

Vegetation data for moss-polster forest plots in the northeastern USA

Background: In summer 1990, Stephen T. Jackson commenced a project aimed at understanding and testing models of pollen representation under closed forest canopy, by comparing modern pollen assemblages from forest-floor moss-pollsters with vegetation composition in the immediate vicinity (20 to 120 m radius). Because it was then widely assumed that most pollen deposited on the forest floor derived from within $10^0 - 10^2$ m, sampling was local and intensive.

An initial study was conducted, in 1990, of 59 plots in four regions of the northeastern US: 7 sites in the Matunuck Hills (MH) of southern Rhode Island, 4 in Douglas State Forest (DSF) (southern Massachusetts), 11 from the eastern Adirondack Mountains (EA), and 10 from the Fish Creek region of the central Adirondack Mountains (FC). Data from thirty of these sites (7 MH, 2 DSF, 11 EA, 10 FC) were used in Jackson & Wong (1994). For each site, a 20-m radius circular plot (.126 ha) was emplaced and all trees >10 cm diameter in the plot were identified, tallied, and measured for diameter at breast height (1.3 m).

Some of the plots from Jackson & Wong (1994) were relocated for pollen resampling in 1991 and 1992. The study was expanded in 1993 and 1994 to include additional sites in the Matunuck Hills, eastern Adirondacks, and Fish Creek region, and to extend vegetation-sampling out to 120 m from the plot center. 37 of the 1990 sites were relocated and resampled during the 1993/94 field seasons, including 5 in the Matunuck Hills, 17 in the eastern Adirondacks, and 15 in the Fish Creek region. At 11 of these sites, a new 20-m plot was established, usually because the original center-point could not be confidently relocated to within a few metres. For each of the 34 new sites (16 EA, 4 MH, 14 FC), a 20-m radius circular plot was emplaced and all trees sampled following 1990 procedures. For all the 1993/94 sites, old and new, estimates of forest composition and basal area for radial distances between 20 and 120 m were made from 85 Bitterlich counts (#7 prism) in a grid array (see Jackson & Kearsley 1998 for details). Exceptions include four new 1994 MH plots, where the Bitterlich surveys were not completed owing to limited time and contracting of Lyme disease among field-crew members. Bitterlich data are missing from one FC plot (204, MP-2). The accompanying table provides a breakdown of known data for the various sites.

All of the sites were in the general vicinity of lakes that were part of the lake-pollen/vegetation comparisons of Jackson (1990, 2019). General descriptions of the regional vegetation can be found in those papers.

For all of the Matunuck Hills and Fish Creek sites, the moss-polster sites were numbered according to the aerial photo on which they were located (photos already on file at Harvard Forest). Thus, "MH766M2" refers to Matunuck Hills, Photo 766, Moss-polster Plot #2. Similarly, at Fish Creek, "F186M4" refers to Fish Creek, Photo 186, Moss-polster Plot #4. (Idiosyncratic exception: Dual Pond is in the Fish Creek area.) Because the eastern Adirondack sites were scattered over a much larger area, the sample numbers are indexed to the particular lakes they were near. Thus, "Bloody Pond MP-2" refers to Bloody Pond area, Moss-polster Plot #2. The plot was near Bloody Pond, on the same aerial photo as the pond.

Field work predated GPS (or at least spatially precise GPS), and exact geographic coordinates for the sites have not been calculated yet. The field notes in the data archives describe how to reach each site, using available landmarks (e.g., pond outlet, trailhead), with compass bearings and tape-measured distances. Permanent markers were not established for the plots (most are in designated wilderness), but the plots were successfully relocated in 1995 and 1996 (and some 1990 plots in 1992 and 1993) using these directions. The precise center may not be relocatable, but it should be possible to navigate to within a few metres. Note that relocation will likely require use of the aerial photos, maps, and (sometimes) notes in the “Jackson NE lake vegetation data” archives already at Harvard Forest.

The data set also includes forest-plot and transect data around two small forest hollows in the Fish Creek area: Dave’s Lost Hollow (Kearsley 1996) and Valhalla Hollow (Kearsley 1996; Kearsley & Jackson 1997). These data were not used in the moss-polster pollen studies.

Potential Utility of the Data: The data comprise a form of ‘permanent plot data’, insofar as the plots (and individual trees) with reasonable accuracy and precision. They may be useful in longitudinal studies of compositional or biomass change. Fish Creek plots included several old-growth stands. Two of the Bullet Pond samples (MP-4 and MP-5) were in old-growth forest, and the Challis Pond stands had an old-growth “feel” to them. The forest around Challis MP-3 was heavily damaged by the July 1995 blowdown event, however.

Construction activity observed during 1995 and 1996 in the Matunuck Hills and near Clark Pond (NY) may have obliterated some of the forest stands sampled in 1990 and 1993/94. Most of the Adirondack sites, however, are on State Forest Preserve lands and hence protected under the Forever Wild clause of the 1894 New York State Constitution.

Methods: Described above; see Jackson & Wong (1994) and Jackson & Kearsley (1998) for details.

Data:

Raw data folders are arranged by region (Douglas State Forest), photo (Matunuck Hills, Fish Creek), or lake names (eastern Adirondacks). Each folder contains:

- Field notes with information on plot location (and navigation)
- Field data sheets with DBH measurements for each individual tree in 20-m plots
- Field data sheets with 85 Bitterlich tallies for the spiral-grid surrounding each of the 1994 plots (20-120-m radius)

Printouts of compiled data for all 20-m plots (1990, 1993, and 1994) for each site are in folders organized by region. Within each region, data are organized by site name (e.g., Bullet Pond, or photo 187) and by sample number (e.g., MP-3).

Data printouts of 120-m compilations appear to have been lost.

All data in this collection were in digital form in the 1990s, and I expect they may reside as QuattroPro or Lotus files on 3.5" floppy disks in a box in my office. I also pinpointed each site location using ROOTS digitizing software, and locations were transferred to Idrisi GIS maps of the vegetation patterns surrounding the sites. Those data may still exist on backup disks. As I go through my disk archives, I will look for digital data files for both the forest inventory data and the plot locations, and will pass on any files or relevant information to Harvard Forest.

Personnel: All 1990 field surveys were conducted by S.T. Jackson with assistance from Adeline Wong, Nina Rivera, Dan Moos, Matt Crenson, Erik Nelson, Raquel Rivera, Heather Pelham, Holly Christofferson, Peter Jaumann, and Peter Allen.

1993 and 1994 surveys were conducted or supervised by S.T. Jackson and Jennifer B. Kearsley, with assistance from David Larsen, Duane Marshall, Cara Gentry, Dan Plimpton, Dan Winchester, Tammy Hinesley, and Peter Allen.

References:

- Jackson, S.T. 1990. Pollen source area and representation in small lakes of the northeastern United States. *Review of Palaeobotany and Palynology* 63:53-76.
- Jackson, S.T. 2019. Modern pollen-assemblage data from small lakes paired with local forest-composition data in northeastern United States. *Ecology* 100(1), e02784 (<https://doi.org/10.1002/ecy.2784>).
- Jackson, S.T., and J.B. Kearsley. 1998. Quantitative representation of local forest composition in forest-floor pollen assemblages. *Journal of Ecology* 86:474-490.
- Jackson, S.T., and A. Wong. 1994. Using forest patchiness to determine pollen source areas of closed-canopy pollen assemblages. *Journal of Ecology* 82:89-99.
- Kearsley, J.B. 1995. *Long-term vegetation dynamics of two forest stands in the north-central Adirondack Mountains, New York*. M.S. thesis, Northern Arizona University, Flagstaff.
- Kearsley, J.B., and S.T. Jackson. 1997. History of a *Pinus strobus*-dominated stand in northern New York. *Journal of Vegetation Science* 8:425-436.

Contact:

Stephen T. Jackson
jackson@uwyo.edu
307-761-5655

23 May 2022