Neotropical coastal mangrove forests are usually “zonal,” with certain mangrove species found predominantly in the seaward portion of the habitat and other mangrove species on the more landward portions of the coast. The earliest research on mangrove forests produced descriptions of species distribution from shore to land, without exploring the causes of the distributions.  
  
The idea that zonation is caused by plant succession was first expressed by J. H. Davis in a study of Florida mangrove forests. According to Davis’ scheme, the shoreline is being extended in a seaward direction because of the “land-building” role of mangroves, which, by trapping sediments over time, extend the shore. As a habitat gradually becomes more inland as the shore extends, the “land-building” species are replaced. This continuous process of accretion and succession would be interrupted only by hurricanes or storm flushings.  
  
Recently the universal application of Davis’ succession paradigm has been challenged. It appears that in areas where weak currents and weak tidal energies allow the accumulation of sediments, mangroves will follow land formation and accelerate the rate of soil accretion; succession will proceed according to Davis’ scheme. But on stable coastlines, the distribution of mangrove species results in other patterns of zonation; “land building” does not occur.  
  
To find a principle that explains the various distribution patterns, several researchers have looked to salinity and its effects on mangroves. While mangroves can develop in fresh water, they can also thrive in salinities as high as 2.5 times that of seawater. However, those mangrove species found in freshwater habitats do well only in the absence of competition, thus suggesting that salinity tolerance is a critical factor in competitive success among mangrove species. Research suggests that mangroves will normally dominate highly saline regions, although not because they require salt. Rather, they are metabolically efficient (and hence grow well) in portions of an environment whose high salinity excludes plants adapted to lower salinities. Tides create different degrees of salinity along a coastline. The characteristic mangrove species of each zone should exhibit a higher metabolic efficiency at that salinity than will any potential invader, including other species of mangrove.

1. The primary purpose of the passage is to  
  
(A) refute the idea that the zonation exhibited in mangrove forests is caused by adaptation to salinity  
(B) describe the pattern of zonation typically found in Florida mangrove forests  
(C) argue that Davis’ succession paradigm cannot be successfully applied to Florida mangrove forests  
(D) discuss hypotheses that attempt to explain the zonation of coastal mangrove forests  
(E) establish that plants that do well in saline forest environments require salt to achieve maximum metabolic efficiency

2. According to the passage, the earliest research on mangrove forests produced which of the following?  
  
(A) Data that implied random patterns of mangrove species distribution  
(B) Descriptions of species distributions suggesting zonation  
(C) Descriptions of the development of mangrove forests over time  
(D) Reclassification of species formerly thought to be identical  
(E) Data that confirmed the “land-building” role of mangroves

3. It can be inferred from the passage that Davis’ paradigm does NOT apply to which of the following?  
  
(A) The shoreline of Florida mangrove forests first studied by Davis  
(B) A shoreline in an area with weak currents  
(C) A shoreline in an area with weak tidal energy  
(D) A shoreline extended by “land-building” species of mangroves  
(E) A shoreline in which few sediments can accumulate

4. Information in the passage indicates that the author would most probably regard which of the following statements as INCORRECT?  
  
(A) Coastal mangrove forests are usually zonal.  
(B) Hurricanes interrupt the process of accretion and succession that extends existing shorelines.  
(C) Species of plants that thrive in a saline habitat require salt to flourish.  
(D) Plants with the highest metabolic efficiency in a given habitat tend to include other plants from that habitat.  
(E) Shorelines in areas with weak currents and tides are more likely to be extended through the process of accumulation of sediment than are shorelines with strong currents and tides.