



Loutfy Boulos: A pillar of Egyptian botany and his botanical legacy

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Abstract

This paper celebrates the incredible contributions of Loutfy Boulos to the Flora of Egypt. Boulos was considered an outstanding international Egyptian taxonomist. As a result of his extensive fieldwork, taxonomic expertise, and meticulous documentation and records, our understanding of Egypt's plant diversity has been significantly advanced. Through his botanical explorations across diverse regions, Boulos collected and identified numerous plant specimens, described new species, added new records, clarified taxonomic problems, and provided invaluable data for conservation efforts. Flora of Egypt's four volumes become an essential reference for researchers, educators, and conservationists. Later in 2009, an updated checklist of the native vascular flora of Egypt was published, with details on the occurrence at the regional level. Indeed, he provided invaluable information in our region's literature. This paper highlights Boulos' significant impact on the scientific community by expanding taxonomic knowledge, promoting conservation, and fostering international collaboration in the field of botany.

Keywords: checklist; conservation; Flora of Egypt; new species; taxonomy

Introduction

Loutfy Boulos Tawadros (1932-2015) was an Egyptian botanist who provided significant contributions to the field of plant science, particularly in his home country. He is easily known through his monumental four-volume publication, Flora of Egypt. This comprehensive work was published between 1995 and 2007. Today his flora serves as a cornerstone for understanding the rich botanical tapestry of Egypt.

Loutfy Boulos: A pillar of Egyptian botany

Boulos' fascination with plants has been blossomed early in his life. He was born on May 14, 1932, in Qena, Egypt. He pursued his botanical studies at Alexandria, University (according to his CV he started at Cairo University) where he eventually became a professor in Botany Department. Throughout his career, Boulos established himself as a leader on plant diversity and economic botany within the arid regions of the Middle East and North Africa.

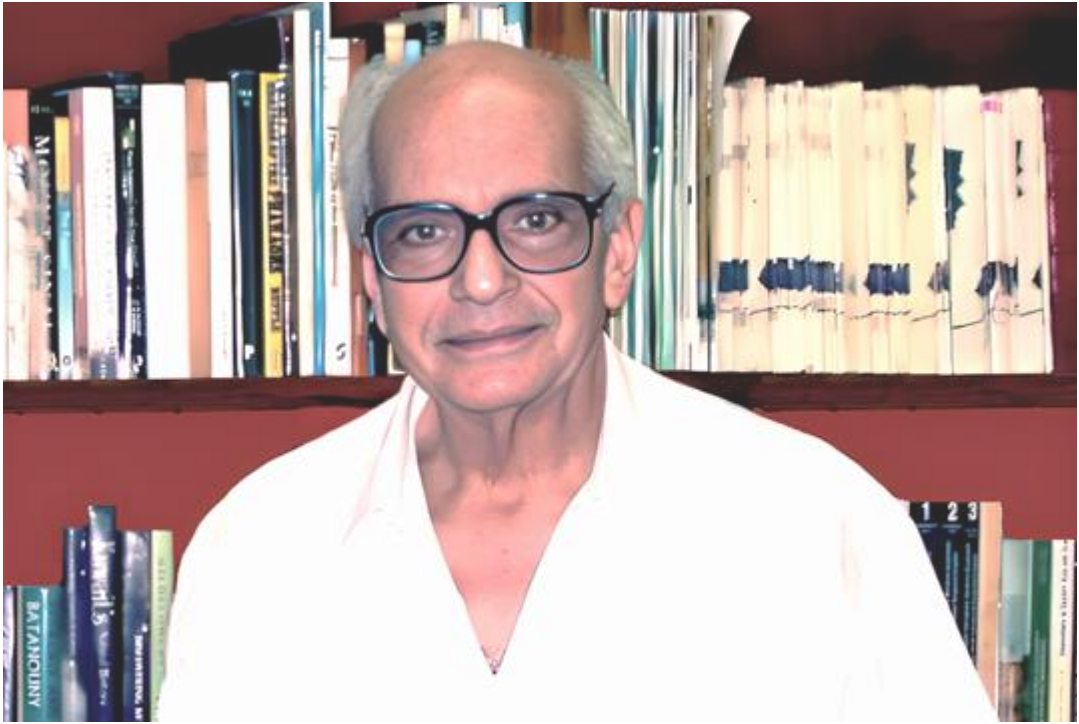
For the Flora of Egypt, Boulos had conducted for several decades. Extensive fieldwork across diverse regions in deserts, oases, and coastal areas. These had revealed the collection and identification of numerous plant specimens, of which many were previously unknown or undescribed. For his meticulous documentation of these specimens. Boulos provided detailed descriptions, illustrations, and photographs. Accordingly, this has provided a valuable resource for scientists, researchers and conservationists.

Far beyond his magnum opus, Flora of Egypt and his updated checklist of the native vascular flora of Egypt, his research interests encompassed a wide variety of topics, such as medicinal plants, weed flora, and the exploration of specific regions as Gaza Zone. Throughout his distinguished career, Boulos actively participated in various projects as: the introduction of crops to Egypt, conservation of desert habitats in Kuwait, and his role as the coordinator for Southwest Asia in the International Union for Conservation of Nature (IUCN) Centers of Plant Diversity Project (1990 – 1993). He had also been affiliated with numerous professional groups and serves as a consultant for the Gulf of Aqaba and St. Katherine Protectorates Development Programmes, as well as for Environmental Quality International (Cairo). Notably, Boulos played a pivotal role in the conceptualization of the desert park and botanical gardens at Siwa Oasis in Egypt's Western Desert (See Appendix 1).

Academic Background and Career

Boulos was born in Qena, Egypt. He completed his undergraduate studies in chemistry and botany at Cairo University in 1954. He subsequently pursued his specialization in botany, earning an M.Sc. from Cairo University in 1961 and a doctorate from the University of Montpellier in 1963. Then he secured a UNESCO scholarship (1960-1963) to pursue further studies and researches under the guidance of Professor Louis Emberger at the Institute of Botany.

Throughout his distinguished career, Boulos held various positions that allowed him to balance research and teaching (Biology teacher, Secondary School of Khan Younis, Gaza Zone, January 1955 - March 1956; Botanist, The Herbarium, Ministry of Agriculture, Cairo, Egypt, March 1956 - August 1960). He served as a researcher at the National Research Centre and Desert Institute in Cairo (1960-1963) then becoming the head of plant taxonomy unit (1963-1966); a Professor of Plant taxonomy at several universities; University of Libya (1966-1971), Cairo University (1971-1973), University of Jordan (1973-1976) beside being there as a UNESCO expert. Boulos also worked as a senior botanist at the International Livestock Centre of



Loutfy Boulos (1932-2015)

Africa, ILCA in Addis Ababa, Ethiopia (1976-1978) at the department of Environmental Sciences and Plant Production. A Professor of Plant Taxonomy and Flora of Egypt at the National Research Centre in Cairo (1978-1984) then at Kuwait University (1984-1996). Also worked as a consultant of plant diversity of arid regions of the Middle East and North Africa (1996 – 2005) and finally an Emeritus Professor (2005- 2015) at Alexandria.

Taxonomy and Conservation

Boulos academic roles were characterized by his involvement in numerous botanical expeditions since 1952, both as a participant and organizer. These expeditions were carried out in various regions as Egypt, Middle East, North Africa, and beyond. Within Egypt, various expedition were carried out to Gebel Elba (1956, 1979, 1998); Nubia (1963 -1964); and to Gilf El-Kebir and Qattara Depression in Gebel Uweinat region (1968, 1978, 1996-1997). He conducted these field trips to supply material, information and photographs for the Flora of Egypt project 1994-2005.

Abroad, he visited and collected plants from **Canary Islands** (1961, 1962); **Madeira** (1962); **Cyprus** (1973); **Ethiopia** (1976-1978); **Kenya** (1977-1978); **Mali** (1977); **Sudan** (1982); **Libya** (1966-1971); **Tunisia** (1968); **Morocco** (1961); **Gaza Zone** (1955-1956, 1963); **Jordan**(1973-1976); **Qatar** (1977); **Saudi Arabia** (1980); **Bahrain**

Loutfy Boulos: A pillar of Egyptian botany

(1985); **United Arab Emirates** (1985, 1986, 1997); **Yemen** (1987, 1988); **Kuwait** (1973, 1984-1996); **Zimbabwe** (1996); **Syria** (1997, 2001).

His botanical surveys in these countries were significant, and he played a key role in the establishment of several herbaria, as that in the University of Libya, University of Jordan, International Livestock Centre for Africa, and the National Research Centre in Cairo. The herbarium at the University of Kuwait (1984), in particular, was a notable achievement in the Arabian Peninsula as it received numerous collections from Kuwait, Bahrain, Qatar, Saudi Arabia, United Arab Emirates, Oman, as well as North and South Yemen. Although the loss of his books, papers, and herbarium specimens during the 1990 invasion of Kuwait, Boulos had continued his work with remarkable resilience and dedication. His competence, scientific rigor, poise, and affability have earned him recognition and invitations to serve on various international committees and deliver lectures at scientific congresses. Boulos' contributions to the field of botany are a testament to his lifelong commitment to advance our understanding of plant diversity in arid regions of the Middle East and North Africa.

He had surveyed master's and doctoral students in several countries

Boulos' academic career has been marked by his extensive fieldwork and participation in various research projects due to his numerous expeditions across Egypt, Arabia, Africa, and Europe since 1952. During 1994 and 2005, Boulos had conducted numerous botanical explorations in Egypt as a part of the Flora of Egypt project.

One of Boulos' most significant contributions to the Flora of Egypt project was his work on the taxonomy of Egyptian plants. As a renowned taxonomist, his expertise was instrumental in clarifying taxonomic problems, describing new species, and providing a comprehensive understanding of the country's plant diversity. Therefore his publications are considered essential references for scientists, researchers and conservationists.

His work had a significant impact on conservation efforts in Egypt. His detailed descriptions of plant species with illustrations, photographs, and their habitats have provided valuable information for conservationists, to protect Egypt's unique plant diversity. Additionally, Boulos' publications have raised awareness about the importance of conservation and the need for international collaboration in this field.

Many plants were discovered as new to science from Egypt, Libya, Jordan, Iraq, Kuwait, Saudi Arabia, Oman, Yemen, Canary Islands, Ethiopia, Somalia, East Africa, Madagascar, Zimbabwe, South Africa, Australia, and New Zealand; while numerous new records were added to the flora of the Middle East. His contributions to taxonomy have been substantial, including the description of numerous new genera and species (listed in Appendix 2). Moreover, Boulos made the remarkable discovery of living specimens of the palm tree *Medemia argun* in 1963 in the Nubian

Desert, which was previously only known from fruits found in ancient tombs in Egypt.

Extensive Publication Record

Throughout his illustrious career, Dr. Boulos had published over 100 papers and articles, as well as, 15 books (Table 1). His published works include different themes, such as *Common Weeds in Egypt* (1967); *Medicinal Plants of North Africa* (1983); *The Weed Flora of Egypt* (1985, and revised edition 1994); and *The Weed Flora of Kuwait* (1988). Noteworthy among these publications are the *Flora of Egypt*, with 4 volumes (1999 – 2005) and an updated checklist of the native vascular flora of Egypt (2009).

His position as an influential figure in the field of botany had been solidified due to his extensive publications, active engagement in professional organizations, and significant fieldwork. His expertise in plant diversity and economic botany in arid regions has left a lasting impact on the understanding and conservation of plant life in the Middle East and North Africa.

Professional Engagements

Boulos' involvement in professional organizations reflects his commitment to advancing botanical science. He was frequently sought as a consultant and played a key role in the establishment of several scientific societies, as that of the Egyptian Botanical Society since 1954; the Association for Tropical Biology since 1961; and OPTIMA (the Organization for the Phyto-Taxonomic Investigation of the Mediterranean Area, Geneva, Berlin, Madrid) since 1974; He became a member of the International Association for Plant Taxonomy in 1961; the Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale (AETFAT) in 1962; In recognition of his contributions, he was appointed a fellow of the Linnean Society of London, since 1974, and then Foreign Member of the Linnean Society (FMLS) since 2005.

Honors and Awards of Boulos

Loutfy's competence, scientific rigor, composed demeanor, and amiable nature earned him recognition and acclaim within the scientific community. Several species have been named in his honor, such as *Atractylis boulosii* Taekholm, *Crocus boulosii* Greuter, *Zygophyllum boulosii* Hosny. He earned honors and awards for his outstanding role as:

- Honorary Member, Al-Bayrunia Society, Rabat, Morocco, since 1985. Furthermore, his expertise led to invitations to deliver lectures at numerous scientific congresses, where he shared his valuable insights and findings.

-Entry in "Men of Achievements", ed. 13, Cambridge, U. K. (1989).

- Honorary Visiting Professor at the National Research Centre, Dokki, Cairo, Egypt (1996,1999).

Loutfy Boulos: A pillar of Egyptian botany

- Prize in Biodiversity from the Council of Arab Ministers for Environment (1996).
- Profile: Loutfy Boulos, peripatetic botanist of the Middle East. *Plant Talk* 26:7 (October 2001).
- Foreign Member of the Linnean Society of London (FMLS), restricted to 50 persons (June 2005).
- Honorary Research Fellow, Royal Botanic Gardens, Kew, U.K. (2005).
- Who is Who entry in "The Cambridge Blue Book" (2005-2006).
- Award of OPTIMA gold medal, 2013.

Boulos Legacy

Loutfy Boulos' dedication to Egyptian flora not only advanced scientific knowledge but also fostered appreciation for the unique plant life of the region. His meticulous documentation *Flora of Egypt* and checklist provide an invaluable data for future generations of botanists to study, conserve, and sustainably utilize Egypt's remarkable plant biodiversity. Boulos' legacy still continues to inspire and guide botanical research in Egypt and the surrounding areas. Following his death in the 27th April 2015, his private books were partially donated to Qatar University, Mazhar Herbarium (MAZHAR), and Cairo University Herbarium (CAI) Furthermore, his private collection (6600 specimens) had been preserved and added to the Herbarium of Mazhar Botanic Garden.



Table 1: Loutfy Boulos's Publications

Year	Publications
1958	New records to the flora of Egypt. <i>Bulletin of the Faculty of Science, Cairo University</i> 34: 75-82, 5 figs.
1959	A contribution to the flora of Gaza Zone. Agric. Extension Dept. Ministry of Agriculture, Egypt, pp. 1-32. <i>Sonchus gigas</i> Boulos nova sp., a new tetraploid Egyptian species. <i>Botaniska Notiser</i> 112: 363-368, 3 figs.
1960	Flora of Gebel El-Maghara, North Sinai. Agric. Extension Dept. Ministry of Agriculture, Egypt, pp. 1-24, 22 plates. The genus <i>Sonchus</i> , a general systematic treatment. <i>Botaniska Notiser</i> 113: 400-420.
1961	On the cytotaxonomy and distribution of <i>Sonchus arvensis</i> L. <i>Botaniska Notiser</i> 114: 57-64, 6 figs.
1962	The generic status of some species earlier treated as <i>Sonchus</i> . <i>Botaniska Notiser</i> 115: 58-60. Sur la taxonomie de <i>Sonchus bipontini</i> Aschers. <i>Bulletin du Jardin botanique de l'état a Bruxelles</i> 32: 105-106. <i>Typha elephantina</i> Roxb. in Egypt. <i>Candollea</i> 18: 129-135, 5 figs.
1963	Contributions aux genres <i>Launaea</i> et <i>Sonchus</i> . In: Humbert, H. (Ed.), Flore de Madagascar et des Comores. Composées II, pp. 880, 882, 884, 889
1964	Plantae novae aegyptiacae. <i>Candollea</i> 19: 209-213, 3 figs.
1965	<i>Babcockia</i> , un nouveau genre de Composées des Iles Canaries. <i>Bulletin du Jardin botanique de l'état a Bruxelles</i> 35: 63-66, 2 figs. <i>Sonchus</i> L. and <i>Embergeria</i> Boulos. In: Eichler H.J. (Ed.), Supplement Black's Flora of South Australia. Adelaide, pp. 330-333.
1966	A natural history study of Kurkur Oasis, Libyan Desert, Egypt. IV. The vegetation. <i>Postilla</i> 100: 1-22, 17 figs. Flora of the Nile region in Egyptian Nubia. <i>Feddes Repertorium</i> 73: 184-215, 21 plates, 1 map.
1967	<i>Taeckholmia</i> , a new genus of Compositae from the Canary Islands. <i>Botaniska Notiser</i> 120: 95-108, 5figs. On the weed flora of Aswan, Egypt. <i>Botaniska Notiser</i> 120: 369-372.

Loutfy Boulos: A pillar of Egyptian botany

	<p>Nomenclatural changes and new taxa in <i>Sonchus</i> from the Canary Islands. <i>Nytt Magasin for Botanik</i> 14: 7-18, 11 figs.</p> <p><i>Sonchus friesii</i>, a new African species of Compositae. <i>Botaniska Notiser</i> 120: 456-459, 1 fig.</p> <p>Common weeds in Egypt. With 150 line drawings by M. El-Gohary. Dar Al-Maaref, Cairo. (with El-Hadidi, M. N.).</p> <p>Street trees in Egypt. With 52 line drawings by M. El-Gohary & S. Makar, Publications of Cairo University Herbarium 1 (1968). Reprinted 1970. Second ed. 141 p. (1979). Revised ed., i-x, pp. 130, American University, Cairo (1988). (with El-Hadidi, M. N.).</p>
1968	<p>The discovery of <i>Medemia</i> palm in the Nubian Desert of Egypt. <i>Botaniska Notiser</i> 121: 117-120, 2 figs.</p> <p>The genus <i>Sonchus</i> and allied genera in the Canary Islands. <i>Cuadernos de Botánica Canaria</i> 3: 19-26.</p> <p>On the agricultural potentialities of the western Mediterranean coastal strip of Egypt. <i>Pol'nohospodárstvo</i> 14: 211-213.</p> <p><i>Sonchus gigas</i> and <i>S. macrocarpus</i> (Comp.). <i>Taxon</i> 18: 348-349 (with Jeffrey C.).</p> <p>Wild flowers in Libya. 17 figs. in colour, text in English and Arabic. Al Hasad 8, Esso Standard Libya, Inc. Publ.</p>
1970	<p>OPB chromosome number reports. <i>Taxon</i> 19: 102 (with Roux, J.).</p> <p>Medicinal herbs in Libya. 10 figs. in colour, text in English and Arabic. Al Hasad 16, Esso Standard Libya, Inc. Publ.</p>
1971	<p>Wild trees and shrubs in Libya. 12 figs. in colour, text in English and Arabic. Al Hasad 20, Esso Standard Libya, Inc. Publ.</p>
1972	<p>Our present knowledge on the flora and vegetation of Libya, bibliography. <i>Webbia</i> 26: 364-400.</p> <p>Introduction et classification. <i>Botaniska Notiser</i> 125: 287-305.</p> <p>Étude caryologique. <i>Botaniska Notiser</i> 125: 306-309 (with Roux, J.).</p> <p>Étude palynologique. <i>Botaniska Notiser</i> 125: 310-319, 2 figs. (with Pons, A.).</p>

	Vivi Täckholm 75 years old. <i>Botaniska Notiser</i> 125: 281-282.
1973	Sous-genre 1. <i>Sonchus</i> . <i>Botaniska Notiser</i> 126: 155-196, 35 figs.
1974	<p>Sous-genre 2. <i>Dendrosonchus</i>. <i>Botaniska Notiser</i> 127: 7-37, 41 figs.</p> <p>Sous-genre 3. <i>Origosonchus</i>, genres <i>Embergeria</i>, <i>Babcockia</i> et <i>Taekholmia</i>, species exclusae et dubiae, index. <i>Botaniska Notiser</i> 127: 402-451, 37 figs.</p> <p>The endemic species of <i>Sonchus</i> and related genera in the Macaronesian Islands. Proceeding 1st International Congress. Flora Macaronesia. <i>Monographiae Biologicae Canarienses</i> 4: 60-63.</p> <p>The genus <i>Sonchus</i> L. In: Täckholm, V. (Ed.), Students' Flora of Egypt, second edition, 16 colour plates of 64 plants, Beirut, pp. 607-608</p> <p>Supplementary Notes to Students' Flora of Egypt, second edition. <i>Publications of Cairo University Herbarium</i> 5: 1-135, 16 plates. (with Täckholm, V.).</p>
1975	<p><i>Diploaxis villosa</i> sp. nov. (Cruciferae). <i>Botaniska Notiser</i> 128: 365-367, 2 figs., (with Jallad, W.).</p> <p>Seven species new to the flora of Jordan. <i>Botaniska Notiser</i> 128: 368-370, 2 figs., (with Jallad, W. & Lahham, J.).</p> <p>L'Étage saharien en Egypte, ses divisions et ses caractères écologiques et floristiques. <i>Publications of Cairo University Herbarium</i> 6: 7-14, 1 table.</p>
1976	<p>The Mediterranean element in the flora of Egypt and Libya. Colloques Internationaux C.N.R.S. no. 235. La flore du bassin méditerranéen: essai de systématique synthétique, pp. 119-124.</p> <p>Progress made in the preparation of the flora of Libya. <i>Boissiera</i> 24: 525.</p> <p>The genus <i>Launaea</i> Cass. In: Tutin T. G. & al. (Eds.), <i>Flora Europaea</i> 4. Cambridge University Press, pp. 326</p> <p>The genus <i>Sonchus</i> L. In: Tutin T. G. & al. (Eds), <i>Flora Europaea</i> 4. Cambridge University Press, pp. 327-328.</p>
1977	On the flora of the vicinity of the Aqaba Gulf. <i>Candollea</i> 32: 73-80, 1 map, (with Lahham J.) .

Loutfy Boulos: A pillar of Egyptian botany

	<p>On the desert flora north-east of Aqaba. <i>Candollea</i> 32: 81-98, 1 map, (with Lahham, J.).</p> <p>On the flora of El-Jafir-Bayir Desert. <i>Candollea</i> 32: 99-110, 1 map.</p> <p>On the flora of Ras en Naqb. <i>Candollea</i> 32: 111-120, 1 map, (with Al-Eisawi, D.).</p> <p>On the desert flora of the area of H-4 and H-5 Pumping Stations N.E. Jordan. <i>Candollea</i> 32: 255–268, 1 map, (with Lahham, J. & Jallad, W.).</p> <p>New and noteworthy plants. <i>Candollea</i> 32: 269-276, 2 maps, 3 figs., (with Al-Eisawi, D.).</p> <p><i>Kickxia azraqensis</i> (Scrophulariaceae), sp. nov. <i>Candollea</i> 32: 277-280, 1 map, 1 fig, (with Lahham, J.).</p> <p>Introduction and Adiantaceae - Orchidaceae. <i>Publications of Cairo University Herbarium</i> 7-8: 115-141, 1 fig.</p> <p>Additions et corrections de la seconde édition de Students' flora of Egypt. <i>Publications of Cairo University Herbarium</i> 7-8: 211-218, (with Täckholm, V.).</p> <p><i>Cousinia austrojordanica</i> (Compositae), a new species from Jordan. <i>Publications of Cairo University Herbarium</i> 7-8: 287-288, 1 map and 1 fig., (with Davies, F. G.).</p> <p>Constituents of local plants XXIII. Test results of 350 accessions in a phytochemical screening program of Egyptian plants. <i>AAASA J.</i> 4: 61-76, (with several authors).</p>
1978	<p>Materials for a flora of Qatar. <i>Webbia</i> 32: 369-396, 10 figs.</p> <p>Flora of Jordan: an introduction to the wildlife of the Hashemite Kingdom of Jordan, 8 colour plates.</p>
1979	<p>Salicaceae to Neuradaceae. <i>Candollea</i> 34: 21-48.</p> <p>Compositae. <i>Candollea</i> 34: 307-332 (by Jeffrey, C.).</p> <p>Progress report on the flora of Libya. –Proc. IX Plenary Meeting AETFAT: 189-190.</p> <p>Vivi Täckholm, née Laurent, 7 January 1898-3 May 1978. <i>Taeckholmia</i></p>

	<p>9: 5-8.</p> <p>Floristic and Taxonomic studies as a basis for utilizing medicinal plants in the Arab States. Chemistry of Medicinal Plants in the Arab States 12-13, UNESCO, Cairo.</p>
1980	<p>Journey to the Gilf Kebir and Uweinat, Southwest Egypt, 1978. <i>The Geographical Journal</i> 146(1): 51-59, 2 figs (with a multidisciplinary group of 16 authors).</p> <p>IV. Botanical results of the expedition <i>The Geographical Journal</i> 146(1): 68-71.</p> <p>Compositae (corrigena). <i>Candollea</i> 35: 565-567, (by Jeffrey, C.).</p> <p>Notes on the Flora of Egypt 1. Six species new to the flora of Egypt. <i>Egyptian Journal of Botany</i> 21(3): 223-226. (1978, volume published 1980).</p> <p>The family Chenopodiaceae. In: Dassanayake M. D. & al. (eds), Flora of Ceylon, 9. Amerind Publ. New Delhi, pp. 14-24.</p> <p>Firewood crops, shrub and tree species for energy production, vol. I. National Academy of Sciences. Washington, D.C., pp. 236, numerous illustrations. (<i>Ad hoc</i> panel).</p>
1982	<p>A comparative study of the flavonoids of <i>Medicago radiata</i> with other <i>Medicago</i> and related <i>Trigonella</i> species. <i>Biochemical Systematics and Ecology</i> 10(1): 33-36 (with Saleh, N.A.M., El-Negoumy, S.I. & Abdalla, M. F.)</p> <p>Flora of Gebel Uweinat and some neighbouring regions of southwestern Egypt. <i>Candollea</i> 37: 257-276, 2 maps, 8 figs.</p>
1983	<p>A chemosystematic study of the phenolics of <i>Sonchus</i>. <i>Phytochemistry</i> 22: 489-492, (with Mansour, R. M. A. & Saleh, N. A. M.).</p> <p>Medicinal Plants of North Africa. pp. 286, 103 plates. Reference Publications, Inc. Michigan 48001.</p>
1984	<p>Med-Checklist Notulae 9 In: Greuter, W. & Raus, Th. (Eds), <i>Willdenowia</i> 14, Berlin-Dahlem, pp. 37-54.</p> <p>Firewood crops, shrub and tree species for energy production, vol. II. National Academy of Sciences. Washington, D.C., pp. 92, numerous illustrations. (<i>Ad hoc</i> panel).</p>

Loutfy Boulos: A pillar of Egyptian botany

	<p>Med-Checklist, a critical inventory of vascular plants of the circum-Mediterranean countries. W. Greuter, H. Burdet, M. & Long, G. (Eds). 1, 3, 4. Genève. (1984, 1986, 1989). (with several authors).</p>
1985	<p>A contribution to the flora of Asir Mountains, Saudi Arabia. <i>Arab Gulf Journal of scientific research</i> 3: 67-94, 4 figs.</p> <p>Is <i>Rosa arabica</i> identical to <i>R. abyssinica</i>? <i>Candollea</i> 40: 389-390.</p> <p>The arid eastern and south-eastern Mediterranean region. In: Gomez-Campo C. (Ed.), <i>Plant Conservation in the Mediterranean area</i>, chapter 8. Dr. W. Junk, Dordrecht., pp. 123-140.</p> <p>The Middle East. In: Goodin J. R. & Northington David K. (Eds), <i>Plant Resources of Arid and Semiarid Lands: a global perspective</i>, chapter 4, Academic Press Inc, pp. 129-185.</p> <p>The weed flora of Egypt. 163 line drawings by M. El-Gohary + pp. 178. (1985). Revised edition pp. i-xxv + 361, including 168 line drawings. (1994). – The American Univ. Cairo. (with El- Hadidi, M. N.).</p>
1986	<p>Three arboreal species new to the Eastern Desert of Egypt. <i>Candollea</i> 41: 183-191, 6 figs., 1 map, (with Hobbs, J.).</p> <p>Ten species new to the flora of Kuwait and Bahrain. <i>Arab Gulf Journal of scientific research</i> 4: 437-447, 5 figs., (with Al-Hasan, R.).</p> <p>The Weed Flora of Kuwait, poster exhibition. <i>Proceedings of the Royal Society of Edinburgh</i> 89B: 309.</p>
1987	<p>A contribution to the Flora of Kuwait. <i>Candollea</i> 42: 263-275, 4 figs .</p> <p>A new species of <i>Coelachyrum</i> (Gramineae) from Egypt. <i>Kew Bulletin</i> 42: 919-920, 1 fig., (with Cope, T. A.).</p>
1988	<p>A new species and variety of <i>Withania</i> (Solanaceae) from tropical northeast Africa. <i>Kew Bulletin</i> 43: 123-125, 1 fig., (with Hepper, F. N.).</p> <p>A contribution to the Flora of Kuwait 2. <i>Candollea</i> 43: 285-292, 1 fig., (with Armer, V.).</p> <p>A contribution to the Flora of South Yemen (PDRY). <i>Candollea</i> 43: 549-585, 2 figs.</p>

	The weed flora of Kuwait, with 82 line drawings by M. El-Gohary. Kuwait University, 175 pp.
1989	<p>Egyptian desert plants with promising economic potential. <i>Arab Gulf Journal of scientific research</i> 7(2): 91-108.</p> <p>The Vegetation of the Western Desert of Egypt. In: Encyclopedia of the Western Desert, Egypt, 1. (in Arabic, Scientific names of plants in Latin). Egyptian Academy of Scientific Research & Technology, pp. 85-106.</p>
1990	In defence of taxonomy. <i>Nature</i> 347: 223-224, (with Stirton, C. H., MacFarlane, T.D., Singh, N. P. & Nicholas, A.) .
1991	<p>A new species of <i>Periploca</i> (Asclepiadaceae) from Southwest Arabia. <i>Kew Bulletin</i> 46: 133-135, 1 fig. (with Goyder, D. J.).</p> <p>The identity, typification and distribution of <i>Salsola imbricata</i> Forsskål. Studies in the Chenopodiaceae of Arabia: 1. <i>Kew Bulletin</i> 46: 137-140.</p> <p>Notes on <i>Suaeda</i> Forssk. ex Scop. Studies in the Chenopodiaceae of Arabia: 2. <i>Kew Bulletin</i> 46: 291-296.</p> <p>A new species of <i>Salsola</i> from Oman. Studies in the Chenopodiaceae of Arabia: 3. <i>Kew Bulletin</i> 46: 297-299.</p> <p>A synopsis of <i>Chenopodium</i> L. Studies in the Chenopodiaceae of Arabia: 4. <i>Kew Bulletin</i> 46: 301- 305.</p> <p>Notes on the Chenopodiaceae in Collenette's Illustrated Guide to the Flowers of Saudi Arabia. <i>Candollea</i> 46: 81-84, (with Freitag, H.).</p> <p>A contribution to the Flora of Kuwait 3. <i>Candollea</i> 46: 75-80, (with Al-Yahya, Y.).</p> <p>Notes on the Chenopodiaceae of Ethiopia, Somalia and Southern Arabia. <i>Nordic Journal of Botany</i> 11(3): 309- 31, (with Friis, I. & Gilbert, M. G.) .</p>
1992	Notes on <i>Agathophora</i> (Fenzl) Bunge and <i>Cornulaca</i> Del. Studies in the Chenopodiaceae of Arabia 5. <i>Kew Bulletin</i> 47: 283-287.

Loutfy Boulos: A pillar of Egyptian botany

	<p>Entries of Malvaceae (40 genera, 179 species), Sterculiaceae (21 genera, 67 species) and all family entries of flowering plants (ca 250) in New Royal Horticultural Society Dictionary of Gardening, Macmillan. 4 vols.</p>
1993	<p>Bioclimatic and phytogeographic characteristics of the arid rangelands of northern Africa and the Near East. – Intern. Rangeland Congress, Montpellier, France, pp. 535-542, (with Le Houérou, H. N.).</p> <p>A new <i>Pulicaria</i> from Southern Yemen. <i>Edinburgh Journal of Botany</i> 50: 79-81, 1 fig., (with Gamal-Eldin, E. M.).</p> <p>Desert Parks as conservation sites in Arabia. <i>Boissiera</i> 47: 312.</p>
1994	<p>Checklist of the flora of Kuwait. – J. Univ. Kuwait (Sci.) 21: 203-218, (with Al-Dosary, M.).</p> <p>Regional Overview: South West Asia and the Middle East. In: Davis S., Heywood V.H. & Hamilton A.C. (eds), Centres of Plant Diversity, vol. 1. Oxford (with Miller, A. G. & Mill, R. R.), pp. 293-348.</p>
1995	<p>Notes on Acacia Mill. Studies in the Leguminosae of Arabia: 1. <i>Kew Bulletin</i> 50: 327-338.</p> <p>Flora of Egypt Checklist. pp. i–xii, + 287. Al Hadara Publ., Cairo.</p>
1996	<p>List of rare, vulnerable, endangered and endemic species of vascular plants in the Sinai Peninsula. Proc. 1st Conf. Egypt. Hung. Env. Egypt. 1993: 275-282, (with Gibali, M.).</p> <p>Useful plants in North Africa and Arabia. In: Batanouny, K. H. & Ghabbour, S. I. (eds.) Proceed. Workshop Arid Lands Biodiversity North Africa 14–16 Nov. 1994, Cairo, Egypt. Academy of Scientific Research & Technology, pp. 127-129.</p> <p>Sur la mention erronée dans la Flora of Libya, d'échantillons en provenance du Jebel Uweinat. <i>Bulletin du Jardin Botanique National de Belgique</i> 66: 13-17, (with Lèonard, J.).</p> <p>The family Chenopodiaceae. In: Miller A. G. & Cope T. A (Eds), Flora of the Arabian Peninsula and Socotra, 1. Edinburgh, pp. 233-283.</p>
1997	<p>Endemic Flora of the Middle East and North Africa. In: Barakat H. N. & Hegazy A. K. (Eds), Reviews in Ecology: Desert Conservation and Development, pp. 229-260.</p>
1998	<p>Some aspects of the plant life in the western desert of Egypt. Journal of Union of Arab Biologists 5(B), Botany 79-94, (with Barakat, H.).</p>

1999	Flora of Egypt, Azollaceae–Oxalidaceae, vol. 1, pp. I–XVI + 419, 544-line drawings, 96 colour photos. Al Hadara Publ., Cairo.
2000	Plants: natural vegetation, native and cultivated trees and shrubs. In: El-Baz, F. & Al-Sarawi, M. (Eds), Atlas of The State of Kuwait from satellite images. KFAS & Boston University, pp. 49-52. Flora of Egypt, Geraniaceae–Boraginaceae, vol. 2, pp. I–XVI, + 352, 409-line drawings, 94 colour photos. – Al Hadara Publ., Cairo.
2001	Site E-75-6: Vegetation and subsistence of the Early Neolithic and Nabta Playa, Egypt, reconstructed from charred plant remains. In: Wendorf, F., Schild, R. & assoc. (Eds), Holocene Settlement of the Egyptian Sahara, 1. New York, pp. 544-591 (with several authors).
2002	Four new combinations in <i>Pulicaria</i> (Compositae: Inuleae). <i>Kew Bulletin</i> 57: 495-498, (with Hind, D. J. N.). The flora and its main habitats. In: Wadi el-Rayan, gateway to the Western Desert, Italian Development Assistance Programme and IUCN, Wadi el-Rayan Protected Area Project, pp. 23-26. Flora of Egypt, Verbenaceae–Compositae, vol. 3, pp. I–XVI, + 373, 384-line drawings, 128 colour photos. – Al Hadara Publ., Cairo.
2004	Egyptian collections in European herbaria. – Proceedings First International Conference on Strategy of Egyptian Herbaria, Giza, Egypt: 1-4. Description of Egypt, Collection of observations and research which were made in Egypt during the expedition of the French army, texts, Natural History, volume II, Paris, 1812, 772 pp. (in Arabic, revised the translation from French to Arabic, and wrote the introduction).
2005	Flora of Egypt, Monocotyledoneae: Alismataceae–Orchidaceae, vol.4, pp. I–XVI, + 617, 404-line drawings, 159 colour photos. – Al Hadara Publ., Cairo.
2007	Grasses in Ancient Egypt. <i>Kew Bulletin</i> 62: 507-511, (with Gamal El-Din Fahmy, A.). Large-scale in vitro screening of Egyptian native and cultivated plants

Loutfy Boulos: A pillar of Egyptian botany

	<p>for schistosomicidal activity. <i>Pharmaceutical Biology</i> 45(6): 501-510. (with numerous authors).</p> <p>Plant diversity in Egypt, 20-line drawings, 85 colour photographs. – Al Hadara Publ., Cairo (in Arabic, scientific names in Latin), 68 pp.</p>
2008	<p>Flora and vegetation of the deserts of Egypt. <i>Flora Mediterranea</i> 18: 341-359.</p> <p>Vivi Laurent-Täckholm: 1898-1978. <i>Taeckholmia</i> 28: 193-210. (With Laurent, T. C & .Kassas, M.) .</p> <p>Plants in Ancient Egypt. 6 colour photos, 3-line drawings, Arabic summary. <i>The Heritage of Egypt</i> 1(2): 14-17.</p> <p>Flore de Tunisie, catalogue synonymique commenté. Montpellier, France. (Avec Le Floc'h E.), 461 pp.</p>
2009	<p>Index 9: Arabic plant names. In: Cappers, R. T. J., Neef, R. & Bekker (Eds), Digital Atlas of Economic Plants, 1. Barkhuis & Groningen University Library, Groningen, 475-483 pp.</p> <p>Flora of Egypt Checklist revised annotated edition. Al Hadara Publ., Cairo, 410 pp.</p>
2010	<p>Conservation approach to the demography and dynamics of protected and unprotected populations of the endemic <i>Ebenus armitagei</i> in the Western Mediterranean Coast of Egypt. <i>Journal for Nature Conservation</i> 18: 151-158, 6 figs., (with Hegazy, A. K., Kabiél, H. F. & Sharashy, O. S.).</p> <p>Functional trails and life history diversity of the North Africa endemic <i>Ebenus pinnata</i> Aiton. <i>Flora</i> 205 (10): 666-673, 7 figs., (with Hegazy, A. K., Kabiél, H. F. & Sharashy, O. S.).</p> <p>The Arabic Names of Peter Forsskål's Flora Aegyptiaco-Arabica. The Royal Danish Academy of Sciences and Letters. Copenhagen, 160 pp. (In P. Provençal, numerous comments and suggestions.).</p> <p>Catalogue synonymique commenté de la Flore de Tunisie. Ministère de l'Environnement et du Développement Durable, Tunisie, 500 pp. (with Le Floc'h. E. & Véla E& etal.).</p>
2011	<p>Contribution to in vitro screening of Egyptian plants for schistosomicidal activity. <i>Pharmaceutical Biology</i> 50(6): 732-739. doi:</p>

	10.3109/13880209.2011.625952 (with numerous authors).
2012	My First Trip to Jebel Uweinat, with black and white photographs. Al Hadara Publ., Cairo, 76 pp. (in Arabic).
2013	The traditional medical uses and cytotoxic activities of sixty-one Egyptian plants: discovery of an active cardiac glycoside from <i>Urginea maritima</i> . <i>Journal of Ethnopharmacology</i> 145(3):746-757 (El-Seedi HR, Burman R, Mansour A, Turki Z, Gullbo J, Göransson U.). DOI: 10.1016/j.jep.2012.12.007 Half of the world's human food comes from 5 plants. <i>Al Illm Magazine</i> 435: 38-39, January issue, (in Arabic).

Commemorative work on Loutfy Boulos

When Boulos passed away, the scientific community reacted with deep sorrow. It was felt profoundly, with tributes emphasizing his remarkable career, modesty, and resilience in the face of challenges as the loss of his herbarium during the Kuwait invasion in 1990. Boulos' passing marked the end of an era in botany, leaving a lasting impact on the scientific community and the field of plant taxonomy. His death was acknowledged in various publications and platforms, highlighting his immense contributions to botany and plant taxonomy (Table 2). Boulos was esteemed for his extensive fieldwork, significant publications, and establishment of herbaria, which greatly enriched the understanding of plant diversity in the Middle East and North Africa.

Table 2. Commemorative work on Loutfy Boulos

Shaltout, K. H., 2004. An updated flora of Egypt. Diversity and Distributions 10(1): 77-78. https://doi.org/10.1111/j.1472-4642.2004.00065.x .
Kassas, M A. 2008. "Outstanding Personalities" In: "Footsteps in the Twentieth Century and Beyond", p. 202.
Curriculum Vitae, Loutfy Boulos, Alexandria University. https://www.yumpu.com/en/document/read/3456883/curriculum-vitae-name-loutfy-boulos-alexandria-university#google_vignette
Heywood, V. H. (2013). Award of OPTIMA gold medal to professor Loutfy Boulos Tawadros. Laudatio by professor Vernon Heywood. Organization for the Phyto-Taxonomic Investigation of the Mediterranean Area (OPTIMA), Palermo., from http://www.optima-bot
Evangelista, F. (2014). Loutfy Boulos, une vie pour la Flore Égyptienne. <i>Hommes & Plantes- Spécial Égypte</i> 90: 42-45
El-Akkad D. (2015). The owner of the Flora Egypt Encyclopedia passed away without honor. May 2015 issue

Loutfy Boulos: A pillar of Egyptian botany

El-Hennawy H. (2015). The great botanist Loutfy Boulos passed away. <i>Al-Ilm magazine</i> 464: 15, June 2015 issue.
Le Floc'h, E. (2015). Notice à la mémoire de Loutfy Boulos 1932 (Qena, Egypt) – 2015 (Cairo, Egypt) <i>Fl. Medit.</i> 25: 173-180.
Osman D. (2015). Goodbye Loutfy Boulos, the international Egyptian plant taxonomist. <i>Academy of Scientific Research and Technology.</i>
Valderrábano, M., Gil, T., Heywood V. and Montmollin B. de (2018). Conserving wild plants in the south and east Mediterranean region. International Union for Conservation of Nature (IUCN). https://portals.iucn.org/library/sites/library/files/documents/2018-048-En.pdf .

Appendix 1. List of professional activities and consultancies

- The vegetation of Sinai, Egypt, Consultant, Dames and Moore, 1982-1983.
- Introduction of some agricultural crops into Nubia, Egypt, 1983-1984.
- New oil plants for agriculture in the western Mediterranean coast of Egypt, 1982-1983.
- Plant resources of Arid and Semi-arid regions of the Middle East, 1981.
- Conservation of rare plants in southeast Mediterranean region, 1980.
- Desert plants with promising economic potential in Egypt, 1986.
- Ornamental and newly introduced plants in Kuwait, 1987-1988.
- Conservation of desert habitats in Kuwait, 1986-1989.
- Member of the scientific committee, Second International Range Management Conference, Kuwait 3-6 March 1990.
- Member of the International Section of the Scientific Committee, IV International Rangeland Congress, Montpellier, France, 22-26 April 1991.
- Coordinator for Southwest Asia, Centers of Plant Diversity Project, IUCN, 1990-1993.
- Consultant and author, *The New Royal Horticultural Society Dictionary of Gardening*, Macmillan, 1990-1992.
- Member of the steering committee of the "Species Plantarum Project", *Flora of the World*, Royal Botanic Gardens, Kew, England since 1993, ongoing project.
- Member of the "Biodiversity Strategy Committee of Kuwait," 1995-1996.
- Member of the Advisory Panel of "Plant Talk", plant conservation periodical, U.K., 1995, ongoing quarterly periodical.
- Member of the Arabian Plant Specialist Group, Riyadh, Saudi Arabia.

- Member of the Biodiversity Specialists in Arab Countries, Beirut, Lebanon, 1996.
- Consultant, International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria (1996-1997).
- Consultant, Environmental Quality International (EQI), Cairo, Egypt, since 1996.
- Consultant, Gulf of Aqaba and Saint Katherine Protectorates Development Programmes, since 1999.
- Member of the International Referees Committee of Webbia, Florence, Italy, since 2004.
- Initiating an eco-garden (ca 2 acres) at the premises of the “Association for the Protection of the Environment”, garbage collectors’ settlement, Moqattam Hills, Cairo, Egypt since 2000, ongoing project, exclusively based on native and traditional Egyptian trees and shrubs.
- Concept development and implementation of the “Desert Park” (ca 500 acres) and “Botanical Garden” at “Aderar Amellal” (white mountain), Siwa Oasis, Western Desert, Egypt, under the auspices of Environmental Quality International (EQI), 1996-present, project in progress.

Appendix 2. List of plants arranged alphabetically, found and described as new to science by Boulos

- *Acacia johnwoodii* Boulos, from Saudi Arabia and Yemen.
- *Acacia yemenensis* Boulos, from Yemen.
- *Babcokia* Boulos, a new genus of Compositae comprising 1 species from Canary Islands.
- *Cousinia austrojordanica* Davies & Boulos, from Jordan.
- *Diplotaxis villosa* Boulos & Jallad, from Jordan.
- *Embergeria* Boulos, a new genus of Compositae comprising 2 species from New Zealand.
- *Kickxia azraqensis* Boulos & Lahham, from Jordan and Iraq.
- *Origanum akhdarensense* Ietswaart & Boulos, from Libya.
- *Pulicaria hadramautica* Gamal-Eldin & Boulos, from Yemen.
- *Rorippa integrifolia* Boulos, from Sinai, Egypt.
- *Salsola omanensis* Boulos, from Oman.
- *Senecio asirensis* Boulos & Wood, from Saudi Arabia and Yemen.
- *Sonchus friesii* Boulos, from Zimbabwe and South Africa.
- *Sonchus gigas* Boulos, from East Africa and Madagascar.
- *Sonchus hydrophilus* Boulos, from Australia and New Zealand
- *Sonchus lidii* Boulos, from Canary Islands.
- *Sonchus macrocarpus* Boulos & C. Jeffrey, from Egypt.
- *Sonchus pitardii* Boulos, from Canary Islands.

Loutfy Boulos: A pillar of Egyptian botany

- *Sonchus saudensis* Boulos, from Saudi Arabia and Yemen.
- *Taeckholmia* Boulos, a new genus of Compositae comprising 7 species from Canary Islands.
- *Tephrosia kassasii* Boulos, from Nubia, Egypt.
- *Vicia sinaica* Boulos, from Sinai, Egypt.
- *Withania sphaerocarpa* Hepper & Boulos, from Yemen, Somalia and Ethiopia.