

现代农业英语 文选

李秀云主编
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序

中国农业科学院研究生院教授李秀云同志主编的《现代农业英语文选》一书选材精当，内容丰富，语言纯正典范，专业术语的注解简明扼要，严谨准确，参考译文既信且达，极有助于读者解除在英语原文中所遇到的难点，并借以学习翻译的技巧。

英语参考书或自学读物不同于英语教材。一套教材是以学生的实际平均水平为出发点，通过合格的教师认真的讲解，循序渐进地向学生传授应具备的基础知识，亦即使他们得到英语基本功的训练。本《文选》作为一本参考书或自学读物，起点较高，其编写目的在于培养并提高学习者阅读农科专业书刊的能力。对于高等农业院校的任何一位教师或学生，对于科研或生产战线上的任何一位农业工作者而言，这种阅读能力是非常必要的，因为只有在具备了这种能力后，他才可以如鱼得水，如虎生翼，在自己的现今或将来的工作岗位上，为我国农业现代化的神圣事业，做出加倍的贡献。

《文选》的选、编、注、译都是主编同志在许多不同专业的农业专家密切合作下，精心完成的。它具有选材上的独特性和优越性，内容上的新颖性和农业经济上的宏观性，以及专业上的权威性，因而十分难能可贵。

多少年来我国出版界为农业科技工作者和农业院校提供

的、涉及农业的英语读物（包括教材、语法、会话、文选、适于自学的对照读物、注解读物等）为数寥寥无几，远远不能适应当前我国改革开放、引进技术、进行国际科学文化交流的新形势，无法满足我们农业机构和有关院校师生提高英语水平（特别是英语阅读能力）的迫切需要。本《文选》的问世不啻雪里送炭，定会受到农业界和外语界人士的重视与欢迎。

由于上述原因，我乐于向广大读者推荐这本好书。

北京农业大学教授 李鲸石

1988年夏序于外语教研室

谨以此书向国庆四十周年献礼

前 言

很久以来，在农业院校学过公共英语的研究生、大学生以及农业科研人员，多么希望有一本用地道英语阐述现代农业科学知识的文选，作为由公共英语学习迈向专业英语应用的台阶。为了满足广大读者的要求，中国农科院研究生院编译了《现代农业英语文选》。

本书精选了当今世界上最有影响的英文科学刊物及国际性专业会议的报告。原作者多为以英语为母语的第一流学者、科学家。经编译者去粗取精，压缩改写，使原文在保留其文体风格的基础上，更加规范、简明和流畅，富有知识性和可读性。其内容包括：农业经济、植物生理、遗传育种，生物技术、土壤肥料、植物保护、蔬菜生产与贮藏、畜牧兽医及农业机械化九个方面，共40篇文章，每篇约三、四千字。

为了帮助读者理解原文及用比较通顺的中文表达，每篇文章后面附有专业词汇和术语的注释及参考译文。这些译文及注释按专业内容，分别由有关专业的科研人员承担，并经过在英语教学、农业科技情报方面有丰富经验的教授、研究员审校。

读者可按所需专业进行阅读内容的选择；需要了解边缘

学科的，也可从中获益。本书是帮助农业科研人员、研究生、大学生进入专业阅读英语书刊的桥梁。其中大量专业词汇及术语，不是任何一种词典能全部包罗的，因而在查考英、汉专业词汇及术语方面，也很有用。当然，科学技术日新月异，农业方面也不例外。虽然我们尽力从80年代的最新文献中选用，然而挂一漏万在所难免。科学技术有其延续性，有了上述八十年代文献的基础，对于更新的知识，就不难触类旁通了。

本书的编译出版是在中国农科院研究生院杨忠源院长，教务主任潘哲同志、毛国良同志的倡导和支持下完成的；本院农业经济所研究员吴大圻同志、品种资源所副研究员岳大华同志对部分单元做了重点审校；本院不少研究生和其他同志为书稿撰成给予了大力协助；在此一并致以衷心的感谢！

我们谨以这一集体辛勤劳动的成果，奉献在读者面前。希望全国各农业院校的老师、同学和各级农业科研人员、翻译工作者人手一册，使它成为您的良师益友。

编 译 者

1988年4月

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WORLD POPULATION AND CROP PRODUCTION

World population statistics make terrifying reading, so rapid has the rise in numbers become. It was not always like this, because for many centuries war and famine, disease and natural disaster kept increases at a reasonable level. Not only that, but any local pressure on land and other resources could always be countered by migration and the colonisation of new areas. But in the last few decades the picture has changed dramatically, and we are now acutely aware of the dire consequences of overcrowding, both regionally and internationally. The population explosion, which Malthus so gravely predicted and described, has occurred and, whether we are prophets of doom or confident technocrats, we have to face the future with realism.

As recently as the middle of this century, well within the life span of many people living today, the total world population was about 2400 million. Thirty years later it had reached 4500 million, and the curve continues to rise climbing inexorably into the future. The present increase per day is about 200000, the size of a medium city, and at this rate 75 million new people are added every year, enough to populate an entirely new country. United Nations predictions lead us to believe that at the very least there will be 9200 million people on earth by the year 2050, but this is more likely to be 11200 million or even 13800 million,

depending on the assumed rate of increase. Such is the age structure of the human population that further very considerable increases are inevitable, no matter how effective birth control measures prove to be. This is the problem that faces mankind.

Let us for the moment ignore future projections and consider the requirements of the present world population of 4500 million. This number of people creates enormous pressures and demands for food and raw materials for industry, and it is to crop plants, one of our few renewable resources, that we must look to meet most of these needs. In highly developed countries we may not always be aware of our dependence on plants, because much of our diet is of animal origin and only about one half to a third of our protein intake comes directly from plant sources. However, since plants are essential for the maintenance of herbivorous animals, we are in the long run concerned with plant production just the same. In any case, on a world scale about 88% of the calorie requirements and 90% of the proteins come directly from plant sources.

To meet these demands, man has developed a range of crop plants but, considering the long history of domestication, it is very noticeable that the number of species involved is strictly limited. It has been estimated that some 80% of edible dry weight is derived from only 11 species, of which two-thirds are cereals. We must therefore get to know these plants thoroughly in order to safeguard and preferably improve their productivity. But even if numerically only a few species predominate, these are many others which play an

important part in the maintenance of mankind. Leguminous grain crops provide nearly one quarter of the world's dietary protein requirements at present and, although they have condescendingly been described as poor man's meat, the ever increasing costs and unfavourable energy balance of animal production may well force us to place greater reliance on these plants in the future. Potatoes do not occupy a large proportion of the total cultivated area of the world, yet their productivity per unit area is very high. Many other crops do not serve as food directly but find their way into our diet after processing. Sugar is obtained from sugar cane or beet, and oil or fats from such plants as ground-nut, soya bean or sunflower. Still other species enrich and improve our diet, even if statistically they do not feature very prominently, while others again, like barley, are used for the production of alcoholic beverages. There are thus many species which have an important place as food plants and, they fully deserve our attention.

The importance of plants as primary sources of food for man should not obscure their essential role in maintaining his domestic animals. A high proportion of the diet in developed countries is of animal origin, and we only need to remind ourselves of such commodities as eggs, butter, milk and cheese to appreciate how important they are. However, by far the highest input of animal products into our diet comes from meat. On a world scale, total annual consumption adds over 110 million tonnes, of which over 75% consists of beef and pork, while poultry and sheepmeat contribute another 23%. The vast population of

animals required to produce these foods rely on plants for their subsistence. Some, like pigs and poultry, are fed predominantly on grain, but all the others are grazing animals and depend on natural or sown pastures or on forages. To meet these requirements, the Gramineae, which also include the cereals, come into prominence as the family containing the herbage grasses, but equally important are the pasture legumes which not only provide nutritious feed but also enrich the ecosystem with symbiotically fixed nitrogen. We shall need to be acquainted with the more important of these species.

Apart from their function of providing food for man, plants also serve a great variety of other purposes. Many of them have been in use since the early days of civilisation, others have been recognised in fairly recent times, and there may be others again which still await development. In an energy-hungry world, crops capable of producing oil are assuming greater prominence, not only in the tropics where the oil palm flourishes, but also in more temperate regions in which soya beans, cotton, sunflower, rape, or linseed provide valuable raw materials for industry. The oil is used in the manufacture of very many products, such as paints, varnishes, plasticisers for plastics, nylons, lubricants or soaps, quite apart from the commodities made by the food industry. Some of the species concerned are also grown to produce valuable plant fibres, and both cotton and linen flax deserve mention in this connection. World cotton production alone amounts to over 12 million tonnes annually. In addition to these crops

cultivated as sources of industrial oil and fibre, there are many other plants that contain substances useful to man. Some of these, like the hop, provide flavours, while others like tobacco or coffee are used as stimulants. Certain species have been used since antiquity in herbal medicine, and literally thousands of biochemical components have now been isolated which are used widely in chemotherapy, as anti-fertility agents, insecticides and a great many other purposes. New compounds are being added every year, and many of them are of sufficient interest to the pharmaceutical industry to deserve further development.

This account of plants in the service of man could not be complete without mentioning important developments in the field of energy. Dwindling resources of petroleum and the necessity by many nations to import all their requirements have stimulated research into the use of crop plants for the production of liquid fuel. In some countries great strides have already been made in setting up new industries concerned with the extraction and fermentation of sugars from such plants as sugar cane or beets. Starchy plant products from potatoes or cereals are also under investigation, although this would involve an additional step in alcohol production. Although initially ethanol is intended as an additive to petrol, there are no great technical problems involved in dispensing with conventional fuel altogether, and some countries like Brazil are well ahead with such developments.

It should not be necessary to enumerate further uses of plant products, nor to construct an impressive list of essential crop species. Enough

has been said to demonstrate the great dependence of man on plants and his ever increasing demands for plant products. If we now cast our eye into the future and take into account the inevitable and rapid rise in world population, we are coming face to face with the outstanding problems of our time. How to work the miracle of feeding the 4000 millions, was the question asked some 30 years ago. Today we must think firmly of twice that number, incomprehensible though this may be, and we must add to this enormous need for food crops the exponentially growing requirements for many other plants.

What are our chances of achieving the seemingly impossible? Only two rational strategies, alone or together, can be put forward to answer this challenge. Either we find more land on which to grow the additional crops required by man or we discover ways and means of raising productivity per unit area still further. Let us examine these alternatives in turn.

The present world area of cultivated land is estimated to be 1.4×10^9 ha, about 10% of the total land surface, but some authorities consider that about 3.2×10^9 ha are available for arable crops. However, before we get too excited about a possible doubling of the area under crops, we should remember that the extra land required is not by any means always in the same place where additional food is needed. The fastest growing population is not necessarily in a region in which big land development is possible, quite apart from the problems of finance and technical resources needed to bring these changes about. Many of the developed nations enjoy a high