

Universal innovative molecular fingerprinting for geographical origin : applications to fruits

THE trade would intensify and extend to the entire planet. The consumer is sensitive to the quality and origin of food products. A molecular technique generated by PCR-DGGE was used to detect the variation in the microbial community of fruits (1).

For the first time, the method of yeast ecology was used as a new traceability analytical tool to identify the geographical origin of tropical fruits from three continents (Africa, Europe, Latin America).



D. Montet ¹, A. F. El Sheikha ^{1,2}, J.M. Bouvet ³

¹ UMR 95 Qualisud (CIRAD, Montpellier University II), 34398 Montpellier Cedex 5, France.

² Department of Food Science and Technology (Minufiya University, Faculty of Agriculture), 32511 Shibin El Kom, Egypt.

³ UPR 39 Forest Genetics (CIRAD, Campus Baillarguet), 34398 Montpellier Cedex 5, France. Contact: elsheikha_aly@yahoo.com

Methodology

The ecology of bacteria and yeasts was studied on fruits from different geographical areas by their fingerprintings of 16S and 26S rDNA respectively. PCR-DGGE was applied on Physalis fruits from three countries (Egypt, Colombia, Uganda, Madagascar) (2), on shea tree from four countries (Cameroon, Mali, Senegal, Uganda) (3) and on clementine from Spain and Morocco. These protocols take into account the methods of El Sheikha *et al.* (1) and Le Nguyen *et al.* (4).

Results

- The DGGE gels showed some significant differences in the migration patterns. However, the duplicates for each sampling location gave statistically similar DGGE patterns throughout the study (Fig 1, Fig 2, Fig 3).
- The band profiles from different countries were different and were specific for each country and could be used as a bar code to discriminate the origin of the fruits.
- When the 16S and 26S rDNA profiles were analyzed by multivariate analysis, distinct microbial communities were detected (Fig 4, Fig 5, Fig 6).

Fig. 1. PCR-DGGE 26S rDNA profiles of Physalis.

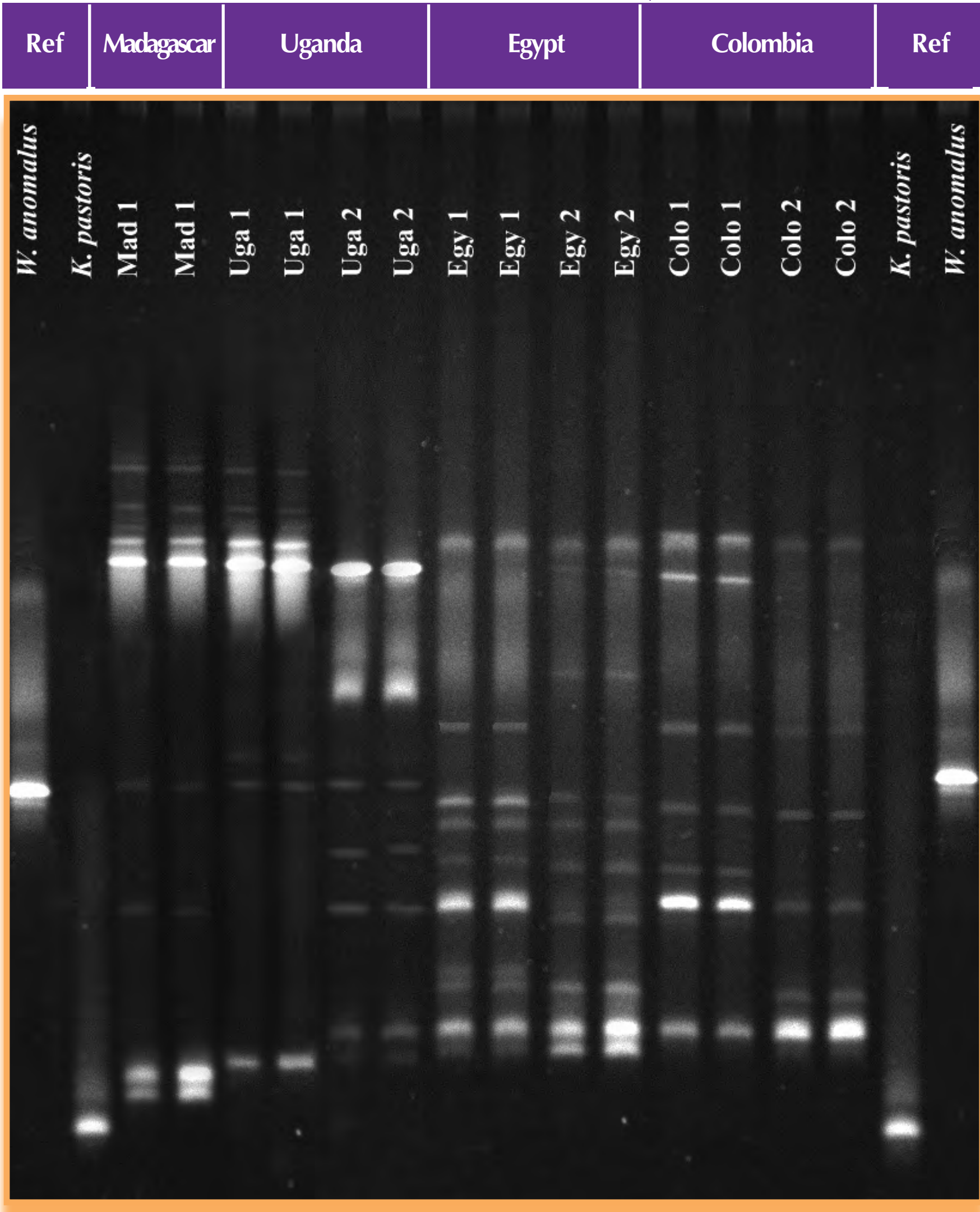


Fig. 4. Cluster analysis of 26S rDNA profiles of Physalis.

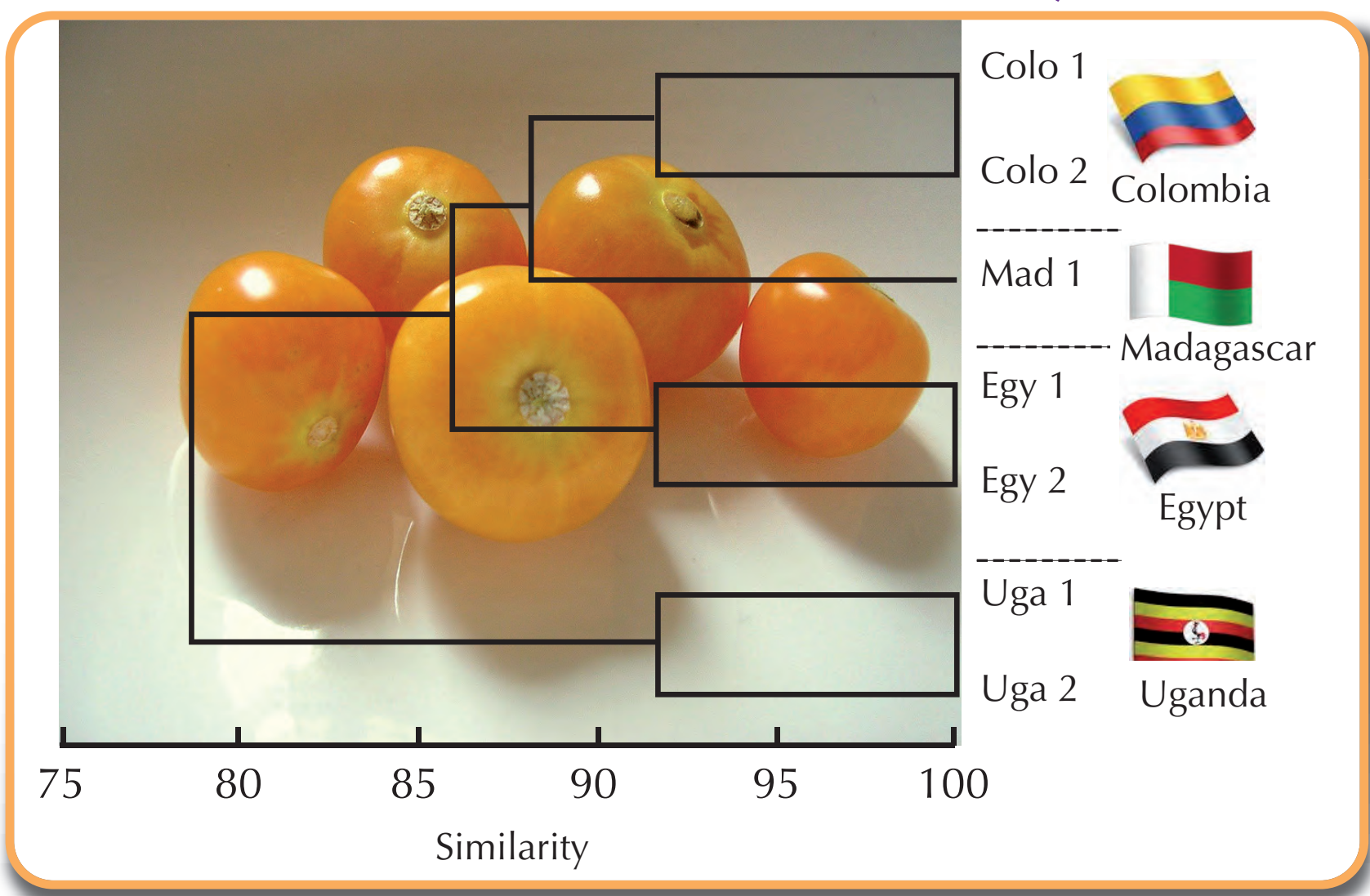


Fig. 5. Cluster analysis of 26S rDNA profiles of Shea tree fruits.

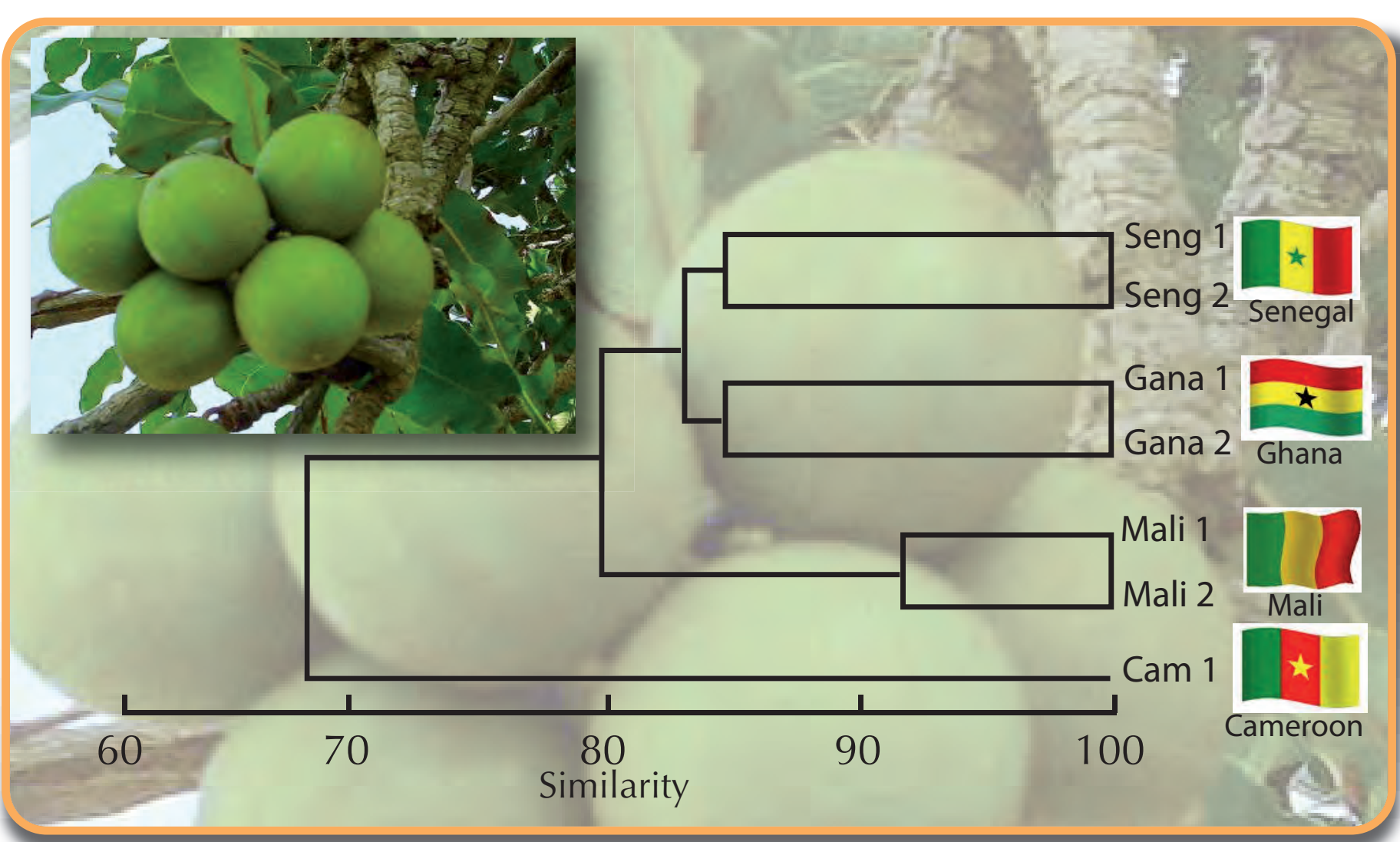


Fig. 3. PCR-DGGE 16S rDNA profiles of Clementine fruits.

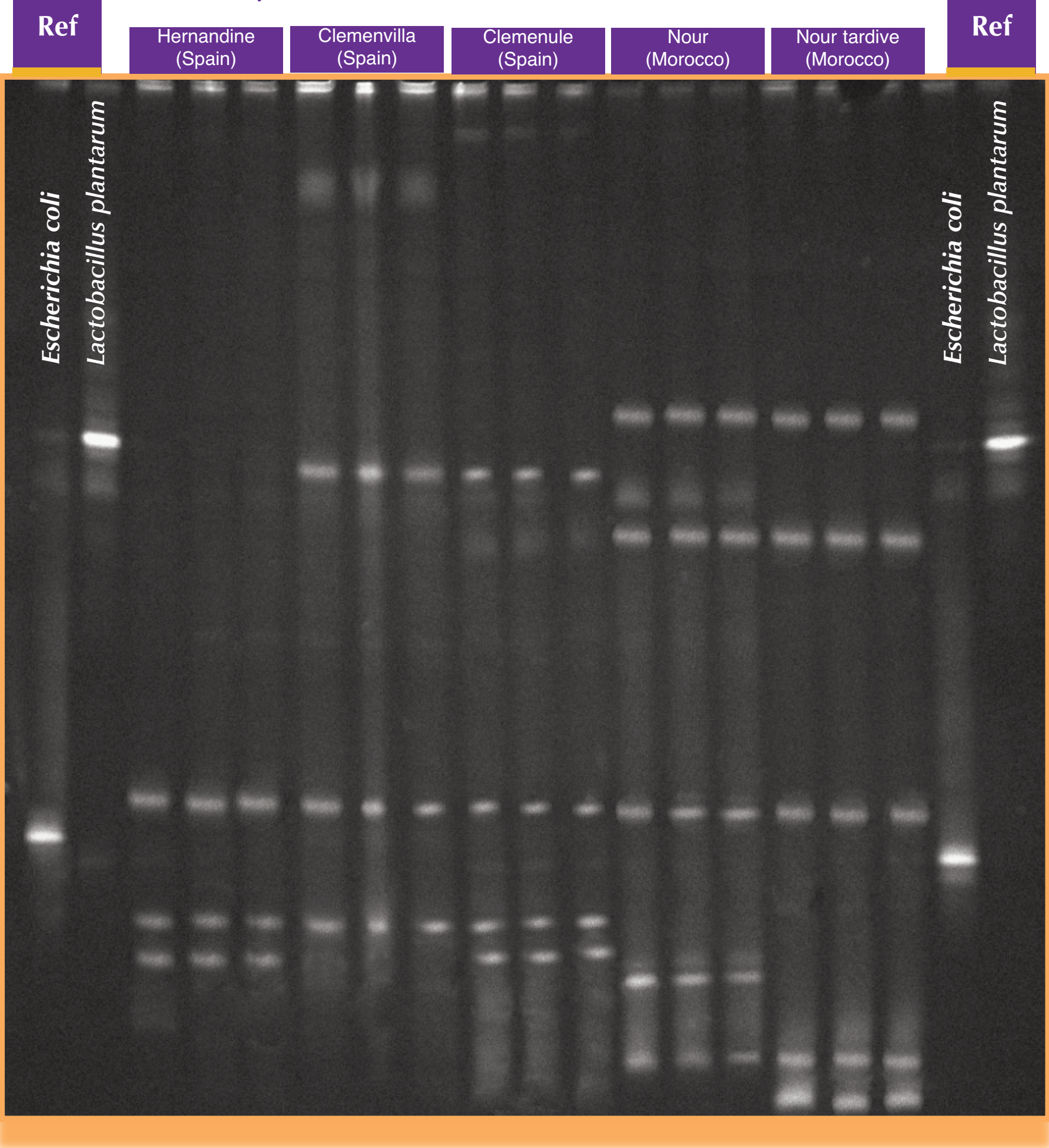


Fig. 6. Cluster analysis of 16S rDNA profiles of Clementine fruits.

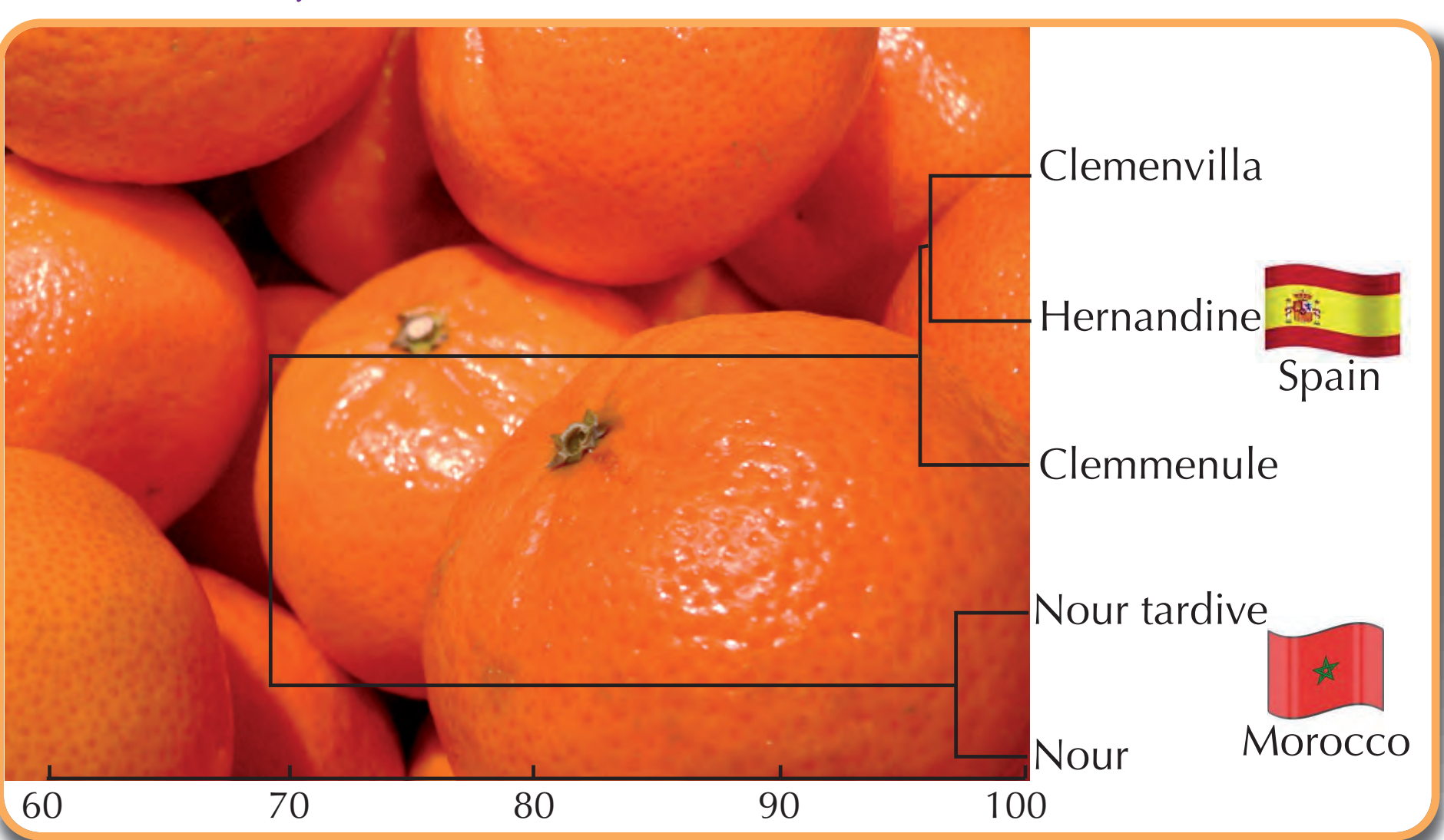
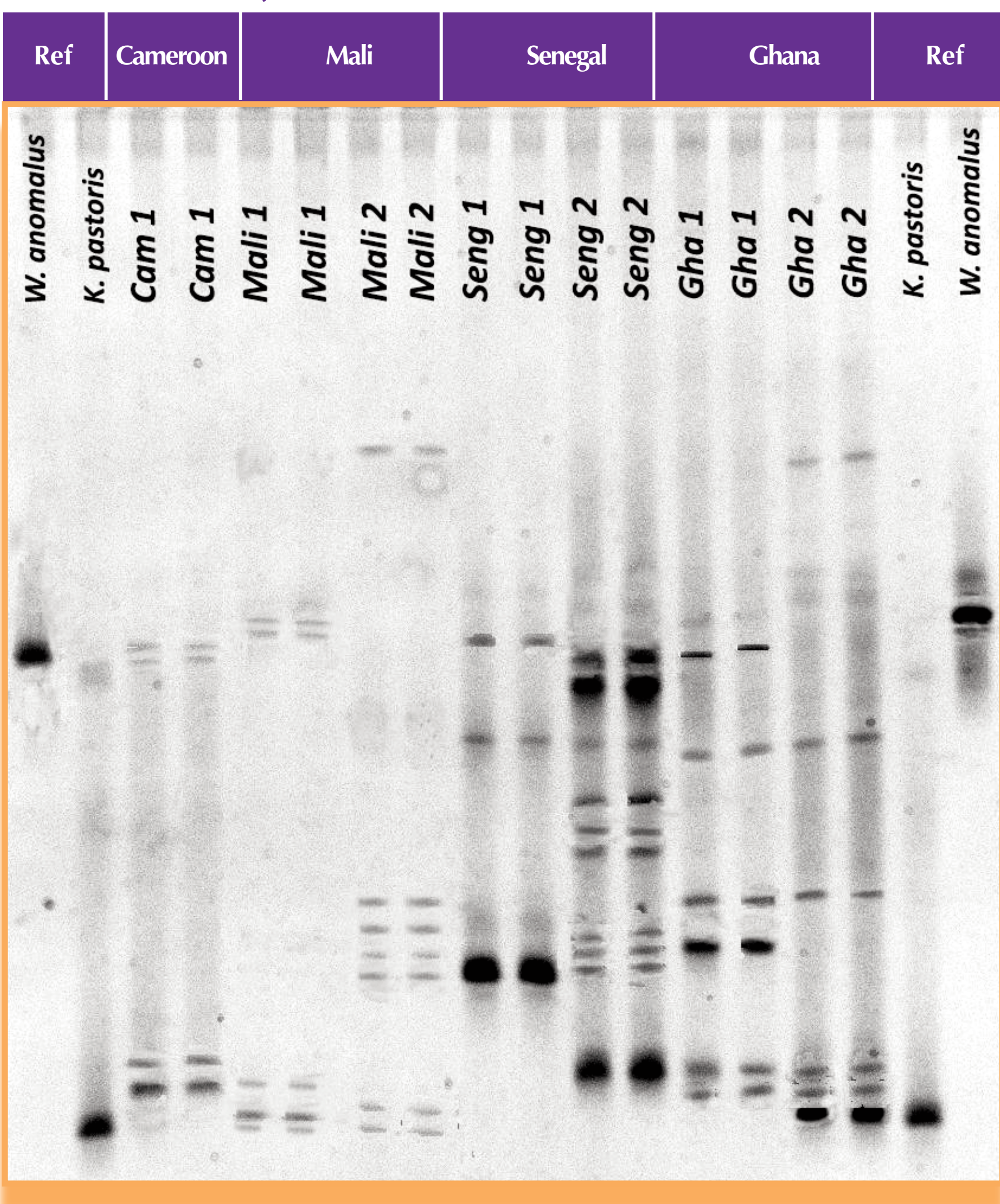


Fig. 2. PCR-DGGE 26S rDNA profiles of Shea tree fruits.



Conclusion

WE demonstrated that there was a link between the microbial populations yeast and bacterial flora and the geographical area. PCR-DGGE is a new traceability tool which provides fruit products with a unique bar code and makes it possible to trace back the fruits to their original country.

References...

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