



THE RESULTS OF PALYNOLOGICAL INVESTIGATIONS AS THE EVIDENCE OF DEVELOPMENT OF THE RZUCEWO CULTURE NEOLITHIC SETTLEMENT ON THE COAST OF THE PUCK LAGOON

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Abstract. Archaeological investigations have been performed for years in the vicinity of the Rzucewo Headland, on the western shore of the Puck Lagoon. The best known site of the Neolithic Rzucewo Culture is located there. Also palynological investigation was performed earlier in this area. The present article is an attempt at recapitulating the obtained information. Materials for the palynological tests came both from organic sediments, which occur on the shore of the present Lagoon, and directly from archaeological excavations.

The obtained results of both the palynological and archaeological tests made it possible to find out that the earliest traces of the economic activity of humans in this area belong to settlement which was earlier than that of the Rzucewo Culture. This Paraneolithic settlement is dated at the end of the Atlantic Period. The area under investigation was covered then by peatlands and lake, which determined that the main economic activity of humans was fishing, and animal husbandry done on a small scale was only an extra activity of the then population.

Archaeologically dated at 4400–3700 years BP, the settlement of the Rzucewo Culture developed when the sea transgressed into the area of the present Puck Lagoon. The results of the research shows that in the economic activity of the inhabitants of the settlement both animal husbandry and farming were treated as matters of secondary importance, while fishing and seal hunting were the main activities. The impact on the environment resembled Mesolithic economy rather than that of the Neolithic Age, hence traces of this activity are poorly visible in pollen diagrams.

Key words: pollen analysis, seal hunters, Rzucewo Culture, Neolithic settlement, palynology, the Puck Lagoon, Rzucewo Headland.

Abstrakt. W okolicy Cypla Rzucewskiego, na zachodnim brzegu Zalewu Puckiego, jest zlokalizowane najbardziej znane stanowisko neolitycznej kultury rzucewskiej, na którym od wielu lat są prowadzone badania archeologiczne, od kilku lat również badania palinologiczne. Materiał do badań palinologicznych stanowiły osady organiczne występujące w strefie brzegowej obecnej laguny jak i próbki osadów pobrane bezpośrednio z wykopów archeologicznych.

Wyniki zarówno badań palinologicznych, jak i archeologicznych wskazały na ślady osadnictwa wcześniejsze niż kultura rzucewska. Ta wcześniejsza faza, związana z osadnictwem preneolitycznym, datowana jest palinologicznie na koniec okresu atlantyckiego. Teren badań zajmowały wówczas torfowiska i jeziora, co decydowało o tym, że głównym zajęciem ludzi było rybołówstwo. Prowadzona na niewielką skalę hodowla bydła była zajęciem dodatkowym.

Osadnictwo kultury rzucewskiej, datowane archeologicznie na 4400–3700 lat BP, rozwijało się w czasie gdy na obszar obecnego Zalewu Puckiego transgredowało morze. Jednak i w tym przypadku wyniki badań palinologicznych wskazują, że zarówno hodowla jak i uprawa roli były zajęciami mniejszej rangi. Głównymi zajęciami gospodarczymi było rybołówstwo i polowanie na foki. Taki typ gospodarki, przypominający bardziej gospodarkę mezolityczną niż neolityczną, słabo zaznacza się na diagramach pyłkowych.

Słowa kluczowe: analiza pyłkowa, łowcy fok, kultura rzucewska, osadnictwo neolityczne, palinologia, Zalew Pucki, Cypel Rzucewski.

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INTRODUCTION

The Puck Lagoon (Fig. 1) is situated in the north-western part of the Gulf of Gdańsk. In the north-east it is separated from the Gulf by the narrow (100–200 m) Hel Peninsula, and in the east by a partly submerged sandy barrier (Seagull Barrier). The area of this lagoon is 102.69 km² with an average depth of 3.13 m and the maximum depth of 9.40 m.

On the western shore of the Puck Lagoon, near the village of Rzucewo, one of the best-known sites of the Rzucewo Culture is located. This is the oldest Neolithic culture to have occurred in this part of the Pomeranian coast. It was first mentioned in 1894 by Hugo Conwentz, but the large excavation research was carried out in 1927–1929 by Józef Kostrzewski (Król, 1997), who introduced the term “Rzucewo Culture” to archaeological literature. This notion means a complex of archaeological artefacts, such as: ceramics, flint and stone artefacts, the characteristic building development of settlements typical of hunter tribes living in the 3rd and 2nd millennia BC by the Bay of Puck, the Gulf of Gdańsk and the Curonian Lagoon. Since 1984, the area of the Rzucewo Headland (Fig. 1), a promontory located on western shore of the Lagoon c. 4 km south-east of Puck, has been of particular interest to archaeologists (Fig. 2), especially its Neolithic site (Król, 1997).



Fig. 1. The location of investigated area



Fig. 2. General view on the archaeological exploration trench — Rzucewo

We know now that in the Stone Age (4400–3700 years BP) a settlement of seal hunters was located in the area of the present-day Rzucewo Headland (Król, 1997). It was established on the gentle slope of the Puck Morainic Upland, which enabled a terraced arrangement of the settlement (Fig. 3).



Fig. 3. The location of the Rzucewo settlement (acc. Żurek, 1953, slightly modified)

The palynological investigations on this area have also been conducted for many years (Miotk-Szpiganowicz, 1997; Bogaczewicz-Adamczak *et al.*, 1999).

RESEARCH MATERIAL AND METHODS

The samples for pollen analyses were taken from organic sediments, mainly peat, lying under the water of the present-day Puck Lagoon, as well as from shore sediments and also straight from the cultural layers of archaeological excavations (Fig. 2).

Samples for microscopic tests were prepared in accordance with the generally accepted principles (Faegri, Iversen, 1978; Berglund, 1979). The obtained results were presented as simplified percentage diagrams drawn using the Polpal software.

RESULTS OF PALYNOLOGICAL RESEARCH

Palynological results were obtained from the four sites. Two of them were located in the area of the present-day Rzucewo Headland and two others in the area of archaeological exploration trench in the Rzucewo Culture settlement site (Fig. 4).

Site 1 — Rzucewo Headland (Fig. 5). The distinct increase in the value of human economic activity indicators, most of all the goosefoot family (*Chenopodiaceae*), motherwort (*Artemisia*), sorrel (*Rumex*) and individual grains of plantain (*Plantago lanceolata*), in the pollen spectrum is registered mainly in the peat sediment horizon. It is connected with the increase in importance of species, which make up meadow communities, mainly grasses (*Gramineae*), and the decrease in the value of lime (*Tilia*) from 38% to 7%, while the share of oak (*Quercus*) increases. Single pollen grains of cereals (*Cerealia*) occur then as well. The share of pollen grains of elm (*Ulmus*) is not changed, hence this sediment can be palynologically dated at the end of the Atlantic Period. Such dating is confirmed by the ^{14}C date: 5520 ± 70 years BP.

Site 2 — Rzucewo-beach (Fig. 6). The obtained palynological picture is very similar to the section of the diagram related to the main peat horizon from the previous site. The increase in the quantity of pollen grains of ruderal plants (*Artemisia*, *Chenopodiaceae*, *Rumex*) and the appearance of single cereal grains (*Cerealia*) takes place when the share of components of a mixed deciduous forest (*Quercetum mixtum*) in the pollen spectra drops. Hence we can say with great certainty that the sediments under investigation are of the same age.

Site 3 — trench 15 E (Fig. 7). The intensification of human economic activity is reflected in the quantity increase of pollen grains of ruderal species (*Artemisia*, *Chenopodiaceae*, *Rumex*), plantain (*Plantago lanceolata*) — a species which is universally considered to be a grazing indicator, and cereals (*Cerealia*). The first pollen grains of rye (*Secale*) appeared as well. The share of components of a mixed deciduous forest (*Quercetum mixtum*) in the make-up of the pollen spectrum is

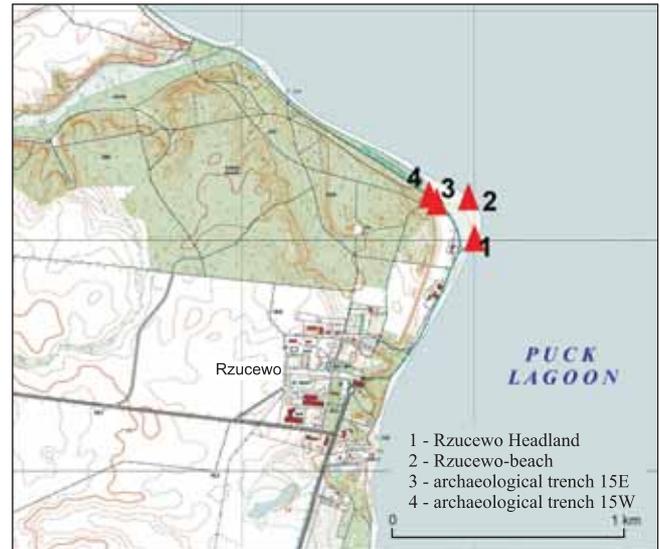


Fig. 4. Sites of palynological investigations

still considerable. Small quantities of pollen grains of hornbeam (*Carpinus*), and single grains of beech (*Fagus*) are also noticed. The appearance of these new tree species and the presence of rye was the decisive factor in dating the accumulation time of this sediment at the Subboreal period.

Site 4 — trench 15 W (Fig. 8). The palynological significance of the obtained pollen spectra is almost the same as in site 3, only the increase in the quantity of pollen grains of cereal (*Cerealia*) is slightly more clear. In both cases the general increase in the number of human economic activity indicators is registered in the younger, better humified peat sediment horizon.

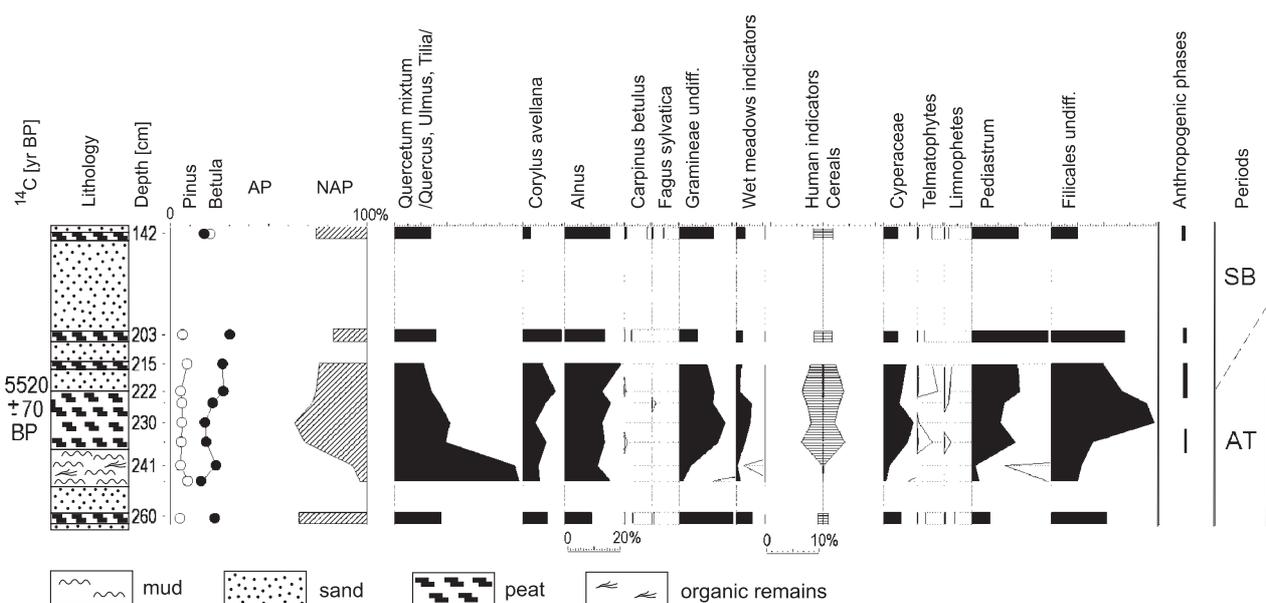


Fig. 5. Rzucewo Headland — simplified pollen diagram

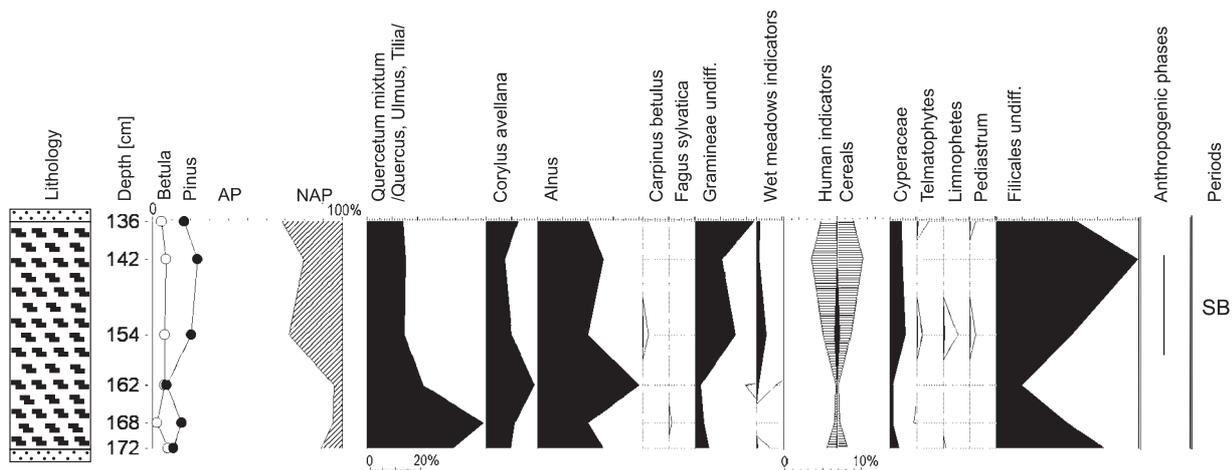


Fig. 6. Rzucewo-beach — simplified pollen diagram (for explanation see Fig. 5)

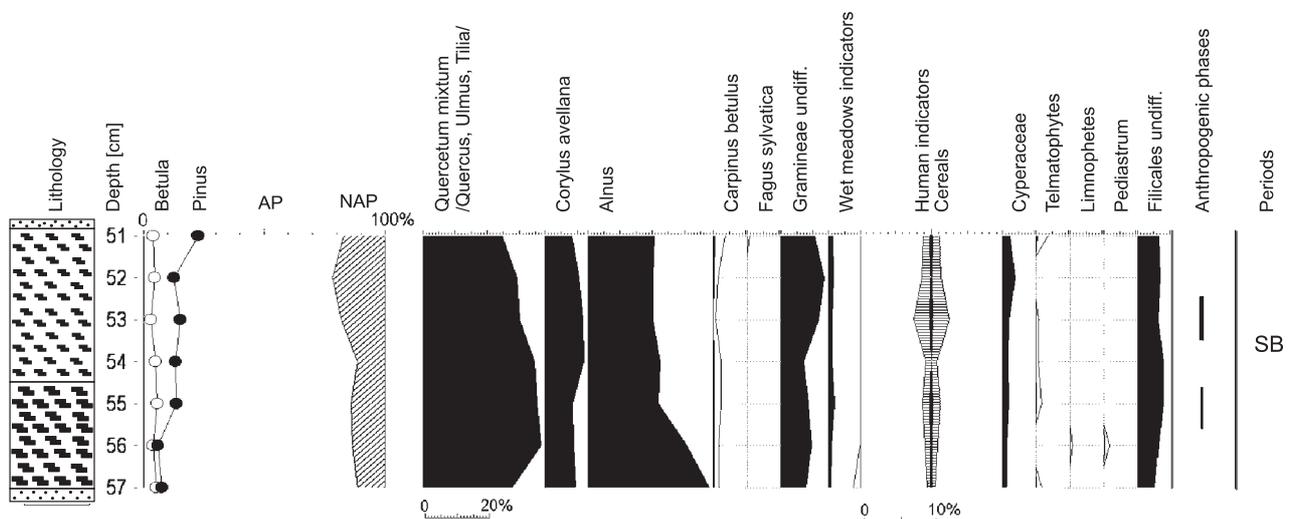


Fig. 7. Archaeological trench 15 E — simplified pollen diagram (for explanation see Fig. 5)

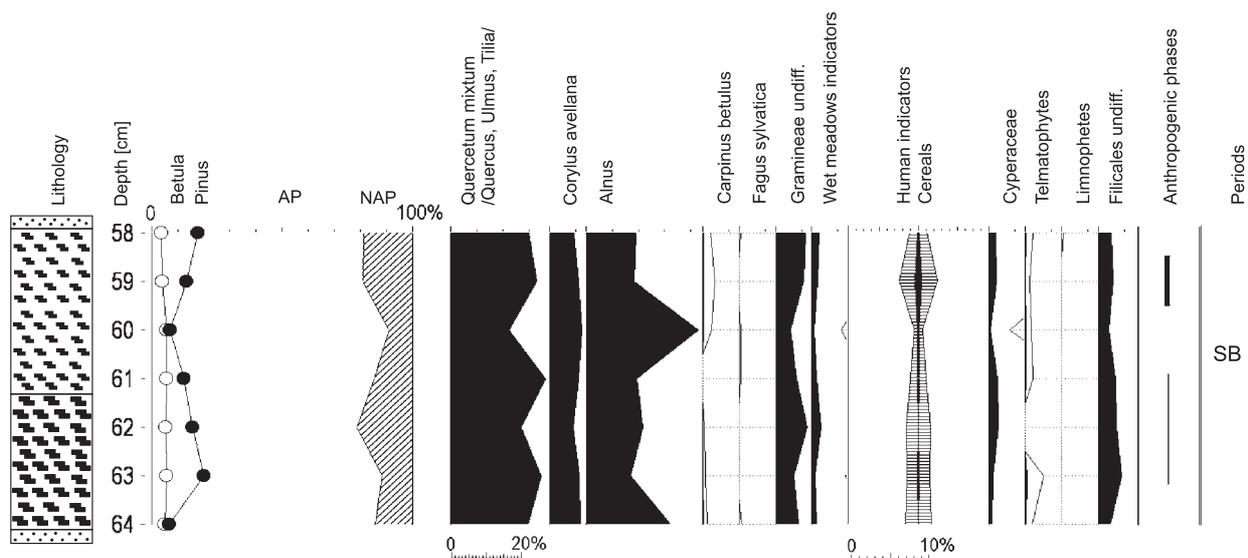


Fig. 8. Archaeological trench 15 W — simplified pollen diagram (for explanation see Fig. 5)

DISCUSSION

The oldest traces of human economic activity were registered in site 1 and 2 — Rzucewo Headland and Rzucewo-beach (Figs. 5 and 6). Ruderal plants appeared in the previous composition of plant communities, including: the goosefoot family (Chenopodiaceae), motherwort (*Artemisia*), sorrel (*Rumex*), which are evidence of settlement. Single occurrences of pollen grains of plantain (*Plantago lanceolata*) indicate the small intensity of animal husbandry. Mixed deciduous forests of lime (*Tilia*), elm (*Ulmus*) and oak (*Quercus*) played a significant part in forest communities. More wet habitats were occupied by communities with alder (*Alnus*) and hazel (*Corylus*), in which elm (*Ulmus*) could also occur, as well as ash (*Fraxinus*) in small quantities. Ferns (Polypodiaceae) also played a significant role in forest communities. The dominance of mixed deciduous forests with a species composition characteristic of the climatic optimum proves that this first appearance of humans in the area took place towards the end of the Atlantic Period. This is confirmed by the ¹⁴C date: 5520 ±70 years BP. At the time, apart from peatlands, marshes and lakes were present in the area of the present-day Puck Lagoon. The intensification of peat-forming processes towards the end of the Atlantic Period was caused by the sea level rising (Uściniowicz, Miotk-Szpiganowicz, 2003).

In accordance to archaeological data, these early traces of human economic activity are related to the Paraneolithic Culture, which developed earlier than the settlement of the Rzucewo Culture (Król, 1997).

Most probably, at the beginning of the Subboreal, the sea entered into almost the entire Puck Lagoon and gradually freshwater lakes were transformed into a brackish/marine lagoon (Uściniowicz, Miotk-Szpiganowicz, 2003). Climatic changes, but most of all local changes in hydrologic conditions caused transformations in the composition of plant communities. Lime (*Tilia*) was partly replaced by oak (*Quercus*), which co-existed with pine (*Pinus*) in the drier habitats. The more extensive wetlands were still occupied by marshy land communities with alder (*Alnus*), hazel (*Corylus*), elm (*Ulmus*) with some ash (*Fraxinus*).

Traces of Rzucewo Culture settlement are visible in sites 3 and 4 (Figs. 7 and 8) located within the archaeological exploration trench (Fig. 2). In the lowest part of this trench, a stone axe manufacturing workshop was discovered. Large boulders were found on whose surface smaller stones were ground, which were later made into axes. In the neighbourhood 12 celts, 1 am-

ber pendant and several worked (ground) stones were found (Król, 1997). The test results of the palynological sediments of the cultural layer indicate a clear increase in the importance of ruderal plants, such as: the goosefoot (Chenopodiaceae), the motherwort (*Artemisia*) and the sorrel (*Rumex*) in the area's vegetation cover, which is evidence of the existence of a settlement. The presence of plantain (*Plantago lanceolata*), cereals (*Cerealia*) and also single grains of rye (*Secale*) is an indication of a not too intensive development of both animal husbandry and farming. The occurrence of human indicator plants and the advance of the Puck Lagoon shoreline towards Rzucewo coincides with the beginning of the Neolithic Rzucewo settlement established by the seal-hunters, which according to archaeological dating lasted from c. 2400 to 1700 years BC (Król, 1997).

Based on the obtained palynological test results we can say that the economic activity of the people of the Rzucewo Culture was more reminiscent of the Mesolithic rather than the Neolithic economy. This is related to the fact that the Rzucewo people preferred the hunting-fishing type of economy. According to the archaeological excavations their main activity was fishing. During the investigations the fish-bones of fish such as: pike, pike-perch, cod, roach and eel were found (Król, 1997). The inhabitants of Rzucewo also used to organise longer sea expeditions to hunt seals. They hunted for common, grey, ringed and harp seal. The large number of bones of these mammals indicates that they played an important role in the diet of the inhabitants of the settlement (Król, 2002). This is indirectly confirmed by the stewing pan-like vessels for fish and seal fat which served as lamps, and are characteristic only for the fishing and hunting tribes of the southern Baltic (Król, 2002). The people of the Rzucewo Culture were also familiar with primitive agriculture and swine and cattle breeding, although these types of economic activity, which dominated in the Neolithic cultures of other regions, did not play a significant role in this area.

During the archaeological excavations, traces of the terrace settlements were found (Żurek, 1953; Król, 1997). The slope was previously levelled to form the terrace levels (Fig. 3). These traces suggest the use of pillars to support the terrace levels. The reconstructed elements of the houses indicate that their dimensions were 4 x 2.5 m. Their walls were made of one sequence of posts (Król, 1997).

CONCLUSIONS

1. The results of palynological investigations fully confirmed the archaeological information connected with the Neolithic settlements on the investigated area.

2. The first traces of human impact on the pollen diagrams suggest that man arrived in the area well before the Rzucewo Culture was established. It can be correlated with the Paraneolithic Culture. At that time, the area of the present-day Puck Lagoon was dominated by marshy, swampy and limnic environments.

3. The beginning of the Late Neolithic Rzucewo Culture (c. 4400–3700 years BP), established by the seal-hunters, was related to the water level increase and coincided with the advance of the Puck Lagoon shoreline towards Rzucewo.

4. The traces of human impact on the pollen diagram are not so visible because those people preferred the Mesolithic type of economy. According to the archaeological investigations, their main preoccupation was seal hunting and fishing.

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