CHAPTER 1

INTRODUCTION

Flowering event of a sugarcane (*Saccharum officinarum L.*) plant is an important concern for both plant breeders and commercial cane growers. Flowering allows plant breeders to cross different sugarcane cultivars and even intergenera such as *Erientus spp.* and *Spontenum spp..* However, flowering event terminates growth and development processes of a sugarcane plant and influences sugar production and accumulation. An efficient breeding and selection program of sugarcane genotypes in different climatic regions requires a quantitative understanding of the plant's developmental responses to environment factors such as temperature and photoperiod. This information is also essential for the development of a sugarcane phenological model, which is needed to incorporate into existing sugarcane crop models to improve model's capacity.

CANEGRO and APSIM-sugarcane models, the two main current sugarcane simulation models used throughout the world and ThaiCane model, the model used in Thailand predict only vegetative growth stages based on growing degree days concept and does not allow prediction of flowering and/or maturity dates (O'leary, 1999), which stop growth process, begin to senescence and cause a decrease in yields (Moore and Osgood, 1989). Growing degree days concept alone is not sufficient to predict flowering dates of a cane plant because the development rate is strongly affected by daylength. Studies on flowering event in *Saccharum spp.* were started in an attempt to control the timing of the event for breeding purpose of different varieties

by using artificial light (James, 1972; James, 1969; Moore and Osgood, 1989; Julien and Soopramanien, 1975; and Clements, 1975). However, there is no prediction of flowering event using influence of climatic factors in these studies.

This research is an initiative attempt to determine the effect of various photoperiods on development rate of four sugarcane varieties with an intention to develop a simple model to predict the flowering event of sugarcane in order to develop a predictive capacity for the current sugarcane simulation model.