

Biogeography. Lecture 19

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Outline

Biogeography of the World

- Distribution: the basic concept

- Floristic kingdoms and faunistic provinces

- Holarctic region I: Nearctic North America



Biogeography of the World

Distribution: the basic concept



Species distribution

- ▶ Range
Restricted with climate, history and natural barriers
- ▶ Disjunction
Examples: East Asia/East Coast; Pacific (West Washington/North Idaho)
- ▶ Endemics
Every species is endemic to some region. What is important, is the size of region. There also species endemic only to Earth: cosmopolitan species like bracken fern (*Pteridium*).

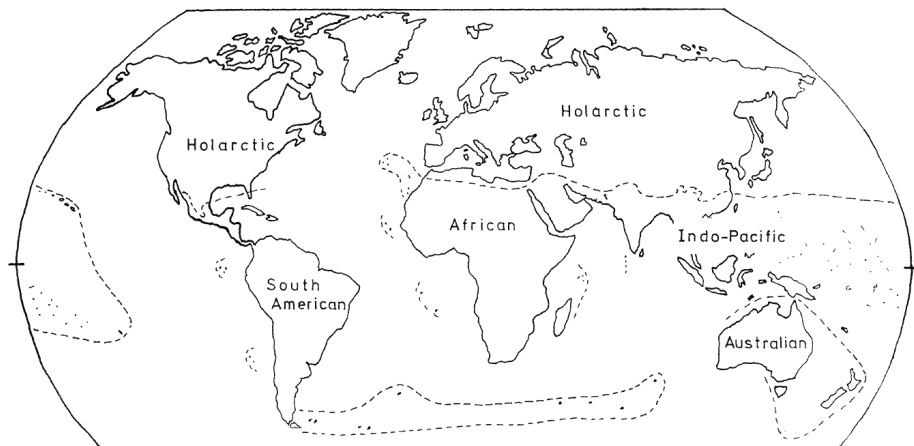


Biogeography of the World

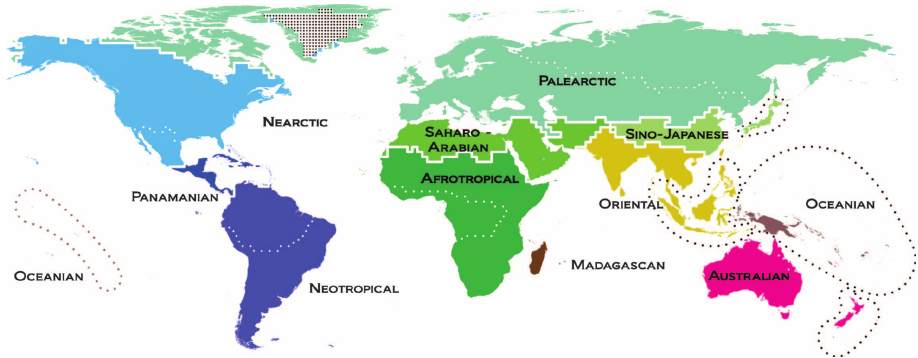
Floristic kingdoms and faunistic provinces



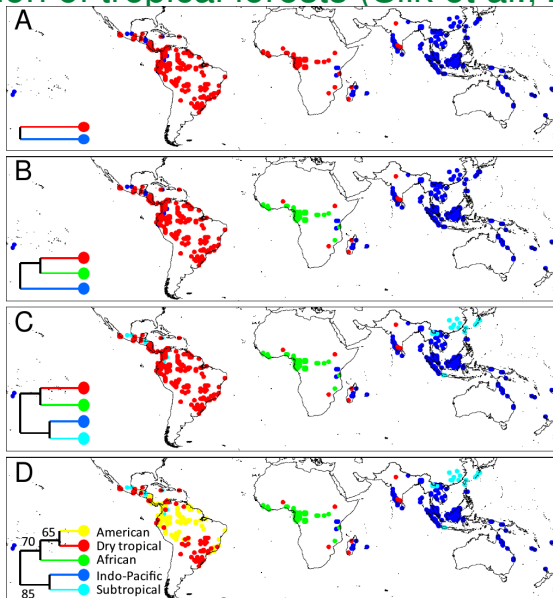
Contemporary look on plant biogeography: five kingdoms (Cox, 2001)



Contemporary look on animal biogeography: 10 provinces (Holt et al., 2013)



Classification of tropical forests (Silk et al., 2018)



Our approach: 5 regions

- ▶ Holarctic (I and II)
- ▶ Neotropical
- ▶ African and Madagascan
- ▶ Indo-Pacific
- ▶ Australian

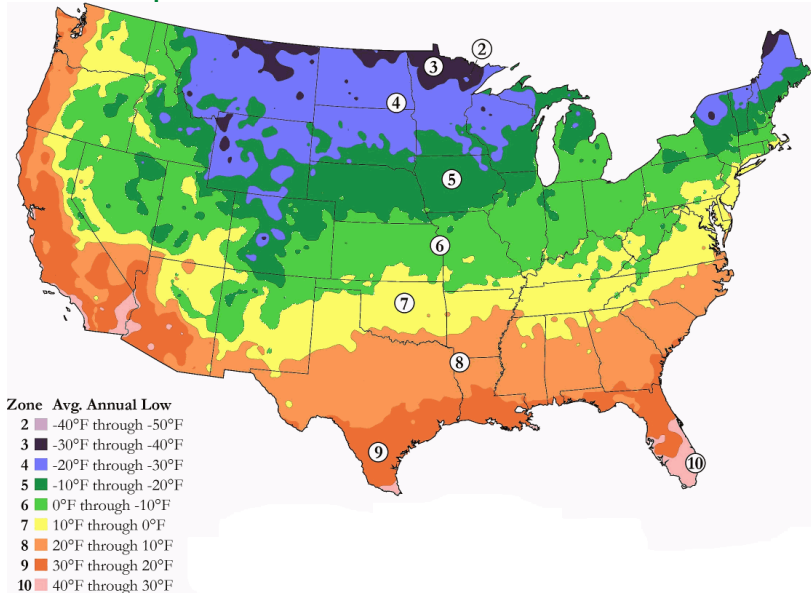


Biogeography of the World

Holarctic region I: Nearctic North America



Climate/temperatures: hardiness zones



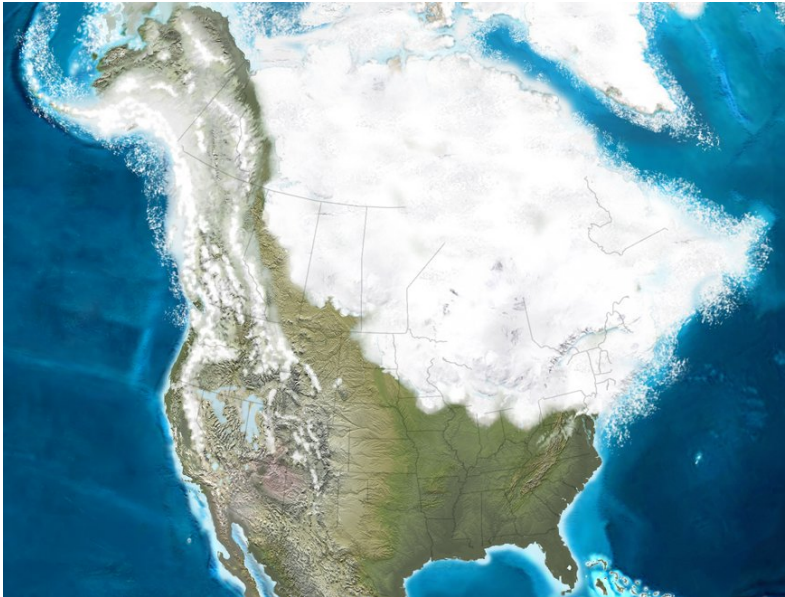
Climate/precipitation



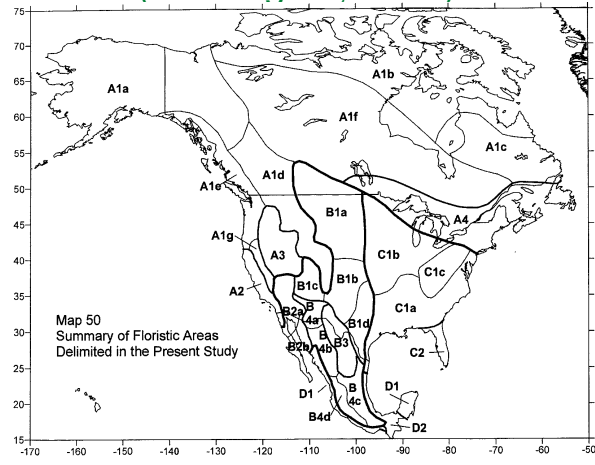
Ecoregions



Glaciation



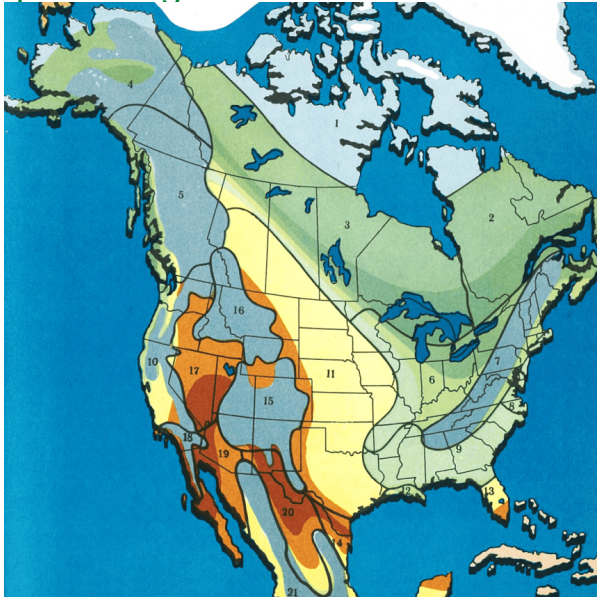
Plant distribution (McLaughlin, 2007)



Map 50. Floristic areas of North America delimited in this study: Northern Region (A), Cordilleran-Arctic Province (A1), Alaskan Subprovince (A1a), Eskimoan Subprovince (A1b), Labradorian Subprovince (A1c), Rocky Mountain Subprovince (A1d), Vancouverian Subprovince (A1e), Hudsonian Subprovince (A1f), Sierra Nevada Subprovince (A1g), Californian Province (A2), Great Basin Province (A3), Canadian Province (A4); Southwestern Region (B), Great Plains Province (B1), Saskatchewan Subprovince (B1a), Kansan Subprovince (B1b), Colorado Plateau Subprovince (B1c), Comanchian Subprovince (B1d), Sonoran Province (B2), Mojavian Subprovince (B2a), Sonoran Subprovince (B2b), Chihuahuan Province (B3), Madrean Province (B4), Apachian Subprovince (B4a), Sierra Madre Occidental Subprovince (B4b), Central Mexican Highlands Subprovince (B4c), Novogalician Subprovince (B4d); Eastern Region (C), Carolinian Province (C1), Austroriparian Subprovince (C1a), Illinoian Subprovince (C1b), Appalachian Subprovince (C1c), Floridian Province (C2); and Neotropical Region (D), Dry Neotropical Province (D1), Humid Neotropical Province (D2).



Biogeographical regions



North America: 21 region

1. Arctic Islands and Greenland
2. Labrador, Sr. Lawrence Valley
3. Canadian Northwest
4. Alaska
5. Yukon and British Columbia
6. Great Lakes and Central Lowlands
7. Appalachians
8. East Coast
9. Coastal Lowlands
10. Central Pacific Coast Ranges
11. Great Plains
12. Mississippi delta
13. South Florida
14. South Texas
15. South Montane region
16. North Montane region
17. Great Basin
18. Southern California
19. Sonora
20. Chihuahua
21. Mexican Sierras



Region 1. Tundra

- ▶ Very similar to Eurasia, almost all species are same
- ▶ Few mammals (reindeer, musk ox, lemmings), only migratory birds, no reptiles and amphibians
- ▶ Forest border is supported mostly by lowest temperatures and permafrost
- ▶ Lichens and mosses are more competitive than flowering plants



Regions 2 and 3. Taiga: boreal conifer forests

- ▶ Again, very similar to Eurasia
- ▶ Typical trees: deciduous *Larix* (larch) and evergreen *Picea* (spruce); North American boreal forests are richer than Eurasian.
- ▶ Forest interleaves with “muskegs”, swampy areas shaped mostly by peatmoss (*Sphagnum* spp.)
- ▶ Food chains are based on large herbivores (deers, moose, elks).
- ▶ Many warm-blood vertebrates will follow the **Bergman rule**: representative of northern species are bigger, and representatives of tropical species are smaller.
- ▶ Plus fact which is still unexplained: for some reason, American species of many genera are bigger in size than Eurasian (moose, bears, beavers and many others including plants)



Regions 4 and 5: wet northwest

- ▶ Anomalous high temperatures and precipitation rates. **However:** almost no rain in July-September so broadleaved trees are not surviving there.
- ▶ Flora and fauna have many connections with Siberia and Eurasian East due to Beringian landbridge. However, some elements (like porcupines) are clearly Neotropical.
- ▶ Rich coastal life: salmon, seabirds, bears, walruses, sea otters (the only species of marine weasels)
- ▶ Vast amount of conifer species, e.g. different cedars like *Pseudotsuga*; and ferns



Sea otter (*Enhydra lutris*)



Some Alaskan photos

http://msubiology.info/shipunov/ph/20140810_ak/



For Further Reading



I. Sanderson.

The Continent We Live On.

1961.

Mode of access: [http:](http://www.biodiversitylibrary.org/item/71734#page/7/mode/1up)

[//www.biodiversitylibrary.org/item/71734#page/7/mode/1up](http://www.biodiversitylibrary.org/item/71734#page/7/mode/1up)



North America.

http://en.wikipedia.org/wiki/North_America



A. Shipunov.

Biogeography [Electronic resource].

2014—onwards.

Mode of access: http://ashipunov.info/shipunov/school/biol_330



A. Shipunov.

Introduction to Biogeography and Tropical Biology [Electronic resource].

2017—onwards.

Mode of access: [http://ashipunov.info/shipunov/school/biol_330/
intr_biogeogr_trop_biol/intr_biogeogr_trop_biol.pdf](http://ashipunov.info/shipunov/school/biol_330/intr_biogeogr_trop_biol/intr_biogeogr_trop_biol.pdf)

