

Mapping the environmental risk potential on surface water of pesticide contamination in the Prosecco's vineyard terraced landscape

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Intensive cropping systems today represent a paramount issue in terms of environmental impacts, since agricultural pollutants can constitute a potential threat to surface water, non-target organisms and aquatic ecosystems. Levels of pesticide concentrations in surface waters are indeed unquestionably correlated to crop and soil management practices at field-scale. Due to the numerous applications of pesticides required, orchards and vineyards can represent relevant non-point sources for pesticide contamination of water bodies, mainly prompted by soil erosion, surface runoff and spray drift.

To reduce risks of pesticide contamination of surface water, the Directive 2009/128/CET imposed the local implementation of agricultural good practices and mitigation actions such as the use of vegetative buffer filter strips and hedgerows along river and pond banks. However, implementation of mitigation actions is often difficult, especially in extremely fragmented agricultural landscapes characterized by a complex territorial matrix set up on urban sprawling, frequent surface water bodies, important geomorphological processes and protected natural areas. Typically, such landscape matrix is well represented by the, Prosecco-DOCG vineyards area (NE of Italy, Province of Treviso) which lays on hogback hills of conglomerate, marls and sandstone that ranges between 50 and 500 m asl. Moreover such vineyards landscape is characterized by traditional and non-traditional agricultural terraces. The general aim of this paper is to identify areas of surface water bodies with high potential risk of pesticide contamination from surrounding vineyards in the 735 ha of Lierza river basin (Refrontolo, TV), one of the most representative terraced landscape of the Prosecco-DOCG area.

Specific aims are i) mapping terraced Prosecco-DOCG vineyards, ii) classifying potential risk from pesticide of the different areas.

Remote sensing technologies such as four bands aerial photos (RGB+NIR) and Light Detection and Ranging (LiDAR) have been used to map vineyards and to evaluate slope and drainage systems. All the data and statistics analyses have been performed in GIS environment.

The areas of surface water located within a buffer zone of 20 linear meters from vineyard perimeter were considered at risk of pesticide contamination, according to European guidelines and on-site experimental results about the pesticide drift effect.

Preliminary results show that 26 ha of the total vineyards within the river basin can potentially affect surface water bodies, highlighting that 19,410 m of perimeter is within 20 m from water courses. Moreover, vineyard classification based on proximity analysis indicates that 6.8 ha are at very high potential risk (<1m from water courses), 8.6 ha are at high risk level (from 1 to 5 m); 4.3 ha are at medium level (from 5 to 10 m), while 8.6 ha are at low level (>10 m).