

## STRUCTURE AND GENETIC DIVERSITY AS REVEALED BY INTER-SIMPLE SEQUENCE REPEAT (ISSR) POLYMORPHISM IN THE ANDEAN TUBER CROP OCA (*OXALIS TUBEROSA* MOL.) GERMPLASM

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The tuber-bearing species, the oca (*Oxalis tuberosa* Mol.), is an important crop cultivated in the uplands of the Andes. The project aims to study the intra-specific and intra-varietal genetic diversity of Andean tubers (oca, ulluco and mashua), which could be considered as a genetic models of vegetatively propagated crops influenced by the human selection and cultural practices. Oca germplasm is conserved by CIP (Centro Internacional de la Papa, Lima, Peru) in *ex-situ* collections (*in vitro* and fields collection). A morphological markers system has been developed from the accessions maintained in fields to allow to classify them into morphotypes, i.e. groups of accessions sharing all the same morphological characters. The genetic diversity of the species and the genetic uniformity of the morphotypes were investigated using the ISSR technique. Thirty-two accessions originating from South America (Argentina, Bolivia, Chile and Peru) and maintained *in vitro* were chosen to represent the ecogeographic diversity of the cultivation area of the species in order to determine its genetic diversity and 44 accessions representing five morphotypes, clearly distinct from each other, were selected from the fields collection to estimate the genetic homogeneity of the morphotypes. Nine primers were selected and used in both analysis. Results (AFC and UPGMA clustering) showed that the genetic structure of the species was influenced by the collection site. The Jaccard's genetic distance between accessions ranged from 0 to 0.49 with an average of  $0.28 \pm 0.08$  (mean  $\pm$  sd). Analysis by country revealed that the Peruvian germplasm presented greater genetic distances from the other countries and possessed the highest intra-country genetic distance ( $0.30 \pm 0.08$ ). The analysis of the morphotypes revealed that all the accessions exactly clustered according to their morphotypes, which were clearly distinct from each other. However, some degree of genetic variation was observed inside each morphotype. In fact, the intra-morphotype genetic diversity revealed a low, but different from zero, average distance of  $0.02 \pm 0.021$  with distances ranging from 0.004 to 0.048. In conclusion, ISSR markers have revealed a relatively low level of genetic diversity in the oca species, which can be related to its predominating reproduction strategy, i.e. the vegetative propagation. An intra-morphotype genetic diversity was also highlighted. This suggests that ISSR markers have a bigger discriminatory capacity than the morphological markers and that the use of the morphological approach alone to eliminate duplicates in germplasm collections of oca could result in a loss of genotypes.