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Phenotypic characterization of an endangered indigenous goat: Comune di Sicilia ecotype

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Characterization of indigenous livestock species is the key to the development of proper strategies for long-term maintenance and use of genetic variation and for guidance in decisions about future utilization and conservation strategies. Comune di Sicilia goat, counts about 500 adults, is bred in western Sicily under low-input management systems and contributes significantly to the livelihoods of resource-poor farmers as a source of protein and income, thanks to its typical dairy products. It is known for its unique adaptive traits, such as heat and drought tolerance, and low disease susceptibility, which make it ideal for production under stressful environments. However, it has received little attention, and, in fact, it is not currently recognized as a breed but only as a local ecotype. The aim of this study was to phenotypically characterize the Comune di Sicilia goat so as to collect all data needed for drafting a breed standard, which, together with genotyping, would allow its official recognition. Phenotypic traits for 78 adult goats (9 males, 69 females) included body weight (BW); withers (WH), croup (CH), and chest height (CHH); chest (CL), length (TL), and croup length (CHL); chest width (CW), hip breadth (HB), and coxofemoral width (CXW); and chest (CC) and shin circumference (SC). Qualitative traits included coat color pattern and type, presence or absence of horns, ears and wattles. Age was estimated based on dentition. Analysis of the morphological descriptors showed some sexual dimorphism (BW: males 54 ± 5 kg, females 43 ± 8 kg; WH: males 75 ± 2 cm, females 71 ± 3 cm; TL: males 81 ± 5 cm, females 73 ± 6 cm; CC: males 102 ± 4 cm, females 82 ± 6 cm), but overall, all parameters showed very little variability. As regards qualitative traits, badger-face was the prevalent coat colour, and there were subjects without horns (50%), ears (5%), and wattles (55%). A relative homogeneity was observed in Comune di Sicilia goats, as well as peculiar phenotypical features, such as diluted pheomelanin and the presence of horns, which might represent environmental adaptative traits. This comes together with an effective population size big enough to be exploited for future breed improvement.

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External egg quality from Siciliana, a native chicken breed of the Sicilian Region (Italy) reared under free range conditions

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Animal biodiversity is an important component of all sustainable agri-food systems. The valorisation of typical products also represents a strategy for the preservation of local breeds. Aim of this study, taking into account the visual criteria of consumer choice, was to evaluate the external characteristics of eggs from the endangered Siciliana (SI) chicken breed compared to Livorno (LI) pure breed and Lohmann white (LW) commercial hybrid ones. No. 63 eggs (21 for each group) were sampled from 3 flocks of 2 local Italian breeds (SI and LI) and 1 commercial strain of LW, all reared in different farm under organic conditions. The following external quality traits were evaluated: egg's weight, length, width, circumference, shape index, shell percentage, and shell index. Eggshell color was determined using a colorimeter (Minolta CM 500) and results were expressed using the CIE L*a*b* system color profile. Furthermore, the image of each eggshell was acquired with a computer vision system (E-eye, Iris visual analyzer 400, Alpha MOS) and results were expressed using the RGB system color profile. E-Eye data were subjected to PCA analysis. As expected, the average weight of the 2 autochthonous breeds eggs was similar (SI =56.80 g; LI =61.23 g) and significantly ($p < 0.0001$) lower than LW eggs (70.33 g). Moreover, the width and circumference of SI group eggs (41.33 and 14.40 mm, respectively) were significantly lower than LI (43.39 mm; 15.04 mm) and LW (45.27 mm; 15.55 mm) groups; therefore, the shape index of SI group eggs (69.21%) was significantly ($p < 0.0001$) different from LW and LI (74.17% and 75.92%, respectively) groups. No significant differences were found for shell percentage and shell index. Regarding shell color, all parameters of SI group (L = 91.88; a = −0.26; b = 10.29) significantly differed ($p < 0.0001$) from LI (L = 94.36, a = −0.87, b = 6.83;) and LW (L = 94.45, a = −0.61, b = 6.07) groups. Results from E-eye showed 5 color codes (2184, 2439, 2455, 2456, 2712) founded only in eggshell of SI and the PCA plot has clearly separated the groups, showing SI at right side of the first component and LW and LI on the left one. Overall, the results, showing how the shape and color of the shell may characterise a breed directing consumers in their