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Dolines on Garfagnana plateaux**location**

region	Tuscany
province	Lucca
municipality	Vagli Sotto, Galliciano
sector	Umbriana, Palodina
toponym/locality	Tontorone, Corona Pian di Lago, Penna

interest

scientific interest	epigean karst phenomena
contextual interest	botanical didactic
interest evaluation	illustrative
level of interest	regional

conservation status

characteristic/condition	good
risk of natural deterioration	non-existent
risk of anthropogenic deterioration	medium

**geological and environmental description**

Despite a large hypogean extension, superficial karst phenomena in the Apuan Alps are not particularly remarkable on large and middle scale, but are more evident in smaller forms, in 'karrens' which often creates karst landscapes with grikes. The uneven orography, especially near the main ridge, is the most important reason for the relatively high number of dolines and the almost absolute lack of poljes, blind valleys and closed basins. These plateaux are rare near the highest Apuan summits. Some of them can be found in places which have been moulded by Würmian glaciers. It is not a coincidence that dolines are almost exclusively found to the north of the main ridge, where slopes are the result of glacial morphogenetic activity.

Nevertheless, epigean karst forms are relatively widespread along the secondary ridges of the Apuan Alps, on the inland side sloping towards Garfagnana. River Serchio right tributaries flow in sub-parallel valleys, separated one from the other by higher watersheds. Moreover, they do not slope towards Camporgiano, Castelnuovo and Galliciano bottom valley as gently as torrents. The Garfagnana mountainside is, therefore, characterized by the alignment of structural highs, levelled towards the crest, which are far from the main ridge. These landforms are to be interpreted as horsts of the Serchio' tectonic ditch (graben), into which they suddenly sink, along the valley Apuan margin. These plateaux with a rather smooth morphology create favourable conditions for medium scale epigean karst phenomena, especially where Tuscan Nappe carbonate formations outcrop. Dolines of remarkable dimensions, mainly flat dish-shaped, may be found on non-metamorphic limestones and dolomites. Their inner part is characterized by a layer of detritus with various degrees of thickness, differently from similar depressions originated in the tectonic window's carbonate formations.

Dolines in Garfagnana are sometimes characterized by water stagnation in correspondence of argillitic intercalations or repellent internal deposits of gravitative origin. Remarkable hygrophilous flora and vegetation can be found in these humid areas with a seasonal surfacing of the aquifer.

description of the level of interest

The dolines on the Apuan inland side plateaux are of regional interest for their quality and quantity, compared to the dimension of the territory. It is noteworthy to recall that 44 karst areas have been registered in Tuscany. They spread over a surface totalling 1,100 km², that is to say 5% of the entire Region. These areas are not very large considering that almost 1/3 of karstifiable lands, 350 km², are located in the Apuan Alps, especially on their inland side of the Garfagnana.