Chafer Conference Message # 2:

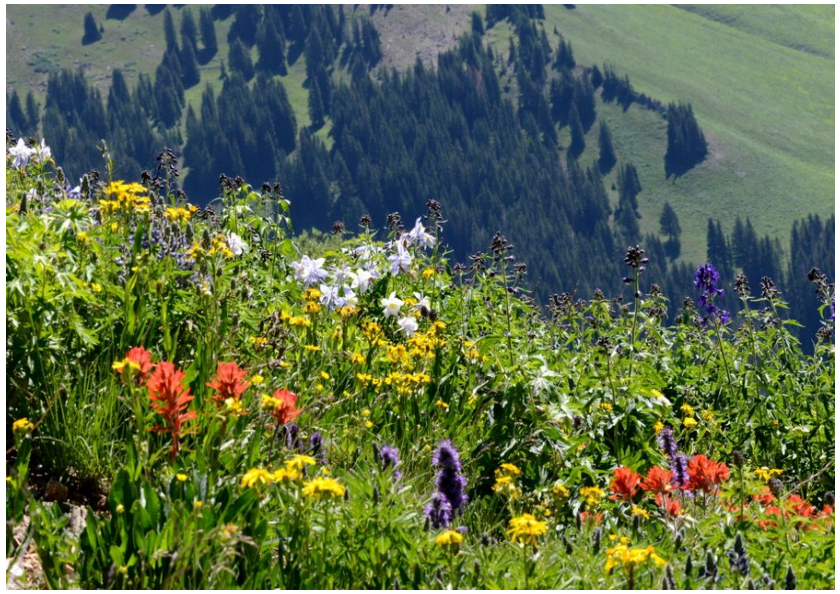
God Values Variety: Diverse Animals & Habitats Show God's Glory:

Biodiversity with Biogeography; Doxological Zoölogy & Biome Ecology; etc.

28 And why take ye thought for raiment? Consider [καταμαθετε = “intensely/thoroughly learn/study”] the lilies [κρινα = “wildflowers”] of the field [αγρου], how they grow [αυξανει = “they grow up”]; they toil not, neither do they spin. 29 And yet I say unto you, that even Solomon in all his glory was not arrayed [περιεβαλετο] like one of these. 30 Therefore, if God so clothe [αμφιεννυσιν] the grass [χορτον] of the field [αγρου], which today is, and tomorrow is cast into the oven, shall He not much more *clothe* you, O ye of little faith? **(**Matthew 6:28-30**)**

KATAMATHETE = 2nd person plural imperative aorist of KATAMANTHANÔ (KATA + MANTHANÔ, “to learn”, “to study”, i.e., to do the action of a MATHÊTÊS / MATHÊTRIA “disciple”)

[27] Consider [κατανοησατε = “intensely/thoroughly mind/think through”] the lilies [κρινα = “wildflowers”] how they grow [αυξανει = “they grow up”]; they toil not, they spin not; and yet I say unto you, that Solomon in all his glory was not arrayed [περιεβαλετο] like one of these. [28] If then God so clothes [αμφιεννυσιν] the grass [χορτον], which is today in the field [αγρω], and tomorrow is cast into the oven; how much more will He *clothe* you, O ye of little faith? **(Luke 12:27-28)**



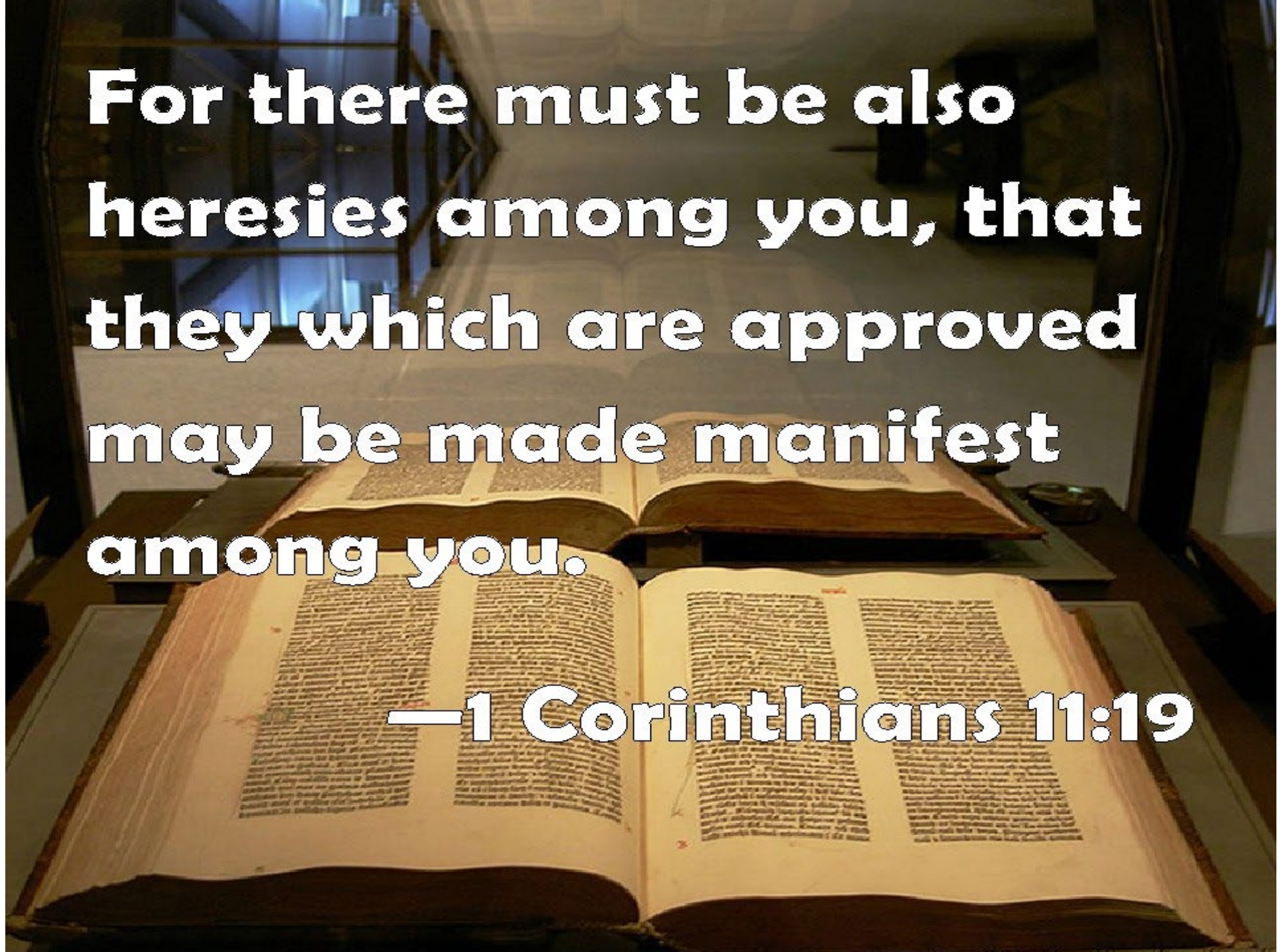
Bluebonnets & Indian paintbrushes


www.ImagesFromTexas.com

Beauty never leaves the leaves!

Maple trees – in rainbow colors!

Autumn is like a trial of human character; what *was* hidden within *is* revealed outside.

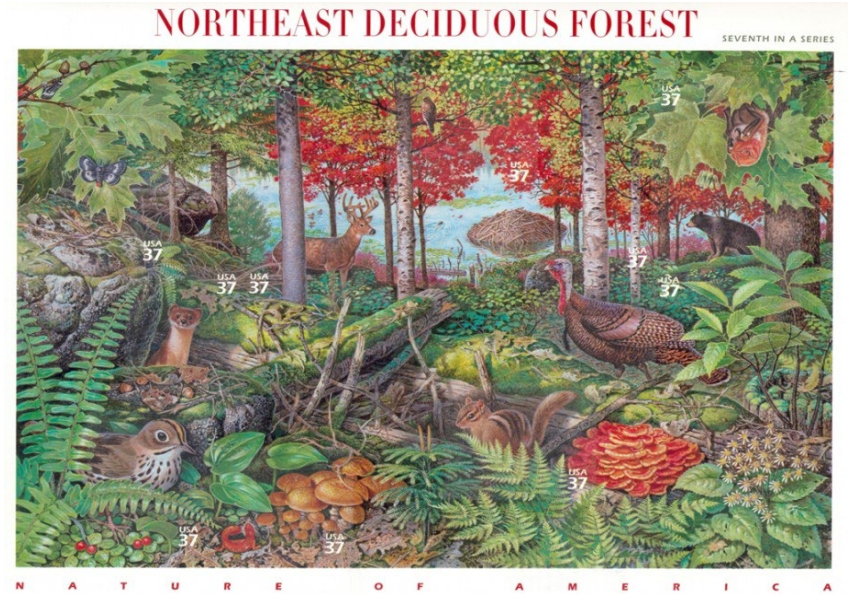

For there must be also heresies among you, that they which are approved may be made manifest among you.
—1 Corinthians 11:19

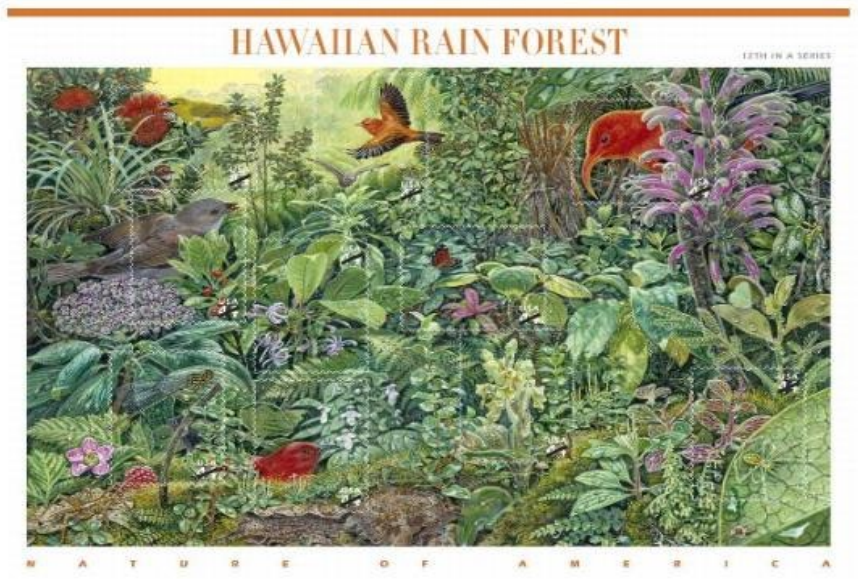
Forests provide biodiversity

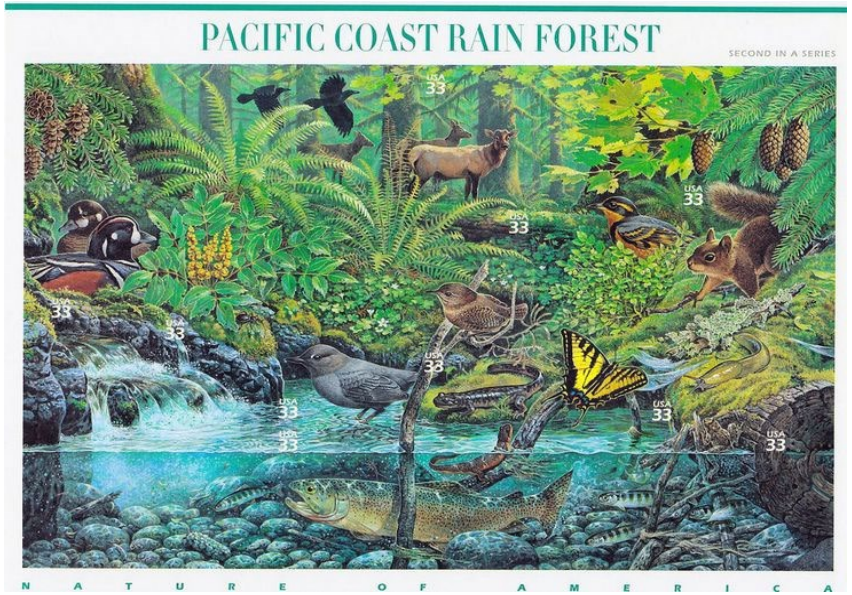
- Forests contain a greater diversity of wildlife than any other terrestrial biome

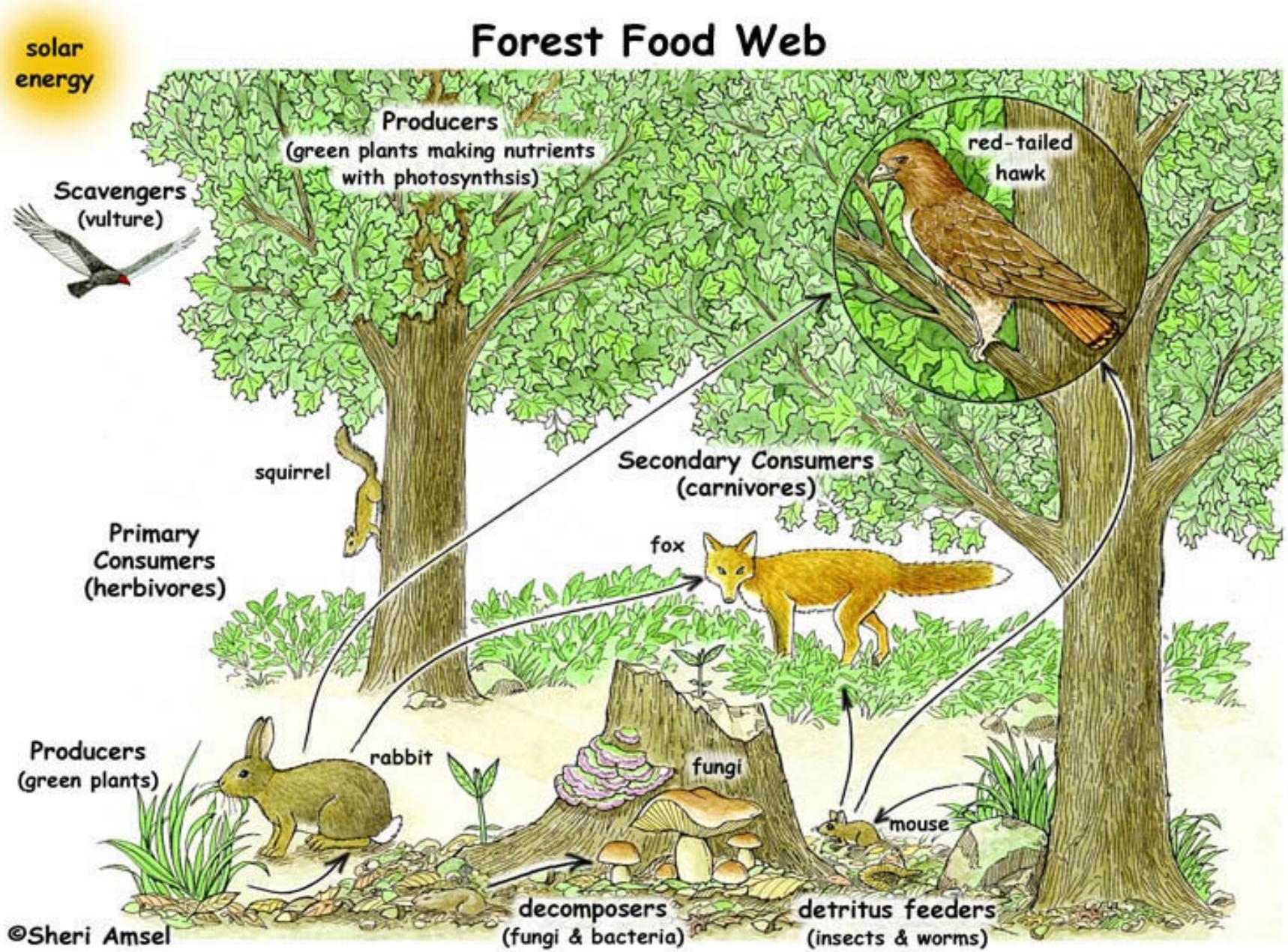
Eastern Forests include permanent or seasonal habitats for various wildlife.

U.S. Postal Service: Forest Ecology Stamps!

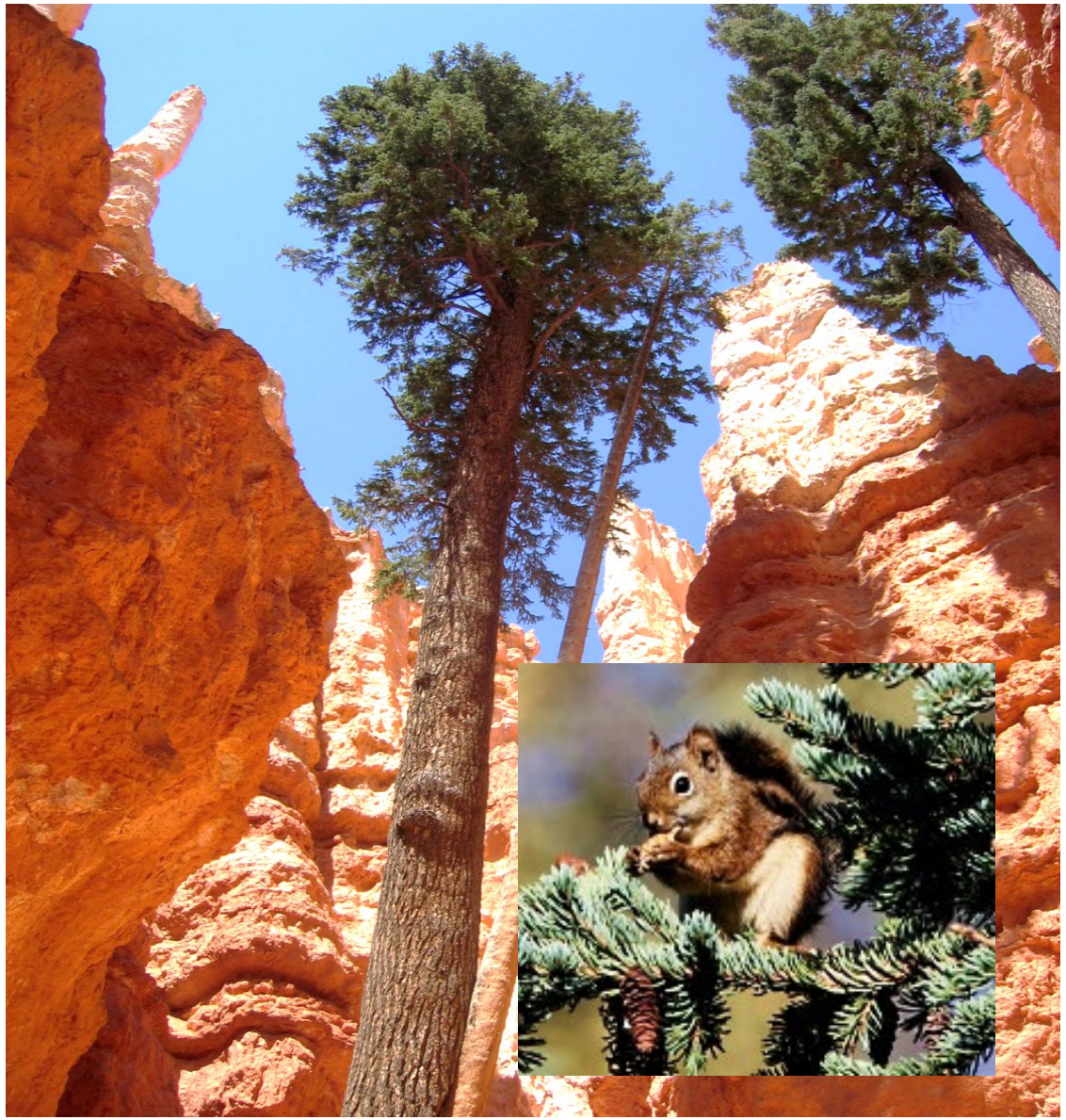







Forest Food Web
solar energy
Producers
(green plants making nutrients with photosynthsis)
Scavengers
(vulture)
red-tailed hawk
squirrel
Secondary Consumers
(carnivores)
Primary Consumers
(herbivores)
fox
Producers
(green plants)
rabbit
fungi
mouse
decomposers
(fungi & bacteria)
detritus feeders
(insects & worms)
©Sheri Amsel

"**Red squirrels** [*who plant conifer seeds and spread fungus spores in Bryce Canyon*] harvest a mushroom-like fungus attached to Douglas fir roots. In [*mutual aid*] exchange for living on the sugars in the fir roots, the hair-like filaments of the fungus greatly extend the Douglas fir's ability to absorb water and [soil] nutrients. The squirrels, fungus, and fir trees all live [like good neighbors] in a wonderful cooperative interdependence." Michael Oard, Tom Vail, Dennis Bokovoy, & John Hergenrather, ***Your Guide to Zion and Bryce National Parks, A Different Perspective***, page 118.

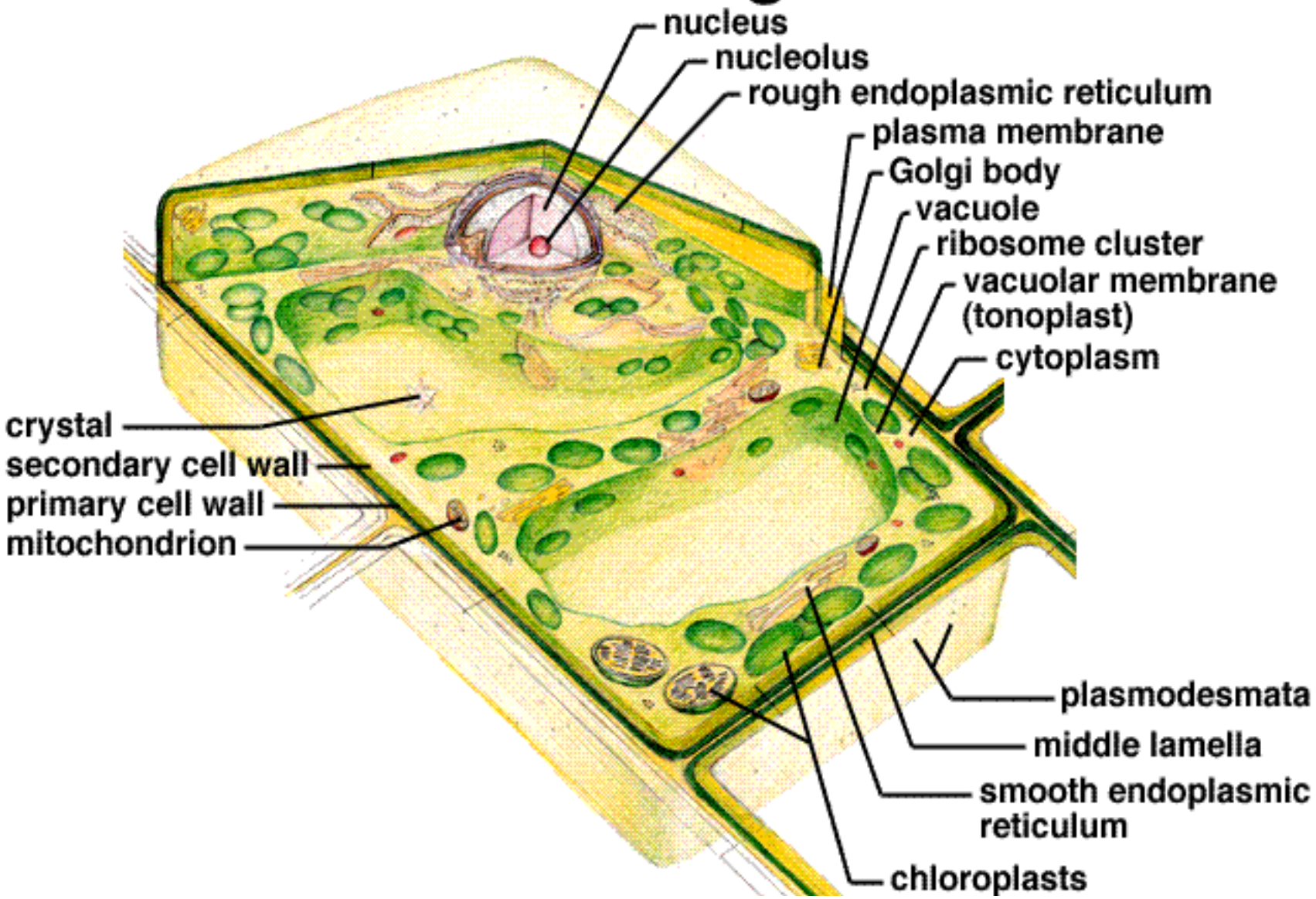


The tree grew, and was strong, and the height thereof reached unto heaven, and the sight thereof to the end of all the earth. The leaves thereof were fair, and the fruit thereof much, and in it was food for all: the beasts of the field had shadow under it, and the fowls of the heavens dwelt in the boughs thereof, and all flesh was fed of it. (**Daniel 4:11-12** [*numbered as* 4:8-9 *in BA text*])

What good are trees?

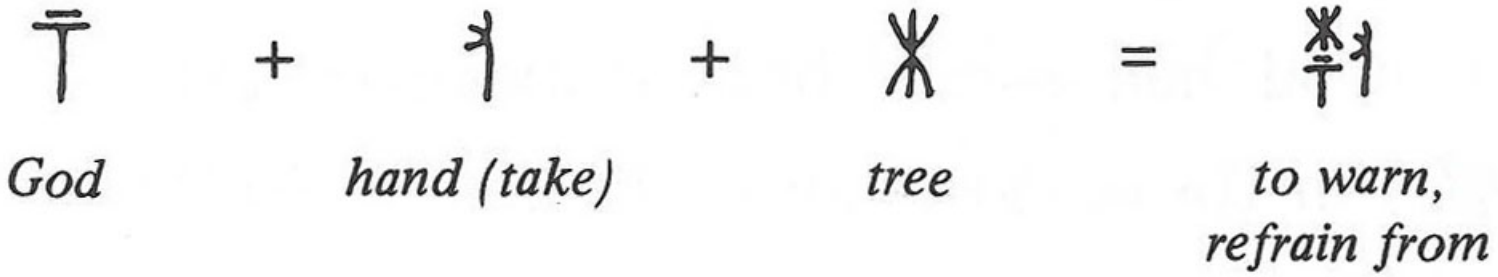
- Provide wood for **timber** (i.e., wood products)
- Provide **shelter/homes** for animals (incl. bugs)
- Provide **edible** fruit, nuts, sap (e.g., maple syrup)
- Provide **wind**-breaks & reduce soil **erosion**
- Provide CO_2 (& carbs) via photosynthesis
- Root systems are part of **nitrogen cycle, etc.**
- Provide **shade** & cooler **temperatures**
- Provide **elevation sites** for aerial viewpoints

A Leaf Cell Diagrammed



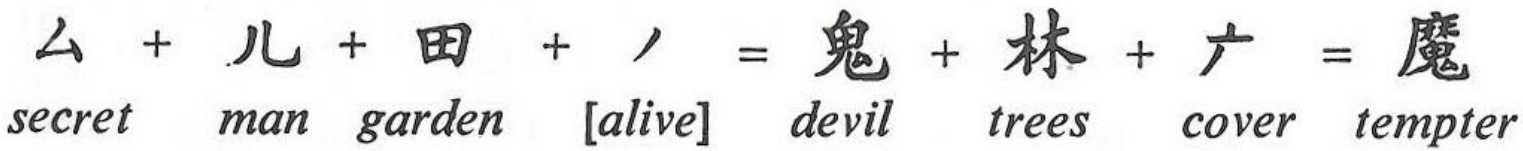
Genesis 2

God warns Adam.



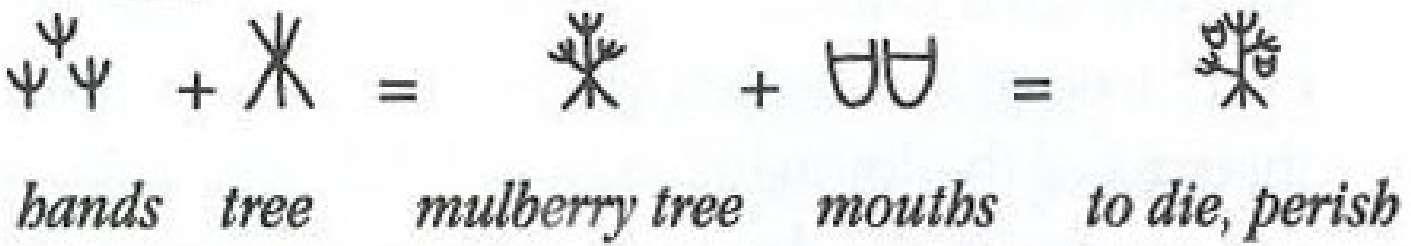
Genesis 3

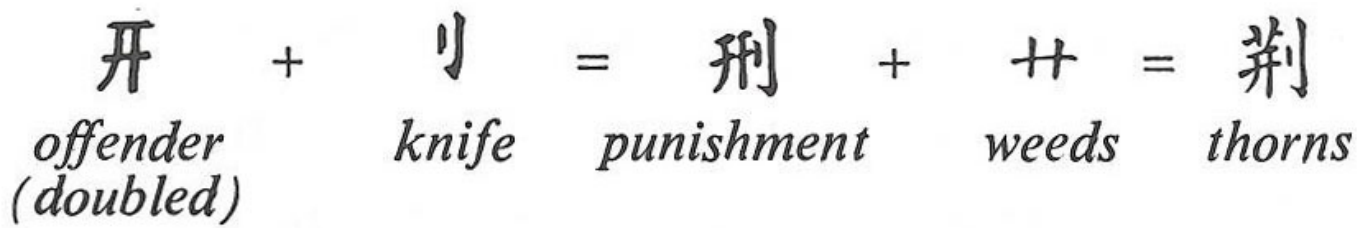
Adam and Woman are tempted.



Genesis 3

Adam and Woman are punished.

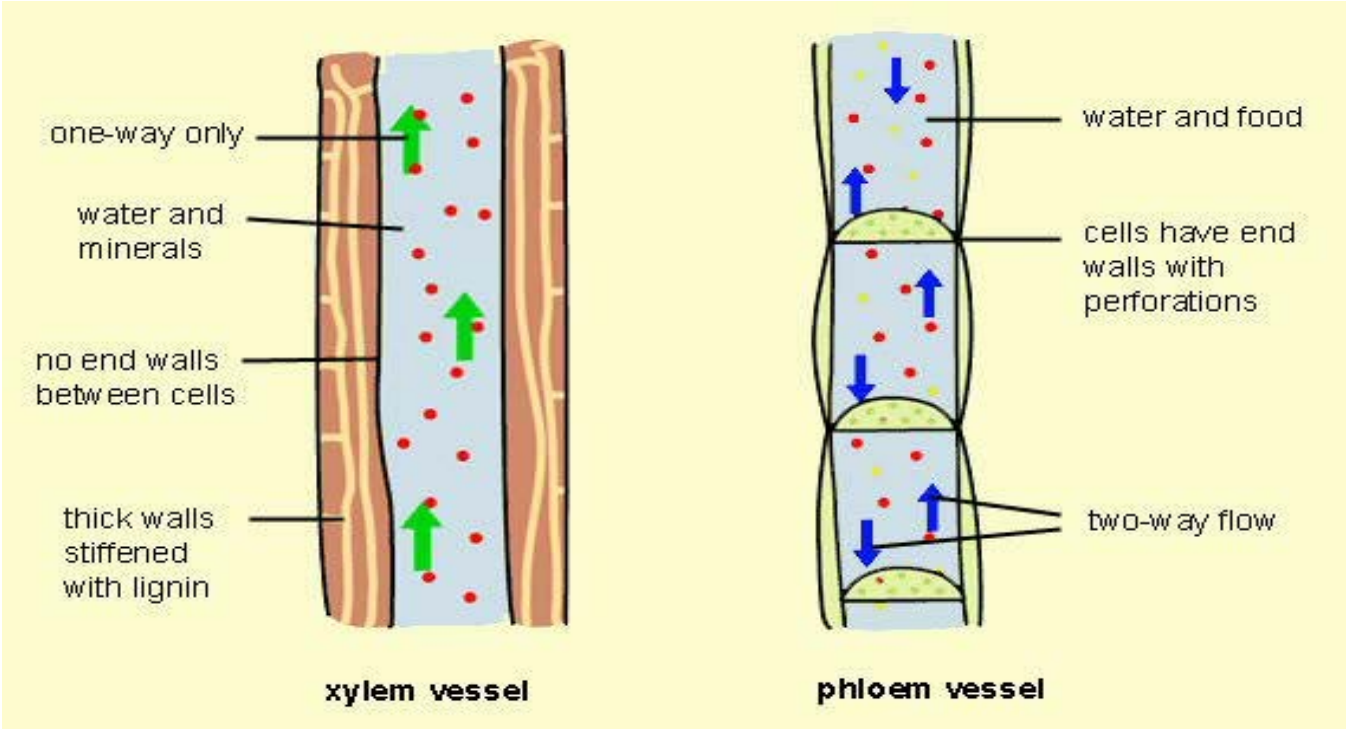




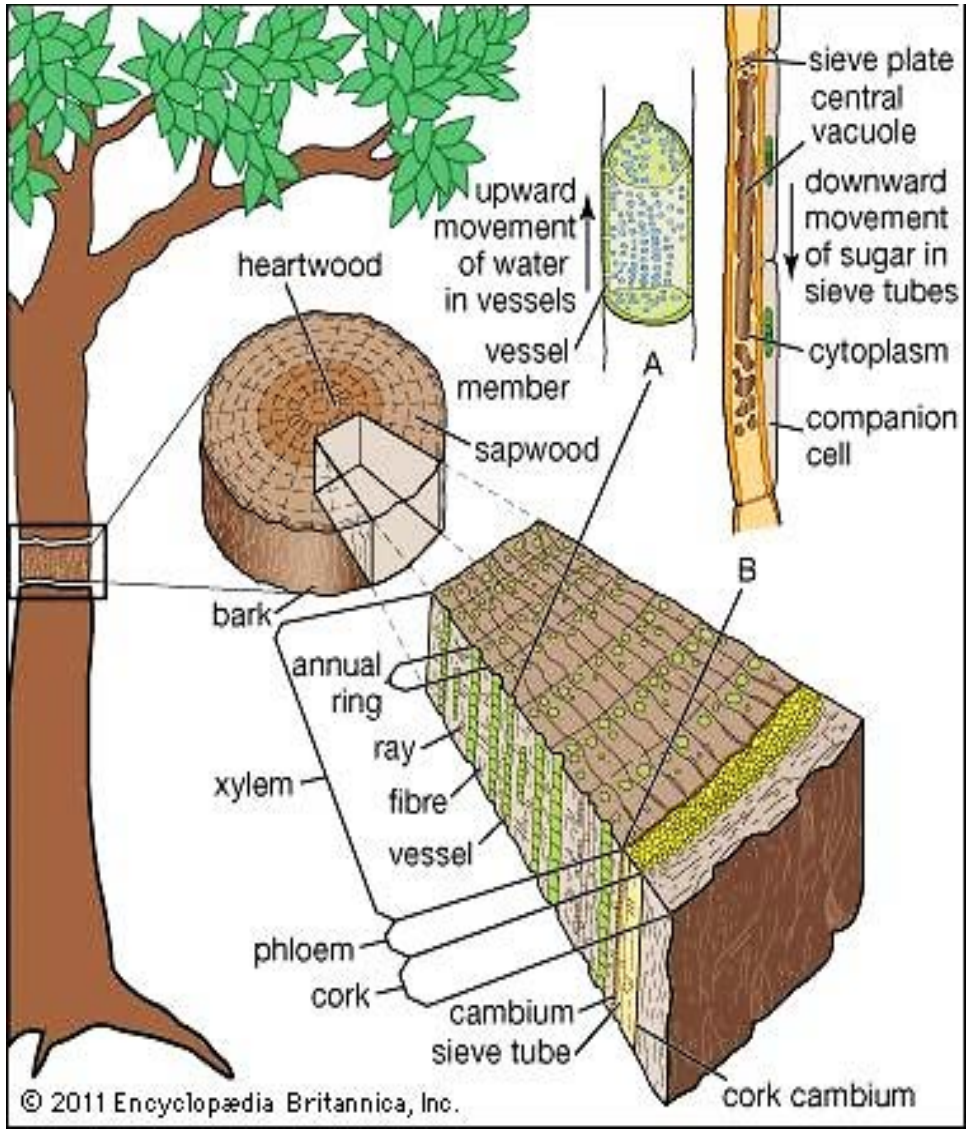
"And he shall be like a tree planted by the rivers of water, that bringeth forth his fruit in his season; his leaf also shall not wither; and whatsoever he doeth shall prosper."

Psalms 1:3 (KJV)

"A tree's internal 'plumbing' system may at first appear uncanny, enabling it to lift water for more than a hundred meters [i.e., > 300 feet high] to the top of the tallest tree or out into widely spreading branches and thousands of leaves and then to carry liquids back again to the trunk and roots." [In fact, it is much more than uncanny – it is miraculous, blending software and hardware that God put into the original trees on Day #3 of Creation Week, notwithstanding the willful ignorance of evolutionists to the contrary! -- JJSJ] [*Quoting from* Ann & Myron Sutton, ***WILDLIFE OF THE FORESTS*** (Chanticleer Press, 1979), page 25.]



“Water containing dissolved minerals rises to the leaves, where sugar[s] and protein[s] are manufactured with the help of solar energy and then taken back down to nourish the stem and roots. This transfer happens principally in the trunk, and in most trees only near the outer surface of that trunk. A thin film of living cells called the **cambium** layer supports several kinds of action: the inside of this cambium sheath, toward the center of the tree, consists of a network of tubes, the **xylem**, through which water rises. Outside the cambium sheath, just under the bark, another system of tubes called the **phloem** carries food-filled liquids [i.e., sap] downward. [*Quoting* Ann & Myron Sutton, ***WILDLIFE OF THE FORESTS*** (Chanticleer Press, 1979), page 25.]

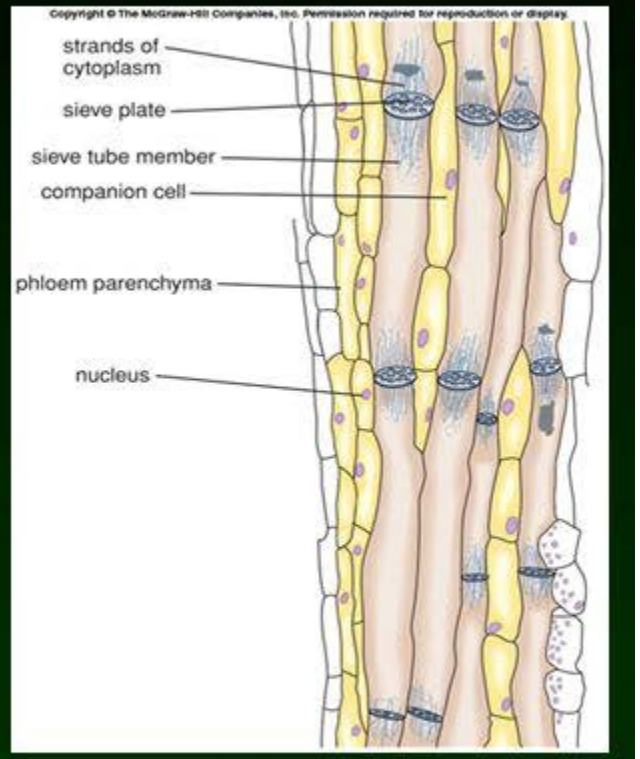


Plant equivalent to blood-clotting

Tissues Produced By Meristems

Complex Tissues

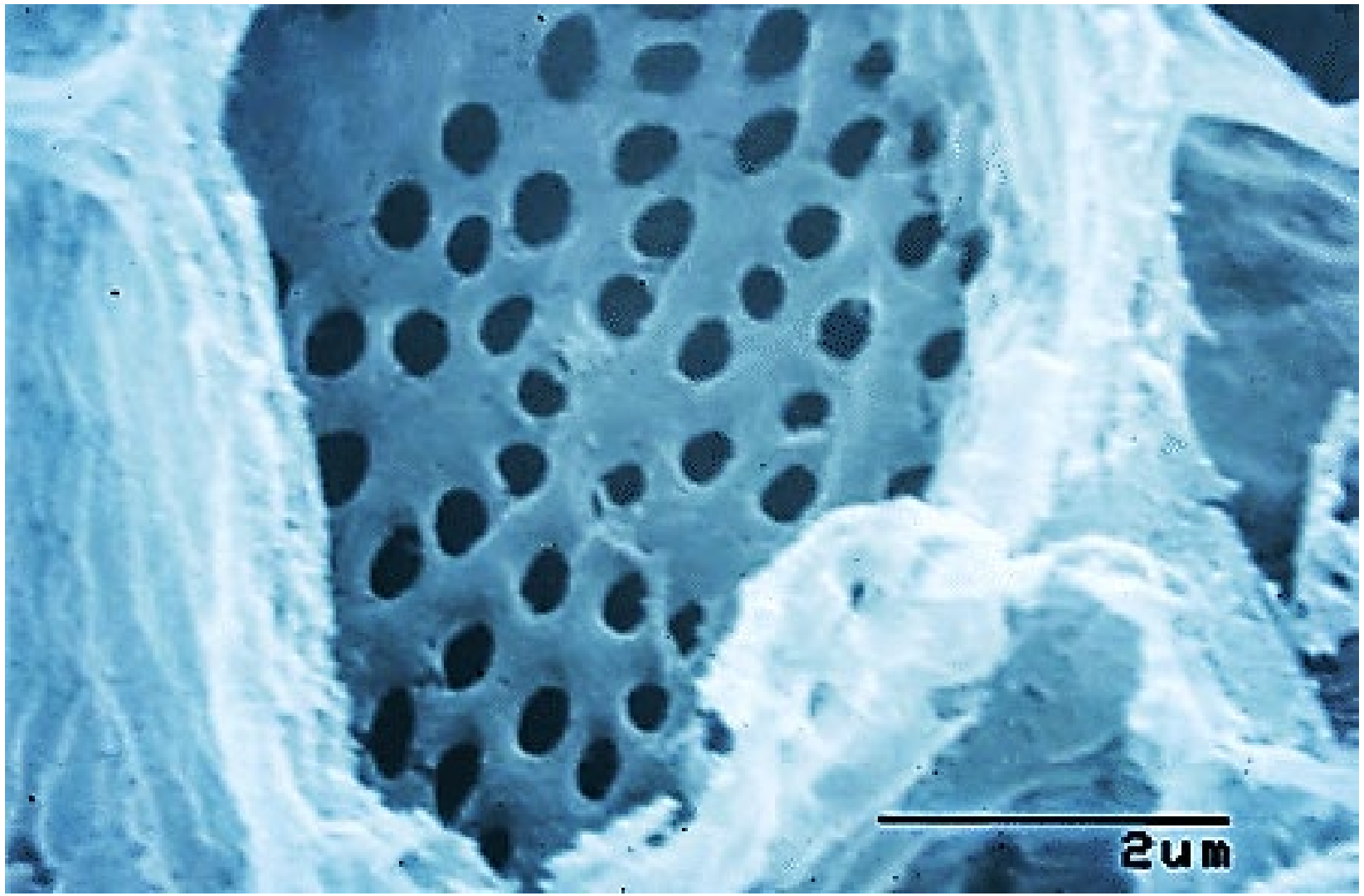
- Sieve Tube Members:
  - Lack secondary cell walls and nuclei
  - Lay end to end to form sieve tubes
  - Walls have sieve plates with small pores
  - Callose forms callus plug - Prevents leaking of sieve tube contents when cell injured



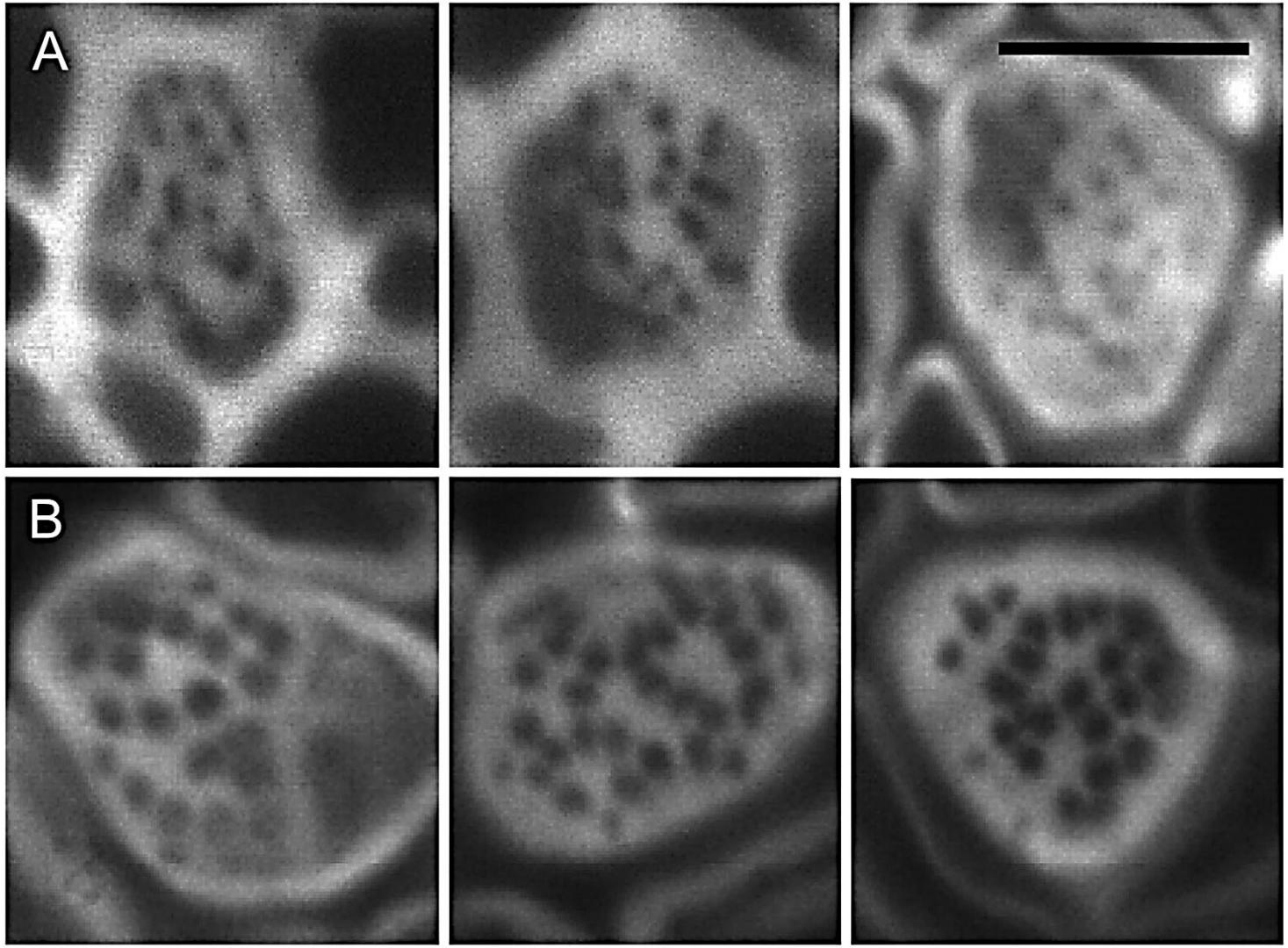
Phloem

- Companion cells - Aid in conduction of food

SEM micrograph showing sieve plate

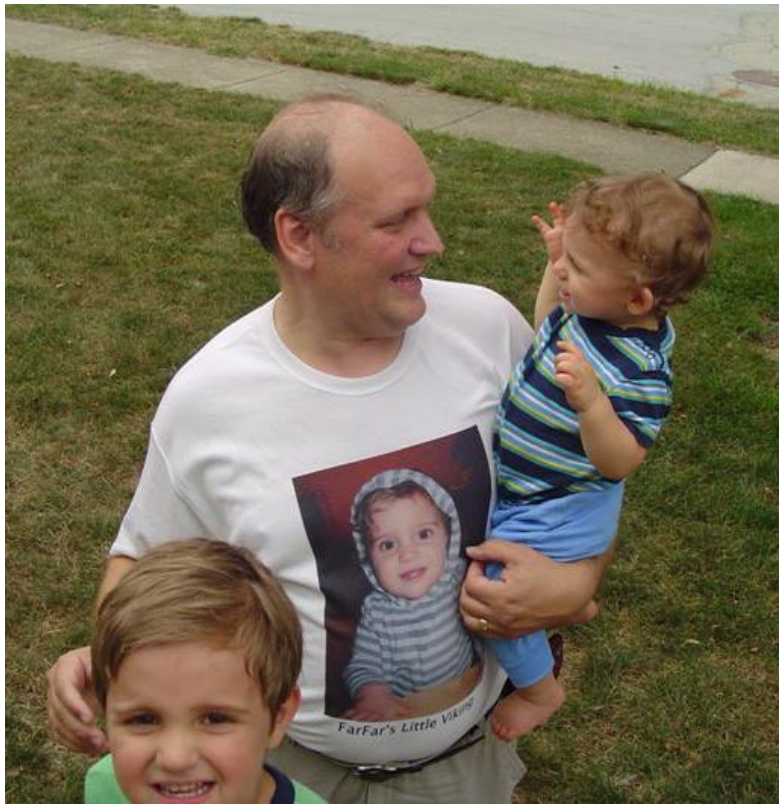


Pores in sieve plates (due to pore density, length, diameter) **regulate a plant's sap flow** (e.g., volume, velocity).



<u>Tree seeds</u> (e.g., nuts) are designed and equipped for **distribution** in a variety of ways, e.g., wind, bird digestion, planting (caching), floating in water, etc.

Teach God's caring providence, when you teach creation ecology



He sends the springs into the valleys, which run among the hills. They give drink to every beast of the field: the wild asses quench their thirst. By them shall the fowls of the heaven have their habitation, which sing among the branches. He waters the hills from his chambers: the earth is satisfied with the fruit of thy works. He causes the grass to grow for the cattle, and herb for the service of man, that he may bring forth food out of the earth.

Psalm 104:10-14

A good man leaveth an inheritance to his children's children. **Proverbs 13:22a**

Thank God for America's Great West !

The **biomes** of **America's Great West** are diverse, but 3 biomes dominate: **deserts, prairies,** and **Western forests.** (Other biomes are mentioned in passing.)






Western biomes: deserts, prairies, conifer forests

For every beast of the **forest** is mine, and the cattle upon 1000 hills. **(Psalm 50:10)**

Western Montane Forests

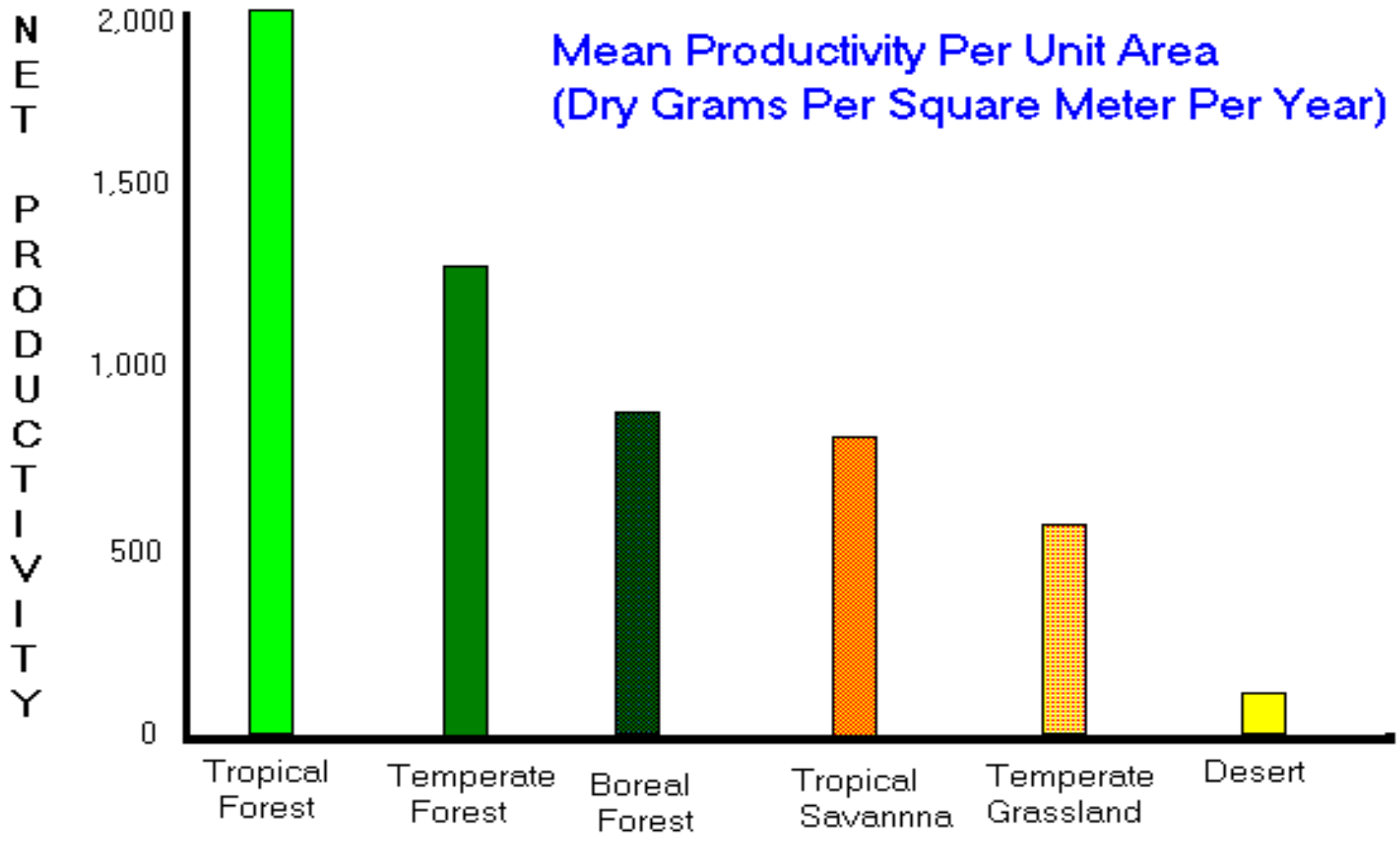
Mutualism: pinyon pines & pinyon jays

Thou makest **darkness**, and it is night: wherein all the beasts of the **forest** do creep forth. **(Psalm 104:20)**

Isaiah (**9:18** & **10:34**) refers to "thickets of the forest". (*Forests include more than just trees*.)

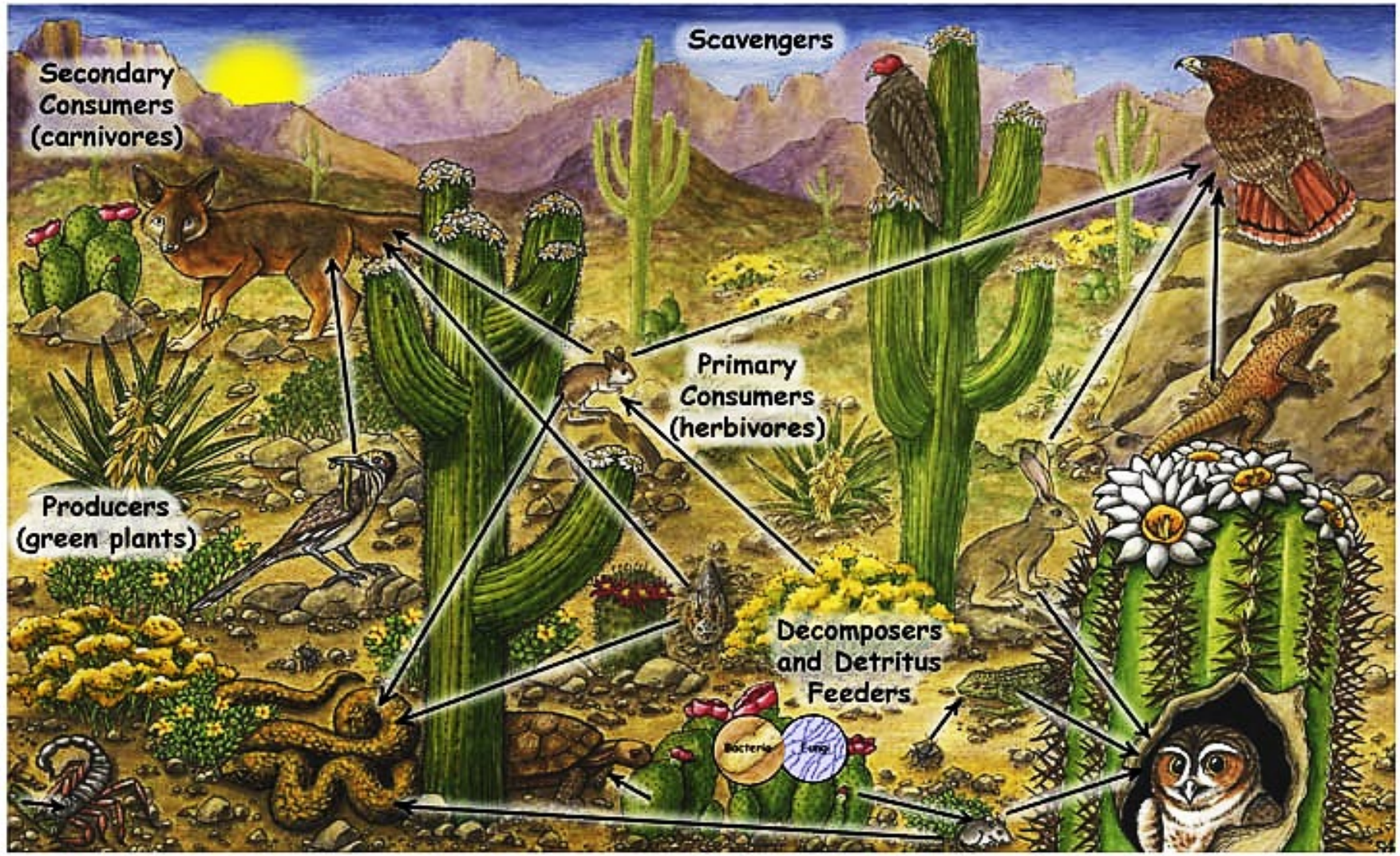
Biomass productivity increase (Isaiah 32:15)

wilderness → fruitful field → forest



Behold, I will do a new thing; now it shall spring forth; shall ye not know it? I will even make a way [*derek*] in the **wilderness** [*midbar*], and rivers [*nehârôth*] in the **desert** [yeshImôn]. The beast of the field [i.e., the nourished land] **shall honour Me** [*tekabbedēnî*], the dragons [*tannîm*] and the owls [*benôth-ya'anâh*], **because I have given** [*nâtattî*] waters in the **wilderness** [*midbar*], and rivers [*nehârôth*] in the **desert** [*yeshîmôn*], to give drink to My people, My chosen. **(Isaiah 43:19-20)**

Desert Food Web



www.exploringnature.org

Black-tailed Jackrabbit (*big ears radiate heat*)

Roadrunner vs. Rattlesnake

Mutualistic symbiosis (a/k/a "mutual aid")

Both organisms benefit

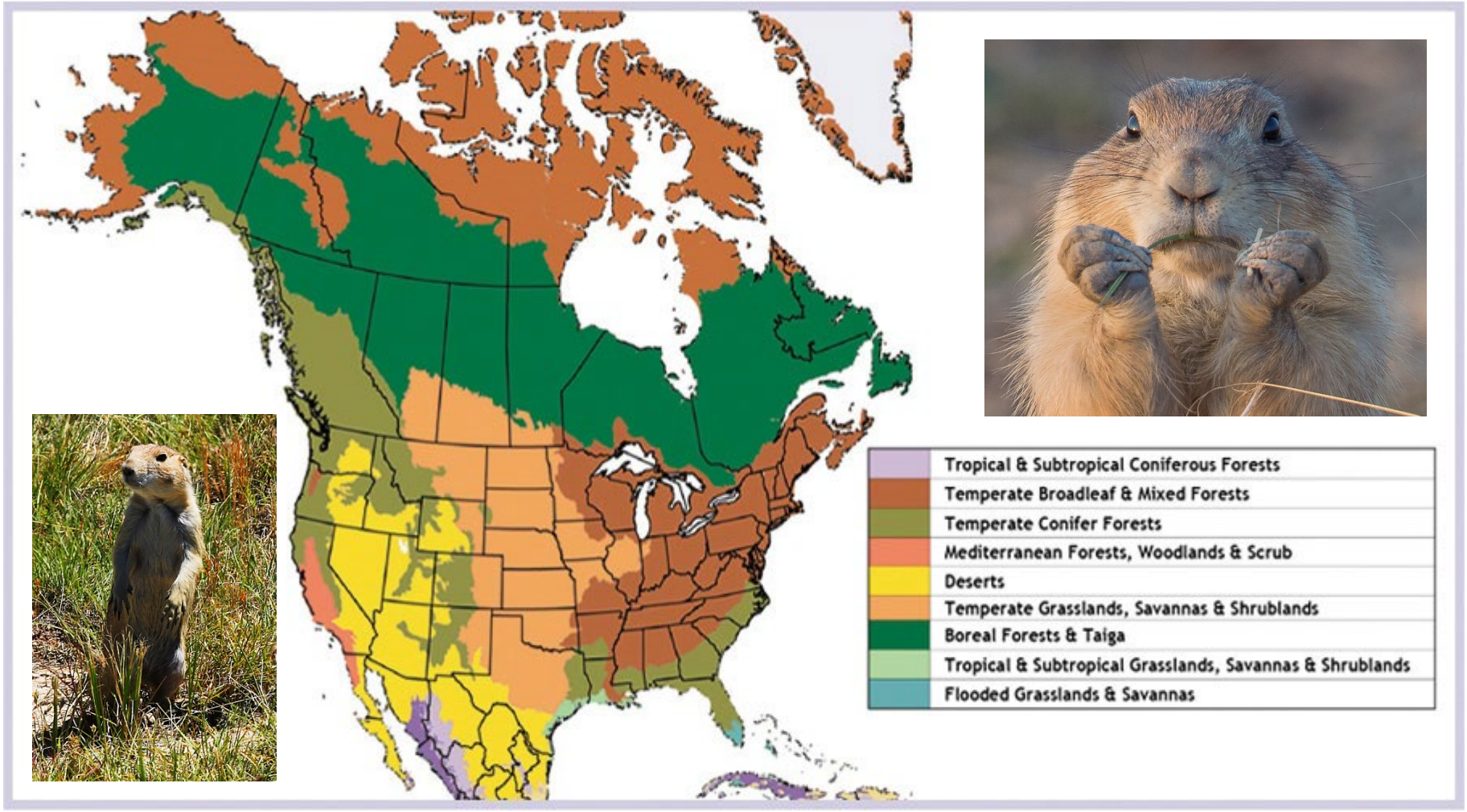
Yucca flowers are pollinated by yucca moths. The moths lay their eggs in the flowers where the larvae hatch and eat some of the developing seeds.

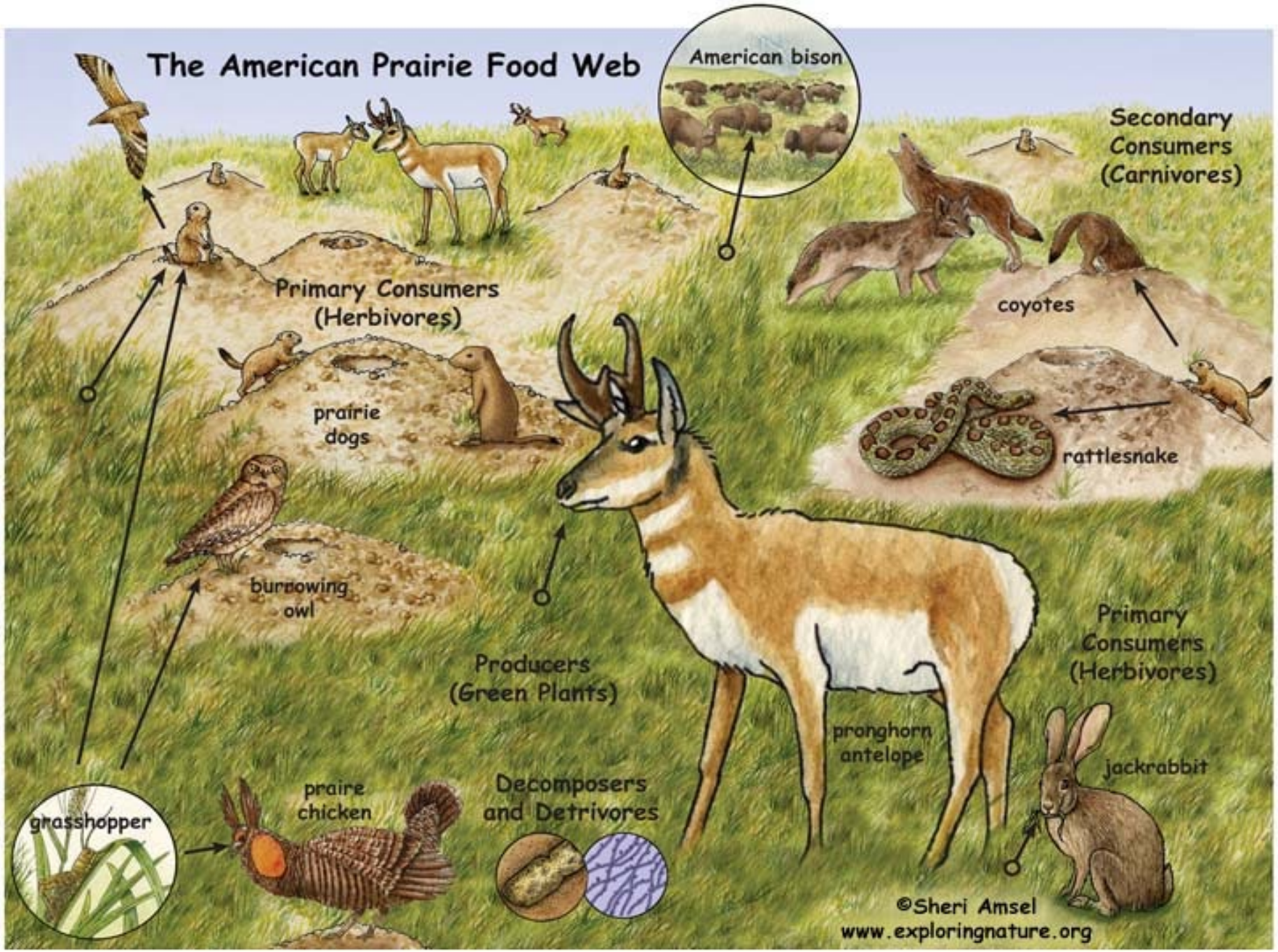
Yucca moth (pollinates yucca shrubs)

this is "mutual aid" -- *not* "survival of the fittest"

America's Great Plains:

notice the Midwest "prairie states"

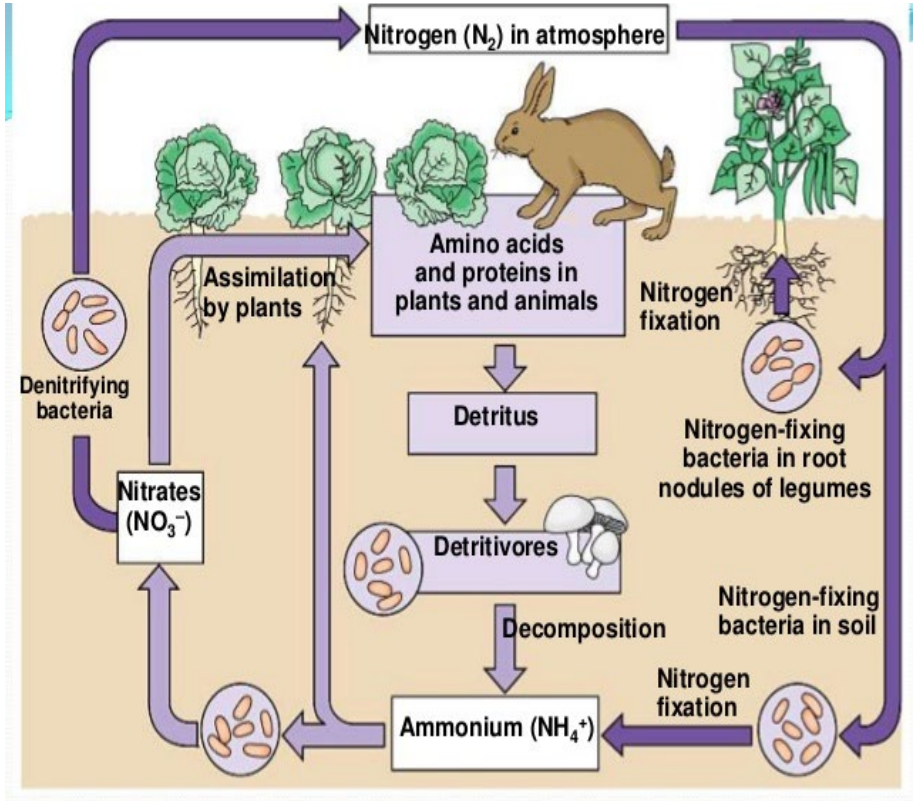


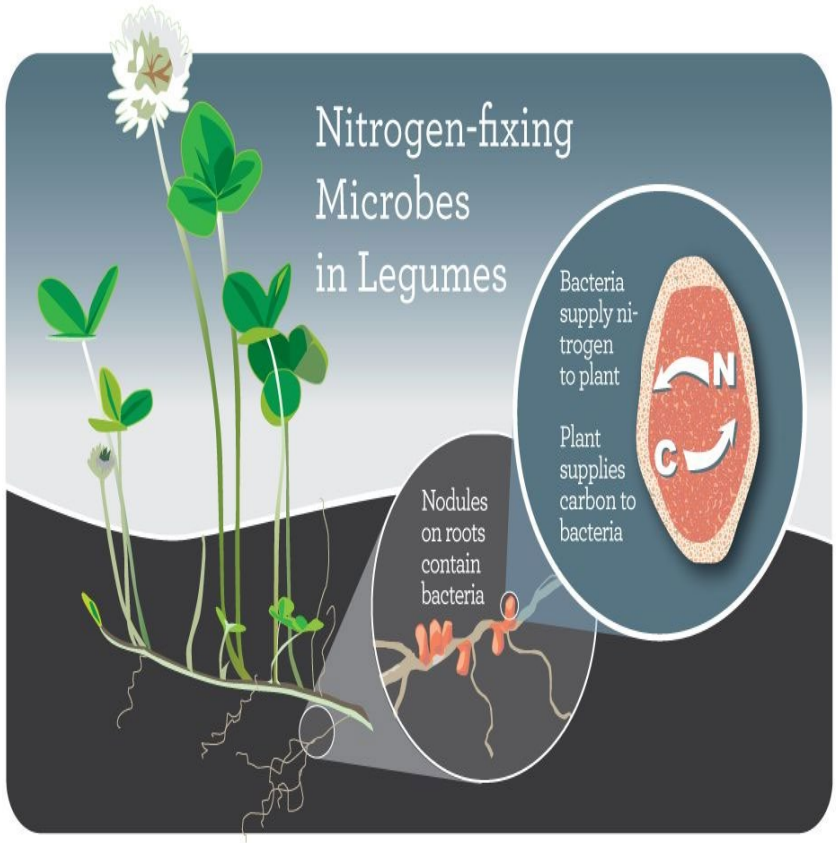

The American Prairie Food Web
American bison
Secondary Consumers (Carnivores)
coyotes
Primary Consumers (Herbivores)
prairie dogs
rattlesnake
burrowing owl
Producers (Green Plants)
pronghorn antelope
Primary Consumers (Herbivores)
jackrabbit
grasshopper
praire chicken
Decomposers and Detrivores
©Sheri Amsel
www.exploringnature.org

Non-mammals also graze: **Grasshopper !**

E.g, **Plains Lubber Grasshopper** (*Brachystola magna*)

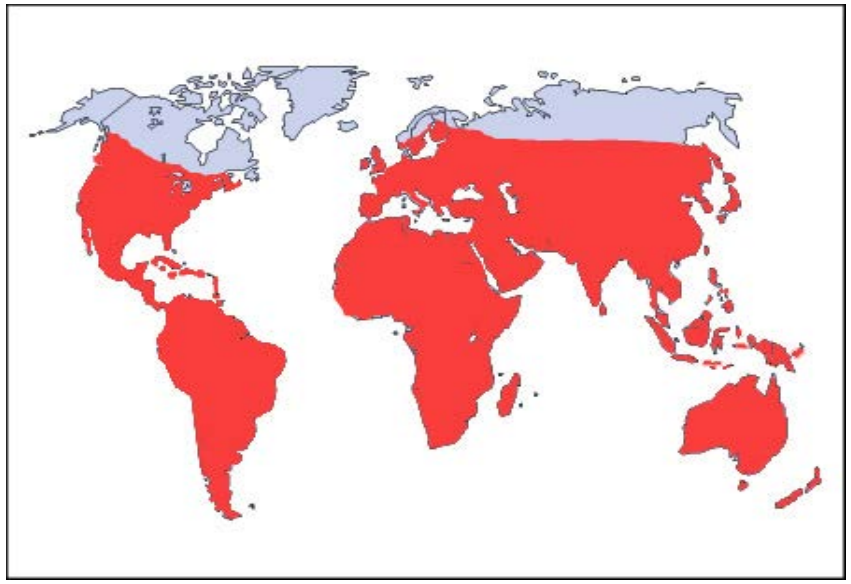
Why are prairie **soybeans** or **alfalfa** such blessings? Both are legumes, hosting *Rhizobia*, helpful endosymbiotic bacteria that "fix" (harness) nitrogen ($\mathbf{N_2}$) from air into compounds (e.g., NH_3, NO_2, NO_3) used to build amino acids, for making proteins. **Clover**, **peas, kudzu**, **beans**, and **lupines** are also legumes. *Rhizobia* can't "fix" N_2 alone; a plant host (trading carbohydrates for "fixed" **N**) is needed, e.g., legume root nodules . Cereal grasses and dicots also use **N**-fixing bacteria.





Ubiquitous waste manager: DUNG BEETLES

(Unless it's really cold, expect to find dung beetles !)



How can such ugly **sin** and **death**, and such **beautiful and gracious life**, coëxist on Earth?

Chichen Itza (Yucatan)

Turquoise-browed Motmot

Looking down from Sugarloaf Mountain, in autumn....

Thanks for listening!