



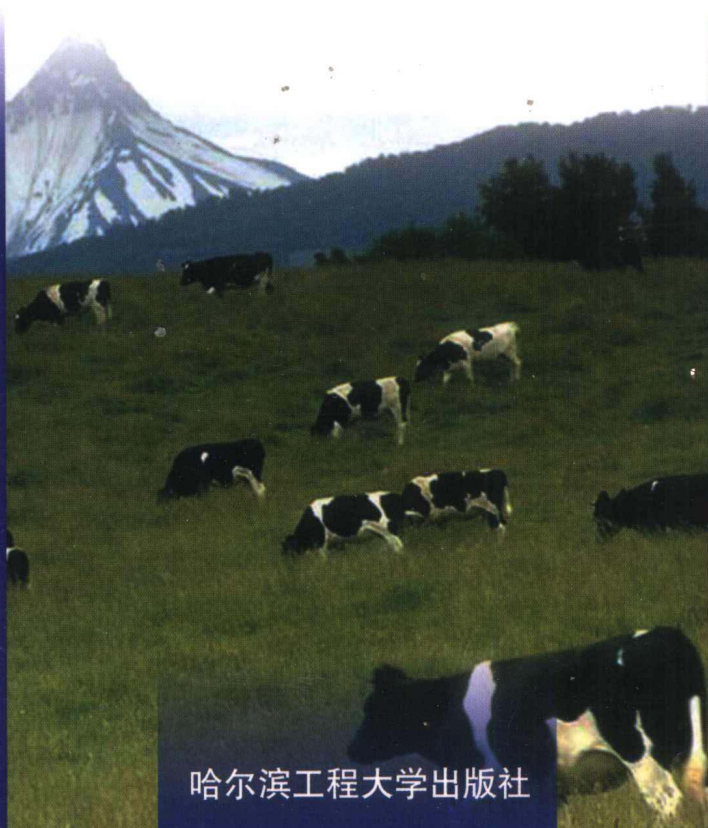
21 世纪农业科学专业英语

总主审 李庆章  
总主编 胡家英

# 动物科学英语

**English Course  
for Animal Science**

张贵学 郭益凤 主编



哈尔滨工程大学出版社

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## 内 容 简 介

本书涵盖了动物营养学、动物遗传育种学、动物繁殖学、水产养殖学等主要内容,可使学生掌握基本的专业词汇,并能阅读动物科学方面的专业文章。

全书共收入 36 篇文章,可供大专院校动物科学专业学生用作英语教材,也可作为相关科技工作者学习专业英语的参考书。

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## 总 序

国家教育部 1999 年 9 月颁发的现行《大学英语教学大纲(修订本)》(以下简称《大纲》)规定:大学英语教学分为基础阶段(大学一、二年级)和应用提高阶段(大学三、四年级)。基础阶段的教学分为六级,或称大学英语一至六级(College English Bands 1-6,简称 CEB1-6)。应用提高阶段的教学要求包括专业英语(Subject-Based English,简称 SBE)和高级英语(Advanced English,简称 AE)两部分。学生在完成基础阶段的学习任务即达到四级或六级后,都必须修读专业英语。已达到六级要求且学有余力的学生,除修读专业英语外,还可以选修高级英语课程。《大纲》不仅对专业英语的重要性,而且对专业英语的词汇和读、听、说、写、译的能力都做了明确说明。

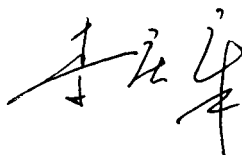
按照《大纲》要求,本套教材在选材时,既注重专业英语的文体特征,又避免使用科普文章。本书教材的 75%左右为专业基础内容,25%左右为专业前沿文献,一般从专业英语期刊中选取。主要因为学生在两年基础阶段的学习后,虽然专业基础知识已经建立,但对专业前沿内容尚知之不多。选取期刊上的内容,目的在于让学生深入了解专业英语文体特征和专业文献阅读方法,用英语来学习专业知识,同时也是向双语教学的过渡。

专业英语与公共英语中的日常英语和文学英语并无本质区别,只是文体(genre)不同。专业英语并无独立的语言系统,虽然专业英语中有大量的专业名词和术语,但是它的基本词汇都来自公共英语。除此之外,专业英语的语法有其自身特性和语法现象,但语法结构都仍遵循公共英语的一般规则,并无自己的独立语法。由此可见,公共英语是专业英语的基础,二者相互关联而具有显著

的共通性。在编写这套教材时,我们采用专业教师和英语教师结合。专业教师负责文献取材,英语教师负责练习编排,文献翻译由专业教师和英语教师共同负责。既注重语言文字的流畅,又注重内容术语的准确。

本套教材是学生完成英语从基础学习过渡到实际应用的有效教材。通过教学,从英语文献阅读、英语资料翻译到英文摘要写作,系统科学地培养学生的英语应用能力,也为日后双语教学的逐步开展铺路搭桥。

是为之序。

A handwritten signature in black ink, consisting of stylized Chinese characters, likely '李庆章' (Li Qingzhang).

\* 李庆章,1953年生,博士,生物化学教授,博士研究生导师,东北农业大学校长。

2002年9月10日

## 前 言

动物科学英语是根据高等农业院校学生的英语基础而编写的一部科学性和实用性较强的教材。内容包括动物解剖、遗传、繁殖、营养、水产养殖科学等方面的内容。全书包括精读和泛读两部分,各 18 章,精读部分每章后附有词汇、译文和练习。泛读部分每章后附有词汇,其中包括一篇科研论文。

通过书中内容的学习,使学生基本掌握与动物科学有关的词汇、术语,扩大了专业词汇量,并巩固大学期间所学的英语语法。更重要的是使学生掌握专业英语及科技文章的写作,为学生毕业以后走向工作岗位或继续深造奠定良好的专业英语基础。

书中的原文均引自 Reproduction in Farm Animals [H. SE. HAFEZ]、畜牧专业英语阅读材料 [Northeast Agricultural University, 1999] 等。除编委的工作外还有刘颖、王海龙、黄贺、刘燕、郎红艳、王守志、王桂华等在本书的编写工作中也做了大量的工作,在此一并致谢。

在本书的编写过程中,如果有这样或那样的不足,真诚地希望广大学生、教师和同仁提出批评指正,谢谢!

张贵学

2002 年 9 月

## Preface

This book is a scientific and practical teaching textbook specialized in English of Animal Science. It has been compiled according to the students' English elementary knowledge of institutions of higher education. It involves a wide range of disciplines including animals dissect, autopsy, heredity, reproduction, nutrition and aquatic breeding, etc. The whole book is composed of two parts, each having eighteen chapters. Part A is the intensive reading attaching new words, translations and exercises. Part B is the extensive reading attaching new words and a scientific dissertation.

This book is written primarily for undergraduates, postgraduates. It can help them grasp large English vocabulary and technical terms in the field of Animal Science. This book will strengthen the students' grammatical knowledge which they have learned at university. Most important of all, this book will help students know the styles of scientific articles and master the writing skill of the professional English.

This book can also help graduates lay a strong professional English foundation in their future work or their further education.

The materials of this book all quote from *Reproduction in Farm Animals* [H. S. E. HAFEZ] and the *English Reading Materials Majoring in Animal Husbandry* [Northeast Agricultural University, 1999], etc. Here we express our gratitude to all members of the editing committee as well as Liu Ying, Wang Hailong, Hang He, Liu



Yan, Wang Shouzhi and Wang Guihua who also have done useful work in the course of compiling this book.

Finally, if there are some defects in this book, we sincerely hope that students, teachers and colleagues can give us some valuable suggestions and critical comments.

**Guixue Zhang**

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# 精读

## Unit 1

### The Mouth, the Pharynx and the Soft Palate

#### The Mouth

The mouth designates not only the cavity and its walls but also the accessory structure that project and drain into it. The mouth has as its main functions the prehension, mastication, and insalivation of food. It may also play a role in aggression and defense, while in man it is important in the formulation of the sounds of speech. In most species it functions as an airway when flow through the nose is impaired.

The mouth cavity is entered between the lips and continues into the pharynx through a caudal narrowing at the level of the palatoglossal arches. It is divided by the teeth and the margins of the jaws into an outer vestibule, bounded by the lips and cheeks externally, and the central mouth cavity proper. When the mouth is closed, these divisions communicate through gaps behind and between the teeth. The vestibule extends caudally toward the ramus of the mandible and the masseter muscle. The proportion of its walls formed by the lips varies with the feeding habits; a wide gap is necessary in species that feed greedily or use their teeth to seize prey or in fight, whereas a smaller opening suffices in most herbivores and rodents.

Diet and feeding habits also determine the form of the lips. In

some species, such as the horse, the lips are employed in collecting food and introducing it to the mouth; for this purpose they must be both sensitive and mobile. When other parts are more important in prehension the lips can be less mobile and reduced in size (e. g. cat) or thickened and insensitive (e. g. ox). The lips of the dog are extensive but thin, and although they can be drawn back from the teeth, they are not capable of other purposeful movements. Lip posture is an important factor in communication in this species and can signal aggressive intent or submission. In newborn animals the lips form the seal about the teat that is necessary for successful sucking.

The lips are composed of skin, an intermediate layer of muscle, tendon, and glands, and the oral mucosa. The skin and mucosa usually meet along the margin of the lips, though the boundary can be displaced in either direction. The muscles that make up the greater part of the lips belong to the mimetic musculature, the field of the facial nerve. They include an orbicular muscle encircling the opening and, with some species variation, others that raise, depress, and retract the lips. Small salivary glands are scattered between the muscle bundles below the mucosa, especially toward the angles (commissures) where the two lips meet.

There is rarely anything remarkable in the arrangement of the lower lip. In the dog it is rather loose, but fastened to the lower jaw at the level of the canine tooth, and has a thin, serrated margin. Modifications of the upper lip are more frequent. Sometimes there is a median naked area continuous with the modified skin around the nostrils. The extensive moist and glandular nasolabial plate of the ox and the rostral disc of the pig are good examples of this. The area of modified skin is often much narrower and may be divided by a median groove as in the dog. Dog breeders refer to this modified region as the "nose leather". In man and horse a hairy integument extends across the entire upper lip.

The *cheeks*, which tend to be most capacious in herbivores have a similar structure. The principal support is the buccinator muscle, which has the important function of returning to the central cavity any food that has escaped into the vestibule. There are additional salivary glands, sometimes aggregated in quite large masses – the zygomatic gland of the dog, concealed below the zygomatic arch, has its origin in this way. The buccal mucosa must be loose enough to allow the occasional maximal opening of the mouth but avoid large folds that would at other times invite injury from the teeth; it tends, therefore, to be tightly anchored here and there. In ruminants, whose food may be dry and rough, additional protection is required; since a very thick and much cornified epithelium would limit flexibility, protection is provided by large, closely spaced, pointed papillae. A small papilla carries the opening of the duct of the parotid gland.

Diverticula of the oral vestibule occur in certain rodents and monkeys. They have a storage function and enable the animal to harvest its food rapidly, stowing it away for later mastication. They attain a considerable size in hamsters, reaching well onto the thorax; when developed to this degree, the pouches have their own supporting musculature.

The cavity within the dental arcades—the *mouth cavity proper* is roofed by the palate; bounded laterally by the teeth, gums, and margins of the jaws; and floored by the tongue and the small area of mucosa left uncovered by the tongue. Most of the walls are rigid and when the mouth is closed the size of the cavity can be altered only by raising or lowering the tongue and floor.

The larger, rostral part of the roof is based upon a bony shelf formed of the palatine processes of the incisive, maxillary, and palatine bones and known as the *hard palate*. This is continued caudally, without visible demarcation by the soft palate in which a connective tissue aponeurosis replaces the bone.

The hard palate is usually flat and is covered by a thick mucosa fashioned into a series of more or less transverse ridges which may guide the food backward. In general, they are most prominent and their covering epithelium is most heavily keratinized in herbivores. A small median swelling, the incisive papilla is commonly found behind the incisor teeth, flanked by the orifices of small ducts that perforate the palate. These ducts branch and lead to the nasal cavity and to the vomeronasal organ. They convey small amounts of the fluid from the mouth for appraisal by the olfactory mucosa of the vomeronasal organ.

A striking peculiarity in ruminants is the dental pad, a tough but yielding cushion in the position generally occupied by upper incisor teeth; the pad acts as a counterpart to the lower incisors in grazing. A dense, richly vascularized tissue beneath the palatine epithelium functions both as the lamina propria of the mucosa and as the periosteum of the bone, attaching so tightly that not even the most vigorous mastication will shift it. Peripherally, the hard palate blends with the gums, the rather insensitive mucosa along the alveolar margins of the jaws.

### The Tongue

The tongue occupies the greater part of the oral cavity but also extends into the oropharynx. It has an attached root and body and a free apex and is a highly muscular organ capable of both vigorous and precise movements—as in prehension lapping, grooming, and manipulating the food within the mouth on the one hand, speech articulation on the other. The mobility is achieved by restricting the attachments to the more caudal part, leaving the apex free to roam both within and beyond the mouth. The attachment of the root is to the hyoid bone, that of the body to the mandible. The tongue is also supported by paired mylohyoid muscles that sling it between the lower jaws. In the dog especially, the tongue is used to procure heat loss by painting, a process facilitated by the very generous supply of

blood and the numerous arteriovenous anastomoses.

In general shape, the tongue corresponds to the oral cavity. The apex is dorsoventrally compressed, the succeeding middle portion somewhat triangular in section, while the root is uniformly wide to allow entry to the muscles passing forward from the hyoid bone. Mucosal reflections also pass from each side of the root to join the soft palate; they demarcate the exit from the mouth.

The mucosa is tough and tightly adherent where there is repeated contact with abrasive food but looser and less heavily keratinized where a softer diet or a more protected position allows. Much of the surface is covered by a variety of papillae. Some, like the soft threadlike papillae that are scattered widely over the human tongue, provide additional protection; the harsh conical papillae that make the cat's tongue so efficient a rasp are a larger version of these. Other papillae carry taste buds and have a more restricted distribution, characteristic for each species; there names-fungiform, foliate, and vallate papillae-give good indications of their shapes. A few small salivary glands lie below the epithelium.

The bulk of the tongue consists of muscle, usually divided into intrinsic and extrinsic groups. There are four pairs of extrinsic muscles. One, the geniohyoideus, lies somewhat apart and passes from the incisive part of the mandible to the body of the hyoid bone; it therefore lies below rather than within the tongue. It is able to draw the hyoid and thus the tongue forward. The genioglossus arises more dorsally than the geniohyoideus and first runs back below the floor of the mouth before dividing into bundles that fan upward in the sagittal plane. Those bundles that turn forward to the apex of the tongue retract this part; those that pass toward the root draw the whole tongue forward; the middle group passes toward the upper surface which it may depress. The other two muscles arise from the hyoid apparatus. The hyoglossus takes origin from the basihyoid and runs forward, lateral to the genioglossus; the



styloglossus takes origin from the stylohyoid, yet farther to the side. Both draw the tongue back but in rather different fashions, the styloglossus tending to elevate it also. The intrinsic muscle is disposed in bundles that run longitudinally, transversely, and vertically. Simultaneous contraction of the transverse and vertical bundles stiffens the tongue.

The muscle bundles are interspersed with considerable amounts of fat, an arrangement that imparts a unique consistency and flavor to the cooked tongue. This fat is very resistant to mobilization in starvation.

In the dog, alone among the domestic species, the ventral part of the tongue contains a prominent fibrous condensation, the *lyssa*, easily recognized on palpation. A fibrous septum that extends from this is responsible for the conspicuous median groove on the upper surface.

### The Salivary Glands

Numerous salivary glands drain into the oral cavity. Their secretion, the saliva, keeps the interior of the mouth moist and when mixed with food facilitates mastication; when the food is eventually formed into a bolus for swallowing, the saliva lubricates its passage.

Small salivary glands have been mentioned as features of the lips, cheeks, and tongue; others are present in the soft palate, pharynx, and esophagus. Though individually unimportant, their collective contribution must be considerable. However, most saliva comes from certain larger glands situated at a greater distance from the mouth cavity into which they drain through longer ducts. Unlike the minor glands, which mostly produce a mucous secretion, certain of these major glands produce a more watery fluid containing the enzyme *ptyalin* which plays a minor role in carbohydrate digestion.

The *parotid gland*, which is purely serous in most species, obtains its name from its relationship to the ear, being molded