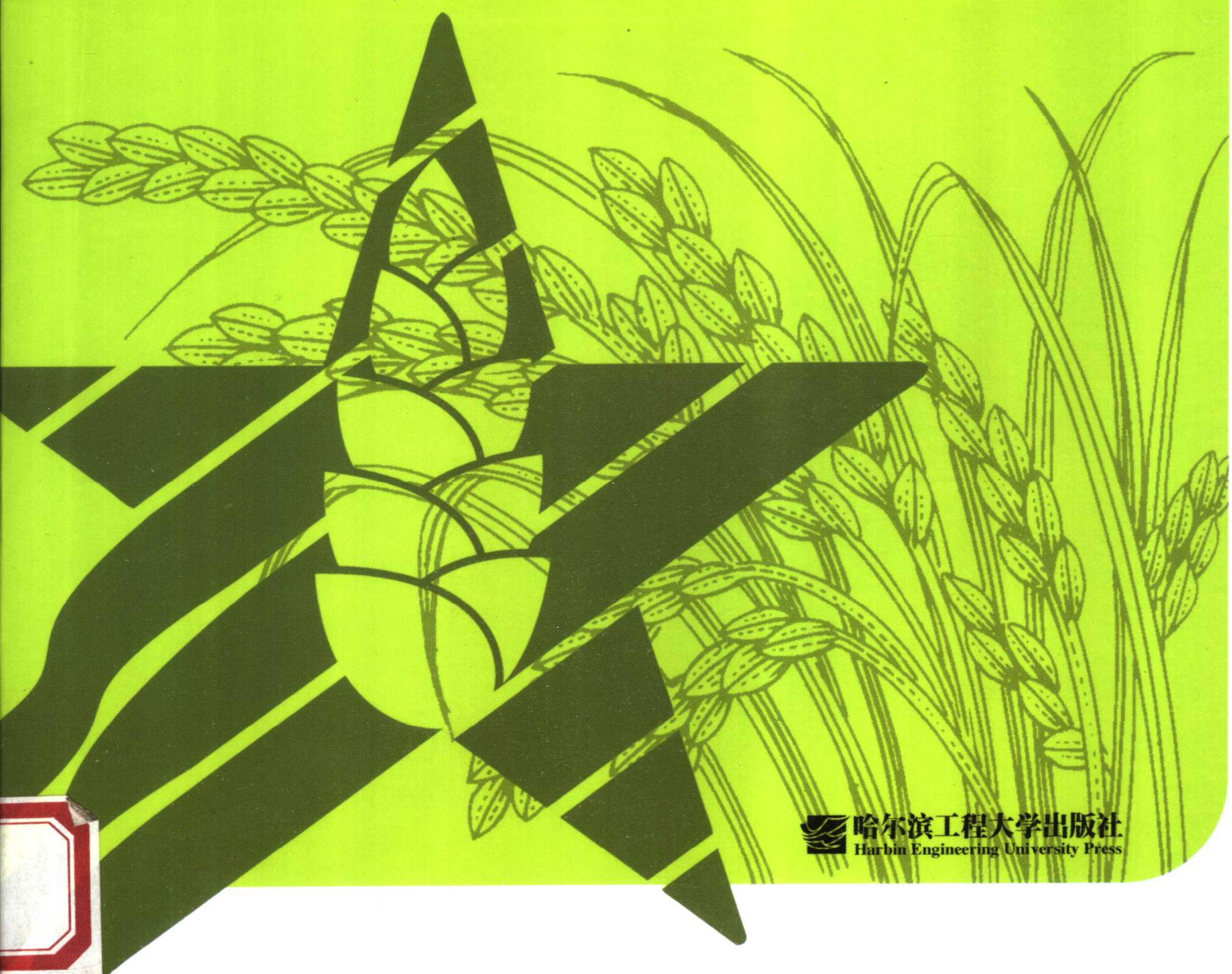
ENGLISH

新世纪农业科学专业英语

园艺英语

English Course for Horticulture

李庆章/总主审 胡家英/总主编
车代弟 王晓为/主 编 刘宏宇 霍俊伟/副主编



哈尔滨工程大学出版社
Harbin Engineering University Press

10-2

ENGLISH

新世纪农业科学专业英语

园艺英语

English Course for Horticulture

车代弟 王晓为 / 主 编 刘宏宇 霍俊伟 / 副主编

哈尔滨工程大学出版社
Harbin Engineering University Press

内容简介

本书是按照高等院校专业英语教学要求，为提高学生的专业英语水平，收集国外园艺相关的科技文章和新技术介绍，并结合多年来园艺教学实践的体会、汲取其他有关资料而编写的。本书选材多样，内容丰富，既由蔬菜、果树和观赏园艺三个方面构成，又从栽培、育种、生物技术、产品采后处理等各个环节形成园艺学科完整的教学体系。全书18个单元，每一单元由精读、泛读、关键字句解释、专业词汇和练习组成。课文附有译文可供教师和学生参考，是高等农林院校本科生的适用教材，也可供园艺工作者和广大业余爱好者学习参考。

园艺英语/车代弟编. — 哈尔滨:哈尔滨工程大学出版社,2007.4

ISBN 978-7-81073-996-2

Ⅰ.园... Ⅱ.车... Ⅲ.园艺-英语-高等学校-教材 Ⅳ.H31

中国版本图书馆CIP数据核字(2007)第046036号

出版发行 哈尔滨工程大学出版社
社 址 哈尔滨市南岗区东大直街124号
邮政编码 150001
发行电话 0451-82519328
传 真 0451-82519699
经 销 新华书店
印 刷 黑龙江省教育厅印刷厂
开 本 787mm×1 092mm 1/16
印 张 17
字 数 326千字
版 次 2007年4月第1版
印 次 2007年4月第1次印刷
印 数 1—2 000册
定 价 24.00元
http://www.hrbeu.press.edu.cn
E-mail:heupress@hrbeu.edu.cn

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。

* 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。

2007年2月

前　言

园艺专业是一个涉及内容很广的学科领域，目前许多高新技术在该领域都有广泛的应用前景，而且发展得日新月异，每个从事园艺工作的专业人员都在时刻关注着该领域的发展状况。为了越来越多的园艺工作者了解国际上园艺学科的发展动向，顺利地阅读园艺专业的英文资料，我们编写了本书。

本书内容包含了园艺专业所涉及的主要作物类型，以介绍花卉、蔬菜、果树栽培育种、贮运加工、生物技术及相关的管理系统知识为主，在讲授各种相关的理论知识的前提下，介绍了各研究方向的进展情况。本书包括 18 个单元，主要内容有：环境因子对园艺作物的影响；花卉的繁殖（有性、无性）；花卉及草坪栽培管理；育种技术；蔬菜的生产，种子处理、保存、育种方法；果树苗木繁殖，果树栽培、修剪、繁育技术，果实品质的评价；生物技术在园艺作物上的应用等。本书内容力求广泛选用不同风格的文章，做到内容新颖、知识面宽、系统性强；使选用的课文内容概念性和知识性强，难度适中，不涉及复杂的专业理论。为便于读者掌握专业词汇，每课课后对重要的关键词作了英、中文两种解释，同时还列出了生词，便于查阅和单词记忆。为了加深读者对课文内容的理解，课后还附有译文、习题和答案。

本书共分 18 个单元，其中第 1 单元到第 10 单元是由车代弟老师编写，第 11 单元到第 14 单元是由刘宏宇老师编写，第 15 单元到第 18 单元是由霍俊伟老师编写。本书译文的指导，语法、习题部分由英语系王晓为老师完成。此外，英语教师程怡参加了本书的部分编写工作。

限于读者水平，成书又比较仓促，错误和不足之处在所难免，欢迎批评指正。

车代弟

Preface

Horticulture is a wide-ranging branch of learning. It develops quickly and has good prospects in applying many new techniques. Each horticulturist pays close attention to the development of it. In order to satisfy more and more horticulturists to get knowledge of the new trends in this field, to read English materials on horticulture smoothly, we edited the book.

The book contains main types of crops involved in horticulture, which mainly introduces the systematic knowledge of flower, vegetable, fruittree planting and breeding, storage, conveyance, processing, biological techniques and related adminstration. Under the premise of introducing various involved theoretical knowledge, the book mainly introduces the progress of different research trends. It contains 18 units, the main contents are: the influence of environments towards horticulture crops; propagation of flower; planting and adminstration of flower and grass; breeding techniques; vegetable production, seed savers and breeding methods; fruittree planting, cutting, propagation techniques and evaluation of the quality of fruit; application of biological technology in horticulture crops, etc.

We try our best to select different types of articles, which are new and systematic. The selected texts are conceptional and informative, not involved in much difficult and complicated specialized theories. In order to help the reades to learn it better, we list the new words in vocabulary, and point out the technical terms separately. At the same time, key words are explained in both English and Chinese. Besides, translation of the texts, related exercises and the answers are given.

In the 18 units, the first to the 10th unit are edited by professor Che Daidi; the 11 to 14 unit are edited by Liu Hongyu; the 15 to 18 unit are edited by Huo Junwe. Wang Xiaowei, the English teacher, supervises all the translation of the texts and are in charge of the parts of grammar and exercises of the whole book.

Dr. Daidi Che

目 录
Contents

Contents

Unit 1

Part A

Temperature

Introduction

Floriculture literature discusses three types of temperatures: air, leaf, and medium. Generally, air temperature is the easiest to monitor, control, and record, but the actual leaf or plant temperature can differ greatly from the air temperature. For example, when the environment is warm and windy with low humidity, the leaf temperature will be lower than the air temperature because of the cooling effect of transpiration. Conversely, cool and sunny conditions with high humidity and little air movement will result in leaf temperature higher than the air temperature. The sun warms the leaf and there is little air movement or transpiration to dissipate the heat. Medium temperature reflects the actual temperature of the roots. Currently most temperature recommendations refer to air temperatures unless stated otherwise, and most recommendations also refer to night temperature, which is more easily controlled. Advances in environmental monitoring equipment and computer technology may soon allow greenhouse production to be based on leaf and medium temperatures rather than on air temperatures.

Temperature can have a general or a specific effect on plant growth. In the former case, plant growth gradually increases or decreases as the temperature changes. Temperature can have a specific effect on plant growth through vernalization, or the induction of a specific response such as flowering by cool temperatures. For example, *Aconitum* tuberous roots require vernalization for flowering (Leeuwen, 1980). For other species, such as purple coneflower (*Echinacea purpurea*), vernalization is not required but results in more rapid flowering and higher-quality flowering stems (Armitage, 1993). Many perennial species require vernalization for rapid, economical production. Propagation, regarding stratification, is a cold treatment applied to seeds to enhance germination.

Air temperature

Optimum and Tolerable Temperature Ranges

Each plant species has an optimum growing temperature range and a tolerable temperature range. The optimum temperatures produce high-quality plants most rapidly. Tolerable temperatures allow the plants to continue growing but may result in long production times or low quality. For example, the optimum night temperature range for chrysanthemums (*Dendranthema* x *grandiflorum*) is 61 to 64℉ (16 to 18℃), but chrysanthemums will still grow at night temperatures as low as 40℉ (4℃) or as high as 80℉ (27℃) (Whealy et al., 1987; Wilins et al., 1990). At the low end of the tolerable temperature range, however, growth will be uneconomically slow and at the high end flower initiation and development temperature are delayed and quality reduced. Consequently, chrysanthemums have a relatively narrow optimum temperature range and a wide tolerable temperature range. For many plant species, the temperature is often dropped several degrees from the optimum temperature one to several weeks before the plants are marketed to enhance color and postharvest life.

Average daily temperature

Average daily temperature controls the rate of plant development. If the average daily temperature is increased (within the tolerable temperature range for a species), most plants will grow faster and flower more rapidly. However, rapid growth often does not mean quality growth. Very warm temperatures encourage weak, poor quality growth which is frequently susceptible to disease. There is often an interaction with light intensity in which low light levels accentuate the poor growth associated with warm production temperatures. Ironically this situation can occur during the summer when heavy amounts of shade are used to reduce greenhouse temperatures. For some species, high daily temperatures may cause physiological responses such as delayed flower initiation in chrysanthemums (*Dendranthema* x *grandiflorum*), poinsettias (*Euphorbia pulcherrima*), and kalanchoes (*Kalanchoe blossfeldiana*) and bolting in petunias (*Petunia* x *hybrida*) (Grueber, 1985; Whealy et al., 1987). Similarly, low daily temperatures may induce premature flower initiation or dormancy. Photoperiod is often involved in these physiological responses to temperature.

Average daily temperature is calculated as an average of temperatures measured each hour (or more frequently if computer monitoring is used), not the average of the high and the low temperatures for a 24-hour period. The latter calculation is likely to be higher than the real average daily temperature, because the night temperature is usually relatively constant whereas the day temperature often gradually rises during the day to a high in the mid-afternoon. In addition, brief high temperatures can occur during cloudy days if the sun shines for a short period. Consequently, using the high-low temperature system to calculate average daily temperature will accentuate the day temperature.

Temperature recommendations

General temperature recommendations are based on whether height control is a concern for the crop species. When height control is not a problem, such as with rosette-forming plants or cut flowers, day temperatures are set 0 to 5℉ above night on cloudy days and 10 to 15℉ above night on sunny days to allow maximum photosynthesis during sunny days and reduce respiration during the night. During cold periods, growers generally lower night temperature as much as possible to reduce fuel costs.

DIF

DIF is the concept of regulating plant height by monitoring the difference between the day and the night temperature. The higher the day temperature is relative to the night temperature (day-night = DIF), the greater the stem elongates (Berghage and Heins, 1991; Erwin et al., 1989a, b; Karlsson et al., 1989). Where final plant height is a concern, such as with poinsettias (*Euphorbia pulcherrima*), Easter lily (*Lilium longiflorum*), and many bedding plants, DIF must be taken into consideration. Increasing the day temperaturie relative to the night will increase internode elongation for many species. Consider three similar greenhouses, for example, where the day and the night are both 12 hours long.

Table 1 - 1 Greenhouse

	1	2	3
	(°F/℃)	(°F/℃)	(°F/℃)
Day temperature	60(15.5)	55(13)	50(10)
Night temperature	50(10)	55(13)	60(15.5)
DIF	+10(5.5)	0	-10(-5.5)
Plant height	tall	medium	short
Average daily temperature	55(13)	55(13)	55(13)

Greenhouse 1 will produce the tallest plants because the DIF is the greatest (+10) and greenhouse 3 the shortest plants (-10 DIF). Plants from greenhouse 2 will be intermediate in height. All plants will flower simultaneously and have similar leaf numbers because the average daily temperature is the same for each greenhouse. Consequently, for plants where height is a concern, the day temperature should be no more than 0 to 5°F (0 to 3℃) above the night regardless of weather.

According to actual stem measurements, a large percentage of the daily stem elongation occurs early in the day just after sunrise, thus cool temperatures (negative DIF) for at least two hours starting just before the first light in the morning will reduce stem elongation (Cockshull et al., 1995; Erwin et al., 1989; Crindal and Moe, 1995; Moe et al., 1995). This cool, early morning pulse is known as the temperature DROP. However, very warm temperatures during the rest of the day (positive DIF) may negate much of the effects of the temperature DROP.

DIF may also affect plant responses other than height such as flower size and flower number in some species. Extreme day-night temperature reversals (e.g., DIF ≤ -5) may induce chlorosis and leaf curling of Easter lilies (*Lilium longiflorum*), although these effects quickly disappear when DIF is less negative (Erwin et al., 1989a). Plant carbohydrate and nitrogen levels also decrease with extreme negative DIF and may result in postharvest leaf fellowing of Easter lilies and bract edge burn and cyathia drop of poinsettias (*Euphorbia pulcherrima*) (Miller, 1997). Some species do not respond to DIF, including most Cucurbitaceae family plants and Dutch bulbs such as Hyacinthus, Tulipa, and Narcissus (Erwin et al., 1989a). Certainly much remains to be learned about the response of many floriculture species to DIF.

Media temperature

Monitoring the soil temperature is important in some situations in addition to monitoring the air temperature. Media heating is important for germination or rooting of cuttings of many species. Generally, media should be at least 70°F (21℃) with 72 to 75°F (22 to 24℃) optimum. Specific species may have a higher or lower optimum medium temperature for propagation. If misting is used during propagation, evaporation of mist may reduce media temperature and additional heat may be required. Heating cables can be placed on the bench, or a heating system may be used under the bench and the bottom of the bench can be enclosed in plastic to trap the heat. Polyethylene tubes can also be used to direct the heat from forced air heaters under the bench, but care must be taken to prevent excess drying of the cuttings or seedlings by covering the bench top with plastic.

Over the past few years, research has been conducted to determine if heating the medium would allow cooler air temperatures to be used during production (Stephens and widmer, 1976). Root zone heating would allow growers to reduce fuel costs by heating the air immediately around the plant medium and not the entire greenhouse air volume. The heat can be concentrated at the root level by using bench heating systems susch as Biotherm™ or placing heating pipes under the bench and trapping the heat under the bench with plastic. Warm air rises, heating the aboveground portions of the plants.

Root zone heating has proved effective with some plant species such as *Cyclamen* and may increase plant growth and speed plant development (Stephens and Widmer, 1976). Root zone heating is most effective during the first 6 weeks after potting. Potential disadvantages include possible flower bud abortion or blasting and altered watering and nutrition regimes. Generally root zone heating is effective but may not be economically justified.

Technical Terms

transpiration [ˌtrænspəˈreiʃən] *n.* 蒸腾作用
photosynthesis [ˌfəutəˈsinθisis] *n.* 光合作用
vernalization [ˌvənəlaiˈzeiʃən] *n.* 春化作用
stratification [ˌstrætifiˈkeiʃən] *n.* 层积现象
germination [ˌdʒəːmiˈneiʃən] *n.* 发芽, 萌发
chrysanthemum [kriˈsænθəməm] *n.* 菊花, 菊属
poinsettia [pɔinˈsetiə] *n.* 一品红
lily [ˈlili] *n.* 百合
rosette-forming [rəuˈzetˈfɔːmiŋ] *n.* 花结形成
bedding-plants [ˈbediŋˈplɑːnts] *n.* 床苗
aconitum 毛茛科
dendranthema 菊科
euphorbia 大戟科
kalanchoe 景天科
petunia 茄科
lilium 百合科
hyacithus 风信子属
tulipa 郁金香属
narcissus 水仙属
erwin et al 石蒜科
petunias 矮牵牛
average daily temperature 平均日温度
temperature recommendation 推荐温度/建议温度

Study Questions and Exercises

Ⅰ. Fill in the blanks with the appropriate words from the text.

1. Floriculture literature discusses three types of temperatures: ______, ______ and medium.
2. Each plant species has an optimum growing temperature range and ______.
3. ______ is important in some situation in addition to monitoring the air temperature.
4. Root zone heating is most effective during the first ______ after potting.
5. ______ can also be used to direct the heat from forced air heaters under the bench.
6. Root zone heating would allow growers to reduce ______ by heating the air immediately around the plant medium and not the entire greenhouse air volume.
7. Tolerable temperatures allow the plants to continue growing but may result in long production times or ______.

Ⅱ. Decide whether the following statements are true or false. Base your answers on the information in this text.

1. Temperature can't have a general or a specific effect on plant growth.
2. Vernalization is not required but results in more rapid flowering and higher-quality flowering stems.
3. Few perennial species require vernalization for rapid, economical production.
4. Average daily temperature controls the rate of plant development.
5. During cold periods, growers generally lower night temperature as much as possible to reduce fuel costs.

Ⅲ. Translation.

1. At the low end of the tolerable temperature range, however, growth will be uneconomically slow and at the high end flower initiation and development temperature are delayed and quality reduced.
2. There is often an interaction with light intensity in that low light levels accentuate the poor growth associated with warm production temperatures.
3. Average daily temperature is calculated as an average of temperatures measured each hour (or more frequently if computer monitoring is used), not the average of the high and the low temperatures for a 24-hour period.
4. According to actual stem measurements, a large percentage of the daily stem elongation occurs early in the day just after sunrise, thus cool temperatures (negative DIF) for at least two hours starting just before first light in the morning will reduce stem elongation.

Part B

Condition Factors

Light

Measuring light requires the use of three factors: color, intensity, and duration. Color (quality) is the wavelength of the light, intensity (quantity) is the strength of the light, and duration (photoperiod) is the time span of the light episode. All three factors are needed to describe how much light is required by plants. Light has two functions in plant growth. The first role is to fuel plant growth through photosynthesis. Plants convert light energy into chemical energy which results in plant growth. Secondly, light initiates or modifies specific physiological responses such as seed germination, flowering, seescence, tuber formation, and dormancy.

Wavelengths are measured in nanometers (nm) with specific wavelengths corresponding to specific colors; for example, yellow light has a wavelength of approximately 580 nm. Although general plant growth usually requires light with all wavelengths, red (700nm) and blue (470nm) wavelengths result in the greatest plant growth response. Conversely, hotoperiodism involves wavelengths centered around red (660nm) and far red (720nm).

The footcandle (fc, 1fc = 10.8lux) quantifies luminous energy, or light visible to the human eye. This system emphasizes the green-yellow wavelengths (530 to 580nm), which the human eye sees the best. Photosynthesis, on the other hand, is driven by a broader range of wavelengths with a red-blue emphasis. Light meters which measure footcandles can give an approximation of greenhouse light levels but may have a 45% error compared with the actual photosynthetic energy in radiation (Muckle, 1997). Photosynthetically active radiation (PAR) measures the amount of light energy equally in all wavelengths from 400 to 700nm, without stressing the green-yellow wavelengths most visible to the eye. A third system of measuring light intensity, based on quantum energy, describes light in terms of tiny particles of energy called photons or quanta and is known as photosynthetic photon flux (PPF). The number of photons is measured in moles (mol) or einsteins (E) with one mole (one einstein = 6.023×10^{23}). Thus, the intensity of light in the quantum system would be measured in the number of photons being transmitted such as $\mu mol \cdot s^{-1} m^{-2}$, which is the preferred unit of measure. Both PAR and PPF emphasize all wavelengths equally within a specific range such as 400 to 700nm or 400 to 850nm without regard to the human eye. PPF meters are available and although most are expensive, low-cost meters have recently been introduced.

Duration refers to the photoperiod or daylength which can affect plant growth two ways: (1) short photoperiods provide less total light energy to plants than long photoperiods at the same light intensity, and (2) the length of the photoperiod may induce specfic physiological response in many plant species independent of the light intensity, which is known as photoperiodism. For example, the poinsettia (*Euphorbia pulcherrima*), a short-day plant, is induced to flower by providing long nights and short days.

Nutrition

Supplying nutrients to floriculture crops is an exact process. The use of well-drained, soilless media and intensive production requires growers to supply all the necessary plant nutrients with little margin for error. Nutritional programs also tend to be highly individualistic with each grower or greenhouse operation having unique nutrient regimes. A number of variables must be considered when developing a fertilization program for a crop species—total quantity or application rates, proportions of each element, application method, and interactions with media type, pH and soluble salt concentration, light levels, water quality, watering practices, production temperatures, and postharvest life.

One other point to consider is the current three-number method for expressing the concentrations of nitrogen (N), phosphorus (P), and potassium (K) in a fertilizer. Although nitrogen is expressed as the actual percentage of nitrogen in the fertilizer, phosphorus is expressed as percentage of phosphorus pentoxide (P_2O_5) and potassium as the percentage of potassium oxide (K_2O) in the fertilizer. Phosphorus pentoxide is only 44% actual phosphorus and potassium oxide is only 83% actual potassium. Thus, a fertilizer described as 10-10-10 (N-P-K) could also be written as 10-4.43-8.3 (N-P-K) if the percentages of elemental N, P, and K were used. Most trade journals use the 10-10-10system, but scientific literature frequently uses percentages of elemental N, P, and K. The rest of the plant nutrients required for proper growth are expressed as a percentage of the actual element present.

Water

In the past many growers have said that the person at the end of the hose determines plant quality. Today the saying holds true, except that the hose has been replaced or supplemented with a variety of automaied systems ranging from flood irrigation to overhead booms. In addition, a variety of factors other than plant quality need to be considered, including cost, water runoff, and nutrition.

Despite the advances in irrigation technology, water still performs the same role in plant growth. Nutrients are transported in water from the medium up through the roots to the shoots. Water is responsible for the ability of most plants to stand upright because nonlignified cells cannot remain turgid without water. Transpiration of water cools plant tissues. Most importantly, water maintains protoplasm in the cells allowing enzymes and other cellular functions to occur.

Media

A good grower will invest much time and money into developing or selecting suitable media. Media provide water, nutrients, and support for the whole plant. Roots require oxygen, so media must provide for good gas exchange. Many growers believe that a majority of the problems that occur during production are linked to the growing media and the roots. Consequently, growers often test several media to select one that works best for them. Growers should never use an untested medium for an entire crop as changing a medium often requires that the irrigation frequency and feritlizer regime also be adjusted.

Technical Terms

wavelength ['weivleŋθ] *n.* 波长

nanometers(nm) ['neinəˌmiːtə] *n.* 纳米

footcandle(fc) ['fut'kændl] *n.* 光度计

luminous ['luːminəs] *adj.* 发光的

light energy 光能

chemical energy 化学能

photosynthetic photon flux(PPF) 光合光子通量

photosynthetically active radition(PAR) 光合有效辐射

photoperiodism 光周期效应/光周期性

Study Questions and Exercises

Ⅰ. Fill in the blanks with the appropriate words from the text.

1. Masuring light requires the use of three factors: ______, ______ and ______.
2. Both ______ and ______ emphasize all wavelengths equally within a specific range such as 400 to 700nm or 400 to 850nm without regard to the human eye.
3. ______ refers to the photoperiod or day-length which can affect plant growth two ways.
4. ______ are measured in nanometers with specific wavelengths corresponding to specific colors.
5. One other point to consider is the ______ for expressing the concentrations of nitrogen, phosphorus, and potassium.
6. A good grower ______ much time and money into developing or selecting suitable media. Media provide water, nutrients, and support for the ______. Roots require oxygen, so media must provide for good gas ______. Many growers believe that a majority of the problems that occur during productiong are ______ to the growing media and the roots. Consequently, growers often test several media to select one ______ or them. Growers should never use an untested medium for an entire crop as changing a medium often requires that the ______ and ______ regime also be adjusted.

Unit 2

Part A

Plant Growth Factors Which Affect Nursery Crop Production

Introduction

A successful nursery must select plant varieties that are well adapted to the growing conditions in its area. Two important factors to consider when choosing a crop are its winter hardiness and its adaptability to the pH conditions of the soil.

Plant hardiness

Hardiness of plants depends on how well the plant is adapted to a complex of factors. Among these are tolerance to cold or heat, tolerance to moisture conditions and adaptability to winter snow conditions. A key factor on the prairies is adaptability to cold, but plants can also be damaged by hot dry periods in the summer. Snow cover can have a dramatic effect on the adaptability of plants to survive. Snow provides an insulating blanket and protects roots that might otherwise be damamged by cold or by freeze-thaw cycles. In areas where snow cover is uncertain, mulches may be used to keep the soil at a more even temperature.

Variation between species

Plant species vary in their adaptability to environmental conditions. Species, which grow naturally in conditions that are similar to the area in which you wish to grow them, are most likely to be well adapted. Some plant species have wide geographical distributions. In these species, plants that originate in one part of the range may be well adapted to growing in our climate while plants or seeds from another part of the range may not survive. For instance, Manitoba maple (*Acer negundo*) is native from the Canadian prairies to Florida. Plants that originate in the Canadian prairie region are adapted to that climate while those from further south may not be. Cultivars, which have been selected from these southern populations, may not survive on the prairies, even though they are the same species. Extensive testing has been done to determine the plants which will thrive in our climate but it is important to know that the source of the plants or seeds is from plants which are climatically adapted.

Vegetative propagation

Cultivars, which are vegetatively propagated, are genetically identical to the source plant and should be adapted to the same conditions as the source plant. However, with grafted plants, the