



Ancient plant DNA, macro- and microfossil studies of the lake sediments from the High Arctic lake Tenndammen, Svalbard



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Photography encouraged

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STUDY AREA AND CORE POSITION

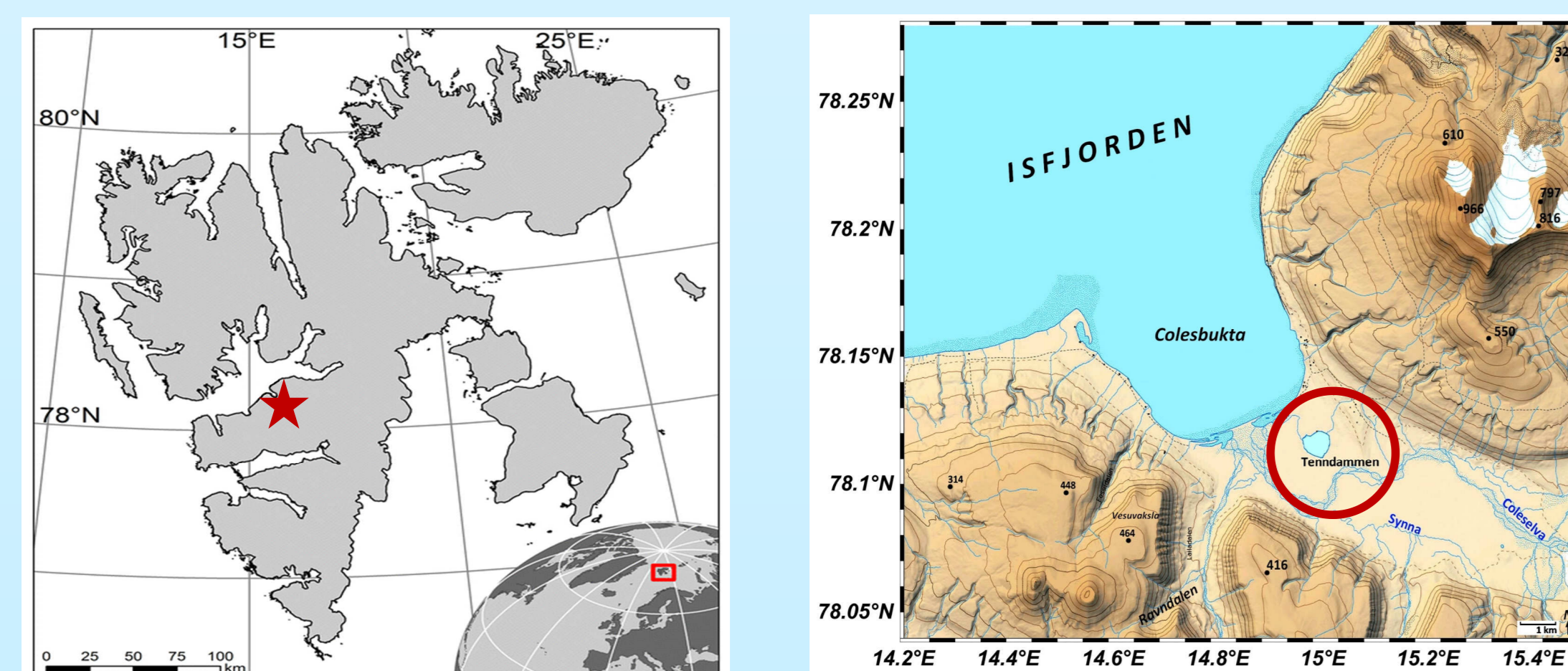


Figure 1. Study area (left) and the core Te2019 position (right): archipelago of Svalbard, Spitsbergen island, N 78°06.118; E 15°02.024, 7 m asl. Coring depth is ca 2.5 m. Length of the core – 85 cm.

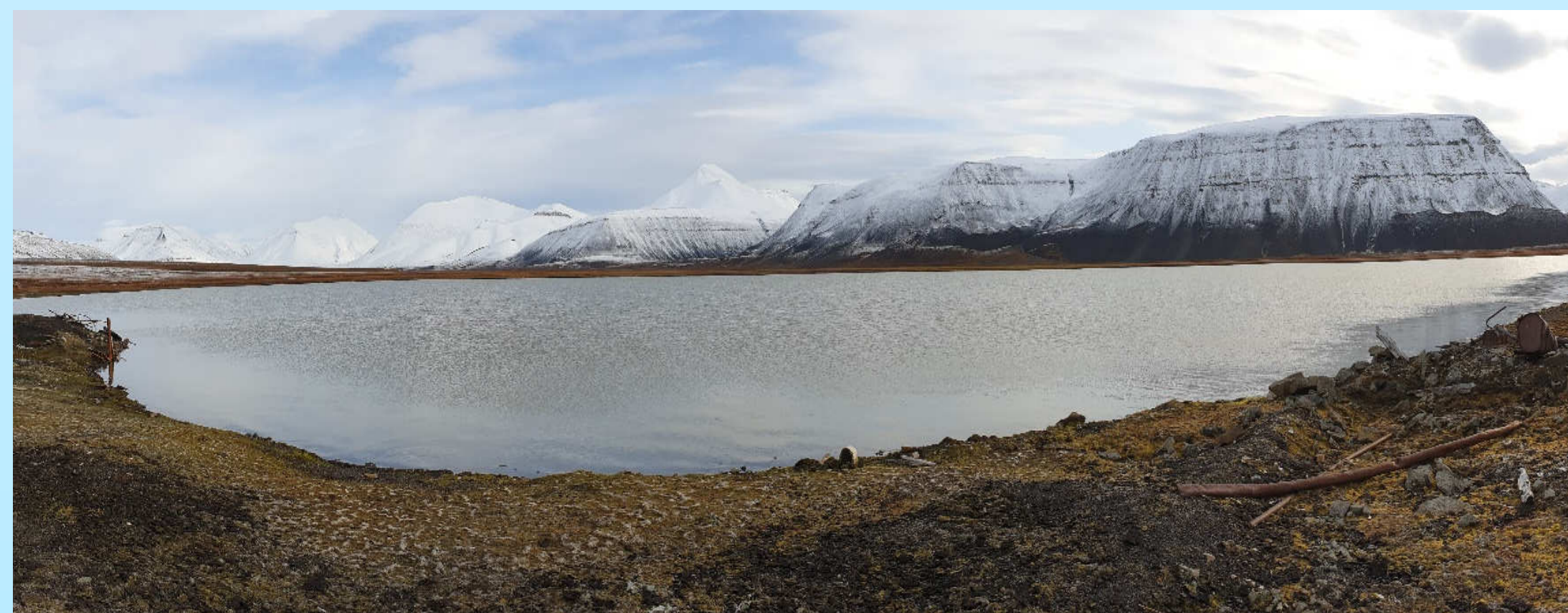


Figure 2. General view of the lake Tenndammen (September, 2019).

CORE DESCRIPTION

Depth, cm	Type of sediment	Color and structure
0-10 at 8.5-9.5	Clayish gyttja clayish gyttja (dark layer of the same lithology)	Brown to olive-brown Dark brown to blackish
10-15	Laminated layer, mixture of clay and gyttja; each lamina is about 0.5-1 cm thick	Olive-brown, laminae are pale-brown to grayish-brown
15-20	Gyttja with clay laminae; each lamina is about 0.5-1 cm thick	Olive-brown, laminae are pale-brown to grayish- or yellowish brown
20-30	Massive, unstructured clay	Olive-brown to brown
30-47.5	Laminated clay with layers of gyttja 0.3-0.5 cm; each lamina is about 0.1-0.5 cm thick	Olive-brown, laminae are pale-brown to grayish-brown
47.5-75.5 at 47.5-59 at 68-75.5	Thick peat with 0.5-1 cm thick Clayey peat Peat contains clasts of sand with gravel	Dark brown Dark brown to black Dark brown
75.5-85 at 83-85	Clayey peat with some sand massive peat clasts	Gray-brown Dark brown

RESULTS OF aDNA, POLLEN AND MACROFOSSIL ANALYSES

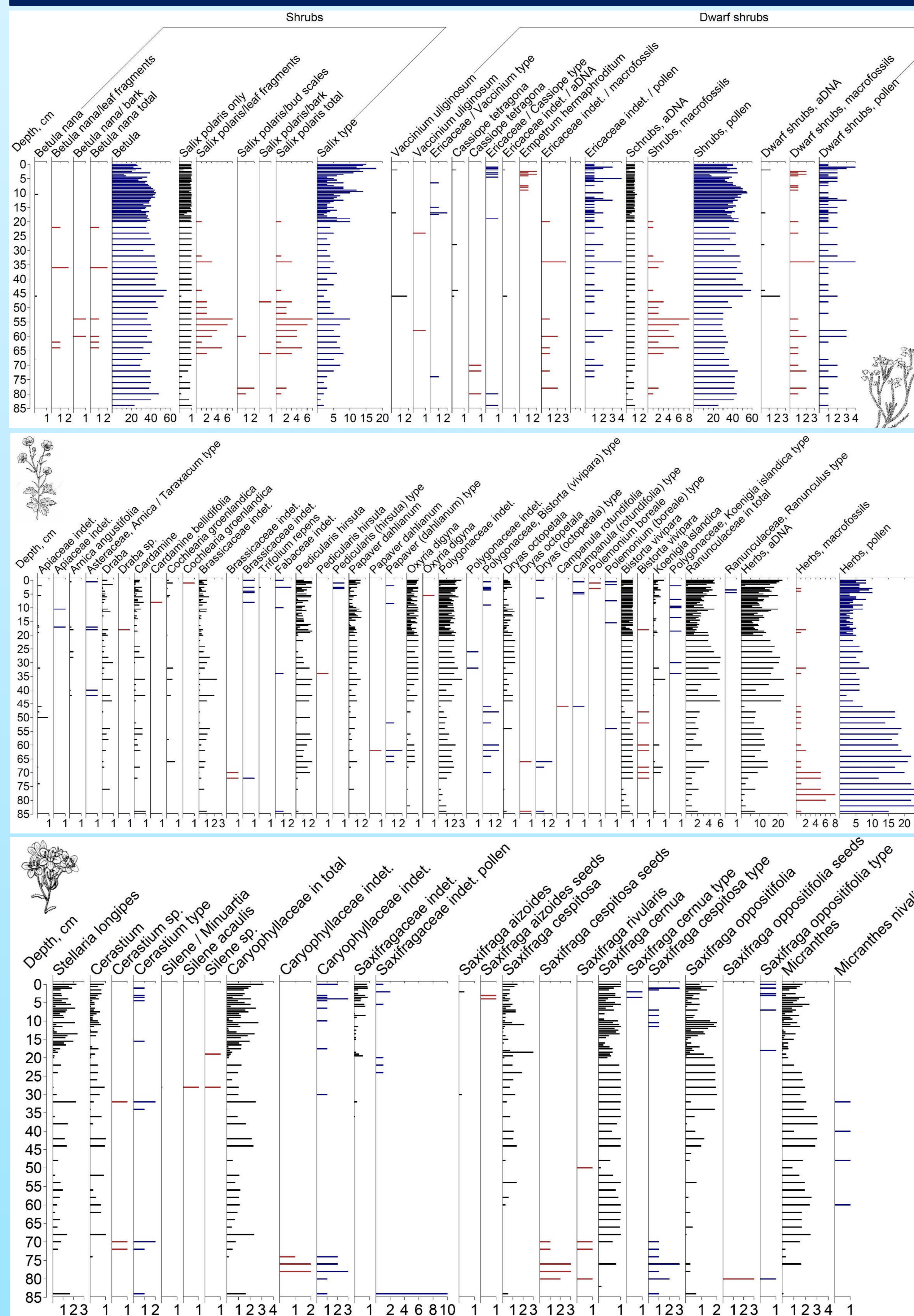


Figure 3. Extractions from the depth-constrained stratigraphic diagrams with aDNA weighted sum of PCR repeats, number of plant macro remains per volume and relative abundance of pollen registered in the sediment core Te2019.

Legend: - aDNA (black), - macrofossils (red), - pollen data (blue)

RESEARCH MOTIVATION

Ancient DNA metabarcoding applied together with the studies of the plant macro-remains, pollen, spores and non-pollen palynomorphs (NPP), open new perspectives and give better taxonomical resolution, allowing to obtain more precise and specific data on the local environment conditions and their changes. So far, only three multiproxy studies that applied together molecular, palaeobotanical and palynological methods are available for the high Arctic archipelago Svalbard. We intend to contribute filling this gap.

TAXA DETECTED IN aDNA, POLLEN AND PLANT MACROFOSSILS

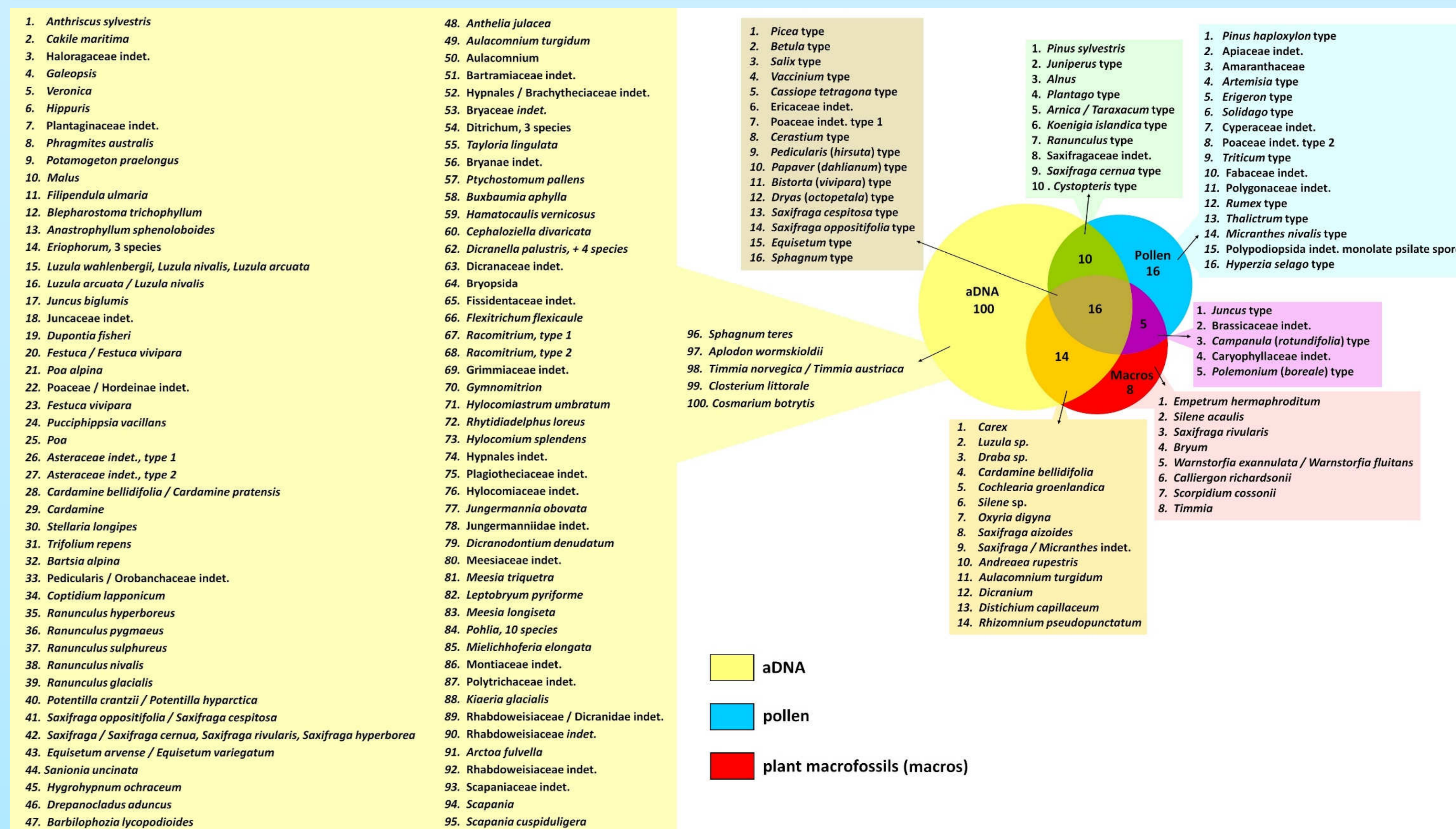


Figure 4. Venn diagram showing the number of plant taxa detected from the sediment core Te2019 through the plant macro remains, pollen and aDNA analyses.

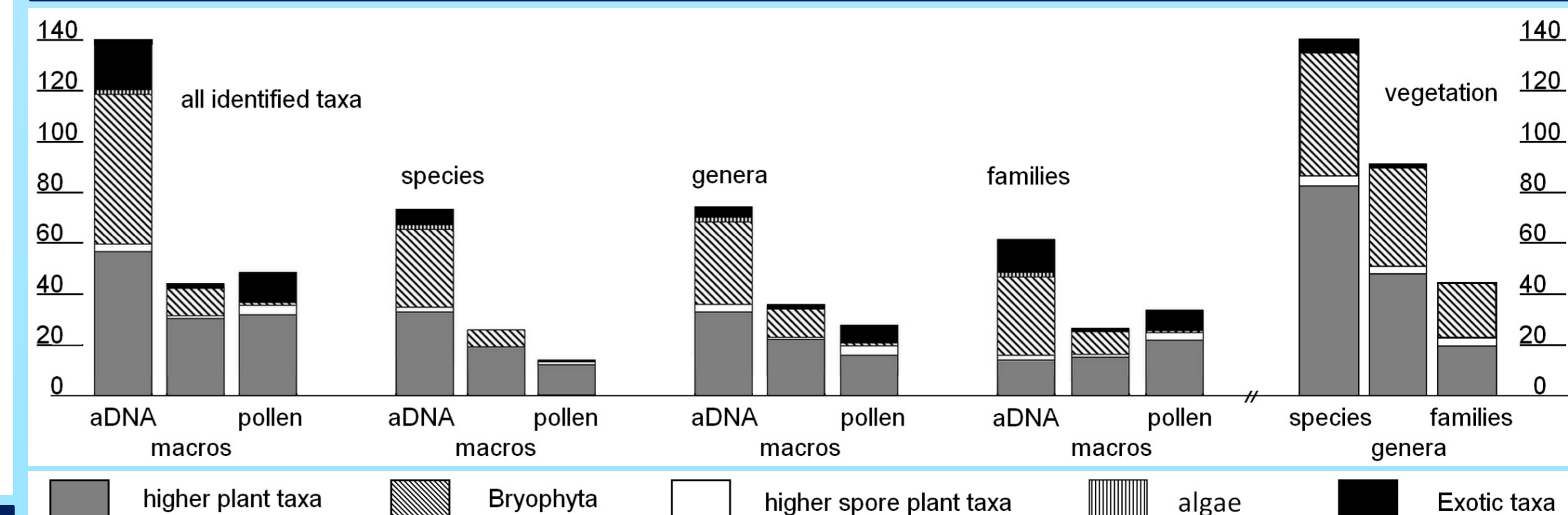


Figure 5. Numbers of taxa for higher plants, Bryophyta, higher spore plants, algae and exotic taxa at the lowest taxonomical level detected in DNA, macrofossils and pollen compared to taxonomic spectra for the local vegetation in Colesdalen. Vegetation surveys done by I.G. Alsos in 2015 and by A. Poliakova in 2019.