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THE PYRALIDAE OF THE LAKE TIBERIAS REGION \*  
A faunistic pheno-ecological survey

by

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### I. General part

The survey presented herewith is part of a general study on the entomofauna of the Lake Tiberias Region (LTR). This study is based upon organized uniform recordings, causal observations, continuous collecting and breedings during 36 years, 1933-1968. In addition, the data and findings of the various collectors, whether foreign or local, who collected in this part of the country, were incorporated. In each case the source and credit is duly given.

The boundaries of the area studied are as follows: the surroundings of the Lake Tiberias (Sea of Galilee), including the Jordan River banks both in the North and in the South, extending in all directions from about the Medi- terranean Sea level (0 m. ) to 210 meters below it.

The insects living in the lake are represented primarily by the stages existing on the land and in the air, including the most immediate shore and its flora and the faunula beneath stones. As far as the aquatic stages are concerned, no uniform observations were carried out, but casual recordings were made.

A survey of the flora, both wild and cultivated, and the climatic elements of this area will be given in detail as an introduction to the general report of the comprehensive study. In the present chapter only data will be given as far as they are needed to elucidate the distribution and frequency of the zoogeographic groups and species under discussion.

The first and only survey of Pyralidae of our area may be found in the column called "nichtermisches Jordantal" in Chapter XVI of the monograph 'Die Lepidopteren Paiastinas', 1933, by H. G. Amsel (2). This diligent and capable author visited this country in spring of 1930, and the column mentioned above includes the Pyralidae which he caught by light trap installed at Tabgha, on the Western shore of the Sea of Galilee. In his work of 1935 (5) he added to this list four species from Tabgha, and in his paper of 1956 (6) he added 13 more species. These latter are based on specimens which I sent to him before World War II and which he retained to that date.

The Pyralidae which were collected from 1933-1966 were identified or authenticated by the following:

The author dedicates this study to Prof. H. Bytinski-Salz - the researcher, the teacher, the friend - with hearty wishes on his 65; birthday.

In the early period - through the British Museum, by G. A. Bisset, and since 1936 - by H. G. Amsel, Karlsruhe, then Bremen. Appreciations are extended to both. Sincere thanks are due in particular to Dr. Amsel, the editor of 'Microlepidoptera Palaearctica', who kindly helped me during all these years. Furthermore, the list of species given was examined by him, and was brought up to date in accordance with the latest taxonomic revisions. Thanks are expressed also to U. Roesler of Bonn who elucidated for me the identity of some species of the difficult group Ephestia - Homoeosoma. Finally, Z. Shoham invited me to examine his collection of Pyralids from light traps at the Hula Valley, and allowed me to include the data of them, which are marked by (zs.).

This following list includes 119 species of Pyralidae. Of these 114 were observed by myself in the course of 36 years, four species collected by Amsel at Tabgha 1930, but were not observed by me, and one species which I saw in the collection of the Agricultural Department of the Mandatory Government of Palestine, caught at Migdal in May 1931.

Of these, 83 species were not recorded previously from the Lake Tiberis Region, among these 16 species which are new to the fauna of Israel. Thus the number of Pyralidae occurring in the whole land of Israel raises well over 300. For comparison, Wiltshire 1952 (42) mentions 207 species for the Iraq. Zerny 1934 (44a) and Ellison and Wiltshire 1939 (18a) about 196 species for the Lebanon and Hayward 1926 (22b), and Rebel 1926 (30) about 78 species for Egypt. These lower numbers may be due to the greater uniformity of biotopes in the two latter countries, but also to less intensive collecting.

According to my observations, 28 of the 119 species are abundant in our area, 24 are common, 11 are not rare, while 56 are rare species.

As to the zoogeographic distribution, I followed the method of Bodenheimer (11, 12) who in turn built his theory on the fundamental principles laid by Eig (18), the founder of the phytogeography of Israel, with slight corrections made by Zohary (45).

Details of the geographical distribution of each species is given in the special part as well as the assignment to one or more faunal elements. As in many other insect groups also many of the Pyralid species extend their range into 2 or more regions, in fact the percentage of such species is 65.5% of the total. Recent papers by Amsel on the Lepidopterofauna of Afghanistan have very much extended our knowledge of the distribution of Western Palearctic species towards the South-Eastern Palearctis. But it should be remembered, that many genera of Pyralidae are extremely polyphagous which also facilitates their distribution over various biotopes and large territories.

Table 1 gives a simplified faunal spectrum, which is based on the geographical distribution of the different species as enumerated in Table II.

Table I: Simplified Faunal spectrum of the Pyralidae of the Lake Tiberias Region.\*

	Med.	I T.	S A.	E S.	Pal.	Pal-trop	Geopol.	End.	Sa.
Number of species	30 + $\frac{41}{2}$	4 + $\frac{22}{2}$	6 + $\frac{9}{2}$	1 + $\frac{5}{2}$	8 + $\frac{8}{2}$	$\frac{13}{2}$	13	9	119
Percentage	42.4%	12.6%	8.8%	3%	10%	5.6%	10%	7.6%	100%

$\frac{1}{2}$

signifies a species which occurs in two different faunal regions and is therefore accounted for with half a point for each region.

The Mediterranean Element is the dominant one with 42.4%. Of the species restricted to the Mediterranean (30) about half have a Circum-mediterranean, half an Eastmediterranean distribution; many of the latter species are replaced by vicariant species in the Western Mediterranean.

The Irano-Turanian Element is with 12.6% the second largest element, but it should be noted that only 4 out of 26 species have a restricted I T distribution, while 22 species are classified as either IT/M, IT/ES or IT/SA, in comparison with the Med. element in which out of 71 species 30 occur in the Med. region only. In general the percentage of the IT element seems to be rather high in comparison with that of the country as a whole, but it should be pointed out that the IT element in the phytogeographical maps of Eig (18) and Zohary (1966) extends through the lower and middle Jordan valley and almost reaches up to lake Tiberias.

The Saharo-Arabian Element is also rather well represented with almost 9%, one third being confined to this region. Its species are found prevalently among the Galleriinae and Crambinae.

The Euro-Siberian Element is of little importance and includes only one species restricted to this area, but many species with more extended areas of distribution are classified under the palearctic faunal element.

The Palearctic Element is defined by Bodenheimer (1935, 1937) as a species occurring in at least 3 of the 4 palearctic subregions (M, IT, SA, ES). Corresponding to the vastitude of this regions it contains quite a large percentage (10%) of the species.

The Paletropic Element includes as well as Indoaustralian species like Herpetogramma licarsivalis, one of the most common species in the Tiberias region, as Ethiopian species like Endotricha consobrinalis penetrating into the Mediterranean, but there are also true paletropic species like Margaronia unionalis or Hellula undalis, both of them migratory agricultural pests.

\* The evaluation of the faunal elements on this and later pages was carried out by Prof. H. Bytinski-Salz with the consent of the author. The author however disagrees with this concept of zoogeographical elements, especially the Irano-Turanian element, as indicated in his former publication (25a), and hopes to prove his concept in further publications on other insect groups of the Lake Tiberias Region.

The Geopolitan Element (10%) with species occurring as well in the old, as in the new world also contains a large number of migrants and pests (see special part). It may be doubtful whether any geopolitan species ever existed before the dawn of human commerce, but though the Mediterranean origin of such storage pests as Cadra, Galleria and the Indian origin of Plodia seem probable, the country of origin of other species seems obscure.

A relatively large number of species are known to be migrants (nos. 93, 94, 97, 98, 108, 119). Witshire 1957 (42) also considers Nos. 11, 13, 91 to be migrants, and I have reasons to support his view. They are all of geopolitan or paleotropic distribution. Though all these species breed constantly in Israel, their migrant nature can be discerned by the occurrence of migrant waves, as shown by the phenological data given by Lane and Rothschild 1961 (24a) for the Coastal plain and by Shoham (unpublished observations comprising several years for the upper Jordan valley.).

Twenty eight species are considered as pests of crops in Israel (see special part). Nine other species are potential pests, they are Nos. 12, 19, 59, 78, 79, 95, 114, 115, 117. In view of the fact that they are mentioned as pests in foreign literature, they may assume such a role here too.

Thirty eight species of the list should be considered as absentees. Two species were not encountered in LTR since 1945, two - since 1944, seven - since 1943, three - since 1942, two - since 1940, thirteen - since 1939, three - since 1938, two - since 1937, and four - since 1935. To this list one should add Pyrausta cespitalis Schiff. which was collected but once in Migdal, 1931, and I had the occasion to examine the specimen in the collection of the Agricultural Department of the Mandatory Government of Palestine.

On the other hand, the list includes five species which were encountered only recently: one species (No. 20) - in 1952, two species (13 and 24) - in 1964, and two species (33 and 79) - in 1965 only.

For the time being I have no explanation for the absence of the Pyralids encountered in the past and for the appearing of those not seen here before. But I hope that I will succeed in bringing to light the 'common denominator', or interrelated factors, of these phenomena - in course of my work, in the following chapters, on the voluminous and variegated material of the other insect orders observed in LTR.

Two species of Crambinae (12 and 13) and one of the Hydrocampaenae (85) live during their larval stage on water-plants. No sufficient information is available on the life history and relationship to water in LTR of four other species, namely two Hydrocampaenae (86 and 89) and two Schoenobiinae (21 and 22).

Phenological data are given for each species in the special part. In Fig. 1 the biweekly occurrence of all species is summarized, together with the daily average temperature for 10 years (Tiberias 1940-1949 (16), the average

maximum average temperature for 34 years (Deganya A 1933-1966, data by the author) and the average relative humidity for 10 years (Tiberias 1940-1949 (16)). The annual frequency curve shows a distinct primary maximum in late spring-early summer (IV-VI) and a secondary lower maximum in late autumn (X-XI), interrupted by a deep minimum in winter (I-II) and a shallow secondary minimum in late summer (VII-IX). This frequency curve for the occurrence of Pyralidae agrees virtually with that given by Amsel 1933 (2) for all species of Palestinian Lepidoptera which also shows two maxima in V and X-XI divided by a minimum in winter and an especially low minimum in VIII.

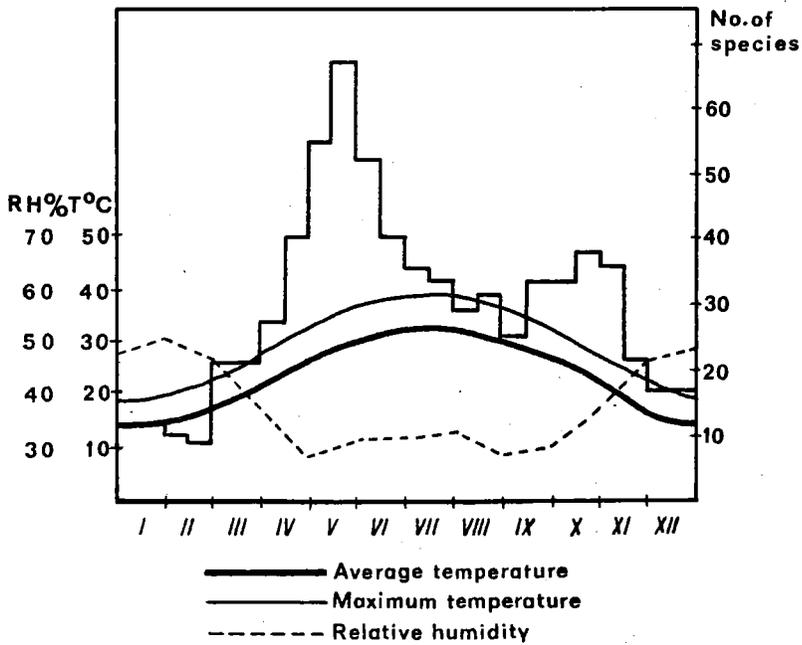
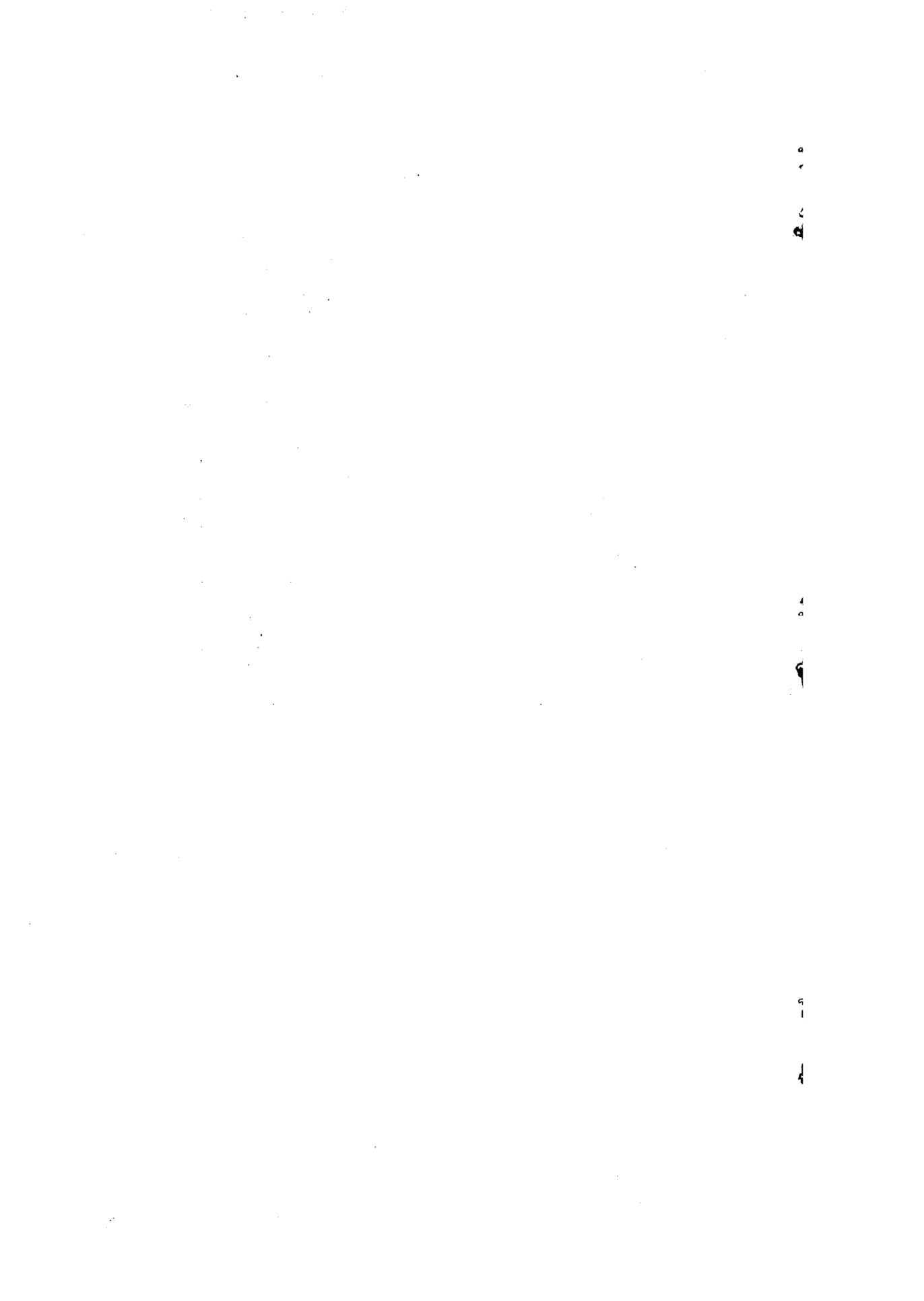


Fig. 1. Seasonal distribution of Pyralid species in the Lake Tiberias region in relation to meteorological data.



## II. SPECIAL PART

In this concluding detailed specific section, synonyms are noted only in cases in which those species appear by their old names in Amsel's studies (2-6) or in the 'Prodromus' of Bodenheimer (12), or if these synonyms have currency in the applied entomology publications in Israel or in the adjacent countries.

### GALLERINAE

#### 1. Arenipses sabella Hmps.

This species is injurious to dates attacking the fruit on the palm and in storage. It is abundant in the palmgroves around Lake Tiberias, and is on the wing from April to mid September. It was bred from the male flowers of the palm. Oviposition was observed early in May; larvae were seen from the end of March to the beginning of May; emergence of adults occurred from the middle of April to the middle of June. It is apparently multivoltine. Known to me also from the Beit-Shean and the Eastern Jezreel Valleys.

#### 2. Corcyra cephalonica Stt.

This moth is known in the tropics as a serious pest of polished rice. However, since it feeds also on grains of other cereals, dried fruit and various stored products, it has spread a great deal, and reached Northern Russia, and may be considered as Geopolitan. It was bred on wheat flour, and adults emerged in the middle of April 1944. Since then it was not seen in our area. This species was neither recorded by Amsel nor Bodenheimer.

#### 3. Galleria mellonella L.

This is a well known now geopolitan pest in beehives. In Italy it may raise 2-3 generations annually (35). In our area its larvae were seen at the end of March and in September-November. Emergence of adults occurred from the end of April to the middle of May and from mid September to mid December.

#### 4. Lamoria jordanis Rag.

This species is common in the Mediterranean Region, but spreads to India and China. In our region it is on the wing from mid October to mid November. It occurs also in the Hula (zs), Jezreel (7) and Lower Jordan valleys (2) and South of the Dead Sea (4). It is injurious to beet.

#### 5. Lamoria anella Schiff.

Abundant and in flight from mid March to mid December, abundant in May-June, but reaches its peak of population from mid September to mid November. Oviposition was observed in May - July (eggs white or

yellowish, deposited in clusters). Bivoltine. Its larvae feed on the date flowers and fruit (7). Recorded also as feeding heavily on the bark of apple trees under burlap-girdles (28a), and was reared from Inula viscosa and Aster. (22a).

#### CRAMBINAE

6. Euchromius bellus (Hb.); syn. Eromene b.

Common. On the wing in May, July-August, and from early October to mid November. The larvae live on dry leaves of Picris and Scabiosa (9). Recorded also from Mt. Carmel (5).

7. Euchromius superbellus (Z.); Eromene s.

Not rare. On the wing from early May to early August, and in November.

8. Euchromius ramburiellus (Dup.); syn. Eromene r., Er. islamella Ams.

Rare. This species was seen at the end of October 1938 and at the end of May 1939. Since then it was not encountered again. The larvae live on dead leaves (9).

9. Euchromius jaxartellus (Ersch.); syn. Eromene cambridgei f. jaxartella

Rare. Was seen once at the end of April 1939. A new species for Israel.

10. Euchromius cambridgei (Z.); syn. Eromene c.

Common. On the wing from early March to the end of June, and from mid August to the end of December, but recently I encountered it also in the mid of July. Oviposition was observed at the end of August (eggs white, oblong). Also recorded from the Lower Jordan Valley and the South of Dead Sea (5).

11. Euchromius ocellus (Haw.); syn. Eromene o.

Quite abundant. On the wing from early February to the end of June and also during August. Its peak of occurrence is at the end of May. Oviposition was observed at the end of June. Known to me also from the Lower Galilee and from the Hula Valley. Recorded from the Judean Mountains, the Lower Jordan Valley and South of the Dead Sea (2, 5). It occurs also in Sinai (24). The larvae feed on dry vegetable matter (9), and perhaps also on stored food products (8). This species is distributed in the tropical and subtropical regions of the Old World, and penetrated also Northern America. It probably is a migrant (42).

12. Pseudobissetia terrestrella (Chr.); syn. Chilo t., Ch. hypenalis Rbl.

Rare. On the wing in April and May. Was bred from Phragmites. Its larvae were once recorded as boring in maize stalks (10).

13. Calamotropha paludella (Hb.); syn. Crambus p., Chilo p.

Was not found in our region before 1964. Since then it occurs only in May. Its larvae are mining in Typha spp. (8, 9) and are mentioned also from dried foliage of these plants (32). It is a new record for Israel. Possibly it may be considered as a migrant, as its distribution extends from Western Europe to Kashmir and in the Irano-Anatolian province, and was recorded also from Africa and Australia.

14. Agriphila cyrenaicella (Rag.); syn. Crambus permixtellus Klchb.

Rare. Was not found again since 1944. On the wing in October and November. Oviposition was observed in mid November (eggs white, single). Recorded from the Mountain zone (2).

15. Agriphila deliella (Hb.); syn. Crambus d.

Very rare. Was seen by me once, in moderate numbers at the end of October 1938. Lives in arid sandy sites (9, 32). New record for Israel.

16. Metacrambus carectellus (Z.); syn. Platytes c.

Rare. Since I have found it in May and June 1935, it never occurred again, but recently observed from the Huleh (Zs). Recorded from the Mountain zone (2), and as rare also from Jericho (5).

17. Pediasia desertella (Led.); syn. Crambus d.

Rare. Was observed twice during the first half of November 1943, but recently, on 23 October 1968, I encountered it again. Recorded from the Coastal Plain, Judean Mountains and the Lower Jordan Valley (2).

18. Pediasia matricella (Tr.); syn. Crambus m.

Not rare. On the wing from mid October to mid November. Recorded from the Lower Jordan Valley (2). Inhabits arid sites (9).

19. Ancylolomia tentaculella Hb.; syn. A. irakella Ams.

Not rare. On the wing from early October to early November. Oviposition was observed in mid October (eggs yellowish, oval). Recorded from the Coastal Plain, Judean Mountains and the Lower Jordan Valley (2). Larvae feed on Gramineaceous plants, in particular on Dactylis (23).

20. Ancylolomia tripolitella Rbl.

Not rare. First seen in 1952. On the wing from the end of October to mid November. Oviposition observed in mid November (eggs yellow, oblong, single). Recorded also from the Lower Jordan Valley. (5).

SCHOENOBINAE

21. Tyridophora furia Swinh.

Rare. Was collected twice in June 1942. Since then not seen, but Recorded also from the Lower Jordan valley and the Judean Mountains (5).

22. Schoenobius alpherakii Stgr.

Common. On the wing during April and May. Recently found also in the Hula Valley, where it appears at the end of the summer (zs). Recorded also from South of the Dead Sea (4).

ANERASTINAE

23. Prinanerastia ablutella Z. syn. Anerastia a.

Common. Flying from mid May to the end of November. Oviposition observed in early November (eggs white, sticky). Recorded also from the Coastal Plain and the Lower Jordan Valley (2); abundant in the South of the Dead Sea (4).

24. Lymira semirosella Rag.

Not rare. Flying in April and May and also at the end of November. Recorded from Jericho, and as rare in the Judean Mountains (4). Recently found in the Hula Valley (zs).

25. Ematheudes punctella Tr.

Common. Flying from mid April to mid June, and from mid September to mid November. Occurs in the Hula Valley in the same seasons. (zs). Recorded also from the Lower Jordan Valley and the Coastal Plain (2).

26. Polyocha venosa Z.

Rare. On the wing in June. Since 1943 it was not observed in the Lake Tiberias Region, but reported recently from the Hula Valley (zs). Recorded also from Mt. Carmel (5).

PHYCITINAE

27. Rotruda inquinatella (Rag.) ssp. amseli Roes.

It was observed since 1945, but previously it was fairly common and was on the wing in mid April and in June-July. Occurs also in the Hula Valley (zs). New to Israel.

28. Rotruda albatella (Rag.); syn. Homoeosoma a.

Rare. On the wing in March and April. Recorded from Jericho (5) (5).

29. Rotruda saxicola (Vaugh.) ssp. subbinaevella (Rag.)

Rare. On the wing in April, but more common in late October. New to Israel.

30. Homoeosoma pseudonimbella Bent.

Common. Flying in March-May and September-November. Also recorded from the bank of the River Yabboq (6). Reared from Solidago (22a).

31. Plodia interpunctella Hb.

Common: It is attracted to light during May-June and from August to mid November. Was bred from maize, grain, peanuts, nuts and raisins. Emergence of adults was observed in May and from August to November. Recorded from Jerusalem where it was found in houses (5). This is a geopolitan pest, attacking stored cereals, other food in storage, and also dead insects (22a). Raises 6-7 generations (31). Seems not to be known in Palestine before 1930 (10).

32. Cadra calidella (Gn.); syn. Ephestia c.

Very common. On the wing from early March to mid November. The peak of its occurrence is in September. Oviposition was observed in June and early August (eggs whitish, single). Injurious to dates and other fruits. May be found also feeding on different vegetable and animal matter. It was bred from Zizyphus fruit, and emergences took place in June and July. Bivoltine (42) or multivoltine (43).

33. Cadra figuliella (Gregs.); syn. Ephestia f.

A serious pest, attacking various kinds of grains and stored fruit (17, 36, 37, 43), also develops well in dates while on the tree (7). Was found in a shelter between date palms early in May 1965 and again in April 1969. Recorded also from the Lower Jordan Valley, the Mountain area and Coastal Plain (5)

34. Delattinia vapidella (Mn.) f. tenebrosa (Z.) syn. Epehestia v.

As early as 1934 larvae of this species were found feeding on Citrus bud grafts (13). It was reared twice from carob grafts, and emergence of adults occurred in March and May. Since 1945 this species was never found again in the Tiberias region. Recorded from the Coastal Plain and Lower Jordan Valley (2).

35. Syria arenicola Rag.

This species was encountered only once, although in fair numbers, at the end of October 1938. New to Israel.

36. Syria angusta Stgr.

One specimen of this species was found in the lot of the previous species in October 1938. New to Israel.

37. Syria biflexella Led.

Was found only once, in the middle of April 1939. Recorded from Syria (29), but new to Israel.

38. Ancylodes staminella Chr.

Rare. Was observed twice only in May 1935 and 1937. Recorded as rare from the Mountain area, Lower Jordan Valley and South of the Dead Sea. (2, 5).

39. Heterographis hellenica Stgr.

Used to be quite common in this region, till 1943 and was on the wing from April to September, reaching the peak of its frequency in August. However, in the very hot night of 23rd May 1969 I caught it again. One specimen was caught recently in the Hula Valley (zs). Recorded in 1930 from the Coastal Plain and the Lower Jordan Valley (2).

40. Heterographis subcandidatella Rag.

A rare species in LTR. Encountered only once, at the end of May 1935. Recorded in large numbers from the Lower Jordan Valley (4) and the Coastal Plain (2). This is a species which penetrates into Iraq, where it is on the wing in the desert and the oases from early spring to the later summer, and there it is multivoltine (42).

41. Heterographis oblitella Z.

A common species. Found from early April to the end of July, and from the end of September to the mid of November. Its larvae feed on Acacia

spp. (22a). Occurs also in the Hula Valley (zs), and is recorded from the Mountain area (2). Rebel recorded this species also from South America (29), where it may be introduced.

42. Heterographis convexella Led.

Very common in LTR. In flight from the end of March to the end of June, and from early August to the end of September. However, Amsel recorded this species from all parts of the country (2), including South of the Dead Sea (4), but excepting the "non eremic Jordan Valley".

43. Cornigerula eremicola Ams.

Encountered only once, at the end of April 1939. Amsel described this species in 1935 from South of the Dead Sea (4).

44. Psorosa dahliella Tr.

Found here only twice, in June and July 1939. Recorded from the Coastal Plain, the Judean Mountains and the lower Jordan Valley (2). Recently found also in the Hula Valley (zs).

45. Oxybia transversella Dup.

Very rare. Caught once, early May 1939. Recorded from the Judean Mountains, (5) and from the bank of the Yabboq River (6). Rebel noted it also from South India (29).

46. Metallosticha nigrocyanella Const.

This species was never collected by myself, but Amsel recorded it from Tabgha in May 1930 (4), and he also collected this species in Jericho, Wadi el Quilt, Ein-Karem and Waldheim (in litt.)

47. Euzophera subcribrella Rag.

Rare. In flight at the end of April. Was not found by me since 1939. In Iraq it was recorded in March (42).

48. Euzophera osseatella Tr.

Very common. In flight from the middle of March to the end of July, and during November and December. Its larvae feed on Solanaceous plants. It was reared on potatoes and from Solanum villosum; emergence of adults took place in May-July and early November. Raises 6 generations (31). Occurs everywhere in the country (7).

49. Euzophera bigella Z.

Was bred once from larvae found in apples early June 1945, and the adults emerged early July. Plaut bred it from quince, and from South Russia it was reported as being severely injurious to apple, apricot and walnut. Under conditions prevailing in Israel it may raise 5-6 generations (28). Recorded from the Mountain area (2).

50. Etiella zinckenella (Tr.)

Common. On the wing from the middle of June to the end of September. Its larvae feed in the pods of various legumes both wild and cultivated. Found attacking also watermelon seeds (43). Bred by myself on cow-pea, soya-bean and Bauhinia. Egg laying occurred at the end of October (eggs white glistening, oblong, sticky). Recorded from the Mountain area and the Coastal Plain (2). Plain (2).

51. Epischnia illotella Z.

This species was collected only once, in September 1935. Seen by Amsel in the Mountain area (5). In Egypt it was recorded as injurious to Acacia nilotica (39).

52. Anoristia gilvella Rag.

Was observed only twice, in May of 1935 and of 1939. Recorded from the Lower Jordan Valley (2), from the bank of the Yabboq River (6) and from South of the Dead Sea (4). It occurs also in Sinai (24).

53. Auxacia bilineella Rag.

This species was found only twice, at the end of September 1943, and in the middle of May, on a hamsin day, in 1945. Since then it was never observed here again. In Iraq it is in flight in the desert area during March-October (42). New to the country.

54. Christophia judaica Ams.

Very rare. Only once caught at light in May 1942. Amsel collected and described it from the Lower Jordan Valley, also recorded it as rare (3).

55. Tephris diversella Ams.

Rare. Before it was found in Deganya, this species was known only from the neighbourhood of the Allenby Bridge in the Lower Jordan Valley (6).

56. Alophia combustella H. -S.

Was caught at light only twice, at the end of April 1939, and in a hamsin night, on 22 May 1969. Bodenheimer recorded the larvae of it as living in Pistacia galls caused by Aphids on the Carmel and the Judean Moun-

tains, the adults emerging in July (10). I bred it from Pistacia leaf galls taken in the Jerzre'el Valley, and emergence of adults occurred in mid April. This species was recently collected in the Hula Valley in April and May (zs). Recorded from the Coastal Plain, Mts. of Judea. Mt. Carmel, the Lower Jordan Valley and the bank of the Yabboq River (2, 5, 6).

57. Oligochroa dionysia (Z.); syn. Salebria d.

Very common. On the wing in April-May, July-August, and especially abundant in October-November. Oviposition observed in July (eggs white, sticky). Recorded from the Hula Valley (zs), also from the Mountain area and the Lower Jordan Valley (2). Occurs also in Sinai (24).

58. Oligochroa sordida (Stgr.); syn. Salebria s.

Very common, flying from mid April to mid August. A larva was found in mid September, and the moth emerged in mid May. Recently collected in the Hula Valley (zs). New to the country.

59. Salebria semirubella Sc. ssp. sanguinella Hb.

Seen by me only once, in fair numbers, at the end of May 1935. Its larvae feed on Lotus leaves (17, 32). A new subspecies to the country.

60. Salebria semiusta Hmps.; syn. S. semiflavella Rbl.

Not rare. In flight from mid June to mid September. Recently found also in the Hula Valley (zs). New to the country.

61. Nephoteryx metamelana Hmps.

Common. In flight from early April to mid June and from mid September to the end of October. Recorded from the Mountain area and the Lower Jordan Valley (2).

62. Nephoteryx mediterranea Ams.

Common. Observed in flight at the end of March and from early May to the end of October. Was bred from a larva found on Zizyphus lotus in mid May; adult emerged early June. Known to me from the Hula Valley (zs). Recorded from the Lower Jordan Valley (2) and from the bank of the Yabboq River (6).

63. Candiope uberalis Swinh.; syn. Pristophora discomaculella Rag.

Common. On the wing early March, April, June, and from mid September to mid November. Occurs in the Hula Valley (zs). Recorded from the Lower Jordan Valley (2) and the bank of the Yabboq River (6).

64. Phycita poteriella Z.

Rare. Was observed only three times, during the first third of June in 1939, 1940 and 1942, and since then it was not seen again in the Tiberias region. Lately it was collected in the Hula Valley (zs). Amsel saw this species in all parts of the country, and states that it was common in the Mountains, and from there penetrated into the desert area where it was rare (5). The larvae feed upon Poterium spinosum (5). In Egypt it was recorded as injurious to Ricinus (39), but this may be a misidentification, and should refer to Ph. diaphana - see No. 65.

65. Phycita diaphana Stgr.

Very common, flying from mid March to mid December. Was bred from Ricinus and from Crozophora tinctoria. Larvae were found early in August and in October-November; emergence was observed in March-April, August and November. In addition to these Euphorbiaceous hosts, the larvae feed also on Populus euphratica (42). Recorded from all over the country, including South of the Dead Sea (2, 4).

66. Phycita zizyphella Chret.; syn. Ph. jerichoella Ams.

This species was no more observed since 1943, but until then it was not rare; and was on the wing from early August to the end of October. Recorded from Jericho, especially in spring (5).

67. Acrobasis zizyphella Rbl.

Not rare, flying from mid September to the end of October, the peak being in September. Recorded from the Lower Jordan Valley; its larvae were observed skeletonizing the leaves of Zizyphus spina-Christi (5).

68. Eurhodope monogrammos Z.; syn. Rhodophaea m.

Very rare, observed but once, at the end of March 1940. Recorded also from the Judean Mountains. (5).

69. Myelois cribrella Hb.

Common. In flight from the end of February to the end of June. Known to me also from the Western Jezreel Valley and from the Hula Valley. Its larvae feed on the inflorescence of some Compositae (10), overwintering in the stalks (42). Occurs also on Echium (17).

70. Myelois cinerea Stgr.; syn. Eurhodope buxtoni Roths.

Was seen by me only once in mid May 1939. Lately collected in the Hula Valley (zs). Amsel recorded this species from the mountains only (2).

71. Myelois pluripunctella Rag.

Was caught but once, at light at the end of May 1935. Since then it did not appear again in the Lake Tiberias Region. Recorded from the Coastal Plain and the Lower Jordan Valley (2).

72. Myelois aeneella Zy.

Amsel collected a female of this species in Tabgha in mid May 1930, and he states it as rare (5). I have not seen this species.

73. Spectrobates ceratoniae (Z.); syn. Myelois c., Ectomyelois c.

Very common, flying from early April to mid June and from mid July to the end of October. The peak of its occurrence is during the second half of August. Was bred from Acacia farnesiana pods, from carob pods and from apple fruit. Larvae were observed in February and July, emergence took place in May and August. It was bred also from shelled almonds in bags and from quince fruit (Plaut, p. com.). Besides that, its larvae may attack Citrus fruit (especially grape-fruit), dates, figs, nuts (7), and also the fruit of Zizyphus spina-Christi (20). Raises four generations (7).

74: Cryptoblabes gnidiella Mill.

Very common. With the exception of January, it is on the wing all year round. Its peak occurs in May-June, especially during the latter half of May. Abundant almost all over the country. Was bred twice from grapes, and also from apple and guava. In addition, larvae of this species were found in Citrus fruit, loquat, fig and peach; also wheat, sorghum, maize and Ricinus may be attacked (7, 10), as well as cotton bolls (31) and other plants. By means of the attacked fruits, the distribution of this species is extending, and so it was already recorded from New Zealand (7) and England (10), but was not yet found in Iraq (42).

ENDOTRICHINAE

75. Endotricha flammealis Schiff.

Common. In flight from mid March to mid May and from mid September to the end of October. Its larvae feed on Agrimonia, Salix, Quercus and Lotus (22a). Known to me also from Mt. Carmel and the Hula Valley, and recorded also from the Coastal Plain (5).

76. Endotricha consobrinalis Z.; syn. E. jordana Hmps.

Very common. In flight almost all year round, except from mid December to mid February. Two peaks are observed in its frequency: one - in June, and one - in the first half of October. Mating was observed in August,

and egg-laying in the latter half of June (eggs yellowish). Known to me also from the Bet-Shean and Eastern Jezreel Valleys where emergence of adults took place in mid January. Recorded from the Lower Jordan Valley and from South of the Dead Sea (5).

#### PYRALINAE

77. Ulotricha egregialis H. -S.

Very common. On the wing from mid April to mid November, reaching peaks of occurrence in April and October-November. Oviposition was observed in June and July (eggs white, free). It is abundant in the Hula Valley, and is flying there from early May to mid November, the peak being in August (zs). Recorded from the Coastal Plain and the Mountains (2).

78. Aglossa pinguinalis L. ssp. asiatica Ersch.; syn. A. rubralis Hmps.

Not rare. In flight in April, June, and from mid November to mid December. By day these moths are hiding in dark corners, and are seen flying mostly at twilight. In the Hula Valley it was light trapped in September-October (zs). Recorded also from the Mountain area and the Lower Jordan Valley (2). The larvae of this species live in detritus of plant and animal matter, in human feces (35), in garbage (32, 43) and under decaying hay in stables (36). When the population is dense, it may attack dried tobacco leaves in bales (43) and also leathern book-bindings (39).

79. Aglossa cuprealis Hb.

For the first time, and for the time being the only one, I saw this species in our area early in April 1965. Amsel recorded it from the Mountain area and the Coastal Plain (2). Its larvae live in hay and in Gramineous and Leguminous waste, and prefer damp food (8). The larvae may attack also cheese and fatty substances (17), or feed on dead insects or on hides (37).

80. Pyralis farinalis L.

Common. In flight from early March to the end of June and also during September and November. The peaks of its frequency occur in the latter half of March, early April and the end of June. Copulation was observed in July. The species is known to me also from the Jezreel Valley, Mt. Carmel, Lower Galilee and the Judean Mountains. It occurs also in the Hula Valley (zs). Its larvae feed on flour, small grain and its derivatives in storage, on hay, straw etc. (8, 17). It was bred also in potatoes (31).

81. Scotomera catapealis (Rag.)

Rare. In flight from mid August to early October. Oviposition observed early in October (eggs green, round, sticky). Occurs also in the Hula Valley. New to the country.

82. Dattinia atrisquamalis (Hmps.); syn. Constantia a.

Rare. In flight from mid October to early November. Recorded also from the Lower Jordan Valley (2).

83. Constantia colchicalis H. -S.

Rare. Was observed twice only, in June 1943. On that occasion oviposition occurred (eggs white, free). In the Hula Valley it appeared in mid August (zs). It was recorded from the Mountain area and the Lower Jordan Valley (2) as well as from the bank of the Yabboq River (6).

84. Anactenia daganialis Ams.

Common. On the wing from mid-April to the end of June, and from early August to the end October. Was described by Amsel in 1956 (6) after a single male caught by me in Deganya A in 1935. But since then I have collected a fair number of this species, among them many females too; and recently I have seen a specimen of it also from the Hula Valley (zs).

HYDROCAMPINAE

85. Nymphula affinialis Gn.

Common. In flight from early August to mid November, the peak occurring during the first half of September. Egg-laying was observed early in August (eggs yellow, oblong, sticky). Recorded also from the Coastal Plain (5). Recently it was reared from larvae found on Potamogeton perfoliatus in the Bet Netofa Reservoir, Lower Galilee (A. Gazith, p.com.)

86. Duponchelia fovealis Z.

Very common. Flies from mid March to the end of July and from early September to the end of November. The peaks in its frequency are in May and in July. Oviposition was observed early in May and early July (eggs white - transparent, round, free or sticky). Recorded from all over the country, including South of the Dead Sea (2, 4).

87. Duponchelia caidalis Obth.

Rare. Observed at the end of September 1943 and mid October 1944. Since then not seen again. Recorded from the Lower Jordan Valley (2).

88. Parastenia bruguieralis (Dup); syn. Stenia b.

Very common. In flight during March-June and from early October to mid November. The peak of its frequency is during autumn. Oviposition was observed in the first third of November (eggs white-transparent, sticky). Known to me also from Mt. Carmel and from the Hula Valley. The species is recorded

from all over the country (2), but specimens collected in the South of the Dead Sea were described by Amsel as a separate subspecies, P. b. bahrlutalis Ams. (5).

89. Dolicharthria punctalis Denis & Schiff. syn. Stenia p.

Very common. In flight from the end of February to the end of June, and from early September to mid December, the peak frequency being in April. Oviposition was observed during the second half of March and first half of December (eggs white). Known to me from the Lower Galilee and the Hula Valley. Its larvae are polyphagous, and feed on the roots of Artemisia (33), on clover, lucerne and Lotus and even on Zostera, a marine plant (22a).

PYRAUSTINAE

90. Hymenia recurvalis F.; syn. Zinckenia fascialis Cram.

Very common. In flight in the latter halves of April and June, and from mid August to the end of December. The peak of its frequency occurs in October-November. It flies also during the day. Known to me from the Jezreel Valley, Coastal Plain, Lower Galilee and the Hula Valley. Its larvae live on beet (leaves and roots), spinach, Chenopodium, Portulaca, and batata (31). It was found also on cucurbits, maize, cotton and sunflower (26, 36). I bred it on Amaranthus retroflexus.

91. Synclera traducalis (Dup.); syn. Pagyda t.

Common. In flight during February and March, and from mid April to the end of November. Oviposition was observed at the end of June (eggs yellowish, sticky). Was bred twice on Zizyphus jujuba; larvae were seen in mid January and the end of September, and emergence of adults took place in mid February and early November. Known to me also from the Western Jezreel Valley. This is a species of a wide and scattered distribution, and was recorded also from South Africa, Siam, and even South America. May be considered a migrant.

92. Antiercta ornatalis (Dup.); syn. Erecta o.

Common. In flight almost all year round. Egg-laying was observed in May, September and November (eggs white-translucent, round, sticky). Known to me also from the Western Jezre'el Valley, where it was bred on batata leaves (Plaut, in litt.), and from the Hula Valley (zs). Amsel recorded it from the bank of the Yabboq River (6).

93. Margaronia unialis (Hb.); Glyphodes u.

Very common. In flight from mid February to mid August, and from the end of October to the end of December. Oviposition was observed at

the end of October (eggs translucent, sticky). One evening I observed large numbers of this moth hovering over a Ligustrum ovalifolium hedgerow. In fact, its larvae live on plants of this family: olive, Ligustrum and jasmine (7, 10, 17); but there are records also from Arbutus (Ericaceae) (22a) and Funtumia (Apo-cynaceae) (35). Known to me also from the Western Jezreel Valley, from Mt. Carmel and from the Hula Valley. It occurs almost all over the country, and in the Coastal Plain it may raise 6 generations (7). Probably a migrant.

94. Hellula undalis F.

Common. In flight from early May to mid January. Was bred on a few occasions from Cruciferous plants, and in fact it is a notorious pest of cabbage and cauliflower, of almost world wide distribution, but its larvae may feed also on plants of other families too: beet, spinach, Reichardia etc. (10, 31; 34). These larvae were found also on plants of the Acanthaceae and Capparidaceae (35, 36). In the Coastal Plain it may raise 7-8 generations (7).

95. Evergestis isatidalis (Dup.); syn. E. conquisitalis Luc.

Very common. In flight from mid November to the end of March. Was not observed in spring and summer. On the other hand, it was attracted to light in cold nights ( $4^{\circ}\text{C}$ ). Was bred on mustard and Isatis. Its larvae were collected in February and early March, and emergence of adults took place in March a year later - it is then an univoltine species. Known to me also from the Lower Galilee, and from the Hula Valley (zs). Recorded also from the Coastal Plain and the Lower Jordan Valley (2).

96. Evergestis pechi Baker

This species was caught only once, at the end of March 1940. New to Israel.

97. Nomophila noctuella Schiff.

This geopolitan and distinct migratory moth is very common also in the Tiberias Region. It is in flight all year round, except in June, and the peaks of its frequency are in February, July and September. It may be seen during warm dry days as well as in cold and rainy nights. It is flying, at times, in day time too. Oviposition was observed early January (eggs yellowish, free). It was bred from larvae collected on Trifolium alexandrinum at the end of October, and emergence of adults took place in mid November. Larvae were collected in the western Jezreel Valley, also on clover, and emergence occurred in April. Specimens of this species were seen also from the Eastern Jezreel, Mt. Carmel, Lower Galilee and the Hula Valley. Amsel recorded it from the Lower Jordan Valley and South of the Dead Sea (2, 4). Its larvae feed also on Polygonum aviculare (8, 38). Cruciferae, clover and alfalfa (35, 22a). In USA it is recorded as damaging cereals, including wheat (36). It raises 4 generations annually. In its

migrations it may cross the Mediterranean Sea, and reach England in numbers (40, 41).

98. Herpetogramma licarsisalis (Wlk.); syn. Pachyzancla l.

Very common. In flight from early May to the end of January. Once it was collected in early March. This is one of the most common moths in our region. It may be seen also during day time on lawns. Was bred from larvae collected on roots of the lawn-grass Stenotaphrum secundatum in the mid August, and emergence occurred at the end of August. Known also from the Hula Valley (zs). Recorded from the Coastal Plain and the Lower Jordan Valley (2). Its larvae feed also on cultivated Cynodon lawn-grass. (7, 10). In Malacca it is injurious to rice (36), and in Australia it is recorded as damaging pasture (19).

99. Loxostege nudalis (Hb.); syn. Phlyctaenodes n.

Rare. Seen only once, at the end of August 1943. Recorded from other areas of the country (2). Its larvae may be injurious to beet by feeding on the foliage (31). In Iraq it is on the wing during April-September, feeding there on Amaranthus graecizans (42). Rebel recorded it also from India (29).

100. Phlyctaenodes pustulalis Hb. var. orientalis Car.

This species was collected but once in our area, in the middle of April 1939. Amsel recorded it as "very common" in the Mediterranean zone of the country, and he observed its larvae mining in Anchusa strigosa (5).

101. Phlyctaenodes foviferalis Hmps.

Common. In flight from mid May to mid July, and also in September. Oviposition observed in early June (eggs white, free). Recorded from the Coastal Plain and Lower Jordan Valley, and was bred from larvae found on Heliotropium rotundifolium (5).

102. Antigastra catalaunalis Dup.

Common. On the wing in early June and during September-November. Oviposition observed in mid October (eggs white-yellowish). At Nahalal, in the Western Jezreel Valley, this species was collected in mid September 1931. It was recorded from the Mountain area and the Lower Jordan Valley (5). It is a severe pest of sesame, attacking the soft parts of the plant, flowers and pods (31, 35, 36). It may feed on Antirrhinum too.

103. Mecyna polygonalis Hb. var. gilvata F.

Rare in the Tiberias region, flying in mid February and in June. In the Hula Valley this species is common enough from mid February to the end of October, in particular during March-June (zs). Larvae were collected on Retama

roetam and on Spartium aegyptium in the Eastern Jezreel Valley early November; adults emerged in the middle of that month. In the collection of the Agric. Dept. of the Mandatory Govrnmt. of Palestine there are some specimens of this species, bred by Ph. Jolles on Cytisus from Jerusalem. Also common in spring in the whole Coastal Plain feeding on Retama (Bytinski-Salz, p. com.) The larvae feed also on Genista (17, 23, 33).

104. Cybalomia pentadalis Led.

Common. In flight during May and June. Known also from the Hula Valley (zs). Recorded from the Judean Mountains and the Lower Jordan Valley (5). In Iraq it is flying from March to September (42).

105. Prochoristis rupicapralis Led.

This species was caught but once, in June 1939. It was recorded from the Mountain area, and in large numbers - from Wadi el Quilt (5). Its larvae feed probably on Capparis (42).

106. Epactoctena octogenalis Led.; syn. Metasia o.

Common. In flight from early April to mid July; was seen once in early September. Oviposition observed early in July (eggs white). Known also from the Hula Valley and recorded from the Judean Mountains and the Lower Jordan Valley (2).

107. Stiphrometasia sancta (Hmps.)

Very common. In flight from mid April to the end of September, the peak of its frequency occurring in May-June. Was bred twice from larvae found on Capparis ovata fruit early in June; emergences of adults - in mid August and at the end of September. Known also from the Hula Valley (zs). Recorded by Amsel from the Lower Jordan Valley, and noted by him as typical to the desert fauna and as rare in Jerusalem (5). In Iraq it occurs in deserts and arid sites, and it is there bivoltine (42).

108. Udea ferrugalis (Hb.); syn. Pionea f.

Very common. On the wing from early January to mid June, and once observed in the first third of November. Oviposition in mid January (eggs white-translucent). Known from Mt. Carmel, Lower Galilee and the Hula Valley. It is a migrant, and reaches England, India and Japan (29, 40). This moth is flying also during day time. Its larvae are very polyphagous, and are recorded from beet (31); Capsicum (36), Verbascum, Calendula (40), Statice, Eupatorium, strawberry (17), Aster (33), violet (35), Stachys, Mentha, Centaurea and Cirsium (22a).

109. Udea languidalis Ev.

I know this species from the Lower Galilee, but it was not yet collected by myself in LTR; however, Amsel caught it in Tabgha in the middle of May 1930. Records are also from the Judean Mountains, Mt. Carmel, the Coastal Plain and the Lower Jordan Valley (5).

110. Anania verbascalis Den. & Schiff.; syn. Pionea v.

This species was never collected by myself, but Amsel caught a male and female in Tabgha in mid March 1930 (p. com.).

111. Ostrinia nubilalis (Hb.); syn. Pyrausta n.

Only recently, on June 20, 1968, I caught one male of the European Corn Borer in Deganya for the first time. But Amsel found one worn specimen in Tabgha in mid May 1930 (5). Until then this species was not mentioned from this country (10). It was first collected by myself in September 1957 in the Jezreel Valley, and recently I have seen a fair number of it from the Hula Valley (zs). In addition to maize, its larvae live in the stalks of Sorghum, hops, Artemisia, and other plants whose stalk is thick enough to harbour them (7). In the Caucasus it attacks Citrus (lemon, oranges and mandarines) shoots and fruit (22). In Israel it was first recorded as a pest in 1952 (27).

112. Pyrausta incoloralis Gn.

Not rare, flying in early March and in September-October. Known from the Hula Valley (zs). Recorded also from the Lower Jordan Valley (2, 5). This species which is of Mediterranean origin, occurs occasionally in Iraq in November (42) and is reported also from India and Australia (29). (Introduced?)

113. Pyrausta diffusalis Gn.

Rare. In LTR this species was observed but twice: in the middle of August 1943 and beginning of November 1967. But was recorded from Mt. Carmel and the Coastal Plain (5).

114. Pyrausta sanguinalis L. f. haematalis Hb.

Observed but once, in August 1943. Recorded from the Coastal Plain, Mt. Carmel, Lower Jordan Valley and the bank of the Yabboq River (2, 5, 6). Its larvae live on Thymus, Rosmarinus (33, 10) and on Salvia (17, 32).

115. Pyrausta purpuralis L. ssp. meridionalis Stgr.; syn. P. aurata Sc.

Not rare. In flight from mid April to mid May. Known from the Hula Valley (zs). Recorded from the Mountain area and the Lower Jordan Valley (2, 5). Its larvae live on Mentha and Origanum (33, 42) and on Plantago too (17).

116. Pyrausta cespitalis Schiff.

I have not collected this species myself, but in the collection of the Agricultural Dept. of the Mandatory Government of Palestine I have seen a specimen of it with the data: Migdal, 18.V.31. Recently also recorded from the Hula Valley (zs). Its larvae live on Plantago spp. (42).

117. Cornifrons ulceratalis Led.

Very common. In flight from mid October to early May, having two peaks of frequency: in November and January. Not to be seen during the summer. Known from Lower Galilee and the Hula Valley. Recorded from the Mountain area and the Lower Jordan Valley, and also in large numbers - in the South of the Dead Sea (4, 5). It was observed in Sinai too (24). In Sicily it injures sesame (35).

118. Anthophilopsis baphialis (Led.); syn. Tegostoma b.

Very common. In flight from the end of April to mid September, reaching its highest frequency in June-July. Lately, in the morning of 22.7.67, I observed in Buteiha, on the North-Eastern shore of Lake Tiberias, masses of this species hovering on blooming Alhagi maurorum. Known from the Hula Valley (zs). Recorded in large numbers from the Lower Jordan Valley (5), and was seen also in Sinai (14).

119. Aporodes floralis (Hb.); syn. Noctuelia f.

Very common. In flight from the end of March to mid November. The peak of frequency is in June and in hamsin nights. Known from the Coastal Plain and the Western Jezreel Valley. Recorded in large numbers from the Lower Jordan Valley (5). Migrant.

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