

EARLY ANTHROPOGENIC ACTIVITIES IN EASTERN LATVIAN LOWLANDS – NEW POLLEN ANALYSES FROM ZVIDZE, LAKE LUBANA REGION

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Abstract

Numerous archaeological sites are situated in Eastern Latvia in the vicinity of Lake Lubana. Their age varies between the Mesolithic Age and the Bronze Age. The results of palynological investigations from a new core of Zvidze site are inspected and discussed. Four local pollen assemblage zones are determined. Special attention is paid to anthropogenic indications, the species composition and to indications of emergence of agriculture. The finds of *Trapa natans* and charcoal are discussed as the signs of human activity. Pollen of aquatic plants and Algae have also been studied. The changes in their species compositions are connected with changes of palaeoecological conditions in Lake Lubana.

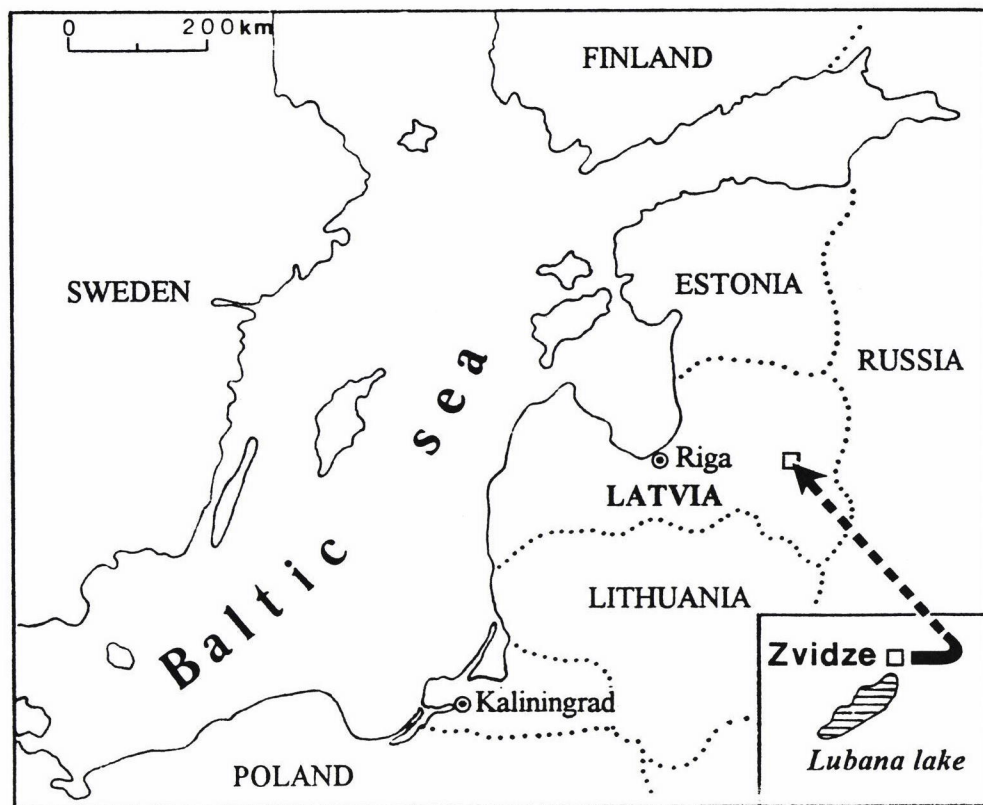


Fig. 1. Location of Lake Lubana area in Latvia. The study site, Zvidze, where there are large prehistoric dwelling sites, is marked with a dot.

Introduction

This paper presents palynological results of anthropogenic activity from the Lake Lubana area in the central part of the eastern Latvian Lowland (Fig. 1). The area is well known for its rich archaeological finds, the so-called Zvidze sites. These sites are situated on the palaeo-shoreline of the Baltic Ice Lake. The prehistoric settlement continued there from the Mesolithic Age until the Bronze Age.

The pollen analytical study is part of a larger project also including archaeological, geomorphological and plant macrofossil investigations, together with radiocarbon datings of the Zvidze sites (Loze 1979, Loze et al. 1984). The principal aim of the palynological research was to create a chronology based on radiocarbon dates. Although several cores have been studied earlier from Zvidze (Jakubovska 1995), the current paper presents the results from a new core situated less than a metre from that of a so-called "basic core" by Loze (1988).

Sediment and laboratory methods

The sediment consists of lake clay (219–192 cm), gyttja (192–102 cm), peat (102–22 cm) and silty sand (22–0 cm). The pollen samples were treated with standard methods and a total amount between 1000–2000 pollen grains were counted from each sample. The pollen of aquatic plants, spores, algae and charcoal particles are expressed as percentages of the total land pollen sum. The Cerealia pollen grains were identified by the grain size and the diameter of the annulus (Beug 1961, Andersen 1979).

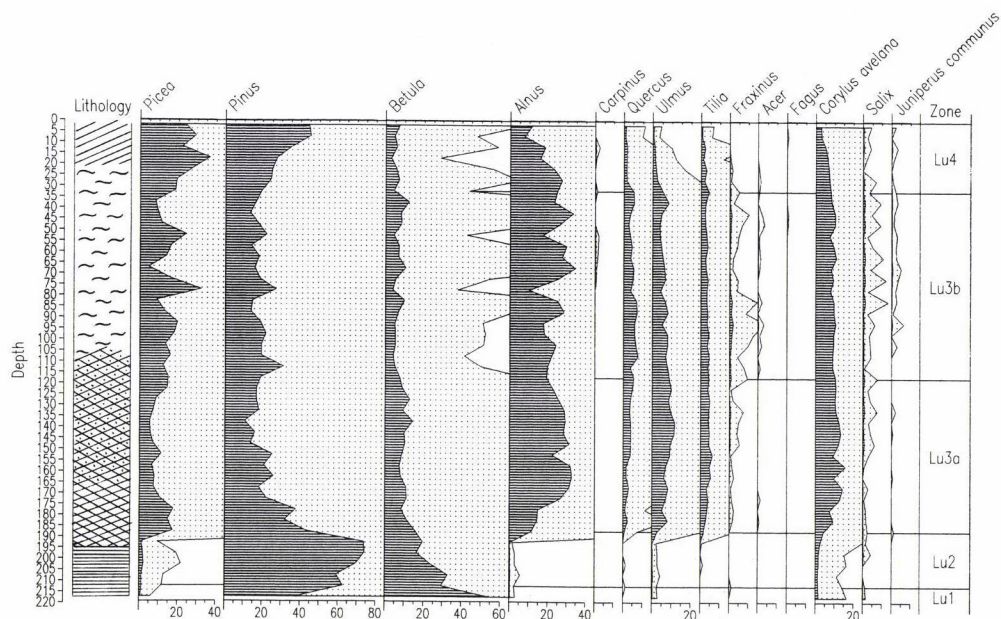


Fig. 2. Arboreal pollen diagram from Zvidze.

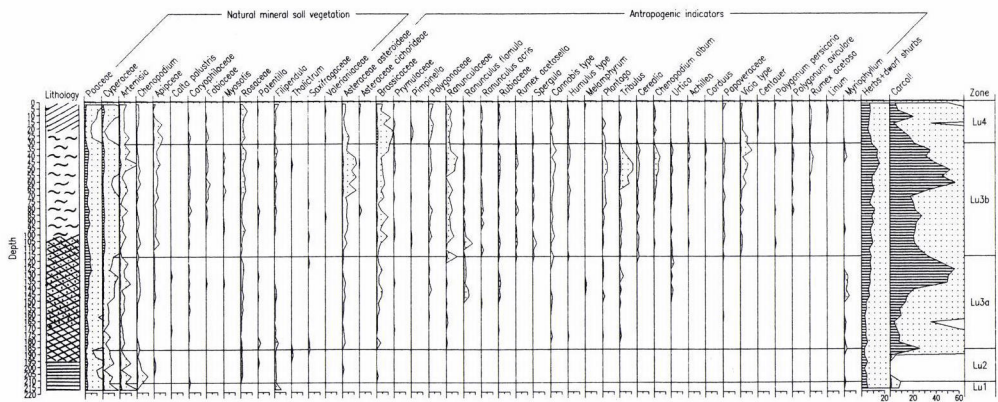


Fig. 3. Non-arboreal pollen diagram from Zvidze.

Results

The results of pollen analysis are shown in Fig. 2 (arboreal) and Fig. 3 (non-arboreal). Four local pollen assemblage zones were determined.

Lu1 (217–112 cm) *Betula* paz. The zone is dominated by high values of *Betula*. Pollen of Poaceae, Cyperaceae, *Artemisia* and *Filipendula* are also present.

Lu2 (212–187 cm) *Pinus-Betula* paz. The lower boundary of the zone is determined by an increase in *Pinus*, which characterize the zone and a decrease in *Betula*. Poaceae, Cyperaceae and *Artemisia* are the main NAP types in this zone.

Lu3a (187–117 cm) *Alnus-Picea-Quercetum mixtum* paz. The lowermost limit of the zone is determined by a rise in *Alnus* and broad leaved trees (*Quercetum mixtum*). *Picea* values decrease in the lower part of the zone. *Alnus* and *Quercetum mixtum* pollen dominate this zone. *Betula* increases temporarily in the upper part of the zone. At the same level there is a charcoal maximum.

Pollen of Zygophylaceae, Primulaceae, Brassicaceae, Ranunculaceae and *Plantago* appear in the lower part of the zone. Poaceae and charcoal rise towards the end of the zone. The continuous curve of *Cannabis* starts in the upper part of the zone. *Plantago* (*P. lanceolata* and *P. major+media*) occur sporadically.

Lu3b (117–32 cm) *Alnus-Picea-Qm-Cerealia* paz. The tree pollen curves follow the pattern of the lower subzone. The start of the Cerealia curve defines the zone boundary.

Initially the Cerealia curve consists of *Hordeum* type pollen grains. Also *Vicia* and *Spergula* are present. *Polygonum aviculare* appear in the beginning of the zone. *Chenopodium album* appear in the middle of the zone, where also the Cerealia curve rises again. Here it consists mainly of *Triticum* pollen. There is also an increase in indicators of arable land, such as *Spergula* and *Rumex acetosella* and appearance of such as *Cordus* and *Achillea*. A charcoal maximum is contemporary with the second Cerealia maximum. Higher amounts of aquatic pollen, for example *Nymphaea*, *Potamogeton* and *Alisma* occur (Fig. 4). Also the amount of *Pediastrum* rises slightly.

Lu4 (32–0 cm) *Pinus-Picea-Alnus* paz. This zone is characterized by a rise in *Pinus* and *Picea* and a decrease in *Alnus* and *Quercetum mixtum*. The anthropogenic indicators decrease in this zone. Only sporadic Cerealia pollen were found (including *Secale*) but together with *Centaurea* and *Linum*.

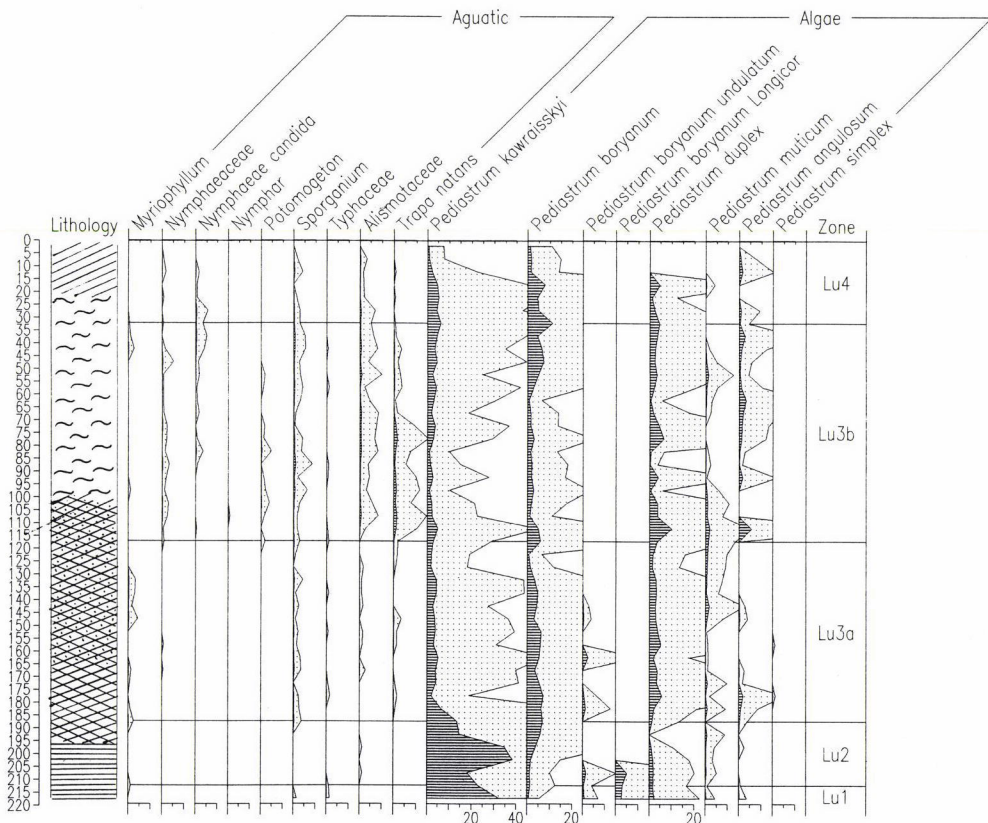


Fig. 4. Diagram for aquatic pollen and algae from Zvidze.

Discussion

The tree pollen diagram shows a development typical to the Latvian vegetational history with special local features. First, the early *Picea* maximum in the beginning of zone Lu3a shows the spread of *Picea* from the east and secondly, the early rise of *Quercus*, also typical for the Lake Lubana region. No radiocarbon dates are available from the present core but according to a dated core published by Loze et al. (1984) the Lu2/Lu3 transition has an age of about 7600 radiocarbon years.

The NAP content of the lowest zones, Lu1, Lu2 and Lu3a shows the presence of wild herbaceous plants typical to moist meadows. They are also present in the upper parts of the diagram, where anthropogenic indicators appear.

The first anthropogenic indicators, such as Zygodontaceae, Primulaceae, Brassicaceae, Ranunculaceae and *Plantago* appear in the lower part of zone Lu3a. The increase of *Betula* in Lu3a can probably be connected with anthropogenic activity or with the deteriorating climate.

In zone Lu3b the amount of NAP rises together with the pollen taxon richness of anthropogenic indicators (Fig. 5). This most probably indicates the appearance of small clearings first and the increase of open area towards the end of the zone, and finally intensive agriculture and animal husbandry.

The results suggest that there were changes of lake level during the Holocene. The increase of aquatic pollen and algae in zone Lu3b suggest a lake level transgression,

Pollen taxon richness

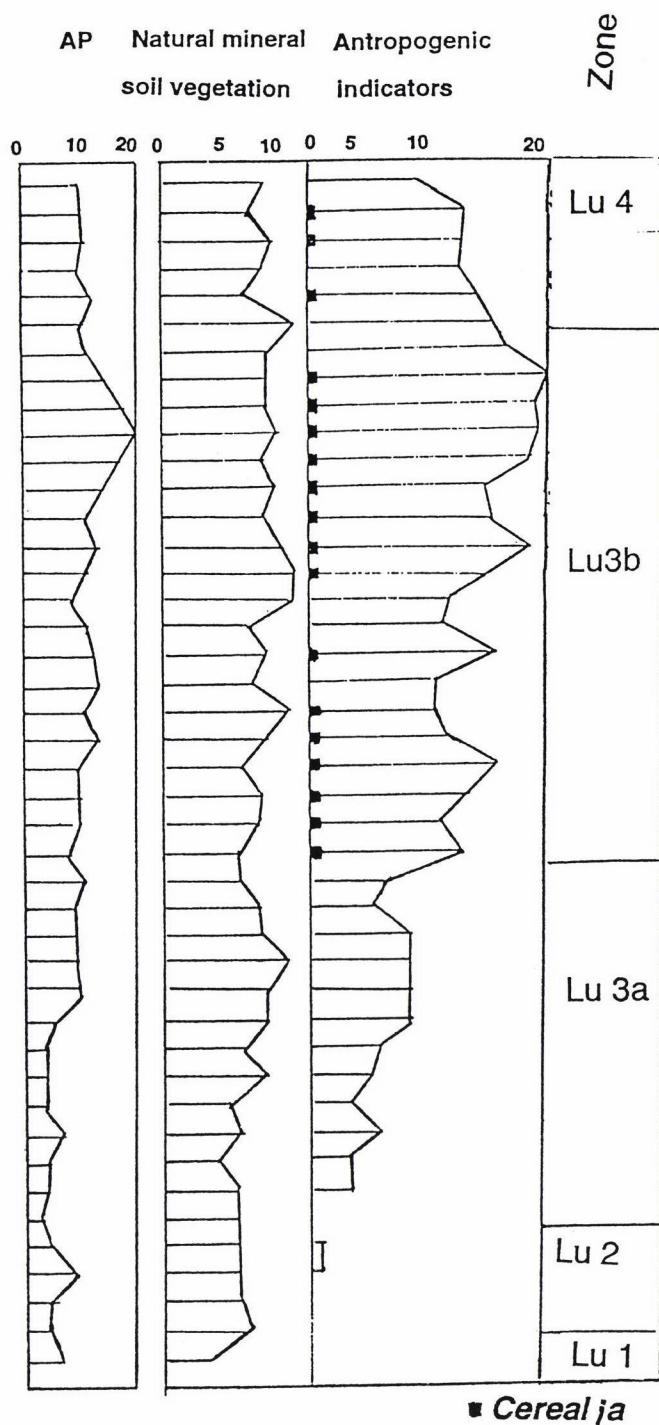


Fig. 5. NAP taxon richness from Zvidze.

the fact that is also suggested by previous studies (Jakubovska 1996). This increase of aquatic pollen and algae coincides with the decrease in *Corylus*, which may have suffered from increased moisture. Also the contemporary increase in *Picea* and rising curves of *Filipendula* and *Cyperaceae* may reflect moister conditions. The changes in *Pediastrum* species suggest changes also in the trophic status of the lake: it was oligotrophic in early Holocene, eutrophic in mid-Holocene and mesotrophic in late Holocene.

The lower part of the Cerealia curve in zone Lu3b consists mainly of *Hordeum*, a feature, which is unique in Latvia. The upper part, on the other hand, consists of *Triticum*. This is a feature known also from Central and Western Latvia. Sporadic *Secale* grains appear near the surface of the core.

According to the archaeological finds in the Lubana area the earliest settlement represents Middle Mesolithic Age and it continued until the Bronze Age. The signs of the earliest human activities are not clearly indicated in the pollen spectra due to the large pollen production of massive woodlands. A following chronology for the later signs of human activity in the pollen spectra is suggested: the lowest Cerealia maximum (*Hordeum*) probably shows the agriculture of the Middle Neolithic Age and the upper maximum (*Triticum*) that of the Late Neolithic. The first charcoal maximum (Lu3a) can possibly be connected with Neolithic activities since remnants of a fireplace with charred remains of nuts of *Trapa natans* and *Corylus avellana* were found near the coring site.

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