Black Park in the United Kingdom and its macrofossils

Introduction

Black Park in Buckinghamshire has mixed and coniferous woodland, dry and wet heathland and acid grasslands. The middle Thames valley where the park is situated has pine trees alder, beech and an old lake of the 18th centuary. Woodland and floodplains and the lake catchment area is the natural habitat. Wet woodlands has species including mosses, lichen and invertebrates. The floodplain has: colluvium, channel lag, laterals accretion deposits, vertical accretion deposits, crevasses play deposits, and channel-fill deposits. ("**http://www.answers.com/topic/floodplain**"). And the peat usually is the most fertile sediment available for storing of macrofossils of terrestrial or aquatic life (shown in the presence of foraminfera).

Aim: To extract paleoecological and Paleoclimatic information from the lake sediments. To examine macrofossils Pollen, plant macrofossil, cladoceran (water fleas), fern, mosses and wind and water borne elements, submerged macrophytes, which play a key role in the functioning of the ecosystem and directly or indirectly affect the biological, physical and chemical patterns and processes. (Timms et al., 1997). We researched leaves detritus.

Method : Pollen analysis and sedimentological analysis were the methods of analysis Macrofossils of leaves taken in floodplains(sediments). Leaf detritus were placed in litter bags . The temperature, pH, conductivity, turbidity and dissolved oxygen and the water velocity was measured. The nitrogen was calculated as per (SARRUGE & HAAG, 1974; MALAVOLTA *et al*., 1989), phosphorous as per(Miyazawa *et al*., 1992), lignin (VAN SOEST, 1963) and carbohydrates as given by (DERIAZ, 1961; CONN and STUMPF, 1975). Heterotrophic bacteria ,the filamentous fungi's density was evaluated . ("*doi.wiley.com/10.1111/j.1472-765X.2006.01878.x")* . The diversity index was used to assess invertebrate community according

to MAGURRAN (1991)

(“ *doi.wiley.com/10.1111/j.1600-0633.2006.00156.x”*). Functional feeding groups were classified according to MERRITT & CUMMINS (1996). The covariance analysis (ANCOVA), multi dependent analysis of variance (MANOVA) was used to see the chemical composition (nitrogen, phosphorous, lignin and carbohydrate-dependent variables) of the leaf detritus, and the functional feeding groups that colonized the detritus, to test microorganisms (yeast, bacteria and fungi) and invertebrate (density-dependent variable) that colonized the detritus.

Samples taken from : From dry soil areas, the floodplains and the lake area, the results are seen in the soil samples and pollens were collected along with leaf detritus and sieved and sampled and compared to each other in terms of density and spread and age.

Dry Soil Area: Holocene vegetation change we see from seeing the plant macrofossils and pollen from packrat middens ranging from 0 to 50,000 years. Bits of twigs, leaves and seeds in the pile debris can be analyzed. “**http://www.forestry.gov.uk/pdf/eng-ee-beds-wet-woodlands.pdf/$FILE/eng-ee-beds-wet-woodlands.pdf**”). Now herbivores were extinct or reduced in numbers. Semi-arid landscapes areas appeared covered with sage, chaparral, and grassland. . Treeless tundra was replaced by birch and then pine and then beech. **Beech** is sprouting on limestone areas and the climate is temperate with steady amounts of rainfall and temperatures which can fall below freezing in winter. The most significant site of the growth of this plant is at the head of the Thames estuary. **Alder** appears in rich, cool and moist woodlands and permeate peatlands, stream banks and lakeshores and moist coves. Soil is medium textured to corase textured soil. Salinity tolerance: 4.5 to 7.5 range. Their CaCo3 tolerance is low. It fixes the nitrogen balance so in a sense it is a soil improving species. It is restricted to stream banks and other moist places. (“http://plants.usda.gov/java/charProfile?symbol=ALGL2”) **Betula :** A deciduous tree which grows up to 20m in height at a very fast rate. Growing well in light(sandy) , medium(loamy) and heavy (clay) soils, it needs soils which are well drained and moist to grow.

The plant prefers neutral, acidic and basic (alkaline) soil, is allergic to shade. It is wind tolerant. Its habitats are the woodlands.

Lake sediments: The plant macrofossil assemblage recovered show woodland and scrubland taxa with a evergreen canopy, well drained rich soil. There is much grassland having (Pastinaca sativa and Rumex) and open ground in this assemblage. Sediment dynamics show rich planktonic and benthic algae like brine shrimp and the brine fly plus many birds. Of them many are migratory birds, the living sensors of environmental change. 'fast-flowing river' birds more or less coincide with water-associated birds categorized as 'upland' by Gibbons; et al. (1993).

Conclusions:: Macroscopic plant have been found by the sieving of sediments and identified according to the modern reference material available in the nomenclatures of Tutin et al.(1964-1993). In the incubated detritus we observed the collector invertebrates to be the most abundant, followed by the predators, shredders, and scrappers. Other groups had a homogenous distribution and their proportions varied little. Nitrogen and phosphorous was correlated to the invertebrate community at the start, while the lignin was correlated to the invertebrates in the more advanced stages and the carbohydrate was not dependent or correlated on the invertebrates at any point during detritus breakdown. We can analyze the soil and we find here Al and K richness and Mg poor smectite sediments.

Buried trees show the biospheric dynamics, the vegetational response to large-scale climatic forcing in the dendochronological data for radio calibration. Faegri & Iversen (1989) "Mineral magnetic techniques and sedimentological analysis, supported by independent geochemical analyses, identify significant variations both in sediment source and flux". http://www.springerlink.com/content/r37417633n65195p/ . . Pollen data is the most abundant here along with plant macrofossils. Molluscan fossils appear in peat too with higher pH. Quaternary temperature and environment show in Beetles, felled timber hold information on the

land management practices. Ponding is shown (by peaty slits accumulated) punctuated by renewed channel activity as shown (in the inorganic carbonate sediments rich in ferrimagnetic minerals), Parker, A G.;[a], Lucas, A. S; [b], Walden, J;[c], . Goudie A S [d]; Robinson, M. A.[e] and Allen, T,G.[f] ("doi:10.1016/j.geomorph.2007.04.029") . Much change has taken place in Quaternary Period in geomorphological processes, floras, faunas and environmental conditions, all influenced by changing climate. The record of such changes is faithfully preserved here in landforms, sediment sequences and organic remains.

("http://www.jncc.gov.uk/default.aspx?page=4175&block=84")

Literature and reference used is as shown below:

References:

Cole K.L; Henderson, N &. Shafer, D. S; (1997). 'Impacts of nineteenth century grazing at Capitol Reef National Park as determined through packrat midden analysis'. Retrieved on 19th November 2009 from http://sbsc.wr.usgs.gov/cprs/research/projects/global_change/capreef.asp

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Faegri & J. Iversen (1989) Textbook of pollen analysis , 4th edition by K. Faegri, P. E. Kaland and K. Krzywinski, 1989

Gibbons et al. (1993) 'Association of British Breeding Birds with freshwater wetland habitats ISBN 978-1-906204-34-1'. Retrieved on November 23, 2009 from http://www.bto.org/research/reports/researchrpt_abstracts/2008/rpt_502.htm

Gibbons, D.W., Reid, J.B. & Chapman, R.A. (1993) 'The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991 London: Poyser'. Retrieved on November 23, 2009 from http://www.bto.org/research/reports/researchrpt_abstracts/2008/rpt_502.htm.

Timms & Moss, 1984; Carpenter & Lodge, 1986; Dieter, 1990; Jeppesen et al.(1997). 'Role of macrophytes in a clay-turbid lake'. Retrieved on November 23, 2009 from http://ethesis.helsinki.fi/julkaisut/maa/limno/vk/nurminen/roleofma.pdf

Kenneth L. Cole, Norman Henderson, and David S. Shafer (1997). 'Holocene vegetation and historic grazing impacts at the Capitol Reef National Park reconstructed using packrat midden '

Timms & Moss, 1984; Carpenter & Lodge, 1986; Dieter, 1990; Jeppesen et al., (1997). 'A 250 year comparison of historical, macrofossil and pollen records of aquatic plants in a shallow lake' . Retrieved on November 23, 2009 from http://dx.doi.org/10.1111/j.1365-2427.2005.01414.x

Fægri, K. & *Iversen*, J., *1989*. 'Textbook of Pollen Analysis'

Berglund and Ralska-Jasiewiczowa, (1986). "Palaeoecological events during the last 15,000 years'. Retrieved on 20th November 2009 from http://dx.doi.org/10.1016/S0277-3791(97)89763-6

Webster, J. R. and E. F. Benfield. (1986). 'Vascular Plant Breakdown in Freshwater System. Annual Review of Ecology and Systematics. 17:567-594.'

SARRUGE &HAAG, (1974); MALAVOLTA *et al*., (1989) 'Leaf breakdown in a tropical stream'. Retrieved on November 23, 2009 from *doi.wiley.com/10.1002/iroh.200510826*

MIYAZAWA *et al*., (1992); MALAVOLTA & NETTO (1989). 'Leaf breakdown in a tropical stream'. Retrieved on 20th November 2009 from *doi.wiley.com/10.1002/iroh.200510826*

Tutin TG *et al.* (1964-1993) *Flora Europaea*. Cambridge University Press, Cambridge (GB).

SOEST, V; (1963). 'Use of detergents in the analysis of fibrous feeds. II. A rapid method for the determination of fiber and lignin. *J. Ass. Offic. Agr. Chem.* **46**:829-35'. Retrieved on November 23, 2009 from http://www.garfield.library.upenn.edu/classics1979/A1979HZ28600001.pdf

Timms et al. (1997). 'Retrieved on November 23, 2009 from link.aps.org/doi/10.1103/PhysRevB.58.10634

DERIAZ, (1961); CONN & STUMPF (1975). 'Leaf breakdown in a tropical stream'. Retrieved on 20th November 2009 from *doi.wiley.com/10.1002/iroh.200510826*

MERRITT & CUMMINS (1996). ' Orders and Families of Aquatic Insects 3rd edition' . Retrieved on November 23,2009 from http://www.sbs.utexas.edu/jcabbott/courses/bio321web/labs/MC_families.pdf.