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Weed communities of winter crop in Egypt

Plevelová společenstva zimní úrody v Egyptě

Jana Kosinová

Kosinová J. (1975): Weed communities of winter crop in Egypt. — Preslia, Praha, 47 : 58—74.

Weed plant communities of winter crop in Egypt have been investigated. A phytocoenological analysis based on 65 relevés from all main regions where land is cultivated was made. This analysis has revealed the existence of three associations defined by floristic, ecological as well as phytogeographical characteristics. Non-irrigated winter crop vegetation in the Mediterranean region is represented by the association *Achilleetum santolinae mareoticum* Tadros et Atta 1958 placed in the alliance *Achilleion santolinae* Zoh. 1950. Irrigated winter crop vegetation belongs to the newly established alliance *Melilotion indici* foed. nova hoc loco which comprises two associations. Ass. *Convolvulo (arvensis)-Rumicetum dentati* ass. nova hoc loco occurs in the Nile Delta, valley and Faiyum Oasis. Ass. *Astragalo (corrugati)-Plantaginetum lagopi* ass. nova hoc loco is restricted to cultivated land in Kharga and Dakhla Oases of the Libyan Desert. Both associations abound in pluriregional weeds; their omniterritorial local pattern in Egypt is shown in ten distributional maps. A computer aided floristic similarity analysis based on Sörensen's coefficient proved the existence of significant regional differences between described communities.

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INTRODUCTION

In accordance with modern trends in botany the Egyptian synanthropic vegetation is becoming an increasingly important topic of study. Rapid growth of Egyptian population calls for more and more land to be cultivated. It may suffice to mention soil reclamation projects in Kharga and Dakhla Oases, Maryut, Tahrir and Sahlia projects in the territory bordering the Nile Delta, and the New Nubia project in southern part of the Nile valley. At the same time the traditional agricultural system is being gradually replaced by modern large-scale production methods. Scientific approach to the problems of salinisation, sand movement as well as weed control is becoming a necessity.

By blocking the irrigation system, weeds have always been of permanent menace in Egypt though in small-scale fellahin cultivations weed infestation has never been of serious danger to economy. There were even some benefits derived from weeds. It served as forage for cattle and pot herbs and vegetables enriched man's diet. Losses caused by weeds increase, however, when large-scale extensive farming system is once evolved (increase of cost of tillage operations, reduction in yield of crops etc.).

Mechanical, chemical or biological weed control is unthinkable without thorough knowledge of weed species, their distribution, ecological behaviour and conditions under which they associate into communities.

MATERIAL AND METHODS

Weed vegetation of winter crop in Egypt was studied during two winter-spring seasons 1967 and 1971. Field observations were made in all main geographical regions where land is cultivated.

The author follows the principles and methods of the Zürich-Montpellier school. The area of recorded relevés was 25 m^2 which corresponds to the minimal area of the studied communities. The field edges were avoided or records were made separately. The field material has been investigated from the viewpoint of floristic similarity coefficients. A computer programme prepared for this purpose (KOSINOVÁ et KOSINA 1971) made it possible to calculate the floristic similarity within, as well as between, a number of chosen sets of relevés. The local pattern of the most significant weeds is shown in distributional maps, where the localities are marked by dots representing an area of 30 km in diameter around the actual locality of the taxon. These maps are based on herbarium material deposited at the Herbarium of Cairo University (CAI) and partly also at the Herbarium of Agricultural Museum, Dokki (CAIM) till June 1971. The author's own records made in the field as well as unpublished records of N. EL HADIDI, M. IMAM and S. GHABBOUR (personal communication) were included. All herbarium specimens have been subject to an elementary taxonomic revision. If the intraspecific taxonomy proved difficult the taxon was treated at the species level and marked s.l. The nomenclature of idiotaxa follows in general Students' Flora of Egypt (TÄCKHOLM et al. 1956). Data on their general distribution have been gathered from the following works: EIG (1931), ZOHARY (1950), Hegi's Illustrierte Flora von Mitteleuropa, Flora of Palestine, Flora of Turkey, Flora of Iraq, Flore de l'Afrique du Nord, Flora of Tropical East Africa etc. As far as the local distribution of the taxa studied is concerned, the subdivision and nomenclature of distributional types follows proposals by the present author (KOSINOVÁ 1972, 1974a). Abbreviations of the Egyptian phytogeographical regions used in the text are as follows: Nd (the Nile Delta), Mma (the Mediterranean coast west of Nd), Nv (the Nile valley), Nvs (northern part of Nv), Nvm (southern part of Nv), Nf (the Nile Faiyum or Faiyum Oasis), O (oases of the Lybian Desert), S (southern Sinai).

GENERAL OBSERVATIONS

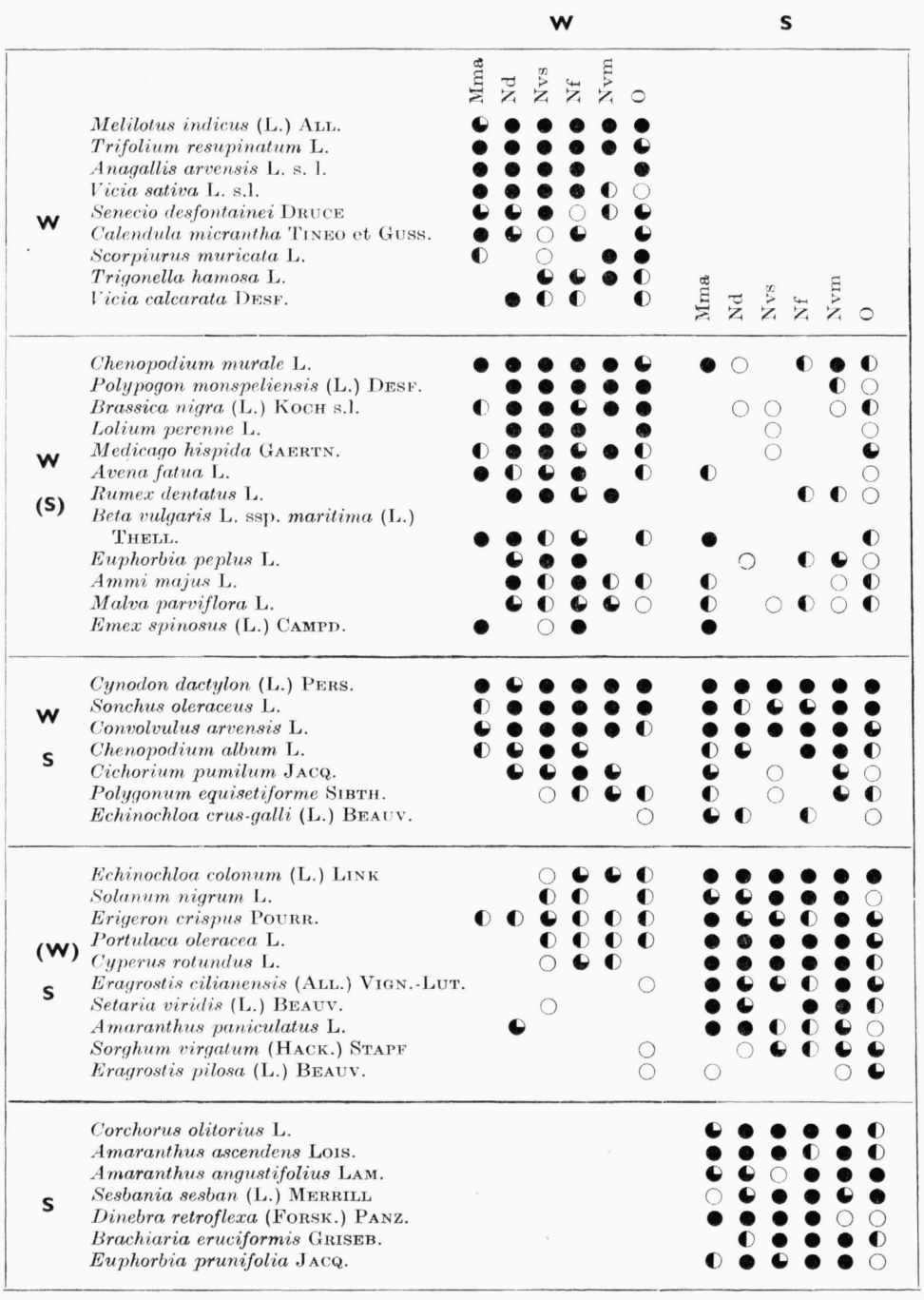
Weeds form true classifiable plant communities. Their existence is entirely dependent on man and sown crop is an integral part of their environment. The ecological basis for their differentiation is the extreme variability of their environment. Agrotechnical methods (including irrigation and crop rotation) as well as the prevailing climatic conditions are fundamental factors which determine or at least influence their composition in the given area. Other factors, including soil, which is often radically changed in the course of cultivation, seem to be of minor importance (KROPÁČ, HADAČ et HEJNÝ 1971).

In arid climate of Egypt artificial irrigation is mandatory for successful cultivation with the exception of the Mediterranean coastal belt where the winter rainfalls are sufficient to keep the so called rain-fed cultivation. In all other areas perennial irrigation either depending on the Nile (Nv, Nf, Nd) or underground water (O) is practised. As described more in detail by EL HADIDI and KOSINOVÁ (1971) the irrigated cultivations are characterized by seasonal sequence of two main crops, winter and summer.

The present study is mainly concerned with the weed communities of the winter crop. Data serving as a basis for examples and comparisons with the summer crop are taken from the field records of M. N. EL HADIDI.

The duration of weed phytocoenoses corresponds to the length of life cycles of individual coenobionts. The Egyptian weed communities of both crops consist of a large number of annuals (W 65%, S 62%) and a small portion of biennals (W 5%, S 1%) and perennials (W 30%, S 37%). These communities exist only three to four moths during the year. Whenever the environmental conditions are repeated (in the course of the three-year or four-year crop rotation cycles) these communities are re-established from the propagules stored in the soil, brought in with the seeds of crop plants or as the case may

Tab. 1. — Groups of Egyptian weeds according to their presence in different regions during winter **W** and summer **S** crop (1967). Categories of presence: ○ < 10%, ◐ 10—20%, ◕ 20—40%, ● > 40%.



Tab. 1 (contd.)

		W			S		
		Mma	Nd	Nvs	Nf	Nvm	O
	Hibiscus trionum L.	○	○	●	●	◕	◐
	Digitaria sanguinalis (L.) Scop.	◕	◕		◕	◕	◕
	Sida alba L.	◐	●	◕		◕	
	Euphorbia aegyptiaca Boiss.			◐	◕	●	◕
S	*Xanthium brasilicum* Vellozo	●	◕	◕		○	○
	Urochloa reptans (L.) Stapf		●	◐	◐		
	Gynandropsis gynandra (L.) Briq.	◐	◕			◕	
	Dactyloctenium aegyptiacum (L.) Richt.	◐	◕		◐	○	○

be by wind and irrigation water from neighbouring artificial and seminatural habitats. Owing to methodical difficulties, this question has not been paid due attention. The process of restoration is most apparent in differentiation and changes of agro-ecophases of rice field weed communities pertinent to the summer crop in Egypt (Imam and Kosinová 1972). As for winter crop weed communities no observations have been made which would indicate differentiation of individual fundamental changes of their habitat. Only shortly before the harvest it is possible to observe a few (mostly perennial) species as *Convolvulus arvensis*, *Cynodon dactylon* and *Lolium perenne* which somewhat influence the physiognomy of the community. The stubble aspect commonly present in the temperate zone is virtually absent. This is accounted for by entire desiccation of the fields shortly before and after the harvest and different agrotechniques (threshing in the field, keeping sheep and goats in the fields as well as early preparation of the fields for the next crop without any irrigation). Only if fodder crop such as *Trifolium alexandrinum* was undersown into cereals the fields are protected against trampling and some common weeds (*Chenopodium murale*, *Melilotus indicus*, *Polypogon monspeliensis*, *Trifolium resupinatum* and *Sonchus oleraceus*) may be found.

An interesting phenomenon to be seen in the Middle East fields are so called relic weeds (Zohary 1950). These typical non-segetal species originally belong to natural or seminatural vegetation. Most of them are deep-rooting species left in the fields because they are difficult to eradicate. In inland parts of the Egyptian cropland these relic weeds have been recorded only scarcely, if at all. *Abutilon pannosum* and *Sesbania sesban* were observed in Luxor area by the present author, *Cassia occidentalis*, *C. italica*, *Crotalaria thebaica* and *Balanites aegyptiaca* in Aswan area by El Hadidi and Ghabbour (1968) and in Egyptian Nubia by Boulos (1966). In fact some of these species are sometimes intentionally left around the fields to fence the crop and to reinforce the banks of irrigation ditches. There are numerous examples of relic weeds in the Mediterranean barley fields (*Thymelaea hirsuta*, *Lycium europaeum*, *Salvia aegyptiaca*, *Lotus polyphyllos*, *Echiochilon fruticosum*, *Crucianella maritima*) which form semi-desert vegetation in this region and persist in fields.

Floristic composition of weed communities of both winter and summer crop was described by El Hadidi and Kosinová (1971) while chorological analysis of the Egyptian weed flora is dealt with in two other papers (Kosinová 1974a, 1974b). The results of these studies proved the existence of two distinct groups of winter and summer weeds, solely present in one crop only. As shown in Table 1 there are three additional groups comprising species occurring to different

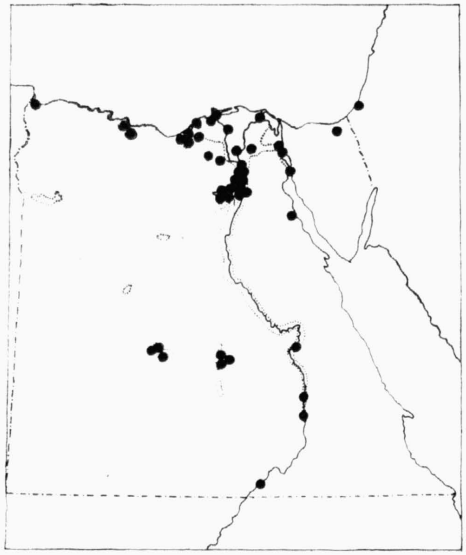


Fig. 1. Distribution of *Anagallis arvensis* L. s.l.

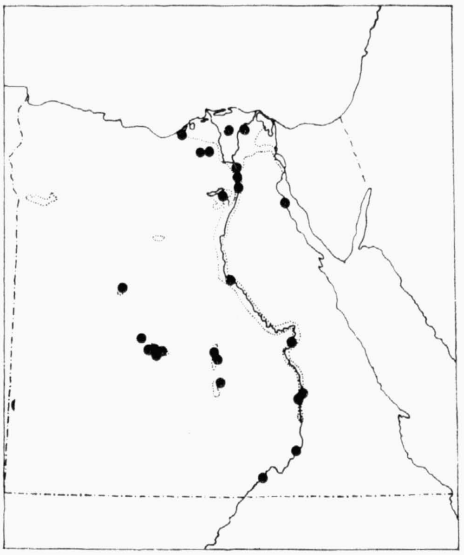


Fig. 2. Distribution of *Brassica nigra* (L.) Koch s.l.

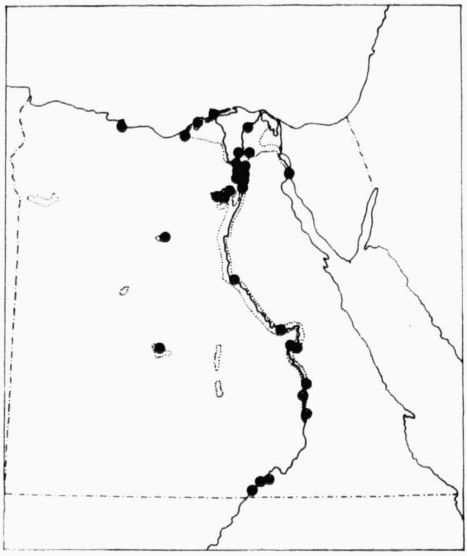


Fig. 3. Distribution of *Cichorium pumilum* Jacq.

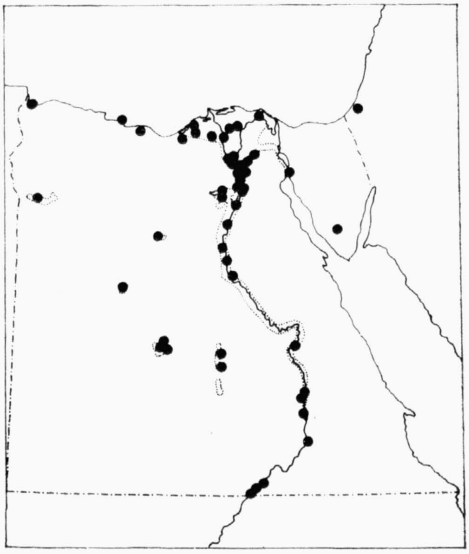


Fig. 4. Distribution of *Convolvulus arvensis* L.

extent in both crops. Summer weeds are predominantly of tropical distribution or origin and their local distributional pattern is apparently confined to the Nile basin. Winter weeds, on the other hand, are represented by species of either Mediterranean origin or Mediterranean (or Mediterranean-Irano-Turanian) distribution. They also include, however, many pluriregionals occurring in boreal areas of Europe and America as well as in tropics of both hemispheres.

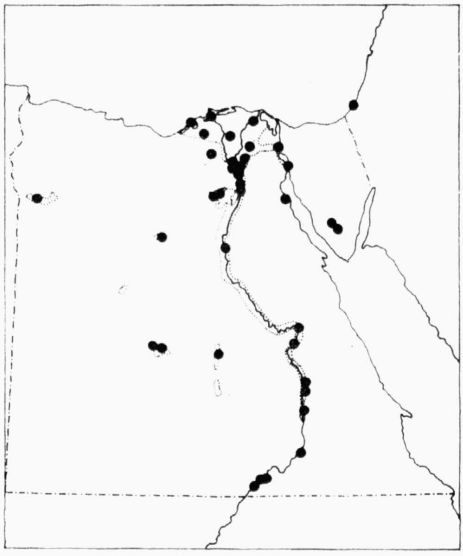


Fig. 5. Distribution of *Euphorbia peplus* L.

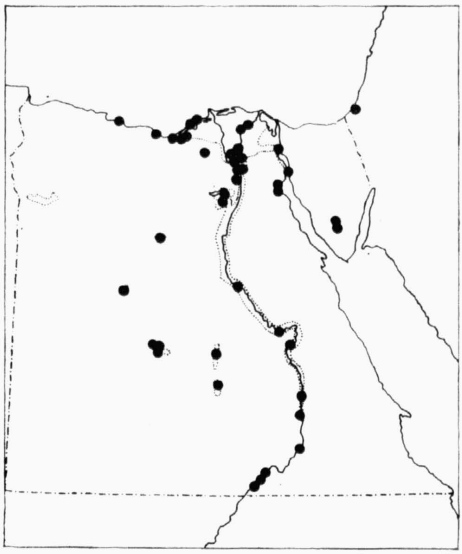


Fig. 6. Distribution of *Medicago hispida* GAERTN.

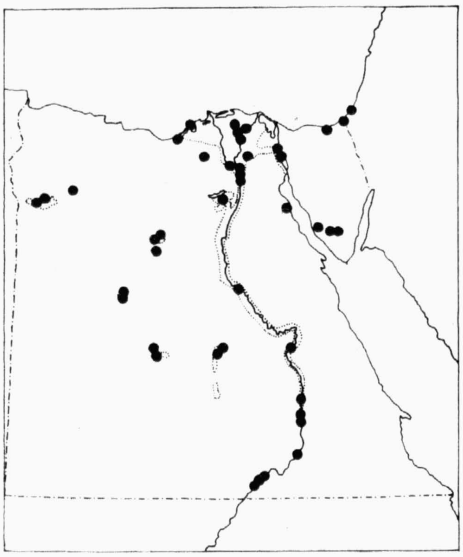


Fig. 7. Distribution of *Melilotus indicus* (L.) ALL.

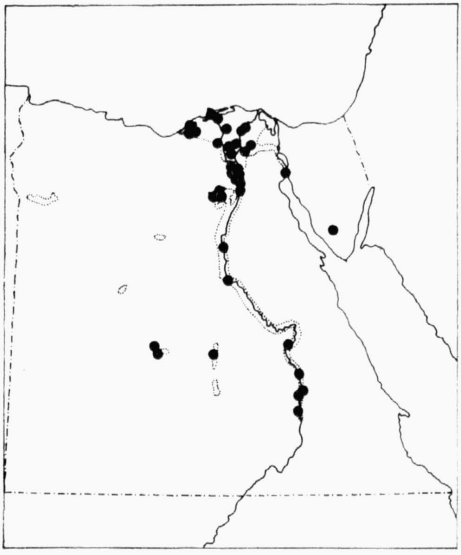


Fig. 8. Distribution of *Rumex dentatus* L.

DESCRIPTION OF COMMUNITIES

Syntaxa of various levels of classification described hitherto from the Middle East territory are confined to non-irrigated or occasionally and slightly

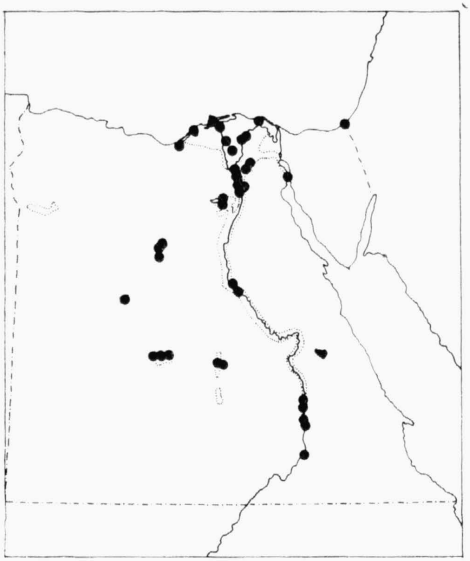


Fig. 9. Distribution of *Trifolium resupinatum* L.

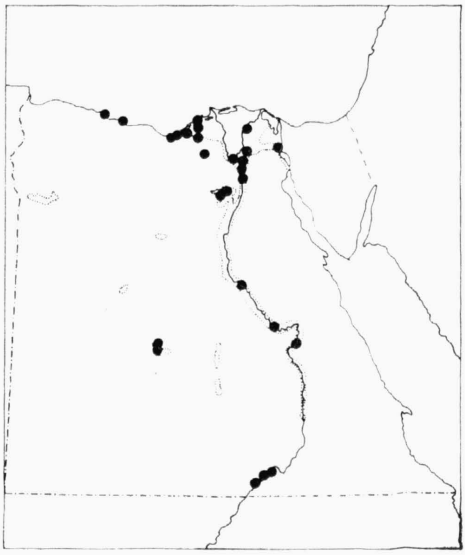


Fig. 10. Distribution of *Vicia calcarata* DESF.

'rrigated lands (ZOHARY 1950, 1963, 1973, TADROS et ATTA 1958). Weed vegetation of irrigated crop has not yet been described. ZOHARY (1963) has briefly surveyed irrigated summer crop weed vegetation in Iran. He proposed a new class *Panicetea segetalia* showing both ecological and floristic relationships to the Iranian hydrophytic vegetation. Its floristic make-up resembles the weed vegetation of irrigated summer crop in Egypt, in particular the rice field phytocoenoses. There are several observations made in gardens and irrigated fields in Cairo and its vicinity by SAARISALO (1968) presented, however, without syntaxonomic evaluation.

The lack of syntaxonomic data on phytocoenoses of permanently irrigated fields led the author to establish the following new syntaxa.

1 Alliance ***Melilotion indici*** KOSINOVÁ, foed. nova hoc loco

This alliance is proposed to include all weed phytocoenoses of irrigated winter crop in Egypt.

Characteristic species combination consists of pluriregional Boreo-Tropical and Mediterranean — Irano-Turanian species (sensu EIG 1931 and ZOHARY 1950). Distributional maps (Figs. 1 to 10) show the omniterritorial character of local range of these species in Egypt. Apparent gaps in distribution are due for one thing to the insufficient exploration of the territory (concerns especially the Nile Delta and middle part of the Nile valley) and for another to neglecting common weeds by collectors because of their (supposed) taxonomic homogeneity.

In spite of considerably different macroclimatical conditions (increasing temperature and aridity from Mediterranean coast to southern inland areas of the Nile valley and Oases) the weed phytocoenoses of winter irrigated crops seem to be homogeneous in their floristic composition and structure.

Characteristic species of alliance *Melilotion indici*																																						
Melilotus indicus (L.) All.	+	1.1	+	2.1	1.1	+	.	.	+	1.1	+	.	.	+	+	+	1.1	+	.	1.1	.	.	.	1.1	+	1.1	1.1	1.1	1.1	1.1	2.1	.	+	.	1.1	1.1	+	+
Cynodon dactylon (L.) Pers.	1.1	1.1	+	1.1	1.1	1.1	+	.	2.1	+	.	.	2.1	+	+	1.1	2.1	+	2.1	.	.	.	1.1	1.1	3.2	+	+	2.2	2.1	.	.	.	+	+	.	.	+	.
Sonchus oleraceus L.	1.1	1.1	+	+	+	+	1.1	+	1.1	+	.	.	+	+	+	+	+	.	+	+	+	+	.	+	1.1	.	+	+	+	.	.	.	+	+	.	+	+	.
Polypogon monspeliensis (L.) Desf.	1.1	+	.	.	1.2	1.1	+	.	+	.	.	.	1.1	+	.	+	+	.	.	.	+	+	.	+	1.1	1.1	1.1	+	+	1.1	+	1.1	1.1	1.1	.	.	+	1.1
Trifolium resupinatum L.	+	+	+	1.1	1.1	1.1	+	.	1.1	+	1.1	.	+	+	+	+	+	+	.	.	1.1	2.1	.	+	+	+	.	.	.	+	+	+	+	.	.	.	.	.
Anagallis arvensis L. s.l.	+	+	.	+	+	+	.	+	+	+	+	+	.	.	+	.	+	+	+	+	+	+	.	.	.	.	.	.	.	+	+	+	.	.	+	+	.	.
Chenopodium murale L.	+	+	+	+	+	+	+	.	.	.	+	.	.	.	.	+	+	.	.	+	+	.	+	+	+	.	.	+	+	.	+	+	+	.	.	+	2.1	+
Avena fatua L.	.	+	+	.	.	.	.	.	+	+	.	.	+	.	+	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Beta vulgaris L. ssp. *maritima* (L.) Thell.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	.	+	.
Malva parviflora L.	+	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	+	.	+	+	.	.	+	.	.	+	.	.	+	+	.	+	+
Medicago hispida Gaertn.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	1.1	+	+	+	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	.	.	.
Brassica nigra (L.) Koch s.l.	+	+	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	1.1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Lolium perenne L.	.	.	.	.	+	.	.	.	.	.	+	.	.	1.1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.
Ammi majus L.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia calcarata Desf.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.		
Characteristic and differential species of ass. *Convolvulo (arvensis)-Rumicetum dentati*																																						
Convolvulus arvensis L.	2.1	2.1	1.1	1.1	+	2.1	2.1	.	1.1	1.1	.	1.1	.	+	1.1	+	+	2.1	1.1	2.1	.	.	.	.	1.1	1.1	1.1	+	.	.	.	.	.	.	.	.	.	.
Rumex dentatus L.	1.1	+	+	.	+	1.1	.	.	+	.	.	.	.	2.1	.	2.1	1.1	+	.	+	.	+	.	.	+	1.1	.	+	.	1.1	1.1	.	1.1	2.1	.	.	.	.
Cichorium pumilum Jacq.	1.1	+	.	.	.	+	.	.	+	.	+	.	.	.	+	+	+	.	.	.	.	+	+	.	.	+	.	.	.	.	.	.	+	+	.	.	.	.
Spergularia marina (L.) Griseb.	+	+	.	.	.	1.1	.	.	.	.	1.1	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	1.1	+	.	.	+	+	+	1.1	+
Chenopodium album L.	.	+	.	.	.	.	.	1.1	+	+	.	.	.	+	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Vicia sativa L. s.l.	.	.	.	.	.	+	.	.	1.1	+	.	+	+	.	+	.	+	+	+	+	.	.	.	.	+	.	.	.	.	+	+	+	.	.	.	.	.	.
Euphorbia peplus L.	+	+	+	+	.	+	+	.	.	+	.	+	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trigonella hamosa L.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	+	+	1.1	.	.	+	+	1.1	.	+	+	+	.	.	.	.	.	.	.	.	.
Euphorbia arguta Banks et Solander	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Silene rubella L.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Capsella bursa-pastoris (L.) Medik.	+	.	.	+	+	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa annua L.	1.1	+	.	.	.	1.1	1.1	.	.	2.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melilotus siculus (Turra) Vitm.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1.1	1.1	.	+	.	.	.	.
Potentilla supina L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	.	.	.
Senecio aegyptius L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	.
Hyoscyamus pussillus L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Agrostis semiverticillata (Forsk.) Christens.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Setaria verticillata (L.) Beauv.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	2.1
Spergularia diandra (Guss.) Heldr. et Sart.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1.1
Companions																																						
Plantago lagopus L.	.	.	.	.	.	.	.	.	.	.	+	.	+	1.1	1.1	1.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calendula micrantha Tineo et Guss.	.	.	.	.	.	+	.	.	.	.	.	1.1	.	.	+	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
Scorpiurus muricata L.	.	.	.	1.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.
Senecio desfontainei Druce	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brassica tournefortii Gouan	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erigeron crispus Pourr.	.	+	.	+	+	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Imperata cylindrica (L.) Beauv.	.	.	.	.	.	.	.	.	.	.	.	1.1	+	+.2	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Echinochloa colonum (L.) Link	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.
Polygonum equisetiforme Sibth.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Portulaca oleracea L.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+
Solanum nigrum L.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Alhagi maurorum Medik.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Launaea nudicaulis (L.) Hook. f.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Coronopus didymus (L.) Sm.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1.1	.	.	.	.	.	.
Emex spinosus (L.) Campd.	.	.	.	.	.	+	.	.	.	.	+	+	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurea calcitrapa L.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Cyperus rotundus L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Medicago ciliaris (L.) Willd.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1.1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	.	.	.
Euphorbia indica Lam.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Lolium temulentum L.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Phalaris minor Retz.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.
Scirpus tuberosus Desf.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cressa cretica L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phragmites communis (L.) Trin.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schanginia baccata (Forsk.) Moq.-Taud.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sorghum halepense (L.) Pers.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium alexandrinum L.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Species observed in two relevés: *Daucus aureus* Desf. (38, 39), *Desmostachya bipinnata* (L.) Stapf (16, 30), *Echium rauwolfii* Del. (38, 39), *Lotus corniculatus* L. (34, 36), *Polygonum salicifolium* Brouss. (17, 30), *Sisymbrium irio* L. (10, 65), *Stellaria pallida* Piré (16, 21), *Urospermum picroides* (L.) F. W. Schmidt (15, 20), *Verbena supina* L. (37, 39).

Species observed in one relevé: *Aizoon hispanicum* L. (64), *Amaranthus paniculatus* L. (14), *Ambrosia maritima* L. (21), *Bromus catharticus* Vahl (29), *Dianthus cyri* Fisch. et Mey. (14), *Frankenia pulverulenta* L. (65), *Fumaria parviflora* Lam. (21), *Glinus lotoides* L. (37), *Gnaphalium luteoalbum* L. (17), *Kochia indica* Wight (12), *Lactuca serriola* L. (21), *Lathyrus aphaca* L. (15), *L. hirsutus* L. (8, 9), *Lippia nodiflora* (L.) Rich. (21), *Matricaria chammomila* L. (25), *Mentha microphylla* C. Koch (17), *Mesembryanthemum nodiflorum* L. (8), *Oligomeris linifolia* (Vahl) Macbr. (30), *Orobanche crenata* Forsk. (14), *O. versicolor* F. G. Schulz (21), *Oxalis corniculata* L. (21), *Paspalidium geminatum* (Forsk.) Stapf (35), *Plantago major* L. (17), *Raphanus sativus* L. (23), *Samolus valerandi* L. (65), *Senecio vulgaris* (L.) Beauv. (20), *Setaria viridis* L. (17), *Silybium marianum* (L.) Gaertn. (18), *Sphenopus divaricatus* (Gouan) Rchb. (8), *Typha australis* Schum. et Thonn. (30), *Vicia lutea* L. (10).

Basic environmental conditions of their microhabitat, i.e. irrigation and man's agrotechnical measures are in general the same. Dominant and co-dominant species like *Cynodon dactylon*, *Polypogon monspeliensis*, *Trifolium resupinatum* and many others are polyhabitual, commonly spread all over the country in all types of secondary habitats.

Two associations delimited mainly on the basis of phytogeography are distinguished (see Table 2 and Table 3).

1.1 Association ***Convolvulo (arvensis) - Rumicetum dentati*** KOSINOVÁ, ass. nova hoc loco

This association is described from the Nile basin territory including the following regions: the Nile Delta (Nd), northern part of the Nile valley (Nvs), the Nile Faiyum (Nf) and southern part of the Nile valley (Nvm). Two relevés recorded in small-scale beduin cultivations in Feiran Oasis in southern Sinai were also included. The large area of cultivated land includes three climatic belts: Mediterranean, Middle Egypt and Upper Egypt. They correspond roughly to four WALTER's subtypes of the arid-subtropical desert type of climate. Soils in these regions, developed on deep alluvial deposits of the river, are generally rich in organic matter and fine soil particles, with low content of soluble salts and slightly alkaline or almost neutral soil reaction. Fields are irrigated from perennial river-canal system and they had been regularly inundated by annual Nile floods till the erection of the Aswan High Dam.

Location of relevés:

Nile Delta (Nd)

No.	8	7. 4. 1967	Boseili, on Alexandria-Rosetta road, barley
	9	7. 4. 1967	Sidi Omar, N of Edfina, wheat
	10	7. 4. 1967	Dusuk, near the river bank, wheat
	11	7. 4. 1967	Quesna, rest-house, clover
	12	7. 4. 1967	Quesna, rest-house, clover
	13	7. 4. 1967	Quesna, rest-house, wheat
	14	3. 3. 1967	Inshas, S of the town, wheat

Northern part of the Nile valley (Nvs)

No.	15	24. 3. 1967	Saqqarah road, wheat
	16	24. 3. 1967	Mit Rahina, wheat
	17	24. 3. 1967	Mit Rahina, clover
	18	24. 3. 1967	Dahshour-Helwan road crossing, broad beans
	19	4. 5. 1967	Giza, at the beginning of Saqqarah road, clover
	20	4. 5. 1967	Giza, at the beginning of Saqqarah road, wheat
	21	24. 3. 1967	El Masraf, near El Saff, broad beans
	22	2. 4. 1967	El Saff, N of the village, wheat
	23	27. 4. 1967	Tel Hamad, near El Saff, wheat
	24	27. 4. 1967	El Saff, N of the village, wheat

Middle and southern part of the Nile valley (Nvm)

No.	25	31. 3. 1967	Assiut, east of Ibrahimia canal, wheat
	26	31. 3. 1967	Assiut, east of Ibrahimia canal, wheat
	27	31. 3. 1967	Assiut, west of Ibrahimia canal, wheat
	28	31. 3. 1967	Assiut, west of Ibrahimia canal, clover
	29	31. 3. 1967	Assiut, west of Ibrahimia canal, wheat
	37	22. 4. 1967	Luxor, village Qurna, wheat
	38	19. 4. 1967	Kom Ombo, governmental farm, wheat
	39	19. 4. 1967	Kom Ombo, governmental farm, wheat

Tab. 3. — Association *Astragalo (corrugati)* — *Plantaginetum lagopi*

Region	O (Kharga)												O (Dakhla)							
Relevé number	47	48	49	50	51	46	45	44	53	54	55	52	59	58	57	61	60	62	63	56
Number of species	22	17	10	23	18	12	10	10	13	11	8	11	23	22	16	18	14	26	24	26
Characteristic species of alliance *Melilotion indici*																				
Melilotus indicus (L.) ALL.	+	+	.	+	.	+	1.1	2.1	+	+	+	1.1	+	+	1.1	+	.	+	+	2.1
Cynodon dactylon (L.) PERS.	.	1.1	.	+	+	+	+	+	1.1	1.1	1.1	1.1	+	1.1	2.1	2.1	+	1.1	1.1	2.1
Sonchus oleraceus L.	+	+	.	+	+	.	.	+	1.1	+	+	.	+	+	+	.	.	+	+	+
Polypogon monspeliensis (L.) DESF.	.	.	.	.	1.1	1.1	.	.	+	+	+	.	.	+	.	.	.	.	+	.
Trifolium resupinatum L.	.	+	.	.	.	+	.	.	.	.	.	.	.	+	+	+	.	.	+	+
Chenopodium murale L.	.	.	+	.	.	.	.	.	+	+	+	.	.	+	.	.	.	.	.	.
Avena fatua L.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	+
Beta vulgaris L. ssp. *maritima* (L.) THELL.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.
Malva parviflora L.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
Medicago hispida GAERTN.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.
Brassica nigra (L.) KOCH s.l.	.	.	.	.	.	.	+	.	.	.	.	+	+	+	+	+	.	.	+	+
Lolium perenne L.	+	+	.	+	.	.	.	+	1.1	+	.	2.1	+	+	.	.	+	.	+	+
Ammi majus L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Vicia calcarata DESF.	.	.	.	+	.	.	+	.	.	.	.	.	.	+	+	.	.	.	.	.
Characteristic and differential species of ass. *Astragalo (corrugati)-Plantaginetum lagopi*																				
Plantago lagopus L.	2.1	1.1	+	+	.	2.1	.	+	+	+	+	1.1	2.1	2.1	+	1.1	1.1	2.1	1.1	1.1
Asphodelus fistulosus L. v. *tenuifolius*	1.1	.	1.1	1.1	.	.	.	.	.	.	.	.	.	1.1	+	+	1.1	+	+	+
Vaccaria pyramidata MEDIK.	+	.	.	+	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+
Astragalus corrugatus BERT.	+	1.1	+	.	1.1	1.1	+	.	+	1.1	.	+	+	1.1	+	+	.	.	.	1.1
Thesium humile VAHL	+	+	.	.	.	.	+	+	.	.	.	.	+	.	.	.	.	+	.	.
Dianthus cyri FISCH. et MEY.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+
Melilotus sulcatus DESF.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.
Convolvulus siculus L.	.	2.1	2.1	.	.	.	1.1	1.1	.	1.1	.	.	.	.	.	.	.	.	.	.
Silene nocturna L.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sorghum virgatum (HACK.) STAPF	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Plantago psyllium L.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Convolvulus fatmensis KTZE.	.	.	.	.	.	.	.	.	.	.	.	.	+	1.1	1.1	1.1	.	+	1.1	1.1
Erodium cicutarium (L.) L'HÉR.	.	.	.	.	.	.	.	.	.	.	.	.	1.2	+	.	.	1.2	.	1.2	+
Erodium malacoides (L.) WILLD.	.	.	.	.	.	.	.	.	.	.	.	+	+	1.1	.	.	.	+	.	.
Lathyrus hirsutus L.	1.1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	2.1	3.1
Trachynia distachya (L.) LINK	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	+	.	+
Companions																				
Calendula micrantha TINEO et GUSS.	+	.	.	.	.	.	+	.	.	.	+	.	+	+	+	+	.	+	.	+
Scorpiurus muricata L.	.	.	.	.	.	.	.	+	.	.	.	+	+	+	+	+	+	.	+	3.2
Senecio desfontainei DRUCE	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	+	.	+
Brassica tournefortii GOUAN	+	+	.	.	.	.	.	+	.	.	.	.	+	+	.	.	.	.	.	+
Erigeron crispus POURR.	+	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.
Imperata cylindrica (L.) BEAUV.	1.2	1.2	.	.	.	.	.	.	+	.	.	.	1.1	.	.	.	.	+	.	.
Echinochloa colonum (L.) LINK	+	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Polygonum equisetiforme SIBTH.	.	.	.	.	+	.	.	.	+	.	.	.	+	.	.	.	.	+	.	.
Phalaris paradoxa L. v. *praemorsa* (LAM. et DC.) COSS. et DR.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Scirpus tuberosus DESF.	.	.	.	.	+	+	+	.	.	.	.	+	.	.	.	.	.	+	.	2.1
Cyperus laevigatus L.	.	+	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.
Eleocharis palustris (L.) R. BR.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.
Eruca sativa (HILL.) GARS.	.	.	.	+	+	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.

Species recorded in two relevés: *Ammannia auriculata* WILLD. (56, 63), *Convolvulus arvensis* L. (50, 62), *Eragrostis cilianensis* (ALL.) VIGN.-LUT. (50, 55), *Lotus arabicus* L. (60, 62), *Phragmites communis* (L.) TRIN. (53, 54), *Plantago pumila* L. (49, 50), *Saccharum spontaneum* L. v. *aegyptiacum* (47, 48), *Salsola foetida* DEL. ex SPRENG (59, 63), *Silene villosa* FORSK. (46, 62), *Solanum nigrum* L. (49, 58), *Sorghum halepense* (L.) PERS. (47, 51), *Spergularia marina* (L.) GRISEB. (52, 63), *Trifolium alexandrinum* L. (48, 56), *Trigonella hamosa* L. (49, 50).

Species recorded in one relevé: *Aeluropus lagopoides* (L.) DRUCE (46), *Alhagi maurorum* MEDIK. (47), *Apium graveolens* L. (60), *Aristida adscensionis* L. (50), *Boerhavia diffusa* L. (50), *Brassica campestris* L. (56), *Cenchrus setigerus* VAHL (50), *Centaurium spicatum* (L.) FRITSCH (62), *Corchorus tridens* L. (50), *Coronopus didymus* (L.) SM. (58), *Cressa cretica* L. (58), *Dichantium annulatum* (FORSK.) STAPF (56), *Echinochloa crus-galli* (L.) BEAUV. (63), *Epilobium hirsutum* L. (62), *Eragrostis pilosa* (L.) BEAUV. (51), *Erodium hirtum* (FORSK.) WILLD. (61), *Euphorbia granulata* FORSK. (50), *Frankenia pulverulenta* L. (46); *Geranium dissectum* L. (63), *Gnaphalium luteo-album* L. (62), *Haplophyllum longifolium* BOISS. (62), *Helianthus annuus* L. (63), *Hyoscyamus muticus* L. (51), *Juncus arabicus* (ASCH. et BUCH.) ADAMS. (53), *Juncus subbulatus* FORSK. (60), *Kochia indica* WIGHT. (51), *Launaea capitata* (SPRENG.) AMIN (50), *Launaea nudicaulis* (L.) HOOK. f. (49), *Lythrum hyssopifolium* L. (62), *Oligomeris linifolia* (VAHL.) MACBR. (60), *Plantago psyllium* L. (47), *Portulaca oleracea* L. (50), *Pulicaria crispa* (FORSK.) BENTH et HOOK. f. (61), *Schanginia baccata* (FORSK.) MOQ.-TAUD. (45), *Sporobolus spicatus* (VAHL.) KUNTH (46), *Typha australis* SCHUM. et THONN. (63), *Verbena officinalis* L. (46), *Vicia sativa* L. s.l. (51).

40 19. 4. 1967 Kom Ombo, private field, clover
41 19. 4. 1967 Kom Ombo, private field, wheat
42 19. 4. 1967 Kom Ombo, near the temple, wheat
43 19. 4. 1967 Kom Ombo, near the temple, wheat

Faiyum Oasis (Nf)

No. 30 24. 2. 1967 Kom Ausheem, wheat
31 2. 4. 1967 Kom Ausheem, clover
32 24. 2. 1967 Tamia, wheat
33 5. 5. 1967 Tamia, wheat
34 5. 5. 1967 Tamia, wheat
35 5. 5. 1967 Shashouk, near the lake Qarun, wheat
36 2. 4. 1967 Faiyum, N of the town, clover

Southern Sinai (S)

No. 64 12. 4. 1967 Feiran Oasis, wheat
65 12. 4. 1967 Feiran Oasis, wheat

The number of species per relevé is low, ranging from 7 to 25 (most frequently about 10) species per relevé of 25 m^2. The cover is rather low as well. Weeds usually form only 10% of total cover, only exceptionally reaching higher values (up to 30%). The association is characterized by constancy of two species, *Convolvulus arvensis* and *Rumex dentatus*, which attain a relatively high cover in several relevés. Other species characteristic of the association are *Cichorium pumilum*, *Spergularia marina*, *Chenopodium album*, *Euphorbia peplus* and *Vicia sativa*, all of them belonging to the Omniterritorial type of distribution. Five other, less frequent, species represent the Riverain type of distribution occurring either in the whole Nile region (*Trigonella hamosa* and *Euphorbia arguta*) or in its northern part only (*Capsella bursa-pastoris*, *Poa annua* and *Silene rubella*).

Three sub-associations seem to exist within this syntaxon. In Table 2 they are tentatively denoted as sub-ass. *typicum* in the Nile valley, sub-ass. *melilotetosum siculi* in the Nile Delta and sub-ass. *hyosciametosum pusilli* in southern Sinai. For the time being the material is, however, unsufficient to characterize these syntaxa of lower rank properly.

1.2 Association ***Astragalo (corrugati)-Plantaginetum lagopi*** Kosinová, ass. nova hoc loco

This association is restricted to cultivated land in Kharga and Dakhla Oases. The climate of these large depressions of the Libyan Desert is extremely arid, entirely rainless with moderate air temperature in winter and high air temperature in summer season. Vast areas of cultivable land are flat plains covered by fertile clayey, loamy or sandy soils. The water supply of artesian wells depends on water-bearing strata of Nubian sandstone. Cultivated areas are located around the villages and newly bored wells belonging to governmental farms. Soils are nearly neutral or slightly alkaline. Owing to intense evaporation and insufficient draining, caused by limited water supply, the content of soluble salts here is much higher than that of cultivated land in the Nile valley.

Location of relevés:

Oases of the Libyan Desert (O)

No. 44 18. 3. 1967 Kharga Oasis, Om el Kusur, wheat
45 17. 3. 1967 Kharga Oasis, Mahariq, wheat
46 17. 3. 1967 Kharga Oasis, near the Hibis temple, wheat

47	12. 3. 1967	Kharga Oasis, rest-house, wheat
48	13. 3. 1967	Kharga Oasis, rest-house, wheat
49	13. 3. 1967	Kharga Oasis, rest-house, wheat
50	13. 3. 1967	Kharga Oasis, Baris Genah, private field, wheat
51	13. 3. 1967	Kharga Oasis, Baris Genah, farm, wheat
52	19. 3. 1967	Kharga Oasis, Baramodi, wheat
53	19. 3. 1967	Kharga Oasis, Baris-Nasser, broad beans
54	19. 3. 1967	Kharga Oasis, Baris-Nasser, wheat
55	19. 3. 1967	Kharga Oasis, Baris-Nasser, wheat
56	17. 3. 1967	Dakhla Oasis, Teneda, wheat
57	15. 3. 1967	Dakhla Oasis, Balat, wheat
58	15. 3. 1967	Dakhla Oasis, Asmant, wheat
59	15. 3. 1967	Dakhla Oasis, Mout, wheat
60	16. 3. 1967	Dakhla Oasis, Rashda, broad beans
61	16. 3. 1967	Dakhla Oasis, Rashda, wheat
62	16. 3. 1967	Dakhla Oasis, Bedkhlou, wheat
63	16. 3. 1967	Dakhla Oasis, Mawhoub, wheat

The mean number of species per relevé is 16, ranging from 8 to 26. Weeds often represent only 10 to 15% of total cover. The stands of crop plants are apparently less dense than those observed in the Nile valley. The association is characterized by constancy and dominance of *Plantago lagopus* and *Astragalus corrugatus*. The former is common also in Faiyum Oasis and elsewhere outside the Nile region and belongs to the Extra-Riverain type of distribution. The latter was only recorded in Kharga and Dakhla Oases and in southern Sinai. Other co-dominants are *Thesium humile* and *Asphodelus fistulosus* (one of the commonest weeds in the Oases). Both these species are almost absent in the Nile region. There are two regional differences in the association seen in the presence of *Convolvulus siculus* in Kharga Oasis and *Convolvulus fatmensis* and several other species in Dakhla Oasis.

Weed phytocoenoses in the Oases abound in many species of Mediterranean or Mediterranean — Irano-Turanian distribution, such as: *Silene nocturna*, *Melilotus sulcatus*, *Dianthus cyri*, *Plantago psyllium*, *Trachynia distachya*, *Erodium malacoides*, *Brassica tournefortii*, *Senecio desfontainei*, *Erodium cicutarium* and *Vaccaria pyramidata*. None of them, however, attains higher constancy and abundance-dominance values. Species characteristic of Egyptian marshy habitats (*Cressa cretica*, *Cyperus laevigatus*, *Aeluropus lagopoides*, *Juncus arabicus*, *Frankenia pulverulenta*, *Schanginia baccata*, *Salsola foetida*) appear occasionally in this association. They form a special ecological group which, however, does not significantly influence the physiognomy of the community. Their occasional presence in the relevés indicates a higher local salinisation of the soil.

2 Alliance ***Achilleion santolinae*** Zohary 1950

2.1 Association ***Achilleetum santolinae mareoticum*** Tardos et Atta 1958

This association is confined to extensive agricultural area of so-called rain-fed barley fields in the Mediterranean region. Species composition, structure and soil properties of these segetal communities have been studied in detail by Tadros and Atta (1958). Weed phytocoenoses belonging to this syntaxon represent winter aspect of private beduin small-scale cultivations or new governmental fields, both surrounded by vast areas of uncultivated semi-desert.

Tab. 4. — *Achilleetum santolinae mareoticum* TADROS et ATTA 1958

Relevé number	1	2	3	4	5	6	7
Number of species	20	30	21	20	32	25	10
Characteristic species of association							
Achillea santolina L.	3.2	+	+	3.2	2.1	2.1	2.2
Chrysanthemum coronarium L.	+	1.1	+	1.1	2.1	2.1	2.1
Convolvulus althaeoides L.	.	.	+	+	+	.	r
Eryngium creticum LAM.	.	.	2.2	2.1	.	.	2.1
Echinops spinosissimus TURRA	+	.	.	.	+	.	.
Echium sericeum VAHL	.	.	.	+	+	.	.
Koeleria phleoides (VILL.) PERS.	.	+	+	.	.	.	.
Salvia lanigera POIR.	.	.	+	.	.	1.1	.
Lathyrus pseudocicera PAMP.	+	.	.	.	.	.	.
Bupleurum subovatum LINK	.	.	.	.	.	+	+
Characteristic species of alliance *Achilleion santolinae*							
Plantago albicans L.	.	.	+	.	.	+	.
Schismus barbatus (L.) THELL.	.	.	+	+	.	+	.
Adonis dentata DEL.	.	.	r	.	+	+	.
Ononis serrata FORSK.	.	.	.	.	+	.	.
Characteristis species of alliance *Thymelaeion hirsutae*							
Thymelaea hirsuta (L.) ENDL.	.	.	.	.	+	.	.
Asphodelus microcarpus SALZM. et VIV.	.	.	1.1	.	+	+	.
Filago spathulata PRESL	.	+	.	.	.	+	.
Launaea nudicaulis (L.) HOOK. f.	.	+.2	.	+	+	+	.
Medicago truncatula GAERTN.	.	+	.	.	.	.	.
Cutandia dichotoma (FORSK.) BATT. et TRAB.	.	+	.	.	+	+	.
Mathiola humilis DC.	.	+	r	.	r	.	.
Erucaria microcarpa BOISS. s.l.	.	+	.	.	+	+	+
Bromus rubens L.	.	+	.	.	.	.	.
Picris radicata (FORSK.) LESS.	+	+	.	.	.	.	.
Anacyclus alexandrinus WILLD.	.	r	+	+	+	+	.
Centaurea alexandrina DEL.	1.2	1.1	+	1.2	.	+	.
Senecio desfontainei DRUCE	.	.	.	.	+	+	.
Companions							
Linaria haelava (FORSK.) DEL.	.	+	.	.	.	.	.
Centaurea glomerata VAHL	.	.	.	1.1	+	+	.
Reseda decursiva FORSK.	.	.	.	.	+	+	.
Carthamus mareoticus DEL.	.	1.1	.	+	2.1	.	.
Roemeria hybrida (L.) DC.	+	.	.	+	.	+	.
Herniaria hemistemon J. GAY	+	+	+	.	.	.	.
Scorzonera alexandrina BOISS.	.	.	+	.	.	.	.
Carduus getulus POMEL	.	.	.	.	+	.	.
Onobrychis crista-galli (L.) LAM.	.	.	.	.	+	.	.
Carrichtera annua (L.) ASCH.	.	+	.	.	.	.	.
Iris sisyrinchium L.	+	.	.	.	.	.	.
Anagallis arvensis L. s.l.	.	.	+	+	.	+	.
Chenopodium murale L.		r	.	r	.	+	.
Calendula micrantha TINEO et GUSS.	.	.	+	.	1.1	+	.
Vicia sativa L. s.l.	+	+	.	+	+	+	.
Emex spinosus (L.) CAMPD.	+	+	.	+	+	+	.
Mesembryanthemum crystalinum STOUT	.	.	.	+	+	.	.
Biarum olivieri BLUME	.	.	.	.	+	+	.
Enarthrocarpus strangulatus BOISS.	+	+	.	.	.	.	.
Papaver dubium L.	.	.	.	.	+	+	.

With the aim of comparing data from all winter crop cultivations in Egypt, relevés of this community have been recorded by the present author from Burg el Arab and Amriya area. They are presented in Table 4.

LOCATION OF RELEVÉS:

Western part of the Mediterranean region (Mma)

No.	1	10. 3. 1967	Burg el Arab, village, wheat
	2	5. 4. 1967	Amriya, new cultivations S of the village, wheat
	3	6. 4. 1967	Burg el Arab, W of the village, barley
	4	6. 4. 1967	Burg el Arab, NW of the village, barley
	5	6. 4. 1967	Burg el Arab, near grotto NW of the village, barley
	6	6. 4. 1967	Burg el Arab, N of the village, barley
	7	6. 4. 1967	Burg el Arab, N of the village, barley

With respect to the high constancy of *Chrysanthemum coronarium* as well as to the absence of *Arisarum vulgare* this group of relevés seems to belong to TADROS' sub-association *chrysanthemetosum*.

DISCUSSION

All 65 phytocoenological relevés presented in Tables 2, 3 and 4 have been evaluated using SÖRENSEN's coefficient of floristic similarity.

Fig. 11 shows mutual relationships of investigated sets grouped by phytogeographical regions. The highest values of the coefficient were obtained between sets belonging to the Nile region (Nvs, Nvm, Nd, Nf). Phytocoenoses from Kharga Oasis exhibit higher mean floristic similarity to the Nile region than those from Dakhla Oasis. As will be shown later, this is accounted for by introduction of grain from the Nile valley. The lowest values of similarity were found between the set from the Mediterranean region (Mma) and all the other investigated sets.

The dendrogram in Fig. 12 presents a hierarchic system of individual relevés based on agglomerative classification. The relevés fuse on different levels of the similarity coefficient forming several distinct clusters. The inclusion of the results of a previous tabular synthesis (as shown in Table 2, 3 and 4) into this dendrogram indicates that classification of winter weed phytocoenoses based on regional differences is fully justified, at least from the viewpoint of floristic similarity. The relevés included into the association *Convolvulo (arvensis)-Rumicetum dentati* from the Nile region and those belonging to the association *Astragalo (corrugati)-Plantaginetum lagopi* from the Oases form two distinct clusters. They fuse on the same level as that reached

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Only in one relevé: *Aegilops* sp. (3), *Aizoon hispanicum* L. (5), *Anthemis melampodina* DEL. (2), *Asparagus stipularis* FORSK. (1), *Chenopodium album* L. (7), *Cynara sibthorpiana* BOISS. et HELDR. (5), *Fagonia cretica* L. (3), *Fumaria densiflora* DC. (1), *Gnaphalium luteo-album* L. (2), *Gymnarhena micrantha* DESF. (5), *Hymenocarpus nummularius* (DC.) G. DON. (5), *Lathyrus aphaca* L. (1), *Lathyrus hierosolymitanus* BOISS. (1), *Lathyrus marmoratus* BOISS. et BL. (1), *Launaea capitata* (SPRENG) AMIN (3), *Linaria albifrons* (SIBTH. et SM.) SPRENG. (4), *Linaria micrantha* (CAV.) HOFFM. et LINK (1), *Lycium arabicum* SCHWEINF. (5), *Malabaila suaveolens* COSS. (1), *Matricaria aurea* (LOEFL.) SCH. BIP. (2), *Medicago hispida* GAERTN. (4), *Mesembryanthemum nodiflorum* L. (4), *Peganum harmala* L. (3), *Parapholis incurva* (L.) C. E. HUBBARD (6), *Plantago cylindrica* FORSK. (2), *Scorpiurus muricata* L. (5), *Silene gallica* L. (2), *Sonchus oleraceus* L. (2), *Spergula falax* (LOWE) E. H. L. KRAUSE (7), *Spergularia diandra* (GUSS.) HELDR. et SART. (2), *Thesium humile* VAHL (7), *Trifolium formosum* D'URV. (7), *Trifolium tomentosum* L. (1), *Trigonella maritima* DEL. (2), *Trigonella stellata* FORSK. (2).

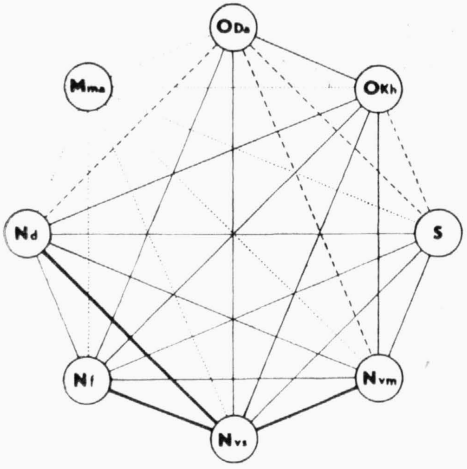

Fig. 11. Floristic similarity between sets of relevés grouped according to phytogeographical regions. (The values of the similarity coefficient > 30% thick line; > 20% thin line; > 10% dashed line; < 10% dotted line)

by the third cluster representing relevés of the association *Achilleetum santolinae mareoticum.*

There are, however, several relevés which seemingly do not fit into this pattern. These include No. 55, 54, 53 and 51 in the cluster of ass. *Convolvulo* (*arvensis*)-*Rumicetum dentati.* Because of their location in the new governmental farm cultivations in Baris (Kharga Oasis), these relevés were included into ass. *Astragalo* (*corrugati*)-*Plantaginetum lagopi.* Their affinity to the set of relevés from the Oases is, however, low. This can be accounted for by introduction of grain from the Nile region, commonly practised in these newly cultivated areas. As was to be expected, relevé no. 50 recorded in the same locality in a private field sown with grain of local provenience is found in the cluster corresponding to the ass. *Astragalo* (*corrugati*)-*Plantaginetum lagopi.* Two exceptions to be noted in the cluster of the ass. ***Astragalo (corrugati)-Plantaginetum lagopi*** are relevés No. 33 and 30, both from Faiyum Oasis. The reason lies in lower presence of alliance and association characteristic species (in relevé No. 30) as well as higher presence of the group of

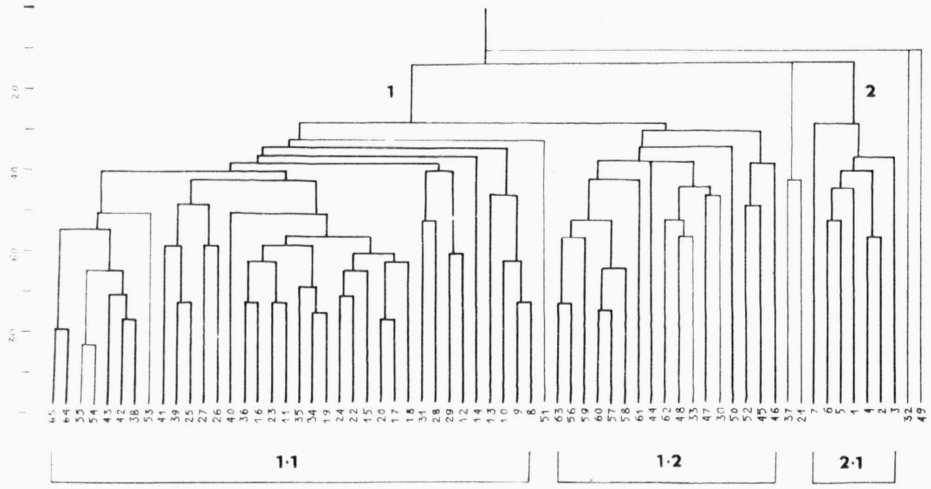

Fig. 12. Hierarchical dendrogram showing cluster relations among individual relevés of winter weed plant communities. (1 *Melilotion indici* foed. nova; 1.1 *Convolvulo* (*arvensis*) — *Rumicetum dentati* ass. nova; 1.2 *Astragalo* (*corrugati*) — *Plantaginetum lagopi* ass. nova; 2 *Achilleion santolinae* Zoh. 1950; 2.1 *Achilleetum santolinae mareoticum* Tadros et Atta 1958.)

Mediterranean and Irano-Turanian species in the two relevés. The same holds for the relevés No. 32 (also from Faiyum Oasis) featuring the lowest level of fusion within the whole dendrogram. The three last exceptions (relevé No. 37 from Luxor, Nvm, No. 21 from El Saff, Nvs and No. 49 from Kharga Oasis may be explained by the low number of species per relevé (9, 11 and 10 respectively) and frequent absence of alliance and association characteristic species.

The dependence of weed communities on sown plants is commonly recognized. The present floristic similarity analysis, however, does not support this concept as far as the Egyptian weed communities of irrigated winter crop are concerned. The following examples taken from the dendrogram corroborate this conclusion. Relevé No. 8 (barley field in Nd) fuses on a considerably high levels of similarity coefficient with the relevés No. 9 and 10, both from Nd, but recorded in wheat fields. Relevé No. 1 and 2 from wheat fields in Mma are situated in the cluster corresponding to Mma region even thought all the other relevés of this set were recorded in barley fields. Relevés No. 60, 58 and 61 recorded in broad beans in Dakhla Oasis fuse with relevés from wheat fields. The same holds for relevés No. 19 and 17 from clover in Nvs and No. 36 from clover in Nf which all fuse with the relevés from wheat fields.

In summer irrigated fields the differences of weed phytocoenoses occurring in stands of various crop plants are more pronounced. Especially rice field weed vegetation is entirely dissimilar that of other crop plant. Even in summer weed vegetation, however, the regional differences are not negligible.

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SOUHRN

Studie se týká plevelových společenstev zimní úrody v Egyptě. Obsahuje fytocenologický rozbor 65 snímků zaznamenaných ve všech hlavních zemědělských oblastech Egypta. V území byly rozlišeny tři asociace, lišící se floristicky, ekologicky a fytogeograficky. Vegetace nezavlažované zimní úrody v pobřežním pásu podél Středozemního moře je řazena k asociaci *Achilleetum santolinae mareoticum* Tardos et Atta 1958, náležející do svazu *Achilleion santolinae* Zohary 1950. Vegetace zavlažované zimní úrody je hodnocena v rámci nově popisovaného svazu *Melilotion indici*, který zahrnuje dvě asociace. Asociace *Convolvulo* (*arvensis*)-*Rumicetum dentati* ass. nova se vyskytuje v nilském údolí, nilské deltě a v oáze Fajjúm. Asociace *Astragalo* (*corrugati*)-*Plantaginetum lagopi* ass. nova je svým výskytem omezena na obdělávané půdy v oázách Libyjské pouště Charga a Dachla. V obou asociacích je přítomno mnoho pluriregionálních druhů, které se vyskytují v celém obdělávaném území Egypta. Jejich rozšíření je dokumentováno deseti bodovými mapami rozšíření. Rozbor floristické podobnosti snímkového materiálu založený na Sörensenově koeficientu a provedený pomocí počítače potvrdil, že regionální odlišnosti mezi popisovanými společenstvy jsou z hlediska klasifikace rozhodující.

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Výročí 1975

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Asistent botanického ústavu přírodovědecké fakulty university v Brně, po uzavření vysokých škol na začátku 2. světové války konzervátor pro ochranu přírody. Jako člen ilegálního hnutí v době nacistické okupace byl umučen r. 1942 v Mauthausenu. Řadu exkurzí zaměřil na Slovensko, ale i do Karpat v Zakarpatské Ukrajině a v Rumunsku a do pohoří Strandža planina na bulharsko-turecké hranici. Ve svých publikacích se věnoval především halofytům jižního Slovenska a zčásti i jižní Moravy, zasvěcenému rozboru však podrobil i jiné zajímavé nové nálezy z těchto oblastí; zajímaly ho i druhy zavlečené. V r. 1934 vyšla jeho shrnující studie o československých hořcích.