



Palynological data on the Monticino Quarry sequence

DARIA BERTOLANI MARCHETTI & LUCA MARZI

Istituto ed Orto Botanico dell'Università, V. Caduti in Guerra 127, I-41100 Mc

180 48
 6

Palynological research was carried out in layers from the Monticino Quarry with the aim of reconstructing the old climate and environment using paleovegetational data.

The layer studied here has a thickness of about 1.5 m and is part of the Colombacci Fm., belonging to the Late Messinian. A sample collected from the overlying Argille Azzurre Fm. appeared devoid of palynomorphs. Samples from a fossil sink hole cut within the evaporites and filled with Colombacci clay proved to be rich in pollen.

The graph in Fig. 2, shows the results of our palynological analysis. *Pinus* type *haploxylon* and *Pinus* type *silvester* were present; the former had a maximum at levels D and C.

The significance of *P. haploxylon*, no longer present here today, remains undefined, but the percent ratio of *P. haploxylon* to *P. diploxylon* (or *silvester* type) increases during the hotter climatic periods. Thus *P. diploxylon* type is given the significance of cooler climate.

The climatic oscillations can be followed by means of the mediocrat curve, which takes into account the percentage of thermophilous taxa; the warmest periods are represented by its peaks. In contrast, the higher values of *Tsuga* + *Cedrus* are related to the presence of cool mountain vegetation.

The values of *Hygrophyta* and *Hydrophyta*, demonstrating marshy or aquatic environments (see *Nymphaeaceae* at Level D), only have a local significance. *Alnus* + *Salix* reflect bank vegetation. *Gramineae*, *Chenopodiaceae*, *Plantaginaceae* testify to local arid substrate conditions.

The presence of coastal lagoons is related to the low but constant *Taxodium* percentages.

In short, we can state the Colombacci sequence is involved in a cool climate, as revealed by the low percentage of mediocrats and by two marked peaks of *Tsuga/Cedrus* at levels E (19.5) and C (14.6). Level E also has a certain percentage of *Picea*, that gives further importance to this peak. This spectrum also has the maximum of *Hygrophyta*, in an inspiring land having ponds with *Nymphaea*.

Globally, the sequence taken at Colombacci shows vegetational features in line with previous research, rich in «tertiary» taxa no longer present, in an overall cool climate, different overlapping vegetational belts, and coastal lagoons.

Figure 1 schematically represents the allimetric vegetational belts and the local ecological conditions,

such as lagoons, etc. The climatic variations may have produced allimetric changes of the belts, but within this general representation.

The palynological data seem to indicate that the Late Messinian (Colombacci) was characterized by successive waves of climatic impairment.

The coniferous belt (*Tsuga*, *Cedrus*, *Picea*) was lowered as a consequence of the cool peaks at levels E and C. A warm dry phase at level D separates the two cool peaks. The second peak probably corresponded to a very rainy period that incremented the hygrophylous and hydrophyllous vegetation. Moreover, it may have produced favourable ecological conditions for *Sciadopitys*, a taxa that today requires 6,000 mm of yearly rainfall.

The possibly slightly older pollen spectrum of the sink hole is palynologically very different. Forest cover is more important, in accord with the characteristics of tertiary woods. Ferns are abundant, but non-arborescent plants are scarce.

The mediocrats reach higher percentage values than in the upper levels. The *Tsuga/Cedrus* complex repeats the low percentage values of the Colombacci bottom.

Overall, we have here a tendentially warm climate mitigate by oceanic conditions, represented by the

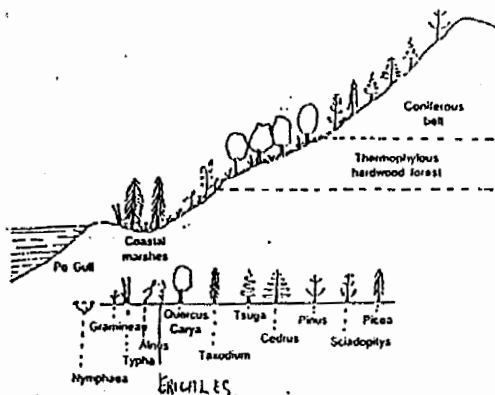


Fig. 1 - Vegetational belts according to palynological analyses carried out at the Monticino Quarry. The collocation of the taxa in vegetational belts is possible; they are really present in the palynological spectra.

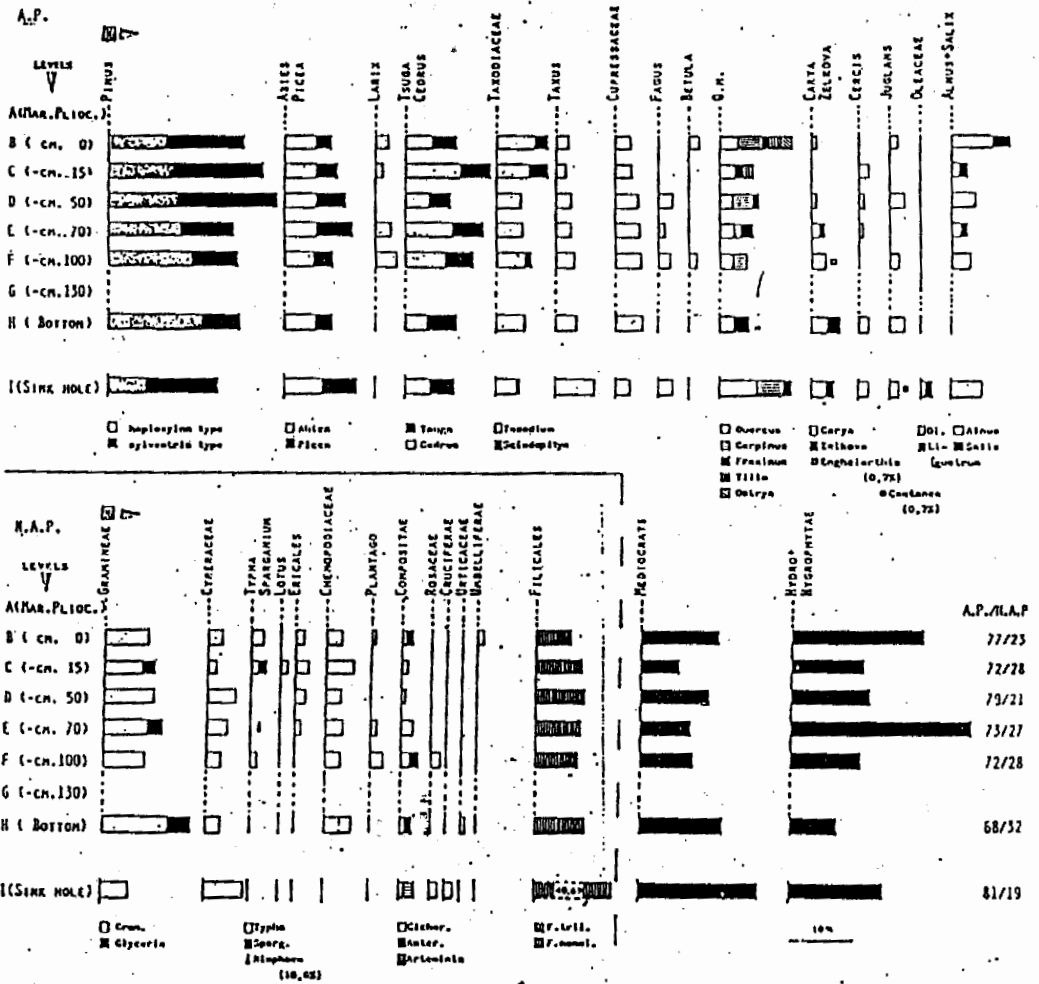


Fig. 2 - Results of palynological analysis: frequency of Arboreal Plants (A.P.) and Non-Arboreal Plants (N.A.P.) are represented.
 Mediocrats = Quercetum mixtum (Q.m.) + Carya + Zelkova + Enghelarthia + Oleaceae + Cercis + Juglans + Castanea.
 Hydro+Hydrophytae = Taxodium + Alnus + Salix + Cyperaceae + Typha + Sparganium + Nymphaeaceae.

presence of *Taxus* and *Fagus*. The abundant precipitation has favoured the formation of lagoons, ponds and marshes.

REFERENCES

BERTOLANI MANCHETTI D., 1984 - *Analyse pollinique des intercalations mameuses du Messinien de la «Formazione Gessoso-solfifera»* (Bologne, Italie du Nord). *Paléobiologie Continentale*, 14 (2), 143-151.
 BERTOLANI MANCHETTI D., 1984 - *Some paleoclimatical and paleovegetational features of the Messinian in the Mediterranean on palynological basis*. *Webbia*, 30, 417-426.
 BERTOLANI MANCHETTI D., 1984 - *Pollen paleoclimatology in the Mediterranean since Messinian time*. In: *Geological Evolution of the Mediterranean Basin*. Springer Verlag, New York, 525-543.

11. Fossil vertebrate in the Lamone Valley, Romagna Apennines - Field Trip Guidebook - Contin, Fauna at the Misc./Pleist. boundary - Internat. Workshop, Faenza 24-31 Mar. 1985