

FOUNDATION, DEVELOPMENT AND ABANDONING OF A BRONZE AGE PILE-DWELLING (“LUCONE D”, GARDA LAKE) RECORDED IN THE PALYNOSTRATIGRAPHIC SEQUENCE OF THE POND OFFSHORE THE SETTLEMENT

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ABSTRACT: Badino F. *et al.*, *Foundation, development and abandoning of a Bronze age pile-dwelling (“Lucone D” site, Garda lake) recorded in the palynostratigraphic sequence of the pond offshore the settlement.*

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The ongoing archaeological excavations at “Lucone D” pile-dwelling (Garda lake morainic amphitheatre, Polpenazze del Garda - Brescia), yielded abundant archaeological artifacts and piles dendrochronologically and/or culturally dated back from 2033±10 to 1800-1900 cal B.C. Palynostratigraphic studies focused on the lacustrine-palustrine sequence in the pond facing the settlement. A palynological record at decennial resolution, supported by AMS datings and independently correlated to the village history through detection of sharp events, describes the environmental changes at the foundation of the settlement, the development of rural landscape during the two-centuries development of the village, and the abandonment.

RIASSUNTO: Badino F. *et al.* Fondazione, sviluppo e abbandono di un abitato palafitticolo dell'età del Bronzo (“Lucone D”, lago di Garda) nella palinostratigrafia dello stagno adiacente all'insediamento. (IT ISSN 0394-3356, 2011)

Gli scavi archeologici in corso presso il sito palafitticolo “Lucone D” (anfiteatro morenico del Lago di Garda, Polpenazze del Garda - Brescia) hanno restituito una ricca documentazione di materiali archeologici del Bronzo Antico (circa 2033-1800 a.C.). Gli studi palinostratigrafici si sono concentrati sulla sequenza stratigrafica conservata nello stagno adiacente l'abitato. Nel presente lavoro viene brevemente descritta la storia dell'ambiente nelle fasi che precedono la fondazione dell'abitato, durante le sue fasi di vita e nel periodo successivo al suo abbandono.

Key words: Bronze Age, pile-dwelling settlement, Lucone, Pollen analysis, human impact, northern Italy

Parole chiave: Età del Bronzo, palafitte, Lucone, analisi pollinica, impatto antropico, nord Italia

The former-lake Lucone (249 m a.s.l., Polpenazze del Garda - Brescia) is located in the western part of the morainic amphitheatre of Garda Lake (Fig. 1), the biggest glacial system in Italy. More than fifty lakes were formed in this region during the lateglacial times which evolved as closed lakes (i.e. without an outlet) after deglaciation completed. During the Early Bronze Age (BA) a sudden increase of long-standing (i.e. centennial-standing) lacustrine villages is observed in these small basins, causing a sharp intensification of human impact on the landscape. Palaeobotanical and sedimentological studies are particularly fruitful in the sediment archives preserved at these waterlogged sites.

The sediments of the Lucone basin contain one of the richest Holocene archives: preservation of plant remains is excellent and the Late Holocene stratigraphic sequence is only faintly damaged by peat quarrying or agricultural works.

Archaeological findings are distributed in five different areas along lakeshores (Lucone A-E,

BAIONI M., BOCCHIO G. (2004)). Two pile-dwellings were excavated (Lucone A and Lucone D): the lithic and bronze assemblages referred them to Early and Middle BA, GUERRESCHI G. (1980-1981), BOCCHIO G. (1985–1988). A more accurate dating is provided by a dendrochronological investigation carried out at Lucone D on 50 *Quercus* sp. Posts, which added chronological precision to the archaeological sequence, restricted to Early BA, MARTINELLI N. (1996).

We present here the first results of a palynostratigraphic investigation of a pond record offshore to the village (Fig. 2). A trench has been dug precisely 13 m from the limit of the innermost stilt houses, the latter marked by waterlogged dump cumulus. Three radiocarbon AMS ages were obtained all from terrestrial plants and calibrated using CALIB software (v 6.0, Queen's University Belfast) with the IntCal09 calibration curve. The age-depth model is also supported by the event-correlation technique. Three main events provide a chronological

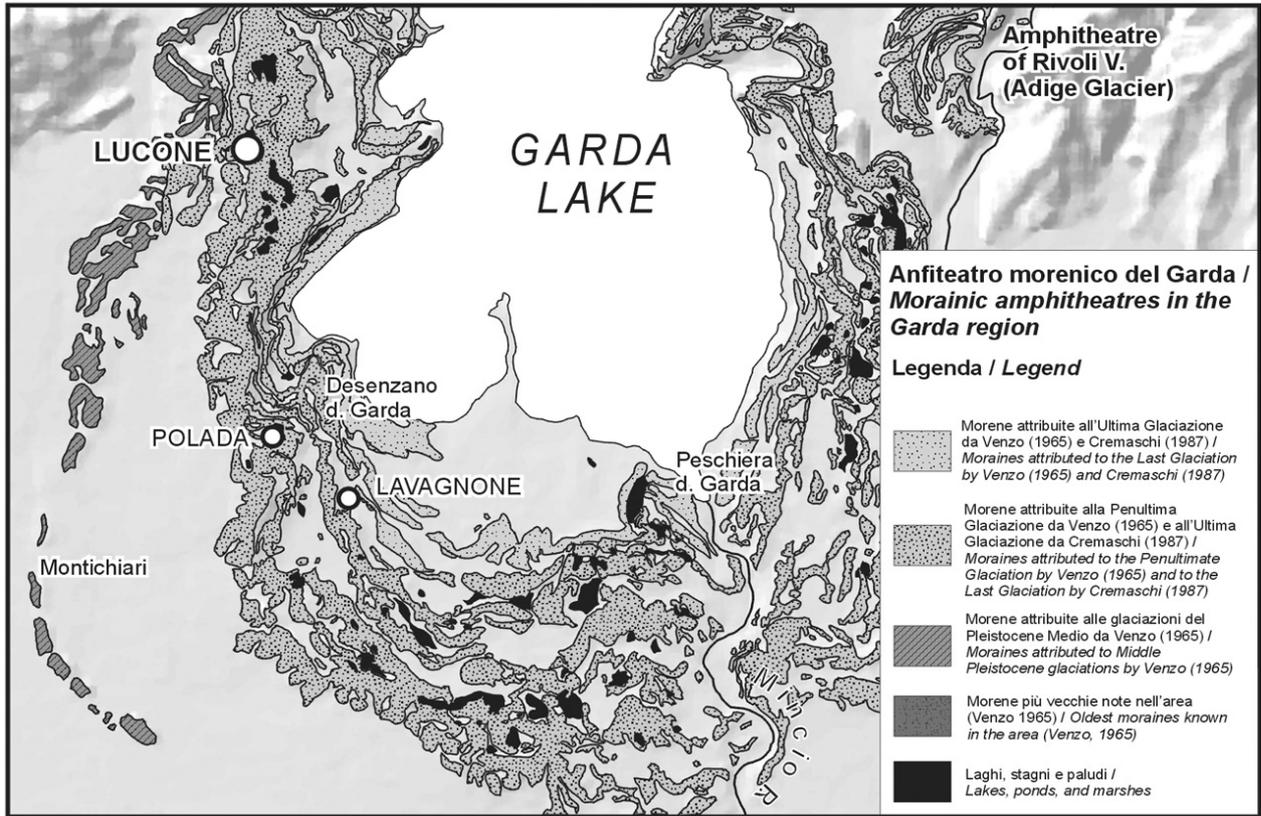


Fig. 1, The Lucone basin (Polpenazze del Garda, Brescia) is located in the western part of the morainic amphitheatre of Garda Lake.
 Il bacino del Lucone (Polpenazze del Garda, Brescia) è localizzato nel settore occidentale dell'anfiteatro morenico del Lago di Garda.

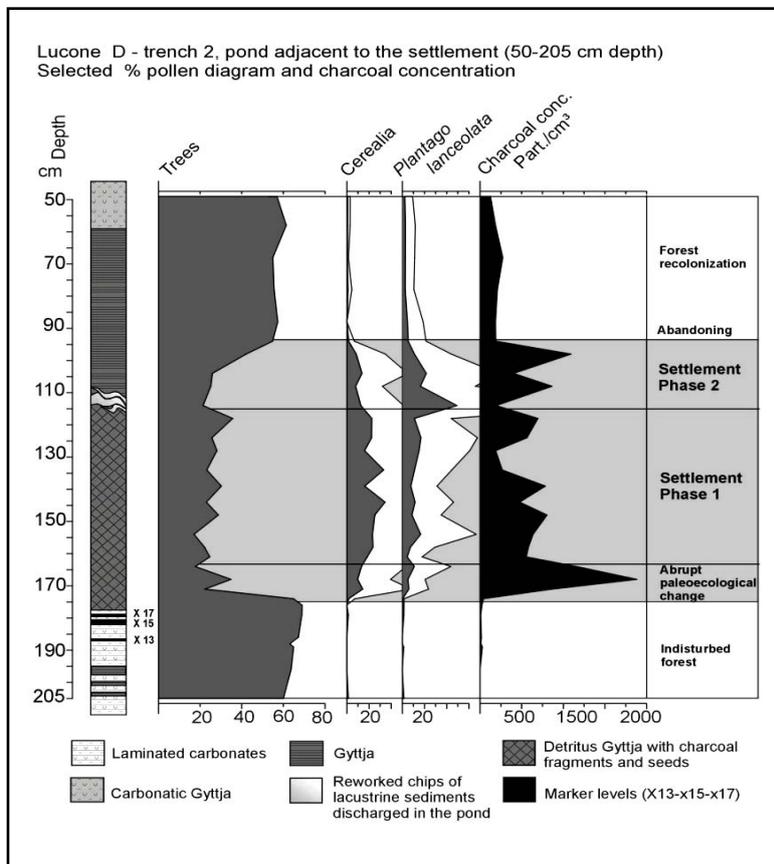


Fig. 2, Summary pollen curves and general evolution of "Lucone D" pile-dwelling. The settlement foundation is marked by a fire and correlated to a sudden reduction in forest cover and cereals % pollen curve expansion.
 Diagramma a curve polliniche selezionate ed evoluzione del villaggio palafitticolo "Lucone D". La fondazione dell'abitato è segnata da un incendio correlato alla deforestazione e all'espansione della curva pollinica percentuale dei cereali.

constrain to the pollen record independent from AMS dating. First, the village foundation is recognized in the pollen-stratigraphy through detecting a sudden deforestation and coeval cereal fields expansion.

Therefore, we attributed its dendrochronological age (2033 ± 10 yr cal BC) to the relevant pollen layer. The village restoring at the dendrochronological age 1980 ± 10 yr cal BC is also detected in the pollen record. Finally, the village abandoning is registered as a relatively sharp event in the pollen record, and may be given its cultural age (1850 ± 50 cal BC). Thus, we obtained a robust chronology which allowed for a quasi-decennial resolution between samples.

The age-depth model highlights an extremely high sedimentation rate during the phase 1 (almost 1 m of compacted organic in 50 years). This is explained by to dump discharge in the pond.

Before the settlement, the area was covered by dense thermophilous broad-leafed forests (*Quercus*, *Carpinus betulus*, *Fagus*, *Ulmus*). The finding of isolated cereals and *Plantago lanceolata* pollen grains supports the occurrence of sporadic human clearings in the Copper Age.

The village foundation is documented by a sudden reduction in forest cover, a strong increase of microscopic charcoal and the synchronous spread of several anthropogenic indicators (*Cerealia*, *Plantago lanceolata*, *Rumex acetosa*, *Trifolium*).

The settlement phase is palynologically two-folded, in agreement with archaeological and dendrochronological data, Bocchio G. (1988), Martinelli N. (1996).

During the oldest settlement phase (phase 1), the pollen composition pattern suggests a strong human impact in with high and stable extent of cereal fields, pastures and orchards. The

beginning of the subsequent settlement phase (2) is marked by pollen changes indicating reduction of cereal fields and also involves forest recolonization. This is correlated to the event of houses restoring, dendro-cronologically dated to around 1970 BC, after an extended fire event well documented in the excavation area.

The final settlement abandoning is shown by a sudden disappearance of cereal pollen and an increasing trend of forest recolonization (*Quercus*, *Corylus*, *Fagus*, *Carpinus betulus*).

Signs of human activity are recorded after the abandoning of Lucone D settlement, during the subsequent Early-Middle Bronze Age and the Iron Age as well.

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