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# The link between breed, territory and product quality: the case of the Cinta Senese

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**Abstract.** The study reports the results of a survey on farming issues from a representative sample of Cinta Senese farms located in Tuscany. The paper reports statistics relating to technical and managerial aspects of farms such as: farm size, land use, feeding techniques, production and reproductive parameters, health management, marketing techniques. The information generated were then analyzed to identify the strengths and weakness of the system, while giving the real opportunities for development of the breed. Again, thanks to results of the survey, this paper describes the main types of salami made from Cinta Senese, indicating, also in this case, the strengths and weakness of the system, especially for what concerns the technical processing and marketing strategy. Particular emphasis is given to issues related to the management of the Protected Denomination Origin (PDO) that, for the Cinta Senese, was obtained, as a transitional, exclusively for the fresh meat.

**Keywords.** Cinta Senese – PDO – Territorial survey – Salami.

## **Le lien entre la race, le territoire et la qualité des produits: le cas de la Cinta Senese**

**Résumé.** L'étude montre, tout d'abord, les résultats d'une enquête sur les modes d'élevage d'un échantillon représentatif des exploitations de Cinta Senese dans le territoire de la région de Toscane. Le travail rapporte les statistiques concernant les principaux aspects techniques et de gestion de l'exploitation parmi lesquels: dimension de l'exploitation, usage du sol, techniques d'alimentation, modèles productifs et reproductifs, gestion sanitaire, techniques de commercialisation. Les résultats obtenus ont été analysés pour déterminer les points de force et de faiblesse du système en indiquant en même temps les opportunités réelles de développement de la race. Le travail décrit aussi les principales typologies de charcuteries produites avec Cinta Senese, en indiquant aussi dans ce cas les points de force et de faiblesse du système surtout en ce qui concerne les techniques de transformation et de commercialisation. Une attention particulière est accordée aux questions relatives à la gestion de l'Appellation d'Origine Protégée (AOP) pour la Cinta Senese, qui a été obtenue provisoirement exclusivement pour la viande fraîche.

**Mots-clés.** Cinta Senese – AOP – Enquête territoriale – Charcuterie.

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## I – Introduction

The Cinta Senese, pig breed native of Tuscany, is farmed in the region since immemorial time; currently, its rearing is expanding also in outside regions after that during the years 60s-80s, it was in danger of extinction because of the strong competition of the improved genotypes. To date, the official statistics report the presence, in Tuscany, of 147 farms with 1,200 sows in breeding. The farming system varies from the completely free range, in which the animals are not supported by structures and receive minimal food supplementation, to the more rational system that uses shelters of varying complexity, especially for the reproduction phase, and food support, not far from the industrial systems. However, the rearing is always outdoors on agricultural land and/or forest with different levels of extensification and animal loading. The wood used is the typical Mediterranean forest constituted primarily of deciduous oak (*Quercus cerris*, *Q. suber*, *Q. pubescens*) and evergreen (*Q. ilex*) and of chestnut trees. The success of

the breed is being realized thanks to the special quality of its fresh meat and cured products. If properly addressed with adequate feeding, which has a strong influence on the fatty component, the organoleptic characteristics of its products are especially appreciated because they are well distinguishable from those of the products originated by standard pig.

## II – Materials and methods

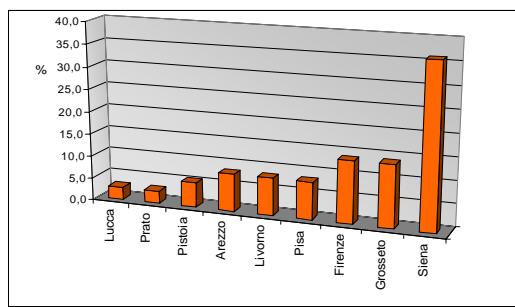
The report relates on the rearing system of Cinta Senese and involves a representative sample of farms (35 on 147) (Fig. 1). Referring to the number of breeding animals, the sample includes about half of the sows reared in Tuscany (681 on 1200). This study wanted to notice technical information on breeding management, productive performances, marketing strategies, processing techniques and to point out breeders' technical and commercial needs.

The survey involved all the provinces of Tuscany except Massa Carrara, which has no farms of Cinta Senese. The distribution Cinta Senese farms by province is represented in Fig. 2: the majority of the farms is located in the province of Siena, while the lowest number of farms surveyed is located in the provinces of Lucca and Prato with just 2.7%.

Data were analyzed using SAS statistical software (SAS Institute Inc., 2003).



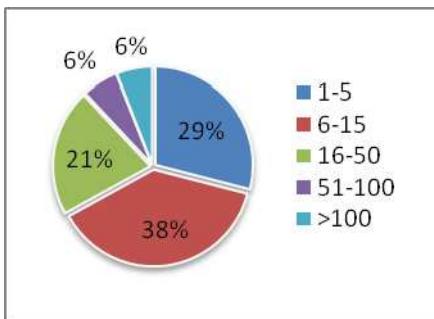
**Fig. 1. Localization of farms included in the survey.**



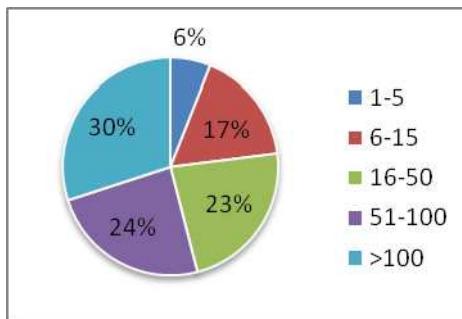
**Fig. 2. Percentage of Cinta Senese farms by province.**

## II – Results

The most represented class of farm size (38%) is the class 6-15 (Fig. 3), where are reared the 17% of the whole of the sows (Fig. 4). The farms of this class were the most investigated because of their importance for the area of study (small rural farms which are well established on the area). The 21% of the farms falls in the third class (16-50 sows) where are reared the 23% of the sows. The farms belonging to this class are the most interesting because they have the size enough to guarantee the self-sufficiency. At the same time these farms rear the animals with traditional techniques exploiting capitals and resources specific of the territory. The 51-100 and >100 classes are equally represented in the sample and have similar size in terms of number of sows (the smallest has 74 sows, the largest 104). The owners of these latter farms consider the livestock activity as an opportunity for capital investment and are able to exploit the favourable economic moment that has recently arisen in the rearing of Cinta Senese breed. In these farms the salami production is characterized by a high technologic level. In these two classes are reared almost the 50% of the sows (Fig. 4).

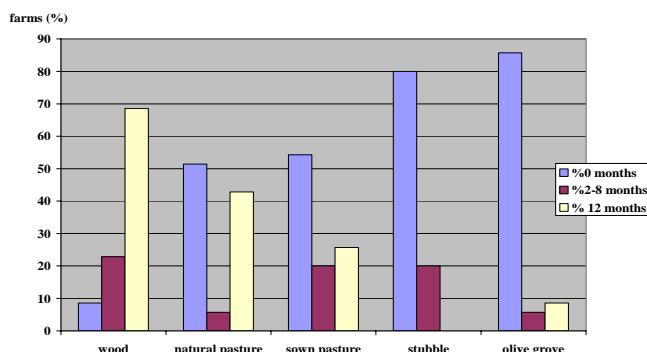


**Fig. 3. Classes of farm size expressed as number of sows.**



**Fig. 4. Percentage of sows for each class of farm size.**

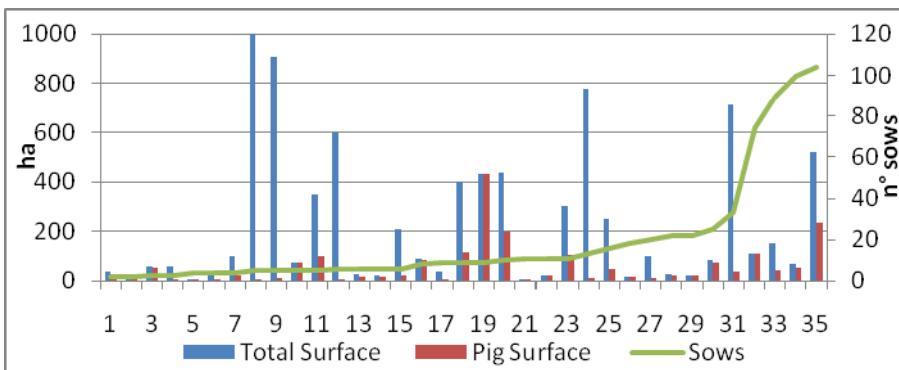
The forest – when present – is used for grazing throughout the year by about 70% of farms (Fig. 5). The pasture – both natural and sown – respect to forest, is less exploited for breeding pigs, and approximately the 50% of farms never uses it for this purpose. Few, or never, farms use the stubble, or other categories such as olive groves, for grazing.



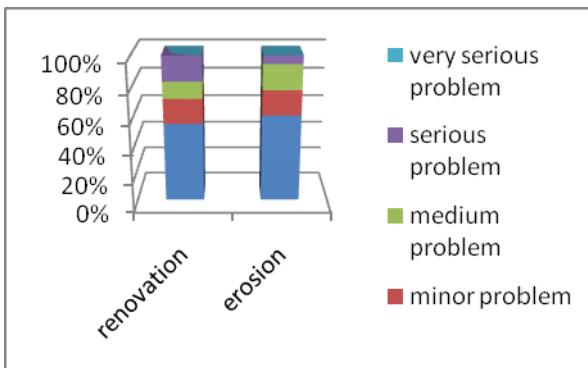
**Fig. 5. Temporal exploitation of surface by farms (expressed as percentage of the total farms).**

In Fig. 6 the 35 farms are listed according to the number of sows. The surface of the farms is not correlated with the number of animals raised, nor with the grazing area. There are farms with few animals and big land surface, as well as farms with many animals but with small land surface available for them, either for grazing or for crops dedicated to animal feeding. Farms with many animals, even when they have a large agricultural area available, use a very small area for the rearing of the pigs; this is because the Cinta Senese rearing has a very marginal role in this type of farms.

Figure 7 shows the degree of perception by the farmer of the environmental problems linked to the rearing of pigs, with particular reference to plant renewing and soil erosion. Over 50% of farmers do not find any kind of problem linked to outdoor pig farming, which is known to produce high impact. This result suggests that people minimizes the problem, this is for the lack of objective and encoded parameters for the measurement of damages.



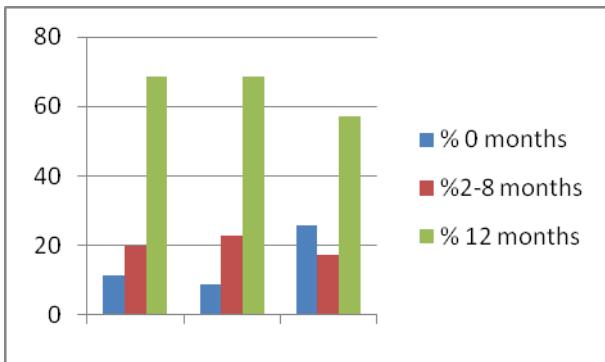
**Fig. 6. Number of sows/ total farm surface and pastured farm surface by pigs.**



**Fig. 7. Perception of environmental problems caused by the rearing of pigs.**

The statistics of Fig. 8 have to be read considering that pigs are grazing on wood only in some periods of the year, particularly when the wood is able to provide its fruits for animal feeding. The 70% of farms grazed on wood the growing and fattening pigs for 12 months, while the 10% of them do not graze on wood these categories. The 55% of farms grazed the sows on wood for 12 months while the 30% of farms do not graze on wood these categories. This statistic raises serious doubts about the sustainability of natural resources because it seems that the forest is perceived as a "container" of pigs and not as a source of food supplements. It seems that only the 20% of the farms has a management according to with this principle.

Only the 20% of the breeders planes the reproductive activity and only in the 8% of the farms the sows have more than two births/year. In most cases (47%) the sows have two births/year, which is the more suited situation in the outdoor rearing system of Cinta Senese (Table 1). In many cases there are data that denote a very low reproductive activity; this is due, prevalently, to a bad management rather than to low fertility of animals. Indeed, taking into account the farming system adopted, the number of born and weaned piglets per litter is satisfactory; it is, on average, more than 7 and 6 piglets, respectively.



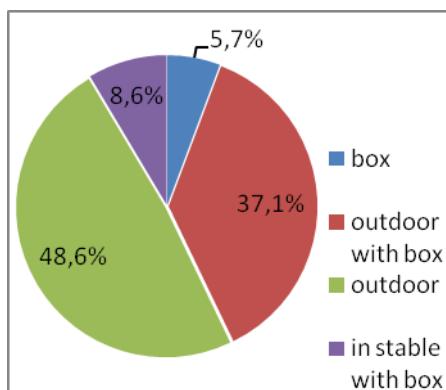
**Fig. 8. Time of grazing on woods according to productive categories.**

**Table 1. Reproductive parameters**

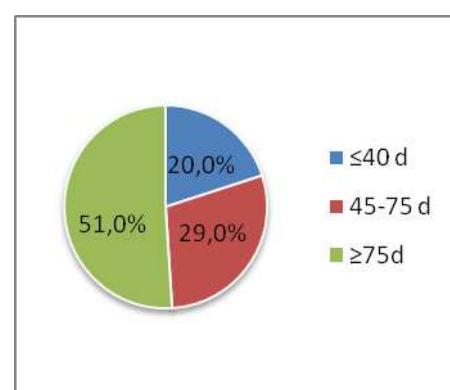
	Births/year/sow	Piglets/birth	Still piglets/birth	Weaned pigs/birth
Mean and s.d.	$1.59 \pm 0.66$	$7.31 \pm 1.64$	$6.82 \pm 1.48$	$6.16 \pm 1.26$
Median	2.00	7.00	6.75	6.00

All farms (except one) are equipped with structures where the sows deliver and suckle the litter (Fig. 9). Three farms are equipped with box for the birth similar to those used in intensive system. The 85% of farms use the consanguinity service provided by ANAS (Associazione Nazionale Allevatori Suini), the 83% of farms have no problems in giving maternity and paternity of the subjects.

The average age at which the piglets are weaned is 59.5 d (SD 24) and mode is 45 days (Fig. 10). All farms wean the pig above the minimum age scheduled for animal welfare (28 days); five farms wean within 36 days. There are many companies that wean the animals at age too high. The situation is detailed in the chart below.



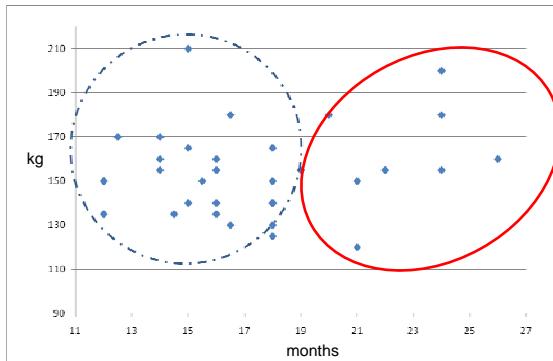
**Fig. 9. Type of births adopted by farms.**



**Fig. 10. Weaning age (days).**

Figure 11 describes, for each farm, the relationship between weight and age of slaughter. It shows that the final product is characterized by great heterogeneity which has a negative impact

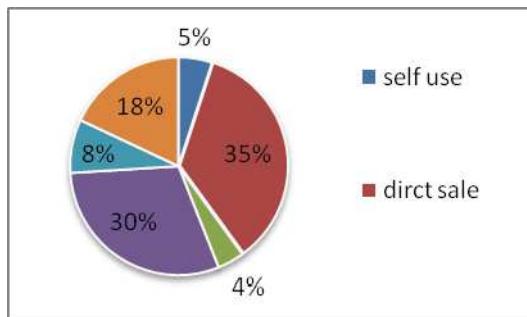
on the quality of the final products. The slaughter weight, which should be around 150 kg (130 to 170), can be reached at 12-15 months with diets characterized by medium-high energy level. This weight can be achieved in 18-21 months with diets characterized by medium-low energy level, mainly on pasture (in figure 11 these two situations are represented by the blue and red ovals respectively).



**Fig. 11. Slaughter age/live weight for each farm.**

The pigs, both sold live and after slaughter, are mostly used for salami production. However, 27 % of farms sales some animals at the age of weaning; these pigs will be fattened by others. The 8% of farms sales light animals to make whole roasted pig.

Regarding to products market, Fig. 12 reports the final destination of carcasses; it's interesting to report that over 40% of farms use a single sale channel, two sale channels for 38% of farms, 22% of farms distributes its production in 3 or more sectors.



**Fig. 12. Products market.**

Large part of the farmers interviewed (75%) stated to delegate to third parties the processing of their products because they do not have the facilities for carcass dissection and seasoning of meat. Two out of 8 processing companies analyzed belong to farmers as a terminal structure of the production cycle and they are used almost exclusively for personal use or otherwise for the production of their products. The other 6 are professional processing companies. Among these one is an industrial-type and five are of medium size. The products obtained from Cinta Senese pig are various: cured ham, salami, bacon, coppa, soppressata, finocchiona, shoulder and belly. Only 7 companies produce Salami and coppa whereas lard is produced by 5 companies and

the ham is processed by all the companies. Two processing plants prefer the winter production while the other processing plants are active all along the year. One of them uses traditional drying chamber while all the others have been equipped with cold air cooling system. Depending on the product, the surveyed companies employ varying amounts of additives. The additives are used in sausage and in the *coppa* from 44% of the companies, in lard from a single company and ham from 2 companies. Twenty-five percent of the processing plants sell the products abroad as well as in the national and local markets, such percentage rises to 50% if one considers only the ham. The production is almost exclusively destined for sales with the exception of the smallest and traditional company which also produces for private use. All the companies selling products as a whole or as pieces and only the biggest company also produces sliced products commercialized in vacuum package.

**Salami:** For the production of salami, two companies prefer to add pork from improved breeds to the mixture in order to reduce problems during maturation, which may occur due to excessive amounts of fat and to its poor quality. The processing technique is: the lean raw material comes from the shoulder whereas the fat comes from the belly and the lard. One company also uses the loin and the ham. Five companies add a small dose of garlic and one of them also wine and hot pepper.

**Coppa or Capocollo:** It is a product that requires a smaller work than the salami. Besides the salt is added a small amount of garlic (premixed with the salt itself) while two companies also add the fennel. Three companies covered all the product with salt. All companies washed the product after the period of curing whereas 60% of them use a wrapping package. Five out of 7 companies producing *coppa* carry out the drying step while the other two move the product directly in the cells of aging.

**Lard:** The lard is the less represented product in the surveyed companies (only 5), perhaps because in many cases it is used for the production of sausages. Almost all the companies cover the cut with salt, 4 companies add also pepper and garlic while only 3 companies add other spices (rosemary, bay leaves, juniper, nutmeg). Two companies made also the intermediate stages of washing and drying after the salting period whereas two other companies put the product directly in the maturation room after salting; one company sell the product immediately after the salting period.

**Ham:** As regard the ham, the fresh leg undergoes to an average trimming in 5 plants, to reduced trimming in 2 and to high trimming in one plant. The ham is with bone in all the plants. The thighs are fully covered with salt in 4 plants while in other 3 plants only a partial coverage of salt is provided. All the plants add pepper and 6 out of 7 include garlic. Five plants perform manual washing and 4 after the wash rest the thighs for a while. The drying step is carried out by 5 plants while the other two go directly to the curing phase. The end of the curing time is time-depending and only 3 plants control sometimes the weight of the final product (Table 2).

**Table 2. Parameters of ham making**

	Weight kg	Days of salting	Resting period	Drying			Curing		
				Days	T °C	Humidity %	Months	T °C	Humidity %
Mean	14.5	25.5	70	42.33	14.6	72	10.5	15.8	77.5
Median	14	21	60	60	14	75	11	14	77.5
Mode	13	21	60	60	14	75	-	14	80
s.d.	2.06	17.16	17.32	30.60	5.55	7.58	3.42	3.49	2.89

## IV – Conclusions

The results of this survey can evidence some strengths and weaknesses points of this breed:

**Strengths.** The main strength is the territorial identity of Cinta Senese rearing and product, which is particularly excited by the name and label of Tuscany. This advantage is palpable and well recognized by the farmers who rely on this link for the marketing of products. The first farmers / entrepreneurs followed this line of propaganda to present the product of Cinta Senese on important international niche markets, thus starting the promotion of the breed, which still ensures the excellence of the product and its brand recognition. The support of public organisms, the interest of scientific research and the activities of the newborn Consortium for the PDO have helped the breed to earn its commercial reputation, thus eliminating completely the risk of extinction. The main strength of the production of salami of Cinta Senese is the good image acquired by the breed and it has an impact in another positive parameter: the selling price. Further strength is definitely the raw material from which it originates. The quality of meat and especially of the fat component, is influenced by the acidic composition. The acidic composition and the quality of fat are linked to the genetic of the breed but they could be modulated with specific plans of nutrition also influenced by the rearing systems adopted. In fact it is well known that the extensive farming, if correctly exploits, plant resources and especially the berries, may lead to products with peculiar organoleptic characteristics coming from a different acidic composition in turns due to specific fatty acids of the diet. From the perspective of technological transformation, they don't appear particular strengths, or at least not in all the surveyed plants; the only peculiarity is the use of garlic for all the products and, in one plant, the use of traditional not air-conditioned rooms.

**Weaknesses.** The strong interaction rearing-environment does not always protect the latter. The wood in particular seems the most suffering component and environmental damage caused by the indiscriminate rearing in some areas could also have some serious long-period consequences. Breeders of Cinta Senese have very different extraction often displaying a careless approach, especially in the early stages. This has led to a strong variability of behaviour that influenced the characteristics of products, with the risk that those of low quality can compromise the reputation of the entire system. The strong individualism of Tuscan breeders that can be mitigated only by strengthening role and actions of the Consortium for the PDO protection. Regarding the technical and marketing strategies, the weaknesses are: the lack of common facilities; the distance, for some farms, from slaughterhouses and processors, which leads to increased production costs; the great variability in the quality of the raw materials due to different livestock management, especially in terms of feeding and age and slaughter weight of the animals. Such variability is not declared in the final products, so the consumer finds under the same typology of products different quality with prices not always proportional. Even the curing process is not standardized, and for some aspects is "top secret" and this also affects the typology of the final products. Another gap, not yet overwhelmed, is the production and marketing typologies that are not yet standardized; the demand/supply ratio is often unstable since the chain is not well structured.

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