

Review questions, Test 1
EBIO 4140, Fall 2005

Note: (1) Two questions near the end have been ~~deleted~~ from the version earlier on the web.
(2) Additional questions given in class are appended.

What are the origins of plant ecology? What factors have been important to its advancement?

Can we study plants in isolation of other components of their environment?

What roles do plants currently play in influencing atmospheric chemistry?

How can plants influence local and regional climate?

What characteristics distinguish plants from other organisms?

What adaptations were necessary for plants to invade terrestrial environments?

What are the distinguishing features of the Bryophyta? ... Tracheophyta?

What adaptations facilitate plant sexual reproduction in terrestrial environments?

What are the functions of roots? Do roots contribute directly to reproduction in plants?

What are some of the characteristics of roots in low nutrient environments?

What is meant by the terms "apoplast" and "symplast?" How do plants control the pathway of water during the movement from soil to leaf?

Why aren't nutrients taken up passively in bulk water by roots?

Why do roots become suberized as they age?

What is the function of the epidermis in plant stems?

How do vascular systems differ in the stems of dicots and monocots?

What are the different kinds of meristems in plants, and how do they serve to influence plant response to some disturbances?

How can plant development influence temporal response to resource variation?

What is the function of a leaf?

What are some of the functions of leaf hairs?

Why did floral development accelerate the evolutionary radiation of angiosperms?

What kind of climates are associated with deciduous plants?

Why are the major deserts found at 30 degrees north and south latitude? What kind of atmospheric circulation is associated with this phenomenon?

Why is there greater precipitation in mountains?

Why might mean annual temperature and precipitation not be good predictors of vegetation types?

What are the components of energy balance that are important for determining leaf temperature?

Why are compound leaves common in desert trees?

What kind of environments are associated with coniferous forests?

What determines the boundary between eastern deciduous forest and tall grass prairie in the central U.S.?

What adaptations do grasses have to minimize damage done by herbivores?

What determines the variation in phenology for plants in the major desert divisions of the southwestern U.S. and northern Mexico?

What plant growth forms can you find in tropical rainforests?

What are the major ecological zones found in the Front Range of the southern Rocky Mountains? What vegetation types, climatic conditions, and disturbance regimes characterize these ecological zones?

What are the products of the light and dark reactions of photosynthesis?

Where do the light reactions of photosynthesis take place?

What are possible benefits to plants from photorespiration?

What anatomical differences differentiate C4 from C3 plants?

How does C4 photosynthesis improve the efficiency of CO₂ uptake?

What factor(s) probably led to the evolution of C4 plants?

How does CAM photosynthesis improve water use efficiency?

What anatomical constraint controls the amount of photosynthesis in CAM plants?

If CAM is a water saving mechanism, why do some tropical plants have CAM?

What kind of an environment would favor a facultative CAM plant over an obligate CAM plant?

What are the mechanisms by which low water availability lowers photosynthesis rates at the leaf level?

What factors determine the CO₂ compensation point in plants?

How do plants limit the damage done by photoinhibition?

Why do C₄ plants tend to have higher photosynthetic temperature optima than C₃ plants?

What are the components of whole plant water potential?

What component of soil water potential is the most important in temperate continental environments?

What force(s) drive the movement of water from the soil to the leaf?

What factors control stomatal opening?

How do stomatal crypts and depressions lower transpirational water loss?

What environmental factors cause xylem embolisms? What anatomical adaptations minimize the occurrence of embolisms, and what are the tradeoffs associated with water movement?

What are some of the adaptations that facilitate plant avoidance of water stress?

How does cell wall elasticity influence the change in turgor pressure with changes in water volume?

What components make up soil?

How do plants influence the rate of mechanical and chemical weathering?

What are the major factors that influence the development of a soil and lead to the development of soil profiles?

What factors influence the cation exchange capacity of a soil?

What controls the input of soil nutrients for plants?

How does soil pH influence nutrient availability to plants?

What nutrients are needed in tissue concentrations > 0.1%, and what plant functions are they associated with?

~~What nutrient deficiency symptoms show up in new rather than old leaves?~~

~~How can the base saturation of a soil be greater than that predicted based on the weathering of cations from an acidic parent material (e.g. granitic rocks)?~~

How can more than one nutrient limit primary production in a plant community?

Why are N and P the nutrients that most commonly limit primary production? What kinds of ecosystems would P be most limiting to production?

How have plants adapted to conditions of low nutrient availability?

Additional Questions –

What are Walter Climate Diagrams? And why are they useful?

What is the relationship between global atmospheric circulation and the distribution of biomes on any given continent?

How does continental physiography play a role in the distribution of biomes?

How do Jenne's 5 functional factors for soil development play out for each of the 10 major soil orders (11 in the handout)? That is, why do the profiles of each of these orders look the way they do?