University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

MATTHEW A. ADELEYE

BSc (University of Lagos, Nigeria, 2014)

"A Multi-Proxy Paleoecological Study of Anderson Fen, Central Vancouver Island, British Columbia, Canada"

Department of Biology

Wednesday, October 24, 2018
10:00 A.M.
Bob Wright Centre
Room A319

Supervisory Committee:
Dr. Terri Lacourse, Department of Biology, University of Victoria (Supervisor)
Dr. Barbara Hawkins, Department of Biology, UVic (Member)
Dr. Joseph Antos, Department of Biology, UVic (Member)

External Examiner:
Dr. Vera Pospelova, School of Earth and Ocean Sciences, UVic

Chair of Oral Examination:
Dr. Astri Wright, Department of Art History and Visual Studies, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

A paleoecological study was carried out on a 4.7 m peat core from Anderson Fen on central Vancouver Island, using a multi-proxy approach. Pollen, non-pollen palynomorphs, and physicochemical analyses were used to document past vegetation, peatland developmental history, and carbon and nitrogen accumulation rates over the last 14,000 years. Lake sediment and aquatic plant remains at the base of the core indicate a shallow pond was present at the site after deglaciation. By ~11,700 calendar years before present (cal yr BP), the shallow pond became a herb-dominated wetland (marsh) through terrestrialization. Bog formation started around 10,500 cal yr BP with decreasing water levels, as indicated by high C:N, *Sphagnum* and fungal remains, and testate amoebae such as *Archerella flavum* and *Heleopera*. A fen developed by ~9400 cal yr BP with fluctuating water levels through the rest of Holocene. Carbon accumulation rates were highest towards the surface and during the early Holocene warm period, with an overall mean rate of 12.9 g/m^2/cal yr, which is low compared to continental and northern peatlands. Pollen analysis reveals that non-arboreal communities dominated by *Salix* prevailed soon after deglaciation before the expansion of *Pinus* forests 13,200 cal yr BP. *Pseudotsuga menziesii* dominated forests between ~10,700 and 8400 cal yr BP under warm and dry conditions. *Tsuga heterophylla* rainforest was established by ~7000 cal yr BP under increasingly cool and wet conditions. Overall, Anderson fen and the surrounding area experienced major and rapid changes in environmental conditions and vegetation in response to climate change during the late glacial and early Holocene, while mid- to late Holocene changes have been more subtle and relatively gradual.