# Genetic characterization of Spanish autochthonous chicken breeds using microsatellites

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## ➢ Introduction

There are 21 officially recognized chicken breeds in Spain, 20 of them endangered because of the introduction of more productive commercial lines. In the recent last years, there has been an increasing interest in the conservation of these local breeds closely related with cultural and traditional uses (food production, religious practices, entertainment, ornamental, etc.). They represent an important reservoir of biodiversity.

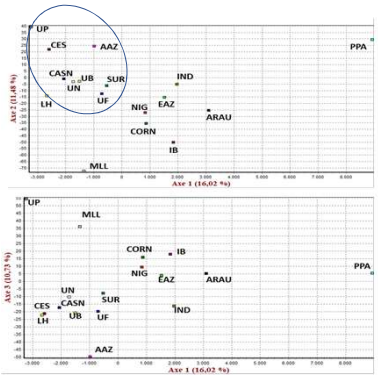
## ➢ Objective

To asses the genetic diversity and population structure of 13 breeds of local chicken breeds.

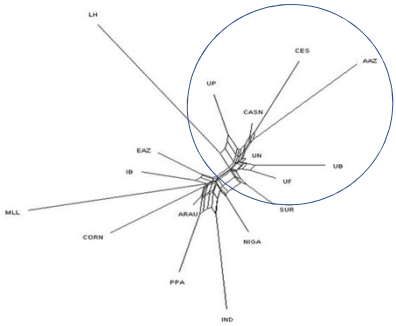
## ➢ Material and Methods

- The analyses included DNA samples of 1296 animals of 13 chicken breeds. Two commercial purebred populations (Leghorn and Cornish), Araucana and Nigerian chicken were used for comparison.
- 30 microsatellites were analyzed.
- Software: MICROSATELLITE TOOLKIT (Park, 2001); GENETIX v4.04 (Belkhir et al. 2004) POPULATIONS v1.2.28 (Langella, 1999); SPLITSTREE 4 (Huson & Bryant 2006); STRUCTURE v.2.1 (Pritchard et al., 2000); STRUCTURE HARVESTER (Earl, Dent A. & vonHoldt, Bridgett M. (2012); CLUMPAK (Kopelman 2015).

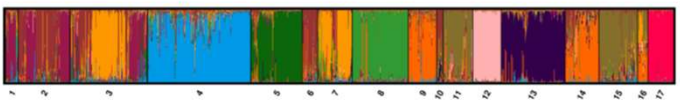
## ➢ Results




Spatial representation of genetic distances among the breeds analyzed, from the three axes obtained in the factorial analyses of correspondence based on microsatellite data. Values between brackets on axes represent the contribution in % of each axis to total inertia.




Neighbor-Net constructed with $D_A$ genetic distances among 17 chicken populations (UB: Utrerana Blanca; UF: Utrerana Franciscana; UN: Utrerana Negra; UP: Utrerana Perdiz; AAZ: Andaluza Azul; SUR: Sureña, CASN: Castellana Negra; CES: Combatiente Español; EAZ: Extremeña Azul; IND: Indio León; IB: Ibicenca; MLL: Mallorquina; PPA: Pita Pinta; ARAU: Araucana; NIGA: Nigeria; CORN: Cornish; LEGH: Leghorn



Population structure of 17 chicken populations inferred by using the STRUCTURE software and based on microsatellite data when K=11 (K optimum according to Evanno method). 1: Utrerana Blanca; 2: Utrerana Franciscana; 3: Utrerana Negra; 4: Utrerana Perdiz; 5: Andaluza Azul; 6: Sureña, 7: Castellana Negra; 8: Combatiente Español; 9: Extremeña Azul; 10: Indio León; 11: Ibicenca; 12: Mallorquina; 13: Pita Pinta; 14: Araucana; 15: Nigeria; 16: Cornish; 17: Leghorn

Ho and He per breed ranged from 0.40 (Combatiente Español) to 0.57 (Utrerana Blanca) and from 0.44 (Combatiente Español) to 0.61 (Extremeña Azul) respectively.

Spanish Southern populations grouped together in the Neighbor-Net.

When the existence of two populations is assumed (K = 2) in the STRUCTURE, the Southern Spanish populations differentiated from the rest of the populations; in K = 11, considered as the optimum K, all populations grouped independently except the Blanca and Franciscana varieties of Utrerana breed, hence the Perdiz variety of Utrerana breed maintained its own cluster.

In the Factorial Analysis of Correspondence, the first and second axis (accounting for 16.02% and 11.48% of the total inertia, respectively) differentiated the Pita Pinta breed from the rest of breeds. Moreover, Utrerana Perdiz population, Andaluza Azul and Mallorquina breeds could be differentiated in the third axis (10.73%).

## ➢ Conclusion

Globally, there is a great diversity in the Spanish chicken populations although it is necessary to make an important effort to differentiate and catalog populations as breeds and their varieties to ensure their conservation.

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## ➢ References


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