

Chapter 1

Introduction

Longan (*Euphoria longana* Lam.) is an important crop in Southeast Asia. It is commonly grown in Thailand, Cambodia, Laos, Vietnam and Taiwan where it is a major commercial crop with high intra and inter country demand. Hong Kong and Singapore are major outlets for longans. Longan is a symmetrical evergreen tree with dense dark green foliage (Crane *et al.*, 2000). In Thailand, trees typically grow to 10 to 12 m and 10 m in width. The largest cultivation area is in the northern part of Thailand, especially Chiang Mai and Lampoon provinces, which are grown about 71 percent of total area. Total fruits yield in 1997 was over 5,000 million baht (Angkasit *et al.*, 1999). Longan is a subtropical tree well adapt to subtropical areas with a cool, non-freezing elevations in Southeast Asia and grows at elevation from 1.8 to 460 m. Longan produces more reliably in areas characterized by low non-freezing temperatures (15^o C or less) and a dry period during the fall and winter. In general, longan trees bear erratically and in some years little to no fruit is produced. That is the major production problem of longan throughout the world (Crane *et al.*, 2000). Sethapakdee (1999) suggested that low temperature, 15 to 20^o C for 1 to 2 weeks is the most important factor for flower induction of longan. Less or no flowering is observed when the temperature is not cool enough. Farmers apply chlorate compounds to induce flowering of longan such as hypochlorite, chlorine solution and potassium chlorate. Potassium chlorate (KClO₃) is more popular with its effectiveness and less toxic. This chemical promotes flowering of longan all year round, but mechanism and metabolism have been elucidated.

The change in development of primordia initiated at the shoot apical meristem is controlled by environmental and endogenous signals. Physiological analysis has led to certain compounds and process being implicated in controlling the floral transition. These include the role of sugars and some hormones (Levy and Dean, 1998). Roots, the hidden half of plants,

consume a half of photosynthates produced per day. Between one-third and two-thirds of all carbohydrates translocated to the roots are used in respiration. Besides, many kinds of hormone are produced in roots. The interactions between these hormones are the quantitative changes in root and shoot caused by perturbations of the root environment. Carbohydrates, nitrogen and hormones are mentioned involving in plant growth and development. Changes of these compounds concentration in root may important to signal flower induction of longan induced by potassium chlorate.

Objectives of the experiment

1. To study the effect of potassium chlorate on changing some physiology and some essential substances in root of longan cv. Dor during flower induction period.
2. To study the correlation of carbohydrate, nitrogen, phosphorus and potassium between roots, leaves and shoots.