Holocene Insect Fossil Assemblages, Little Takli Island, Katmai National Park and Preserve

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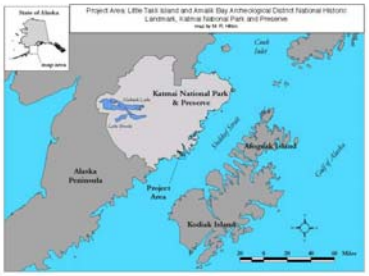


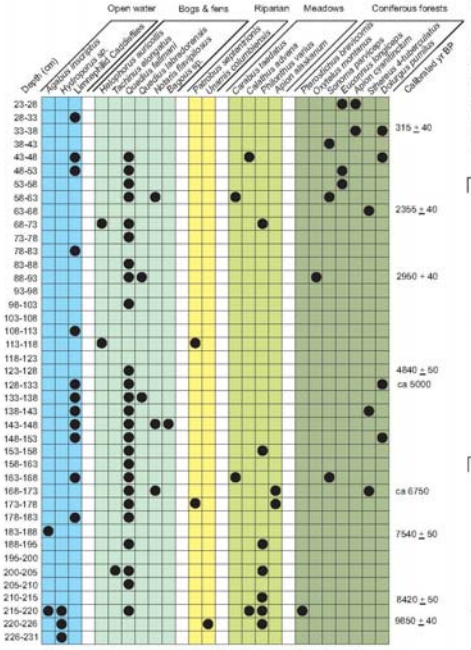
Peat Column capped by 1912 Novarupta tephra and with glacial till at base.

Objectives

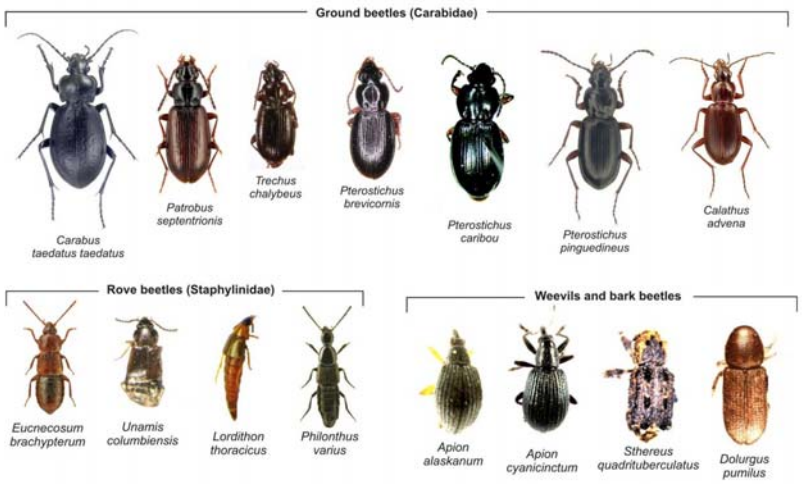
A bluff on the west coast of Little Takli Island exposes approximately 2.3 m of peat that was deposited in a small bog throughout much of the Holocene (i.e., the last 11,000 years). During August, 2010, a National Park Service field party went to the island, and excavated a column of peat at the same site where a previous excavation had taken peat for paleobotanical studies (cf. Bigelow 2004). The new peat column was taken specifically for the extraction of insect fossil remains. The aim of the study was to use the fossil insect assemblages extracted from the peat to reconstruct post glacial environments on the island, which is adjacent to another small island from which significant archaeological finds have been documented from the Mink Island Site (Schaaf nd.).

Methods

A column of peat was taken from the exposure (right), in 10-cm thick blocks that measured 25 X 25 cm in length and breadth. At the University of London they were cut into 5-cm thick blocks, soaked in water to rehydrate the samples, and wet-screened with a 300 micron-mesh to remove fine particles. The screened residues were processed by the kerosene flotation method (Elias, 2010) to concentrate and isolate the fossil insect remains from the plant remains. These concentrated samples were picked in 60% ethanol under a low-power stereo binocular microscope. The dominant plant taxa from each sample were noted during insect picking. Fossil insect specimens were stored in vials of 60% ethanol, and identified under the microscope with the aid of taxonomic literature and by comparison with modern, identified specimens in the author's Alaskan insect collection. Faunal interpretations were based on modern collection data noted in the taxonomic literature cited in the text, below. A few samples contained sufficient numbers of predators and scavenger species to allow a paleotemperature reconstruction using the Mutual Climatic Reconstruction method, based on the modern climatic parameters associated with the species found in the fossil assemblages (Atkinson et al., 1987).



Ecological summary diagram, Little Takli Island insect faunal assemblages. The presence of a taxon in a given interval is marked with a black dot. The assemblages are divided into ecological groupings. Calibrated radiocarbon ages from Hilton (unpublished).



Summary

✱From 6,750 until about 5,000 cal yr BP, the presence of coniferous bark-feeding beetles clearly indicates the presence of conifer trees. This is difficult to understand in light of the paleobotanical evidence that indicates Little Takli Island did not support conifers at any time in the Holocene. However, the two beetle species indicative of conifers (the weevil *Sthereus quadrituberculatus* and the bark beetle *Dolurgus pumilus*) both live under the bark of conifers, so it is possible that the beetles arrived on the island on board drift wood from trees that grew elsewhere in Alaska. Neither of these beetles is host-specific, so we cannot say which species of conifer they indicate.

✱There is evidence elsewhere in southern Alaska, such as the Cook Inlet region, that conifers were present during intervals of the Holocene in which little or no conifer pollen was preserved (Tom Ager, U. S. Geological Survey, personal communication, June, 2011). In these circumstances the presence of conifers was detected through macrofossil remains (conifer wood or needles). Some wood was recovered from the Little Takli peat samples in this interval, but it has not yet been identified. It may be possible, therefore, that conifers were growing on Little Takli Island during the mid-Holocene, but that they were not producing sufficient pollen to be detected palynologically.

✱Between about 5,000 and 3,000 cal yr BP, the coniferous forest indicators drop out of the record, and return at about 2,350, 1000 and 300 cal yr BP.

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