

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Farmers need varieties of plants that have the combined characteristics of cultural, genetic and ecological diversity: types of characteristics that allow the crops to adapt well to local environmental conditions. Such varieties tend to be tolerant to pest and disease. To sustain healthy biodiversity on their farms, farmers need access to lots of varieties, including the older commercial varieties taken from catalogues (Singh, 2002).

As a result, plant breeding is the act of developing new varieties of plants through the transfer of desirable traits from parent to progeny, through the practical application of genetics. Plants evolve naturally over generations through genetic variation that results from sexual reproduction and genetic mutation. The aim of plant breeding is to intervene in this process so as to ensure the transfer of specific desirable traits from parent stock to progeny. This involves changing the hereditary makeup of plants so as to fix the required traits in a stable form for successive generations (“The Australian Agency for International Development”, 2001).

This process continues today, so that further plant varieties will be available to meet the challenges of sustainable agriculture, population growth and environmental impact, as well as providing other economic, social and cultural benefits for the community. Hence, plant breeding is particularly important for agricultural development around the world. New varieties are developed for agriculture for a variety of purposes, including for improving the productivity, quality and consistency, adaptation to diverse environmental conditions, flavor and nutritional value, resistance to diseases and pests, and properties useful in handling, shipping and storage (“The Australian Agency for International Development”, 2001).

New varieties of plants are one of the most powerful tools to enhance food production in a sustainable way, to increase income in the agricultural sector and to contribute to overall development. It also contributes to the demand for more tasty

products or fragrant flowers, more resistant crops against drought, heat, cold or plant diseases. The great increase over the last 50 years in the development of new varieties has made the agricultural sector more efficient and profitable to the producers (“Plantum NL the association”, 1993).

The development of a new variety is frequently a long and costly undertaking. By allowing the breeder to control the commercialization of the variety, Plant Variety Rights gives the breeder a chance to recoup costs and profit from breeding investments. Without the legal protection of rights, the breeder can very soon lose control of the commercialization of the new variety to persons who had not contributed towards the breeding costs (“Institute for Seed and Seedlings”, 2001).

Without protection of intellectual property that is new plant genetics, no developments in plants would be possible. Strong breeder's rights encourage breeding companies to take risks: investing in new product development (Plantum, 1993). On the other hand, the World Trade Organization (WTO) desires to reduce distortions and impediments to international trade, and taking into account the need to promote effective and adequate protection of intellectual property rights, and to ensure that measures and procedures to enforce intellectual property rights do not themselves become barriers to legitimate trade (“Trade related aspects of intellectual property rights”, 1995).

To this extent, the Agreement on Trade-Related Aspects of Intellectual Property Rights, TRIPS Agreement was then established in 1994, which provides for an obligation to protect plant varieties under Article 27.3b. The article is prescribed for plants and animals, other than micro-organisms, and essentially biological processes for the production of plants or animals, other than non-biological and microbiological processes. However, members shall provide for the protection of plant varieties either by patents or by an effective system or by any combination thereof. The provisions of this subparagraph shall be reviewed four years after the date of entry into force of the WTO Agreement (“Trade related aspects of intellectual property rights”, 1995).

Being a member of the WTO, Thailand is legally bound to follow its agreement. The Plant Variety Act B.E. 2542, then, was enacted to protect plant

genetic resources and breeders rights. Under the current legislation, a new variety must be approved by the Plant Variety Protection Office in Thailand for protection to be received. Testing of new plants for variety protection is required by the act for those who are applying for their rights. Plant variety protection gives the variety owner the exclusive right to propagate and trade the propagation material of its variety. Others may only do so if the breeder consents and on payment of a certain fee (“สำนักคุ้มครองพันธุ์พืชแห่งชาติ”, 2543).

The criteria of testing are prescribed under Article 12 and 16 of the act that requires four conditions: novelty, distinctness (D), uniformity (U), and stability (S). By providing an incentive to breeders, Plant Variety Protection encourages that investment and effort be put into plant breeding in Thailand. The result is that farmers, horticultural producers and home gardeners gain access to an increased number and range of improved varieties. Thus, Plant Variety Rights benefit not only plant breeders, but also the public generally (“สำนักคุ้มครองพันธุ์พืชแห่งชาติ”, 2543).

The act was fully implemented in 2003. Since then, a number of orchid genera, *Dendrobium* hybrid breeders applied for rights. Most of them are declared a novelty based on their flowers, their size and color. Consequently, the new varieties of *Dendrobium* hybrids must be subject to a series of examinations to demonstrate that the new variety meets the DUS requirements (Figure 1). Comparative tests and trials between new or candidate varieties and references or the most similar varieties will be set up to determine whether they are significantly different. On completion of the appropriate DUS tests, the variety will be considered by experts to ascertain whether all the appropriate requirements for Plant Breeders' Rights have been met. If the variety meets the criteria for a grant of rights then a registration to grant rights to the variety will be issued. Therefore, the result of the trial is a key document, which is used for granting a breeder's rights.

1.2 STATEMENT OF THE PROBLEM

This study aims to answer the following questions:

1.2.1 What are differences between the new variety of *Dendrobium* hybrid and the extant varieties?

1.2.2 How can one differentiate between those varieties?

1.2.3 Does the distinctness of the characteristics qualify enough to be registered as a new variety under the Plant Variety Protection Act?

1.3 OBJECTIVES OF THE STUDY

This research has the following objectives:

1.3.1 Main objective

To assess the different value between new varieties of *Dendrobium* hybrid and the existing ones that enable the variety owner to be given the exclusive right to propagate and trade the propagation material exclusive to that variety.

1.3.2 Sub objective

1. To collect and maintain orchid varieties for DUS tests
2. To establish a database for orchid varieties
3. To research and collect data on the characteristics of new varieties of the *Dendrobium* hybrid for reference in view of future DUS test

1.4 DEFINITION OF TERMS/VARIABLES AND DEFINITIONS

The definitions of the terms, acronyms and abbreviations of this study are as follows:

CPVO	Community Plant Variety Protection Office
DNA	Deoxy Ribo Nucleic Acid
DOA	Department of Agriculture
DUS	distinctness, uniformity, and stability

EU	European Union
IP	intellectual property
LSD	Least Significant Difference
MG	Measurement by a single observation of a group of plants or parts of plants
MS	Measurement of a number of individual plants or parts of plants
P	Probability
PBR	Plant breeders' Rights
PVP	Plant variety protection
QL	Qualitative characteristic
QN	Quantitative characteristic
PQ	Pseudo Qualitative characteristic
RHS	Royal Horticultural Society
SPSS	Statistical Package for Social Science
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UPOV	International Union for the Protection of New Varieties of Plants
VG	Visual assessment by a single observation of a group of plants or parts of plants
VS	Visual assessment by observation of individual plants or parts of plants
WTO	World Trade Organization

1.5 SCOPE OF THE STUDY

This study is limited to orchid plant and focuses only on the *Dendrobium* hybrid, Dangphimon and Dangphiriya varieties. However, the study has the potential to promote plant variety protection under the Plant Variety Protection Act B.E. 2542 which has the objective of encouraging plant breeders to breed new varieties of plants

by giving them the plant breeders' rights and to conserve plant genetic resources for sustainable use.

1.6 SIGNIFICANCE OF THE STUDY

This study of the Testing of a New Plant for Variety Protection, Orchid, *Dendrobium hybrid*, Dangphimon is significant in several respects.

1.6.1 The new variety of *Dendrobium*, Dangphomon would broaden the genetic base for further research on new plant varieties, and conservation and sustainable use of plant genetic resources.

1.6.2 The testing of Dangphimon will center on Plant Breeders Rights (PBR) especially Plant Variety Protection in view of the globalization of agribusiness.

1.6.3 The findings would encourage the breeders to breed more new varieties of plants.

1.6.4 The new variety of *Dendrobium*, Dangphomon would increase the economic advantages for the breeder.

1.7 ORGANIZATION OF THE STUDY

The study of The Testing of a New Plant for Variety Protection, Orchid, *Dendrobium hybrid* in this paper is divided into five chapters. The first chapter provides an introduction to the rationale, objective, scope of the study, terms, significance of the study, and organization of the study. Chapter II offers a review of literature to the relevance fields of the study. Chapter III highlights of methodology of study that consists of materials, procedures, and data analysis. Chapter IV covers the key results both quantitative and qualitative that are associated with the orchid plant characteristics. Chapter V closes the study with conclusions, a discussion which comprises a summary of the study and findings, and the most important issues that need to be done in the future.