

Plant Geography —Botany 422 2017

Suggested Topics for Term Papers

Use the library system's literature search bases (e.g., *Web of Knowledge*) to find appropriate references. Some references might be provided in the lecture handouts on many of these topics. Please see Ken or Jeff about topics of your own choosing - you must have your topic approved by us by Friday, March 17, prior to Spring Break.

WORLD VEGETATION TYPES AND THEIR CLIMATIC ADAPTATION

Convergence in life forms in similar vegetation but different regions; different flora many possibilities! (giant rosette tree, bottle trees, cushion plants, very big trees of temperate rainforests, mangrove habit) - need to bring in systematic relationships

Drip tips in tropical rain forests

Biogeography of deserts

Edaphic factors in plant endemism — serpentine, etc.

Biogeography of carnivorous plants

Global climate change and plant distributions (e.g., beech)

Mediterranean sclerophyll flora — age and relationships

HISTORICAL BIOGEOGRAPHY

Defining "areas of endemism"

New cladistic/biogeographic analytical approaches

Wallace's line — What is its significance for plants?

The *Glossopteris* flora and plate tectonics

Nothofagus — Historical biogeography of the southern beeches

The greening and browning of Australia — plate tectonics and biogeography.

Historical biogeography of the Indian subcontinent — the last 100 million years.

Historical biogeography of Madagascar — the last 100 million years.

The fossil and modern distribution of relictual taxa. Choose a genus (e.g., *Metasequoia*, *Sequoiadendron*, *Ginkgo*, *Liriodendron*, *Nypa*).

Tree species diversity in Europe and North America: Is the Ice Age to blame for Europe's botanical poverty?

Phylogeography and the identification of Eurasian ice age "refugia"

Coastal and alpine Pleistocene refugia in the Pacific Northwest — effects on patterns of plant endemism, distribution, population structure

The refugium theory — hypotheses and tests in South America

The refugium theory — hypotheses and tests in Africa

DISPERSAL BIOLOGY

Seed dispersal by fish in the Amazon Basin

Baker's rule and island colonization

Types of dispersal events to the Hawaiian Islands

Molecular phylogenetic evidence favoring dispersal over vicariance explanations for widespread plant and animal distributions

Recent long distance inter-continental dispersal between tropical forests

Recent long distance inter-continental dispersal between deserts

Plants as evidence for pre-Columbian contacts between the Old and New Worlds (e.g., cotton, sweet potato)

BIOGEOGRAPHY OF ISLANDS

Krakatau and recolonization of plants and animals

Recent tests of the "Theory of Island Biogeography"

Lakes as islands - insights from aquatic plants

The relationships and origins of the tepui (Guayana Highland) flora

The relationships and origins of the Hawaiian floras (or pick a specific group)

The relationships and origins of the Australian flora today

The relationships and origins of the Malagasy (Madagascar) flora today

Relationships, origins and uniqueness of New Zealand's flora today

Relationships, origins and uniqueness of New Guinea's flora

Relationships, origins and uniqueness of New Caledonia's flora

Adaptive radiation on islands (pick a group from Hawaii, Canary Islands, etc.)

FLORISTICS AND DISJUNCTIONS

Intercontinental Disjunctions (Choose a particular pattern: e.g., Africa — South America;
North America — South America; North America — Eurasia (Amphi-Atlantic);
Eastern Asia — Eastern North America)

Molecular evidence in the study of disjunctions — many examples

Molecular data to clock date disjunctions of floras — many examples

ORIGIN AND BIOGEOGRAPHY OF NORTH AMERICAN FLORA

Cretaceous flora provinces of North America

The "tension zone" of Wisconsin, Michigan — a reanalysis

Floristic origins of the prairies (and/or plains)

Polyploidy and distribution: sorting out cause and effect

Phytogeographic relationships of Great Lakes bog (or fen) floras

The Driftless Area — Its phytogeographic specialties

Coastal plain elements in the Great Lakes flora

Western elements in Eastern North America

Phylogeographic studies of species (choose a recent set of studies on a group of related plant or animal species)

What is a "native" plant?

Road salt and pickle factories: The anthropogenic spread of halophytes

The biogeography and spread of weeds in North America or Wisconsin (choose an example: e.g., giant reed, cat tail, reed canary grass, garlic mustard, purple loosestrife, Eurasian milfoil)

EXTINCTION AND BIOGEOGRAPHY

Rates of plant species extinction in past geological eras in comparison to contemporary extinctions

Global climate change and predicted changes in forest tree species distributions