

Botanical Note**The developmental phases of plant taxonomy and floristic studies in Egypt*****A.S. Al-Nowaihi***Faculty of Science, Ain Shams University, Cairo, Egypt*

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In general terms, this short review is to acquaint Botanists with the developmental phases of plant taxonomy & floristics along the last 80 years. The founders of this discipline in Egypt are mentioned by names, being the roots of the 1st Phase. Their direct students are named as well and represent a welcome outgrowth to the 2nd Phase. Other workers, not mentioned but not denied, spread at present in different institutions and represent a welcome outflow that shapes the 3rd Phase. Meanwhile, it is not intended to enumerate the whole publications and/or the scientific activities of any of the scholars, but rather to highlight the cornerstone accomplishments in the three phases.

Plant taxonomy and floristics in Egypt started as early as 1925 when the Egyptian University was established and the Department of Botany was headed by the Swedish Gunar Taeckholm. In 1927 G. Taeckholm, accompanied by his wife Vivi Taeckholm, and M. Hassib paid a visit to Gebel Elba Region. The plants collected were deposited in some international herbaria. Meanwhile, V. Taeckholm, being impressed by the country and its vegetation, collaborated by M. Hassib and Mohammed Drar, the Keeper of the Herbarium of the Ministry of Agriculture at that time, began the establishment of the Cairo University Herbarium (CAI). This team received valuable help from all the Egyptian botanists of the time in Cairo University and some botanists from Alexandria University, particularly Salah Eid, T. Tadros and Shoukry Saad, as well as several

botanists from the Ministry of Agriculture. Abroad, valuable facilities were offered from Swedish botanists, the library staff of the Swedish Academy of Science, authorities of Kew Herbarium and some other herbaria and institutions.

More Botanical Excursions to different locations resulted in the subsequent increase in the number of specimens and species. The progressive accumulation of the specimens and the species triggered V. Taekholm to think about an encyclopedic 'Flora of Egypt' which was, to her, a life time wish. Her insistence and patience during the search for every accessible information of prime botanical importance cropped a welcome publications of comprehensive, documented and superb books. The 1st book appeared in 1941, the 2nd in 1950, the 3rd in 1954 and the 4th in 1969. The need for a manual and handy book was verified by her 'Student's Flora of Egypt'; the 1st edition in 1956 and a 2nd revised one in 1973.

In Cairo University, plant taxonomy and floristic studies began to flourish when Loutfy Boulos and Amal Abdel-Wahed were awarded the first M.Sc. Degrees.

Still in Cairo University, M. Hassib published three most valuable papers. The first was in 1938 as a monographic study 'On Cucurbitaceae in Egypt'. This paper was an extensive and intensive study dealing with all the cultivated taxa from the genus down to the sub-variety plus two wild genera. In Egypt, This study marked the firrst research work in taxonomy. In 1945, Hassib's second publication was about 'An Ecological Study of a Salty District Caused by Drainage From a Sewage Disposal Farm, Cairo'. This paper showed how can a sandy desert be converted to a productive farm through a continuous and abundant supply of water and organic material; which refers to the possibility of changing the desert vegetation, or in other words, it was an early call for soil reclamation. The last valuable publication appeared in 1951 dealing with the "Distribution of Plant Communities in Egypt" in which he was the first to apply Raunkiaer System on the Egyptian Flora. This latter work is and will always be considered as the cornerstone for taxonomic, floristic and ecological studies.

As floristic and taxonomic studies were expanded, field workers were faced by drastic alterations in the vegetation, both quantitative and qualitative, that resulted in response to several man-made disturbances to the environment along the last fifty years exemplified by industrialization, urbanization and pollution. The impact of these was marked upsetting to the

habitats, species distribution and species richness. This inspired L. Boulos to think about a modern flora that truly reflects the present status of the different floristic elements. With enthusiasm and great patience he involved himself in revising and updating systematic treatments of the vascular plants. The outcome was the publication of three volumes on the "Flora of Egypt" in 1999, 2000 and 2002. The three volumes are concerned with the dicots, covering the native and the naturalized plants and enumerating the endemics in each region. The species descriptions are concise and useful in recognizing the diversity of the plant wealth, the keys are precise, the illustrations are expressive and the coloured photos for some species are more than beautiful. A fourth volume by the same author covering the monocots remains the scholar's hope. Earlier to that, Boulos published his checklist in 1995 with updated nomenclature. Jointly with Mohamed Nabil El Hadidi, they published in 1984 a book on 'The Weed Flora of Egypt' and another one in 1989 on the 'Street Trees of Egypt'. Other contributions by L. Boulos to floras of some Arab and African countries, although highly estimated, are put aside at the moment.

Still in Cairo University, and after the death of V. Taeckholm in 1978, El Hadidi became involved in teaching taxonomy and flora and was also in charge of the herbarium until his retirement. The contributions of El Hadidi are amazing in scope and number. He jointly supervised more than 80 M.Sc. and Ph.D degrees awarded by different Universities. In addition to his previously mentioned books with L. Boulos, El Hadidi published more than 100 papers integrating Taxonomy, Systematic treatments, Archaeobotany, Ethnobotany and Cytology. El Hadidi, as an author and editor and collaborated by workers from Cairo, Ain Shams and Assiut universities published, of no less importance, two parts of volume 1 on '*Flora Aegyptiaca*' in 2000. Part 1 included brief information about the geomorphology and the climate as affecting the flora of the country, the phytogeographical regions and identificatory keys to the vascular cryptogams, the Gymnosperms, the monocotyledonous and the dicotyledonous families. Not neglecting the vernacular names, the nomenclature was updated and accompanied by detailed morphological descriptions of both the species and the habitats. Part two of this volume appeared in the same year including precise keys to the different plant groups together with descriptions and illustrations. It also included a red data list of rare, endangered and threatened species. Both parts are a real

floristic addition. El Hadidi and his team planned to cover the entire flora of the country in five consecutive volumes but, unfortunately, died before further stepping to its completion.

In Alexandria University another school emerged when Shoukry Saad conducted research work in Palynology. A number of his valuable publications was concerned with the surface characters of the pollen and its bearing on Taxonomy.

In Ain Shams University, which was established in 1950, and after moving from Cairo University, M.Hassib was involved in teaching taxonomy and flora. He established a Botanical Garden which became unique as regards the number of species it contains. He also established a herbarium (Ain Shams University Herbarium, CAIA) by the assistance of Ahmad Khattab, a talented plant collector and A.S. Al-Nowaihi who was under training as a first demonstrator. Under the supervision of M. Hassib the first M.Sc. and Ph.D Degrees were awarded to A.S. Al-Nowaihi in 1959 and 1962 respectively. After the death of M.Hassib in 1964, Al-Nowaihi became involved in teaching taxonomy and flora, then supervised, and still does, a number of consecutive theses for the M.Sc. and Ph.D. degrees.

The movement of M. Hassib from Cairo University to Ain Shams University in 1950 was the beginning of another school of plant taxonomy that was differently shaped as far as the adopted approach in the research work is concerned. However, the two schools may be generally featured by the following.

The school of Cairo University has been mainly concerned with systematic treatments relying on the morphological vegetative and floral characters. Later, vegetative anatomy, seed and pollen characters have been used in combination with the gross morphology. In spite of this the vegetative approach remains the dominant trend inferred from the publications and the outcome of the research activities of the workers affiliated to this school.

The school of Ain Shams University, being aware of the agreement on the conservatism of the anatomical characters and the value of the vascular systems in understanding relationships among plants, has chosen from the early beginning the approach of vegetative anatomy and floral vascularization. The first in constructing more precise keys where there is an overlap in the morphological characters. The second helps in deciding the nature of the floral organs and their accessories, the affinity between the

taxa under investigation, the magnitude of the floral characters and their polarity, the apparent and the crypt characters, the metamorphosed floral organs, all help in suggesting evolutionary levels to the taxa under investigation relative to each other. As this school expanded, the injection of new ideas and tools added more approaches by applying other parameters such as numerical analysis, SEM of the surface of the fruit, seed and pollen, seed coat anatomy, cytological criteria, and more recently the molecular criteria. The latter are exemplified by DNA fingerprinting, protein electrophoresis, isozymes and the like. At present, students of both schools radiate in different institutions providing valuable contributions. Needless to say, the two schools in both universities are complemented.

In conclusion, the three developmental phases of plant taxonomy & floristics in Egypt so presented may refer to an on and on increase in the number of the researchers in different institutions as well as to a diversification in the approaches adopted. Once again, the utmost credit goes to the pre-eminent founders of Plant Taxonomy & Floristics in Egypt, Late Professor V. Taeckholm and Late Professor M. Hassib, *May Their Souls Rest In Peace*.

* This lecture was read as one of the plenary lectures on the occasion of the First International Conference on "Strategy of Egyptian Herbaria", March, 9-11, 2004, held at the Agriculture Museum, Dokki, Giza, Egypt. Only a brief abstract of this lecture appeared on page 261 of the proceedings of that conference.