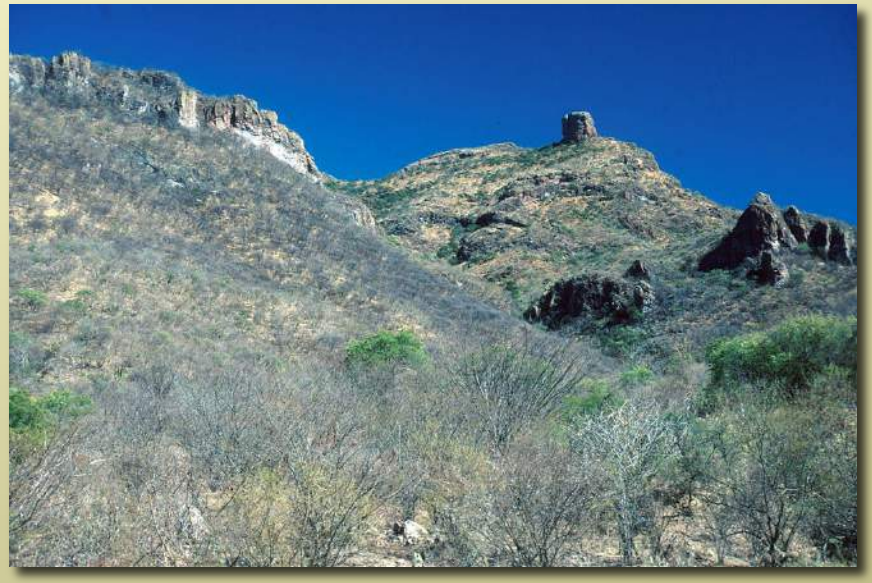
Temperate Deciduous Forests

Temperate Deciduous Forests

- evolution of “deciduous” habit

Most agree that the “deciduous” habit first arose as an adaptation in response to winter aridity in the subtropical forests - reduce water demand by shedding leaves



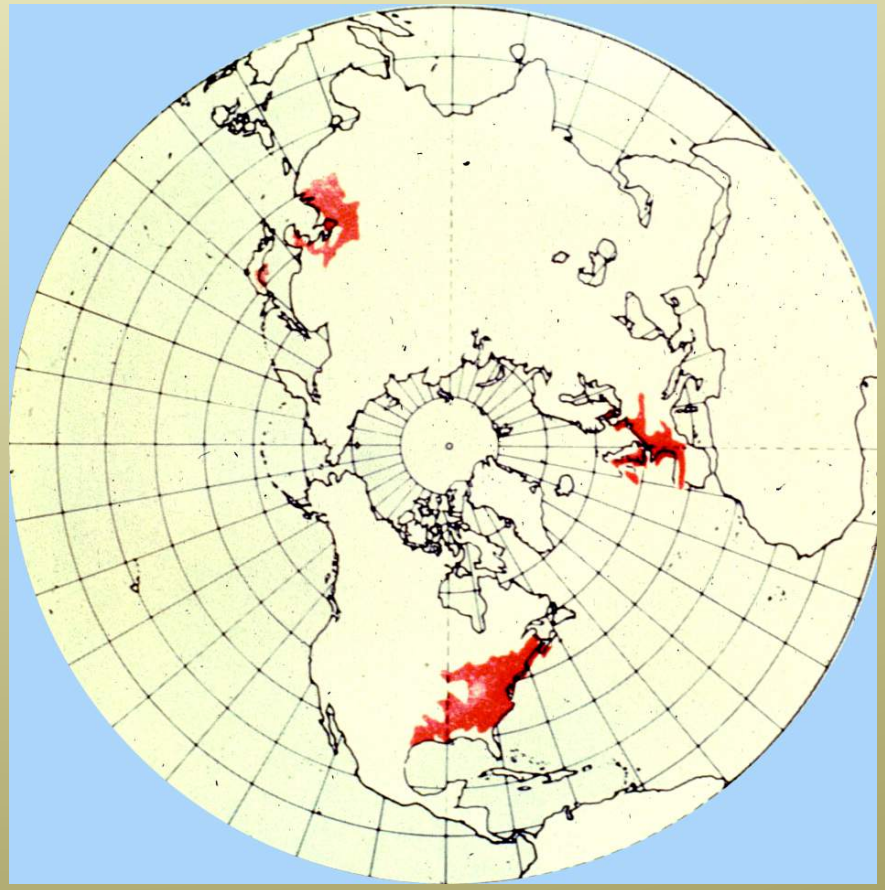
Winter brown

Subtropical dry forest of Mexico

Summer green

Temperate Deciduous Forests

- evolution of “deciduous” habit in temperate regions is a response to winter cold - loss of thin deciduous leaves in winter represents a saving of material as compared with the freezing of thick evergreen leaves



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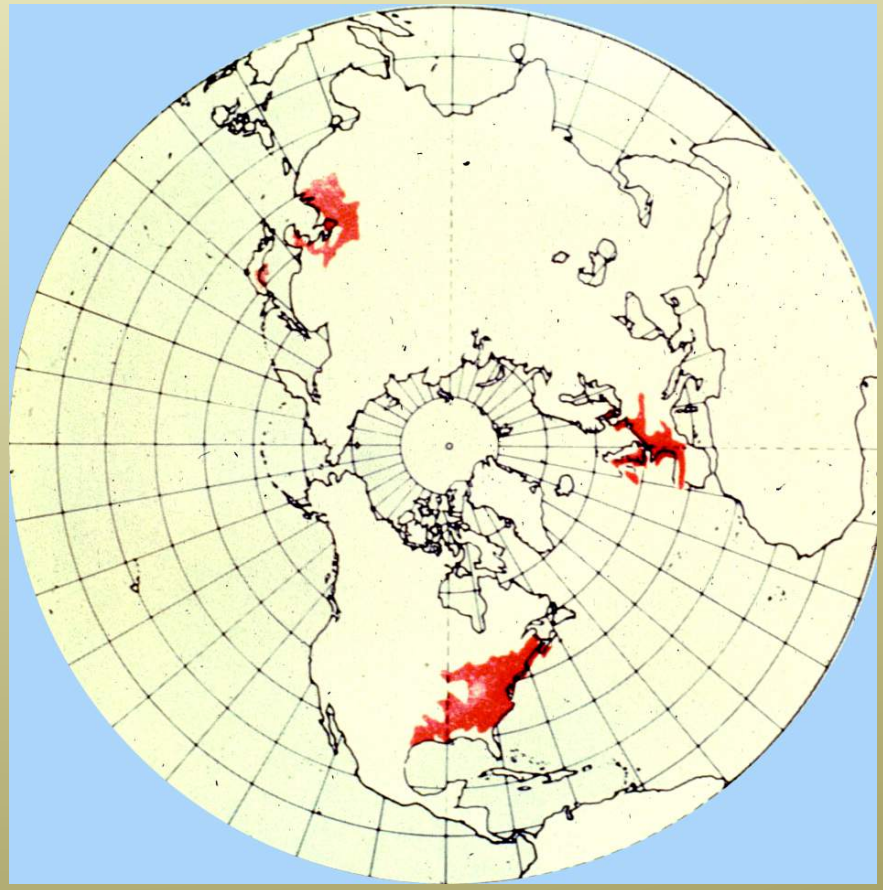


Map of fall colors around the northern hemisphere

Temperate Deciduous Forests

Acer (maples) in southern Indiana

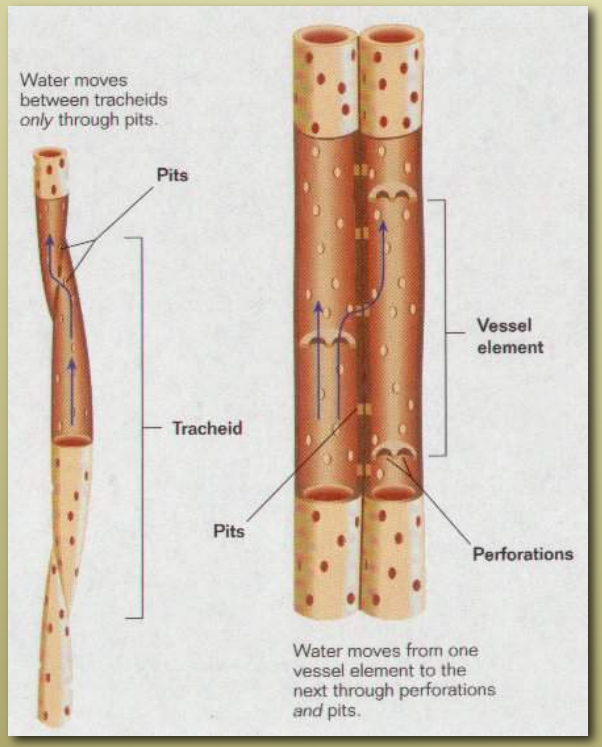
- a gradient from “evergreen” to mixed “evergreen-deciduous” to “deciduous” forests from SE USA to upper Midwest

Rhododendron in Roan Mt., Tennessee

Live oak evergreen forest, South Carolina

Temperate Deciduous Forests

- further north and west, angiosperms with water-efficient but freezing-sensitive vessels elements lose out to less efficient, slower-growing, but more freeze-tolerant gymnosperms with tracheids only

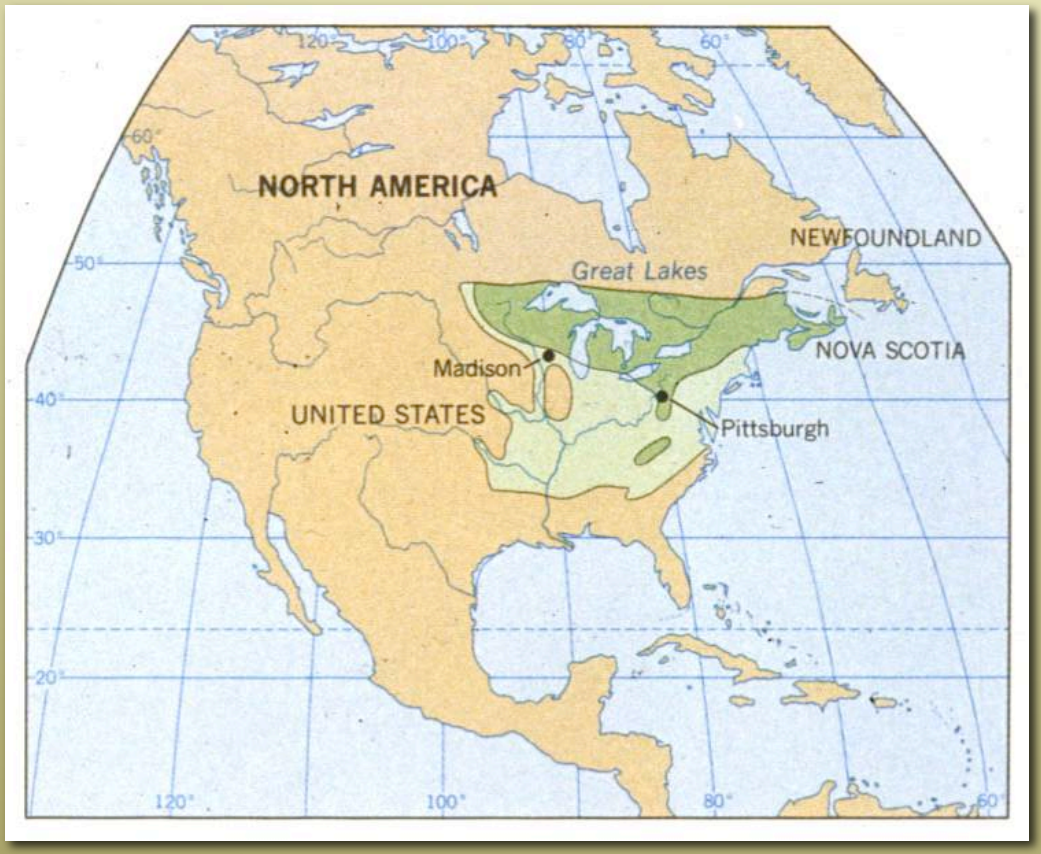


Boreal forest, upper Michigan

Temperate Deciduous Forests

- three main floristic regions in Northern Hemisphere

(small size of continents at this latitude in S. Hemisphere precludes effective formation)



- eastern North America: north of temperate (subtropical) evergreen forest and south of boreal forest

deciduous

mixed deciduous/boreal

Temperate Deciduous Forests

- three main floristic regions in Northern Hemisphere

(small size of continents at this latitude in S. Hemisphere precludes effective formation)

- western and central Europe:

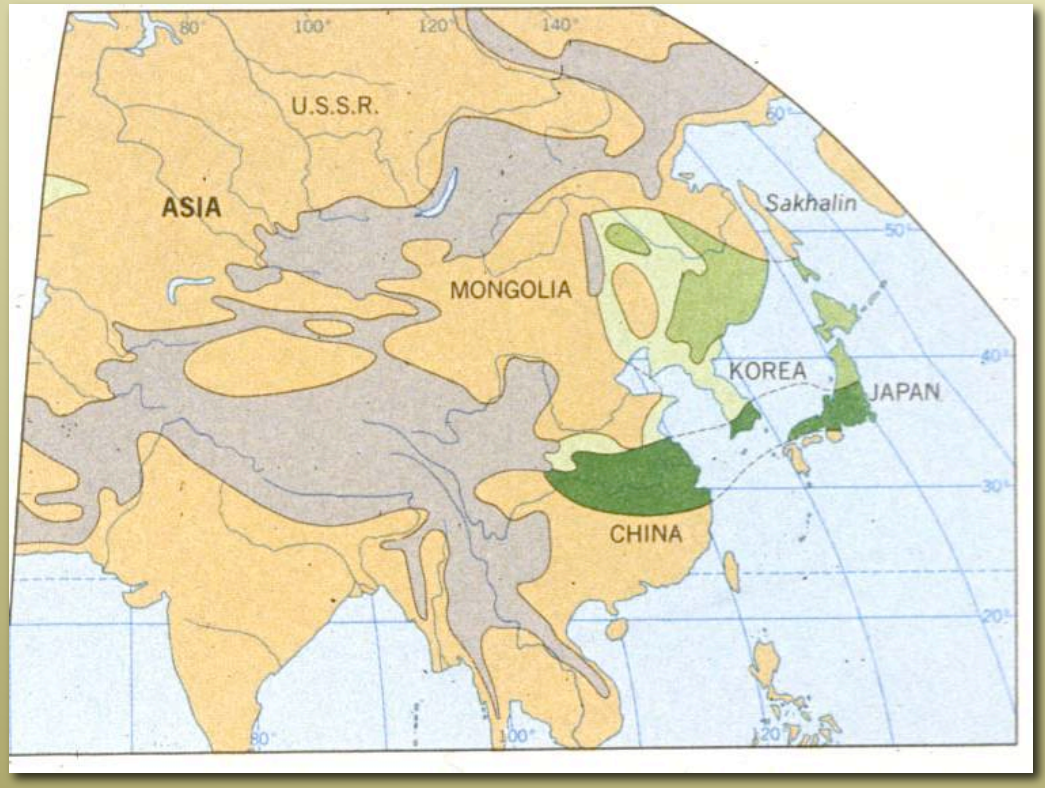
deciduous

mixed deciduous/boreal

Temperate Deciduous Forests

- three main floristic regions in Northern Hemisphere

(small size of continents at this latitude in S. Hemisphere precludes effective formation)



- eastern Asia: north of temperate (subtropical) evergreen forest

deciduous

mixed deciduous/boreal

evergreen

Temperate Deciduous Forests

- dense shade cast by canopy by mid-summer

- trees with unisexual flowers in aments/catkins before leafing out - wind pollinated

- one-seeded dry fruits - wind or animal dispersed

Temperate Deciduous Forests

- dense shade cast by canopy by mid-summer

- reduces shrub layer diversity

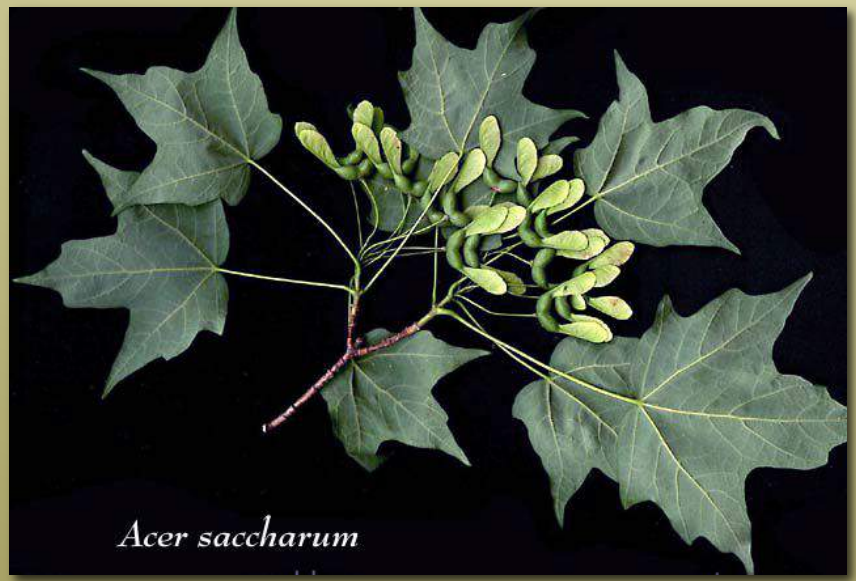
- increases geophyte ("spring ephemeral") diversity with similar adaptations of early flowering, large broad leaves, fleshy fruits

Trillium and *Arisaema* (jack-in-the-pulpit) convergence

Temperate Deciduous Forests

- eastern North America flora- more on floristic relationships among three regions later

Acer - sugar maple: the most dominant of the deciduous forest trees



Temperate Deciduous Forests

- eastern North America flora

Fagus - American beech

Temperate Deciduous Forests

- eastern North America flora

Ulmus - American elm

Aesculus - buckeye

Temperate Deciduous Forests

- eastern North America flora

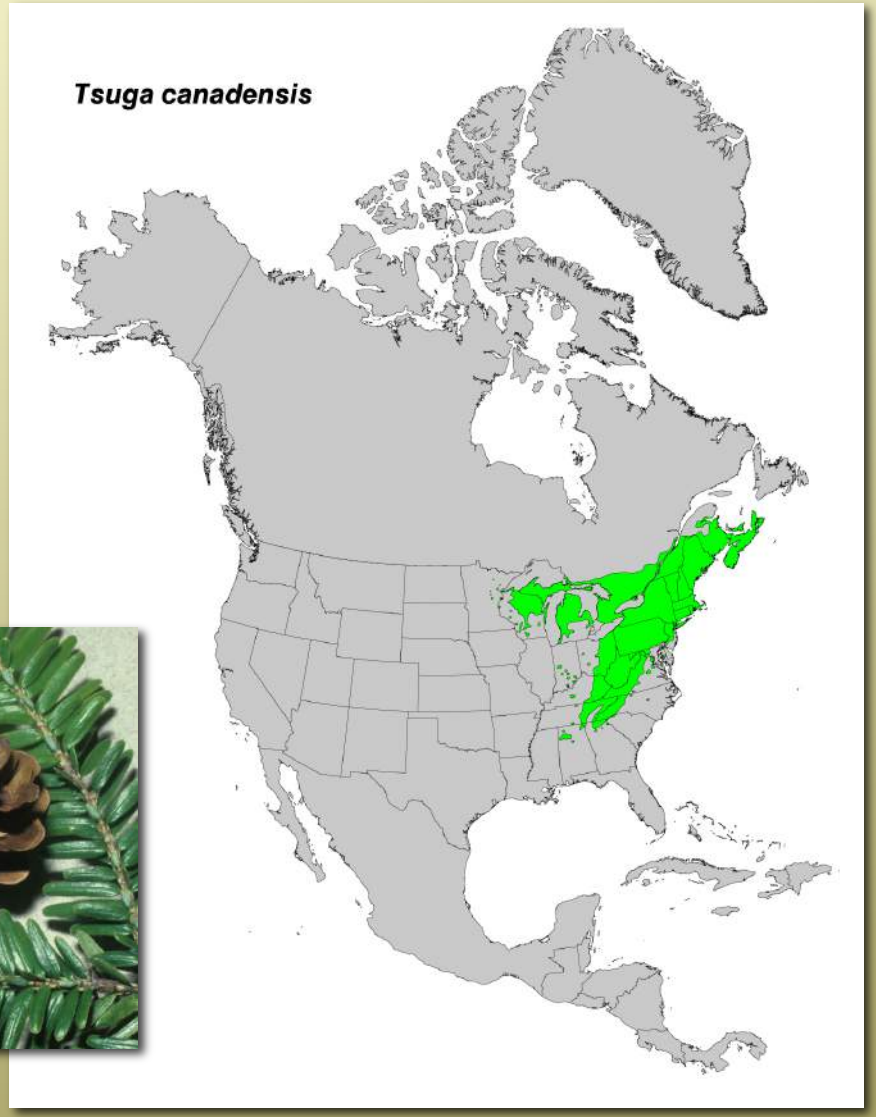
Carya - shagbark hickory

Quercus - oak

Temperate Deciduous Forests

- eastern North America flora

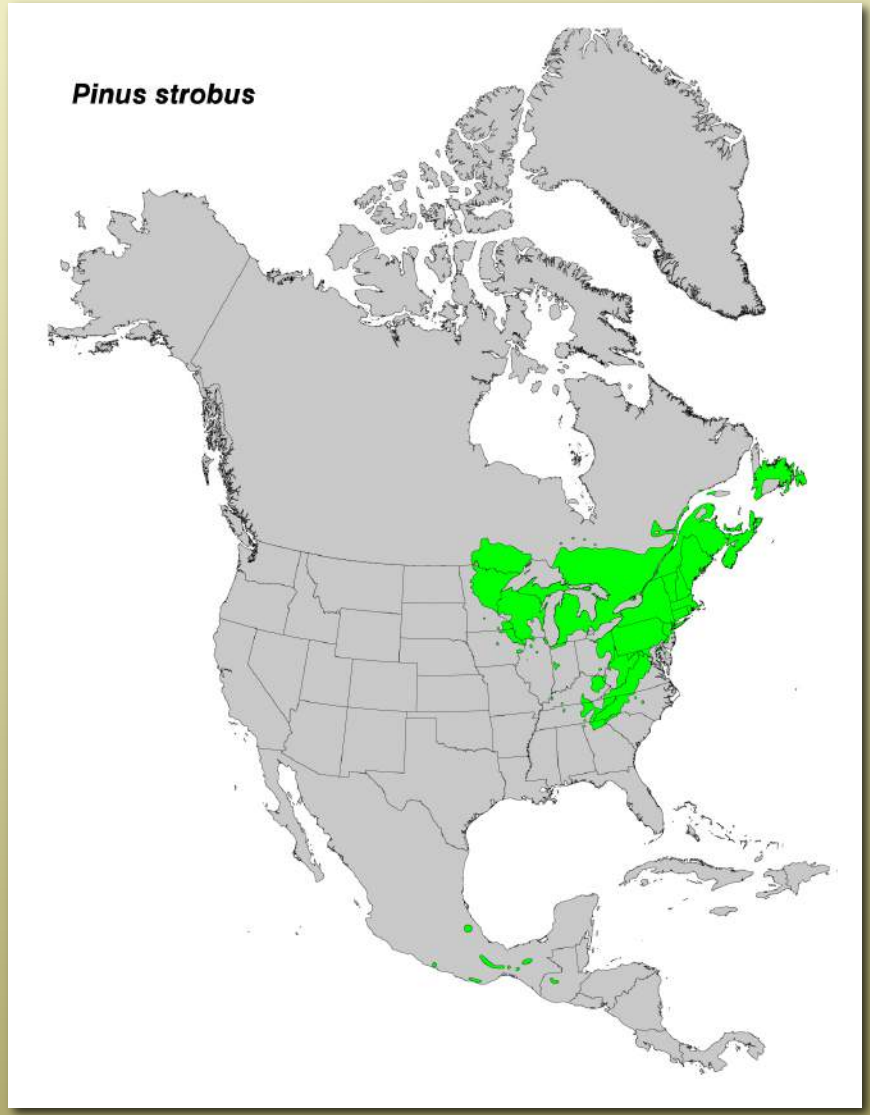
Tsuga canadensis (American hemlock) - one of several evergreen gymnosperms



Temperate Deciduous Forests

- eastern North America flora

Pinus strobus (white pine) - one of several evergreen gymnosperms



Temperate Deciduous Forests

- eastern North America flora

Papaveraceae - Dutchman's breeches

Ranunculaceae - baneberry

Berberidaceae - mayapple

Temperate Deciduous Forests

- eastern North America flora

“Liliaceae” - trout lily & trillium

Temperate Deciduous Forests

- eastern Asia flora - share genera but more diverse overall

Liriodendron chinense

eastern Asia

Liriodendron tulipfera
Tulip tree, Magnoliaceae

eastern North America

Temperate Deciduous Forests

- eastern Asia flora - share genera but more diverse overall

Podophyllum hexandra

eastern Asia

Podophyllum peltatum
Mayapple, Berberidaceae

eastern North America

Temperate Deciduous Forests

- western Europe flora - share some genera but less diverse overall

Fagus sylvatica - European beech

Aesculus hippocastanum - horsechestnut (Balkans)