A methodological proposal for the estimation of the Standard Output of dog breeding. A study case from Italy

Franco Mari[*,a]

[a] Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Italy

Abstract

In countries with a post-industrial economy, where agriculture evolves towards rural development, canine breeding can be a good opportunity to integrate agricultural income. Despite this and despite being an agricultural activity in all respects, cynophilia is not contemplated among the productive activities for which the calculation of Standard Output is envisaged, an economic variable set by the EU to measure the economic size of farms aimed at the granting of aid. Considering the inconvenience that this causes to canine breeders, the present contribution proposes a methodology for estimating the variable under examination consistent with the community legislation and based on a method of breeding that meets the principles of animal welfare. As dog breeding is not intended for production of food or other material goods other than puppies, its production cycle is not suitable for a subdivision based on homogeneous categories of age or weight, as occurs in traditional farms. The consistency with the community legislation, which is realized in the quantification of the annual production of the breeding, has therefore been obtained by means of the financial discounting of the costs and revenues obtainable throughout the entire production cycle and in calculation of their annual share. The compliance of the breeding technique with the principles of animal well-being, on

Article info

* *Corresponding author*: Franco Mari - Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria - Via Po 14, 00198 - Roma, Italia - e-mail: franco.mari@crea.gov.it.

the other hand, stems from compliance with the rules laid down in the *Ethical code of the breeder of dogs* prepared by *Enci – Ente Nazionale della Cinofilia Italiana* (Italian National Body for Cynophilia). The data needed to estimate the costs and revenues associated with dog breeding are almost completely available online and the results obtained are congruous and very interesting.

Introduction

The European Commission (2014), with Regulation (EU) No 807/2014, establishes that the minimum and maximum thresholds that delimit the field of eligibility of the "Young Farmers Settlement" aid must be calculated using the Standard Output (SO) of the crops and livestock present on the farm. From this moment, farmers' attention to productive activities for which this variable is expected to be calculated, as well as to their respective productivity levels, has greatly increased. Furthermore, there have been numerous requests for the inclusion of new productive activities in the list of activities for which the calculation of the SO is envisaged and, among these, also those of dog breeders. To date, unfortunately, also due to the absence of official statistics on dog breeding, the requests of this last category of farmers have not yet been fulfilled.

Sizing the phenomenon under study is not easy because, as already mentioned, the statistics relating to it are very scarce. In Italy, the number of breeders registered in the Enci register (as of 11 November 2019) are 1,833 (Enci, 2019a). However, registration is not mandatory. The number just provided, therefore, is certainly underestimated. The only obligation for breeders, with at least five breeding females and at least thirty puppies a year, is the acquisition of a Value Added Tax (VAT) number. As already mentioned, however, it is an agricultural VAT number and, therefore, cannot be used to distinguish dog breeders from other farmers. As for the number of dogs registered in the genealogical book, on the other hand, no data is transferred from the Enci website (www.enci.it). The only information that can be found in the literature, therefore, is a statistical source from Enci relating to new registrations of dogs in the years 2003 to 2013 and some articles, again based on data from Enci, relating to the most common breeds in Italy, of which the last is for 2017. According to Rossi and Ferretti (2014), the total new registrations of dogs were 140.001 in 2013, while those registered to the breeds considered in this contribution (see below) were 65.561 and represented 46.8% of the total. From the second information (National Geographic Italia, 2017), instead, it appears that the new registrations of these

last races in Italy were 76.561 dogs in 2016. In three years, therefore, they have grown by 16.8%.

Given the above, the objective of this study is to propose a methodology for calculating the SO of canine breeding. The methodology should be coherent with EU legislation and based on a responsive breeding method to the principles of animal welfare. Furthermore, considering that the Standard Gross Margin (SGM), which consists in SO less specific costs (specific costs are variable costs directly attributable to production activity), presents information content much closer to the cognitive needs of the breeders than it is to that of the SO, it is considered appropriate also to include estimates of this second variable in the objective of the study.

1. Definition and use of SO

SO was introduced by the community legislation for reasons related to the classification of farms. Regulation (EC) No 1242/2008 (European Commission, 2008) defines it as the normal value of the gross annual production of a certain agricultural activity in a given region; value that must be calculated by multiplying the physical productions of the activity in question (main and secondary products) by the respective selling prices ex works. The calculation does not include VAT, product taxes and direct payments. For livestock activities the main products to consider are meat, milk and honey. The by-products, on the other hand, are new-borns, wool and wax. Other indications provided by the afore mentioned regulation are the following:
* productions and prices to be used in the calculation of the SO must derive from five-year averages;
* the reference period of the SO is the year. The SO of agricultural activities that have greater or lesser cycles than the year must however be related to the year;
* for livestock productions, the physical unit of reference of the SO is the head of cattle (100 heads for birds and the hive for bees).

The classification of farms was carried out by means of SGM (European Commission, 1985) which is obtained by deducting the specific costs from SO. In the case of livestock productions, these include feeding, replacement (of the animals at the end of the career), veterinary expenses (including mating) and other specific costs (water and energy). In addition, the specific costs to be deducted from SO must be calculated based on the farm supply prices, net VAT and any subsidies related to costs. Finally, even in the cost calculation, the physical quantities and the prices to be considered are those that arise from long-term averages.

For more information, see the cited Regulations and the volume <small>INEA</small> *methodology for calculating the Standard Output of livestock production. Applied to the three-year period 2003-2005* (Mari & Rossi, 2010). SO and SGM data about Italian Agricultural activities, instead, are available at https://rica.crea.gov.it/redditi-lordi-standard-rls-e-produzioni-standard-ps-2010.php.

In dog breeding, it should be pointed out that since it is not intended for production of meat or other material goods other than puppies, its production process lends itself poorly to the division into homogeneous categories of age or weight as occurs, instead, for traditional livestock farms. In view of this, the correct method of calculating the economic variables in question is the financial discounting of the costs and revenues that occur during the entire production process and, then, the calculation of the annual share. Furthermore, given the methodological nature of the contribution, it is considered possible to omit the calculation of the long-term production averages and costs.

2. The breeding of reference

The feasibility of dog breeding, as well as those of other livestock, depend essentially on two factors: the breed and the breeding technique. The estimation of the economic/financial variables under study, therefore, cannot ignore the examination of these factors. In this regard, the top ten of dog breeds in Italy is as follows: German Shepherd, English Setter, Labrador Retriever, Chihuahua, Golden Retriever, Jack Russel, American Staffordshire, Rottweiler, Italian Cane Corso and Boxer. With reference to the breeding technique, on the other hand, the identification of the parameters that define it is very simple because they are set by law. In Italy, the law that regulates canine activity (Law No. 349/1993) refers, to the activities pertaining to the selection of breeds (and therefore to reproduction), to the provisions of the Italian National Body for Cynophilia (Enci) which, meritoriously, has produced the *Ethical code of the breeder of dogs* (Enci, 2019b) to which the breeders registered with the Body must adhere. This is a regulation that summarizes the serious and honest behaviour of breeders in 23 points. Of these, those closely related to reproduction are the following:

- do not pair breeding females that are too young, not before the second menstruation period, or too old. After seven years of age it is advisable to obtain a veterinary certificate of suitability for reproduction;
- it is appropriate for a breeding female, to safeguard her well-being, to have no more than five litters in her life;
- do not deliver (sell) puppies before the 60 days of life.

Considering that a breeding female reaches sexual maturity at a variable age, depending on the breed, between six and ten months and that she has

a menstruation period every six months, compliance with the above rules means that the first mating cannot take place, simplifying, before the year and a half of age. Then, planning a pairing a year, the breeding female reaches the last pairing (fifth) at five and a half years, age at which she ends her productive career having respected all the rules of which above.

3. Materials and methods

The estimate of SO and SGM of canine breeding will be developed for the mentioned breeds raised in the way described above.

As already mentioned in paragraph 1, it is recalled that the SO is given by the difference between revenues and replacement, while the SGM is given by the difference between revenues and total specific costs.

Moreover, it is necessary to consider that the SO and the SGM will have to be calculated on an annual basis, to comply with EU regulations. This means that it will be necessary to calculate the present values of the costs and revenues and, therefore, the five-year quotient (duration of the productive career of the breeding females) of the appropriate differences between revenues and costs. This will also allow to calculate the Net Present Value (NPV) by means of which the present value of a series of expected cash flows is defined, not only adding them in the accounts, but discounting them on the basis of the rate of return. Finally, it has to be considered that the discount of revenues and costs, as well as the calculation of the NPV, was made at an interest rate of 2.5%.

Table 1 highlights the biological characteristics of the animals on which the economic variables under study depend. The average weight of the breeding females derives from breed standards or from other sources (Hill's Pet, 2019; GreenStyle, 2019), the life expectancy, the number of puppies per litter and the mortality rate, instead, derive from the specialized literature (Einleger, 2017; Borge *et al.*, 2011; Tonnessen *et al.*, 2011; Evans & Adams, 2010). Finally, the weight of the animals at the weaning was estimated as the 20% of the adult weight (Bailoni, 2013).

Table 2 shows the selling prices of puppies disclosed by some websites that seem to be among the most organized and competent on the subject (Cani.com, 2019; Idee green, 2019; Tuttogreen, 2019). For German Shepherd, English Setter and Italian Cane Corso in the source Cani.com, the maximum prices have been estimated by adding to the respective minimum values the extent of the variation range that arises from the difference, within the quoted source, between the average of the maximums and the minimum. The same operation was done to estimate the maximum prices of the English Setter, Chihuahua and Italian Cane Corso in the source Tuttogreen.

Table 1 - Biological characteristics of the canine breeds most popular in Italy

	Weight of the breeding female	Life expectancy	Puppies per litter	Mortality rate	Weight at weaning
	(Kg)	**(Years)**	**(N.)**	**(%)**	**(Kg)**
German Shepherd	27.0	11.0	6.1	17.2	5.4
English Setter	25.0	11.0	6.4	12.5	5.0
Labrador Retriever	30.5	11.0	6.9	23.3	6.1
Chihuahua	2.3	16.0	3.2	16.0	0.5
Golden Retriever	27.3	11.5	7.5	17.6	5.5
Jack Russel Terrier	5.5	13.0	4.4	8.5	1.1
American Staffordshire	24.5	13.0	5.6	15.0	4.9
Rottweiler	42.0	9.5	7.4	15.9	8.4
Italian Cane Corso	42.5	11.0	7.4	15.0	8.5
Boxer	25.0	9.0	6.6	8.6	5.0

Source: our processing from different sources.

Table 2 - Selling prices of puppies (Euros per head)

	Cani.com		Idee green		Tuttogreen		Average
	min	**max**	**min**	**max**	**min**	**max**	
German Shepherd	700	1,318	500	800	300	1,000	770
English Setter	500	1,118	400	600	400	1,011	671
Labrador Retriever			1,200	1,800	1,000	1,200	1,300
Chihuahua			800	800	1,200	1,811	1,153
Golden Retriever	800	1,500	500	1,050	500	1,100	908
Jack Russell	400	1,000			1,000	2,000	1,100
American Staffordshire	500	1,500	200	900	500	1,500	850
Rottweiler	500	1,000	600	1,000	600	1,000	783
Italian Cane Corso	700	1,318	700	700	700	1,311	905
Boxer	400	900	450	900			663

Source: our processing from different sources.

Table 3 shows the costs and revenues expected from the breeding. Revenues were estimated by providing a mating per year for five years (starting from a year and a half and up to five and a half years of age) and multiplying the number of puppies per litter, reduced by the mortality rate, for the average selling price of puppies.

Table 3 - Expected costs and revenues (€)

Years	German Shepherd		English Setter		Labrador Retriever		Chihuahua		Golden Retriever	
	Costs	Revenues	Costs	Revenues	Costs	Revenues	Costs	Revenues	Costs	Revenues
1	1,170		1,111		1,312		827		1,193	
2	2,343	3,887	2,214	3,760	3,028	6,880	1,779	3,099	2,594	5,614
3	2,343	3,887	2,214	3,760	3,028	6,880	1,831	3,099	2,594	5,614
4	2,343	3,887	2,214	3,760	3,028	6,880	1,831	3,099	2,594	5,614
5	2,343	3,887	2,214	3,760	3,028	6,880	1,831	3,099	2,594	5,614
6	2,343	3,887	2,214	3,760	3,028	6,880	1,831	3,099	2,594	5,614
7	437		405		478		125		437	
8	437		405		478		125		437	
9	437		405		478		125		437	
10	437		405		478		125		437	
11	437		405		478		125		437	
12							125		437	
13							125			
14							125			
15							125			
16							125			

Years	Jack Russel		American Staffordshire		Rottweiler		Italian Cane Corso		Boxer	
	Costs	Revenues	Costs	Revenues	Costs	Revenues	Costs	Revenues	Costs	Revenues
1	877		1,130		1,408		1,439		1,109	
2	1,965	4,429	2,305	4,046	2,898	4,875	3,050	5,691	2,247	3,996
3	1,965	4,429	2,305	4,046	2,898	4,875	3,050	5,691	2,247	3,996
4	1,965	4,429	2,305	4,046	2,898	4,875	3,050	5,691	2,247	3,996
5	1,965	4,429	2,305	4,046	2,898	4,875	3,050	5,691	2,247	3,996

Table 3 - Continued

Years	Jack Russel		American Staffordshire		Rottweiler		Italian Cane Corso		Boxer	
	Costs	Rev-enues	Costs	Rev-enues	Costs	Rev-enues	Costs	Rev-enues	Costs	Rev-enues
7	171		400		620		625		405	
8	171		400		620		625		405	
9	171		400		620		625		405	
10	171		400		620		625			
11	171		400				625			
12	171		400							
13	171		400							
14										
15										
16										

Source: our processing from different sources.

The detail of the costs, instead, is reported in table 4. As can be seen, each yearly cost of table 3 comes from the sum of the costs of replacement, feeding, veterinary and other cost reported, for the same year and the same breed, in table 4. The replacement cost has been calculated as a quotient between the value of the animal and the number of years of her productive career. Taking up that the breeding female was born on the farm or was purchased when it was a puppy, the value has been calculated by adding to the selling price of the puppy the expenses (food, veterinary and other) incurred in the first year of life.

Food costs have been estimated with reference to a diet based on dry food (croquettes). Regarding these, tables 5 and 6 report the information used to calculate the quantity of croquettes consumed by the animals over the different years of their life. Table 5 shows the average daily ration to be given to animals in terms of essential nutrients (crude protein and total fat), distinguished for the different phases of their life (Feuer, 2006), as well as the multiplicative factors to be used for the passage from the ration of maintenance of the adult phase to the rations of the other physiological phases (growth, gestation and lactation). Table 6 shows the average daily ration given to animals in terms of commercial product. The transition from the quantities of table 5 to those of table 6 has been carried out considering the daily rations recommended by some of the most well-known croquette brands whose retail price is around € 50 for a 12 kg pack (€ 4,17/kg),

Table 4 - Detail of the costs (€)

Years	German Shepherd				English Setter				Labrador Retriever				Chihuahua				Golden Retriever			
	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others
1	277	375	480	38	255	342	480	34	373	417	480	42	283	58	480	6	300	375	480	38
2	277	726	1,268	73	255	659	1,234	66	373	805	1,769	80	283	108	1,376	11	300	717	1,506	72
3	277	726	1,268	73	255	659	1,234	66	373	805	1,769	80	283	108	1,376	11	300	717	1,506	72
4	277	726	1,268	73	255	659	1,234	66	373	805	1,769	80	283	108	1,376	11	300	717	1,506	72
5	277	726	1,268	73	255	659	1,234	66	373	805	1,769	80	283	108	1,376	11	300	717	1,506	72
6	277	726	1,268	73	255	659	1,234	66	373	805	1,769	80	283	108	1,376	11	300	717	1,506	72
7		334	70	33		304	70	30		371	70	37		50	70	5		334	70	33
8		334	70	33		304	70	30		371	70	37		50	70	5		334	70	33
9		334	70	33		304	70	30		371	70	37		50	70	5		334	70	33
10		334	70	33		304	70	30		371	70	37		50	70	5		334	70	33
11		334	70	33		304	70	30		371	70	37		50	70	5		334	70	33
12														50	70	5		334	70	33
13														50	70	5		334	70	33
14														50	70	5				
15														50	70	5				
16														50	70	5				

Table 4 - Continued

Years	Jack Russel				American Staffordshire				Rottweiler				Italian Cane Corso				Boxer			
	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others	Replacement	Food	Veterinary	Others
1	282	104	480	10	283	334	480	33	313	559	480	56	335	567	480	57	253	342	480	34
2	282	200	1,463	20	283	646	1,311	65	313	1,080	1,397	108	335	1,093	1,513	109	253	659	1,269	66
3	282	200	1,463	20	283	646	1,311	65	313	1,080	1,397	108	335	1,093	1,513	109	253	659	1,269	66
4	282	200	1,463	20	283	646	1,311	65	313	1,080	1,397	108	335	1,093	1,513	109	253	659	1,269	66
5	282	200	1,463	20	283	646	1,311	65	313	1,080	1,397	108	335	1,093	1,513	109	253	659	1,269	66
6	282	200	1,463	20	283	646	1,311	65	313	1,080	1,397	108	335	1,093	1,513	109	253	659	1,269	66
7		92	70	9		300	70	30		500	70	50		505	70	50		304	70	30
8		92	70	9		300	70	30		500	70	50		505	70	50		304	70	30
9		92	70	9		300	70	30		500	70	50		505	70	50		304	70	30
10		92	70	9		300	70	30		500	70	50		505	70	50				
11		92	70	9		300	70	30						505	70	50				
12		92	70	9		300	70	30												
13		92	70	9		300	70	30												
14																				
15																				
16																				

Source: our processing from different sources.

It has been assumed, in other words, that the daily rations recommended by the commercial products characterized by the quoted price level contain the quantities of essential nutrients sufficient for the correct feeding of the animals.

Table 5 - Daily ration of essential nutrients, per physiological stage

	Adult	Growth	Gestation	Breastfeeding
	Grams of nutrients per kilo of body weight			
Crude protein	1.67	3.74	4.61	10.56
Total fat	0.94	1.40	1.94	4.48
	Multiplicative factors			
Crude protein	1.00	2.24	2.76	6.32
Total fat	1.00	1.50	2.07	4.79

Source: our processing by *Your dog's nutritional needs* (Feuer, 2006).

Table 6 - Daily ration of dry food (g.)

			Average	
Classes of weight (kg) of adult dog	**Active dog**	**Less active dog**	**Per dog**	**Per kilo of body weight**
1 – 5	75 – 100	40 – 75	72.5	14.5
5 – 10	100 – 150	75 – 115	110.0	11.0
10 – 20	150 – 275	115 – 200	185.0	9.3
20 – 35	275 – 375	200 – 275	281.3	8.0
35 – 50	375 – 500	275 – 400	387.5	7.8
50 – 65	500 – 575	400 – 525	500.0	7.7

Source: our processing from different sources.

Moreover table 7 shows the quantities of croquettes consumed by the dog breeds considered in the different periods of their life. The exact amount of food consumed by a dog during growth (from weaning to adult weight gain) involves daily knowledge of its body weight. This is because the amount of food to be fed to the animal is a function of its weight and because during its growth its weight changes daily and not linearly. The growth is normally represented by a variable curve, among other things, also as a function of the breed (mole) of the animal. Not having the data mentioned above, the

inconvenience can be overcome assuming that the growth of the animal is linear. In other words, it is assumed that the weight increase during growth is constant. The hypothesis entails a negligible error because the assumed line, interpolating the growth curve, minimizes the distances between it, the concavity (physiological decline) and the convexity of the curve, tending to compensate one with the other. Under this hypothesis, the quantity of croquettes consumed within the first year of age is given by the area of the rectangle trapezoid in which:

- the minor base is given by the daily ration multiplied by the weight at the weaning (two months of age);
- the major base is given by the daily ration multiplied by the weight at the adult age (one year of age);
- the height of the trapezoid is given by the numbers of days between weaning and adulthood (305 days).

This quantity of croquettes, therefore, was multiplied by the factor 2,24, as indicated in table 5. The amount of croquettes consumed in each of the years from the second to the sixth (productive period) was estimated by calculating, firstly, the amount of croquettes consumed in one month of life as an adult. This quantity was calculated as the area of the rectangle in which one side is given by the daily ration multiplied by the weight at the adult age and the other side is given by the number of days content in one month (30 days). Two of these quantities, therefore, were multiplied by the factor 2,76 (gestation) and two others by the factor 6,32 (breastfeeding) (Feuer, 2006). The quantity of croquettes consumed per year, is therefore given by the sum of the quantities consumed in the two months of gestation, in the two months of breastfeeding and in the remaining eight months in which the breeding female is neither in gestation nor in lactation. The quantity of croquettes consumed in each of the years from the seventh year of life to the death of the breeding female is given by the quantity of croquettes consumed in the month of life as an adult multiplied by twelve months. Finally, in order to get from the quantities of croquettes in table 7 to the food costs of table 4, the quantities under examination were multiplied, as already mentioned, with an average croquette price of € 4,17 per kg. The veterinary costs, moreover, have been calculated on the base of the veterinary interventions and the intervention prices listed below (Anselmi, 2015; Indrebo, 2008). In the first year, a first visit with application of microchip and deworming (€ 60), three vaccinations (€ 40/each) and control of genetic race diseases: hip and elbow dysplasia, oculopathies, heart and ear diseases (€ 300). From the second to the sixth year, a routine visit (€ 30), a vaccination and a mating, plus a first visit and a vaccination for each puppy born; from the seventh year onwards, a routine visit and a vaccination. The cost of mating was estimated at 90% of the value of a puppy and, this, in the hypothesis in which the stallion is

in possession of at least the certification of exemption of specific genetic race diseases (Anselmi, 2015; Beuchat, 2015). The amount of the other costs (water and energy), on the other hand, having no information in this regard, was estimated at 10% of the food costs.

Table 7 - Determination of the needs of dry food

	German Shepherd	English Setter	Labrador Retriever	Chihuahua	Golden Retriever	Jack Russel Terrier	American Staffordshire	Rottweiler	Italian Cane Corso	Boxer
Daily ration per kilo of body weight (g)	8.0	8.0	8.0	14.5	8.0	11.0	8.0	7.8	7.8	8.0
Body weight at weaning (kg)	5.4	5.0	6.1	0.5	5.5	1.1	4.9	8.4	8.5	5.0
Body weight at adult (kg)	27.5	25.0	30.5	2.3	27.3	5.5	24.5	42.0	42.5	25.0
Need of dry food per year (kg)										
– the first year	90	82	100	14	90	25	80	134	136	82
– from the second to the sixth year	174	158	193	26	172	48	155	259	262	158
– from the seventh year onwards	80	73	89	12	80	22	72	120	121	73

Source: our processing from different sources.

4. Results

Table 8 presents the results of the study. It, more exactly, illustrates the current values of the costs and revenues seen in the previously paragraph, as well as the relative values of NPV, SO and SGM. As you can see, the breeding female with the far greater value of NPV (over 15,000 euros) is the one of Labrador Retriever breed. The Golden Retriever, Jack Russel Terrier and Italian Cane Corso breeds follow at an appreciable distance (around 9,000-11,000 €). Finally, the breeding females of the other breeds have PNV values between 4,500 and 6,500 euros. As regards, however, the values of SO and SGM, it can be said that, although they are appreciably variable according to the breed, they reach extremely interesting levels. In the context of traditional livestock breeding, in fact, the highest SO, related to sows and dairy cows, are on average around € 2,000/head. It can be stated, therefore, that the SO of a Chihuahua breeding female, which is the lowest among those of the examined dog breeds, is equal to the SO of a sow or a dairy cow. The SO

of a Labrador Retriever breeding female, which is the highest among the SO of the canine breeds considered, however, is about 2,5 times greater than the SO of a sow or a dairy cow. Finally, it should be considered that in some breeds (German Shepherd, English Setter, American Staffordshire and Boxer) the relatively low SO values may derive from underestimates in the average selling prices of puppies, which are also appreciably lower than those of the other breeds. In other words, while it is clear that the low level of the Chihuahua SO, achieved compared to the very respectable sale prices of puppies, depends on the dynamics of the costs and of the revenues of this breeding, the same thing cannot be said for the breeds mentioned above. Finally, the SGM values are also interesting, which, as can be seen, are between 28 and 52% of the SO value.

Table 8 - NPV, SO and SGM of a breeding female in the Italian breeding of purebred dogs

		German Shepherd	English Setter	Labrador Retriever	Chihuahua	Golden Retriever	Jack Russel Terrier	American Staffordshire	Rottweiler	Italian Cane Corso	Boxer
Current value of:											
– Revenues	€	18.058	17.468	31.963	14.396	26.079	20.575	18.797	22.648	26.439	18.567
– Replacement	€	1.526	1.404	2.055	1.559	1.653	1.554	1.559	1.724	1.845	1.394
– Specific costs	€	11.985	11.336	14.863	8.442	13.346	9.143	12.182	14.799	15.887	10.871
NPV	€	4.548	4.728	15.045	4.395	11.081	9.878	5.056	6.125	8.707	6.302
Yearly values of:											
– SO	€	2.755	2.677	4.985	2.140	4.071	3.170	2.873	3.487	4.099	2.862
– SGM	€	758	788	2.508	733	1.847	1.646	843	1.021	1.451	1.050
– SGM/SO	%	28	29	50	34	45	52	29	29	35	37

Source: our processing from different sources.

Conclusion

The objective of the present paper was to formulate a methodological proposal for the estimation of the SO and SGM of canine breeding, including the verification of the availability of the data necessary to

the estimate. The methodological proposal is based on the adoption of a production process consistent with EU legislation and on a method of breeding that meets the principles of animal welfare. The calculation of the annual value of the production process has been carried out following the financial discounting of the costs and revenues relating to the entire production cycle and, therefore, through the calculation of the annual average values of the variables being studied. In carrying out this operation, the appropriate differences between revenues and costs were related to the years of the breeding females' productive career. Finally, it should be noted that, as also appears from other studies on this topic (Kaygisiz & Ograk, 2008), the values assumed by the economic aggregates object of the study, although considerably variable according to the breed, stand at levels appreciably higher than those provided by traditional livestock. Furthermore, the value of these economic aggregates is even greater if we consider that, in some cases, the relatively low SO level may result from underestimation of the puppies actual selling prices.

References

Anselmi, G. (2015). Il prezzo del padre. Il valore della monta e il suo pagamento. *I nostri cani*, *61*(5), 20-22.

Bailoni, L. (2013). Nutrizione e alimentazione animale. -- Available on www.google. com/search?q=15.+Lezione+13_fabbaccrescimento&rlz=1C1GCEU_itIT875IT875 &oq=15.%09Lezione+13_fabbaccrescimento&aqs=chrome..69i57j33.3490j0j7&so urceid=chrome&ie=UTF-8.

Beuchat, C. (2015). Estimating the breeding value of a dog. *The Institute of Canine Biology*. -- Available on www.instituteofcaninebiology.org/blog/how-can-you-estimate-the-breeding-value-of-a-dog.

Borge, K.S., Tonnessen, R., Nodtvedt, A. & Indrebo, A. (2011). Litter size at birth in purebred dogs - A retrospective study of 224 breeds. *Theriogenology*, *75*(5), 911-919, doi: 10.1016/j.theriogenology.2010.10.034.

Cani.Com (2019). -- Available on www.cani.com/razze-di-cani.

Einleger, A. (2017). Lifespan of a dog: a dog year chart by breed. How long should you expect your dog to live? *PetCareRx*. -- Available on www.petcarerx.com/article/lifespan-of-a-dog-a dog-years-chart-by-breed/1223.

Enci (2019a). Breeders register. -- Available on www.enci.it/libro-genealogico/registro-allevatori.pdf.

Enci (2019b). Ethical code of the breeder of dogs. -- Available on www.enci.it/media/2115/f-7249_01.pdf.

European Commission (1985). Commission Decision of 7 June 1985 (85/377/EEC). OJ L. 220, 17.8.85.

European Commission (2014). Commission Delegated Regulation (EU) No 807/2014 of 11 March 2014, OJ L. 227, 31.7.2014.

European Commission (2008). Commission Regulation (EC) No 1242/2008 of 8 December 2008, OJ L. 335, 13.12.2008.

Evans, K.M. & Adams, V.J. (2010). Proportion of litters of purebred dogs born by caesarean section. *Journal of Small Animal Practice*, *51*, 113-118, doi: 10.1111/j.1748-5827.2009.00902.x.

Feuer, D. (2006). *Yours dog's nutritional needs. A Science-Based Guide For Pet Owners.* National Research Council of the National Academy of Sciences.

GreenStyle, Amstaff (American Staffordshire Terrier): aspetto, indole e costo. -- Available on www.greenstyle.it/cani/american-staffordshire-terrier.

Hill's Pet. (2019). Razza canina Golden Retriever, Informazioni e tratti della personalità. -- Available on www.hillspet.it/dog-care/dog-breeds/golden-retriever.

Ideegreen. (2019). -- Available on www.ideegreen.it/elenco-razze-di-cani-51687.html.

Indrebo, A. (2008). Animal welfare in modern dog breeding. *Acta Veterinaria Scandinavica, 50(Suppl 1): S6*, doi: 10.1186/1751-0147-50-S1-S6.

Kaygisiz, F. & Ograk, Y.Z. (2008). Cost and Productivity Analysis for Puppy Production in Kangal Race Dog Production Companies in Sivas. *Journal of Animal and Veterinary Advances*, *7*(10), 1273-1275.

Mari, F. & Rossi, R. (2010). INEA methodology for calculating the Standard Output of livestock production. Applied to the three-year period 2003-2005. -- Available on http://dspace.crea.gov.it/bitstream/inea/241/1/RICA%20-%20RLS_English_DEF_Layout%201.pdf.

Quale,it. (2018). Spese veterinarie 2018: quali sono? -- Available on www.quale.it/assicurazioni/news-assicurazioni/spese-veterinarie-2018-quali-sono/.

Rossi, V. & Ferretti, D. (2014). Statistiche ENCI: 11 anni a confronto. -- Available on www.tipresentoilcane.com/2014/06/25/statistiche-enci-2013-11-anni-a-confronto/.

Sapevatelo. (2017). Quali sono le razze canine più diffuse in Italia? National Geographic Italia. -- Available on www.nationalgeographic.it/natura/animali/2017/02/17/news/quali_sono_le_razze_di_cani_piu_diffuse_in_Italia.

Tonnessen, R., Sverdrup Borge, K., Nodtvedt, A. & Indrebo, A. (2012). Canine perinatal mortality: a cohort study of 224 breeds. *Theriogenology*, *77*, 1788-1801, doi: 10.1016/j.theriogenology.2011.12.0324.

Tuttogreen (2019). -- Available on www.tuttogreen.it/animali/cani/.

Franco Mari
Council for Agricultural Research and Economics (CREA), Research Centre for Agricultural Policies and Bioeconomy
Via Po, 14 - 00198 Roma, Italy
Tel: +39 06 47856558, E-mail: franco.mari@ crea.gov.it
Senior researcher. At INEA (Italian National Institute for Agricultural Economics, merged into CREA) he was head of the Accounting and Microeconomic Analysis Unit. He was also a member of the EU working group on the Typology and Structure of farms. Current research interests, are microeconomic analyses, agro-energies and animal welfare.