

CHAPTER 1

INTRODUCTION

Hippeastrum, commonly known as **amaryllis** (Okubo, 1993) and **fire lily** (Smitinand, 2001), is a flowerbulb belonging to Amaryllidaceae. The plant originated in Southern Africa as well as in South American countries. The centre of distribution of this genus is around the Amazon basins of Brazil, Bolivia and Peru. Consequently, *Hippeastrum* spreaded out and distributed to other parts of the world (Traub, 1958) where a large number of varieties were bred and widely used. It had long been introduced to Thailand, well naturalized in various parts of the country and recognized as one of the native ornamentals.

At present, *Hippeastrum* cultivated in Thailand can be categorized into 2 groups from the characters of the plants and their utilization patterns as 1) local small-flowered and 2) introduced large-flowered hybrids. For local *Hippeastrum*, the plants of this group still maintain their hardened domesticated properties. They grow and propagate well in warm environments and, moreover, are tolerate to drought, pests and diseases, to a certain extent. Since most of the varieties are not named, they are called by the colours of the flowers, red, pink, orange or white. Typical characters of these plants are leafy, deciduous in the open and evergreen under humid shades, bear small flowers with attractive decorated-petals on slender but strong stalks. They flower more than once a year. Local *Hippeastrum* are usually grown outdoor as bedding plants or placed under partly shade as pot plants. Although known with no commercial values, but, cut flowers of local varieties stay in vases up to 7-10 days. Unlike local *Hippeastrum*, large-flowered types are famous for their commercial properties. They produce showy flowers on fleshy and thick stalks with lengthy shelf-life and sold for high price as indoor flowering pots. But, being hybrids from temperate countries, large-flowered varieties grow well to their best qualities only in highland nurseries or under controlled environments, making it somewhat inconvenient for average lowland growers to produce them, commercially.

To provide flower growers with considerable-priced *Hippeastrum* bulbs of various varieties suitable for lowland productions, Huai Hong Khrai Royal Development Study Centre had initiated the project of *Hippeastrum* Improvement to serve such purpose. Hybrids have been made from crosses of local and introduced varieties, aiming at producing new varieties of different ploidy levels to be selected for flowering pots and beds as well as cut flowers. Although achievements were made to a certain point but obstacles in many aspects arose, thus delaying releases of selected varieties.

Theoretically, obstructive problems are bound to occur in various phases throughout hybridization process when crosses are made among the parents of different ploidy levels. Physiological studies in particular aspects can develop certain methodologies to overcome those obstacles, hence shorten the length of hybrid deliverances.

This study was carried out to take part in such development as far as physiological methodologies are concerned. Firstly, floral development of diploid and tetraploid parents were investigated focusing on organogenesis of reproductive structures leading to appropriate techniques to evaluate capacity, susceptibility and compatibility towards fertilization of the parent plants. Secondly, specific physiological methodologies enhancing and/or improving hybridizing efficiencies were developed and, thirdly, applicable means of variety identification of parent plants including the hybrids were established. Results obtained from this study were not only useful for *Hippeastrum* improvement but also relevant to other species of Amaryllidaceae, sharing similar practical problems.