Entomofauna

ZEITSCHRIFT FÜR ENTOMOLOGIE

Band 27, Heft 4: 57-76 ISSN 0250-4413 Ansfelden, 30. April 2006

The Drepanoidea of Israel: Distribution, Phenology and Ecology (Lepidoptera: Thyatiridae and Drepanidae), with description of a new species

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Abstract

The distribution, flight period and abundance of the three Israeli Thyatiridae and two Drepanidae species are summarized. The family Thyatiridae with the three species (*Tethea ocularis* (LINNAEUS, 1767), *Asphalia ruficollis* ([DENIS & SCHIFFERMÜLLER], 1775), and *Polyploca laororshanae* sp. nov.) is recorded from Israel for the first time. The latter species, *Polyploca laororshanae* sp. nov., is newly described from North Israel.

Two Drepanidae species are known from previous publications, but *Cilix asiatica* BANG-HAAS, 1907 was previously misidentified as *C. glaucata* (SCOPOLI, 1763) and so *C. glaucata* must be replaced by *C. asiatica* in the Israeli list of Lepidoptera, while the occurence of *Watsonalla binaria* (HUFNAGEL, 1767) has been verified. The distribution, phenology, ecology, abundance and the association of these species with the main phyto-geographical zones, as well as their characteristic woodland habitats are described.

Zusammenfassung

Verbreitung, Flugzeit und Häufigkeit der drei israelischen Thyatiridae- und der beiden Drepanidae-Arten werden dargestellt. Die Familie Thyatiridae mit den drei Arten (*Tethea ocularis* (LINNAEUS, 1767), *Asphalia ruficollis* ([DENIS & SCHIFFERMÜLLER], 1775) und *Polyploca laororshanae* sp. nov.) wird erstmals aus Israel gemeldet. Die letztere Art, *Polyploca laororshanae* sp. nov., wird aus Nord-Israel neu beschrieben.

Zwei Drepanidae-Arten sind bereits aus der Literatur bekannt, aber *Cilix asiatica* Bang-Haas, 1907 wurde bisher als *C. glaucata* (SCOPOLI, 1763) falsch determiniert und daher muß *C. glaucata* in der israelischen Lepidopteren-Liste durch *asiatica* ersetzt werden, wohingegen das Vorkommen von *Watsonalla binaria* (HUFNAGEL, 1767) bestätigt wurde. Die Verbreitung, Phaenologie, Ökologie, Häufigkeit und die Assoziation dieser Arten mit den hauptsächlichen phyto-geographischen Zonen und auch ihre charakteristischen Wald-Habitate werden beschrieben.

KEY WORDS: Israel, Levant, Middle East, Mediterranean, Palaearctic Region, Zoogeography, Irano-Turanian, Saharo-Arabian, Lepidoptera, Thyatiridae, Drepanidae, fauna.

Material and Methods

Widespread collecting was conducted between 1986 and 2004 within the Israeli-German project for the study of the Israeli Lepidopteran fauna. This project was a joint effort of The Hebrew University, Tel Aviv University, The Nature Reserves and Park Authority of Israel, the Zoologische Staatssammlung Munich in Germany and Museum Witt, Munich, Germany. Lepidoptera were collected during a period of 18 years totalling about 3000 nights with mobile light traps powered by a generator (250 Watt bulbs HQL & ML) and about 1500 nights with mobile light trap systems powered by batteries (12Volt 8 Watt & 20Watt, 6 Volt 4 Watt Black light UVB tubes) which were moved on a daily basis. Additionally, a widespread network of permanent light traps (220V 20W Black light UVB & UVC tubes) was maintained. Traps were in most cases relocated on an annual basis. From year to year 10-34 traps were operated (HAUSMANN, 2005; MÜLLER et al., 2005).

Abbreviations

MWM: Museum WITT, Munich, Germany
TAU: Tel Aviv University, Israel
JMF: Collection of J. MOOSER, Freising, Germany
ZSM: Zoologische Staatssammlung, Munich, Germany
NHM: Hungarian Natural History Museum, Budapest

Introduction

In the currently accepted systems, the Drepanoidea contain only two families, the Epicopeiidae and Drepanidae. In the Drepanidae s. l., the two formerly widely accepted families, Thyatiridae and Drepanidae, are united and attributed the rank of only subfamilies, the Thyatirinae and Drepaninae. We accept that Thyatiridae and Drepanidae are closely related and see the problem to place some extra-palaearctic genera in one of these two families. Still we retain Thyatiridae and Drepanidae as two separate families and see no urgent reason to change the traditional rank of these families which were treated in the rank of distinct families in the whole faunistic literature concerning the Palaearctic Region.

In the early 20th century, only one Drepanidae species from Israel was known (AMSEL 1933, 1935a, 1935b).

During a survey of insects associated with oaks, BYTINSKI-SALZ & STERNLICHT (1967), later summarized and supplemented by HALPERIN & SAUTER (1991), added another species. During this survey, three species of the family Thyatiridae were added to the local fauna which now totals five species. The distribution pattern, phenology, ecology and the association of all the species with the main forest types of Israel are described in the current paper.

The major phyto-geographical zones and woodland types of Israel

Israel is located at the eastern part of the Mediterranean Basin in the northern part of the Syrian-East African Rift Valley (PICARD, 1963). The character of the country is mainly determined by its position within the Mediterranean zone as crossroads between three continents and two oceans and by being a boundary of cultivated land and desert (POHORYLES & SZESKIN, 1973). In consequence of the alternating geographical and climatic zones, plants and animals of different origin are found and many species reach their marginal point of geographical distribution in Israel (FURTH, 1975; JAFFE, 1988). The plants of Israel belong to five phyto-geographic regions. The large zones are the Mediterranean, Irano-Turanian and Saharo-Arabian, the small ones are the Tragacanth and Ethiopian zones which constitute small enclaves surrounded by the other zones (ZOHARY, 1966).

Thyatiridae and Drepanidae, as forest species, were found in Israel, mainly in the Mediterranean and to a small extent in the Irano-Turanian zone.

The Mediterranean temperate zone covers areas receiving an annual average precipitation of 350 mm or more (ZOHARY, 1962). The Mediterranean vegetation is divided into two distinct types: That of the hills and that of the Coastal Plain. Maquis is dominant in the hills with their higher precipitation (about 500-700 mm) (BIEL, 1944). Today, most of the Coastal Plain consists of agricultural areas and human habitation (KOSSWIG, 1955).

The Irano-Turanian zone, a semi arid area, is a dry steppe or desert steppe stretching from its southwest border in Israel through Iran, Turkestan and Middle Asia to the Gobi desert. The average annual rainfall is 200-300 mm during winter only. Low brush or

dwarf bushes with Artemisietum plant associations are characteristic for this region (ORNI & EFRAT, 1980; ZOHARY, 1973).

Plant communities growing in Israel are influenced by their phyto-geographical positions, climatic factors, soil and human activities (DANIN, 1988). The principal woodlands of Israel are found in the Mediterranean Temperate zone especially in Judea, Carmel and Galilee. Based on a database of the 18 year survey, silvicolous Macro-Lepidoptera were associated in Israel with six distinct natural forest types. The main habitats conform to the principal woodland characterization of DANIN (1992, 1995).

Quercus calliprinos woodland is an evergreen sclerophyllous maquis dominated by *Q. calliprinos*. Two principal associations can be discriminated according to the soil, limestone or volcanic soils. A: *Q. calliprinos* trees and their companions often grow in bushy, dense thickets with very little undergrowth on limestone. Typical mesophytic companions are *Rhamnus alaternus*, *R. punctatus*, *Eriolobus trilobatus*, *Acer obtusifolium*, *Crataegus azarolus*, *C. monogyna*, *Laurus nobilis*, *Hedera helix*, *Ruscus aculeatus* and *Paeonia mascula*. At the fringes or in clearings many herbaceous species are found which are typical for shady areas with wetter climate like in the Upper Galilee or Western Galilee. Towards the south, the number of mesophytic components decreases and in dry maquis stands in the Judean Mt.s. often only *Rhamnus lycioides* is present. This kind of woodland rarely exceeds a height of 4-5 m. B: Dense maquis which is composed of *Q. calliprinos, Crataegus monogyna*, *C. aronia* and *Prunus ursine* on basalt and other volcanic soils like on the Golan Heights above 500 m. The trunks are typically covered with mosses and lichens on north facing slopes. A mixture of perennial grasses, numerous annuals and semi-shrubs originating from Mediterranean maquis, mountainous tragacanth and typical semi-steppe bathas grow in clearings and along forest edges. Small isolated woods and hedges with large *Q. calliprinos, Pistacia palaestina* and *P. atlantica* trees can be seen in dryer areas.

Quercus boissieri woodland consists mainly of winter deciduous trees like *Q. boissieri, Cercis siliquastrum, Pyrus syriacus, Prunus ursine* and *Crataegus azarolus*. This forest is typical for humid shady north-facing slopes and narrow canyons as found in the Northern and Western Galilee.

Quercus ithaburensis Park forests are xerothermic and grow on as diverse soils as sandy-loam, hard chalk, hard rock and basalt. They are accompanied by a large variety of other trees especially *Styrax officinalis, Pistacia atlantica, P. palaestina, Rhamnus lycioides*, other *Quercus* species, *Ziziphus spina-christi*, and *Z. lotus* depending on the stand. The most important component is the rich undergrowth of shrubs, semi-shrubs, many herbaceous species and grasses. Many flowers provide a rich insect life during spring. This forest type is found on the Golan Heights in elevations of 0-500 m and the Galilee. Only small relics survived in the Coastal Plain.

Ceratonia siliqua and *Pistacia lentiscus* Park forests are xerothermic and found on rather hot and dry sites from 0-300 m elevation in all the limestone hills at the foot of the Central Mountain Range of the Mediterranean zone in Judea, Samaria, Carmel, Gilboa and the Galilee. This community is accompanied by *Rhamnus lycioides, Olea europaea, Quercus calliprinos, Pistacia lentiscus, Micromeria fruticosa, Stachys palaestinus* and

others depending on the stand. The undergrowth of herbaceous plants is not as rich as in *Quercus ithaburensis* Park forests.

Pinus halepensis and *Arbutus andrachne* woodlands are often found on marly-chalk ground with a rather poor undergrowth of some semi-shrubs like *Fumana thymifolia*, *Coridothymus capitatus*, *Cistus creticus*, *C. salviifolius*, *Helianthemum syriacum*, *Satureja thymbra*, *Thymbra spicata*, and *Teucrium creticum.* Only few annual companions are found in this community. This forest is typical for the central mountain range of the Mediterranean zone and some areas in the Galilee. The composition of species generally becomes poorer from north to south.

Riparian forests with *Platanus orientalis*, *Salix* spp. and *Populus euphratica* accompany some of the streamlets in the northern Mediterranean zone, the Jordan Springs and parts of the northern Jordan River. Small but well pronounced riverine forests grow around the Jordan springs and in some of the narrow shady canyons of the Western Galilee which, even in summer, do not dry up. These forests have a very rich undergrowth of herbaceous plants. Only stretches of Gallery Forests could survive along tributaries of the Jordan River south of the Sea of Galilee. Some streamlets in the semiarid Irano-Turanian Zone draining the Western and Northern Negev into the Mediterranean Sea only support a few *Salix* and *Tamarix* bushes; the situation is very similar along the southern part of the Jordan valley. Many wet riverbanks are covered with dense but not very diverse vegetation such as *Phragmites australis, P. frutescens, Arundo donax*, and *Rubus sanguineus* in both zones.

Synanthropic woodland, intensively managed or planted by man, replaced many natural forests in Israel. Typical elements are citrus and mango orchards in the Coastal Plain, mainly olive and almond trees are found in the central mountain range, apple and cherry plantations are common in the Northern Galilee. Pine forests were planted all over Israel as far south as the Northern and Western Negev. These plantations do not support any natural undergrowth apart from some neglected old olive groves and almond woods.

Faunistic survey

Drepanidae BOISDUVAL, [1828]

The Drepanidae contain 789 species worldwide (HEPPNER, 1991), only 2 are represented in Israel (Tab. 1).

Cilix asiatica BANG-HAAS, 1907

This species was misidentified as *Cilix glaucata* (SCOPOLI, 1763) in Israel and is found as such in the common checklists. The mixture of *Cilix asiatica* and *C. glaucata* has only recently been corrected (DE FREINA & WITT, 1987a). These two species seem to have an allopatric distribution in Turkey and only *C. asiatica* is represented in the Middle East.

Cilix glaucata, a European species, is found all over Europe apart from the northern parts of England and most of Scandinavia (DE FREINA & WITT, 1987b). In the East Mediterranean it only reaches Western Turkey. It is also known from the Mediterranean parts of Morocco, Algeria and Tunisia (according to material in MWM).

Cilix asiatica is found in South-Eastern Europe, the eastern parts of Turkey and Lebanon (DE FREINA & WITT, 1987a). It belongs to a group of similar, weakly marked species which were formerly mixed, but show clear genitalia differences. *Cilix depalpata* STRAND, 1911 from Afghanistan and Pakistan was formerly synonymised with *C. asiatica* and is now regarded as a distinct species. A similar West-European species of the group was very recently described: *C. hispanica* PEREZ de GREGORIO et al., 2002 has apparently a wider distribution and is not confined to Spain as indicated in the original description, but it seems to be distributed also in Southern France and Sardinia according to specimens in MWM.

In Israel, *Cilix asiatica* is widespread in the Mediterranean zone and penetrates in the Irano-Turanian zone around the Sea of Galilee and along some canyons of the Judean Desert draining into the Jordan River.

This species is fairly common in the Galilee, Mt. Hermon in an elevation up to 1600 m and Mt. Carmel. As a rule, it becomes rarer and more local towards the south also in its main distribution area. In the Judean Mts, Shefela, the Coastal Plain and Samaria it was uncommon. Within the Irano-Turanian zone it was always rare and local.

The habitats of *Cilix asiatica* are different types of xerothermic woodland, especially *Qercus ithaburensis* Park forests in the Mediterranean zone. Preferred habitats are sunny and warm clearings and along fringes of forests with *Crataegus* sp. bushes, *Rubus* thickets, and various Rosaceae. On Mt.. Hermon, it was only collected in the vicinity of *Prunus ursina* (KY., 1864), *Rosa canina* (L., 1753), *Pyrus syriaca* (BOISS., 1849) and other Rosaceae.

It is restricted to shady canyons or slopes with *Eriolobus trilobatus* (LABILL., 1847) or *Rosa canina* bushes in the Irano-Turanian zone.

In Israel, the known host plants are *Jasminum*, Oleaceae (HALPERIN & SAUTER, 1991) and *Rubus tomentosus* (BORKH., 1794) (unpublished data of the authors). In Lebanon, *C. asiatica* is known to feed on plum trees and hawthorn bushes (TALHOUK, 1997). Our data suggest that the larvae of *C. asiatica* feed polyphagous on a variety of Rosaceae species in Israel like the sister species *C. glaucata* does in Europe (DE FREINA & WITT, 1987b).

Adults were observed from mid-April to early October with pronounced peaks in late April to May, July and to a smaller extent in September to early October. The species probably flies in Israel in two generations with a third partial one.

***Watsonalla binaria* (HUFNAGEL, 1767)**

W. binaria is a European species which is found in France, Southern England, Central and Southern Europe, South Russia, the Mediterranean parts of Turkey and the Levant. It is rare in the Western parts of the Mediterranean region where it is replaced by *W. uncinula* (BORKHAUSEN, 1790).

In Israel the species is confined to the Mediterranean zone. It is fairly common in the Galilee, Mt. Hermon up to 1600 m, Mt. Carmel, Judean Mts and Shefela. As a rule, this species becomes rarer and more local towards the south; this phenomenon concerns the distribution area as a whole. The species is generally local and rare in the Coastal Plain and Samaria.

The main habitats of *W. binaria* are xerothermic *Qercus ithaburensis* Park forests with a rich undergrowth of shrubs, semi-shrubs and herbaceous plants. The species is also found in sunny and warm clearings and along fringes of dense *Q. calliprinos* maquis. It is rare or absent in shady canyons or shady north facing slopes with winter deciduous maquis dominated by *Q. boissieri* as well as in xerothermic *C. siliqua* and *P. lentiscus* Park forests with scattered oak bushes.

In Israel, the known host plants are *Quercus ithaburensis* and *Q. calliprinos* (BYTINSKI-SALZ & STERNLICHT, 1967)

Adults were observed from mid-April to early October with pronounced peaks in April, June – July and to a smaller extent in September. The species probably flies in Israel in three generations. In Southern Europe so far only two generations are known.

Thyatiridae SMITH, 1893

This is a small family containing only 208 species worldwide (HEPPNER, 1991) with a concentration of species in the Palaearctic and Oriental Regions. It is comparatively well represented in Israel with 3 species all recorded here for the first time (Tab. 1).

***Tethea ocularis* (LINNAEUS, 1767)** (Fig. 5)

This is a new record for the fauna of Israel. The population is attributed to the nominate subspecies.

T. ocularis is distributed all over Europe with the exception of Ireland, Northern England and Northern Scandinavia (DE FREINA & WITT, 1987b). It is also known from Turkey (WERNY, 1966), Northern Syria and northern Iran, according to data from MWM, JMF and ZSM. It is distributed towards the East through Russia and reaches with several subspecies of doubtful justification as far East as China and Japan (WERNY, 1966). There are so far no records from southern Iran, Lebanon or Jordan.

In Israel, this species seems to be confined to the most northern parts of the Mediterranean zone.

Only one specimen was collected in mid-May 2005 by MÜLLER & KRAVCHENKO near Tel Dan along the River Jordan in Israel.

The habitat is a small but well pronounced riverine forest with numerous *Populus euphratica* trees, and *Salix* sp. bushes with a dense undergrowth of herbaceous plants. The site is cool and shady even in summer (fig. 9).

In Europe and Turkey the main habitats of *T. ocularis* are wet and shady valleys with riverine forests, to smaller extent poplar plantations (DE FREINA & WITT, 1987b). The larvae feed on *Populus* and *Salix*, but seem generally to prefer poplar. In South Europe and Turkey the flight period is from April to October in. There are two generations.

***Asphalia ruficollis* ([DENIS & SCHIFFERMÜLLER], 1775)**

This is a new record for the fauna of Israel.

A. ruficollis is widely distributed in the southern regions of Europe from Southern France throughout the Southern Alps, Northern Italy, large areas of the Carpathian basin towards most parts of the Balkans and the southern half of Turkey, though it is generally a rare species. It becomes increasingly local and rare towards the northern and North-eastern parts of Turkey. There are no records from the Levant, Iran or the Caucasus region.

In Israel this species seems to be confined to the most northern parts of the Mediterranean zone where it was uncommon and rather local.

A. ruficollis was found on humid shady north-facing slopes with dense thickets of *Quercus calliprinos* often with mesophytic companions and sparse undergrowth, along narrow canyons with *Quercus boissieri* and other deciduous trees and to a smaller extent in small shady clearings of dense oak forests. So far, all records are from Nahals (Hebrew for Streamlets) and from evergreen sclerophyllous maquis forests of the Western Galilee below an elevation of 300 m a. s. l. and probably this species also inhabits suitable habitats in the Northern Galilee. In Israel, adults were collected from late March to late April.

In Europe and Turkey, *A. ruficollis* is known from different types of xerothermic oak forests (DE FREINA & WITT, 1987b). The larvae feed on various *Quercus* species. The flight period is from late February to mid-April in one generation.

***Polyploca laororshanae* LÁSZLÓ, RONKAY, RONKAY & WITT sp. nov.** (Fig. 1-4)

Material

Holotype: male, "Israel, Upper Galilee, Kfar Hafradim, 800 m, 10 km east of Ma'a lot, Mt Addir, 27. 04. 1999, Lf., leg. LI & MÜLLER", slide No. LG 2129 (W 7153) (MWM).

Paratypes: 8 males with the same data as the holotype, slide Nos: LG 2105 (W 7122), LG 2128 (W 7154), LG 2132 (W 7119), LG 2137 (W 7120), LG 2138 (W 7121); 1 male, 4 females, Israel, Upper Galilee, Mt. Hillel, 900m, 15 km east of Carmel [Karmi'el], NW Haifa, E. iii.2001, light-trap, slide Nos: LG 2130 (W 7124), LG 2131 (W 7125) (females); 1 male, Israel, Upper Galilee, Even Menahem, 800m, 15 km north of Ma'a lot, 22. iv.1999, light-trap, leg. LI & MÜLLER, slide No. LG 2104 (W 7123); 2 males, Israel, Hermon Mt., 1600 m, 16. iv. 2003, KRAVCHENKO, V.; 1 male, Israel sept., Mt. Meron, 1200 m, end iii 2005, leg. G. MÜLLER, (MWM).

4 males and 2 females, Israel, Upper Galilee, Mt. Meron, 800 m (near Field School), mid iv 1985, leg. MOOSER & MÜLLER; 2 males and 1 female, Israel, Northern Golan Heights, Mas'ada, 900m, mid iv 1987, leg. MOOSER. JMF.

7 males and 3 females, Israel, Mt. Hermon, 1200-1600m, N. Si'on, early iv 2001, leg. Kravchenko & Müller; 3 males and 3 females, Israel, Upper Galilee, Mt. Meron, 1000 m, late iii 2004, leg. KRAVCHENKO & MÜLLER. TAU.

Taxonomy. The genus *Polyploca* HÜBNER, [1821] comprises four known species belonging to two lineages, the *P. ridens*- and the *P. korbi* species-groups. Both species-groups contain two externally confusingly similar species of which the genitalia show clearly recognizable differences in both sexes. The new species is an allopatric sibling of *Polyploca korbi* REBEL, 1901.

Diagnosis. The new species, *Polyploca laororshanae* cannot be satisfactorily distinguished from its closest relative *Polyploca korbi* REBEL, 1901 by external features; the distinctive specific features are expressed only in the configuration of the genitalia.

The male genitalia of the two species are similar in type, the differences are, however, large and easily recognizable: *P. laororshanae* has much broader and longer, flag-like socii with hook-like apex, while those of *P. korbi* are more slender, regularly arched, slightly falcate, and the terminal spine is smaller, almost straight. The tegumen of *P. laororshanae* is conspicuously shorter, basally broader than that of *P. korbi*; the sclerotized apical laminae of the tegumen of the new species are considerably broader and somewhat shorter than those of *P. korbi*. The valva of the new species is somewhat narrower and shorter, with large, rounded basal costal plate, while the valva of *P. korbi* is more robust, with more elongate, flattened basal lobe. The sacculus of the new species is conspicuously broader, extending to costa of valvae, while that of *P. korbi* is extending only to three-quarters of the width of valva; the saccular extensions of *P. laororshanae* are significantly shorter than those of *P. korbi*. The aedeagus of the new species is somewhat shorter and thicker, the dorsal arm of the carina is shorter, basally broader, the ventral arm is much shorter, broadly incised apically, without long, acute terminal spine. The cornuti field of *P. laororshanae* is considerably larger, more rounded, consisting of a greater number of cornuti than in *P. korbi*, the cornuti themselves are somewhat smaller than in the related species. Comparing the female genitalia of the two species, *P. laororshanae* has slightly longer and broader, more strongly sclerotized ostium and somewhat broader signum bursae.

Description. Wingspan 35-38 mm, length of forewing 16-17 mm. Sexes similar. Head, palpi, frons, vertex and collar pale brownish grey; eyes scarcely hairy; antenna lamellate in both sexes, in the male slightly broader; tegulae greyish brown. Forewing narrow, long, with apex pointed. Ground colour ashy grey, basal area somewhat darker, terminal area with brown shade. Basal and subbasal lines deleted; antemedial line double, rather broad, strongly curved, inner line shadow-like, outer line sharply defined with blackish scales, area between lines filled with red-brown. Orbicular and reniform stigmata encircled with black, filled with ground colour, the former more or less rounded, the latter narrow, elongate. Median fascia indistinct, diffuse or obsolete, rather narrow. Postmedial line double, interrupted, slightly sinuous, filled with red brown. Praeterminal line rather narrow, shadow-like, pale grey, sinuous. Subterminal line pale grey, interrupted, wavy, consisting of fine arches, distally with a row of dark brownish grey dots; terminal line blackish grey, more or less continuous, consisting of fine arches; cilia long, pale brownish grey, with darker medial stripe. Hindwing ground colour pale brownish grey, marginal area suffused with darker grey. Discal spot absent; cilia long, whitish grey. Underside of wings shining brownish grey, transverse stripes and traces of stigmata absent, costal patches poorly visible.

Male genitalia (Fig. 6): Uncus absent; socii relatively long, broad at base, evenly S-shaped, more or less flag-like, with hooked postero-lateral spine. Apical lamina of tegumen strongly sclerotized, bifurcate, ribbon-like, more or less straight. Dorsal plate of tegumen sclerotized, broad, triangular; fultura superior represented by relatively narrow, ribbon-like sclerotization. Fultura inferior sclerotized, broad, deeply incised medio-apically; vinculum short, rounded. Valva relatively short, triangular, evenly tapering towards finely pointed apex. Sacculus rather broad, distally rounded, longer than half of total length of valva; with two sclerotized distal processi on ventral surface: mesal process short, crest-like, terminal process short, digitiform, with rounded apex. Costal margin of valva almost straight, with large, rounded basal lobe. Aedeagus medium-long, deeply furcate distally, arms of carina heavily sclerotized. Dorsal arm of carina medium-long, robust, broad-based, apically pointed, ventral arm rather short, apically broadly incised. Vesica rather short, narrowly tubular, membranous, upturned dorsally; with a small, rounded field of cornuti consisting of short, conical spines.

Female genitalia (Fig. 7): Papillae anales relatively long, broad, with finely sclerotized proximal edges. Apophyses posteriores rather short; 8th tergite relatively narrow, distal margin slightly incised, proximal margin almost straight. Apophyses anteriores moderately long. Ostium bursae strongly sclerotized, rather broad and long, calyculate, proximally folded, its anterior end is reversed backwards, directed caudad; ductus bursae short, relatively broad, sclerotized, bent towards cervix bursae. Cervix bursae rather narrow, tubular part of corpus bursae relatively long, almost straight. Corpus bursae ovoid, with narrow, relatively short, dash-like signum.

Etymology: The species is named in honour of Dr Laor ORSHAN of the Entomological Laboratory, Ministry of Health (Israel) for her achievements in medical entomology as well as for her help, patience and long lasting friendship to the first author.

Faunistic notes and habitat (Fig. 8). *P. laororshanae* is a Levantine species new to science that is so far only known from Northern Israel. Some of the collection sites were very close to the neighboring countries Lebanon and Syria. It is reasonable to assume that in the future this species will also be found there in suitable habitats.

In Israel *P. laororshanae* seems to be confined to the most northern parts of the Mediterranean zone where it was rare and rather local.

So far, this species was collected only in forest areas above 800 m elevation, around Mt. Meron, the Northern Golan Heights and Mt Hermon.

It was found in clearings and along the fringes of evergreen sclerophyllous maquis on limestone from 800 m upwards at Mt. Meron. Here the forests are dominated by *Q. calliprinos* and a variety of *Rhamnus, Acer, Crataegus* and some other winter deciduous trees. Forests hardly exceed a height of 10 m at the collecting site, most of the trees are only about 4-5m high. The clearings and fringes of the forests are heavily overgrown with many herbaceous plant species which are typical for shady Mediterranean areas.

The new species was collected from 900 m upwards on volcanic soils in the Northern Golan Heights. Habitats were at the fringes of clearings in midst dense maquis of *Q. calliprinos*, with some *Prunus ursina*, *Crataegus monogyna* and *C. aronia.* Here the forests are frequently wetted by low clouds and the tree-trunks are typically covered with

lichens and mosses in shady places. The trees do not exceed 5 m in height and the clearings are covered with meadows with a rich variety of annuals and grasses.

On Mt. Hermon, the most southern outpost of the karstic Anti Lebanon mountain range, *P. laororshanae* was collected in some of the winter deciduous mountain forests at an altitude of 1000-1600 m. Above 1300 m the vegetation in Israel is Oro-Mediterranean with a very specific flora (DANIN, 1988). Here the habitat consists of groups of scattered *Q. boissieri*, *Q. libani*, and other winter deciduous trees that are found within Israel only here. The forests are denser in some of the valleys and on some north facing slopes. The undergrowths are typically grasses and a rich variety of annuals. The area is regularly covered with snow in winter, while the summers are hot and dry.

There are no records from xerothermic Park forests or woodland without oaks. It is improbable that the species will be found much further south but it is possible that within the Galilee it will be found below 800 m in suitable habitats.

The biology and the host plant of *P. laororshanae* are unknown. The other species of the genus are known to feed on oak probably also being the case for the new species.

Adults were seen from mid-March to late April. The flight period of *P. laororshanae* is rather late in spring compared to the phenology of the other *Polyploca* species and according to its southern range.

Its allopatric sibling *Polyploca korbi* Rebel, 1901 is found in large parts of Turkey, Northern Syria and NW Iran (data of MWM, NHM, JMF and ZSM).

Status & abundance			Evergreen Maquis *Quercus calliprinos*	Winter deciduous Maquis *Quercus boissieri*	Xerothermic Park forests *Quercus ithaburensis*	Xerothermic Park forests *C. siliqua & P. lentiscus*	Woodlands *P. halepensis & A. andrachne*	Riparian forests *P. orientalis, & P. euphratica*	Synanthropic woodland
W. binaria			XX	X	XXX	X			
C. asiatica		+	XX		XXX	XX	X		**X**
A. ruficollis	N	+		XXX					
T. ocularis	N	R L						XXX	
P. laororshanae	N	R L	XXX	XX					

New record for Israel	N	
Distribution in habitat type	XXX	Principal distribution
	XX	Secondary distribution
	X	only occasionally found
Abundance & Distribution	++++	Abundant (more than 500 per year)
	+++	Common (100 to 500 per year)
	++	Fairly common (20 to 100 per year)
	+	Uncommon (5 to 20 per year)
	R	Rare (less than 5 per year)
	L	Local (known from less than 3 localities)

Tab. 1: The distribution and abundance of Drepanidae and Thyatiridae in Israel associated with the major forest types

Results and Discussion

The Thyatiridae with three species, one of them being new to science, are recorded from Israel for the first time. One of the two known Israeli Drepanidae species, *C. glaucata*, proved to be a misidentification. *C. glaucata* is deleted from the Israeli Lepidoptera list and replaced by the morphologically very similar, often allopatric species *C. asiatica* (DE FREINA & WITT, 1987a).

The five Drepanoidea species are rather specific in their habitat preferences in Israel, though they are all generally woodland species. *A. ruficollis* was so far found only along streamlets or canyons with shady winter deciduous forests dominated by *Q. boissieri*. All the records were from the lower parts of the Western Galilee (below 300 m elevation).

T. ocularis is mainly associated with riverine forests or forests in wet lands with sufficient amounts of poplars and willows; the present record widens its known general distribution area towards the south. Future surveys in the neighboring Lebanon will show if there are more colonies of this species in suitable biotopes between Turkey and Israel or if the Israeli population is already totally disjunct.

The new species *P. laororshanae*, in contrast, seems to be less specific though until now all records are from sites above 800 m elevation. This species was found in, shady or sunny, dense evergreen *Q. calliprinos* dominated forests in shady winter deciduous *Q. boissieri* dominated forests and among scattered groups of *Q. boissieri*, *Q. libani* in the valleys and canyons of Mt. Hermon.

The Israeli Thyatiridae probably find their most southern distribution in the Northern and Western Galilee like many other species that are centered in the northern Palaearctic Region (KRAVCHENKO et al., 2005; MÜLLER et al., 2005 a,b,c).

Future surveys in the region have to show, if the Thyatiridae species are really so specific in respect to their habitats in the Galilee and consequently local, or if they are rare but more widespread within the Galilee and neighbouring Lebanon.

The two Drepanidae species are widely distributed in different types of Mediterranean oak forests but clearly concentrate in the xerothermic *Q. ithaburensis* Park forests of Northern Israel. *C. asiatica* is the only species of Israeli Drepanoidea which was found also within or at the fringes of pine forests and synanthropic woodland with suitable host plants. *C. asiatica* is also the only species which penetrates in the Irano-Turanian zone. This species was always uncommon or rare, though it is widespread, and possibly not very specific concerning its habitats.

The Thyatiridae and Drepanidae, like other forest inhabiting groups (e.g. Notodontidae, Sphingidae and Nolidae), become generally rarer and more local towards the south in the Mediterranean forests of the Levant (MÜLLER et al., 2005 a, b, c). This phenomenon can be explained by the fact that many plant and animal species become gradually rarer towards the periphery of their geographic distribution before they vanish (HENGEFELD & HAECK, 1982; BROWN, 1984).

Acknowledgements

We thank all our colleagues and many generous Israeli citizens who helped with this survey. We are grateful to the Israeli Nature and Parks Authority (NPA), who supplied the collecting permits, especially to Dr Rueben ORTAL, Dr Didi KAPLAN (NPA Northern District Biologist), to Mr. Yiftah SINAI (NRA Carmel District Biologist), Mr. Zeev KULLER (Central District Biologist), and the staff of the NPA- regional rangers, Nature Reserves and National Parks directors throughout Israel. Prof. J. KUGLER, Dr. A. FREIDBERG (Entomological collection, University of Tel Aviv) and Prof. J. FITTKAU (former Head of the Bayerische Zoologische Staatssammlung Munich, Germany). Dr Hedva PENER, Dr Laor ORSHAN and Dr Heather BROMLY-SCHNUR (Entomological Laboratory, Ministry of Health), the late Dr Shoshana YATOM (Volcani Center, Bet Dagan). Mr. Yossi Lev ARI, and Mr. Giora GISSIS (Bet Ushishkin Museum, Qibbutz Dan), the late Mr. Zeev SHOAM (Qibbutz Neot Mordachai), and particularly Benni & Aliza BEN DAVID of Kefar Sabba. The authors are grateful to cand. rer. nat.Verena WITT (Munich) for linguistic assistance.

This study would not have been possible without the generous help of Prof. Y. SCHLEIN, Hebrew University, Hadassah Medical School.

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Legend

Fig. 1. *Polyploca laororshanae* LÁSZLÓ, RONKAY, RONKAY & WITT sp. nov. ♂. Holotype, Israel, Upper Galilee, Kfar Hafradim, 800 m, 10 km east of Ma'a lot, Mt Addir, 27.04.1999, Lf., leg. LI & MÜLLER. MWM.

Fig. 2. dto. ♂. Paratype, Israel sept., Mt. Meron, 1200 m, Ende März 05, leg. B. MÜLLER. MWM.

Fig. 3. dto. ♂. Paratype, Israel, Upper Galilee, Even Menahem, 800m, 15 km north of Ma'a lot, 22.IV.1999, light-trap, leg. LI & MÜLLER. MWM.

Fig. 4. dto. ♀. Paratype, Israel, Upper Galilee, Mt Hillel, 900m, 15 km east of Carmel [Karmi'el], NW Haifa, E.III.2001, light-trap, leg. LI & MÜLLER. MWM.

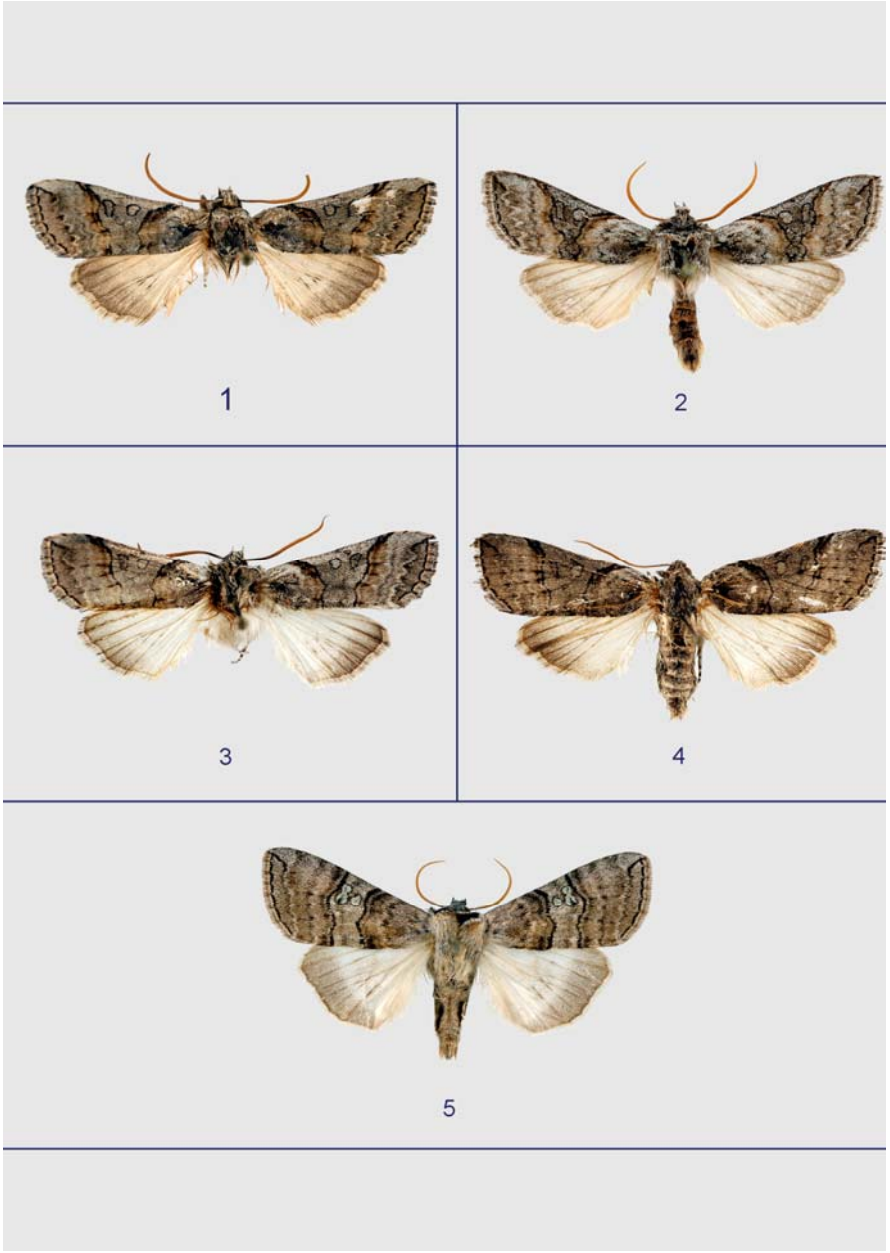
Fig. 5. *Tethea ocularis ocularis* (LINNAEUS, 1767), male, Israel sept., Jordan springs, Tel Dan, ca. 200 m, June 2005, leg. B. MÜLLER. MWM.

Fig. 6. *Polyploca laororshanae* LÁSZLÓ, RONKAY, RONKAY & WITT sp. nov. ♂ genitalia.

Fig. 7. dto. ♀ genitalia.

Fig. 8. Habitat of *Polyploca laororshanae* LÁSZLÓ, RONKAY, RONKAY & WITT sp. nov., Upper Galilee.

Fig. 9. Habitat of *Tethea ocularis ocularis* (LINNAEUS, 1767), Upper Galilee, Northern Hula valley, Jordan springs.



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Druck, Eigentümer, Herausgeber, Verleger und für den Inhalt verantwortlich:
Maximilian SCHWARZ, Konsulent f. Wissenschaft der Oberösterreichischen Landesregierung,
Eibenweg 6, A-4052 Ansfelden, E-Mail: maxschwarz@inode.at.
Redaktion: Erich DILLER, ZSM, Münchhausenstraße 21, D-81247 München;
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