

## A NEW SITE OF BURIED PEAT AT LÕPE, SW ESTONIA

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**Abstract.** Older organic lagoonal, lacustrine, or paludal deposits underlie transgressive marine sediments in more than half a hundred localities in Estonia enabling the correlation of shorelines and marine sediments. Buried peat in an area of 1 hectare at Lõpe was analysed palynologically and dated by the  $^{14}\text{C}$  method. The Pre-Boreal pollen spectrum and two  $^{14}\text{C}$  dates ( $9216 \pm 70$  and  $9258 \pm 69$  yr BP) suggest that in this region the *Ancylus* transgression reached its maximum about 9000–9200 years ago.

**Key words:** buried peat, *Ancylus* transgression, Baltic Sea, palynology,  $^{14}\text{C}$  dates, shore lines.

### INTRODUCTION

Estonia is acknowledged as a key area for solving several topical problems concerning the evolution of the Baltic Sea. Among the major problems to be addressed are the beginning and duration of the *Ancylus* Lake, and in particular, the age of the *Ancylus* transgression. Due to the different tectonic situation and intensity of vertical movements of the Earth's crust the *Ancylus* transgression culminated at different times in different Baltic Sea areas (Кессел & Payкас, 1984). In spite of the rather rapid rise of the water level during the *Ancylus* transgression its maximum in Finland should be somewhat older than in Estonia. On the other hand, however, big age differences in close-lying sections are sometimes rather difficult to explain. Therefore, every new site of buried organic material will impart valuable information for establishing the exact age of transgression. In the spring of 1991 a very promising site of buried peat was discovered at Lõpe in the village of Kilksamaa, Pärnu County, by Reet Karukäpp. The first author together with Reet Karukäpp and Rein Vaikmäe studied it in August 1991.

### THE GEOLOGY OF THE LÕPE SITE

The site at an absolute height of 9.6 m on a coastal terrace is situated in the fields of the Lõpe farm (Fig. 1). The bottom of the section is at a height of 7.9 m. The 18-cm-thick buried organic layer (*Phragmites* peat with wood, mainly pine trunks) was found at an absolute height of 8.6–8.78 m.

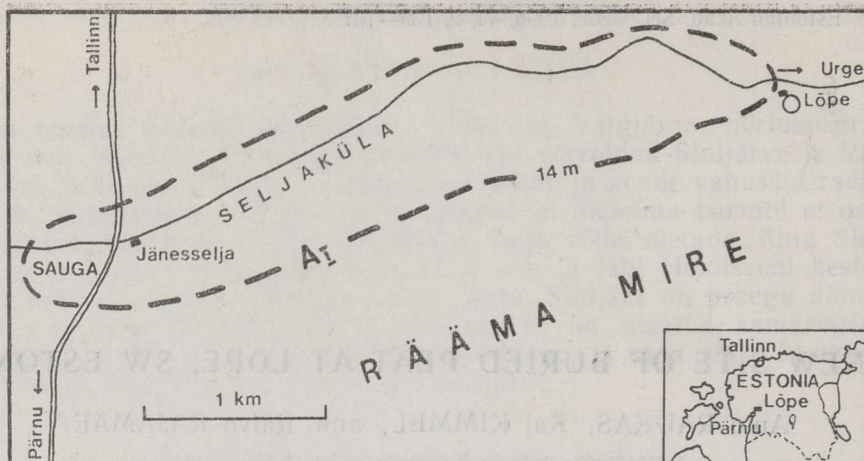


Fig. 1. Location of the Lõpe site.

The lithology of the studied section is as follows:

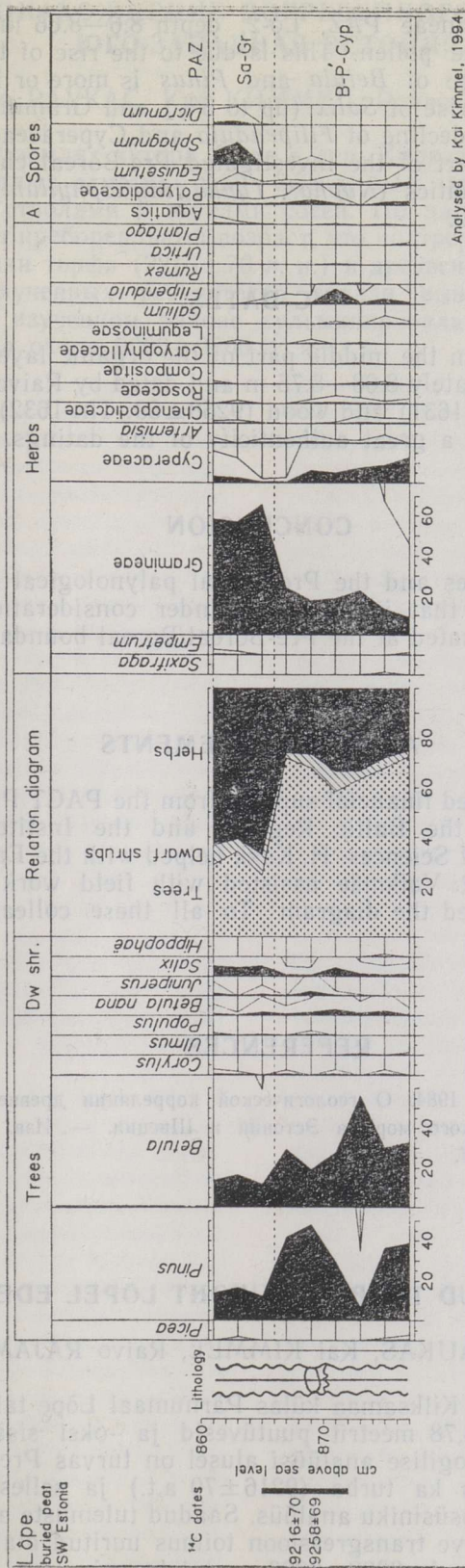
- 0.00—0.20 m: sandy soil;
- 0.20—0.50 m: gravel;
- 0.50—0.60 m: bluish-grey silt;
- 0.60—0.68 m: pink fine-grained sand;
- 0.68—0.71 m: blackish-grey silt;
- 0.71—0.81 m: pink fine-grained sand;
- 0.81—1.00 m: blackish-grey silt with nests of organic matter;
- 1.00—1.18 m: dark brown thick well-decomposed *Phragmites* peat with fragments and trunks of wood (mainly pine);
- 1.18—1.45 m: grey loamy carbonaceous (c. 90% pebbles and gravel grains) till. The upper part of the till is rewashed and more sandy.

The buried organic peat was studied in an area of about 1 hectare in land improvement excavations.

### PALYNOLOGY OF THE PEAT LAYER

The section was analysed palynologically by Kai Kimmel. The samples above the peat layer were taken at every 5 cm, and from the peat at every 2 cm. In the covering sand and silt pollen grains were either entirely absent or only occasional redeposited grains were found. Therefore, it was not possible to draw a reliable pollen diagram.

On the ground of the palynological data Kai Kimmel divided the buried organic layer into two local pollen assemblage zones (PAZ; Fig. 2) both belonging to the Pre-Boreal chronozone. In the *Pinus*—*Betula*—*Cyperaceae* PAZ, Lõ-1, depth 8.66—8.78 m, *Pinus* ranges from 10 to 40% and *Betula* mainly from 15 to 30% (in one sample 55%). *Pinus* is the dominant. The proportion of *Betula nana* is up to 2%. The sum of herbaceous plants is relatively high (up to 30%). Gramineae make up 20%. *Cyperaceae* are common. *Filipendula* reaches 5%. *Artemisia*, *Chenopodiaceae*, and *Polypodiaceae* are rare. The content of *Salix* is 1—3%.



Analysed by Kai Kimmel, 1994

Fig. 2. Palynological diagram of the Løpe section.

The *Salix*—Gramineae PÄZ, Lõ-2, depth 8.6—8.66 m, differs in the lower values of tree pollen. This is due to the rise of the groundwater level. The percentage of *Betula* and *Pinus* is more or less equal (both c. 15%). A distinct rise of *Salix* (up to 5%) and Gramineae (up to 6%) and, respectively, a decline of *Filipendula* and Cyperaceae are characteristic of the upper part of the investigated Pre-Boreal chronozone. Some pollen grains of aquatics (*Nyphar*, *Typha*, *Myriophyllum*) and spores of *Sphagnum* are found.

#### <sup>14</sup>C DATES

Two samples from the middle part of the organic layer were taken at a depth of approximately 8.68—8.75 m and dated by Raivo Rajamäe. Both peat (9216±70: Tln-1631) and wood (9258±69: Tln-1632) yielded similar ages. This indicates a great authenticity of the datings.

#### CONCLUSION

Both the <sup>14</sup>C dates and the Pre-Boreal palynological spectrum of the buried peat suggest that in the area under consideration the Ancyclus transgression culminated at the Pre-Boreal/Boreal boundary about 9000—9200 years ago.

#### ACKNOWLEDGEMENTS

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#### REFERENCES

- Кессел Х., Раукас А. 1984. О геологической корреляции древнебереговых образований Балтийского моря в Эстонии и Швеции. — Изв. АН ЭССР. Геол., 33, 3/4, 146—157.

### UUS MATTUNUD TURBA LEIUKOHT LÖPEL EDELA-EESTIS

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1991. aastal leiti Kilksamaa külas Pärnumaal Lõpe talu maadel absoluutkõrgusel 8,60—8,78 meetrit puutüvesid ja -oksi sisaldav mattunud turba kiht. Palünoloogilise analüüsi alusel on turvas Preboreaalse vanusega. Seda kinnitab ka turba (9216±70 a.t.) ja selles leiduva puidu (9258±69 a.t.) radiosüsiniku analüüs. Saadud tulemuste alusel võib järeldada, et Antsülusjärve transgressioon toimus uuritud alal Preboreaali ja Boreaali piiril ligikaudu 9000—9200 aastat tagasi.

# НОВОЕ МЕСТОНАХОЖДЕНИЕ ПОГРЕБЕННОГО ТОРФА В ЛЫПЕ, ЮГО-ЗАПАДНАЯ ЭСТОНИЯ

Анто РАУКАС, Кай КИММЕЛ, Райво РАЯМЯЭ

В 1991 г. на землях хутора Лыпе в дер. Килксамаа в уезде Пярну-маа на абсолютных отметках 8,60—8,78 м был найден слой погребенного торфа со стволами и ветками сосен. По палинологическим данным, торф имеет пребореальный возраст, что подтверждают и радиоуглеродные датировки торфа ( $9216 \pm 70$  л. н.) и древесины ( $9258 \pm 69$  л. н.). На основе полученных результатов сделан вывод, что анциловая трансгрессия в изученном районе кульминировала на границе пребореала и бореала около 9000—9200 л. н.