.

In recent years all indigenous pig breeds have been involved in programs and projects for recovery and valorisation using the European, national and regional funds, except for the Greek pig that has been identified with this project.

Almost all the concerned herds show an organization that provides the complete production cycle. While in the case of the *Mora Romagnola* pig breed surveys has been made in some farms (17%) that provide only the fattening stage. This last type is rare and rather temporary for the local breeds, because there is no need to specialize the farming of these breeds.

Farms surveyed are very similar even if the morphological characteristics were different, highlighting also significant differences in relation to their slaughter weight (from 110 of *Nustrale* to 150 kg of *Cinta Senese* up to 190 kg of *Nero di Parma*).

The slaughter weight is reached at different times and it shows a wide variability even within the same breed.

So there are margins to improve farming techniques without changing the characteristics of a typically extensive farming.

Finally, the relationship with the territory and in particular with the use of forests. In some situations the grazing in the wood is not much used, while in many others situations we can observe a strong animal loading on the woodland. Often the animals are placed permanently in the wood causing damages without gaining an advantage in terms of feeding.

This is certainly a problem and it could also become a limiting factor for the development of this type of farming.

Trying to make compatible the native pig breeding with a sustainable grazing in the wood is certainly the challenge for the next years, a challenge that will ensure the development of these important breeds and will guarantee the consumers about the availability of quality products that, because of their typical characteristics, will be very important to represent a given territory.

Acknowledgements

The research was supported by MED Territorial Cooperation Programme, funded by the European Regional Development.

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