

Our wines.

The genetics of Teroldego.

Clonal selection in the 70's standardised the Teroldego grape variety and depleted its genetic diversity: only a few clones selected for high yields were used throughout the Campo Rotaliano and became the only expression of this varietal. In 1985 our work for the recovery of this variety's variability began. We identified the oldest vineyard on the estate, then selected and multiplied the plants that met the desired quality requirements.

After continuous monitoring and further selection, we identified 15 biotypes of Teroldego (in approval phase, scheduled for 2012) that are now being used for replanting and for the qualitative backbone of our wines.

Today our work continues with the study of three hundred individuals derived from seeds of self-fertilized Teroldego vines.

A project for the improvement of an old grape variety: Teroldego

The study of its origins and the prospects offered by
its genetic improvement

*(Summary of the research conducted by the University of Milan
and by Foradori Winery)*

Research on the origin of Teroldego

Two innovative lines of research have been developed: one that uses the tools of cultural anthropology and the methodological assumptions used for researching the origin of Europe's human populations. The other, mainly molecular, based on the frequency of certain DNA sequences present in about 150 European varieties, from the Caucasus to Portugal, has investigated the origin of grape varieties according to their degree of kinship and their relationship with some European regions. The results, collected in a Ph.D. thesis discussed at the end of 2003, have established for the first time a polycentric source for European grape varieties, confirming the so-called "indigenous" hypothesis. According to this hypothesis, domestic grape varieties do not derive from a passive east to west migration, but are the end-result of countless crosses starting from as far back as the Neolithic era between oriental grape varieties and wild or semi-wild varieties. Man, or rather his

culture, was nevertheless decisive in guiding the choice of the plants obtained from these natural crosses. Hence, the position of the Piana Rotaliana on trade routes between North and South and the cultural contributions of the Greeks and Reto-Etruscans were certainly the main inspirers of these choices for Teroldego. DNA analysis has shown the presence of sequences with eastern origins near others from wild varieties, but the most interesting aspects are those related to the close kinship, not yet entirely understood, between Teroldego and Syrah, through cousins, their common grandfather being Pinot. The oriental origin of Teroldego is therefore linked to Syrah, which seems to be part of a group of varieties (the Serine and Shesh) very close to each other genetically that are now present in what was once called Northern Epirus. The genetic affinity of Syrah with Viognier (the Vugava of the island of Vis) and the equivalence between the Mondeuse (father of Syrah) and the Refosco from Friuli confirms Syrah's Dalmatian origin.

The clonal selection of Teroldego

Clonal selection is a technique used for genetic improvement that consists in identifying within old vineyards those specimens to be used for replanting that have particularly promising characteristics in terms of yield and quality. For clonal selection to lead to an improvement in wine quality, it is necessary that the population of individuals that make up a grape variety displays a high variability in the characters that are the criteria for selection.

Put simply, the varietal population must consist of individuals that differ greatly in their phenotypic characteristics. The Teroldego grape variety consists of a very small population of individuals as it is only cultivated on the Piana Rotaliana on a few hundred hectares. Furthermore, in the past as well as more recently, the variety has been subject to mass selections followed by clonal selections, which have greatly depleted its variability. Thus in the existing vineyards, those of the third-fourth post-phylloxera reconstruction, the prevailing varietal types serve well the productive aims of the Denominazione (Denomination) with their large bunches, high fertility, and their not particularly high polyphenolic and aromatic make-up.

To improve the quality of the wine, in terms of concentration and cellar life, it is necessary to reduce the grape yield per plant by using training systems that are less developed than the pergola and by drastically thinning the bunches. The results, however, are often partial. Consequently, a project of so-called 'weak' clonal selection was recently developed that entails the isolation of multiple founders. This project identified, in the last remaining old vineyards of the winery, several biotypes that are very different from the current types of Teroldego. The wines obtained in laboratory fermentations

expressed a stronger character while not losing the variety's typicity. Among the biotypes identified there is one with small bunches that has remarkable characteristics. To conclude this long project, Foradori is registering 15 biotypes, which will increase the plant material available for all the new plantings in the estate's vineyards. Simultaneously, a hitherto unknown historic centre of secondary variability for Teroldego has been identified and observed in Valtellina. This variety is known in that region since the 1600's under the name of Merlina. The origin of this grape variety, common in the Berbenno area, is not yet clear but it probably came from Trentino with the ancient commercial exchanges between Trentino and Lombardy, through the Val di Sole and Tonale Pass. During the past 400 years the more difficult climatic conditions of the Valtellina compared to the Piana Rotaliana led to a selection that favoured biotypes with small bunches and with a high production of colouring matter. A vineyard will be established on the Foradori estate for the comparison of the best selected strains of Merlina with the best biotypes from the Piana Rotaliana. The best clones will be used for the reconstruction of new vineyards where individuals whose enological properties complement one another will be mixed in varying proportions.

The creation of a new variability in Teroldego through self-fertilization

Often, native grape varieties grown in limited areas are represented by few individuals and as such display a low phenotypic variability. It is therefore hard, as stated above, to achieve interesting results in terms of quality through clonal selection alone. Furthermore, in the case of Teroldego, the strong selective pressure conducted in past years has led to a significant erosion of its genetic diversity, basically reducing its phenotypic expression to only 3 or 4 very productive clones. These results could have been interesting in the '60s when high yields prevailed over aspects of quality, but now, as consumers become increasingly demanding, this low variability is not enough to ensure the production of complex wines. As with other small varieties that have these same problems, a genetic improvement project has been developed that involves the creation of new types of Teroldego through the planting of seeds obtained by self-fertilisation. In the process of self-fertilization there is the segregation of the morphological characters of the plant as well as the characters responsible for juice composition; i.e. compared to the fathering variety they occur with greater amplitude in their phenotypic expression but avoiding the great changes that affect the genetic structure of crossings when gene pools of two different plants are involved.

As can be expected with the process of self-fertilisation, the aim of this rese-

arch is to obtain Teroldego vines with less vigour, with smaller and more sparse bunches, with thicker skins and richer in secondary metabolites (aromatic and colouring matter). In addition, the vines obtained through selffertilisation do not have negative viral symptoms.

Two vineyards have been established for the comparison of several thousand vines grown from seed and these will bear their first fruit in this year's harvest. Still, it is a lengthy and costly trial that won't be put into general farming practice before 5-8 years.

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