

## VENETIAN RADICCHIO BIOTYPES, WHO CAME FIRST?

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*chicory, combined DNA fingerprint, ancestral relationship*

Chicory, or *Cichorium intybus* L., is a leafy vegetable commonly known in Italy as "Radicchio". This diploid and allogamous species ( $2n=18$ ) is widely cultivated in Europe, North America and Asia, and it is commercialised in the food market as a head or mixed salad. In Italy, the production area is mainly concentrated in the Northeast, where the five main biotypes traditionally recognized are "Treviso Tardivo", "Treviso Precoce", "Verona", "Variegato di Castelfranco", and "Rosso di Chioggia". According to some historical reports, Treviso Tardivo proves to be the first biotype cultivated in the Venetian territories since the 16<sup>th</sup> century. The appearance of Treviso Precoce is certainly posthumous and is thought to be the result of several cycles of selection of Treviso Tardivo. The cultivation of the other three biotypes is decidedly more recent (20<sup>th</sup> century), with Verona preceding the appearance of Variegato di Castelfranco and the Rosso di Chioggia. Beyond the historical documents relating to the genealogy of these five biotypes, molecular studies supporting specific hypotheses have never been performed. Using old farmers' populations, we analysed 652 samples belonging to the five-above mentioned biotypes of Radicchio to reconstruct their genetic relationships. The combination of two kinds of molecular markers (RAPD and AFLP) produced 127 polymorphic loci and it allowed the reconstruction of the relationships among the five biotypes of Radicchio, confirming in most cases the historical information available. From our findings, the two genetically most distant biotypes are

the Treviso Tardivo and the Rosso di Chioggia, while in between there are the Verona, the Treviso Precoce and the Castelfranco populations. Furthermore, it is observed that the Verona biotype originate a well-supported clade obtained from ancestors belonging to the Treviso Tardivo. Conversely the Treviso Precoce, showed a closer relationship to Castelfranco and Chioggia. These findings suggest two separate differentiation events that led to the constitution of the Verona and the Treviso Precoce biotypes starting from Treviso Tardivo. Moreover, the Castelfranco group seems to be originated starting from the Treviso Precoce as the common ancestor, and from a subsequent event of selection, the Chioggia biotype was derived. Noteworthy, it was reported that both Castelfranco and Chioggia biotypes were originated by interspecific crosses of Radicchio with endive (*Cichorium endivia* L.), and from our findings, it seems that the chicory, or Radicchio, ancestor's biotype is closer to the analysed samples of Treviso Precoce than to the others. Further studies, using DNA sequence related molecular markers, would allow deeper investigations on the phylogenetic relations of this species's varieties to reconstruct with higher fidelity its morphological differentiation and development.