

CHAPTER FIVE

CONCLUSIONS, DISCUSSION AND RECOMMENDATION

This chapter presents (1) a summary of the study, (2) a summary of the findings, (3) discussions of the positive and negative facts between the findings and the reviews, (4) conclusion, and (5) recommendations for future research.

5.1 SUMMARY OF THE STUDY

This section summarizes work being carried out in DUS testing to assess the distinctness, uniformity, and stability of new variety of orchid plant, Dangphimon, by comparing it with an extant variety, Danhpiriya.

5.1.1 Objectives of the Study

To assess the different characteristic of the new variety of *Dendrobium* hybrid, Dangphimon, and the extant one, Dangphiriya, enabling the variety owner to receive exclusive right to propagate and trade the propagation material of its variety.

5.1.2 Subjects, Materials, and Procedures

In October 2005, 40 propagated materials of the *Dendrobium* hybrid, Dangphimon and Dangphiriya were collected randomly from the breeder's field. All of them were 2 years old plants and grown in coconut bark under a shade covering 70 % shade was applied. Plants were arranged in randomized complete blocks 2 m. long by 1.60 m. (4 rows) wide in 2 replications.

5.2 SUMMARY OF THE FINDINGS

The result of the study can be summarized as follow:

5.2.1 Distinctness

Comparative trial test results shows that sixteen characteristics between the candidate variety, Dangphimon, and the example variety, Dangphiriya were distinct from each other significantly at $P=0.01$. or 1 %.

5.2.2 Uniformity

No particular problem was noted regarding the uniformity. Even though both Dangphimon and Dangphiriya varieties reached 3 different heights during treatment, the majority population could be considered as uniform.

5.2.3 Stability

The variety was considered sufficiently stable as there was no evidence to indicate that it lacked uniformity or failed to conform to the essential characteristics of its description. Moreover the tested plants are vegetatively propagated varieties, like the Dangpimon, so the candidate then was considered to be sufficiently stable because there was no evidence to indicate that it lacks uniformity ("The Community Plant Variety Office", 2002) which means the stability would exist for every generation. Therefore, the stability test was not conducted for this research.

5.3 DISCUSSION

This section concerns the implications of the findings, exploring some crucial points which would be of benefit for future research. It is the first time in Thailand for one to perform this kind of research. The literature review found that published work on DUS testing on orchid plants is very limited. Only, one article was found after a search through various journals and is relevant to the current study: the testing of orchid, *Phalaenopsis*. It is a fact that the study can result in the achievement of intellectual property (IP) rights for the breeder. Most of the breeders therefore avoid sharing such test data. Keeping the data is one way of protecting their IP. However, regarding the testing systems, UPOV and its members have some publications that can be accessed. The findings can be summarized as follows:

5.3.1 According to the literature review, most of the UPOV member countries have 3 systems of DUS testing (1) the government growing test which the competent authorities conducted at government locations in a so-called a "state-run" testing system, (2) the on-site inspection by government officials or the competent authorities conducted at the breeder's own premises, otherwise known as a "breeder-run" testing system, and (3) the documentary examination in which a trial is not

necessary if the data from the government growing test is reliable. Having a relatively new in the DUS testing field, Thailand so far conducts only the on-site inspection, which is time consuming and expensive.

5.3.2 Based on a review of the DUS testing of the orchid, *Phalaenopsis* by the UPOV's member countries, it is defined that the duration of the tests was the equivalent to a single growing cycle. The tests have to be conducted in a greenhouse under temperature controlled conditions in three periods of the year: spring, autumn and winter. Since it is in a tropical area, the weather in Thailand is consistently the same throughout the year. A finding shows that the DUS testing can be done only in a single growing cycle and at one time no matter what period of year it is, as the orchid, *Dendrobium* can flower the whole year round.

5.3.3 According to the literature review, 54% of the orchids produced in Thailand are exported and it is the world's largest orchid exporter. To maintain this figure and Thailand orchid business, breeding of new varieties of orchid plants is the most important activity to be promoted. The more new varieties are bred, the better the economic circumstances of the breeders are. However, if the system of DUS testing is too complicated for the breeders to be granted the PBR, it would be a major constraint in the competition with other countries in this region, which have a more advanced testing system.

5.4 CONCLUSION

The following conclusions can be drawn from the discussion above.

5.4.1 The system of DUS testing in Thailand is still far from the standards of the UPOV's member countries.

5.4.2 In Thailand, the DUS testing of the orchid plant, *Dendrobium* can be conducted in all periods of the year in one crop cycle and at one time only in order to facilitate the testing system.

5.4.3 It is not necessary to use all the 88 characteristics of the *Dendrobium* to make an assessment during the DUS testing as only some major characteristics are enough to differentiate the distinctness of the varieties tested.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

Based on a review of previous study, and the findings and conclusion of this study, the following recommendations are made for future research.

5.5.1 To promote the breeding of new orchid varieties on the market by shortening or facilitate the DUS testing method, thus encouraging the breeders to breed more plants. With this in mind, some of the 88 characteristics that have to be investigated during the DUS testing on the basis of botanical value must be omitted in order to save time and money.

5.5.2 Future research progress should rely on greater collaboration amongst UPOV's member countries and apply the features of the effective DUS testing systems, growing tests, and documentation. If successful orchid production can be demonstrated, and a viable industry develops, plant breeding companies will soon move in to provide the necessary Thai-adapted varieties.

5.5.3 Because there is little breeding capacity in Thailand at present, this does not mean that genetic improvement is not taking place. As far as breeding is concerned, researchers investigate both the characteristics of the phenotype and genotype, indicating that progress could be made in both aspects, and that this could improve the potential of orchids as sustainable crops for Thailand. However, until the market is big enough to provide a royalty income to breeders through cut flowers, pot plants, and propagating material sales, companies will not invest in genetic improvement of orchids by means of molecular breeding. Therefore, the government should invest in biotechnology research as a national priority, as the DNA finger print resulting from the molecular breeding programme would be crucial evidence for the infringement cases.