



NEW DISTRIBUTIONS OF SOME SPECIES OF EGYPTIAN FLORA

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ABSTRACT

This research reviews the distribution of some old species of the Egyptian flora in different phytogeographical regions. Results are compared with the suggestions given by **Täckholm (1974)**, **El-Hadidi and Fayed (1994/95)**, **El-Khanagry and Mohamed (2004)**, and **Boulos (2009)**. The research includes new distribution of 38 species belong to 34 genera and 22 families.

INTRODUCTION

Distribution of plants in a flora is affected by geographical intervals, rainfall, floods, water and soil salinity, soil type (chemical and mechanical), and agricultural expansion in new areas, i.e., Sahl El-Tina El-Qantara Sharq (Sinai), Sharq El-Uweinat, Toushky at Western Desert, new lands at east and west Delta and Nile valley in upper Egypt; in addition to agricultural practices, transfer of soil and organic fertilizers from Nile valley to new areas. All the previous factors are playing major roles in changing and transferring the flora from one location to another. These changes represent problems for agricultural production and studying the flora. The Egyptian flora of the Nile valley was previously studied by many researchers; e.g., **El-Amry (1981)**, **El-Bakry (1982)**, **Mahgoub (1993)**, **Mashaly (1987)**, **El-Shayeb (1989)**, **Soliman (1989)** and **El-Khanagry (1993)**. **Shaheen (1987 and 2004)** and **Fawzy et al (2011)** study the flora of Aswan & Nile Nubian. Meanwhile, **Hassan (1987)** surveyed the flora of the Eastern Desert and some sites of the Red Sea region. Also, **Hassan (1992/93)** studied the flora of Nile valley in Upper Egypt.

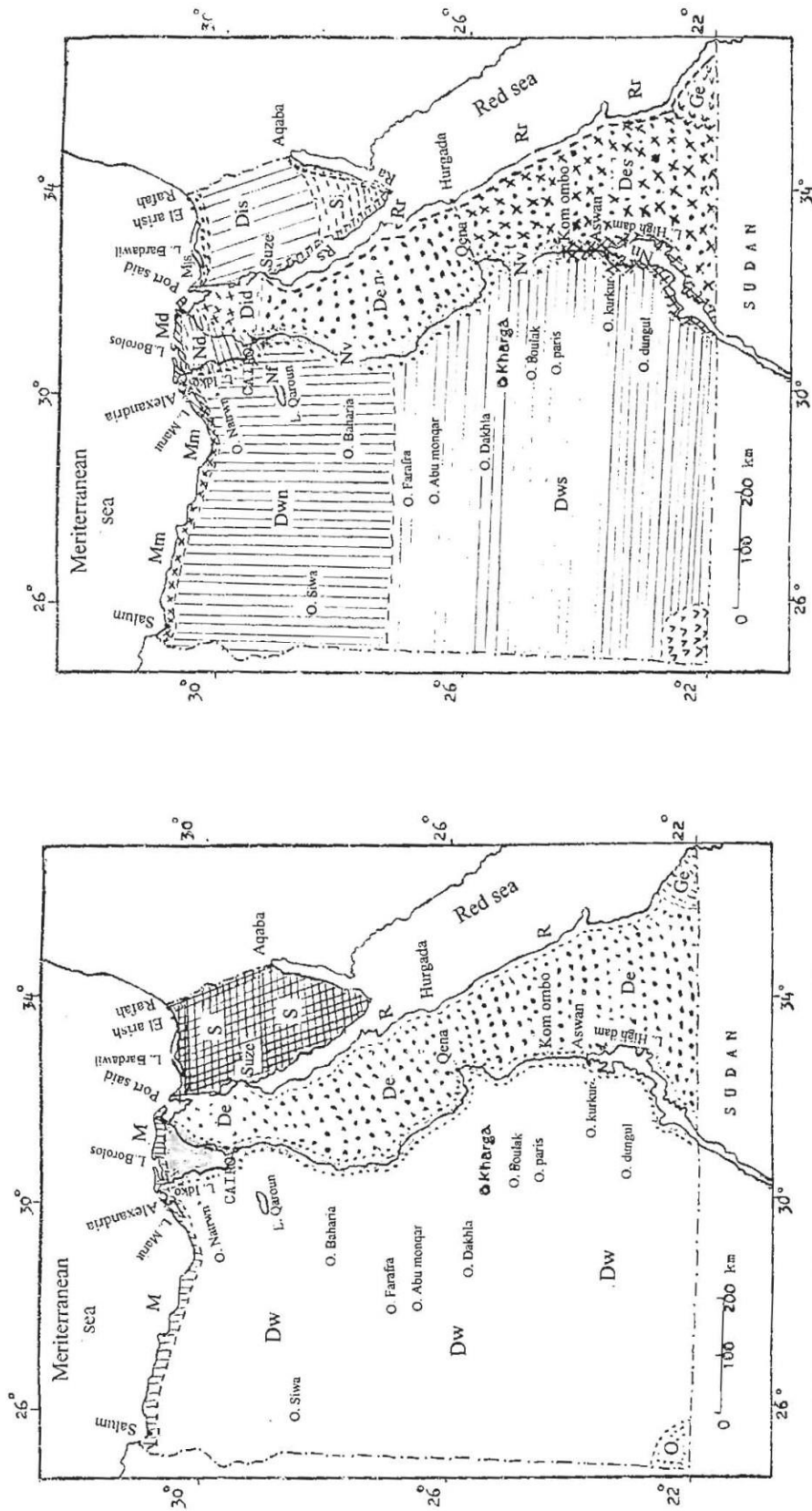
This research considers the transfer of some species from a region to another, and explains the different factors which led to the new distributions of these species.

MATERIALS AND METHODS

The following investigations are based on specimens collected from different phytogeographical regions. The distribution of these specimens was checked to **Täckholm (1974; Map 1)**, **El-Hadidi and Fayed (1994/95; Map 2)**, **Boulos (2009 Map 3)**, and **El-Khanagry and Mohamed (2004; Map 4)**. Specimens were identified by means of botanical keys before being compared with those kept in the Herbarium of Flora and Phytotaxonomy Researches Department (CAIM) and the Herbarium of Faculty of Science, Cairo University (CAI). Most specimens collected throughout the present study were kept in CAIM. **Map 4** was constructed to illustrate the phytogeographical regions suggested in this investigation viz., Nile lands (N.), Nile Delta (Nd.), Nile Valley from Cairo to Sudan frontier and including Fayoum (Nv.); Mediterranean coastal (M.), from Alexandria to Saloum (Mm.), from Port Said to Alexandria (Md.), from Rafah to Port Said (Ms.); All desert (D.), Eastern desert (De.), Northern parts from North Galala to the line between Qena-Qousier (Den.), Southern part (Des.). western desert (Dw), Northern parts (Dwn.), Southern parts (Dws.), Isthmic desert (Di.), Sinai desert (Dis.), and the region between Damietta Nile branch, Suez Canal and North Galala (Did.); Red Sea region (R.), Red Sea coastal (Rr.), Suez Gulf coast (Rs.), Aqaba Gulf coast (Ras.); Sinai mountains (S.); Gebel Elba (GE.), Gebel Uweinat (U.); Oases (O. with name of oases). Lakes (L. with name of lake) abbreviations of different phytogeographical regions used in previous works as well as those used in this study are shown in **Table (1)**.

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Map (4). Phytogeographical regions suggested by El-Khanagry and Mohamed (2004).

Map (3). Phytogeographical regions suggested by Boulos (2009).

Table 1. Abbreviations of different phytogeographical regions suggested by different authors

Regions	Authors	T	H	B	K & M
I-Nile land		N	N	N	N
Nile Delta		Nd	N	N	Nd
Nile valley (south cairo to komombo)		Nv	N	N	Nv
Nile Fayoum		Nf	N	N	N f
Nile Nubbian south Kom Ombo to Sudan		N	Nn	N	Nn
II-Mediterranean coastal		M	M	S	M
North Delta		-	-	-	Md
North Sinai coastal		Mp	M	M	Ms
Western Med. Coastal		Mma	M	M	Mm
III-Desert		D	D	D	D
Eastern desert		Da		De	De
Northern part		Da. sept	Dg	De	De. n
Southern part		Da. mer	Da	De	De. s
Isthmic desert (Sinai part)		Di	Di	S	Dis
Ithmic desert (Delta part)		Di	Dg	De	Did
Western desert		DI	-	Dw	Dw
Northern part		DI	DI	Dw	Dw. n
Southern part		DI	Dn	Dw	Dw. s
IV-Red Sea region		R	R	R	R
Red Sea coastal		R	Ra	R	Rr
Suez Gulf		S	Rz	S	Rs
Aqaba Gulf		S	Rq	S	Ra
V-Mountains					
Sinai mountains		S	S	S	S
Gebel Elba		GE	Sa	GE	GE
Gebel Uwienat		U	Uw	O	U
VI-Oases		O	O	O	O + name
Oases of north-western desert		-	OI	-	of oases
Oases of south-western Desert		-	On	-	
VII-Lakes					L + name
Northern lakes		Nd	M	N	of lake
Quaron lake		Nf	N	N	
Bardawil		Mp	Ms	S	
High-dam lake		-	Nn	N	

All the species in this research were described and drawn in **Täckholm (1974)**, **Boulos (1999, 2000, 2002 and 2005)** and **El-Khanagry (2005)**.

Authors reported in this paper are abbreviated as follows:

T : Täckholm (1974).

H : El-Hadidi and Fayed (1994/95).

B : Boulos (2009).

K & M : El – Khanagry & Mohamed (2004).

RESULTS AND DISCUSSION

The revised distributions of the species collected from different Egyptian locations are given below with reference to new suggested phytogeographical regions compared to distributions of those reported by **Täckholm (1974)**, **El-Hadidi and Fayed (1994/95)**, **Boulos (2009)** and **El-Khanagry and Mohamed 2004**). Engler system is used by authors and all investigators in this paper.

1. Urticaceae

1.1. *Forsskalea tenacissima* L.

(T: D., O. (Uweinat), GE., S.; H: D., S., Sa., U.;
B: D., O., (Uweinat), GE., S.)

Nn: Wady El-Noqra, Kom Ombo, Aswan, New land 15.3.2012, Habeeb.

2. Aizoaceae

2.2. *Trianthema portulacastrum* L.

(T: GE.; H: Sa; B: GE.; K & M: Rr., O., Dis.)

Nn: Tropical farm, Aswan governorate, 15/5/2012, Habeeb.

Note: This species was recorded by **El Amry (1981)**; **El Bakry (1982)**, **El Mashaly (1987)**, **El Shaeb (1989)** and **El Khanagry (1993)** at different locations in Nile Delta and Nile valley.

3. Caryophyllaceae

3.3. *Silene gallica* L.

(T: O, Mma. Di.; H: M.; B: O., M.)

Did: Ismailia, waste place, sandy soil 14.5.2009, El-Khanagry.

4. Amaranthaceae

4.4. *Amaranthus albus* L.

(T: Nv., Mp., O.; H: Not recorded.; B: N., O.)

Mma: Wady El Natroun – Alamin road, south El Hammam,,
Water melon field, sandy soil. 6.5. 2009, El Khanagry and Emara.

4.5. *Amaranthus lividus* L.

(T: Nd., Nv., Mma., S.; H: M., Dl., Nv.; B: N., M., S.; K & M: Did., Dwn.)

Rr: Sahl Hashish, Hurgada, in garden 20.7., 2014, El-Khanagry.

4.6. *Amaranthus palmeri* S. Watson

(T: not recorded, H: Nn; B: N. (Kom Ombo))

Did: El-Kassasine, Maize field, sandy soil, 23.7.2002, El-Khanagry.

4.7. *Amaranthus tricolor* L.

(T: Nd., Nv.; H: not recorded; B: N., M.; K & M: Den.)

Rr: Hilton noor, El-Kora Road, Hurgada, 27.7.2012, El Khanagry

Note: This species has a terminal spike.

5. Ranunculaceae

5.8. *Nigella sativa* L.

(T: Not recorded; H: not recorded; B: N., M.)

Did: Wady Hagoul, Suez road, sandy soil 13.3.2013, Mohamed.

6. Capparaceae

6.9. *Cleome droserifolia* (Forssk.) Delile

(T: Uweinat, R., D., GE., S.; H: D., S., R., Sa., Uw.; B: Uweinat, D., R., GE., S.)

Nv: Akhmim, Sohag, Sandy soil, 6.3.1994, Mohamed.

7. Cruciferae

7.10. *Coronopus didymus* (L.) Sm.

(T: Mma.; H: Nv.; B: N.)

Ds: El-Qantara Sharq, edge of wheat field, sandy soil, 7.4.2014, Mohamed.

8.11. *Lepidium virginicum* L.

(T: not recorded; H: Nv.; B: De. (Ismalia))

Nd: Agr. Museum Dokki, Giza, in garden, 15.5.2011, Mohamed.

Note: This species was collected by J.R. Shabetai from Ismailia in 22.5.1933 and determined as *Lepidium sativum*, while, **M. Abdallah (1975)** renamed the specimen as *Lepidium virginicum*.

8. Resedaceae

9.12. *Ochradenus baccatus* Delile

(T: Mp., D., R., GE., S.; H: M., D., S., R., Sa., B: M., D., R., GE., S.)

Nv: Aulad Toq Shark, sandy soil, 14.4.1993, Mohamed.

9. Leguminosae

10.13. *Leucaena leucocephala* (Lam.) de Wit

(T: not recorded; H: not recorded; B: not recorded)

Nn: Aswan Botanical Garden, 8.12.2012, Habeeb.

Note: This species added by **El-Khanagry (2005)** as a new weed species, to the flora of Egypt and the collections site, Nv, Dwn, Den, Rr, Ms regions.

11.14. *Clitoria ternatea* L.

(T: Nd. (Cairo) GE.; H: Nv.; B: N.)

Nn: Aswan Botanical Garden, 12.7.2012, Habeeb.

12.15. *Macroptilium atropurourem* (DC.) Urban.

(T: Not recorded; H: not recorded; B: not recorded).

Nn: The tropical garden, kom Ombo, Aswan, 3.5.2012, Habeeb.

13.16. *Medicago lupulina* L.

(T: Mma, O.; H: M., O.; B: M., O., S.)

Did: Wady Hagul, Suez road sandy soil, 5.5.2009, Mohamed.

10. Oxalidaceae

14.17. *Oxalis corymbosa* DC.

(T: not recorded; H: not recorded; B: not recorded).

Nn: Aswan Botanical Garden, 8.6.2014, Habeb.

Note: This species is new recorded by El-Khanagry (2005).

11. Euphorbiaceae

15.18. *Euphorbia granulate* Forssk.

(T: D., GE.; H: D., Sa.; B: D., R., GE.)

Nv : El kitkata, Saqolta, Sohag, 13.8.1993, Mohamed.

15.19. *Euphorbia hirta* L.

(T: Nd., Nv., Mma.; H: M., N., O., S.; B: N., M., S.)

Rr: Sahl Hashis, Hurgada, in garden, 20.7.2014, El-Khanagry.

12. Cucurbitaceae

16.20. *Momordica charantia* L.

(T: not recorded; H: not recorded; B: not recorded).

Nn : Tropical garden, Kom Ombo, Aswan, 5.5.2012, Habeb.

13. Onagraceae

17.21. *Oenothera durummondii* Hook.

(T: Mp. (Rafah); H: M. (near Rafah); B: S.)

Mm : El Hammam, international road, sandy soil, 3.6.2009 Mohamed.

14. Umbelliferae

18.22. *Apium graveolens* L.

(T: N., O., M., S., H: not recorded; B: M., De., S.)

Did: Wady Hagul, Suez road, sandy soil, 7.7.2013, Mohamed.

15. Asclepiadaceae.

19.23. *Pergularia tomentosa* L.

(T: Uweinat, D., R., GE., S.; H: D., O., S., R., Sa.; B: Uweinat, D., R., GE., S.)

Nv: Aulad Toq Sharq, Sohag, 5.4.1993, Mohamed.

20.24. *Cynancum acutum* L.

(T: N., M., O.; H: M., N., O; B: N., M., O.)

Rr: Sahl Hashis, Hurgada, in garden, 20.7.2014, El-Khanagry.

16. Convolvulaceae

21.25. *Ipomoea eriocarpa* R. Br.

(T: Nd., Nv.; H: Nv., B: N.)

Mm: Mariut region, Cairo-Alexandria desert road before Alexandria, waste place, sandy soil, 30.10.2011, El-Khanagry.

21.26. *Ipomoea hederacea* Jacq.

(T: not recorded; H: not recorded; B: N.)

Mm : Mariut region, Cairo- Alexandria desert road before Alexandria, waste place, sandy soil, 30.10.2011, El-Khanagry.

22.27. *Merremia dissecta* (Jacq.) Hallier f.

(T: not recorded; H: not recorded; B: N.)

Nn : Tropical garden, Aswan, 3.5.2012, Habeb.

17. Verbenaceae

23.28. *Phyla nodiflora* (L.) Greene.

(T: N., O., M., Di.; H: M., Di., N., O.; B: N., O., M., D., S.)

Rr: Gebel El-Harim, Hurgada, in a garden, 7.9.2013, El-Khanagry.

18. Labiatae

24.29. *Mentha logifolia* (L.) Huds. *subsp. schimperi* (Briq.) Briq.

(T: not recorded; H: S.; B: S.)

Nn : Tropical island, Kom Ombo. Aswan, 3.5.2012, Habeb.

19. Solanaceae

25.30. *Solanum elaeagnifolium* Cav.

(T: Mp. (El Arish); H: M. (El Arish); B: N., S. (El Arish))

Mm: Burg El-Arab, waste place, sandy soil, 6.8.2013, Mohamed.

20. Compositae

26.31. *Artemisia vulgaris* L.

(T: not recorded; H: not recorded; B: N. (orchard))

Nn : Aswan Botanical Garden, 13.5.2012, Habeb.

27.32. *Conyza bonariensis* (L.) Cronquist.

(T: N., O., M., Di., S.; H: N., O., M., D., S.; B: N., O., M., D., S.)

Rr: Sahl Hashis, Hurgada, in a garden, 20.7.2014, El-Khanagry.

28.33. *Taraxacum turcicum* Soest.

(T: Nd. (Cairo); H: not recorded; B: N. (Cairo))
Dwn.: 6 october city in a garden, 6.4.2006, El Khanagry

29.34. *Verbesina encelioides* (Cav.) Benth. ex A. Gray.

(T: Nv. (Aswan). H: Nn., O., S., B: N. (Aswan), O. (Kharga), S. (El Arish))
Rr: Gebel El Harim, Hurgada, in a gurden, 7.9.2013, El-Khanagry.

21. Commelinaceae**30.35. *Commelina bengalensis* L.**

(T: GE.; H: Sa.; B: GE.)
Nn: Tropical Garden, Aswan, 3.5.2012, Habeeb.
Note : **El-Khanagry and Mohamed (2005)** found a new distribution for this species in Nd. and Did.

22. Gramineae**31.36. *Cenchrus echinatus* L.**

(T: not recorded; H: Nv.; B: N.)
Nn: Agr. Research Station, Kom Ombo, 16.5.2012, Habeeb.

32.37. *Leptochloa paniceae* (Retz) Ohwi.

(T: not recorded; H: Nv.; B: N.)
Nn: Aswan City, in a garden of Katarakt Hotel, 6.2.2012, Habeeb.

33.38. *Paspalidium geminatum* (Forssk.) Stapf

(T: N., O., M., Di; H: M., N., O., S.; B: N., O., M., De.)
Rr: Gebel El-Harim, Hurgada, in a garden, 7.9.2013, El-Khanagry.

Trianthema portulacastrum and *Commelina benghalensis* were recorded in Gebel Elba only by **Täckholm (1974)**, **El-Hadidi and Fayed (1994/95)** and **Boulos (2009)**, The important note that there is no relation between Gebel Elba and the locations where the species recorded in Nile valley and E. desert. In addition to the new distribution of the previous species in Nn. region, **El-Khanagry (1993)** recorded it in Delta region, **Hassan (1992/93)** recorded it in upper Egypt, while **El-Khanagry and Mohamed (2004)** recorded the species from Hurgada (Rr.), Wady El-Natroun (O. Natroun) and El-Qantara Sharq (Dis). This distribution may be mean that the seeds of the species were introduced with fodder compounds. *Cynanchum acutum* and *Pergularia tomentosa* may be

transfer by air (seeds have long and soft hairs). Some species might be transfer from location to another through human factor *i.e.*: *Leucaena leucocephala*, *Clitoria ternatea* and *Merremia dissecta*. Also, some species transfer by soil, organic fertilizers or machines *i.e.*: the genera of *Amaranthus*, *Euphorbia*., *Ipomoea*.

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