

## TARTU RADIOCARBON DATES XII

*EVALD ILVES*

Institute of Zoology and Botany, Estonian Academy of Sciences, 202400 Tartu, Estonia

### INTRODUCTION

This list includes dates of geological samples measured using a single-channel liquid scintillation  $^{14}\text{C}$  counter at the Geochemical and Statistical Laboratory, Tartu, Estonia. Our modern standard is made of benzene enriched in  $^{14}\text{C}$ , and its activity is checked with NBS oxalic acid standard sample. Dates are given in conventional radiocarbon years, based on the Libby half-life of  $5570 \pm 30$  years. A.D. 1950 is the reference year. Errors refer only to  $1\sigma$  standard deviation calculated from count rates involved.

### GEOLOGICAL SAMPLES

*Estonia*

#### **Nigula Bog series**

Nigula bog reservation lies at SW border of coastal region of Estonia, 35 km S of Pärnu and 10 km E of coast of Riga Bay. Bog stretches N-S, 9 km long and 3–4 km wide. Five small islands are located west of bog, covered with wood. Samples coll. 1973 by E. Ilves and A. Sarv (Nigula 3, 4), and in early 1980s, by M. Ilomets. (Nigula 19, 24, 42, 46, 51) (Ilomets, Ilves & Rajamäe 1984). Figure 1 shows locations where samples were collected.

#### *Nigula 3*

**TA-1116. Nigula 3** **500  $\pm$  60**

Raised peat from 130–140 cm depth.

**TA-1115. Nigula 3** **1820  $\pm$  60**

Raised peat from 236–246 cm depth.

**TA-1113. Nigula 3** **2190  $\pm$  70**

Raised peat from 330–340 cm depth.

**TA-316. Nigula 3** **4330  $\pm$  70**

Raised peat with charcoal remains from 408–412 cm depth.

**TA-1111. Nigula 3** **2290  $\pm$  80**

Raised peat from 416–426 cm depth.

**TA-1110. Nigula 3** **7230  $\pm$  70**

Fen peat from 458–468 cm depth.

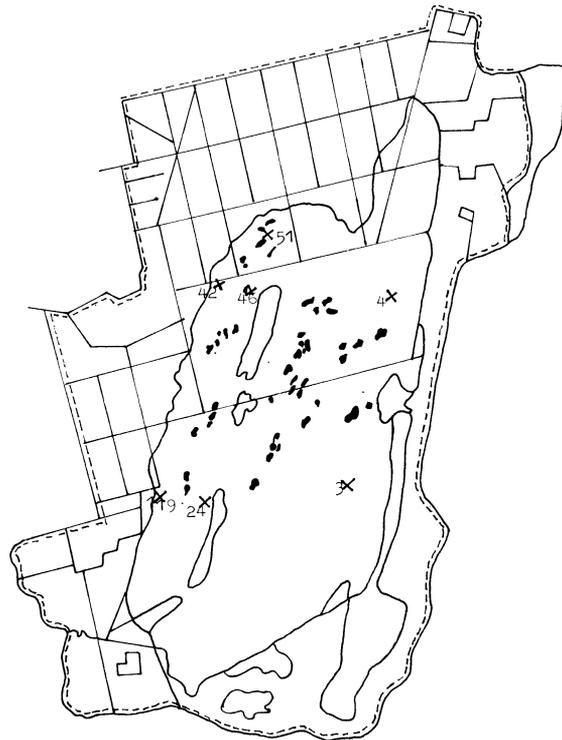


Fig. 1. Map of Nigula Bog showing locations where samples were collected. Numbers correspond to samples listed in text.

<b>TA-331.</b>	<b>Nigula 3</b>	<b>7080 ± 70</b>
Fen peat from 465–475 cm depth.		
<b>TA-1108.</b>	<b>Nigula 3</b>	<b>7290 ± 90</b>
Fen peat from 507–517 cm depth.		
<b>TA-403.</b>	<b>Nigula 3</b>	<b>7500 ± 70</b>
Fen peat with weakly decomposed <i>Phragmites</i> layer from 520–530 cm depth.		
<i>Nigula 4</i>		
<b>TA-569.</b>	<b>Nigula 4</b>	<b>4590 ± 80</b>
Mesotrophic peat from 360–370 cm depth.		
<b>TA-570.</b>	<b>Nigula 4</b>	<b>4680 ± 80</b>
Mesotrophic peat from 370–380 cm depth.		

<b>TA-571.</b>	<b>Nigula 4</b>	<b>5010 ± 70</b>
Mesotrophic peat from 455–465 cm depth.		
<b>TA-572.</b>	<b>Nigula 4</b>	<b>6010 ± 80</b>
Mesotrophic peat from 479–480 cm depth.		
<b>TA-480.</b>	<b>Nigula 4</b>	<b>6000 ± 70</b>
Mesotrophic peat from 480–490 cm depth.		
<b>TA-410.</b>	<b>Nigula 4</b>	<b>8600 ± 90</b>
Fen peat from 500–510 cm depth.		
<i>Nigula 19</i>		
<b>TA-1150.</b>	<b>Nigula 19</b>	<b>280 ± 60</b>
Raised peat from 92–97 cm depth.		
<b>TA-1158.</b>	<b>Nigula 19</b>	<b>300 ± 60</b>
Raised peat from 97–102 cm depth.		
<b>TA-1151.</b>	<b>Nigula 19</b>	<b>420 ± 60</b>
Raised peat from 180–190 cm depth.		
<b>TA-1152.</b>	<b>Nigula 19</b>	<b>940 ± 60</b>
Raised peat from 204–214 cm depth.		
<b>TA-1153.</b>	<b>Nigula 19</b>	<b>1600 ± 60</b>
Raised peat from 230–240 cm depth.		
<b>TA-1154.</b>	<b>Nigula 19</b>	<b>1700 ± 60</b>
Raised peat from 258–268 cm depth.		
<b>TA-1155.</b>	<b>Nigula 19</b>	<b>1670 ± 70</b>
Raised peat from 300–305 cm depth.		
<b>TA-1156.</b>	<b>Nigula 19</b>	<b>1960 ± 60</b>
Raised peat containing birch bark from 346–350 cm depth.		
<b>TA-1157.</b>	<b>Nigula 19</b>	<b>2540 ± 60</b>
Raised peat from 358–363 cm depth.		

*Nigula 24*

**TA-1197. Nigula 24** **360 ± 60**

Raised peat from 71–76 cm depth.

**TA-1198. Nigula 24** **870 ± 70**

Raised peat from 163–168 cm depth.

*Nigula 46*

**TA-1206. Nigula 46** **Modern**

Raised peat from 50–60 cm depth.

**TA-1207. Nigula 46** **590 ± 70**

Raised peat from 134–144 cm depth.

**TA-1208. Nigula 46** **1550 ± 70**

Raised peat from 240–250 cm depth.

**TA-1209. Nigula 46** **1590 ± 70**

Raised peat from 273–283 cm depth.

*Nigula 51*

**TA-1199. Nigula 51** **160 ± 50**

Raised peat from 80–90 cm depth.

**TA-1200. Nigula 51** **820 ± 60**

Raised peat from 152–160 cm depth.

**TA-1201. Nigula 51** **1100 ± 70**

Raised peat from 220–230 cm depth.

**TA-1202. Nigula 51** **1340 ± 60**

Raised peat from 265–275 cm depth.

**TA-1203. Nigula 51** **1570 ± 80**

Raised peat from 328–338 cm depth.

**TA-1204. Nigula 51** **1610 ± 60**

Raised peat from 380–387 cm depth.

**TA-1205. Nigula 51** **4130 ± 60**

Mesotrophic peat from 424–431 cm depth.

*Nigula 42*

**TA-1210. Nigula 42** 410 ± 60

Raised peat from 100–110 cm depth.

**TA-1212. Nigula 42** 1630 ± 70

Raised peat from 346–356 cm depth.

**TA-1213. Nigula 42** 3590 ± 70

Raised peat from 453–463 cm depth.

**Nohipalu Valgjärv series**

Valgjärv Lake lies 3.5 km S of Veriora settlement (SE Estonia) in pine forest (6.3 ha<sup>2</sup>, max. depth 11.7 m). Lake is government protected (Mäemets 1977). In N littoral peat of lake, at 0.6–0.7 m depth, juniper stumps were found and <sup>14</sup>C dated. Soil humus collected near N coast of lake and deposits from small (50 m diam.) round bog, SE of lake, were also dated. Samples coll. by A. Mäemets, E. Ilves and M. Pork, Inst. Zoology and Botany, Tartu.

**TA-577. Nohipalu Valgjärv** 3130 ± 80

Juniper stumps.

**TA-693. Nohipalu Valgjärv** 3120 ± 80

Juniper stumps.

**TA-787. Nohipalu Valgjärv** 3300 ± 80

Juniper stumps.

**TA-698. Nohipalu Valgjärv** 3060 ± 80

Juniper stumps.

**TA-567. Nohipalu Valgjärv** 5980 ± 200

Soil layer containing humus.

**TA-753. Nohipalu Valgjärv** 3600 ± 80

Fen peat from 330–340 cm depth.

**TA-754. Nohipalu Valgjärv** 3900 ± 60

Sapropelized fen forest peat from 340–350 cm depth.

**TA-755. Nohipalu Valgjärv** 4220 ± 70

Aleuritic bog deposits with black layers from 360–370 cm depth.

**Estonian Lakes series**

*Saadjärv Lake.* The largest lake in the drumlin landscape of Estonia, 53.4 m asl, lies on the border of Tartumaa and Jõgevamaa districts, 16 km N of Tartu. It is about 700 ha<sup>2</sup>, 6 km long and 1.8 km wide. Maximum depth is 25 m in the SE part of the lake. Average depth is 8 m. The lake is government protected (Mäemets 1977). Samples coll. 1977 by E. Ilves and A. Lindpere, Inst. Zoology and Botany, Tartu.

**TA-1009. Saadjärv** **1570 ± 60**

Surface layer of lake sediments, 15 cm thick, under water, 22 m deep.

*Udsu Lake.* Udsu is the deepest lake of the Sakala upland (Valgamaa Dist., 3 km S of Koorküla). The lake lies NE-SW, 76 m asl, 6.2 ha<sup>2</sup>. Maximum depth is 30.25 m (Mäemets 1977). Samples coll. 1978 by E. Ilves and A. Lindpere.

**TA-1053. Udsu Lake** **640 ± 60**

Surface layer, 15 cm thick, under water, 24 m deep.

*Petajärv Lake.* Petajärv Lake lies in the Valgamaa Dist., 35 km SE of Koorküla. The lake lies NW-SE, 67 m asl, 3.6 ha<sup>2</sup>, 22 m depth (Mäemets 1977). Samples coll. 1978 by E. Ilves and A. Lindpere.

**TA-1052. Petajärv Lake** **Modern**

Surface layer of lake sediments, 7 cm thick, under water, 21.5 m deep.

*Tollari Lake.* Tollari Lake lies in the Valgamaa Dist., 1.5 km W of Karula, 94.2 m asl, 4.5 ha<sup>2</sup>, maximum depth, 9.9 m. The lake is surrounded by cultivated land (Mäemets 1977). Samples coll. by E. Ilves and A. Lindpere.

**TA-1010. Tollari Lake** **720 ± 60**

Surface layer of lake sediments, 5 cm thick, under water, 8.3 m deep.

*The High Caucasus Mountains***Central Caucasus series**

The dates below are part of the complex study of glaciation and moraine accumulation dynamics related to modern glacial processes (Serebryannyi *et al.* 1984). Samples subm. by L. R. Serebryannyi, Inst. Geography, USSR.

*Salkanalla.* The Salkanalla bog is one of the small spring-type *Carex* peat bogs in the Kriyut. The 80–120 m bog lies W-E, 2150 m asl and terminates in the E by a pronounced rock threshold, below which a tributary of Kshlyksu River begins. The latter flows into the Cherek Bezengi River near Sovetski settlement.

**TA-840. Salkanalla** **160 ± 50**

*Carex* peat from 27–30 cm depth.

<b>TA-841.</b>	<b>Salkanalla</b>	<b>840 ± 60</b>
Sedge peat from 48–50 cm depth.		
<b>TA-842.</b>	<b>Salkanalla</b>	<b>1840 ± 70</b>
Sedge peat from 72–75 cm depth.		
<b>TA-843.</b>	<b>Salkanalla</b>	<b>1930 ± 70</b>
<i>Carex</i> peat from 100–103 cm depth.		
<b>TA-844.</b>	<b>Salkanalla</b>	<b>3500 ± 70</b>
Sedge peat from 136–139 cm depth.		
<b>TA-845.</b>	<b>Salkanalla</b>	<b>3890 ± 70</b>
<i>Carex</i> peat from 175–178 cm depth.		

**Bezengi series**

Stratigraphic sections were taken from the Cherek River Valley, 7.5 and 5.5 km from Bezengi Glacier.

<b>TA-865.</b>	<b>Bezengi 1</b>	<b>3350 ± 70</b>
Peat with considerable admixture of sand from 55–58 cm depth.		
<b>TA-866.</b>	<b>Bezengi 1</b>	<b>4250 ± 80</b>
Peat with considerable admixture of sand from depth 65–70 cm depth.		
<b>TA-867.</b>	<b>Bezengi 2</b>	<b>650 ± 80</b>
Loam formed into humus from depth 60–65 cm depth.		

**Karasu series**

Karasu bog is 500–300 m, 2000 m asl, in a large glacial depression of Karasu River Valley, 3 km SE of confluence of Dyhsu and Karasu Rivers, giving rise to Cherek Balkarsky River.

<b>TA-1047.</b>	<b>Karasu 1</b>	<b>1720 ± 80</b>
<i>Carex</i> peat with mineral admixtures from 145–150 cm depth.		
<b>TA-1048.</b>	<b>Karasu 1</b>	<b>2390 ± 80</b>
<i>Carex</i> peat with mineral admixtures from 190–195 cm depth.		

**Kurnoyat series**

Kurnoyat is small bog in Kryut in Psygansu River Valley, 1900 m asl. Peat is *ca.* 7 m thick, overlain by peat sapropel.

<b>TA-1112. Kurnoyat</b>	<b>450 ± 60</b>
Fen peat with mineral admixtures from 95–100 cm depth.	
<b>TA-1109. Kurnoyat</b>	<b>3180 ± 60</b>
Peat sapropel with mineral admixtures from 565–570 cm depth.	

**Haldeschal series**

Haldeschal is a small *Carex* peat bog in Haldeschal River Valley, 2300 m asl, 2.5 km from glacier.

<b>TA-1230. Haldeschal</b>	<b>1020 ± 70</b>
Bryales-sedge peat with mineral admixtures from 70–73 cm depth.	
<b>TA-1231. Haldeschal</b>	<b>1380 ± 70</b>
<i>Carex</i> peat with mineral admixtures from 103–106 cm depth.	
<b>TA-1232. Haldeschal</b>	<b>1550 ± 70</b>
<i>Carex</i> peat with mineral admixtures from 130–133 cm depth.	
<b>TA-1233. Haldeschal</b>	<b>3360 ± 90</b>
<i>Scheuchzeria</i> peat on peat sapropel with mineral admixtures from 145–150 cm depth.	

**Sakeni series**

Sakeni River Valley is one of main tributaries of Kodari River in NE Abkhazia.

<b>TA-1227. Sakeni 2</b>	<b>1130 ± 70</b>
Forest peat with mineral admixtures from 10–15 cm depth.	
<b>TA-1228. Sakeni 2</b>	<b>1220 ± 70</b>
Forest peat with mineral admixtures from 20–25 cm depth.	
<b>TA-1229. Sakeni 2</b>	<b>1050 ± 70</b>
Wood remains from 45–55 cm depth.	

**Low Sakeni series**

<b>TA-1234. Sakeni “L”</b>	<b>440 ± 50</b>
Fen-type <i>Carex</i> peat with mineral admixtures from 40–42 cm depth.	
<b>TA-1235. Sakeni “L”</b>	<b>1000 ± 60</b>
Fen-type <i>Carex</i> peat with mineral admixtures from 80–82 cm depth.	

<b>TA-1236.</b>	<b>Sakeni “L”</b>	<b>1260 ± 60</b>
Fen-type <i>Carex</i> peat with mineral admixtures from 108–110 cm depth.		
<b>TA-1237.</b>	<b>Sakeni “L”</b>	<b>1320 ± 60</b>
Fen-type <i>Carex</i> peat with mineral admixtures from 148–152 cm depth.		
<b>TA-1238.</b>	<b>Sakeni “L”</b>	<b>2250 ± 60</b>
<i>Equisetum</i> peat with mineral admixtures and woody branches from 207–210 cm depth.		
<b>TA-1279.</b>	<b>Sakeni “L”</b>	<b>2430 ± 70</b>
Wood remains from 210 cm depth.		
<b>TA-1239.</b>	<b>Sakeni “L”</b>	<b>2270 ± 60</b>
Fen peat from 240–245 cm depth.		
<b>TA-1278.</b>	<b>Sakeni “L”</b>	<b>3080 ± 70</b>
Peat layer in sapropel with mineral admixture from 248–252 cm depth.		
<b>TA-1280.</b>	<b>Sakeni “L”</b>	<b>2740 ± 90</b>
Peat layer in sapropel with mineral admixture from 335–345 cm depth.		

*Aktoprak, Georgia*

Aktoprak is archaeological site, 1360 m asl, 1.5 km from Kektash River confluence with Chegem River.

<b>TA-1056.</b>	<b>Aktoprak</b>	<b>2100 ± 60</b>
Charcoal layer in carbonated loam deposits from 200–205 cm depth.		

*Spitsbergen, Norway***Semmeldalen series**

Semmeldalen peat moor in Semmeldalen Valley, Nordenskjöld Land, 61 km from Semmeldals-elva River confluence with Rein-o River, on 5 m terrace (25 m asl), is intensively undermined by river. Terrace is covered with peat overlying thick subterranean ice 300 m along Semmeldals-elva River. the terrace rests against gently sloping proximal slope of ridge of probably glacial origin (Serebryannyi *et al.* 1984). Samples subm. by L. R. Serebryannyi. Lithium carbide was synthesized with CO<sub>2</sub> because of abundant mineral admixtures in samples.

<b>TA-1509.</b>	<b>Semmeldalen</b>	<b>1830 ± 300</b>
Peat with mineral admixtures from 45 cm depth.		

<b>TA-1510.</b>	<b>Semmeldalen</b>	<b>2890 ± 300</b>
Peat with mineral admixtures from 58–63 cm depth.		
<b>TA-1511.</b>	<b>Semmeldalen</b>	<b>2980 ± 400</b>
Peat with mineral admixtures from 73–78 cm depth.		
<b>TA-1513.</b>	<b>Semmeldalen</b>	<b>3250 ± 300</b>
Peat with mineral admixtures from 90 cm depth.		
<b>TA-1512.</b>	<b>Semmeldalen</b>	<b>2210 ± 200</b>
Peat with mineral admixtures from 110–115 cm depth.		
<b>TA-1557.</b>	<b>Semmeldalen</b>	<b>4440 ± 150</b>
Peat with mineral admixtures from 155–165 cm depth.		

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