Late Carboniferous Tropical Dryland Ecosystem, Joggins, Nova Scotia[1]

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Museum dioramas usually depict the Late Carboniferous tropical zone as being covered by humid rainforests composed of densely spaced tree-sized lycopsids. However, new evidence from the Langsettian fossil cliffs of Joggins, Nova Scotia suggests that this may only be half the story. At this classic site, grey coal-bearing units deposited in humid wetland coastal plain environments and containing 'normal' lycopsid-dominated rainforest vegetation are interbedded with red bed units. The red bed units, which are the focus of this paper, were deposited in seasonal dryland alluvial environment and contain an unusual floral and faunal assemblage. Depauperate floral remains in the deposits of anastomosing river channels, crevasse splays, and overbank muds are dominated by cordaite gymnosperms (*Cordaites* leaves, *Artisia* pith casts, and woody *Dadoxylon* trunks and branches; >80% of specimens). Present in subordinate numbers are pteridosperms (*Eusphenopteris*), sphenopsids (*Calamites*) and lycopsids (*Sigillaria*). A high proportion of this plant material has been charred in wildfires. Faunal remains associated with waterhole deposits in seasonally dry channels include land snails (*Dendropupa*), giant freshwater clams (*Asterodonta*) and the pelvic girdle and jaw of loxomatid reptiles. These data indicate that Late Carboniferous dryland tropical environments supported low diversity, fire-prone gymnospermous vegetation consisting mostly of shrubs or small trees inhabited by a unique fauna. At Joggins, gymnospermous dryland ecosystems repeatedly alternated with lycopsid wetland ecosystems, perhaps in response to glacial-interglacial climate rhythms.

[1]6th European Palaeobotany and Palynology Conference, Athens, Greece; *in* Abstracts with Programs, p. 80.
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