An updating about the performances of Pinot Gris and Traminer vines affected by the GPGV trichovirus-related grapevine disease

Umbrerto Malosinisi¹, Pierluigi Bianchetti¹, Tomás Román Villegas¹, Mauro Varnera², Valeria Guandalini³ and Giorgio Nicolini¹

¹ FEM Fondazione Edmund Mach, via E. Mach 1, 38010 San Michele all'Adige, TN, Italy
² Metzconovia snc, via del Teroldeggi 1, 38016 Metzconovia, TN, Italy
³ Corresponding author: umberto.malosinisi@femach.it

Summary
This paper presents an update of a multi-year survey carried out in Trentino (North-east Italy) regarding Pinot Grigio and Traminer Aromatico grapevines, whether or not temporarily affected by a disease linked to the Trichovirus recently discovered (1), which was named Grapevine Pinot gris Virus (GPGV). Diseased plants show symptoms resembling mite infestations or Thrips. Symptoms occur in spring, at the bud-break, and are characterized by leaf deformation, chlorotic speckling or motting, stunting or poor growth of shoots and inflorescences. Data regarding the number of buds, fertility and grape yield per vine are reported; and so for cluster, berry, stem, and pruning weights. Symptomatic plants show a significant drop of production due to the lower number and weight of cluster and berries. Seeds are also present in a fewer number. In few plants the reduced vigor affected also the choice of branches for pruning renewal, leading sometimes to plants death. The chemical composition of the grape from vines with and without symptoms are also shown.

INTRODUCTION
Symptoms of stunting, chlorotic motting and leaf deformation were observed on the cv Pinot gris in Trentino vineyards since 2003. After ruling out the involvement of other agronomic factors and pathological agents, the infection of several cluster-, ampelo- and vitivinuses was also excluded. A biological indexing program demonstrated a graft-transmissible reproduction of symptoms and a NGS (Next Generation Sequencing) approach of metagenome investigation was performed. This allowed the description of a new Trichovirus closely related to Grapevine berry inner necrosis virus (GBNV), which was named Grapevine Pinot gris virus (GPGV) (1, 6). Afterwards, similar symptoms were reported from Traminer and Pinot noir in Trentino (2), Friuli Venezia Giulia, in Apulia on the table varieties Black Magic and Supernova (10), in Emilia Romagna, in Veneto on Gria (4) and in Slovenia on Pinot gris, Sauvignonase and Muscat blanc (8). GPGV was also found in Korea (7) on Tannara, a table grape. Recently, GPGV was detected in Slovak and Czech Republics (9). All mentioned reports show that, although GPGV is present in several regions, its association with symptoms is conflicting, a finding noticed since the inception of its discovery (1), which showed that the virus was found with a limited percentage also in symptomless vines, disclosing therefore, a latent behavior.

MATERIALS and METHODS

Materials
All the vines of 1 vineyard of Pinot gris (total 1053 vines) and 1 vineyard of Traminer (1106) were monitored. The presence of symptoms in the first year of the work and in 2013 is given in table 1.

Methods
- Visual ranking of the symptoms (from 0 = symptomless to 3 = heavy) on shoots and vines. Figure shows an example on Pinot gris
- biological indexing (indicators: Cabernet, Pinot gris, Traminer, V. rupestris, V. riparia) of cane
- serological (DAS-ELISA) and molecular tests (RT-PCR multiplex & single RT-PCR) on wood and leaves
- agronomic & oenological parameters.

RESULTS and DISCUSSION

With time, the number of symptomatic vines increased from 13 to 30% in Pinot and from 3 to 6% in Traminer (see 2009 & 2011 vs 2013 in table 1).

- Symptomatology in each vine is maintained (table 1).
- Symptomatic vines showed a reduced vigor & yield (Pinot gris: about -30% -50% respectively, in Traminer: -43% -60% due to lower number and weight of clusters (Pinot gris -30% for both parameters; Traminer: -44% & -20% respectively) (table 2).
- At harvest, in both varieties the chemical composition of grapes is modified: in Pinot gris: about --43% for Brix, 21.85 ± 1.6 and 22.22 ± 1.6 n.s.; total acidity (g/L): 6.36 ± 0.7 and 6.28 ± 1.0 n.s.; Ravaz’s index [a/b]: 3.6 ± 2.6 and 4.4 ± 2.4 n.s.; pH: 3.34 ± 0.1 and 3.33 ± 0.1 n.s.; N° of seeds/vine: 600 ± 372 and 1761 ± 647 n.s.; grape yield (Kg): 1.329 ± 0.7 and 2.680 ± 1.3 0.01; cluster weight (g): 199 ± 34 and 142 ± 45 0.001; number of buds: 1,940 ± 1.1 and 4,290 ± 1.5 0.001; fertility at the bud --break (A): 126 ± 58 and 158 ± 44 0.05; number of buds: 0.1 0.2 0 0.3
- Vines with symptoms showed a reduced vigour & yield: cluster weight (g): 99 ± 34 and 142 ± 45 0.001; number of buds: 1,940 ± 1.1 and 4,290 ± 1.5 0.001; fertility at the bud --break (A): 126 ± 58 and 158 ± 44 0.05

The authors acknowledge for their scientific & analytical support: at FEM: P. Bragagna;
at IVV-CNR & University of Bari: G.P. Martelli, P. Saldarelli, E. deLillo, V. Savino & coworkers;
at DipSA-University of Bologna: R. Credi, F. Terlizzi, R. Beber & coworkers;
at University of Naples: P.P. D’Errico & coworkers;

REFERENCES