NEGRO DE LOS PEDROCHES, THE MOLECULAR DEFINITION OF A NEW VARIETY OF THE IBERIAN PIG BREED

NEGRO DE LOS PEDROCHES, LA DEFINICIÓN MOLECULAR DE UNA NUEVA VARIEDAD DE LA RAZA PORCINA IBÉRICA

Martínez, A.M.1, J.V. Delgado1, J.L. Vega-Pla2, F. Escribano3 and A. Cabello4


ADDITIONAL KEYWORDS

INTRODUCTION

The European pig genetic resources are essentially formed from breeds...
belonging to two ancient strains: the Celtic type in north-central Europe and the Mediterranean type in the south (Porter and Tebbit, 1993). Both types were represented in Spain by native breeds, but today only the Iberian Pig from Mediterranean type is completely developed. Other autochthonous breeds are rare, endangered or extinct.

The Iberian Pig is among the most important livestock of Spain, bred mainly in traditional extensive (sustainable) conditions and benefiting important ecosystems such as the Mediterranean paddock named dehesa, which produces high quality derived products (loin, ham etc) with high profitability. Classically the Iberian Pig breed was divided into several varieties based in morphological, productive traits and more recently using molecular markers (Martínez et al., 2000).

The Negro de Los Pedroches (figure 1) is an ancient variety of the Iberian Pig from the Pedroches Valley (Province of Córdoba, Spain) that has remained until the present times, although today it is in great risk of extinction. The Negro de Los Pedroches pig has certain characteristics that make it unique and worthy for conservation: it has a typical morphology of the Iberian Pig and a good reproductive ability, meat/carcass conformation and weight gain performance. The project to rescue this variety includes a genetic analysis using 25 microsatellites recommended by

*Figure 1. Female of the Negro de Los Pedroches Variety. (Hembra de la variedad Negro de Los Pedroches).*

Archivos de zootecnia vol. 52, núm. 198, p. 220.
ISAG-FAO for studies on porcine biodiversity. In spite of not showing high values of genetic diversity, it can be stated that the Negro de los Pedroches pig is a breed variety that perfectly fits the profile of the Iberian Pig breed, together with other well-defined varieties. The objective of this work was to estimate if the Negro de Los Pedroches variety belongs to the Iberian Pig breed, based on genetic distance analysis based on microsatellite markers and if its particular genotypic profile can be considered sufficiently different to be considered another variety of the Iberian Pig.

MATERIAL AND METHODS

A sample of 22 individuals of Negro de Los Pedroches pig was analysed, selected according to their genetic characteristics and grouped at a ranch of the Guadamatilla Association in Pozoblanco (Córdoba). DNA was extracted from blood samples using the Kawasaki method (Kawasaki, 1990). The microsatellites used for the analysis were: CGA, IGF1, SO002, SO005, SO026, SO068, SO090, S0101, S0155, S0178, S0215, S0225, S0226, S0227, S0228, S0355, S0386, SW122, SW24, SW240, SW632, SW72, SW857, SW911, SW936 and SW951. The microsatellites were amplified using the polymerase chain reaction (PCR) by several multiplex reactions (Martínez et al., 2000). Electrophoresis was carried out using the ABI 377 XL automatic sequencer (Applied Biosystems, Foster City, CA, USA).

The genotypes obtained were compared with those available for other varieties of the Iberian Pig breed (Martínez, 2001). Nei genetic distances were calculated between populations (Nei, 1972) as well as the D_A individual distance based on the proportion of alleles shared for two individuals averaged over loci (Bowcock et al., 1994) using the computer program MICROSAT v.1.5b (Minch, 1997). An UPGMA tree was constructed with

<table>
<thead>
<tr>
<th></th>
<th>Duroc</th>
<th>Dorado</th>
<th>Entrep</th>
<th>Lampiño</th>
<th>Manchado</th>
<th>Pedroches</th>
<th>Retinto Extremo</th>
<th>Retinto Português</th>
<th>Silvela</th>
<th>Torbiscal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorado Gaditano</td>
<td>0.256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negro Entrepelado</td>
<td>0.253</td>
<td>0.108</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negro Lampiño</td>
<td>0.292</td>
<td>0.204</td>
<td>0.171</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manchado Jabugo</td>
<td>0.349</td>
<td>0.305</td>
<td>0.175</td>
<td>0.293</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negro Pedroches</td>
<td>0.291</td>
<td>0.213</td>
<td>0.179</td>
<td>0.197</td>
<td>0.282</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retinto Extremo</td>
<td>0.283</td>
<td>0.130</td>
<td>0.031</td>
<td>0.161</td>
<td>0.178</td>
<td>0.199</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retinto Português</td>
<td>0.311</td>
<td>0.219</td>
<td>0.125</td>
<td>0.237</td>
<td>0.259</td>
<td>0.283</td>
<td>0.139</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvela</td>
<td>0.297</td>
<td>0.131</td>
<td>0.066</td>
<td>0.162</td>
<td>0.218</td>
<td>0.176</td>
<td>0.069</td>
<td>0.132</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torbiscal</td>
<td>0.411</td>
<td>0.272</td>
<td>0.195</td>
<td>0.187</td>
<td>0.280</td>
<td>0.289</td>
<td>0.190</td>
<td>0.244</td>
<td>0.144</td>
<td></td>
</tr>
</tbody>
</table>
Figure 2. UPGMA tree based on individual genetics distances. (Árbol UPGMA basado en distancias genéticas individuales).

Archivos de zootecnia vol. 52, núm. 198, p. 222.
MOLECULAR DEFINITION OF A NEW IBERIAN VARIETY

the D_{SA} values using the NEIGHBOR module of the program PHYLIP v.3.57c (Felsenstein, 1995).

RESULTS

All loci were polymorphic and the number of alleles varied between two and eleven. The average of the observed number of alleles was 4.16, heterozygosity by direct count (H) was 0.538 and expected heterozygosity reach 0.576, these values are similar to those obtained in other Iberian Pig varieties (Martínez et al., 2000).

Twenty Duroc individuals were included as an outgroup for the genetic distance computations and showed the largest distances from all other populations. The smallest genetic distance for Negro de Los Pedroches (table 1) was with Entrepelado followed with Lampiño, indicating an influence of these varieties in its origins.

The UPGMA individual tree of population samples (figure 2) shows a variety clustering of Iberian Pig with the exception of Silvela which appears mixed in some clusters. Lampiño, Torbiscal, Retinto Portugués, Manchado de Jabugo and Negro de los Pedroches samples were clustered into different groups.

The Negro de Los Pedroches pig shares important genetic, as well as phenotypic, characteristics with the Iberian Pig, as it fits perfectly within the group of varieties of this breed that were analysed here. These results are in concordance with those expected from morphological and productive traits.

ACKNOWLEDGEMENTS

This work was financed by Project RZ00-15 of Programa Nacional de Recursos y Tecnologías Agroalimentarias of Ministerio de Ciencia y Tecnología and developed in the molecular genetics laboratory of Delegación de Investigación y Desarrollo Agrícola y Ganadero of Diputación de Córdoba.

REFERENCES


