

INCIDENCE OF NINE VIRUSES IN CLONAL SELECTIONS OF ITALIAN V. VINIFERA CULTIVARS

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Introduction

Grapevine is a very important fruit crop that can be negatively influenced by various graft-transmissible infectious diseases of a viral nature (1). Since our wine industry requires an expansion of the available range of local cultivar clones free from virus and virus-like infections, an extensive sanitary selection programme was started a few years ago.

In this paper we report the incidence of nine viruses and the evidence of high levels of some of these pathogenic agents.

Materials and Methods

Field inspections and sample collections were carried out in different Italian viticultural regions throughout the 2000-2002 seasons. In autumn-winter, dormant cuttings were taken from individual vines of 19 cultivars ("Aglanico", Barbera", Bordò magher", "Croatina", "Falanghina", "Fiano", "Greco", "Inzolia", "Malvasia bianca", "Malvasia nera", "Marzemino", "Montepulciano", "Nebbiolo", "Negroamaro", "Nero d'Avola", "Primitivo", "Sagrantino", "Sangiovese" and "Verdicchio") and analyzed by ELISA for detecting the following viruses: GFkV, GFLV, GLRaV-1, GLRaV-2, GLRaV-3, GLRaV-6, GLRaV-7, GVA and GVB (1, 2).

Antibodies to all viruses were of commercial origin (Agritest, Valenzano, Bari; Bioreba, Reinach, Switzerland) and used according to the manufacturer's instructions. Cortical scrapings from the mature canes ground in extraction buffer were the antigen sources. Absorbance at 405 nm greater than twice the healthy value was considered positive for the virus tested.

Results and Conclusions

Virus infections were detected by ELISA in 3,589 out of 4,205 samples (85.4%). On average, GLRaV-3 was the most common (28.6%), followed by GFkV (25.7%), GVA (23.3%), GLRaV-1 (10.4%), GFLV (6.1%), GLRaV-2 (2.6%), GVB (2.4%), GLRaV-7 (0.8%) and GLRaV-6 (0.1%).

The incidence of GLRaV-3 was particularly high in the tested vines of "Negroamaro" (43%), "Malvasia nera" (34.3%), "Malvasia bianca" (31.8%), "Primitivo" (31.2%), "Montepulciano" (31.1%), "Bordò magher" (30%), "Nero d'Avola" (29.9%) and "Sangiovese" (29.6%). GFkV presence ranged from 42.6% ("Sangiovese") to 3.1% ("Croatina"). Peaks of GVA infections were detected amongst "Verdicchio" (42.1%), "Marzemino" (41.2%) and "Croatina" (40.6%) candidate clones. GLRaV-1 was also widely distributed and its incidence varied from 42.2% ("Sagrantino", "Verdicchio") to 1.8% ("Negroamaro", "Malvasia nera"). GFLV was detected with high incidence only in selections of "Bordò magher" (43.3%), "Nebbiolo" (18.3%) and "Montepulciano" (10.2%). Significant levels of GLRaV-2 infections were found in "Aglanico" (18.8%), "Sangiovese" (11.1%), "Malvasia nera" (9%), "Nero d'Avola" (6.2%) and "Primitivo" (4%). GVB incidence appeared significant only in vine populations of certain cultivars of southern Italy sites like "Negroamaro" (8.9%), "Primitivo" (6.7%) and "Malvasia nera" (4.8%). The highest rates of GLRaV-7 presence were in "Montepulciano" (4.2%), "Sangiovese" (3.7%), "Marzemino" (2.9%), "Nebbiolo" (2.6%) and "Greco" (2.4%) candidate clones. Finally, GLRaV-6 was detected only in plants of "Nero d'Avola" (0.3%), "Primitivo" (0.4%) and "Malvasia nera" (0.2%).

In a single vine, viruses were usually detected as mixed infections. Generally, the most frequent combinations were: GFkV+GLRaV-3+GVA (15.2%), GFkV+GLRaV-3 (10.2%), GLRaV-3+GVA (7.6%), GLRaV-1+GVA (5.1%), GFkV+GLRaV-1+GLRaV-3+GVA (4.7%), GFkV+GFLV+GLRaV-3+GVA (2.9%), GFkV+GLRaV-2+GLRaV-3+GVA (2.6%), GLRaV-1+GLRaV-3+GVA (2.4%) and GFkV+GLRaV-1+GVA (2.4%).

Infections of a sole virus with the highest incidence were instead the following: GFkV (9.5%), GLRaV-3 (6.3%), GLRaV-1 (2.4%), GVA (2.1%) and GFLV (1.2%).

The results of the laboratory assays carried out showed that important grapevine viruses, and related diseases, infect certain local cultivars with high rates. In this regard, to improve grapevine crops, there is little doubt that it will be necessary to produce virus-free clones and to continue with efficient sanitary selection programmes.

Acknowledgements

This work was supported by Coop. Vitis Rauscedo, Via Richinvelda 45, 33095 San Giorgio della Richinvelda (PN), Italy.

References

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