ENGLISH FOR ACADEMIC PURPOSES SERIES

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AGRICULTURE

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ENGLISH LANGUAGE TEACHING

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A. Understanding a printed text (1)

The following text will introduce you to the topic of forestry. Look at the way it is divided into sections and paragraphs. Pay attention to the headings and notes in the margins, and to the illustrations and captions.

Now look at these questions:
1. What must forestry be based on?
2. Which two systems of classification does the writer mention?
3. Summarise what paragraph 3 is about in your own words.
4. Do all trees have the same kind of root system?
5. The writer describes one cause of damage to forests. What is it?

Read the passage through and find the answers to the questions. Remember, you do not have to understand every word to answer the questions.

Forestry

Principles of Forestry

Since the primary task of the forester is centered on producing trees, understanding trees and their growth is essential. Although certain special terms may be used for convenience, the principles underlying the growth, development, and reproduction of trees of the forest are the same as those for other crop species. Thus, forestry must be based on a sound understanding of botanical principles. One critical point to keep in mind is that trees are generally managed for wood production, i.e., stem tissue. Compared with most horticultural and agronomic crops, forests represent long-lived, perennial plants. (Orchards are somewhere between forests and most other crops.)

2 Classification

In United States forests, all trees are spermatophytes, or seed plants. They are classified formally as either gymnosperms (cone-bearing plants) or angiosperms (flowering plants). This formal classification is accepted scientifically, but others are routinely used by foresters. The most common general classification identifies a tree according to its leaf form as a hardwood or softwood tree. Hardwoods are broad-leaved, generally deciduous, flower-bearing trees (Fig. 25-2). Softwoods are needle-leaved, mostly evergreen, cone-bearing trees (Fig. 25-3). This broad classification is far from perfect: the southern long-needled pine is classified as a softwood species although its wood is harder than that of many of the hardwoods, and several deciduous broad-leaved species yield softwood, e.g., basswood, willow, and aspen. This leads to the confusing terms hard hardwoods and soft hardwoods. Some sense can be made from this when it is remembered that the terms were established early, when the demand was for the soft white pine and the very hard white oaks only. Later use of numerous species of widely varying hardness or softness could not erase the old established usage.
Morphology and Anatomy

3 Although a forest may contain annual, biennial, and short-lived perennial plant species, trees are generally considered to be the major vegetation; they are long-lived perennials that usually produce a single central stem and attain a height of 6 m or more. Rarely does a forest tree reach maturity in less than 15 to 20 years; some trees may grow continuously for centuries though generally very slowly after the first hundred years. In considering the growth of trees, increases in both height and diameter, or girth, are important in determining the yield of lumber or other products. In terms of gross morphology, as a rule, trees growing in a typical forest environment are taller and have smaller root systems than those growing separately or under widely spaced, ornamental settings. The apical or top portion of the tree, the crown, is also smaller under crowded conditions. Note that the word crown has a different meaning in forestry than in horticulture and agronomy. In forestry, the crown is that portion of the tree which has branches (Fig. 25-4). Since shade decreases the ability of branches to survive, the trees in crowded forests tend to shed their lower branches and thus have less crown in proportion to clear stem.

4 Roots Roots serve the same general function as for other plants: anchorage, absorption of water and essential minerals, and storage of photosynthetic. The storage function is less important in forest trees than for most perennial field crops since stem tissue takes over much of the storage function in trees.

5 Tree species differ markedly in the extent of their root systems, differences that may affect how the species are managed in a forest. For example, most oak, hickory, and walnut trees have deep and extensive taproot systems which provide extremely solid anchorage. Thus, these and other trees with similar root systems are not as prone to uprooting by severe winds. In harvesting a forest, wind damage is a minor concern with these trees. Spruces and balsams, on the other hand, have shallow root systems and can be uprooted even by moderate winds. In planning the harvest, such trees must be removed or allowed to remain in a pattern that will ensure adequate wind protection. Most forest trees fall somewhere between these extremes. Generally, the root system provides sound anchorage except in relatively extreme conditions. Of course, even deep-rooted species can be uprooted under severe conditions, such as prolonged heavy rains before or during high winds. Hurricane conditions can level extensive areas of forest. In addition, trees that normally produce taproots may develop shallow root systems because of poor soil conditions, e.g., only a thin layer of soil above the bedrock. In such cases trees may be not only stunted but also easily blown over.
B. Check your understanding

Now read the text carefully, looking up any new items in a dictionary or reference book. Then answer the following questions:

1. Why are forests usually managed?
2. What is the difference between an angiosperm and a gymnosperm?
3. How are hardwoods and softwoods differentiated?
4. What kind of tree is the aspen?
5. How long does it take for a forest to mature?
6. How do you assess the amount of wood you will get from a tree?
7. What is a crown?
8. Why is the storage function of a tree's roots less important than those of a field crop?
9. Why is an oak less likely to be uprooted than a balsam?
10. When is the root system inadequate to anchor a tree?

C. Increase your vocabulary

1. Look at the first paragraph again. What words have the same meaning as:
   - well-informed
   - main; most important
2. Look at paragraph 2 again. What words have the opposite meaning to:
   - straightforward; easy to understand
   - as an exception
3. Look at paragraph 2 again. Can you explain the words:
   - hard hardwood
   - hard softwood
4. Look at paragraph 3 again. What words have the same meaning as:
   - go on living
   - deciding
   - hundreds of years
   - part
   - all the time
   - seldom
5. Look at paragraphs 4 and 5 again. Which words correspond to these definitions:
   - holding something down so that it is not blown over
   - liable or inclined to
   - going on for a long time
   - poorly developed
   - qualities which are as wide apart as possible

D. Check your grammar

1. ASKING QUESTIONS

You want to find out about the oil palm. Your teacher has the information you need. Find out about the oil palm by asking questions. Note down the answers. Ask about the following points:

Botanical name: __________________________
Family: __________________________
F. Understanding a printed text (2)

Read the following text carefully, looking up anything you do not understand.

**Classification schemes**

1. The most important of several broad ecological classifications of trees for forest management is shade tolerance. A shade-tolerant tree can generally withstand closer planting or more competition for light than a nontolerant type. This becomes a major consideration in planting, thinning, or harvesting operations and schedules. Forest trees are classified under three broad headings with regard to light requirements:
   - Shade-tolerant species—e.g., balsam fir, hemlock, redwood, basswood, spruce, birch, and maple
   - Intermediate—e.g., Douglas fir, ash, elm, and many oaks
   - Shade-intolerant—e.g., cypress, eastern red cedar, larch (tamarack), pine, aspen, black cherry, black walnut, cottonwood, hickory, locust, red gum, sycamore, yellow poplar, and willow

2. Species in these three groups presumably differ in basic physiological processes related to photosynthesis. The most common explanation is that the differences in shade tolerance are related directly to differences in the amount of light required to reach light compensation, or the amount of light a plant needs for net photosynthesis to occur, as well as light saturation (see Chap. 7). It is important to note that these classifications are broad. Within any species are genotypes which may be more or less tolerant to shading than the average. Since a common cause of shading is crowding or dense planting, trees that tolerate shading are, within limits, also expected to tolerate more crowded conditions than nontolerant species. Tolerance is obviously a major consideration in deciding whether to manage trees as even-aged stands or as uneven-aged, stands where regeneration and growth must take place in the shade of several older age classes.
3 The pattern of crown development is important in identifying the species that will succeed in uneven-aged conditions; related to, or an expression of, shade tolerance, it can be a significant factor in thinning, harvesting, and forest-management decisions. In a given stand, some trees, as they go through their life cycles, grow above all others and appear to dominate a stand. Others, at the opposite extreme, may never emerge at the upper surface of the forest crown or foliar canopy. Many fall somewhere in between, not truly dominant but not obviously occurring only at the lower levels of the canopy. Obviously trees that do not reach a dominant crown position must be shade-tolerant or else they would not survive and might as well be cut and used.

4 Recognizing crown types, shading, and spacing requirements are crucial in making harvest and thinning decisions. Four types of crown development and position are recognized:

- **Dominant Trees**—The crowns extend above the general height of the forest canopy and receive full sunlight from above and partial sun from the sides. They experience minimal shading because they reach beyond competitors.
- **Codominant Trees**—Crown development is at the general level of the forest canopy. Trees receive full sunlight from above but lateral shading from adjacent trees. Crowns are medium-sized and not as extensive as those associated with dominant trees.
- **Intermediate Trees**—Crowns are formed below the general level of the forest canopy but extend up into it. Trees that develop in this manner must tolerate shading.
- **Overtopped Trees**—Crowns are formed below the canopy level, receiving only filtered light.

5 Species can also be classified according to other ecological factors. Three species of pines, white, red, and jack, are adapted to the dry, sandy soils of the north. On heavier, well-drained soils in the same region, mixed hardwood forests are found, along with other pines, spruce, fir, and hemlock. Of course, in both situations, trees are adapted to the typical northern climatic conditions.

6 Other examples of widespread habitat are the extensive southern pine forests (see Fig. 25-7), typical of the southern coastal plains, the gums (Fig. 25-8) and cottonwoods found in association with southern bogs and swamps, and the cedars and balsam firs found in association with the colder, northern swamp areas.
G. Check your understanding

1. Look at paragraph 1 again. Are these statements correct or incorrect?
   • A hemlock tree can stand more shade than an aspen.
   • A tamarack needs more light than a redwood.

2. Look at paragraph 2 again. Which words correspond to these definitions:
   • growing again  
   • the genetic makeup of an individual, determined by the assemblage of genes it possesses  
   • thick  
   • supposedly

3. Look at paragraph 3 again. Which words have the same meaning as:
   • showing what something is  
   • having meaning or importance  
   • have control or influence over  
   • an overhanging covering

4. Look at paragraph 4 again. Can you explain in your own words the differences between dominant, codominant, intermediate and overtopped trees?

5. Look at paragraphs 5 and 6 again. Can you explain:
   • habitat  
   • swamp

6. Choose one or more trees which are native to your country and with which you are familiar. Can you classify them according to the information given in the text? Write a paragraph or two classifying your chosen tree(s).

H. Understanding discourse

A tutor is telling some students about some arrangements he has made. Note down the arrangements that have been made and what you should do.