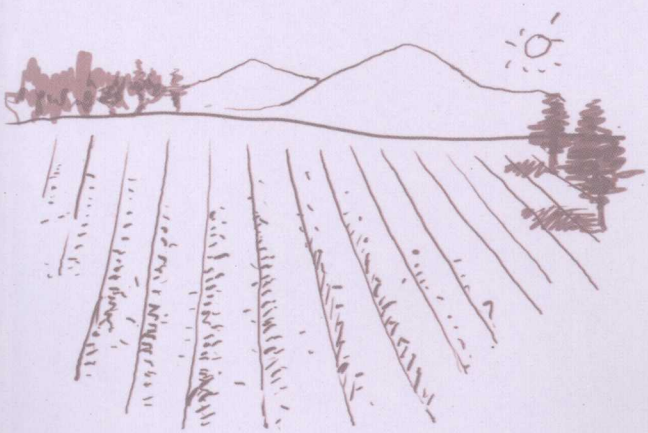
全国高等农林院校"十一五"规划教材

ENGLISH FOR SCIENTIFIC
PURPOSE IN PRATACULTURAL SCIENC

草业科学专业英语



李青丰◎主编

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前　言

“专业英语”是一门为提高大学高年级学生国际科技交流能力而设计的课程。高年级学生在学完大学普通英语课程，掌握了英语的基本语法并积累了5 000个以上英语单词后，应该较为系统地学习英语在科技方面的表达和沟通技巧。本教材正是为此而编写，希望能够作为大学三四年级学生在加强其科技交流能力方面的一本有用的参考书。本教材虽然是为草业科学以及相关学科的科技英语教学而编写的教科书，但也希望能作为其他相关学科师生及科技工作者的一本参考书。

本教材所选的课文涵盖了植物、生态、草地、牧草、草坪、放牧管理等草业科学主要学科的内容。每一课程单元由三部分内容组成：第一部分为普通的专业课文，目的是引导学生逐渐了解、熟悉草业科学专业英语的基本内容和习惯表达等基础知识。第二部分为科技英语，由浅入深地介绍英文科技书籍、杂志文章的构成特点、层次结构、表达方式等内容。本教材还注重知识的实用性，在不同的学习阶段插入了一些阅读练习，如使用索引、仪器说明、实验指导等。第三部分为专业词汇和构词法，利用配图等手段，结合课文内容，每一课介绍一个主题的专业词汇。该部分的重点是让读者在熟悉简单专业文章写作要求的同时，扩大专业词汇量和了解专业英语的一些主要表达方式。写作方面，除在前部分的课程单元中穿插介绍了一些常见应用文写作的文体格式和写作技巧外，最后一课（第15课）详细介绍了杂志文章、英文摘要以及墙报的格式要求、组织结构、写作要点及技巧。

正文后附有部分练习的参考答案。书中没有列出太多的专业词汇，教师可根据学生的英语程度以及对不同专业的不同要求，自行增加或调整词汇部分的学习和练习。

本教材由李青丰主编。具体编写分工如下：李青丰编写了第1、3、7、15课的课文以及全部课程的科技阅读和练习部分；王赟文编写了第6、8、10、11、14课的课文部分；赵桂琴编写了第5、9、12、13课的课文部分；赵萌莉编写了第2、4课的课文部分。

由于编者水平有限，书中难免存在不足，希望读者多提宝贵意见，以便今后修正。

编　者

2009年4月

郑 重 声 明

Contents

Lesson 1 Plants and Their Lives

Part A The Parts of a Plant and Their Functions

A plant is a living organism. It is made up of different parts, each of which has a particular purpose, or specialized function. If one part of the plant is not functioning properly the whole plant will suffer. But we may cut flowers off the plant or prune the roots. Such damage is only temporary and so the plant will continue to grow.

The basic parts of a plant are the root system, which is below the ground, and the shoot system above. The root of a plant has two main functions. It takes in, or absorbs, water and minerals from the soil through the root hairs, which are single cells near the tip of each root. The other function of the root is to hold, or anchor, the plant firmly in position in the soil.

The root system

Plants grow rooted in the soil. If you grasp a plant and pull it the roots may not come out of the soil easily. The top part of the plant may break off, leaving the roots in the soil. You may have to pull very hard indeed to uproot the whole plant. Gardeners know this, so when they are weeding they fork over the ground to loosen the roots of the weeds before trying to remove the weed plants.

The roots keep the plant firmly fixed in the soil. They also support the stem of the plant so that the leaves can receive the light of the sun. The roots may be white or brown in colour. The water that the plants need from the soil is absorbed by the roots.

Plants such as sugar beet and carrots are able to store food in their roots. In this way they can keep growing for more than one season. In addition, plants such as clover and lucerne, known as "legumes", have special bacteria, which live on the roots. These simple forms of life take nitrogen out of the air which is in the soil. Such leguminous plants are usually ploughed under the soil. By doing this the soil is made more fertile.

The shoot system

The shoot system above the ground consists of the stem, leaves, flowers and fruits. The shoots grow above the ground in the light. On the stem there are buds. These may produce

flowers, or they may make leaves. These buds usually occur just above the place, called the axil, where a leaf joins the stem. There is one bud at the end of the stem. This bud is where the stem gets longer, so it is here that growth occurs. There are also a number of side buds in the axil of the leaf. These buds will sometimes also grow, giving the plant a bushy shape.

One of the functions of the stem is to support the plant. Another important function is to enable water and minerals to pass up from the roots to the leaves and flowers. Organic materials such as sugar travel down the stem to the roots. The leaves grow out of the side of the stem. Their main job is to make food for the plant by the process known as photosynthesis. For this process sunlight is necessary. Water from the soil and carbon dioxide from the air are converted into sugars and other carbohydrates. During the process oxygen is formed and released into the air.

The leaves

Leaves are usually green. If you see a grass leaf you know that it comes from a grass plant. You know what an oak leaf looks like. You know a clover leaf when you see one. All the leaves that grow on a certain type of plant have the same sort of shape. If you look at a leaf you will see that it is often thin and flat. The edge of the leaf may be smooth or it may be toothed, like a saw. The edge of the oak leaf is toothed, but the teeth are large and blunt. Leaves like the oak and the apple are called the simple leaves. The strawberry and clover leaves are so deeply cut that each leaf looks as if it is three leaves. These leaves are called compound leaves. The parts of the leaf are called leaflets. There is no bud at the base of the leaflets. There is only a bud at the base of the leaf stalk. All leaves have a bud in the axil where they join the stem.

Running down the centre of each leaf is a thick ridge. This is the main vein. There are many smaller veins branching off this vein. These smaller veins may branch again to form even smaller veins. Veins are harder than the rest of the leaf blade and they form the skeleton of the leaf. They carry food and water between the leaf and stem. When the leaf falls off the plant the thin blade will rot quickly, but the veins will often survive for a long time. You may find leaf skeletons under hedges.

The leaves of the grasses grow from their base so they get longer all the time. This is why the grass has to be cut during the summer. In the grasses the veins are nearly parallel. However in many plants the veins form a net.

If you cut a leaf of a net-veined plant it will not grow again. It will remain the shape you have cut it, until it falls off the plant.

The flower

The flower contains the reproductive organs of the plant. The stamens produce the male sex

cells, or spermatia, which are carried in the pollen grains. The carpel produces the female cells, or ovules. The fruit, the ripened ovary of the flower, encloses the seed and protects them while they are developing. The seed itself consists of an embryo and foodstore. The embryo is the part which will develop into another plant and the foodstore is necessary to provide nourishment for the young plant while it is growing.

Part B Reading Exercise: The Life Cycle of a Plant

The life cycle of a typical annual plant can be divided into several stages.

Seed germination

The first stage is germination. Seeds remain dormant, or in a resting state, if they are kept cool and dry. When the amount of moisture and the temperature level are right, the seeds germinate and start growing.

Certain conditions are necessary for this to happen. An essential condition is that the seeds must be alive. Sometimes the seeds are dried at a temperature which is too high. This has two effects: the water content in the seeds is reduced too much, and certain essential proteins are destroyed. As a result, the seeds die.

Other conditions for germination concern amount of moisture in the soil. If dry seeds are planted in dry soil, they will not germinate until it rains. On the other hand, if there is too much water in the soil, the seeds will not germinate either. This is because wet soils remain cold for a long period of time than drier, well-drained soils. If the soil is too cold germination will not occur. An additional reason for seeds not germinating is that badly drained soils may lack sufficient oxygen. Dormant seeds require very little oxygen in order to alive, but when they start to germinate they require more.

In the first stage of germination the primary root, or radical, emerges. Then the stem pushes its way upward until it appears above the surface of the soil. At the same time the root system grows downward, and begins to spread through the soil. In the early stage of development the seedling depends entirely on the foodstore in the seed but as soon as the first leaves are produced, it is able to manufacture food for itself. The seedling begins photosynthesis.

Plant growth and development

Next, the plant entered the stage of rapid growth. In this stage of the life circle, the plant begins to grow to its full size. When it is mature enough, it flowers, and when this happens pollination and fertilization are ready to take place. In the process of the pollination the pollen is

carried by wind or insects from the stamens to the stigma of the carpel. It germinates on the stigma and grows down the style into the ovary, where fertilization takes place.

Pollination

The flower has a special purpose. It enables the plant to reproduce itself. In the process of sexual reproduction the special male sex cells have to be carried to the female sex cells so that they can join together to form a new plant. The sex cells are called gametes and when they join they form an embryo, which is a very young organism. This process of joining is called fertilization. In animals the male carries his gametes to the female but this is not possible in plants, as they cannot move.

The pollen grain

Sexual reproduction varies in different plants. Some produce both male and female gametes in their flowers. Other species, such as the holly and willow, have plants that are either male or female. These can only make male or female gametes. This is why some holly bushes never carry berries.

The male gametes are carried in pollen grains. Before seeds can be produced the pollen grain must carry the male gametes to the female part of the flower. Then the male gametes can fertilize the female gamete. During the journey the male gamete would quickly dry out and die if it was not protected by the covering of the pollen grain.

The flower

The male part of the flower is called the stamen. This consists of a thin stalk, called the filament, with a hollow anther at the top. The pollen grains are made in the anther which burst open when it is ripe to release the pollen.

The female part of the flower is the carpel which contains one or more female gametes. There are no openings in the wall of the carpel. The top of the carpel is sticky and is called the stigma. The pollen grains land on the stigma. The stigma is often on a stalk called the style.

Types of pollination

The process of transferring pollen grains from the male stamens to the female carpel is called pollination. There are two main types of pollination:

(1) Self-pollination. This happens when the pollen is transferred from the anthers to the

stigmas of the same flower. Many flowers avoid this happening because the anthers ripen at a different time from the carpools.

(2)Cross-pollination. This occurs when the pollen of one plant is transferred to the stigma of another plant. There are two ways in which this can happen:

a. The pollen may be carried by animals such as insects, birds, or spiders.

b. The pollen may be carried by the wind.

Animal pollination

The most common animals that pollinate flowers are insects. They are attracted to the flowers by their brightly coloured petals and by their scent. Many flowers produce nectar. This is a sugary substance that the insects eat. The nectar is usually at the base of the flower and the insect has to push past the stamens to reach it. As it does this some of the pollen will fall on the insect's body. Some will also fall on the stigma of the same flower. As the insects moves from flower to flower the pollen may be carried to the stigma of another flower. This will result in cross-pollination occurring.

Pollen grains are rich in protein and are used by insects as food. Hive bees have special hind legs to carry the pollen back to their hive. They store the pollen as beebread and feed it to their queen and babies.

Wind-pollination

This occurs when the pollen is carried by the wind to the stigmas of other flowers. Flowers that are wind-pollinated are often small and green. The anthers are on long drooping filaments so that they hang out of the flower. The styles are also long and the stigma is feathery, to catch the pollen as it floats on the wind. The pollen itself is either very small or has special wings to help it float on the air.

Part C Glossary and Word Building

1. Labeling a plant (Figure 1-1)

2. Some useful prefixes

mono-: monochrome, monogenic, monogenesis, monoploid, monosome

bi-: binary, bicolour, biennial, bicarpellary

di-: digenesis, digenetic, digamety, diploid, dioxide

tri-, ter-: triangle, triploid, trilateral, tertiary

tetra-: tetraploid

penta(o)-: pentagon, pentose

hexa(o)-: hexose

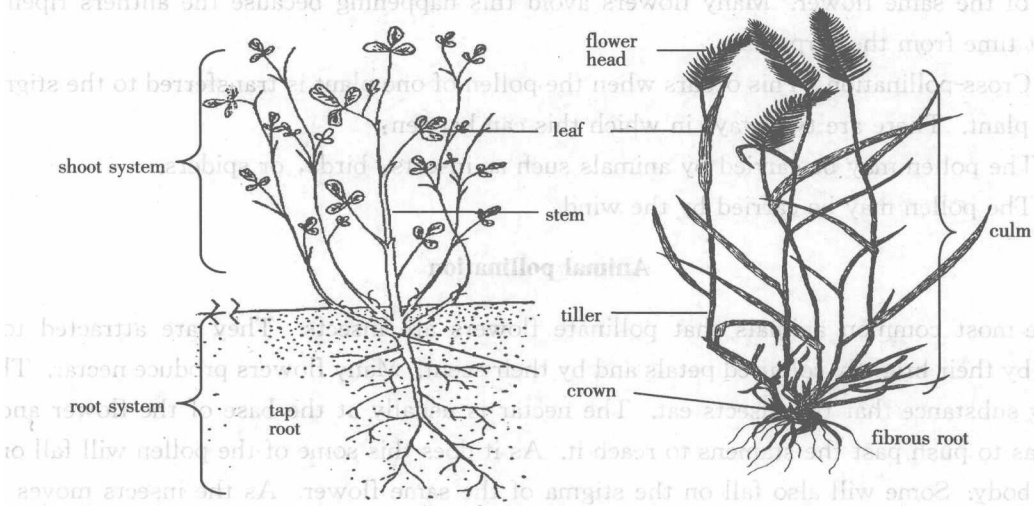

Figure 1-1 The parts of a plant

Lesson 2 Types of Plants and Variety of Life

Part A Types of Plants

Plants are very important living things. Life could not go on if there were no plants. This is because plants can make food from air, water and sunlight. Animals and man cannot make food from air, water and sunlight. Animals get their food by eating plants and animals too. Therefore, animals and man need plants in order to live. This is why we find that there are so many plants around us.

If you look carefully at the plants around you, you will find that there are many types of plants. Some plants are large while others are small. Most plants are green. There are two main types of plants: flowering plants and non-flowering plants.

Flowering plants have roots, stems, leaves, flowers and fruits. Almost all the trees around us are flowering plants. You can probably recognize some plants from their flowers or their fruits.

Non-flowering plants do not grow flowers. They include coniferous trees, mosses, liverworts, algae and fungi. You cannot see many non-flowering plants around you.

Flowering plants

Flowers are useful to us in many ways. One of them is that they help us to recognize the different types of plants which we find growing all around us. Flowers have different shapes, sizes and colors. Each flower is attached to the stem by a flower stalk. In some plants, the flowers grow singly while in others the flowers may grow together in a bunch.

Most flowers have four parts—petals, sepals, male parts and female parts.

The petals

When you look at a flower you usually notice the petals first because they are brightly colored. Different plants have petals of different colors. They attract insect or birds.

The sepals

Below the petals, on the outside of the flower, are sepals. They usually look like small

leaves. They protect the flower bud.

The male parts

The stamens are the male parts of the flower. Some flowers have many small stamens while others have a few. Each stamen has two parts—the filament and the anther. The anther, when ripe, produces a yellowish power called pollen. Each pollen grain contains a male cell which can fertilize a female egg cell.

The female parts

The female parts are found in the center of the flower. There are three parts—the stigma, the style and the ovary. The ovary is a welling at the base of the flower. Inside the ovary there are tiny ovules. Each ovule contains an egg cell. The style is a long thin stalk arising from the ovary. At the tip of the style is the hairy, sticky stigma.

Flowers with both male and female parts are called bisexual flowers. Examples of plants with bisexual flowers are the tomato, capsicum, convolvulus, cow pea and lily plants. Some flowers have stamens only. These flowers are called male flowers. Some only have the pistil and so they are called the female flowers. The papaya, pumpkin, cucumber and watermelon are examples where the male and female parts are on separate flowers.

Non-flowering plants

Most plants do not grow from seed. They grow from spores. Spores are very, very small. Some spores are so small and light that can float in the air. We may say that spores are quite similar to seed. When these spores fall on wet and shady place, they usually grow into new plants.

Coniferous trees

Coniferous trees are seed-producing plants which have true roots and stem. Their leaves are usually needle-like or scale-like structures. They produce their seeds in cones. Larch, spruce, pine and cypress are examples of conifers.

Ferns

Ferns have roots, stems and leaves. Their stems are swollen and grow just below the ground. The spores can be found inside spore-boxes which are found on the undersides of the leaves.

Mosses and liverworts

Mosses only have leaves and stems which are usually erect. They have no roots. Mosses grow in wet, damp places, clinging to tree trunks, stones and walls.