LIBRANDI

Genetic improvement in native varieties

1. *Genetic and phytosanitary improvement in Calabrian cultivars through clonal selection*

Clonal and phytosanitary selection, aimed at the creation of healthy, behaviourally homogeneous clones, proved itself essential for our vines. In fact, as observed by Franco Mannini of Turin's National Research Council (Institute of Plant Virology, Grugliasco Unit), in charge of this research branch, specifically in the case of the three grapevines examined in Cirò (Gaglioppo, Magliocco and Pecorello), most of the 300 selected and analyzed strains proved to be contamined, but the healthy ones quickly took root in our estate's homologation field.

The Italian Register of Grapevine Varieties collects more than 700 clones of 140 cultivars, selected with both phytosanitary and qualitative parameter. Lots of international varieties are featured, as well as the most popular native grapevines from central and northern Italy, while southern grapevines clones, always scant, sometimes are totally absent. Calabrian varieties in particular were nowhere to be found. Yet, Calabria is the biggest viticulture germplasm reservoir in Italy, the region with the most grapevine varieties, many of which are still almost unexploited, but some of which, as in the case of Gaglioppo, are highly popular.

The sanitized breeding material obtained from this selection will be made available for all winemakers.

After a first pre-selective stage in the old vineyards of the Cirò area, in 2008 we planted an homologation field for clonal selection, counting 50 strains for each examined clone, grafted on a 1103 Paulsen healthy rootstock. This pilot site, born within the Rosaneti estate in Rocca di Neto (KR), followed an experimental method recommended by the official protocol (DM 24/06/08), with two noncontiguous repetitions for each clone.

We implanted 24 virus-free clones (Pecorello, Magliocco Dolce and, of course, Gaglioppo) in repeating parcels, then we began a clonal selection and a careful analysis of their genetic expression. This activity in the vineyard goes hand in hand with some surprisingly successful microvinifications. In order to highlight the actual potential of the selected clones without any external disturbance, we decided to avoid any grape pruning operation. Our

attention was particularly focused on ampelographic aspects (leave and grape features) and agronomic traits (vigor, actual fertility, productivity, grape size), on the quality of musts (sugars, fixed acidity, pH, organic acids), on the moment of harvesting as well as on tracing the grapevines' evolution with specific ripening curves, and on their enological aptitude. The evaluation of this last item consisted in an in-depth analysis of the polyphenolic and aromatic quality of the grapes, combined with the microvinification of the grapes. A special care has been put in using an unvaried method for every clone. We payed close attention to the sampling, collecting 300 grapes for each parcel. The vinification, instead, was carried out on the total amount of grapes produced by each clone. Grape analysis and microvinification were ran in the Enosis Meraviglia laboratory, in Fubine (AL).

The phytosanitary selection allowed us to identify virus-free clones, diversifying the agronomic and enological behavious and highlighting some rather different aptitudes for each examined variety.

PECORELLO. The two selected clones do not present any difference in agronomic and enological behaviours: they were both productive and stored a good amount of sugar, providing alcoholic wines with a sufficiently acidic value. Regarding this last feature, one clone's grapes have a bigger amount of tartaric acid, with the subsequent positive effect of lowering the pH, an advantageous trait for white wines quality.

MAGLIOCCO DOLCE. There are ten presumed clones in the field: eight are Magliocco, one is Arvino and one is an unidentified biotype we named Librandi. During this first year of observation, the clones presented a rather wide range of agronomic and enological aptitudes. Products obtained from three Magliocco clones stood out for their higher alcoholic strenght, an appropriate extract and a superior polyphenolic component.

GAGLIOPPO. There are eight presumed clones in the field. After a first examination, the clones presented a quite wide range of agronomic and enological aptitudes.

The clones in the homologation field are the result of a wide, in-depth sanitary control through the ELISA test on several hundreds of strains that were identified during the pre-selection process. Those clones proved to be either free from all main vine viruses, or just infected with mildly harmful or unharmful viruses. Every clone in the field has also been tested

for viruses with a biomolecular PCR analysis, and submitted to biological trials on sample vines (in progress under our screen-house). The mother plants are preserved in the IVV-CNR screen-house in Alba (CN).

The results of this work were published in 2012 in a scientific essay titled *VITIGNI DI CALABRIA – Selezione e Potenzialità Enologiche* (Calabrian grapevines – Selection and enological potential), in which the agronomic and enological characterization through clonal selection of these three important Calabrian vines is thoroughly explained.

In 2014, the long-time partnership between Azienda Librandi, IPSP-CNR and Enosis resulted in the selection and registration in the Italian Register of Grapevine Varieties of the first four clones of cv Gaglioppo (GU n. 127 del 04/06/2014) (AA. VV., 2008, Mannini et al., 2012). The spreading and commercialization of these clones as «certified material» operated by the plant nursery chain and the subsequent grafting for the creation of new vineyards will doubtlessly improve Gaglioppo's production and quality standards. Surely a first step in this direction is the employment of genetically selected material, free from harmful viruses, but the final quality of the Gaglioppo grape depends on several other factors.

The first Calabrian clones to finally appear in the Ministero delle Politiche Agricole national register, therefore formally representing the quality of research and the legitimacy of Calabrian DOC are:

- For Gaglioppo N. clones: *I-Librandi CVT 75, I-Librandi CVT 80, I-Librandi CVT 164* e *I-Librandi CVT 165*;
- For Greco Nero N. (Magliocco) clones: *I-Librandi CVT 38, I-Librandi CVT 41, I-Librandi CVT 48* e *I-Librandi CVT 68*;
- For Pecorello b. clones: *I-Librandi CVT 6* e *I-Librandi CVT 8*.

2. *Redevelopment of recovered clones for important minor varieties*

While conducting its tests in the homologation field, our team is also recovering some virus-stricken clones through the meristem culture technique, sometimes combined with in vitro thermotherapy, depending on the type of virus. In a highly critical environment as that of the virus-laden Calabrian vineyard, this activity becomes crucial to widen the clonal virus-free base of the main cultivar (Gaglioppo) and to recover healthy ancestor-plants for minor or rare

grapevines. So far, the redevelopment has been attained for 6 Gaglioppo clones, 2 Arvino, 2 Guarnaccia, 3 Iuvarello, 2 Mantonico, 1 Greco Bianco and 1 Marchesana. To avoid any viral or phytoplasma reinfection, the «primary source» for each clone is securely preserved in the Vivalb nursery screen-house, in Fraz. Vaccheria, Alba (CN), in partnership with Turin's National Research Council, under the supervision of Doctor Franco Mannini.

In 2016, the recovered clones have finally been implanted in our estate, in a new experimental homologation field for clonal selection.

In order to collect all the different indexes that constitute the clones' ID card as well as their agronomic and enological potential, we eventually created a database of all the plants' agronomic features, which is constantly updated throughout the year.