

**DISTRIBUTION LIST OF THE BUTTERFLIES OF ISRAEL WEST OF THE
JORDAN RIVER (LEPIDOPTERA)**

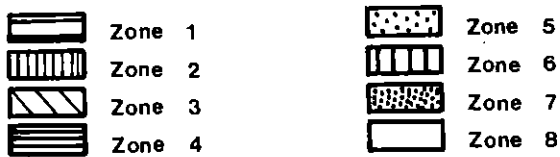
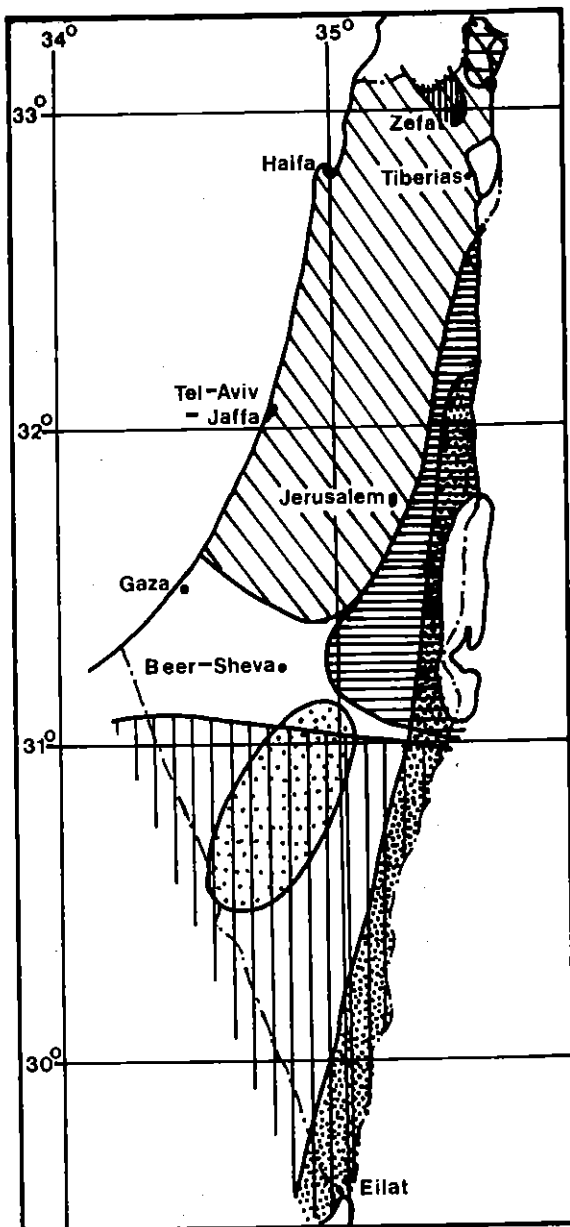
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ABSTRACT

Eight distributional zones of the Israeli butterflies west of the Jordan river are defined. The technique of defining such zoogeographical zones is explained. An updated list of one hundred and three species relative to these zones is given. *KEY WORDS*: Rhopalocera, Israel, distribution list.

INTRODUCTION

The exploration of butterflies in Israel started in the 19th century. Very few records are available from this period as the data were gathered by casual collectors. The first comprehensive lists appeared only at the end of the century; Kalchberg (1897) published a list of the butterflies of Haifa and Mt. Carmel. The list, containing 27 species, has one misidentification, namely *Lycaena bavius* (*Pseudophilotes bavius*) and a single doubtful record of *Lycaena cyllarus* (*Glaucopsyche alexis*). The latter has never been observed in the investigated area again. Swinton (1898) published a list of 35 species from Jerusalem. Short lists published by Fountaine (1902), Kneucker (1903), Gauckler (1906) and Herzog (1910, 1911) contained previous records only. The first world war brought to Israel British collectors, mostly officers in service: P.A. Buxton, H. St. J. Philby, P. Barraud, V. Bell, A.F. Hemming and P.P. Graves. They collected all over Israel, and their material enabled Graves (1925) to publish his comprehensive work on the butterflies of Palestine and Transjordan. From a total of 79 recorded species - four were recorded from Transjordan only. Two other species to be excluded from Graves' (1925) list are *Scolitantides bavius* (*Pseudophilotes bavius*) which is a copied error from Kalchberg (1897) and *Hesperia phlomidis* which has never been observed again in Israel and is apparently a misidentification. Hemming (1934) recorded 60 species with collecting data, plus 16 others by their names only. His list includes the same two errors mentioned above. Much of the material on which he based his paper was collected by L.K. Lockhart and by F. Bewsher and his wife. Amsel (1933, 1935), who collected mainly around Jerusalem and in Wadi Kelt (Judean Desert), published a zoogeographical, ecological and faunistic study which together with previous records included 86 species. His list included one form (*Danaus dorippus*), the same two previous errors and nine misidentifications ("*colias myrmidone*, *Limenitis Camilla*, *Melitaea arduinna*, *Satyrus miszechii*, *Pararge aegeria*, *Pararge hiera*, *Epinephele jurtina*, *Epinephele wagneri*, *Tarucus theophrastus*"). Bodenheimer's (1937) "Prodromus Faunae Palaestinae" is the last comprehensive list of the Rhopalocera of Israel and the area east.



Map 1. Distribution zones of the butterflies of Israel.

of the Jordan. The 102 species, subspecies and forms include 4 errors (*Pseudophilotes bavius*, *Tarucus theophrastus*, *Syrichthus proto lycaonius*, *Colias myrmidone*), 15 species known to occur east of the Jordan only, one form (*Pontia daplidice albidice*), 2 mis-identifications (*Aporia crataegi augusta*, *Melitaea trivia persea*), one invalid subspecies (*Colotis phisadia palestinensis*) and 3 dubious species. The net total for Israel is therefore 76. Since Bodenheimer's (1937) list, 5 more species have been added: *Euchloe falloui* (by Nakamura & Benjamini, 1973), *Apharitis cilissa* and *Pseudophilotes aben-cerragus* (by Larsen, 1974), *Pontia glauconome* and *Catopsilia florella* (by Kamon, 1964).

The aim of this work is to present an up-to-date list of all the butterflies (Rhopalocera) known to exist in Israel. This list contains 22 species recorded for the first time.

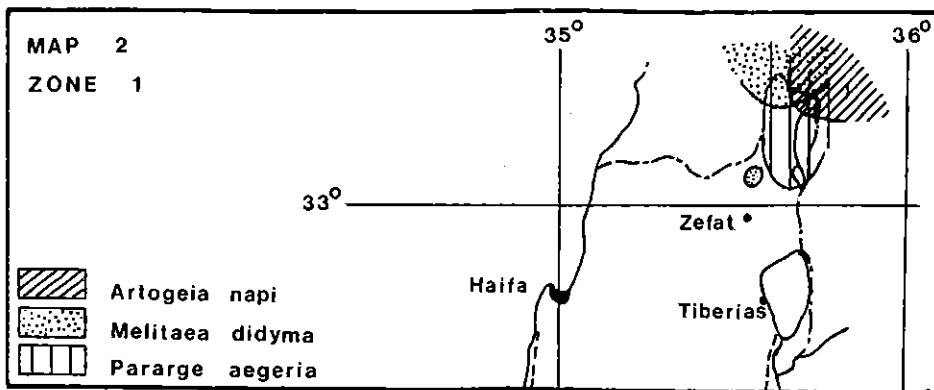
The following works were particularly useful during the preparation of the list: Evans, 1949; Higgins, 1941; Higgins & Riley, 1973; Jong, 1972, 1974. The list and recorded distributions are based mainly on my own investigations during the last 28 years all around Israel. They are supplemented by some data from other collections enumerated in the acknowledgements.

DISTRIBUTION ZONES

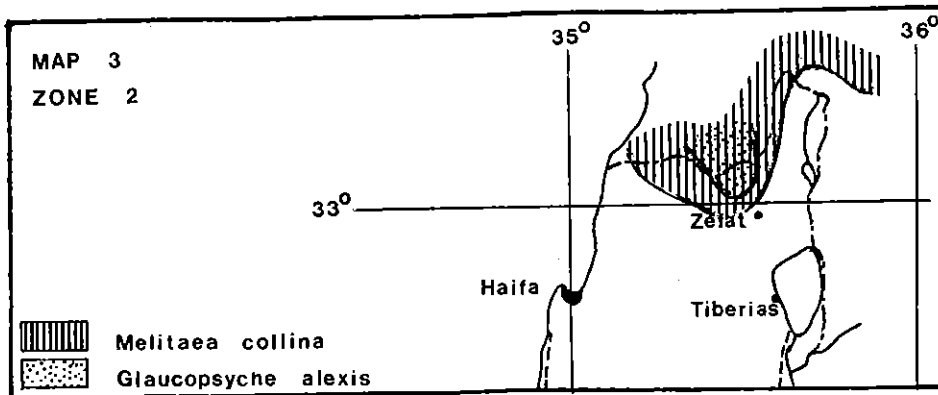
A first attempt is made here to define butterfly distribution zones in Israel west of the Jordan river. All data for each species were marked on the map and the borders of the distribution were drawn. (For excluded migrants, wide ranging and problematic species — see Table 1 and remarks). All the maps were superimposed on each other resulting in a composite range map (Pyle, 1976), known also as a "spaghetti map" (Remington, personal communication). Groups of lines which have very close and similar patterns were observed and approximate lines were drawn accordingly resulting in the presently proposed eight distribution zones (map 1). Comparing these zones with the phytogeographical map of Israel (Zohary, 1956, 1973) discovers common lines.

The distribution zones are:

ZONE 1 — Northern Jordan Valley, north of Lake Hula national reserve with Mt. Ramim on its western side. This zone is an extension of the Lebanese Beqaa Valley and presents low, damp, hot and green inland mediterranean valley. Some species have their southern limit of expansion here (map 2).



ZONE 2 – Mt. Meron (Jermak) and its surrounding valleys from 600 m to the top (1200 m). The borders of this zone are somewhat flexible to the west and to the north as shown in map 3 for *Melitaea collina*. It presents high mediterranean fauna which resembles the upper colline and lower montane belts of Mt. Hermon. Some common species such as *Chazara persephone*, *Callophrys rubi*, *Cyaniris antiochena* and *Celastrina argiolus* fly in both ranges and in no other part of Israel.



ZONE 3 – The northern and central mountain ranges and the coastal plain, constituting the main mediterranean Zone. This zone can be subdivided to northern coast, southern coast and central region. For typical distribution – see Map 4.

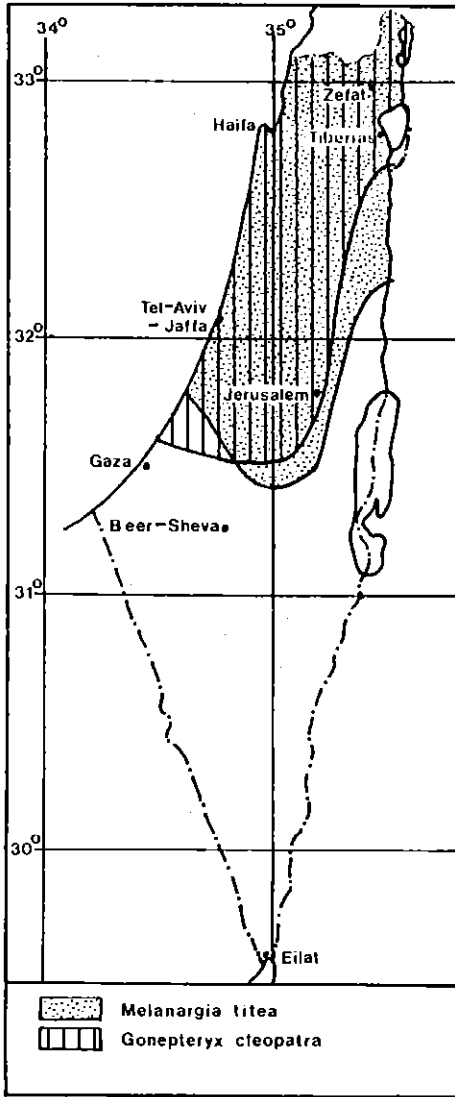
ZONE 4 – Central Irano-Turanian Zone – west of the Jordan River and south of Lake Kineret (Sea of Galilee) as south as the southern slopes of the Judean Hills. This zone presents the western extension of the Irano-Turanian steppe fauna. For typical distribution – see Map 5. For examples of invading mediterranean species – see Map 9.

ZONE 5 – Southern (high) Irano-Turanian zone – includes the central mountains of the Negev from about 500 m to the top (1000 m). This zone presents a fauna of a more rainy and cool Irano-Turanian region (sometimes with snow in winter) mixed with some mediterranean and eremic elements. For typical distribution – see Map 6. The south coastal distribution of *Spialia doris* is a late summer seasonal penetration. For invading mediterranean species – see distribution patterns of *Melitaea trivia* and *Melitaea phoebe* (Map 9).

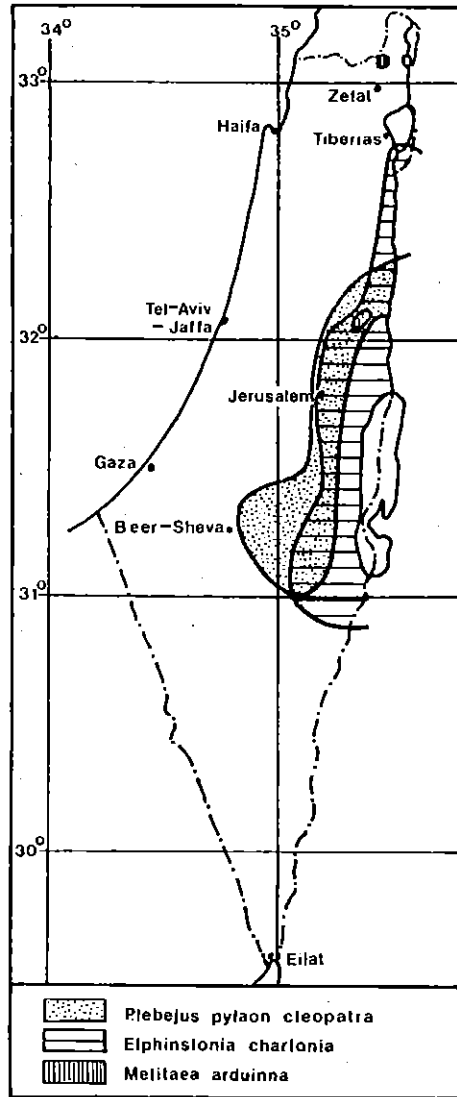
ZONE 6 – Eremic zone – presenting the Saharo-Arabian desert extension into southern Israel. Map 7 presents two typical distributions and a third one (*Polyommatus loewii*) which extends to zone 4.

ZONE 7 – Sudanian zone, presenting penetration of Sudanian elements, both floral and faunal to the desert conditions of the Rift Valley. This zone expands north of Eilat, along the Arava, the Dead Sea area and up to Jericho and Wadi Fara. For typical distribution – see Map 8.

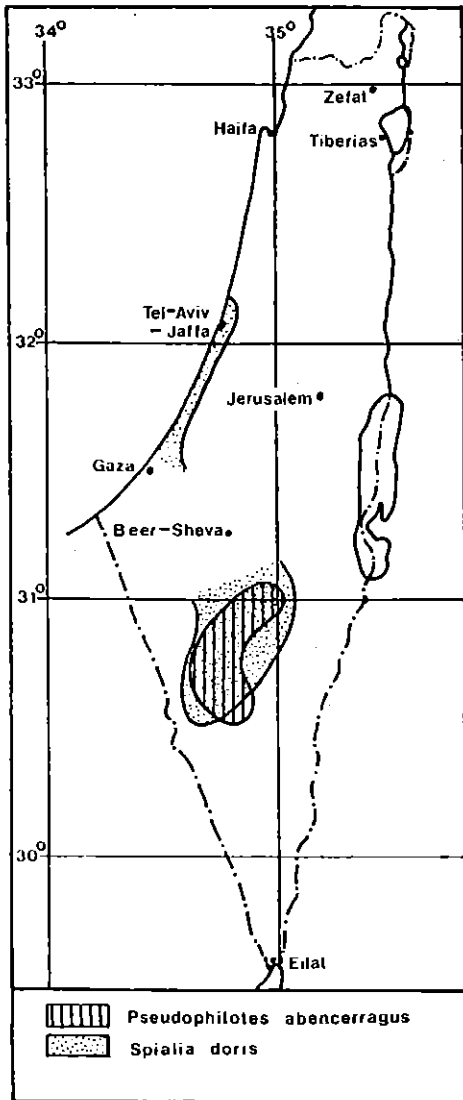
ZONE 8 – Transition zone between zones 3 and 4 in the north to zones 5 and 6 in the south (Map 1). It is equally composed of Mediterranean, Irano-Turanian and Saharo-Arabian elements. This zone includes the Mediterranean coast of the Negev, the Negev lowlands and the Beer-Sheva region. 38% of its butterflies are defined as penetrating species – see Map 10 for examples. Not a single species has this zone as its main habitat.



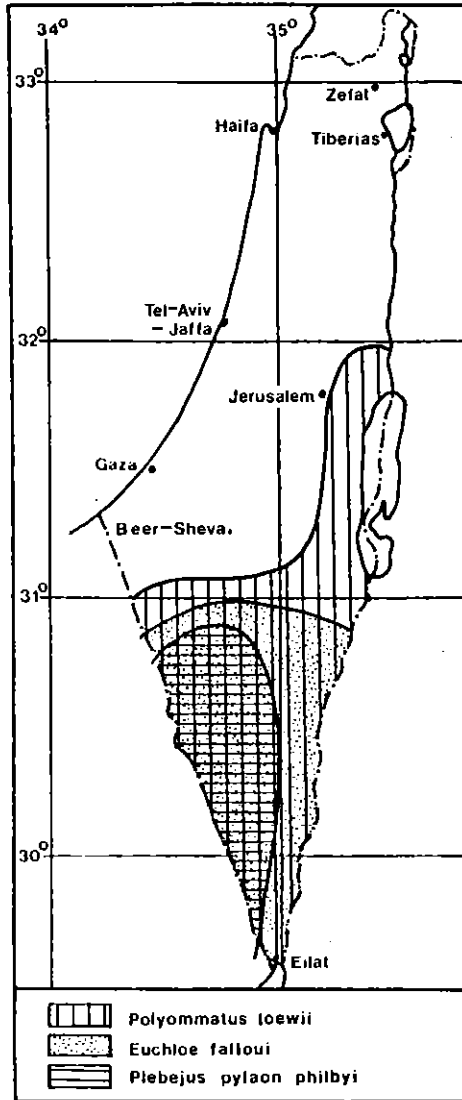
MAP 4
ZONE 3



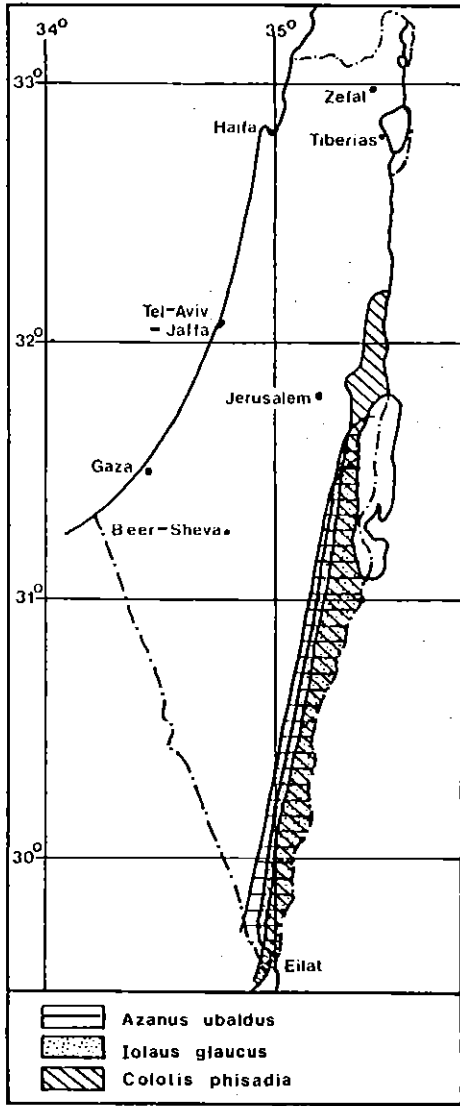
MAP 5
ZONE 4



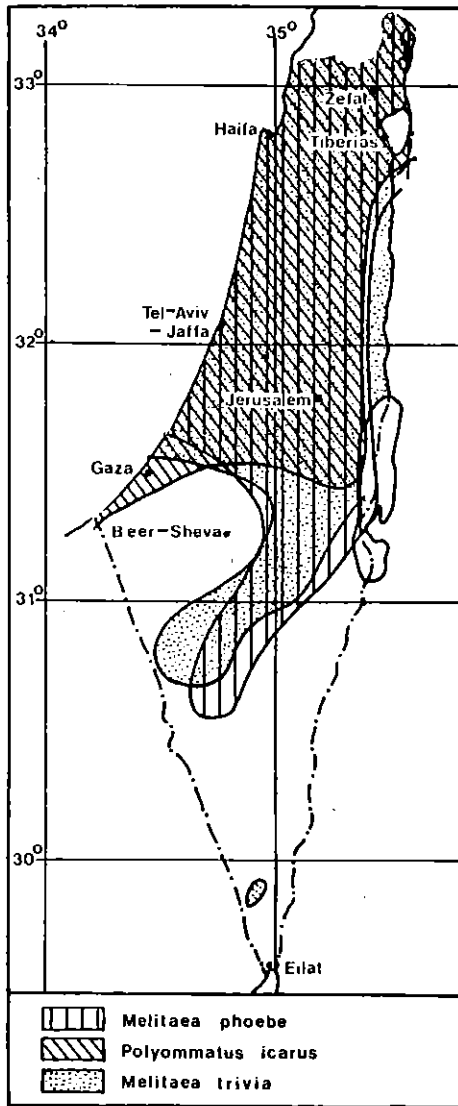
MAP 6
ZONE 5



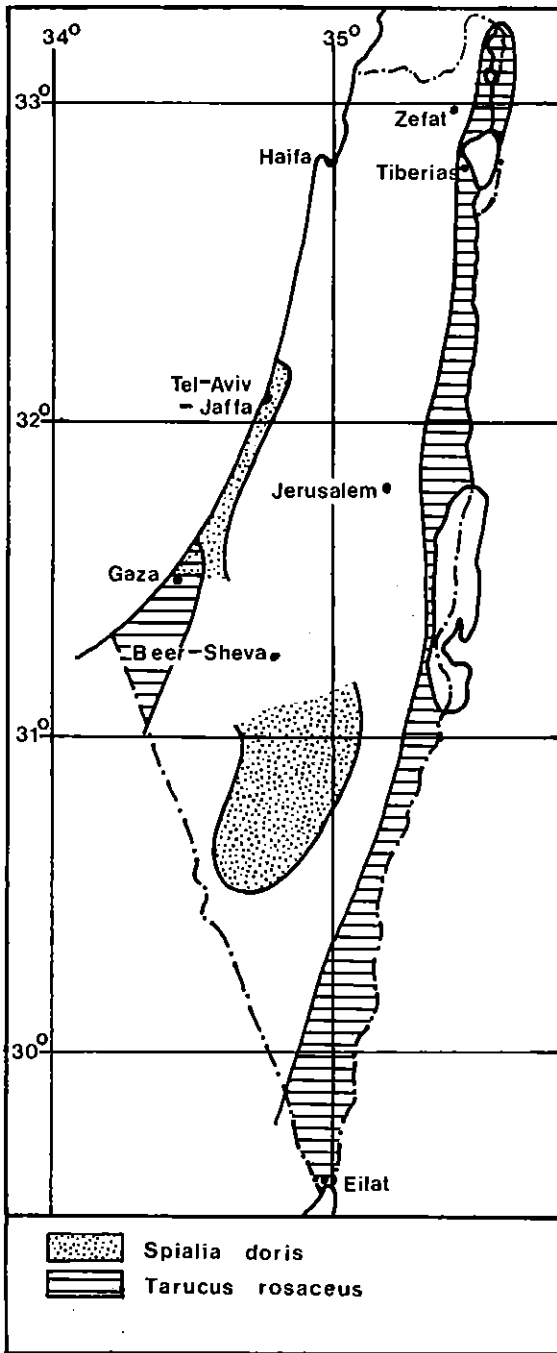
MAP 7
ZONE 6



MAP 8
ZONE 7



MAP 9



MAP 10

DISTRIBUTION LIST

All species and subspecies known from Israel are listed in Table 1. This table is divided into 8 columns according to the zones defined above. Zones 1, 2 and 3 with 63, 70 and 76 species respectively have the richest fauna. Zone 4 is the most penetrated area (by 15 species) being mainly invaded by butterflies from zones 3 and 5. Zones 5, 6 and 7 are nearly equal, having 27, 30 and 25 species respectively. Zone 8, excluding the penetrating and extinct species is actually the poorest zone. It does not appear so poor because of a relatively large number of penetrating species (13).

Notes to the distribution of some of the species are appended to the table.

The following acronyms and marks are used in Table 1:

- ++ – Main habitat
- + – Secondary habitat (species occurring regularly, but in low populations or locally).
- P – Penetrating species
- M – Migratory species
- E – Extinct species
- * – Additional distribution data at the end of Table 1
- N – Species new to Israel
- X – Species not included in the composite range map

TABLE 1: DISTRIBUTION LIST OF THE ISRAELI BUTTERFLIES

SPECIES	ZONE								N,*X
	1	2	3	4	5	6	7	8	
PAPILIONIDAE									
1 <i>Papilio machaon syriacus</i> Verity, 1905	++	++	++	+				P	
2 <i>Papilio machaon saharae</i> Oberthür, 1879					++	+			N
3 <i>Papilio alexanor maccabaeus</i> Staudinger, 1891	+	+	++	+					*
4 <i>Iphiclides podalirius virgatus</i> Butler, 1865	P		P						
5 <i>Allancastris cerisyi speciosa</i> Stichel, 1907			++						*
6 <i>Allancastris deyrollei eisneri</i> Bernardi, 1971	++	++	++	P					N
7 <i>Archon apollinus bellargus</i> Staudinger, 1891	++	++	++					P	*
PIERIDAE									
8 <i>Aporia crataegi augustior</i> Graves, 1925	++	++	++						
9 <i>Pieris brassicae catoleuca</i> Röber, 1896	++	++	++	+				+	
10 <i>Artogeia rapae leucosoma</i> Schawerda, 1905	++	++	++	+	P	P		+	
11 <i>Artogeia napi dubiosa</i> Röber, 1907	P								N
12 <i>Pontia daplidice daplidice</i> Linnaeus, 1758	++	++	++	++	++	+	+	+	X
13 <i>Pontia glauconome</i> Klug, 1829			M	P	++	++	++	P	X
14 <i>Colotis fausta fausta</i> Olivier, 1804	M	M	M	M	M	M	++	M	*X
15 <i>Colotis phisadia phisadia</i> Godart, 1819				P			++		
16 <i>Colotis chrysonome chrysonome</i> Klug, 1829							E		*X
17 <i>Anaphaeis aurota</i> Fabricius, 1793	E	E	E	E	E	E	E	E	*X
18 <i>Euchloe ausonia mellisande</i> Fruhstorfer, 1908	++	++	++	+				+	
19 <i>Euchloe ausonia aegyptiaca</i> Verity, 1911					+	+			
20 <i>Euchloe falloui</i> Allard, 1867					++	++			
21 <i>Euchloe belemia palaestinensis</i> Röber, 1907	++	++	++	++	+	P		+	
22 <i>Anthocharis cardamines phoenissa</i> Kalchberg, 1894	++	++	++						

SPECIES	ZONE								N,*X	
	1	2	3	4	5	6	7	8		
23 <i>Anthocharis gruneri gruneri</i> Herrich-Schäffer, 1851		P	++	++						
24 <i>Anthocharis damone syra</i> Verity, 1911	+	++								N
25 <i>Elphistonina charlonia elisabethae</i> Hemming, 1932			P	++	P	+				
26 <i>Zegris eupheme uarda</i> Hemming, 1932			P	++	+	P				
27 <i>Colias crocea</i> Geoffroy, 1785	++	++	++	++	+	+	+	+		
28 <i>Gonepteryx cleopatra taurica</i> Staudinger, 1881	++	++	++							
29 <i>Catopsilia florella</i> Cramer, 1775	M	M	M			M	+			*X
NYMPHALIDAE										
30 <i>Danaus chrysippus chrysippus</i> Linnaeus, 1758	M	M	M	M		M	M	M		*X
31 <i>Charaxes jasius jasius</i> Linnaeus, 1767		++	++							
32 <i>Limenitis reducta schiffermülleri</i> Higgins, 1933	++	++	++							
33 <i>Hypolimnas misippus misippus</i> Linnaeus, 1764			M							N,*X
34 <i>Vanessa atalanta</i> Linnaeus, 1758	++	++	++	P				P		
35 <i>Vanessa cardui cardui</i> Linnaeus, 1758	++	++	++	++	++	++	++	++		X
36 <i>Polygonia egea egea</i> Cramer, 1775	++	++	++	+						
37 <i>Damora pandora pandora</i> Denis & Schiffermüller, 1775			P	E?						N,*X
38 <i>Melitaea cinxia clarissa</i> Staudinger, 1901			P							N,*X
39 <i>Melitaea phoebe telona</i> Fruhstorfer, 1908	++	++	++	+	++					
40 <i>Melitaea collina</i> Lederer, 1861	+	++								N,*
41 <i>Melitaea didyma libanotica</i> Belter, 1934	+	+								N,*
42 <i>Melitaea deserticola macromaculata</i> Belter, 1934			++	+						
43 <i>Melitaea trivia syriaca</i> Rebel, 1905	++	++	++	+	+	P				
44 <i>Melitaea arduinna</i> Esper, 1784 (ssp.?)		+		+						N,*
SATYRIDAE										
45 <i>Ypthima asterope</i> Klug, 1832	++	+	++	+						
46 <i>Melanargia titea titania</i> Calberla, 1891	++	++	++	P						
47 <i>Hipparchia fatua sichaea</i> Lederer, 1857	++	++	++							
48 <i>Hipparchia pisidice</i> Klug, 1832	+	++	++		+	P		P		
49 <i>Chazara persephone transiens</i> Zerny, 1932		+	E?							*
50 <i>Pseudochazara telephassa telephassa</i> Hübner, (1819-1826)	+	++	++	P				P		
51 <i>Mantola telmessia telmessia</i> Zeller, 1847	++	++	++	P						
52 <i>Hyponephele lupinus centralis</i> Riley, 1921		+	+							N
53 <i>Pararge aegeria aegeria</i> Linnaeus, 1758	+	P								N
54 <i>Lastommata maera orientalis</i> Heyne, 1894	++	++	++	P						
55 <i>Lastommata megera emilyssa</i> Verity, 1919	++	++	++							
56 <i>Kirinia roxelana</i> Cramer, 1777		++	+							N,*
LYCAENIDAE										
57 <i>Callophrys rubi intermedia</i> Tutt, 1907		+								
58 <i>Strymonidia spini melantho</i> Klug, 1832	+	++	++	P						
59 <i>Nordmannia ilicis bischoffi</i> Gerhard, 1853	+	++	+							
60 <i>Tomares nesmachus</i> Oberthür, 1894			+					E		*
61 <i>Virachola livia</i> Klug, 1834	+		+	+	P	+	++	P		*X
62 <i>Iolaua glaucus jordanus</i> Staudinger, 1881							++			

SPECIES	ZONE								N,*X	
	1	2	3	4	5	6	7	8		
63 <i>Apharitis acamas acamas</i> Klug, 1834	+	+	++							
64 <i>Apharitis cilissa</i> Lederer, 1861		++								
65 <i>Lycaena phlaeas timeus</i> Cramer, 1777	++	++	++	++	P	P				
66 <i>Thersamonía thersamon omphale</i> Klug, 1834	++	++	++	+	++	+		P		
67 <i>Anthene amarah amarah</i> Guérin, 1847							+			N,*X
68 <i>Lampides boeticus</i> Linnaeus, 1767	++	++	++	++	++	+	++	+		X
69 <i>Syntarucus pirthous pirthous</i> Linnaeus, 1767	++	+	++	+		+	+	+		X
70 <i>Tarucus balkanicus balkanicus</i> Freyer, 1845	++	+	++	++				+		
71 <i>Tarucus rosaceus</i> Austaut, 1885							+	++	+	
72 <i>Azonus jesus gamra</i> Lederer, 1885	+		++			+	++	+		X
73 <i>Azonus ubaldus</i> Cramer, 1782							++			N
74 <i>Chilades galba</i> Lederer, 1855										
75 <i>Freyeria trochylus trochylus</i> Freyer, 1845										
76 <i>Plebejus pylaon cleopatra</i> Hemming, 1934			+	++				+		
77 <i>Plebejus pylaon philbyi</i> Graves, 1925					++	+				N
78 <i>Artica agestis</i> Denis & Schiffermüller, 1775 (ssp.?)	+		++	P						*
79 <i>Cyaniris antiochena</i> Lederer, 1861		++								N
80 <i>Polyommatus icarus zelleri</i> Verity, 1919	++	++	++	+			+	+		
81 <i>Polyommatus loewii uranicola</i> Walker, 1870				++	++	+	+	P		
82 <i>Pseudophilotes vicrama astabene</i> Hemming, 1932	+	++	++	P						
83 <i>Pseudophilotes abencerragus nabataeus</i> Graves, 1925				P	++					
84 <i>Iolana alferii</i> Wiltshire, 1948				P	++	+				N
85 <i>Celastrina argiolus paraleuca</i> Rober, 1897		+								N,*X
86 <i>Glaucopsyche alexis</i> Poda, 1761, spp.?		++								N
87 <i>Zizeeria karsandra karsandra</i> Moore, 1865	++	P	++	+		+	++	+		X
HESPERIIDAE										
88 <i>Carcharodus alceae alceae</i> Esper, 1780	++	++	++	++	P	P		P		
89 <i>Carcharodus orientalis maccabaeus</i> Hemming, 1932		++	++							
90 <i>Carcharodus stauderi ambigua</i> Verity, 1925	++	++	++	+	++			P		
91 <i>Spialia orbifer hilaris</i> Staudinger, 1901	++	++	++	P						
92 <i>Spialia doris doris</i> Walker, 1870			P		++			P		N,*
93 <i>Syrichthus tessellum nomas</i> Lederer, 1855		++	+							
94 <i>Syrichthus proto hieromax</i> Hemming, 1932		++	++							
95 <i>Pyrgus melotis jordana</i> Hemming, 1932	++	++	++							
96 <i>Thymelicus acteon phoenix</i> Graves, 1925	+	+	++							
97 <i>Thymelicus lineola fornax</i> Hemming, 1934			+							*
98 <i>Thymelicus sylvestris syriaca</i> Tutt, 1905	+	++	++	+						
99 <i>Thymelicus hyrax</i> Lederer, 1861	++	++	++	P						
100 <i>Pelopidas thrax thrax</i> Hübner, 1821	++		++	+			++			
101 <i>Gegenes nostradamus</i> Fabricius, 1793			P	+		+	++	+		
102 <i>Gegenes pumilio</i> Hoffmannsegg, 1804	++	+	++	++						
103 <i>Borbo borbonica zelleri</i> Lederer, 1855	E		E							*X
Total	63	70	76	54	27	30	25	34		
P - per zone	2	5	5	15	5	7	0	13		
E - per zone	2	1	1	1	1	1	2	2		
M - per zone	3	3	6	2	1	3	1	2		
Net value (Total minus (P+E+M))	56	61	64	36	20	19	22	17		

ADDITIONAL NOTES TO TABLE 1

Papilio alexanor – The species is found in the eastern parts of Zones 3 and 2 and the western part of Zone 1, mainly in mountainous cliffs and eastern slopes where its foodplant, *Férula* (Umbelliferae) grows. Not reported south of Jerusalem's latitude.

Allancastris cerisyi – Flies in the north-west part of Zone 3, as far south as Zichron-Yaakov. Its distribution is a southern expansion of the Lebanese population – (Larsen, 1973).

Archon apollinus – Expands along the southern coast, out of Zone 3 as far as Gaza and Dier el Balach.

Pieris brassicae – Extending along the southern coast, out of Zones 3 and 8 as far as Gaza and Chan-Yunes.

Colotis chrysonome – Apparently extinct. Ein Gedi's last record is 28 years old, possibly because of its almost extinct food-plant, *Maerua* (Capparaceae).

Colotis fausta – The species is a permanent resident only in Zone 7 and especially in the Dead Sea area where it overwinters mainly as larva. In early spring it starts to migrate westward and northward.

Anaphaeis aurota – The species was observed in large numbers by the author in Haifa every summer from the 1950's until the mid-sixties, thereafter it dwindled there until its final disappearance in 1969.

Anaphaeis aurota – Extinct since 1969.

Catopsilia florella – This species succeeded to establish a permanent foothold in Eilat (Zone 7) where it feeds on *Cassia corymbosa* (Papilionaceae) which is widely planted by the local municipality. In the spring and summer it migrates northwards and establishes local temporary communities in Zone 3 where large groups of cultivated *Cassia* plants exist.

Danaus chrysippus – Migrates to Israel from overwintering areas in the south, possibly from Egypt. It is not a permanent resident, though arrives almost every year.

Hypolimnas misippus – A single migrating male was collected in Herzeliya (north of Tel-Aviv) 40 years ago.

Damora pandora – A single record from Mt. Meron. Bodenheimer (Iris 46, 1932 and Teva Vearetz, 1934 (in Hebrew)) mentioned an unlabeled specimen, possibly from Jerusalem, in father Schmitz's collection. Thanks to father Curly I succeeded recently to trace this collection in the cellars of Schmitz Girls School, East Jerusalem. Among many unlabeled, well preserved specimens which were collected in Palestine between 1908 and 1912 (father Curly's personal information) there was unfortunately no sign of *D. pandora*. However, some specimens carry the labels of the late Trevor Troughton who collected west of the Jordan River between the years 1951 and 1953.

Melitaea cinxia – A single doubtful record from Mt. Meron.

Melitaea collina – The occurrence in Zone 1 (Mt. Ramim only) links the populations of Zone 2 and Mt. Hermon. Locally distributed west of Zone 2, close to the Lebanese border.

Melitaea didyma – Only recorded from two localities: Nahal-Iyon near Metula – Zone 1, and Nahal Dishon/Aviv north of Zefat – Zone 2.

Melitaea arduinna – The first record for Israel is a male that was collected by the author in Maale Efraim – 19.4.80. This locality (in Zone 4) is exactly opposite the known East Jordan population near Salt (T. Larsen and K. Guichard, personal com-

munication). Lately (10.4.82) a second locality was found in Nahal Aviv – Zone 2. (leg: I. Shaked, R. Kopan, E. Morag).

Chazara persephone – Its extinction in Jerusalem took place about 20 years ago (the latest record is 1961) when its habitats were destroyed by new buildings (Bytinski-Salz, personal communication). The species may be rediscovered north of Jerusalem.

Kirinia roxelana – So far known in Zone 3 from 2 localities: Mt. Carmel and around Ma'alot – west of Zone 2.

Tomares nesimachus – An isolated endangered colony exists south of Mt. Carmel on the Efraim hills. Gaza's specimen (Graves, 1925) remained the single record for this area (Zone 8).

Virachola livia – The species is not a permanent resident in Zones 1, 3, 4 and 6 where it establishes flourishing summer colonies. It overwinters in Zone 7.

Anthene amarah – This species, which was recently (25.9.82) discovered in Israel by the author, is recorded only from Eilat. So far it was not found in the Arava valley.

Aricia agestis – Not yet recorded from Zone 2 where it should be found. The species is known from mountainous parts of Zone 3 and especially around and west of Jerusalem. In Zone 4 it was collected by the author in upper Nahal Arugot (northeast of Hebron).

Celastrina argiolus – A single male was collected by N. Karni on Mt. Meron (800m).

Spialia doris – Penetrates in late summer into the southern coast (Zone 3), as north as Herzeliya.

Thymelicus lineola – A rather rare and local butterfly in upper elevations of Zone 3, formerly more widely distributed (Graves 1925, Hemming 1934).

Borbo borbonica – Extinct in Israel since 1960's when the swamps of the Hula Lake were drained. Formerly recorded from upper Jordan Valley north of Kinneret. A single specimen from the Yarkon River is deposited in the collection of the Department of Zoology, Tel-Aviv University.

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