

Report on Iter Mediterraneum II

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Introduction

The 2nd OPTIMA Expedition — Iter Mediterraneum II (Israel, 19.3. - 10.4. 1989) — resulted in a collection of over 2000 numbers of vascular plants. Among these were a few species new to Israel, most by thanks to the fact that the European participants were familiar with the west Mediterranean flora. Seeds collected were used for karyological research that is published in this volume. The results of the biosystematic study of an additional collection of 49 living plants and/or seeds of *Crassulaceae* will be published elsewhere.

The following took part in the expedition:

Local organizer:

A. Danin, Department of Botany, The Hebrew University of Jerusalem. (Present address: Department of Evolution, Systematics, and Ecology, The Alexander Silberman Institute of Life Sciences, The Hebrew University of Jerusalem).

Senior participants:

T. Raus, Botanischer Garten und Botanisches Museum, Berlin.
 W. Sauer, Universität Tübingen, Lehrstuhl Spezielle für Botanik.
 S. Brullo, Istituto e Orto Botanico, Università di Catania.
 B. Valdés, Departamento de Biología vegetal y Ecología, Universidad de Sevilla.

Junior participants:

F. Amich, Departamento de Botánica, Facultad de Biología, Salamanca.
 S. G. Gardner, Department of Botany, University of Reading.
 R. C. H. J. van Ham, Rijksuniversiteit, Utrecht.
 A. Gambino, Dipartimento di Scienze Botaniche, Palermo.

Part-time companions:

F. Axelrod, Department of Botany, The Hebrew University of Jerusalem.
 Battia Pazy, Department of Botany, The Hebrew University of Jerusalem.
 Rivka Nokrian, Department of Botany, The Hebrew University of Jerusalem.

Seminar

A preliminary seminar was held in Jerusalem on March 20th, 1989. It included lectures on the geography, geomorphology, flora and vegetation of Israel (A. Danin, chapter 3 of the present volume).

Another lecture on the "Wild genetic resources of crops in Israel" was presented by D. Zohary (cf. D. Zohary 1983).

Methods of collection

During the first week of the expedition, the lack of an efficient method for drying the large quantities of specimens presented a serious problem. 200 numbers were collected on the first day, corresponding in fact to some 1500 sheets, which was much beyond the capacity of the press with electronic heater of the herbarium in HUJ. Each of the senior participants was convinced that "his method" for plant processing was the best. A compromise method had to be developed. The following was found to be the best we could achieve in our conditions.

Available pressing material:

Drying paper: Newspapers only.

Presses:

- Wooden presses of the Swedish model (cf. Täckholm 1956: 11) (x 2)
- Field presses with leather straps (Täckholm l.c.) (x 5)
- Criss-cross wooden presses (x 30).

Collecting:

The major taxonomic groups were allocated to participants as follows:

- 1 senior and 1 junior collected most of Sympetalae (*Compositae*, *Labiatae*, *Scrophulariaceae*, *Dipsacaceae*, etc.); they also collected *Apiaceae* (*Umbelliferae*).
- 2 seniors collected all the Monocotyledones and *Boraginaceae*.
- 1 senior and 1 junior collected Papaverales.
- 2 juniors collected *Leguminosae*.
- 1 senior collected the other families (*Chenopodiaceae*, *Aizoaceae*, *Caryophyllaceae*, etc).

It was hard to convince some of the participants to collect only "their" families, and to sample a sufficient number of duplicates.

Numbering of the specimens:

The numbering method was as follows: each site was allocated a running number (1 to 58 in our expedition). Specimens collected in each particular site were numbered consecutively, starting with 1 (and up to a maximum of 108).

Pressing and paper exchange:

The harvest of the entire day was put into a Swedish press or a few field presses for 24 hours, and the papers were changed during the 2nd evening. Thereafter, the plants were transferred to criss-cross presses. During the two weekend days the material was packed into small parcels bound with a string, that contained only 10 sheets of plants each.

The 10-sheet parcels were placed in the open and exposed to the sun for as long as possible. The dry material was separated from the wet one and was further processed by the workers of the herbarium in Jerusalem (HUJ).

If we had succeeded to set up these procedures from the first day of the expedition we would have saved a lot of time. This is the main justification for writing such a long "methods" chapter.

Typing the data

The plants were identified in the field by 6 letter codes. These codes are composed of the 3 first letters of the genus name and the 3 first of the specific epithet. For example, the code for *Asphodelus ramosus* is ASPRAM. For *Veronica orientalis* it is VERORI, but for *Verbascum orientale*, VERORE (the last letter is used to avoid duplication). The codes method is used in our Department since 1965, so many of the codes are well known and much time can be saved in the field. Undetermined or doubtfully identified taxa were listed by their full generic name.

The local organizer typed specimen and locality information during the weekends into his personal computer (IBM-compatible P.C.), using Wordstar 4.00 in the N-mode (writing a non-document file) which produces plain ASCII files. Two files were thus produced, to include field book information: (1) a specimen file (OPLIST. COD) with numbers and plant names, coded as above, and (2) a locality file (OPSITES) with full data of all 57 collection sites. A programme was prepared by Barak Danin to automatically translate file 1 into (3) a list of all fully named plants, with spelled-out names, in numerical order (OPLIST. TOT); (4) the same in alphabetical sequence (OPLIST. SRT); and (5) a list of incompletely named specimens, by genera (OPLIST. ERR). (6) A cumulated list of collected species and genera was also generated.

The temporary lists prepared each week were cumulated after the last collection day. The print-outs of these files were very helpful when unnumbered or erroneously numbered sheets had to be checked. Re-numbering of even one species justified the effort invested in computerizing the data during the expedition. We saved a lot of time using these files. It is advised that future expeditions make use of portable computers in order to prepare such lists during the expedition.

Samples from each file are reproduced below. Files 2-6 were given to the participants on the closing day.

Examples:

1. OPTLIST.COD

01.001 SCRRUB
 01.002 *Fumaria*
 02.001 VALVES
 02.002 ANTPAL
 02.003 ANTPSE

2. OPTSITES

#1

Judean Foothills: near Netiv Halamed-hei, *Acacia albida* reserve, deep clayey soil (grumusol). Grid: 34°57'40"E-31°41'20"N. Altitude: 270 m. Precipitation: 454 mm. 21.3.1989.

#2

Judean Foothills: near Sedot Micha. Brown rendzina developing on nari crusts over Eocene chalk. Much of the area was burnt in summer 1988. *Ceratonia siliqua-Pistacia lentiscus* association. Grid: 34°54'43"E-31°43'25"N. Altitude: 220 m. Precipitation: 450 mm. 21.3.1989.

3. OPTLIST.TOT

01.001 SCROPHULARIA	RUBRICAULIS
02.001 VALERIANELLA	VESICARIA
02.002 ANTHEMIS	PALAESTINA
02.003 ANTHEMIS	PSEUDOCOTULA
02.004 HELICHRYSUM	SANGUINEUM

4. OPTLIST.SRT

07.005 AARONSOHNIA	FACTOROVSKYI
06.055 AARONSOHNIA	FACTOROVSKYI
06.009 ABUTILON	FRUTICOSUM
31.002 ACACIA	RADDIANA
31.003 ACACIA	TORTILIS

5. OPTLIST.ERR

01.002 *Fumaria*
 02.045 *Medicago*
 02.046 *Medicago*
 02.078 *Gagea*
 02.096 *Bromus*

6. OPTLSTSP

AARONSOHNIA	FACTOROVSKYI
ABUTILON	FRUTICOSUM
ACACIA	RADDIANA
ACACIA	TORTILIS
ACANTHUS	SYRIACUS

Determinations

Plants were temporarily named in the field. During the years 1989-1991, critical determinations and comments were assembled by the author (A. Danin) who named most of the specimens.

Voucher specimens of the material collected for biosystematic studies of the *Crassulaceae* of Israel by R. C. H. J. van Ham and H.'t Hart are deposited in Jerusalem (HUJ) and Utrecht (U). The specimens have been incorporated into the general list. They are denoted by the locality number in combination with the name of the collector (Ham) and the accession number of the collection of *Crassulaceae* at Utrecht.

After the final determination, authors' names, citation of publication place and synonyms were added to the names, as in the following examples:

Aaronsohnia factorovskyi Warburg & Eig, Bull. Inst. Agric. Nat. Hist. Tel-Aviv 6: 40 (1927)

Abutilon fruticosum Guillemain & Perrottet in Guillemain & al., Fl. Seneg. Tent.: 70 (1831) [*A. denticulatum* (Fresen.) Webb]

Acacia raddiana Savi, Acacie Egiz.: 1 (1830)

Mosses from several localities were named by Dr. I. Herrnstadt (HUJ), whereas many more bryophyte specimens, collected "privately" by one of the expedition members, were presented in a separate paper independently (Brullo et al., 1991a). He and his co-workers are also responsible for the separate publication of a new species of *Allium* (*A. kollmannianum*) from specimens grown from bulbs that were collected during the expedition (Brullo et al. 1991b).

Collection sites (Mean annual rainfall according to Dorfmann (1981); Altitudes according to maps produced by the Survey of Israel). The itinerary map is presented in Fig. 1.

21.3.1989

#1

Judean Foothills: near Netiv Halamed-hei. *Acacia albida* reserve, deep clayey soil (grumusol). *Grid:* 34°57'40"E-31°41'20"N. *Altitude:* 270 m. *Precipitation:* 454 mm.

#2

Judean Foothills: near Sedot Micha. Brown rendzina developing on nari crusts over Eocene chalk. Much of the area was burnt in summer 1988. *Ceratonia siliqua-Pistacia lentiscus* association. *Grid:* 34°54'43"E-31°43'25"N. *Altitude:* 220 m. *Precipitation:* 450 mm.

#3

Philistean Plain: 11 km S of Ashkelon. Sandy soil developed on kurkar (calcareous sandstone). *Corydorymetum capitati*. *Grid:* 34°34'46"E-31°34'20"N. *Altitude:* 70 m. *Precipitation:* 435 mm.

#4

Philistean Plain: 1 km S of Ashdod. Stable sand dunes. *Grid:* 34°40'02"E-31°46'50"N. *Altitude:* 20 m. *Precipitation:* 435 mm.

22.3.1989

#5

Judean Desert: near Mishor Adumim. Stony slopes with nari crusts on Senonian chalk. Brown lithosol, semi-steppe batha of *Echinops polyceras* and *Phlomis brachyodon*. *Grid:* 35°19'20"E-31°48'10"N. *Altitude:* 250 m. *Precipitation:* 250 mm.

#6

Dead Sea Valley: near Mizpe Dragot, 15 km N of En Gedi. Slopes and small cliffs of dolomite and wadis. *Grid:* 35°19'20"E-31°35'15"N. *Altitude:* (-) 350 m. *Precipitation:* 70 mm.

#7

Dead Sea Valley: near Ormat's solar ponds, 2 km N of the Dead Sea northern coast. Salty soil in wadis. *Grid:* 35°30'31"E-31°48'10"N. *Altitude:* (-) 370 m. *Precipitation:* 100 mm.

23.3.1989

#8

Samaritan Desert: near Ma'ale Michmash. Deep clayey soil (dark brown grumusolic soil) and brown rendzina on limestone slopes. *Grid:* 35°05'30"E-31°52'50"N. *Altitude:* 250 m. *Precipitation:* 300 mm.

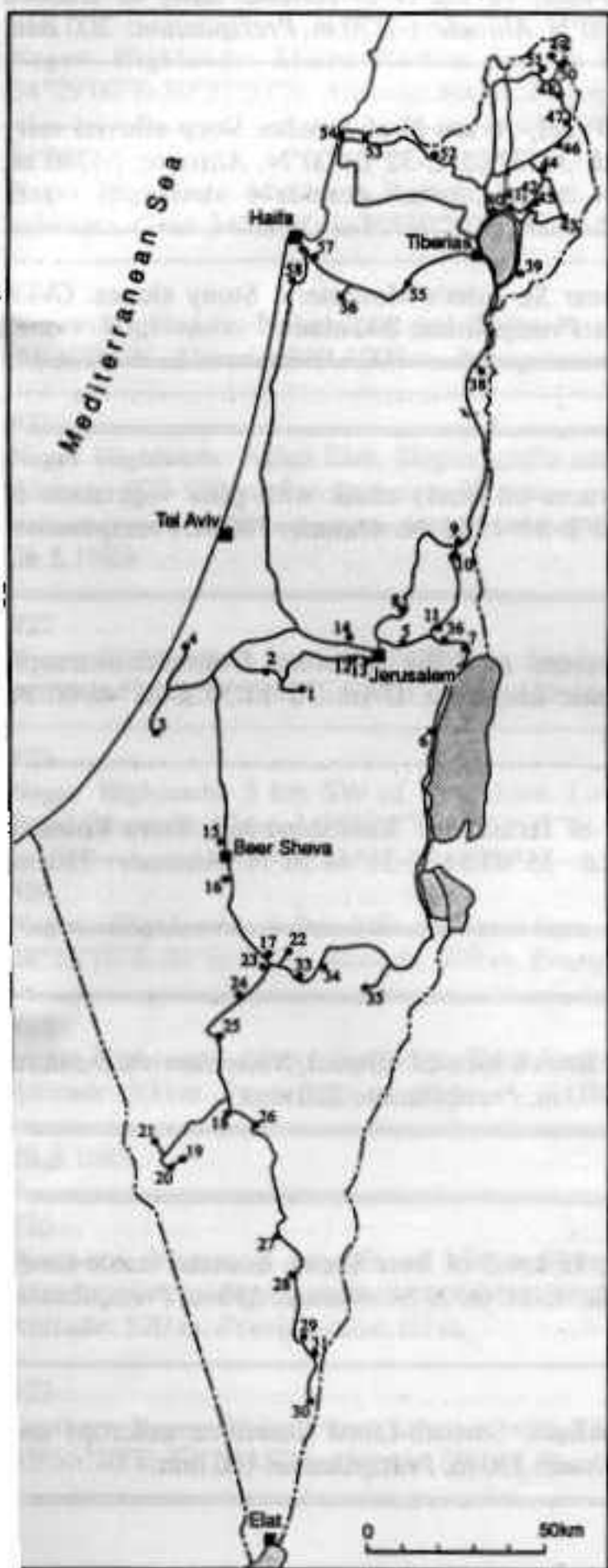


Fig. 1. Map showing the itinerary of Iter Mediterraneum II, with the numbered collection sites.

#9
Lower Jordan Valley: 1 km NE of Pzael, 18 km N of Jericho. Salty or leached calcareous soil. *Grid: 35°27'30"E-32°03'20"N. Altitude: (-)270 m. Precipitation: 200 mm.*

#10
Lower Jordan Valley: 2.5 km SSE of Pzael, 16 km N of Jericho. Deep alluvial salty soil, reserve of *Salvadora persica*. *Grid: 35°27'05"E-32°01'00"N. Altitude: (-)280 m. Precipitation: 200 mm.*

#11
Judean Desert: 5 km SW of Jericho, near St. John's Monastery. Stony slopes. *Grid: 35°27'55"E-31°50'30"N. Altitude: (-)10 m. Precipitation: 200 mm.*

24.3.1989

#12
Judean Mts: Jerusalem, near Ora. Terraces on marly chalk with poor vegetation of *Coridothymetum capitati*. *Grid: 35°09'00"E-31°45'15"N. Altitude: 780 m. Precipitation: 540 mm.*

#13
Judean Mts: Jerusalem, Givat Bet Hakerem, near Bet Hakerem. Dolomite outcrops, Veradim formation, Terra Rossa in karstic landscape. *Grid: 35°11'30"E-31°46'00"N. Altitude: 770 m. Precipitation: 540 mm.*

#14
Judean Mts: Kiryat Anavim, 10 km W of Jerusalem. Limestone hill, Terra Rossa, a Pine forest that was burnt 8/1987. *Grid: 35°07'51"E-31°48'50"N. Altitude: 750 m. Precipitation: 682 mm.*

26.3.1989

#15
Northern Negev: 5 km N of Beer Sheva. Brown loessial lithosol, *Noaeetum mucronatae*. *Grid: 34°47'00"E-31°18'30"N. Altitude: 300 m. Precipitation: 220 mm.*

26.3.1989

#16
Northern Negev: sands of Nahal Sekher, 15 km S of Beer Sheva. Loessial stable sandy soil, *Noaeetum mucronatae*. *Grid: 34°49'20"E-31°06'00"N. Altitude: 330 m. Precipitation: 150 mm.*

#17
Negev Highlands: 2 km NW of Yerokham. Smooth-faced limestone outcrops and wadis. *Grid: 34°54'30"E-31°00'05"N. Altitude: 330 m. Precipitation: 100 mm.*

 27.3.1989

#18

Negev Highlands: Mizpe Ramon. Weeds in gardens and among houses. *Grid*: 34°29'00"E-30°35'20"N. *Altitude*: 860 m. *Precipitation*: 90 mm.

#19

Negev Highlands: Makhtesh Ramon, Karnei Ramon. Basalt outcrops and a few other substrata. *Grid*: 34°40'00"E-30°30'20"N. *Altitude*: 770 m. *Precipitation*: 80 mm.

#20

Negev Highlands: Nahal Loz and Borot Loz (various habitats). *Grid*: 34°39'30"E-30°30'00"N. *Altitude*: 960-1000 m. *Precipitation*: 90 mm.

#21

Negev Highlands: Nahal Elot. Slopes, cliffs and wadis. *Grid*: 34°36'30"E-30°32'01" N. *Altitude*: 920-980 m. *Precipitation*: 90 mm.

28.3.1989

#22

Negev Highlands: 6 km SW of Dimona. Sandy loess soil near the nature reserve of *Iris petrana*. *Grid*: 34°59'00"E-31°01'30" N. *Altitude*: 330 m. *Precipitation*: 100 mm.

#23

Negev Highlands: 5 km SW of Yerokham. Loessial soil and near outcrops of smooth-faced limestone. *Grid*: 34°53'40"E-31°58'00" N. *Altitude*: 500 m. *Precipitation*: 100 mm.

#24

Negev Highlands: 8 km SW of Yerokham. Loessial soil and stony slopes. *Grid*: 34°53'10"E-30°56'00"N. *Altitude*: 500 m. *Precipitation*: 100 m.

#25

Negev Highlands: Above En Avdat. Hard Eocene chalk. *Grid*: 34°45'20"E-30°49'30"N. *Altitude*: 500 m. *Precipitation*: 90 m.

29.3.1989

#26

Southern Negev: 8 km SE of Mizpe Ramon, Nahal Gevanim. Magmatic rocks (Nordmarkite), slopes, rock outcrops and wadi beds. *Grid*: 34°53'15"E-30°35'00"N. *Altitude*: 520 m. *Precipitation*: 60 m.

#27

Southern Negev: Nahal Paran junction with Ramon-Elat road. Pebbly wadi beds. *Grid*: 35°56'20"E-30°20'15"N. *Altitude*: 390 m. *Precipitation*: 33 mm.

#28

Southern Negev: 6 km S of Zihor junction. Chalky ground in Eocene chalk hills. *Grid*: 35°01'00"E-30°16'30"N. *Altitude*: 390 m. *Precipitation*: 30 mm.

#29

Southern Negev: Near Kibbutz Shizafon. Wadis in gravel plain. *Grid*: 35°02'05"E-30°03'00"N. *Altitude*: 430 m. *Precipitation*: 33 mm.

#30

Southern Negev: Nahal Hyon. Gravels in wadi. *Grid*: 35°00'00"E-30°12'00"N. *Altitude*: 310 m. *Precipitation*: 33 mm.

#31

Arava Valley: Yotvata. Disturbed ground and wadis. *Grid*: 35°03'30"E-29°59'10"N. *Altitude*: 100 m. *Precipitation*: 40 mm.

#32

Arava Valley: Grofit junction. Large pebbly wadi. *Grid*: 35°04'00"E-29°59'30"N. *Altitude*: 150 m. *Precipitation*: 40 mm.

30.3.1989

#33

Negev Highlands: Makhtesh Hathira, Nahal Hathira. Sandy-silty wadi. *Grid*: 35°01'00"E-30°57'03"N. *Altitude*: 310 m. *Precipitation*: 80 mm.

#34

Negev Highlands: Yamin-Rotem Plain, 10 km SSE of Dimona. Stable sand covering sandstone. *Grid*: 35°04'06"E-31°01'00"N. *Altitude*: 330 m. *Precipitation*: 80 mm.

#35

Negev Highlands: Makhtesh Hazera (Makhtesh Katan). Sandy alluvium, pebbly wadis and limestone outcrops. *Grid*: 35°13'00"E-30°57'30"N. *Altitude*: (-)10 m. *Precipitation*: 55 mm.

#36

Judean Desert: near the entrance to Nabi Musa. *Grid*: 35°26'00"E-31°47'20"N. *Altitude*: (-) 120 m. *Precipitation*: 100 mm.

#37

Judean Mts: Jerusalem, Givat Ram, 0.5 km E of the entrance to the University Campus.

2.4.89

#38

Bet-Shean Valley: 6 km SSW of Bet-Shean. Slightly saline seapages with date palms and *Phragmites australis*, dark clayey soil. *Grid*: 35°31'00"E-32°27'30"N. *Altitude*: (-)200 m. *Precipitation*: 323 mm.

#39
Kinnrot Valley (Upper Jordan Valley): 2 km NE of Kibbutz Haon. Steep limestone and sandstone slopes. *Grid: 35°38'30"E-32°44'00"N. Altitude: (-)150 m. Precipitation: 396 mm.*

3.4.1989

#40
Kinnrot Valley (Upper Jordan Valley): near En Sheva (Tabkha). South-facing limestone slope. *Grid: 35°32'20"E-32°52'20"N. Altitude: (-)200 m. Precipitation: 400 mm.*

#41
Kinnrot Valley (Upper Jordan Valley): Jordan River banks, near Arik Bridge. *Grid: 35°37'00"E-32°54'00"N. Altitude: (-)200 m.*

#42
Golan: 5 km E of Almagor. Pseudosavanna of *Ziziphus spina-christi* accompanied by annuals; protogrumusol on basalt. *Grid: 35°39'30"E-32°54'30"N. Altitude: (-)40 m. Precipitation: 400 mm.*

#43
Golan: Nature Reserve (Bajuria). Grumusol and margins of a vernal pool. *Grid: 35°39'30"E-32°54'30"N. Altitude: 430 m. Precipitation: 600 mm.*

#44
Golan: near the ancient synagogue of Qazzin. Protogrumusol on basalt. *Grid: 35°42'32"E-32°59'10"N. Altitude: 350 m. Precipitation: 600 mm.*

#45
Golan: Yahudiya forest. Park forest of *Quercus ithaburensis* on basalt. *Grid: 35°40'30"E-32°55'25"N. Altitude: 40-50 m. Precipitation: 500 mm.*

4.4.1989

#46
Golan: Har Shipon. Volcanic ash. *Grid: 35°45'50"E-33°04'17"N. Altitude: 740 m. Precipitation: 750 mm.*

#47
Golan: Tel Avital. Volcanic ash. *Grid: 35°48'10"E-33°06'30"N. Altitude: 1000 m. Precipitation: 850 mm.*

#48
Golan: Odem Forest, near Masaada. Shallow soil on basalt. *Grid: 35°45'15"E-33°13'00"N. Altitude: 1010 m. Precipitation: 900 mm.*

#49

Mt. Hermon: lower teliferique. Slopes of hard karstic Jurassic limestones. *Grid:* 35°46'20"E-33°17'30"N. *Altitude:* 1690 m. *Precipitation:* 1200 mm.

#50

Mt. Hermon: 2 km NW of Majdal Shams. Crevices of hard limestone. *Grid:* 35°45'20"E-33°16'40"N. *Altitude:* 1335 m. *Precipitation:* 1200 mm.

#51

Mt. Hermon: near the tomb and oak reserve of Sheikh Othman, 1 km E of Qalaat Namrud. *Grid:* 35°43'50"E-33°15'00"N. *Altitude:* 800 m. *Precipitation:* 900 mm.

5.4.1989

#52

Upper Galilee: near Sasa. Muddy soil at the margins of a vernal pool. *Grid:* 35°23'20"E-33°04'15"N. *Altitude:* 810 m. *Precipitation:* 800 mm.

#53

Upper Galilee: Near Ya'ara. Terra Rossa on hard limestone, maquis and clearings. *Grid:* 35°12'00"E-33°04'10"N. *Altitude:* 200 m. *Precipitation:* 800 mm.

#54

Coastal Galilee: coast of Rosh Haniqra. Hard calcareous sandstone (kurkar), gravels and sandy soil in the sea-spray zone. *Grid:* 35°05'07"E-33°05'30"N. *Altitude:* 10 m. *Precipitation:* 600 mm.

6.4.1989

#55

Lower Galilee: 1 km N of Nazareth. Cultivated rendzina on Senonian chalk. *Grid:* 35°19'00"E-32°44'00"N. *Altitude:* 400 m. *Precipitation:* 600 mm.

#56

Esdraelon Valley: near Yoqneam, deep clayey soil near the road. *Grid:* 35°06'10"E-32°39'45"N. *Altitude:* 40 m. *Precipitation:* 650 mm.

#57

Mt. Carmel: Upper Nahal Neshar, 2 km S of Neshar. Terra Rossa on hard limestone. *Grid:* 35°31'40"E-32°45'30"N. *Altitude:* 280 m. *Precipitation:* 700 mm.

#58

Coastal Carmel: Atlit, coastal sands, salt marsh margins, and hard calcareous sandstone (kurkar). *Grid:* 34°56'00"E-32°42'20"N. *Altitude:* 2-20 m. *Precipitation:* 536 mm.

References

Brullo, S., Privitera, M. & Puglisi, M. 1991a: Note sulla flora e vegetazione briofitica di alcune aree desertiche di Israele. — *Candollea* **46**: 145-153.

- Brullo, S., Pavone, P. & Salmeri, C. 1991b: *Allium kollmannianum*, a new species from Israel. — Fl. Medit. 1: 15-20.
- Dorfmann, Z. 1981: Rainfall map. — Jerusalem.
- Taeckholm, V. 1956: Student's flora of Egypt. — Cairo.
- Zohary, D. 1983: Wild genetic resources of crops in Israel. — Israel J. Bot. 32: 97-127.

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