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Appendices

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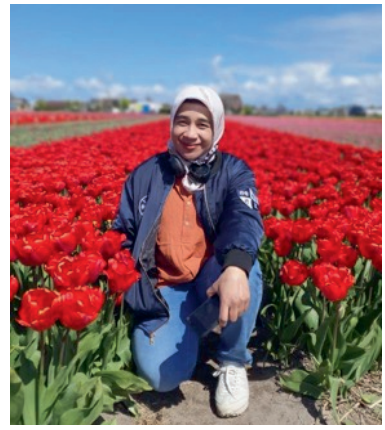
The support and contributions of all these individuals and organizations have been invaluable to the completion of this research. Although their names are listed here, my appreciation extends beyond words. I am genuinely grateful for their presence in my life.

CURRICULUM VITAE



Dewi Pramanik was born on May 4th, 1980, in Ciamis, Indonesia. In 1998, she obtained a BSc in Plant Breeding and Seed Technology from IPB University (Bogor Agricultural University). She then started working as a laboratory assistant in the Treub Tissue Culture Laboratory of the Bogor Botanical Garden. In 2004-2005, she worked as an assistant manager of plant tissue culture initiation in Bumi Tekno Kultura Unggul Tbk. From 2005 until 2022 she worked as a scientist and breeder at the Indonesian Ornamental Crops Research Institute. In June 2022, she joined the National Research and Innovation Agency (BRIN).

Dewi is interested in tissue culture technologies, plant breeding, and plant genetic resources of orchids and other ornamentals. Her first meeting with international scientists took place in 2007 when she followed a three-months course at Wageningen University and Research (WUR) as part of the HORTIN project, a joint partnership between Indonesia and the Netherlands. She learned haploid technology by culturing microspores of *Brassica napus*. This experience made her decide to pursue a MSc degree at WUR. In 2012 she was granted a scholarship from Indonesian Agricultural Research and Development Agency (IAARD) to study plant breeding and genetic resources in Wageningen. She completed her MSc thesis on tulip and *Arabidopsis* tissue culture and produced two publications. She subsequently completed her minor thesis in 2012 by evaluating the overexpression of WRKY genes in tomato GMOs related to salt tolerance.

In 2015, Dewi was awarded a scholarship from Nuffic to learn more about the management of plant genetic resources at the Center of Development and Innovation in the Netherlands. In 2016, she received a scholarship from IAARD and Sakata Seed Corporation to study *Impatiens* at the University of Tokyo, Japan. These two events influenced her desire to pursue a PhD degree in biodiversity, particularly on the genetics underpinning flower and fruit development.

In 2017, she began her SMARTD-IAARD funded PhD research on the evolution and development of orchid flowers and fruits at Naturalis Biodiversity Center and Leiden University in the Netherlands. Throughout her PhD project, Dewi acquired various research-related skills, ranging from molecular to imaging techniques. She also attended scientific conferences and initiated a collaboration with ecologist Annemarie Heiduk on

evolution and development of flowers of *Ceropegia sandersonii*. In addition, she collaborated with composer Nick Roth, who translated protein-coding sequences of floral developmental genes of representative species of the five orchid subfamilies into musical notes.

Dewi enjoys traveling in her spare time, but due to the Covid-19 pandemic, this was temporarily not possible. At this time, Dewi began to enjoy running. For her, running promotes tranquility and creativity. A PhD project is a protracted battle, requiring a solid mind to endure the pressure. Physical activity, such as running, is a way for Dewi to maintain physical and emotional wellness.

LIST OF PUBLICATIONS AND PLANT VARIETY REGISTRATION CERTIFICATES

Publications and manuscripts in this PhD thesis

Pramanik, D., Ciftci, O., Woudstra, Y., 2022. Transcriptomics. In: de Boer, H., Marcella, M.O., Verstraete, B., Gravendeel, B. (Eds.), Molecular Identification of Plants: From Sequence to Species. Pensoft publisher, Sofia-Bulgaria. doi: 10.3897/ab.e98875

Pramanik, D., Dorst, N., Meesters, N., Spaans, M., Smets, E., Welten, M., Gravendeel, B., 2020. Evolution and development of three highly specialized floral structures of bee-pollinated *Phalaenopsis* species. *Evodevo* 11, 16. doi:10.1186/s13227-020-00160-z

Pramanik, D., Becker, A., Roessner, C., Rupp, O., Bogarin, D., Perez-Escobar, O.A., Dirks-Mulder, A., Droppert, K., Kocyan, A., Smets, E., Gravendeel, B.. Evolution and development of fruits of *Erycina pusilla* and other orchid species. Accepted by *PLOS ONE.*

Pramanik, D., Vaskimo, L., Batenburg, K.J., Kostenko, A., Droppert, K., Smets, E., Gravendeel, B., Resupination of orchid fruits and roots analysed with 2D photographs and a bioinformatics pipeline for processing sequential 3D scans. Provisionally accepted by *Applications in Plant Sciences.*

Pramanik, D., Spaans, M., Kranenburg, T., Bogarin, D., Heijungs, R., Lens, F., Smets, E., Gravendeel, B., 2022. Inflorescence lignification of natural species and horticultural hybrids of *Phalaenopsis* orchids. *Scientia Horticulturae* 295, 110845. doi:10.1016/j.scienta.2021.110845

Additional Peer reviewed publications

Heiduk, A., **Pramanik, D.**, Spaans, M., Gast, L., Dorst, N., van Heuven, B.J., Gravendeel, B., 2020. Pitfall flower development and organ identity of *Ceropegia sandersonii* (Apocynaceae-Asclepiadoideae). *Plants* 9. doi:10.3390/plants9121767

Soehendi, R., Kartikaningrum, S., **Pramanik, D.**, Meilasaria, R., Fibrianty, E., Yufdy, M.P., Marwoto, B., Kamogawa, T., 2021. Genetic and phenotypic variabilities of 24 *Impatiens platypetala* accessions from South Sulawesi, Indonesia. *Agriculture and Natural Resources* 55, 265–272. doi:10.34044/j.anres.2021.55.2.15

Rachmawati, F., **Pramanik, D.**, Winarto, B., 2020. Adventitious shoots derived from leaf explants in in vitro mass propagation of Indonesian selected anthurium clones. *International Journal of Agriculture, Forestry and Life Sciences* 4, 48–55.

Herlin, D., Kartikaningrum, S., **Pramanik, D.**, Wegadara, M., 2019. Genetic variability of some *Lilium longiflorum cultivars* in Indonesia. *Acta Horticulturae* 1240 (18): 111–116. doi:10.17660/ActaHortic.2019.1240.18

Rianawati, S., **Pramanik, D.**, Kartikaningrum, S., Dewanti, M., Suryanah, Budiarto, K., Marwoto, B., 2019. Clustering analysis on interspesific hybrid of *Paphiopedilum Maudiae x tonsum* crossing. IOP Conf. Ser.: *Environmental Earth Sciences* 308, 012082. doi:10.1088/1755-1315/308/1/012082

Gravendeel, B., Bogarin, D., Dirks-Mulder, A., Wati, R.K., **Pramanik, D.**, 2018. The orchid genomic toolkit, in: What Future for Orchids? *Les Cahiers de la Societe Francaise d'Orchidophilie* 9, pp. 72–76.

de Klerk, G.-J., **Pramanik, D.**, 2017. Trichloroacetate, an inhibitor of wax biosynthesis, prevents the development of hyperhydricity in Arabidopsis seedlings. *Plant Cell, Tissue,and Organ Culture* 131, 89–95. doi:10.1007/s11240-017-1264-x

Pramanik, D., Rachmawati, F., Winarto, B. 2016a. Propagation of *Phalaenopsis* 'Puspa Tiara Kencana' via somatic embryogenesis. *Acta Horticulturae* 1113 (3): 21–26. doi:10.17660/ActaHortic.2016.1113.3

Pramanik, D., Yufdy, M.P., Shintiavira, H., Winarto, B., 2016b. *In vitro* secondary embryogenesis derived from meta-topoline treatment on mass propagation of *Phalaenopsis* 'AMP 17.' *Notulae Scientia Biologicae* 8, 62–68. doi:10.15835/nsb819692

Shintiavira, H., **Pramanik, D**., Winarto, B., 2015. *In vitro* organogenesis of Lisianthus [*Eustoma grandiflorum* (Raf.) Shinn] derived from leaf explant. *Thai Journal of Agricultural Science* 48, 199–206.

de Klerk, G.J.M., **Pramanik, D.**, 2014. Plants growing in vitro. Are there profits in removing epidermal wax? *Prophyta, The Annual* 2014, 42–43.

Winarto, B., Rachmawati, F., **Pramanik, D.**, Teixeira da Silva, J.A., 2011. Morphological and cytological diversity of regenerants derived from half-anther cultures of anthurium. *Plant Cell, Tissue and Organ Culture* 105, 363–374. doi:10.1007/s11240-010-9876-4

Abstracts

Pramanik, D., Rachmawati, F., Winarto, B. Propagation of *Phalaenopsis* 'Puspa Tiara Kencana' via somatic embryogenesis. 29th International Horticultural Congress (IHC2014). Brisbane, Australia, 17-22 August 2014. (Poster presentation)

Pramanik, D., and Gravendeel, B. Evolution and Development of *Phalaenopsis* flowers. European Orchid Show & Conference. Scientific meeting: What future for orchids?Paris, France, March 23-25th, 2018. (Poster presentation)

Pramanik, D., Dorst, N., Meesters, N., Smets, E., and Gravendeel, B. Evolution and development of pollination related floral traits in *Phalaenopsis*. 2nd conference of the Netherlands Society for Evolutionary Biology (NLSEB). Ede, The Netherlands, 16 April 2019. (Poster presentation)

Pramanik, D., and Gravendeel, B. Evolution and development of pollination related floral traits in *Phalaenopsis.* 7th International Orchids Conservation Conference, 27 May to 1 June 2019, London, UK. (Oral presentation)

Pramanik, D., von Barnau Sythoff, A.F., Helderman, L., Albronda, S., Pha, W., and Gravendeel, B. Expression of floral dorsoventral asymmetry genes in *Phalaenopsis* orchid transcriptomes. The 23rd World Orchid Congress (Virtual Conference), 23 to 26 April 2021, Taichung, Taiwan. (Poster Presentation)

Outreach

de Klerk, GJM, Bos, H, and **Pramanik, D.** 2014. Tulpscheutjes in weefselkweek blijken zwaar ondervoed. BloembollenVisie (305), pp. 18–19.

Pramanik, D. 2020. New insight in evolution of butterfly orchid flowers. Nature Today. https://www.naturetoday.com/intl/en/nature-reports/message/?msg=26586

Plant variety registration certificates

Suskandarai Kartikaningrum, Rudy Soehendi, Mega Wegadara, Minangsari Dewanti, Mawaddah, and **Dewi Pramanik**. 2022. Plant registration certificate *Impatiens* Gincu Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Suskandarai Kartikaningrum, Rudy Soehendi, Mega Wegadara, Minangsari Dewanti, Mawaddah, and **Dewi Pramanik**. 2022. Plant registration certificate *Impatiens* Mojang Timo Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Rudy Soehendi, Suskandari Kartikaningrum, Budi Marwoto, Muhamad Taufik Ratule, Fadjry Djufry, Ronald Bunga Mayang, Mega Wegadara, and **Dewi Pramanik**. 2021. Plant registration certificate *Impatiens* Imadata Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Sri Rianawati, Suskandari Kartikangrum, Rudy Soehendi, Minangsari Dewanti, **Dewi Pramanik**, Fitri Rcahmawati, Suryanah, Euis Rohayati, Eneng Yulianti, and Sadeli. 2019. Plant registration certificate var. *Paphiopedilum* Tonsina Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Sri Rianawati, Budi Marwoto, **Dewi Pramanik**, Rudy Soehendi, Minangsari Dewanti, Kurniawan Budiarto, Syafni, Euis Rohayati, Eneng Yulianti, and Sadeli. 2019. Plant registration certificate var. *Paphiopedilum* Mauredi Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Sri Rianawati, Budi Marwoto, Yoyo Sulyo, Rudy Soehendi, Minangsari Dewanti, Nur Qomariah Hayati, **Dewi Pramanik**, Suryanah, Nina Marlina, Laily Qodriah, Sadeli. 2019. Plant registration certificate var. *Cymbidium* Tortilla Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Darliah, Eka Fibrianti, Suskandari Kartikaningrum, Rudy Soehendi, **Dewi Pramanik**, Nina Rosana, Siti Hajar, and Nina Marlina. 2018. Plant registration certificate var. *Dendrobium* Almira Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Lia Sanjaya, Lila H., Budi Marwoto, Rudy Soehendi, Indiyarto B. Rahardjo, Eka Fibrianty, Minangsari Dewanti, Sri Rianawati, **Dewi Pramanik**, Budi Winarto, Dedeh Siti Badriah, and Supenti. 2017. Plant registration certificate var. *Phalaenopsis* Adelina-2 Agrihorti. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Kristina Dwiatmini, **Dewi Pramanik**, Sri Rianawati, and Kustatang. 2011. Plant registration certificate var. *Phalaenopsis* PB NV001. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Kristina Dwiatmini, **Dewi Pramanik**, Sri Rianawati, and Sadeli. 2011. Plant registration certificate var. *Phalaenopsis* PB NV002. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Kristina Dwiatmini, **Dewi Pramanik**, Kustatang, and Sadeli. 2011. Plant registration certificate var. *Phalaenopsis* PB MF004. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Kristina Dwiatmini, **Dewi Pramanik**, Muchdar Soedarjo, and Sadeli. 2011. Plant registration certificate var. *Phalaenopsis* PB MF006. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Kristina Dwiatmini, **Dewi Pramanik**, Muchdar Soedarjo, and Kustatang. 2011. Plant registration certificate var. *Phalaenopsis* PB MF007. Indonesian Ornamental Crops Reserch Institute (IOCRI).

Budi Marwoto, Yusdar Hilman, Lia Sanjaya, dan **Dewi Pramanik**. 2008. Plant registration certificate Lily var. Delino. Indonesian Ornamental Crops Reserch Institute (IOCRI).

PE&RC TRAINING AND EDUCATION STATEMENT

With the training and education activities listed below the PhD candidate has complied with the requirements set by the C.T. de Wit Graduate School for Production Ecology and Resource Conservation (PE&RC) which comprises of a minimum total of 32 ECTS (= 22 weeks of activities).

Review/project proposal (6 ECTS)

- Genetic regulation of orchid flower and fruit development
- Evolution and development of orchid flowers and fruits

Post-graduate courses (3.4 ECTS)

- 3D Visualization workshop Avizo; Naturalis Biodiversity Center (2017, 2018)
- Phylogenetics: principles and methods; Wageningen University (2018)
- Introduction course on R; PE&RC (2018)
- Distance learning executive course on intellectual property and genetic resources in the life sciences; World Intellectual Property Organization (2023)

Laboratory training and working visits (1.5 ECTS)

- Application of laser micro dissection (LMD) for isolation of RNA from dehiscence zones of *Erycina pusilla* fruits; Department of Botany, Justus Liebig University, Giessen, Germany (2020)

Invited review of journal manuscripts (1 ECTS)

- Horticultural Science: plant genetic resources (2023)

Competence strengthening/skills courses (4.4 ECTS)

- Time management; Leiden University (2018)
- Speed reading; Leiden University (2018)
- Improve memory for PhD; Leiden University (2018)
- Communication in science; Leiden University (2019)
- Effective communication; Leiden University (2020)
- LaTeX workshop; Wageningen University (2020)
- PhD Career webinar; Naturalis Biodiversity Center and Yellow Research (2021)

Scientific integrity/ethics in science activities (0.6 ECTS)

- Scientific conduct; Leiden University (2019)

PE&RC Annual meetings, seminars and the PE&RC retreat (2.1 ECTS)

- PE&RC First years weekend (2017)
- PE&RC midterm weekend (2018)
- PE&RC Last year's weekend (2020)

Discussion groups/local seminars or scientific meetings (7.5 ECTS)
- Endless forms/evolutionary ecology focus group meetings (2017-2021)
- IBL Spotlight seminars (2018)
- 7th Euro evolution and development conference; Galway, Ireland (2018)
- Naturalis colloquium (2019-2021)
- State of the world's plants and fungi virtual symposium; Royal Botanic Gardens (2022)

International symposia, workshops and conferences (6.42 ECTS)
- European orchid show & conference; poster presentation; Paris, France (2018)
- NLSEB Conference; poster presentation; Ede, the Netherlands (2019)
- 7th International orchid conservation conference; oral presentation; London, UK (2019)
- 23rd World orchid congress; poster presentation; online (2020)

Societally relevant exposure (5.1 ECTS)
- New insight in evolution of butterfly orchid flowers (2020)
- Pitfall flower development of Ceropegia sandersonii (2020)
- Music project orchidees (2021)
- Jury of orchids in the 23rd world orchid congress (2021)
- Transcriptomics chapter of e-book (2022)

Committee work (1 ECTS)
- Naturalis inclusive group (2020-2021)

Lecturing/supervision of practicals/tutorials (7.2 ECTS)
- Evolutionary biology (2017, 2018)
- Genomic architecture (2018, 2019)

BSc/MSc thesis supervision 4 students (20 ECTS)
- 4 Research topics