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Non-genetic factors affecting hunting ability in Italian Maremma scent hound

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ABSTRACT

This study aimed to evaluate the effect of four non-genetic factors (sex, coat colour, competition judges, type of trial) on the five hunting traits (search, approach, tracking of prey, standstill barking and physical skills) used to estimate the aptitude for wild boar hunt in Italian Maremma Scent Hound. A total of 1147 dogs (734 males, 399 females, and 14 not sexed dogs) were evaluated in competitions held in North-Central Italy, from 2010 to 2011. Dogs were tested as individuals, pairs and packs. Coat colour had no effect on the five tested traits. A significant difference ($p < 0.01$) between males and females was observed only for search. Type of trial had a significant effect ($p < 0.01$) on all the five hunting traits. Judges factor was significant ($p < 0.01$) for physical skills and barking remaining firm in place. A significant positive phenotypic correlation was observed among tracking of prey, approach and physical skills ($p < 0.01$). Approach and physical skills were positively correlated with approach ($p < 0.05$) and tracking of prey ($p < 0.01$). Search was negatively correlated with all the other four, whereas standstill barking showed no correlation with any traits. These data are the basis to improve our knowledge about the values of variability in considered hunting traits and they provide genetic criteria to the breeders to achieve more stringent selective choices.

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Introduction

The Italian Maremma scent hound (IMSH) probably resulted from selections made by hunters towards the end of 1800 to obtain dogs able to hunt for wild boars in the tangled undergrowth of Maremma woods, a locality in the region of Tuscany (Leonardi 2007). The breed was officially recognized by the Italian National Kennel Club (ENCI) in 2003 and is fairly distributed in the central regions of Italy (ENCI 2003). In 2014 we had 2395 new registrations divided between 164 rough haired and 2231 short haired (ENCI 2015). The IMSH is classified as hound and bloodhound. The aptitude for wild boar hunt is estimated in IMSH by scoring five traits that are evaluated during boar-hunting field trials. As the dogs are tested in open field, many environmental factors influence the trial results. The aim of this study was to assess the effects of four non-genetic factors (coat colour, sex, judges, type of trial) on wild boar hunting performance in Italian Maremma Scent Hound.

Materials and methods

The analyses were based on IMSH field trials results from 14 competitions held in North-central Italy. The trial data contained records from January 2010 to March 2011. They were reported in the evaluation forms kindly contributed by ENCI. The total trial data had 1147 records from 734 males, 399 females, and 14 not sexed dogs. Boar-hunting field trials follow the guidelines contained in the Regulation for the Zootechnic Assessment of Hounds (ENCI 2009). The trials were held outdoors on normal hunting grounds, mainly forested landscapes. They were divided into three types: individual (single dog), pair (two dogs), or pack (from six to twelve dogs). Each trial was assessed by a maximum of three approved judges for 60 min of accurate observation. Reported scores were reached by consensus. The following five hunting traits were assessed during field trials: search, approach, physical skills, tracking of prey, and ability to bark remaining firm in place (Table 1). In addition to the scorings of

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Table 1. Selected traits that are used by judges to evaluate the performance of dogs during field trial.

Trait	Score	Judging criteria
Physical skills, morphology, breed style, timbre and tone of voice, homogeneity (pair, pack)	1–50	Physical skills, intelligence, expressiveness of the voice, no screams, uniformity of behaviour according to the tested breed.
Search (manoeuvrability, discipline, connection)	1–30	Activity, intelligence and sagacity in searching for traces of nocturnal passage of boars, as well as the point of attack.
Approach (olfaction, cohesion)	1–30	Speed and methodical approach to the prey.
Ability to bark remaining firm in place (courage)	1–40	Cautious courage, penalizing aggressiveness, rashness or shyness.
Tracking of prey (assuredness, persistence, cohesion)	1–50	Accuracy and durability in tracking prey, as well as fluency in solving mistakes.

these traits, the data held information on four non-genetic factors: sex, coat colour (tawny or striped), competition judges, and type of trial.

The effect of the four non-genetic factors on the five hunting traits was evaluated by means of one-way ANOVA of type I (i.e. with fixed factors). When a factor had more than two level a multiple comparisons was carried out according to Hochberg's GT2 post hoc test, because of the unequal sample size in the factor levels. Phenotypic correlations were estimated using the Pearson correlation coefficient. Statistical analyses were carried out using the SPSS software, v. 12.0 (IBM SPSS Statistics, Armonk, NY).

Results and discussion

Coat colour had no statistically significant effect on any of the five hunting traits. Therefore, the aptitude for wild boar hunt in IMSH is not influenced by the colour of coat. Differently, a relationship between coat colour and aggressive behaviour in the case of English cocker spaniels, where animals with a solid coat colour show higher levels of aggression than those that are parti-coloured (Podberscek & Serpell 1996, 1997; Pérez-Guisado et al. 2006; Amat et al. 2009). Also Kim et al. (2010) reported behavioural differences between fawn and white coat Jindo dogs.

A statistically significant difference ($p < 0.01$) between males and females was observed only for the search trait. Male dogs performed the task slightly better than females (Table 2). Behavioural differences between males and females have been reported in previous studies. Karjalainen et al. (1994, 1996) showed that, in Finnish Spitz, males seemed to have better scores for measures expressing dog's speed (searching and following scores), while females seemed to have better scores for traits that measured the skills of dog when working with birds, like barking. However, the differences between sexes were small at a practical level. Boenigk et al. (2006), in their evaluation of genetic and environmental sources of variation in the Hovawart dog, found significant differences between males and females. Also, Lindberg et al. (2004) reported similar results in their study on Swedish Flatcoated Retrievers. However, Liinamo et al. (1997) showed that the effect of sex was not statistically significant on any of the studied traits in Finnish Hounds.

Table 2. Effect of sex on search hunting trait.

Hunting trait	Sex	M	SD	*N*
Search	Males	38.26[a]	1.220	734
	Females	38.02[b]	1.225	399

The different letters of the exponent indicate values significantly different at $p < 0.05$ level. M: means; SD: standard deviation; *N*: number of observations.

Table 3. Effect of type of trial on the five hunting traits.

Hunting trait	Type of trial	M	SD	*N*
Search	Individual	38.37[a]	1.180	374
	Pair	38.11[a]	1.109	671
	Pack	37.81[b]	1.855	102
Approach	Individual	25.09[a]	1.144	234
	Pair	24.84[a]	0.979	523
	Pack	23.78[b]	0.997	67
Tracking of prey	Individual	25.20[a]	1.248	233
	Pair	24.85[b]	1.130	521
	Pack	24.13[c]	1.205	67
Physical skills	Individual	36.10[a]	1.600	234
	Pair	35.76[a]	2.103	523
	Pack	33.82[b]	1.392	67
Standstill barking	Pack	40.10[a]	1.426	67
	Pair	38.43[b]	1.776	523
	Individual	38.18[b]	1.698	234

The different letters of the exponent indicate values significantly different at $p < 0.05$ level. M: mean; SD: standard deviation; *N*: number of observations.

Table 4. Effect of competition judges on physical skills and standstill hunting traits.

Hunting trait	Competition judges	M	SD	*N*
Physical skills	2	36.17[a]	1.924	403
	1	35.34[b]	1.638	67
	3	35.22[b]	2.044	351
Standstill barking	1	38.93[a]	1.579	67
	3	38.72[ab]	2.050	351
	2	38.23[b]	1.544	403

The different letters of the exponent indicate values significantly different at $p < 0.05$ level. M: mean; SD: standard deviation; *N*: number of observations.

Type of trial had a statistically significant effect ($p < 0.01$) on all the five hunting traits (Table 3). The multiple comparison tests showed that there was

Table 5. Correlation coefficients among tested hunting traits.

Traits	Search	Approach	Tracking of Prey	Physical skills	Standstill barking
Search	–	−0.076[a]	−0.040	−0.100[b]	−0.037
Approach		–	0.571[b]	0.071[a]	−0.063
Tracking of prey			–	0.187[b]	0.037
Physical skills				–	0.015
Standstill barking					–

[a]Correlation is significant at the 0.05 level (2-tailed).
[b]Correlation is significant at the 0.01 level (2-tailed).

always a statistically significant difference between individual versus pair ($p = 0.03$) as well as between individual versus pack type of competition ($p < 0.05$) between pack versus individual and pair. Yet, whereas for search, approach, tracking of prey and physical skill traits, the pack evaluation got scores statistically smaller than those of both pair and single evaluations, for the standstill barking trait the situation was reversed. Arvelius and Klemetsdal (2013), in their study about the evaluation of hunting traits in the English Setter population in Sweden and Norway, found that the type of competition had a significant effect on four of the six tested traits for the Swedish data and on all tested traits for the Norwegian data.

Competition judges had a statistically significant effect on physical skills ($p < 0.001$) and ability to bark remaining firm in place ($p < 0.01$) (Table 4). For the physical skills trait, the multiple comparison test showed that there was a statistically significant difference between two competition judges versus one and three competition judges ($p = 0.05$). Physical skills trait has higher scores when evaluation is done by two judges. For the ability to bark remaining firm in place, the multiple comparison test showed that the mean score given by one competition judges was statistically higher ($p < 0.05$) than that given by two competition judges. In contrast to Pfleiderer-Högner (1979) who found no significant differences between judges, Ruefenacht et al. (2002) reported that the effect of number of judges was highly significant for all the seven tested traits in German shepherd dog.

Lastly, a Pearson's product–moment correlation was run to assess the relationship between the five tested hunting traits (Table 5). A significant positive phenotypic correlation was observed among tracking of prey, approach and physical skills. On the other hand, approach and physical skills were negatively correlated with search, whereas standstill barking was not correlated with any of the other four traits. Karjalainen et al. (1996), in their study about the evaluation of the effects of the environmental factors on seven measures of hunting performance in Finnish Spitz, found that phenotypic correlations among the measures of hunting performance were low between barking frequency and searching scores. Also, barking frequency did not correlate very strongly with the following scores.

Conclusions

Our study showed that, in the Italian Maremma Scent Hound (IMSH), coat colour and sex have no, or limited effect, on the five hunting traits investigated. Hence these factors could not be used in selecting IMSH for wild boar hunt. Differently, for as concern the type of trials it is advisable to avoid the evaluation of dogs in pack, as the different scores assigned to the dogs evaluated with this trial respect to those evaluated singly or in pair.

Very few studies exist today about the genetic quantification of aptitudes in hound breeds. Aptitudes are very complex characters, strongly influenced by genetic factors as well as by non-genetic ones, like diet, canine welfare, and training. Our results are the first steps toward the genetic quantification of aptitudes in a hound breed. Also, they represent a starting point to assess the link between standard traits and functional aptitudes of a given breed. Lastly, our findings are the basis to provide genetic and scientific criteria for selection to breeders. Using this information, they will achieve more stringent selective choices that are not based solely on purely empirical methods or aesthetical standards.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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