國立嘉義大學九十四學年度博士班入學考試

所別：農學研究所
組別：甲組（作物組）
科目：農學專業英文

一、請將下列短文翻譯成中文(劃底線的專有名辭可直接使用原文)(25%)

There is evidence for both extracellular and intracellular ABA receptors in guard cells. ABA closes stomata by causing long-term depolarization of the guard cell plasma membrane. Depolarization is believed to be caused by an increase in cytosolic Ca^{2+}, as well as alkalinization of the cytosol. The increase in cytosolic calcium is due to a combination of calcium uptake and release of calcium from internal stores. This calcium increase leads to the opening of slow anion channels, which results in membrane depolarization. IP_3, IP_6, cADPR, PA, and reactive oxygen species all function as secondary messengers in ABA treated guard cells, and G-proteins participate in the response. Outward K^+ channels open in response to membrane depolarization and to the rise in pH, bringing about massive K^+ efflux.

二、請將下列短文翻譯成中文(劃底線的專有名辭可直接使用原文)(25%)

We recently identified an extremely short (20 cm tall) rice line, which is an ideal model for larger rice cultivars. We called this line "Super Dwarf" rice. Here we report the response of Super Dwarf to temperature, photoperiod, photosynthetic photon flux (PPF), and factors that can affect time to head emergence. Vegetative biomass increased 6% per ℃, with increasing temperature from 27 to 31℃. Seed yield decreased by 2% per ℃ rise in temperature, and as a result, harvest index decreased from 60% to 54%. The time to heading increased by 2d for every hour above a 12-h photoperiod. Yield increased with increasing PPF up to the highest level tested at 1800μmol m^{-2} s^{-1} (12-h photoperiod; 77.8mol m^{-2} d^{-1}). Yield efficiency (grams per mole of photons) increased to 900μmol m^{-2} s^{-1} and then slightly decreased at 1800μmol m^{-2} s^{-1}.

三、請將下列短文翻譯成中文（25%）

Regulating plant growth is an integral part of the production program of many greenhouse crops. Stretching due to high temperatures or low light can be a production reality. To prevent excessive stem elongation, a number of nonchemical and chemical control options are available. The three primary options for controlling plant growth are biological, physical, and chemical. For most greenhouse operations, a combination of factors is used to manipulate plant growth. Each is covered below.

Growing varieties that are shorter growing is often the first step available to growers. While this may work in theory, it may not be commercially practical. Many customers demand specific color or growth form characteristics, and shorter growing varieties with these attributes may not be available. Therefore, physical or chemical control strategies must also be incorporated into a production plan.

Knowing how the growing environment and cultural practices can affect plant growth will help in managing a crop's growth. There are a number of physical control options available: container size, timing, water stress, nutrient stress, mechanical conditioning, light quality and quantity, pinching, and temperature.

To control excessive plant growth, many crops require the use of chemical growth regulators (PGRs). Most of the commercially available PGRs are anti-gibberellins and work by inhibiting gibberellin (GA) synthesis within the plant. Gibberellins promote cellular elongation, so without them, cells do not elongate as much and plants do not grow as tall.

四、請將下列短文翻譯成中文（畫底線的專有名詞可直接使用英文）25%

Anthocyanins are nearly ubiquitous in plants, and provide color in flowers, fruits, leaves, stems and storage organs ranging from scarlet to blue. Anthocyanin accumulation in leaves is influenced by many environmental variables, such as nutrients, temperature, availability of water and, in particular, light. Because of the green／blue／UV light absorbing characteristics of these pigments, their accumulation may serve as an adaptive mechanism to protect plants from damaging levels of sunlight. In this report, we examine the effect of UV light on the accumulation of anthocyanins in leaves of the deciduous woody shrub, *Cotinus coggygria* cv. Royal Purple.

C. coggygria cv. Royal Purple, is grown as a garden bush and for cut decorative branches as well. Most studies on *C.coggygria* focused on increasing the propagation efficiency of this plant. The main attraction of this plant is the dark wine-purple color produced in its leaves due to various environmental conditions such as high light intensities, low temperatures and soil composition.

In the present study, we examined the effect of UV light (from 300-400 nm) on pigmentation of *C.coggygria* leaves. The UV effect was examined by covering plants with three different polyethylene sheets that transmit different amounts of UV light. Since *Cotinus* is often grown under plastic covers, our work will determine the spectral properties of plastic covers that will give the maximal anthocyanin pigmentation in *Cotinus* leaves.