全国高等农林院校“十一五”规划教材

英语阅读

下册

萧好章　主编

研究生教学用书

English

中国农业出版社

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前　言

全国高等农林院校“十一五”规划教材《研究生英语教学系列教材》是依照国家教育部（原国家教育委员会）颁发的《非英语专业研究生英语（第一外语）教学大纲》（以下简称《大纲》）指导精神、根据我国目前农业高等院校研究生英语教学发展现状，为进一步提高研究生英语教学质量，巩固和加强研究生英语综合运用能力而专门设计、编著的，以满足21世纪全国农业高等院校研究生公共英语教学及教学改革、教学创新和素质教育的需求。本系列教材具有校强的针对性、实用性和系统性，全面体现了“研究生英语教学的宗旨是为了使学生掌据英语这门工具，进行本专业的学习、研究与国际交流，为我国的社全主义建设服务”（《大纲》）的教学指导思想。

《研究生英语教学系列教材》由三个部分组成：《英语阅读》（上、下册）、《英语听说》（上、下册）和《英语科技论文写作》。该套教材编写工作由我国名牌农业大学组织实施，参加编写工作的院校有中国农业大学、西北农林科技大学、华中农业大学、南京农业大学、华南农业大学5所院校。《英语阅读》由中国农业大学和华南农业大学联合主持编写，《英语听说》由南京农业大学和华中农业大学联会主持编写，《英语科校论文写作》由西北农林科校大学主持编写。

全国高等农林院校“十一五”规划教材《研究生英语教学系列教材》具有以下特点：

一、教材吸收了农业院校在长期的研究生英语教学和教材编写中积累的丰富经验，充分采纳国内外的先进教学理论和方法，力求有所继承又有所创新；

二、教材在选材上以自然科学为主要内容，同时兼顾题材的信息性、时代性和前瞻性。内容新颖，知识性强，编写内容与学生的学科发展紧密结会；

三、教材以课文为核心，课程练习设计以学生为中心，以便充分开展教学活动。重视培养学生扎实的语言核能，注重培养学生把所学专业与英语相结合的应用能力；

四、力求从实际出发，注重培养学生的听、说、读、写、译各项技能，以全面提高学生科技英语的综合应用能力。

《英语阅读》着重培养学生的阅读和翻译技能，在语言知识和语言能力方面打下牢固的基础。题材新颖，内容丰富，将信息的获取与语言知识的学习集于一身。全书体例编排新颖实用，语言规范，是新时代研究生公共英语教学的理想教材。

《英语听说》突出实用性，强调语言运用能力的培养，同时照颖到语言基础的训练及巩固。题材接近实际生活和工作需要，以综合技能训练为主，重点进行反复训练，着力于提高学生的听力技能和口语表达能力，注重介绍英美等国的日常生活、风俗习惯、文化背景等知识，以满足不同场合口头语言交际活动的需要。

《英语科技论文写作》注重培养学生的科技文章写作核巧和创新写作能力。从单词、短语、句子到段落，从写作将式到论文规范，再到篇章知识与技巧运用，书中同时还配有新颖的实例和典型的范文，使学生实现用英语写作科技论文、表达思想、传递信息的目标，为将来在SCI、EI、ISTP源等国际期刊上发表高水平科研论文奠定扎实的基础。

本书编写过程中，先后得到中国农业出版社有关领导的热情支持和热心同行的积极帮助，在此一并致谢。

全国高等农林院技“十一五”规划教材《研究生英语教学系列教材》的编写工作是一项创新性的举措。由于编者水平有限，措误和疏漏之处在所难免，热忱欢迎广大读者批评措正，使本系列教材在今后的修订版本中得以进一步的完善。

编　者

2006年7月

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Unit 1

Agricultural Development

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Warm-up

- What role does rice play in our daily life? Do you eat rice everyday?
- What do you prefer, good quality grain or high-yielding one? Is there any mixture of the two?
- How many farmers are there in China, planting grain to feed 13 billion people? What about in U.S.A?
- Why and how do scientists try to enrich the rice crops and improve the seeds?
- Who is Yuan Longping? What has he done over the past years ? Please compare him with the Scientists in the text below.

In-Class Reading

Tiny Grain Holds Big Promise

By Jay Wrolstad

(From College of Agriculture and Life Sciences at Cornell University · Winter 2004—2005)

(Rice's simple ***exterior belies*** *its complex secrets for surviving stresses such as drought, cold, insects, and disease. Plant* ***molecular*** *biologists are using the transgenic approach to improve stress tolerance, while plant breeders are* ***deciphering*** *rice's genetic codes and exploring wild and ancient varieties to make rice better able to feed the world.)*

As an agricultural commodity, rice is second to none. In some Asian cultures it is **revered** as a gift from the gods, and since the dawn of civilization this grain has provided nourishment to more people than any other crop.

That's why cutting-edge research being done in the College of Agriculture and Life Sciences on rice is of critical importance to millions of people worldwide. This work involves genetic improvement of rice for stress tolerance, as well as developing and applying molecular-scale tools for improving varieties of the crop.

Ray Wu, professor of molecular biology and genetics, is taking the transgenic approach, introducing genes of potential benefit into rice by transformation, thereby generating fertile crops that are tolerant to drought salt and low-temperature conditions. These three conditions are the most significant nonbiological stresses on crops, he says.

"Many genes are over-expressed when a plant is subjected to the three stress factors," Wu explains. "Some are primary and **confer** a degree of tolerance, and our job is to guess which are the most important genes to introduce into rice" Once tested, beneficial "promoters" are added to the gene or group of genes and **boost** the stress tolerance after integrating the genes into the rice **chromosomes**.

Wu uses a custom-designed promoter sequence added to the gene or **fused** genes to enable precise control over gene expression. Depending on the need, the genes can be turned on in the transgenic plants when stresses occur. As an example, transgenic rice plants that harbor a fused gene to overproduce **trehalose**, a naturally occurring sugar, become more tolerant to stresses such as drought or low temperatures.

In this example, the genes for trehalose synthesis were introduced into **Indica** rice varieties, which account for 80 percent of rice grown worldwide.

Typically, scientists select a rice variety that is most easily transformed and will thrive in greenhouse conditions. "We started with **basmati rice**, an Indica variety," says Wu. "It is the most expensive variety, with a pleasant **aroma** and good cooking qualities." Another variety being transformed is IR64, developed by the International Rice Research Institute. It is cultivated throughout Southeast Asia and is the most widely grown rice worldwide.

The implications of this work are broad, indeed; the same genetic modification strategy and the same genes can also be used to transform corn and wheat increasing by threefold the benefits of this type of research.

Addressing the issue from a different angle is Susan McCouch, a professor in the Department of Plant Breeding. Her work focuses on "smart breeding" rather than transgenic techniques, using crossing and selection to improve the performance of rice crops grown throughout the world.

In essence, the objective is to identify regions of chromosomes containing genes for disease and insect resistance, grain quality, plant structural characteristics, and for adaptation to specific environmental **niches**.

"Our goal is to find genes hidden in the wild or ancestral varieties of rice that over time, have been **sifted** out of modern high-yielding varieties, reducing the crops' natural defenses and ability to survive in stressful conditions," McCouch says. The new varieties are very productive, but what has been left behind is what the variation needed to further enrich the rice crops of the future. McCouch is recovering some of their original complexity.

McCouch, who created a map of the thousands of genes in the rice **genome**, which was hailed as a major plant-breeding achievement, is now using the map to figure out where genes of importance to rice quality and productivity are found. She approaches this problem by creating crosses between the crop and its wild relatives that are more productive than crosses between two high-yielding **cultivars**. She takes the most promising offspring coming from the wild X modern rice crosses and subjects them to a genetic analysis to determine which genes or combinations of genes make some individuals superior to others.

"The intellectual thrill is to use our knowledge to show that there are diamonds in the rough when it comes to ancient rice varieties. Using **genomics** approaches, we can figure out which genes make the difference, and we can use the information to **sieve** through the existing pool of wild species or thousand-year-old varieties to find hidden genes that can be used in crosses to boost the yields of our best high-yielding varieties," she says. McCouch is collaborating with breeders at the West African Rice Development Association, the International Center for Tropical Agriculture, and the International Rice Research Institute, and national programs in Asia, Latin America, Africa, and the United States. They are determining the potential for rapidly integrating useful genes from wild species and traditional farmer varieties into improved rice varieties with high yield, good grain quality, early maturity, as well as durable resistance to pests.

Harnessing the power of information technology, McCouch is compiling data that integrates information about genomics, breeding expertise, and the cultural and biological characteristics of individual rice-growing areas, ranging from Asia to Africa to South America. All the information is publicly available, and the databases and information resources are designed to make it easy for people to understand what we do and to put new knowledge to work. "We want to empower people on-site to help them make their rice better," she says.

The significance of the work being done by Wu and McCouch is difficult to overstate, given that the total rice production worldwide is 500 million tons per year, amounting to a \$100 billion industry. According to Wu, the loss of yield due to the three primary stress factors is about 20 to 30 percent so if we have highly tolerant rice plants, we can expect to produce at least 100 million tons more rice per year. He is confident that the new technology will succeed, with **incremental** increases in stress tolerance. "If we can start at 10 percent improvement and work from there, other scientists will pick up our work and take it further."

Indeed, at least 10 years of research and development work, safety testing, and certification are ahead before large-scale production and distribution of transgenic rice seeds to farmers can begin. In a twist of logic, Cornell scientists are seeking patent protection of the trehalose-enhancement technologies, not to control the market and profit from the work, but to ensure that the technologies can be offered in the public domain, Wu says.

The bottom line, Wu says, is feeding the world, and especially those in developing countries. "My hope is that our seeds will be given to seed companies that in turn will distribute them to farmers, so that many poor farmers will benefit, and the extra grain produced can help feed several millions of poor people a year, he says."

As for those who oppose genetically modified plants, Wu **contends** that the manipulation of plants has been ongoing for hundreds of years, ever since cross-breeding first occurred. "Compared to three years ago, the objection to genetically modified plants and the food produced by these plants has **subsided** considerably," he says. "Those who oppose genetically modified plants based on nonscientific arguments and use false statements and scare tactics are running out of steam, as people gain a better understanding of what we are trying to do."

Rice serves as a model for other crops in sequencing plant genomes, McCouch says. "As an international community, we must insist that science remains open and collaborative. We can use the genome information to improve lives everywhere, not just in the developed world."

While noting that the work done by Wu still requires verification in the field, W. Ronnie Coffman, chair of the Department of Plant Breeding, says the work thus far represents proof of concept and holds much promise. McCouchs success in mapping the rice genome has provided a blueprint for improving an array of grains, he adds.

"Rice is the world's most important crop, and the grass family includes several primary staples like rice, wheat, **maize**, **sorghum**, **millet** and others for the world's population," Coffman says. "The College of Agriculture and Life

Sciences is playing a leading role in the public sector when it comes to the latest plant breeding techniques and technology."

McCouch **concurs**, saying, "As an educational institution with a global vision, Cornell is investing in training citizens of the world and helping people help themselves. We train the students and create information, and that serves as the starting point to deliver information to the far corners of the globe."

New words and Phrases

1. exterior [eks'tiəriə] *n.* the outside part of something, especially a building 外部，外面
2. belie [bi'lai] *v.* *formal* [正式] to make sb. or sth. appear to be different from how they really are 掩饰
3. molecular [məu'lekjulə] *adj.* Relating to molecules 分子的
4. decipher [di'saifə] *v.* to succeed in understanding the meaning of something written in a secret system of letters or symbols called a code 破译（密码）
5. revere [ri'viə] *v.* *formal* [正式] to have a lot of respect and admiration for someone or something 尊敬；崇敬
6. confer [kən'fəː] *v.* *formal* [正式] to give something to someone 授予；给予
7. boost [buːst] *v.* to help something to increase, improve, or become more successful 提高；改善；推动；促进
8. chromosome ['krəuməsəum] *n.* one of the things like very small strings in the NUCLEUS of all living cells. Chromosomes contain genes. 染色体
9. fused [fjuːzd] joined together 连在一起
10. indica rice ['indikə] *n.* a cultivated variety of rice 籼米
11. basmati rice ['bæzməti] *n.* an Indica variety of rice, white and parboiled, long grain premium quality. It is highly delicious and palatable.
12. aroma [ə'rəumə] *n.* a smell that is strong but pleasant 浓香；芳香
13. in essence used to emphasizing what is the most important feature of something 本质上；实质上
14. niche [nitʃ] *n.* a place or position precisely suited to a person's talents 合适的地方

15. sift [sift] *v.* to remove one part of something 筛出
16. genome ['dʒiːnəum] *n.* the complete set of genes in a living thing 基因组
17. cultivars ['kʌltivəz] *n.* a cultivated variety 品种
18. sieve [siv] *v.* to put a liquid or mixture through a sieve 筛，滤
19. harness ['hɑːnis] *v.* to get control of something in order to use it for a particular purpose 控制利用
20. incremental [inkri'mentəl] *adj.* increasing gradually 增加的；递增的
21. contend [kən'tend] *v.* *formal* [正式] [+that] to claim that something is true 声称；主张；认为
22. subside [səb'said] *v.* to become weaker, less violent, or less severe 减弱；减轻；平静下来；平息
23. sorghum ['sɔːgəm] *n.* [U] a plant that produces grain and grows mainly in tropical areas 高粱
24. maize [meiz] *n.* [U] *Br E* 英国英语；*Am E* 美国英语 corn 玉米
25. millet ['milit] *n.* [U] a type of grain often used as food for birds 小米
26. concur [kən'kəː] *v.* to agree with the someone or something 同意；赞同

Exercises

Self-Checking up

Read the following statements and decide whether they are true or false. Write T for true and F for false in front of each statement.

1. Agricultural commodity is nothing but rice, which has provided nourishment to all the people in the world.
2. The cutting-edge research in the College of Agriculture and Life Sciences is on genetic improvement of rice for stress tolerance.
3. Professor Ray Wu is a molecular biologist at Cornell University.
4. The genetic modification strategy and the genes done by Ray Wu and McCouch can be only employed to transform rice and wheat.
5. Rice quality and productivity are the two problems that are being solved respectively by Wu and McCouch.
6. Seed companies will own a lot of money from the scientists mentioned in the