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J. F. MAXWELL'S CONTRIBUTION TO BOTANICAL SPECIMEN COLLECTION AND THE TAXONOMY OF MELASTOMATACEAE

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ABSTRACT

J. F. Maxwell's contribution to botanical specimen collection and taxonomy of Melastomataceae in Southeast Asia is outlined here. With over 31,000 specimens, collected between 1968 and 2012, Maxwell has the highest number of plant collections in Thailand.

Keywords: conservation, taxonomy, plant collections, J. F. Maxwell, Melastomataceae, Southeast Asia, Thailand

INTRODUCTION

In the forests of south-eastern Thailand—the region where he first started his botanical exploration of Thailand—James Franklin Maxwell carried out his part of a forest expedition. After finishing his work, he sat down in the forest, fell over with a cardiac arrest and passed away a few hours later (KANSUNTISUKMONGKOL, 2015; BROCKELMAN, 2015; WEBB *ET AL.*, 2016). I doubt that Max, as he was known to everyone, could have thought of a more fitting way to go.

Max was a firebrand, an eccentric field botanist, an ecologist and a conservationist. To him, the only way to study plants was in their entirety—through extensive fieldwork to see plants in their natural habitats, detailed comparative studies in the herbarium and an uncompromising work ethic, to go through all published literature on the plants in question. He was vocal, direct and an outspoken critic on the quality of botanical work, often not in the most diplomatic way and this made it difficult for those who had to work with him, both directly and indirectly. This behaviour was not out of any malice, but pure irreproachable honesty and love for his field of study. In this respect, he was in the league of other eccentric and outspoken botanical greats like C. G. G. J. van Steenis and E. J. H. Corner. This honesty though, was hard to stomach in humble self-effacing Asian societies. Whatever Max did (and he did do quite a few things that would have raised eyebrows in any part of the world) never led to his ostracization. He was part of the botanical family and remains so in death.

Other naturalists and friends have, previously and in this issue, compiled accounts of Max's work and philosophy of life (BROCKELMAN, 2015; KANSUNTISUKMONGKOL, 2015; WEBB *ET AL.*, 2016). To this end, here I elaborate on two aspects of Max's botanical career: 1) plant specimen collections, and 2) his contribution to the taxonomy of the Melastomataceae.

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MAXWELL'S PLANT SPECIMEN COLLECTIONS

Max was a prolific plant collector. He would definitely be among the "big hitters" in the botanical world – one of the just 2% of the plant collectors who collectively made 50% of all type specimen collections (BEBBER *ET AL.*, 2012). His unique way of doing things makes it difficult to determine the exact number of specimens he collected. This is because he had a unique numbering system which included the year and specimen number, the latter starting from 1 at the beginning of each year. This method of specimen numbering was his way of mentally cataloguing his specimens, elaborated in another paper in this issue (WIJEDASA, 2017). It enabled him to recall collecting nearly all specimens, along with associated ecological information, in exquisite detail. Sometimes he would return to the same plant he observed in flower to collect it in fruit or vice versa for many years.

So, the only way of determining the exact number of specimens he collected is through his collection books. To answer this question, I sat down with Max in 2011 and went through his collection books. It was an amazing record of every single specimen he had collected since 1974. By 2011, he had collected 31,142 specimens (Fig. 1), mostly from Thailand. While this is the highest number of collections in Thailand (compared to the 23,000 specimens collected by A. F. G. Kerr (JACOBS, 1962)), it is an underestimate of the total number of specimens Max collected throughout his career for two reasons. Firstly, Max was based in Thailand from 1968, but he did not have a record of specimens he collected before 1974. Considering that

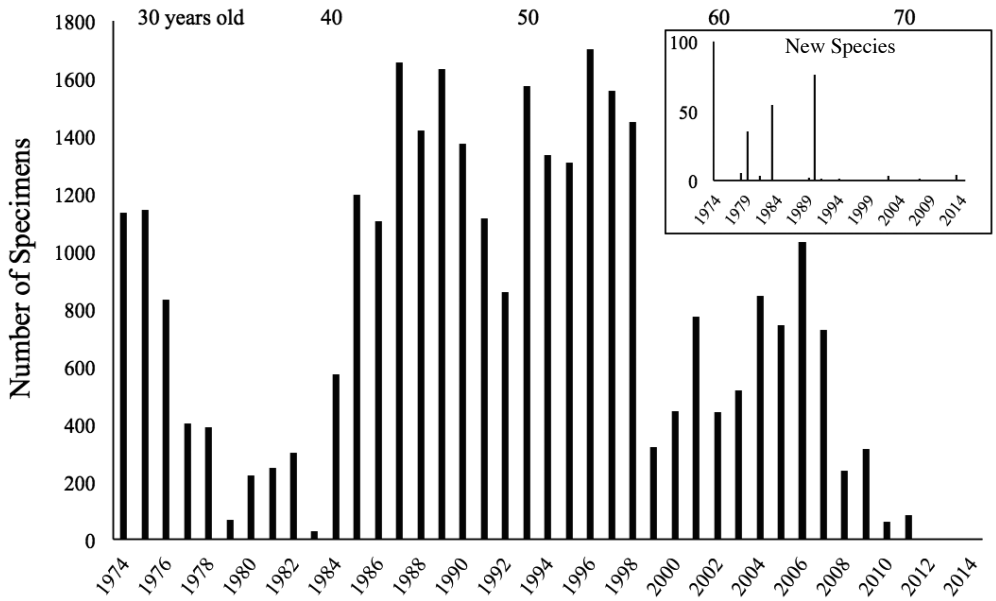

Figure 1. The distribution of Max's 31,142 specimens collected between 1974 and 2011. The numbers at the top indicate Max's age. Data is from Max's collection books accessed in 2011. Note that Max was based in Thailand from 1968 onwards but had no record of specimens he had collected before 1974 and the author did not have access to collection books after 2011. Inset figure: The distribution of the 185 new species and variety names that Max described over time, data from IPNI (2016) accessed on 21 April 2016.

the earliest confirmed number of specimens Max collected was 1,133 in 1974, it is possible that he collected a few thousand specimens in these early years. Secondly, I did not have access to his collection books since meeting him in 2011 and, thus, don't know how many specimens he collected between 2012 and 2015.

Considering that Max collected 2 to 8 duplicates per specimen that would result in a conservative estimate of a total of 70,000–120,000 individual specimens throughout his career.

Anyone working in Southeast Asia is usually able to identify the unique specimens that Max collected. Most plant specimens you find in herbaria have rudimentary plant labels with only a few basic plant characters. A common joke that Max would make to his students was about specimen labels surrounding the Melastomataceae genus—*Memecylon* (which he reviewed as part of his M.Sc. and I am reviewing for the Flora of Thailand project) was that most labels for this genus would only mention: "tree, flower blue". Such labels fail to account for so many informative characters that are lost upon drying, as well as important habitat and ecological information, which is important for understanding and identifying plants. In comparison, Max's specimens were distinct in being complete with all parts of the plant important for taxonomy being represented. The greatest asset of these specimens is Max's detailed ecological and descriptive notes. These notes covered plant ecology, soil characters, base rock type, habitat description, climate and detailed descriptions of the characters of the plants such that each description took about 5 to 10 lines. Each plant label was carefully typed out on the same classical typewriter that he used throughout his career. The description would be so detailed, so as to allow the description of a species new to science, based on his specimen notes alone. The detailed ecological information in these labels has been of particular importance in the tropics, where finding flowering and fruiting specimens is extremely rare and consequently, poorly documented. Such vital information is sometimes only known from his specimen labels. Max would never compromise on the details in his specimen labels, which now constitute one of his greatest contributions to the botany and ecological study of Southeast Asian forests. Many of the forests where Max once walked and collected have since been converted to other land uses and in many places, his detailed records are all that remain of these long gone forests.

Max's main collections are housed in three herbaria that he himself set up or helped to start during his career: Prince of Songkla University Herbarium (PSU), the herbarium of Faculty of Pharmacy, Chiang Mai University (CMU) and finally the herbarium of Department of Biology, Faculty of Science, Chiang Mai University (CMUB).

J. F. MAXWELL'S CONTRIBUTION TO MELASTOMATACEAE TAXONOMY

While Max loved plants and ecology (Maxwell, 1988, 2004), he had a special place in his heart for the Melastomataceae. This is best reflected in 175 of the 185 new plant species and varieties he named throughout his career belonging to various tribes within the Melastomataceae (Fig. 1, inset).

His first foray into tropical plants started when he was stationed on the Thailand-Cambodia border during the Vietnam War (Brockelman, 2015). He made a flora of the naval base, where he was stationed. This is, probably, one of the first floras for a single region in Thailand. After that, he spent time in the Bangkok Herbarium, followed by a move to the Singapore Botanic Gardens and the University of Malaya (the precursor of the National University of Singapore) to pursue a Masters and Ph.D.

The years between 1976 and 1983 were to be his most prolific in his taxonomical study of Melastomataceae. He started with the revision of the two genera: *Medinilla* and *Pachycentria* (MAXWELL, 1978). This was followed by revisions of the cryptic and taxonomically challenging woody trees, *Memecylon* and *Ljindenia*, as part of his Masters in Science in the University of Malaya (MAXWELL, 1980a, 1989b). While studying his M.Sc., he continued to do extensive side projects, worthy of M.Sc.s in their own right - a revision of *Pternandra* (MAXWELL, 1981) and taxonomic notes on the tribe Dissochaetae, covering the genera *Creochiton*, *Diplectria*, *Dissochaeta*, *Macrolenes* and *Pseudodissochaeta* (MAXWELL, 1980b), which were part of his Ph.D., continuing on from his M. Sc., which he completed in 1978. Max started working on his Ph.D. at the University of Malaya. The research, supervised by Professor Hsuan Keng, focused on a taxonomic revision of the Melastomataceae subtribes Dissochaetinae and Diplectriinae (MAXWELL, 1983). Though he completed the work, which included 54 new species names and revisions of numerous others, he was not awarded a Ph.D. degree.

I asked Max in 2011 why he did not receive a Ph.D., even though he had completed the work needed. According to Max, his supervisor did not attend his Ph.D. defence and instead, his examiner, who was a leaf anatomist, asked him to carry out extensive leaf micro-anatomical studies, in order to finish his thesis. This was outside of what had been proposed and accepted as the basis of his Ph.D. research. Typical of Max, he refused to carry out the additional work, resulting in him not receiving his Ph.D. Both retired Professor E. H. Holttum (the former Director of the Singapore Botanic Gardens and the founder of the department of Botany at the University of Singapore) and C. G. G. J. van Steenis (keeper of the Leiden Herbarium and founder of the Flora Malesiana foundation) wrote to the department to reconsider, but to no avail. All the actors in this episode of Max's life have since passed away. We may never know all the facts behind why Max did not officially obtain a Ph.D. But, what is evident is that by the end of 1983, when Max would have been awarded the Ph.D., he had already named 97 new species and varieties and revised the taxonomy of numerous more taxa making him the only Asian expert in the field of Melastomataceae. To this day, the family remains one of the largest neglected families in the region with only a handful of botanical studies in the family (WIJEDASA & HUGHES, 2012; HUGHES & WIJEDASA, 2012; HUGHES, 2013; TAGANE *ET AL.*, 2015).

Max continued his work on the Melastomataceae taxonomy, naming a further 79 new species and varieties after his unfinished Ph.D., with his last species description coming in 2007. Most of Max's later Melastomataceae work centred on Thailand and Indochina. This led to an unpublished treatise which, eventually aided the authors of the Melastomataceae account for the Flora of Thailand.

MAX AFTER SINGAPORE

Max returned to Thailand in 1984. He was based in several herbaria, before finally settling down in the Department of Biology of the Chiang Mai University and setting up CMUB in 1992. His focus shifted from pure taxonomy to the study of vegetation, ecology and the conservation of the plants that he studied. He funded his work at the CMUB herbarium through vegetation related consultancies. This gave him the independence to explore vast areas of unexplored habitats in Indochina as he saw fit. His work in these areas was, in most cases, the first and sometimes, the last documentation of unique habitats under threat of conversion to other land uses. This might have been what encouraged him to play a key role in the setting up of the Forest Restoration Unit (FORRU) with Dr. Stephen Elliott in Chiang Mai. FORRU was to spearhead a successful international reforestation program and made use of species specific ecological data that Max had painstakingly collected over the years.

Max's work on vegetation ranged from large-scale country to region wide analyses of vegetation, based on his observations and collections over the years (Maxwell, 1989a, 2004). Some site-specific ecological studies that resulted in floras and inventories are those of Khao Khieo Game Sanctuary (Maxwell, 1980c), Si Chang Island (Maxwell, 1994b), Ban Saneh Pawng area (Maxwell, 1995), Doi-Kuhn Than National Park (Maxwell *et al.*, 1995), Jae Sawn National Park (Maxwell *et al.*, 1997), Doi-Sutep-Pui National Park (Maxwell, 1988, Maxwell & Elliot, 2001), Mae Yom National Park (Maxwell, 1999), Doi Muang Aw (Palee & Maxwell, 2000), Seephandon Wetlands in Laos (Maxwell, 2001), Ko Hong Hill (Maxwell, 2006b), Doi Thung (Maxwell, 2008, 2009c), the Emerald Pool in Krabi (Maxwell, 2009a), the Mekong (Maxwell, 2009b), Prey Lang and the Cardamom Mountains in Cambodia (Theilade *et al.*, 2011). This list is far from exhaustive, as Max did not write about all the areas he visited. Furthermore, he published in many places that are difficult to trace. But, his focus on ecology and conservation was clear, with particular attention to details of plant-habitat relationships.

During his work on vegetation, Max continued to make valuable botanical discoveries across diverse families (Maxwell, 1989a, 1991, 1993, 1994a, 1996, 1998, 2005a, b, 2006a, 2010; Nangngam & Maxwell, 2013). It may take many years before we finally know how many of the specimens that Max collected are of species new to science. In my ongoing revision of the Melastomataceae, genus *Memecylon*, for the Flora of Thailand, I have found at least three yet-to-be-described species among Max's collections, one of which—*Memecylon maxwellii* sp. nov., is described in this memorial issue his honour. At the time of publication twelve species from eleven different families have been named after Max (Table 1).

Max believed in mentoring young botanists. He never had many possessions, but whatever he had he gave away to those who needed it more. Max's specimens and publications will last long and his memory will survive in the changes he made in the minds of the young botanists who he influenced and the work they produce.

Table 1. Species named after Max. Data from IPNI accessed on 21st April 2016. With the exception of *Memecylon maxwellii* sp. nov. described in this issue.

Family	Species	Year of Publication
Scrophulariaceae	*Lindernia maxwellii* T. Yamaz. =*Vandellia maxwellia* (T. Yamaz.) Eb. Fisch., Schäferh. & Kai Müll.	1978 2013
Melastomataceae	*Phyllagathis maxwellii* B. C. Stone & A. Weber	1987
Araceae	*Amorphophalus maxwellii* Hett.	1994
Oleaceae	*Chionanthus maxwellii* P. S. Green	2000
Acanthaceae	*Strobilanthes maxwellii* J. R. I. Wood	2003
Araceae	*Arisaema maxwellii* Hett. & Gusman	2003
Leguminosae	*Racosperma maxwellii* (Maiden & Blakely) Pedley	2003
Poaceae	*Eremochloa maxwellii* Veldkamp	2003
Zingiberaceae	*Boesenbergia maxwellii* Mood, L. M. Prince & Triboun	2013
Gesneriaceae	*Ornithoboea maxwellii* S. M. Scott	2014
Myrtaceae	*Melaleuca maxwellii* (F.Muell.) Craven & R. D. Edwards	2014
Melastomataceae	*Memecylon maxwellii* Wijedasa sp. nov.	2016

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