Chapter 1

Introduction

Longan (*Dimocarpus longan* Lour.) is one of the most popular members of Sapindaceae. Although the production of longan in global scale is much smaller than some major tropical and subtropical fruits such as banana, citrus and mango. The longan industries is mostly residing in southeast Asia. In Thailand, the largest longan cultivation area is in the northern region especially Chiang Mai and Lamphun provinces, which is grown about 71 percent of total area. Total fruits yield was over 5,000 million baht/year (Manochai *et al*., 2005). In general, longan trees bear erratically and in some years little to non fruit is produced. In the past, the alternate bearing was the major production problem of longan throughout the world (Crane *et al*., 2000). At present, chlorate compounds especially potassium chlorate ($KClO_3$) are commonly used to induce off-season longan flowering. Besides $KClO_3$, growers also use sodium chlorate ($NaClO_3$) but it still less popular (Manochai *et al*., 1999a). $KClO_3$ could be applied as soil drench, foliar spraying and trunk injector. However, soil drench is the most effective method. Factors on inducing flowers with soil drench are tree size, tree vigor, soil type and availability of water. The recommendation rate of $KClO_3$ application as soil drench was 8-10 $g.m^{-2}$ or 40-60 $g.m^{-2}$ canopy diameter. This chemical should be applied when the leaves were fully matured. Flowering also could be induced with foliar spraying of 1 $g.L^{-1}$ (Sritontip *et al*., 1999). The role of chlorate on flower induction is still unclear and has been elucidated. There were some hypotheses about flower induction of longan by $KClO_3$, but the best hypothesis was that chlorate ion change in hormonal balance (Pankasemsuk, 1999). In many researches, the increasing of cytokinins (CKs) and decreasing of auxins and gibberellins contents could be detected before flowering of longan. Generally, CKs

are synthesized at various meristematic sites in the plant, including shoot apex, young leaves, cambial region and root apices. However, root is known as the major site of CKs biosynthesis. Furthermore, CKs synthesized in the roots are transported upward into the shoot via the xylem stream (Srivastava, 2002; Emery *et al*., 2000). CKs in roots might be concerned with flowering in longan. On the other hand, Moonrat (2005) found that $KClO_3$ could induce flowering in longan which grown in nutrient solution. Therefore, the hormonal changes and some biochemical of the leaf and shoot of longan which is treated with $KClO_3$, for flower induction in derooted longan should be studied. For the better understanding of the flowering induction mechanism in longan by $KClO_3$.

Objective of the experiment

To study the effects of potassium chlorate on flowering, physiological and biochemical changes in leaf and shoot of derooted air-layered longan cv. Daw.