

REPORT OF A COLLECTING TRIP TO GREECE BY S.B.J. MENKEN AND
E.J. VAN NIEUKERKEN, 1980, PRIMARILY TO COLLECT NEPTICULIDAE
(LEPIDOPTERA)

BY

ERIK J. van NIEUKERKEN

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Vrije Universiteit

P.O. Box 7161

1007 MC Amsterdam

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INTRODUCTION

Since the middle of 1977 the research of the department of Animal Systematics and Zoogeography in the Vrije Universiteit has concentrated on a study of Nepticulidae. The main projects are: 1. Phylogeny and systematics of the Nepticulidae, and 2. Speciation and Host-race formation in certain groups of Nepticulidae. The majority of the material for both projects originates from Europe, although revisions of collections of nearctic and eastern palaearctic species have been undertaken. This has the obvious advantage that we are able to collect other stages of the life-cycle in addition to the adults, and also living specimens which are important for experimental work and biochemical systematic studies.

As the fauna of the mediterranean area is much richer and more diverse than the western european fauna, it soon became apparent that we had ourselves to collect in that area. In the spring of 1980 Georgina Bryan and I undertook a field-trip to Tunisia and Algeria, and in the autumn of the same year, Steph B.J. Menken and I collected in Greece. The latter visit is the subject of this report.

Whereas the fauna of central Europe is fairly well known, the mediterranean Nepticulidae have been neglected. Systematic sampling has hardly been undertaken, and much unknown material is still hidden in collections. Klimesch described many species from the mediterranean, especially in 1975, and from Rhodes and Anatolia in 1978, and some species described in various older publications. Furthermore he collected much in Spain Dalmatia and Italy, and also the Canary Islands (Klimesch, 1977) but published only a part of the results. Apart from the above mentioned publication on Rhodes, almost nothing is known from Greece. A study of a small collection from the Copenhagen Museum is now being undertaken by me but further preserved material is scarce. Thus collecting on the mainland of Greece was likely to be very promising.

Remarks

The purpose of this report is to present the details of localities and to give a preliminary review of the results and an indication of the importance of this collecting-trip. As the identifications of some species are, at present, tentative, readers are requested not to quote these data without the written confirmation by the author. It will be published in a definitive way at a later date.

ACKNOWLEDGEMENTS

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METHODS

Collecting and conserving

Each locality was given a station number: one station generally indicates a restricted area with more or less uniform vegetation. In some cases two or more places within a few kilometers form one station, when they are approximately the same altitude and vegetation. Each foodplant at a station is given a sample number in the form 80580S. The first 2 figures indicate the year. When a letter-suffix is present, it denotes the purpose for which the specimens will be used (KE = rearing, E = larva in collection, S = deepfrozen for biochemical work). With these numbers the mines will always correspond with the reared or preserved material.

The leaves were kept in plastic bags, sometimes with some moss to keep the material humid. In the evenings the material was provisionally sorted out with the aid of a Zeiss stereomicroscope. Larvae for the collection were immediately preserved, with or without the leaf, in alcohol 70%. Larvae selected for rearing were placed in plastic bags with moss and/or leaf-litter in which to pupate. Larvae for biochemical studies were also placed in plastic bags with a little moss, and forwarded by express to the laboratory in Amsterdam, where they were taken from the leaves and deep frozen at -30°C .

Rearing

In the laboratory the moss and leaf-litter with the cocoons and actively feeding larvae were put into jamjars, the vacated leaves were removed and dried in a plant-press. A few moths emerged in October, and those remaining were divided according to the altitude of collecting. The material which originated from above approximately 800 m was kept in an out-house without heating until the end of March, the rest was kept from December to February at $4-8^{\circ}\text{C}$, and brought into a heated room afterwards.

Nomenclature

The names of the plants used are according to the Flora Europaea (Tutin et al. 1974-1976). The nomenclature of the Nepticulidae is in agreement with our current ideas.

ITINERARY

We arrived in the evening of 9 September at the international airport of Athens after a calm flight and went immediately in a hired car to our hotel in Vouliagmeni. On the following day we drove as fast as possible through Athens and visited the Goulandris Natural History Museum at Kifissia, north of Athens. This museum was founded in 1964 by Mr and Mrs Goulandris, first as a botanical museum, but since 1972 there has been a zoological collection as well. We looked at the exhibits and visited the science department where we saw the herbarium and the entomological collection. This latter collection is still very small. See also *Annales Musei Goulandris* 4 (1978): 11-12.

We continued our journey to Evvoia via Mount Parnis, here we did some collecting. There was a luxuriant vegetation of *Bupleurum fruticosum*, so we hoped to collect *Fedalmia bupleurella* (Chrétien) but were unsuccessful. This species is still only known from France and Spain. In the afternoon we arrived at Steni Dhirfios on Evvoia where we settled in a simple hotel.

Evvoia (Evvia), 10-14 September

Steni is situated at the foot of the Dhírfis Oros (1743), the highest mountain in Evvoia. From our room we had a pleasant view over the village. During the evening we collected on our balcony with the aid of a blended lamp (menglicht). Among the numerous moths many *Thaumetopoea pityocampa* (Denis & Schifferrmüller) were notable.

From Steni we visited the Dhírfis first by a foot-path up to 500 m. and later, higher by a small road which runs up to a mountain cottage at ca 1100 m. The slopes are almost completely covered by forest comprising *Castanea sativa* and *Abies cephalonica*. These forests are still in good condition up to ca 1000 m.

The most interesting nepticulid here was *Niepeltia loranthea* (Klimesch) which feeds on *Loranthus europaeus*, a parasite which here commonly grows on old chestnut trees. In station 6 we found two new host records for Nepticulidae: *Ectoedemia agrimoniae* (Frey) feeding on *Aremonia agrimonoides* and *Fedalmia* cf *saturejae* Parenti on *Origanum vulgare* ssp *hirtum*.

The identification of the latter is based on the fact that similar mines and larvae occurred on the same spot on *Calamintha nepeta*, the usual foodplant, and the fact that both plant genera are related. In other localities on Evvoia mines on both plants were also found together. In Steni we lost almost a day with gear-box trouble. Collecting in the lower parts of Evvoia and the Kandhilion mountains did not yield many living larvae, the numerous vacated mines however were an indication of a rich nepticulid fauna in other seasons.

On the 14th we drove northwards over Evvoia on our way to the mainland. The region between Strofiliá and Elliniká appeared to be heavily damaged by forest-fires. Most of the northern half of Evvoia is covered by extensive *Pinus nigra* forests. We took the ferry from Ayiókambos to Glífa and arrived via the motorway in Loutrá Ipátis.

Mountains of Sterea Ellas

The Oíti (Iti) Oros arises suddenly from the Lamia plain in which our hotel is situated. We visited the mountain on the 15th over a small road that was in a bad condition and via the Moni Agathonos and Kastanea runs to Neochorion. There are parts with beautiful forests, mainly of *Abies cephalonica*, but also with *Quercus frainetto* and *Q. pubescens*, but in many places the forest is destroyed or rudimentary. Only bare slopes with grass and shrubs are left (st. 17-18). On the 16th we went via Lamia, - here we posted a parcel of living material - and the pass of Thermopylae to the southern slopes of the Oíti Oros. Between Oíti and Pavliani there was still plenty oak and fir forest. Further westwards, near Mavrolitháron (N. of Stromni) fir was dominant and in the clearings shrub species such as *Crataegus heldreichi*, *Prunus cocomilia*, *Pyrus elaeagrifolia*, *Rosa* and *Acer campestre* were growing.

We spent the night in the tent just between the Vardhoúsia and Oíti mountains.

The northwestern slopes of the Vardhoúsia were quite similar to the Oíti Oros. We passed several picturesque villages as Dafni, Anatoli and Marmara and collected mainly Rosaceae feeding nepticulids. In the evening we reached Karpenission.

Central Pindhos mountains

The 19th we spent in ascending the southern slopes of the Timfristos mountain, which is almost completely deforested. Near the mountain hostel at 1800 m the vegetation was destroyed by goats and sheep, the only insects were enormous numbers of grasshoppers. The journey to more western parts of the Pindhos, on the 20th was very aggravating because of the extremely bad condition of the main road Karpeníssion - Agrínion. An interesting aspect of the vegetation was that *Quercus coccifera* suddenly became very abundant on the west of the main Pindhos range and was often the dominant species; whilst on the eastern side, it could not be seen. We noticed the same in the northern Pindhos west of Metsovon. We recorded two more localities for *N. loranthella*, in one the *Loranthus* was growing on a *Quercus pubescens*. The collecting of this species is often difficult because *Loranthus* generally grows high up in the trees and cannot be reached. Only on steep slopes is it possible to reach the plant without climbing the trees.

On the 21st we drove via small unmetalled roads east of the Timfristos to Karditsa. We crossed one of the most beautiful parts at the Pindhos, with extensive *Abies* forests and locally stands of *Quercus* spp. The eastern slope of Timfristos is rocky and steep and therefore retains some remnants of the original vegetation. We recognized a.o. *Sorbus aria* and *Rhamnus alpinus* but they were unreachable. Collecting was also very successful this day. Firstly we found numerous larvae on *Prunus cocomilia* of a species which we thought was undescribed, but later appeared to belong to *Stigmella amygdali* (Klimesch). Secondly in a beautiful valley near Fournás we collected *Stigmella*-larvae on *Geranium versicolor*, which adds a new plant family to the list of hosts of european Nepticulidae.

The hot and cultivated Thessalian plain was not of much interest to us and was traversed as quickly as possible. We visited the famous Meteora monasteries near Kalambaka before we entered the Pindhos again and settled in Metsovon.

Northern Pindhos mountains

From Metsovon we visited the northern Pindhos range near the Katara pass (1705) and Miléa. In contrast with the mountains of Sterea Ellas and the central Pindhos the rock is mainly serpentine instead of limestone. As a consequence the vegetation is very different - fir is completely absent.

The dominant trees from 1000-1700 m are *Fagus sylvatica* and *Pinus nigra*, the latter is replaced above 1700 m by *Pinus heldreichi*. On mount Mavrovouni, west of mount Miléa, I saw an open *Pinus heldreichi* wood with an undergrowth of *Buxus sempervirens* and *Vaccinium myrtillus*. The latter was carefully searched for mines, but without success. On beech both european *Stigmella* species were common.

The village of Metsovon is very remarkable for the houses are mainly built of wood and everything is clean, which makes the village atypical for Greece and reminds one more of Switzerland! Wood-carving is an important occupation in Metsovon.

The weather, which had been nice until now changed on the 24th and it began to rain. Our journey back to southern Greece was via Ioánnina, Dervisiana, Arta, Agrínion, Mesolóngion, Navpaktos and Itéa to Dhelfoi and Arakhova. We did not collect much, but noticed many *Euphorbia dendroides*, still leafless, along the coast of the Gulf of Corinth between Navpaktos and Itéa.

Parnassos mountain

Our base was hotel Anemolia at Arakhova. On the 27th we visited the ruins of Delphi. The southern slopes near Dhelfoi are covered with a kind of Garrigue (st. 55). Here we collected numerous *Ectoedemia terebinthivora* (Klimesch) which was formerly only known from Rhodos in the spring. In the almond orchards, especially behind our hotel, there was a pest of an unknown *Ectoedemia* species. We collected at light from our balcony and caught some specimens of *Stigmella* near *suberivora* among others.

From Arakhova we visited Mount Parnassos. There is a good road up to 2000 m, which passes through an extensive *Abies* forest, but above 2000 m the mountain is bare, with only some dwarf shrubs, such as *Rhamnus saxatilis* and *Prunus prostrata*. On some *Rhamnus* plants almost all leaves appeared to be mined by a *Stigmella*-species. As these plants are small, and there was only a small amount of leaf litter underneath in the rock crevices it was easy to collect a number of cocoons, which is an unusual case in Nepticulidae.

On the 29th it was time to return to Athens, so we followed the main road until we reached Mount Parnis which we crossed via the same road as on 10th. We collected on the same spot. Near Kifissia we visited a luxuriant thicket along a stream with many *Styrax officinalis*. On this plant we hoped to find mines of *Nepticula styracicolella* Klimesch, which is only known from Rhodos, but despite intensive searching no sign of it was found. On the 30th, our last day in Greece, we spent sightseeing in Athens, but in the end mines were even found in the middle of the town in the ancient Agora. After a quiet flight we arrived at midnight in Amsterdam.

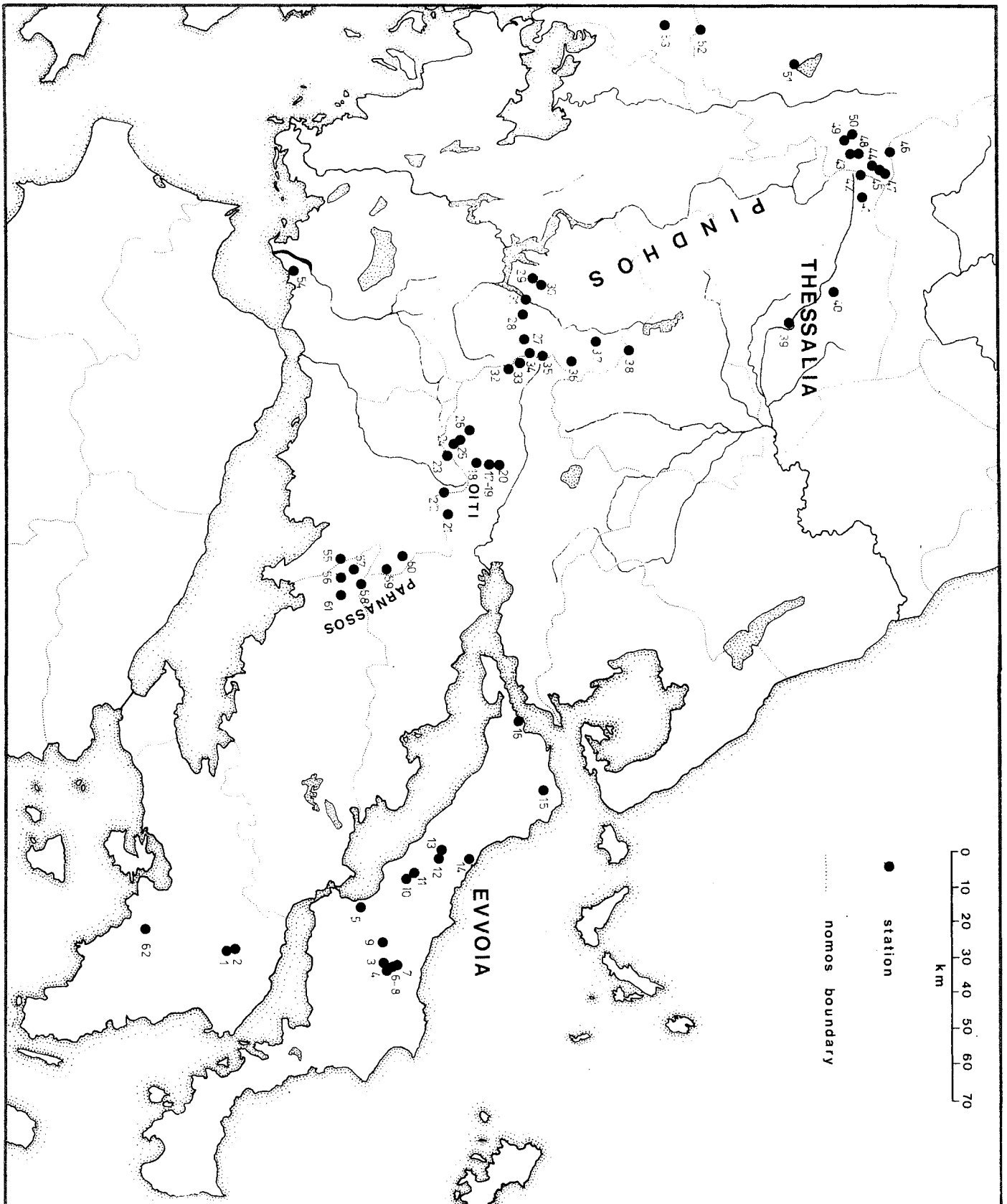


Fig. 1. Map of Central Greece with collecting stations. Collecting trip S.B.J. Menken and E.J. van Nieukerken, 1980.

LIST OF STATIONS

The data are given in the following order: station number, province (Nomos), locality-name (transcription according to Times-Atlas), altitude. Geographical coordinates, Date. Description of locality and vegetation (VU sample numbers without preceding 80 and letter codes).

1. Attika. Parnis Oros: 8 km N. of Dhekélia, + 700 m. 38.11 N-23.47 E. 10.IX.1980. Rich maquis on limestone, along road. *Quercus ilex*, *Pistacia terebinthus*, *Cotinus coggia*, *Phillyrea angustifolia*, *Smilax aspera*, *Bupleurum fruticosum* (528, 529).
2. Attika. Parnis Oros: 10 km N. of Dhekélia, + 700 m. 38.12 N- 23.47 E. 10.IX.1980/29.IX.1980. Oak-Wood on north slope with *Quercus pubescens*, *Q. cerris*, *Q. ilex*, *Ulmus* sp., *Olea europaea* as dominant trees. Near dry stream also *Ostrya carpinifolia*, *Platanus orientalis* and *Pinus halepensis*. Shrub: *Crataegus monogyna*, *Rubus ulmifolius*, *Pistacia terebinthus*, *Phillyrea latifolia*, *Rosa*, *Prunus cocomilia* (530-533; 697-700).
3. Evvoia. Steni Dhirfios, 400 m. 38.35 N - 23.51 E. 10-11.IX.1980. In and near village: valley with *Platanus orientalis* and few *Quercus pubescens*. Dry hills along road with shrub: *Crataegus monogyna* ssp. *azarella*, *Pyrus amygdali formis*, *Rubus*, *Quercus cocciifera*, *Sarcopoterium spinosum* (534-537; at light on balcony of hotel).
4. Evvoia. Dhirfis Oros, 2 km NE Steni, + 500 m. 38.36 N - 23.51 E. 11.IX.1980. Wood comprising *Castanea sativa* (with *Loranthus europaeus*), *Abies cephalonica*, *Erica arborea*, *Pteridium aquilinum*, brooms. (538, 539).
5. Evvoia. Néa Artáki, 100 m. 38.31 N - 23.39 E. 11.IX.1980. Dry stream bed in cultivated area. Mainly shrub of *Vitex agnus-castus*, some *Pistacia lentiscus*. Very dry. (540, 541).
6. Evvoia. Dhirfis Oros, S. slopes, + 700 m. 38.36 N - 23.51 E. 12.IX.1980. *Abies cephalonica* forest with *Castanea sativa*, *Quercus pubescens*, *Q. ilex*, *Prunus* sp. Undergrowth: *Pteridium aquilinum*, *Asparagus* sp., *Calamintha nepeta*, *Origanum vulgare* ssp. *hirtum*, *Aremonia agrimonoides* (542-546).
7. Idem + 900 m. 38.37 N - 23.51 E. 12.IX.1980. *Abies-Castanea* forest with *Pteridium*. *Platanus* along road (547, 548).
8. Idem, + 800 m. 38.36 N - 23.51 E. 12.IX.1980. Mainly *Castanea* forest with some *Abies*, *Quercus pubescens* and *Pteridium*. (549).
9. Evvoia. Kadhenoi, 150 m. 38.34 N - 23.47 E. 13.IX.1980. Cultivated area, broad valley with dry stream surrounded by thick *Platanus* wood, rows of *Populus nigra*. Undergrowth: *Rubus*, *Styrax officinalis*, *Calamintha nepeta*, etc. Hedges with *Paliurus spina-christi*, *Prunus* cf. *domestica* (550-555).

10. Evvoia. Kandhilion Oros, 5 km N. of Politika, + 500 m. 38.39 N - 23.34 E. 13.IX.1980, along road, planted poplars (556, 557).
11. Evvoia. Kandhilion Oros, 7.5 km N. of Politika, + 550 m. 38.40 N - 23.33 E. 13.IX.1980. Dry grassland surrounded by *Pinus halepensis* and *Platanus* wood, also a thicket of *Cotinus coggyria* (558).
12. Evvoia. Prokopion, sea level. 38.44 N - 23.30 E. 13.IX.1980. *Quercus pubescens* copse with some *Pinus halepensis*. Shrub layer: *Q. pubescens*, *Q. ?carris*, *Phillyrea latifolia*, *Crataegus monogyna*, *Rubus*, *Pyrus amygdaliformis*, *Vitex agnus-castus* (559).
13. Evvoia. 2 km W. of Prokopion, 200 m. 38.44 N - 23.28 E. 13.IX.1980. *Pinus halepensis* wood with maquis undergrowth consisting of *Cotinus coggyria*, *Cercis siliquastrum*, *Pistaccia lentiscus*, *P. terebinthus*, *Phillyrea latifolia*, *Arbutus unedo*, *Smilax aspera*, *Quercus ilex*, *Pyrus amygdaliformis*. Small stream with *Platanus* and *Populus* (560-563).
14. Evvoia. 1 km E. of Mandoudhion, sea level. 38.48 N - 23.29 E. 14.IX.1980. Poplar plantation and shrub: *Palurus spina-christi*, *Rosa* (564-566).
15. Evvoia. 2 km SE. of Góuves, 200 m. 39.00 N - 23.15 E. 14.IX.1980. River valley with open *Platanus* wood. Much *Cotinus coggyria*, also *Pistacia terebinthus*, *Cercis siliquastrum*, *Colutea arborescens* (567).
16. Evvoia. Agiokambos, 5 km SE. Oreof, sea level. 38.56 N - 23.02 E. 14.IX.1980. *Ulmus-Vitex* shrub along sea-beach (568-569).
17. Fthiótis. Oíti Oros, N. slope near Kastanea, 4 km SW. Ipáti, + 1000 m. 38.41 N - 22.12 E. 15.IX.1980. Dry bare slopes with grassland and thickets: *Abies cephalonica*, *Prunus cocomilia*, *Crataegus heldreichi*, *Acer campestre*, *Salix alba*, *Rosa* (570-572).
18. Fthiótis. Oíti Oros, N. slope near Neochorion, 7 km SW. Ipáti, + 1400 - 1500 m. 38.49 N - 22.12 E. 15.IX. 1980. Degenerated *Abies* wood with locally *Juniperus*, *Prunus cocomilia*, *P. cerasifera*, *Crataegus heldreichi*, *Rosa* sp. Very dry and stony (573-575).
19. As station 17, + 900 m. 28.51 N - 22.12 E. 15.IX.1980. *Abies cephalonica* wood with *Quercus frainetto*, *Q. cf pubescens*, *Q. coccifera*, *Juniperus* sp. (576-577).
20. Fthiótis. Oíti Oros, lera Moni Agathonos, 3 km W. of Ipáti, 450 m. 38.52 N - 22.12 E. 15. IX. 1980. Slopes with woodland and park of monastery. *Quercus* spp., *Q. coccifera*, *Acer monspessulanum*, *Ulmus*, *Cornus mas*, *Pistacia terebinthus*, *Phillyrea latifolia*, *Hedera helix* (578-581).
21. Fthiótis. Oíti Oros, 4 km E. of Pávlani, 850 m. 38.44 N - 22.23 E. 16. IX. 1980. *Abies cephalonica* forest with many low *Quercus pubescens* and *Q. frainetto*. Other shrubs: *Ostrya carpinifolia*, *Crataegus heldreichi*, *Prunus cerasifera*, *Quercus coccifera*, *Rubus*, *Coronilla emerus*, *Pteridium aquilinum* (582-585).

22. Fokís. Oíti Oros, S. slopes, 3-4 km NE Strómi, 1250 m. 38.43 N - 22.18 E. 16.IX.1980. Clearings and fields in *Abies* woodland. Separate bushes of *Prunus cocomilia*, *Crataegus heldreichi*, *Pyrus elaeagrifolia*, *Acer campestre*, *Rosa*, *Ulmus* (586-591).
23. Fokís. Oíti Oros: Kastriótissa, 7 km NW Strómi, 1200 m. 38.45 N - 22.11 E. 17.IX.1980. *Abies* wood with much *Q. frainetto*, *Juniperus* and *Pteridium*. Along stream: *Platanus*, *Rubus*, *Fragaria vesca*, *Aremonia agrimonoides*, etc. (592-596).
24. Fthiótis. Vardhoúsia Ori: Dafni, 7 km SE Mármara, 1100 m. 38.45 N - 22.10 E. 17.IX.1980. Cultured terraces near village, hedges with *Rubus*, *Prunus*, fruit-trees, *Populus tremula* copse (597-600).
25. Fthiótis. Vardhoúsia Ori: Anatoli, 5 km SE Mármara, 1000-1100 m. 38.46 N - 22.08 E. 17.IX.1980. Slopes with shrub and separate trees: *Abies*, *Juniperus*, *Acer campestre*, *A. monspessulanum*, *Crataegus heldreichi*, *Prunus cocomilia*, *Rosa* sp., *Pteridium aquilinum*. Cultured terraces with wild and cultivated plums (601-604).
26. Fthiótis. Vardhoúsia Ori: Mármara, 900 m. 38.48 N - 22.06 E. 17.IX.1980, Cultured terraces (605).
27. Evritanía. Mt. Timfristós, S. slopes above Karpenision, 1200 - 1400 m. 38.56 N - 21.48 E. 19.IX.1980. Dry slopes, totally deforested. Up to 1200 m mainly *Spartium junceum* shrub with some *Quercus coccifera*, *Juniperus*, *Prunus spinosa*, locally *Cornus sanguinea*, *Rosa*, *Prunus cocomilia*. From 1200 - 1400 m thickets comprising *Prunus cocomilia*, *P. mahaleb*, *Pyrus elaeagrifolia*, *Crataegus heldreichi*, *Rosa* sp., *Rhamnus* sp. Also collected on *Platanus* trees along stream (606-610).
28. Evritanía. Kalesménon, 600 m. 38.56 N - 21.43 E. 20.IX.1980. Thick *Quercus coccifera* shrub along road (611).
29. Evritanía. Frangísta, + 600 m. 38.58 N - 21.37 E. 20.IX.1980. River valley, cultivated land with *Platanus* and thick maquis-like *Quercus coccifera*-shrub with *Q. pubescens*, *Q. frainetto*, *Fraxinus ornus*, *Carpinus orientalis*, *Fragaria vesca*, *Aremonia agrimonoides* and *Agrimonia eupatoria* (612-616).
30. Evritanía: 3 km NE Frangísta, + 1000 m. 38.59 N - 21.38 E. 20.IX.1980. Open woodland with *Quercus pubescens*, *Q. frainetto*, much *Q. coccifera*, *Acer monspessulanum*, *Pyrus elaeagrifolia*, *Crataegus monogyna* (617-620).
31. Evritanía. 2 km W. of Kalesménon, valley of Mégdhova (Tavropos), 400 m. 38.57 N - 21.41 E. 20.IX.1980. River valley with *Salix alba* and *Populus nigra* along banks (621-622).
32. Fthiótis. 1-2 km W. of Timfristós (village), 1000 m. 38.54 N - 21.54 E. 20.IX.1980. Dense wood with *Abies cephalonica* and *Castanea sativa* as dominant trees. Further *Quercus pubescens*, *Rubus*, *Juniperus* sp., *Pteridium aquilinum* and *Loranthus europaeus* growing on *Castanea* (623-624).

33. Fthiōtis. 4 km NW Timfristós (village), 1400 m. 38.56 N - 21.53 E. 21.IX.1980. Clearings in *Abies*-wood with dense vegetation of *Pteridium aquilinum* and some *Crataegus heldreichi*, *Prunus cocomilia*, *Rosa* (625-627).
34. Fthiōtis. E. slope of Mt. Timfristós, 2 km NE summit, 1400 m. 38.57 N - 21.51 E. 21.IX.1980. Dry grassland, rocks, some shrub as *Crataegus laciniata* (628).
35. Evritanía. 4 km W. of Palaiókastron, 1200 m. 38.59 N - 21.51 E. 21.IX.1980. Steep west slope with open *Quercus petraea* s.l. wood, *Juniperus* and few *Pinus nigra*, *Abies* (629-630).
36. Evritanía. Fournás, 800 m. 39.04 N - 21.52 E. 21.IX.1980. Narrow steep valley with deciduous wood in cultivated land. The following plants were noted: *Alnus glutinosa*, *Corylus avellana*, *Prunus avium*, *Platanus orientalis*, *Quercus frainetto*, *Carpinus orientalis*, *Cornus mas*, *Acer campestre*, *Castanea sativa*, *Rosa* sp., *Rubus* sp. Herbs: *Fragaria vesca*, *Aremonia agrimonoides*, *Anemone*, *Cyclamen*, *Viola*, *Helleborus*, *Geranium robertianum*, *G. versicolor*, *Prunella vulgaris*, *Sanicula europaea*, *Dryopteris*, *Saxifraga*, *Mycelis*, *Clinopodium*, *Geum urbanum*, *Anthriscus*, *Brachypodium pinnatum* (631-638).
37. Evritanía. 3 km SE Neráidha, + 1200 m. 39.07 N - 21.49 E. 21.IX.1980. Dry valley with *Populus canadensis* in *Abies* forest (639).
38. Evritanía. 6 km SSE Rakhoúla, 1000 m. 39.11 N - 21.51 E. 21.IX.1980. Mixed wood with *Platanus*, *Abies*, *Acer pseudoplatanus*, *Carpinus betulus*, *Quercus frainetto* (640).
39. Tríkala. Ráxa, 150 m. 39.37 N - 21.44 E. 22.IX.1980. Dry river with thickets comprising *Rubus ulmifolius*, *Vitex agnus-castus*, *Ulmus* sp., *Salix* cf. *amplexicaulis*. *Platanus*-trees and *Prunus domestica* along road, cultivated area in plain. (641-645).
40. Tríkala. Kastráki: near Moni Roussani ton Meteoron, 400 m. 39.43 N - 21.38 E. 22.IX.1980. Roadside underneath one of the famous Meteora monasteries with a vegetation of *Convolvulus arvensis*, *Calystegia sepium*, *Rubus*, *Urtica dioica*, *Ficus carica*, *Prunus mahaleb* and thistles (646-647).
41. Tríkala. 3 km ENE of Malakási, 1000 m. 39.48 N - 21.19 E. 22.IX.1980. Southeastern slopes along main road, dry with grassland and shrubs. Main species: *Ostrya carpinifolia*, *Acer monspessulanum*, *A. campestre*, *Crataegus heldreichi*, *C. monogyna*, *Quercus pubescens*, *Cornus mas*, *Pyrus elaeagrifolia*, *Salix alba*, *Rubus* sp. (648-652).
42. Tríkala. Near Katára pass, 6 km NE Métsovon, 1650 m. 39.48 N - 21.14 E. 22.IX.1980. Edge of pure *Fagus sylvatica* wood (653).
43. Ioánnina. Métsovon, 950 - 1000 m. 39.46 N - 21.11 E. 23.IX.1980. Cultivated area in river valley underneath Métsovon with some remnants of original wood: *Pinus nigra* with some *Coronilla emerus* and *Dorycnium*, locally hayes with *Rubus*, *Acer campestre*, *A. monspessulanum*, *Cornus mas*, *Crataegus*, *Ulmus*, *Ostrya*, etc. (654-657).

44. Ioánnina. 7 km NNE Métsovon, between Métsovon and Miléa, 1500 m. 39.50 N - 21.12 E. 24.IX.1980. *Fagus sylvatica* wood with scarce undergrowth of *Pteridium*, *Helleborus* sp., *Geranium versicolor*, *Aremonia agrimonoides*, *Potentilla* etc. (658).
45. Ioánnina. 8 km NNE Métsovon (SW of Miléa), 1300 m. 39.51 N - 21.13 E. 24.IX.1980. Along stream in open *Fagus sylvatica* - *Pinus nigra* wood. Undergrowth as 44 (659).
46. Ioánnina. 11 km N Métsovon, pas between Mts Miléa and Mavrovouni, 1700 m. 24.IX.1980. Remnants of *Fagus sylvatica* - *Pinus heldreichii* wood (660).
47. Ioánnina. Miléa, 7 km SE Kraniá, 1200 m. 39.51 N - 21.13 E. 24.IX.1980. Pastures with *Crataegus monogyna*, *Rosa*, *Prunus cocomilia*. Collecting short by rain (661-663).
48. Ioánnina. 3 km NW Métsovon, 1300 m. 39.47 N - 12.09 E. 24.IX.1980. Pastures with separate *Crataegus monogyna* bushes. Very poor collecting (664).
49. Ioánnina. 1.5 km SE Voutonási (or Votonóssion), ca 1000 m. 39.46 N - 21.08 E. 25.IX.1980. Thick *Quercus coccifera* shrub with *Ostrya carpinifolia* and scarce undergrowth (665, 666).
50. Ioánnina. Voutonási (or Votonóssion), 700 m. 39.46 N - 21.07 E. 25.IX.1980. Valley: *Platanus* wood with *Fraxinus*, *Ostrya*, *Petasites*, *Salvia glutinosa*, *Geranium versicolor*, *Sanicula eruopaea*, *Angelica sylvestris* a.o. Slopes with *Quercus pubescens* wood and *Ostrya*, *Acer campestre*, *Q. coccifera* and *Coronilla emerus* (667-672, 671 not existing).
51. Ioánnina. Katsiká, near Limni Ioannínon, 480 m. 39.38 N - 20.53 E. 25.IX.1980. Cultivated area near lake. Collected in dry ditch with *Rubus*, *Juncus*, *Cyperus* and *Agrimonia eupatoria* (673).
52. Ioánnina. 2 km S. Derviziana, 500 m. 39.23 N - 20.46 E. 25.IX.1980. Maquis with *Quercus coccifera*, *Arbutus unedo*, *Phillyrea latifolia*, *Erica arborea*, *Carpinus orientalis*, *Pyrrhacantha*, *Rubus ulmifolius* (674).
53. Prévaza. 4 km SW Papadátes, 100 m. 39.17 N - 20.46 E. 25.IX.1980. Cultivated area with bushes of *Paliurus spina-christi*, *Vitex agnus-castus* and *Phlomis fruticosa*. Many flowering *Urginea maritima* (675, 676).
54. Aitolia. Krionéri, sea level. 38.21 N - 21.36 E. 26.IX.1980. Reed-swamp near sea.
55. Fókis. 3 km E of Dhelfoi, ca 700 m. 38.29 N - 22.32 E. 27.IX.1980. Steep southern slope with garrigue and terraces with almond and olive yards. Garrigue with a.o. *Quercus coccifera*, *Pistacia terebinthus*, *Phlomis fruticosa*, *Euphorbia acanthotamos*, *Olea europaea*, *Calycotome villosa*, *Rhamnus oleoides*, *Urginea maritima* (677-679).

56. Voiotía. Arákhova, 950 m. 38.29 N - 22.35 E. 27 and 29.IX.1980 .
Cultivated terraces with olive and almond and few *Quercus coccifera*,
Rosa and *Phlomis*, behind hotel Anemolia (680, 681, at light on
balcony).
57. Voiotía. Parnassós Oros, 6 km NW Arákhova, near Kalivia Eradhian
Arakhovis, 1150 m. 38.31 N - 22.33 E. 28.IX.1980. Plateau with mainly
Quercus coccifera-thickets. Other shrub species: *Prunus cocomilia*,
Crataegus heldreichi and *Rosa* (682-684).
58. Voiotía. Parnassós Oros, ca 2 km W. of summit, near skiing-chalet,
2000 m. 38.32 N - 22.35 E. 28.IX.1980. Bare mountains with dwarf
shrubs: *Prunus prostrata*, *Daphne oleoides*, *Anthyllis* sp., *Juniperus*
sp., *Thymus saxatilis*, *Rosa* (685, 686).
59. Fókis. Parnassós Oros, N. slopes, 5-6 km S. Polidhroson, 1000-1200 m.
38.36 N - 22.33 E. 28.IX.1980. Road-side and apple orchards in
Abies cephalonica-*Pinus nigra* forest (687-690).
60. Fókis. Halfway Lílania and Polídhroson, ca 400 m. 38.38 N - 22.31 E.
28.IX.1980. River valley in cultivated area with *Platanus*, *Populus*
nigra, *Rubus*, *Vitex agnus-castus*, *Cercis siliquastrum*, *Crataegus*
monogyna, etc. (691-693).
61. Voiotía. 5 km Arákhova, 700 m. 38.29 N - 22.39 E. 29.IX.1980.
Along main road: rows of poplars and *Quercus coccifera*-*Crataegus*
monogyna shrub (694-696).
62. Attika. Athína, ancient Agora, sea level. 37.58 N - 23.43 E. 30.IX.1980.
Park in town (701, 702).

RESULTS

In this chapter only the results concerning the Nepticulidae are treated. In fact we almost only collected this family because of the intensive searching, time prevented us from collecting other insects.

In total we found at least 58 species, but some of these only as empty mines, 15 species of *Ectoedemia*, 36 *Stigmella*, 3 *Niepeltia*, 2 *Trifurcula*, 1 *Fedalmia* and 1 *Obrussa*. From these we were able to rear the adults of 27 species. Another 20 species were collected as larvae but the rearing did not yield adults. This applied mainly to species from which we collected a few larvae amongst numerous vacated mines. These late larvae often appeared to be parasitized or in any case less vital. Our failure to rear the *Ectoedemia* and *Stigmella* larvae from oak and rose are more surprising for the numbers were not that small.

The larvae of 24 species were collected to preserve in alcohol for morphological studies and 15 species (323 larvae) were put in the deep freeze for studies on allozymes. The number of larvae consigned to the deep freeze is relatively low because the specimens were posted back to the university and on arrival, four or five days later, it was not uncommon to find the entire batch had already pupated.

Up to four species are possibly new to science, and at least 30 species are recorded from Greece for the first time.

List of species collected

The species which have been found are enumerated in the table on page 19 together with the food plants; an indication which are new records for Greece and which are new host records; the stations where found and the number of reared adults and collected larvae. From the station numbers underlined adults have been reared and the numbers in brackets denote stations where only vacated mines have been collected. Thus from the other stations we collected tenanted mines, but for various reasons no adults emerged.

Species	A	Foodplant	B	Stations	adults reared	emergence	C	D
1. <i>Obrusca splendami</i> (Hering)	x	Acer campestre	x	22			6	
2. <i>Ectoedemia (Zimmermannia) sp.</i>	x	Quercus pubescens	x	3				
3. <i>Ectoedemia agrimonoides</i> (Frey)	x	Arenonia agrimonoides	x	6, 29	15dd, 2099	2.V-9.VI.81	20	73
4. <i>Ectoedemia arcuatella</i> (Herrich-Schäffer)	x	Agrimonia eupatoria	x	24, 29, 43, 51				
5. <i>Ectoedemia angulifasciella</i> (Stainton)	x	Fragaria vesca	x	29, 36, 37	2dd, 19	2-15.VI.81		26
6. <i>Ectoedemia malelicella</i> (Klimesch)	x	Rosa spp.	x	2, 18, 22, 25, 36				25
	x	Prunus mahaleb	x	27, (40)	1d, 499	21.V-25.VI.81		
	x	Prunus cocomilia	x	17, (22), 27, 57	1d, 499	7.V-24.VI.81		6
	x	Prunus domestica	x	(25)				
7. <i>Ectoedemia (nov?) spec.</i>	x	Prunus dulcis	x	55, 56	40dd, 4499	2.V-8.VII.81	15	113
8. <i>Ectoedemia terobinthus</i> (Klimesch)	x	Pistacia terebinthus	x	(1), 15, (20), 55	11dd, 1199	2.V-11.VI.81	15	14
9. <i>Ectoedemia altifasciella</i> (Heinemann)	x	Quercus petraea s.l.	x	35	2dd, 19	8-11.V.81	3	8
10. <i>Ectoedemia emulsi</i> (Groschke)	x	Quercus pubescens s.l.	x	6, (20), 21				
	x	Quercus pubescens s.l.	x	2, 6, 12, 19, (20), 21, 50				10
	x	Quercus frainetto	x	(19), 21				1
	x	Quercus petraea s.l.	x	35				1
	x	Quercus cerris	x	(2)				
11. <i>Ectoedemia spec. 1</i>	x	Quercus petraea s.l.	x	35				
12. <i>Ectoedemia spec. 2</i>	x	Quercus cerris	x	2				4
13. <i>Ectoedemia spec. 3</i>	x	Quercus coccifera	x	(61)				
14. <i>Ectoedemia spec. 4</i>	x	Castanea sativa	x	33				2
15. <i>Ectoedemia groenkei</i> (Skala)	x	Vitex aquino-castus	x	5, (16), 39, 53, 60	3dd, 299	28.III-15.V.81	10	4
16. <i>Niepelita platani</i> (Müller-Rutz)	x	Platanus orientalis	x	(3), 7, (13), 18, 27, (29, 50, 60), 62				3
17. <i>Niepelita near minima</i> (Rebel)	x	Pistacia terebinthus	x	1, 15, 55, 2	7dd, 499	14.IV-11.V.81	9	1
	x	Pistacia lentiscus	x	5				3
18. "Stigmella" <i>Loranthella</i> Klimesch	x	Loranthus europaeus	x	4, 8, (30), 32	9dd, 799	18.III-13.IV	14	
19. <i>Fedalmia saturifera</i> (Parenti)	x	Calamintha nepeta	x	6, (9), 13	1 (escaped)	28-29.IV.81		
	x	Origanum vulgare	x	6	1d	7.IV.81		
20. <i>Trifurcula cryptella</i> (Stainton)	x	Coronilla emerus	x	(21), 43, 50	1d, 19	8-9.IV.81		
21. <i>Trifurcula dorycnella</i> (Saire)	x	Dorycnium pentaphyllum	x	(23), 59	5dd, 799	5-22.V.81	5	
22. <i>Stigmella cf aurella</i> (Fabricius)	x	Agrimonia eupatoria	x	24	1d	4-6.X.80		
	x	Arenonia agrimonoides	x	23				
	x	Fragaria vesca	x	(6), 24, (29), 36				
	x	Rubus spp.	x	(2, 3), 9, 23, (24, 35, 36, 39), 52				
23. <i>Stigmella sp. near aurella</i> (Fabricius)	x	Geranium versicolor	x	36, (45, 50)	4dd, 399	7-13.X.80		
24. <i>Stigmella plagiolella</i> (Stainton)	x	Prunus cocomilia	x	(17), 22, 27, 33, 47, 57, 59	4dd, 499	25.IV-4.V.81		
	x	Prunus domestica	x	(9), 25, (33), 39				
	x	Prunus mahaleb	x	40				
	x	Prunus spinosa	x	(36)				
25. <i>Stigmella speciosa</i> (Frey)	x	Acer monspessulanum	x	(20), 25, (30, 43)			1	
	x	Acer pseudoplatanus	x	(38)				
26. <i>Stigmella obliqueella</i> (Heinemann) ?	x	Salix alba	x	(31, 41)				
27. <i>Stigmella pallidifolia</i> Klimesch ?	x	Salix cf. amplexicaulis	x	(39)				
28. <i>Stigmella trimaculella</i> (Haworth)	x	Populus nigra - hybrida	x	(9), 10, (14, 31, 60, 61)				
29. <i>Stigmella campinella</i> (Heinemann)	x	Ostrya carpinifolia	x	2, 21, (41, 49)	5dd, 399	2-6.IV.81	1	
	x	Carpinus orientalis	x	(29)				
30. <i>Stigmella tityrella</i> (Stainton)	x	Fagus sylvatica	x	42, 44, 46	5dd, 499	10-22.IV.81		33
31. <i>Stigmella periphaella</i> (Doubleday)	x	Crataegus monogyna	x	(3, 50), 41, (61)			1	
	x	Crataegus heldreichi	x	(18), 22, (27), 33, 57	7dd, 899	14-29.IV.81		3
	x	Crataegus laciniata	x	34	1d	11-13.IV.81		
32. <i>Stigmella pomella</i> (Vaughan)	x	Malus domestica	x	59				
33. <i>Stigmella basiquitella</i> (Heinemann)	x	Quercus pubescens s.l.	x	(3)				
	x	Quercus petraea s.l.	x	(35)				
	x	Castanea sativa	x	(4, 7, 32)				
34. <i>Stigmella samiatella</i> (Zeller)	x	Quercus pubescens s.l.	x	6	1d	28-30.III.81		
35. <i>Stigmella spp.</i>	x	Quercus pubescens s.l.	x	2, (3), 6, 12, 19, (20, 21)				
	x	Quercus frainetto	x	(19, 29)				
	x	Quercus petraea s.l.	x	35				
	x	Quercus cerris	x	2				
	x	Castanea sativa	x	(4), 7				
36. <i>Stigmella ?suberivora</i> (Stainton)	x	Quercus coccifera	x	(28, 29, 30, 49, 61)				
	x	? Quercus coccifera	x	56	2dd, 599	at light		
37. <i>Stigmella hemargynella</i> (Kollar)	x	Fagus sylvatica	x	(42)				
38. <i>Stigmella ulmivora</i> (Fologne)	x	Ulmus sp.	x	(16, 20, 39)				
39. <i>Stigmella ulmiphaga</i> Preissecker	x	Ulmus sp.	x	22	2dd, 299	2-9.VI.81		
40. <i>Stigmella freyella</i> (Heyden)	x	Convolvulus arvensis	x	10, 40				
	x	Calystegia sepium	x	40				
41. <i>Stigmella anomalella</i> (Goeze)	x	Rosa sp.	x	59	1d	25-27.IV.81		
42. <i>Stigmella spec.</i>	x	Rosa spp.	x	(14, 17, 18, 36), 57, (58)				
43. <i>Stigmella amygdali</i> (Klimesch)	x	Prunus cocomilia	x	(17), 27, 33, 57, 59	7dd, 499	4.IV-18.V.81	10	12
44. <i>Stigmella viscerella</i> (Stainton)	x	Ulmus sp.	x	(20, 39)				
45. <i>Stigmella palliurella</i> Klimesch	x	Paliurus spina-christi	x	(9, 14, 53)				3
46. <i>Stigmella malella</i> (Stainton)	x	Malus domestica	x	(24), 36, (56), 59				1
47. <i>Stigmella rhamnophila</i> (Ansel)	x	Rhamnus saxatilis	x	58	7dd, 499	4-13.IV.81	6	2
	x	R. lycioides ssp. oleoides	x	55				
48. <i>Stigmella hybnerella</i> (Hübner)	x	Crataegus monogyna	x	2, 3, (47), 48, 61	2dd, 19	4-7.IV.81		
	x	Crataegus heldreichi	x	(18), 22, 33				
	x	Crataegus laciniata	x	(34)				
49. <i>Stigmella aceris</i> (Frey)	x	Acer campestre	x	17, 25, 26, (41, 50)	2dd, 29	3-9.X.80	3	
50. <i>Stigmella oxyacanthella</i> (Stainton)	x	Crataegus monogyna	x	47				
51. <i>Stigmella cf. crataegella</i> Klimesch	x	Crataegus heldreichi	x	23				
52. <i>Stigmella ?pyri</i> (Glitz)	x	Pyrus communis	x	9				
53. <i>Stigmella near pyri</i> (Glitz)	x	Pyrus amygdaliformis	x	3, 13	1d	19.II.81		2
54. <i>Stigmella prunetorum</i> (Stainton)	x	Prunus cocomilia	x	27, 33	1d	22.IV.81		
	x	Prunus avium	x	(36)				
55. <i>Stigmella minortheriella</i> (Stainton)	x	Corylus avellana	x	(36)				
56. <i>Stigmella nimbodungensis</i> (Preissecker)	x	Salix alba	x	41				3
57. <i>Stigmella promissa</i> (Staudinger)	x	Cotinus coggyria	x	1, (11, 13)				
58. <i>Stigmella spec.</i>	x	Pyrus elaeagnifolia	x	22, 27, (41, 43)				

Table 1. List of species collected, with collecting and rearing data.

Explanation: A = new record to Greece; B = new host record, C = number of larvae preserved; D = number of larvae deep frozen for biochemical work.

Remarks

5. *Ectoedemia angulifasciella* (Stainton)

Although we collected many larvae, no adults emerged. Perhaps the rearing jars were kept too dry, and in some cases the larvae were probably collected too young. Nevertheless there seems to be no doubt about their identity. This species is synonymised by several authors with *E. atricollis* (Stainton), but there is increasing evidence that this is incorrect, supported by the greek records, since no trace of *E. atricollis* was found on any of the *Crataegus*, which often occurred amongst the same vegetation as the roses from which we collected.

6. *Ectoedemia mahalebella* (Klimesch)

This species is closely related to *E. spinosella* (de Joannis), but they are most likely distinct. The adults which we bred from larvae on *Prunus mahaleb* and *Prunus cocomilia* do not show any difference.

7. *Ectoedemia* (nov.?) spec.

In almond orchards near Arakhova this insect was almost a pest. It is very similar to *E. spinosella* but is possibly a new species. This is the first *Ectoedemia* ever recorded from almond.

8. *Ectoedemia terebinthivora* (Klimesch)

This species was previously only known from Anatolia and Rhodos where Klimesch (1978) could only find larvae in the spring. Near Dhelfoi we however collected several larvae together with numerous vacated mines. This is an indication of a second generation.

11-14. *Ectoedemia* spp.

The identification of southern European mines from the *E. subbimaculella*-group is hardly possible with the present knowledge and the rearing of adults failed, because the larvae were collected too young and the leaves dried out.

17. *Niepeltia* sp near *minimella* (Rebel)

The species which we bred from *Pistacia terebinthus* seems to be identical with the form which Klimesch (1978) bred from *P. lentiscus* on Rhodos. He regarded it as a subspecies of *N. minimella*, but in my opinion it deserves specific status. The mines on *P. terebinthus* are different from those on *P. lentiscus* possibly due to the different texture of the leaves.

18. "*Stigmella*" *loranthella* Klimesch to be transferred to *Niepeltia*

19. *Fedalmia saturejae* (Parenti)

The species was formerly known from *Calamintha nepeta* in Spain, Corsica and Italy (Klimesch, 1976). It makes mines in the leaf and the stem. In Evvoia mines could be found commonly on *C. nepeta*, and in station 6 also on *Origanum vulgare* L. ssp *hirtum* (Link) Ietswaart (= *O. heracleoticum* in Flora Eur, cf Ietswaart, 1980). This seems to be the first record of a *Fedalmia* species in *Origanum*.

22. *Stigmella* cf *aurella* (Fabricius)

At this moment there seems to be no reliable character for separating mines of *S. aurella*, *S. auromarginella* (Richardson) and *S. splendissimella* (Herrich-Schäffer). Therefore the collected material could not be separated, apart from the single male which was bred from *Agrimonia* and belongs clearly to *S. aurella* in the sense of Klimesch (1981).

23. *Stigmella* near *aurella*

The discovering of a *Stigmella* mining on *Geranium versicolor* was a real surprise; the more so, when it was found that the adults showed no differences from *S. aurella*. Although *S. aurella* feeds on a number of plants, such as *Rubus*, *Fragaria*, *Geum* and *Agrimonia*, these are closely related and all belong to the Rosaceae. In the locality where we found it, mines were also present on *Rubus* and *Fragaria*, but mostly vacated, whereas on *Geranium* many feeding larvae were found. A decision about the status of this form can not reliably be taken with our present state of knowledge.

35. *Stigmella* spp from Oak

The mines of these species are very similar and therefore cannot be identified with certainty. It is likely that the following species are amongst those collected: *S. samiatella* (Zeller), *S. eberhardi* (Johansson) and *S. zangherii* (Klimesch).

36. *Stigmella* sp near *suberivora* (Stainton)

The mines collected on *Quercus coccifera* are similar to those of *S. suberivora* from western Europe. However, we collected some adults in Arakhova near a thicket of that oak, which differ in their male genitalia and possibly constitute a new species. The collected mines could also belong to this species.

38. *Stigmella ulmivora* (Fologne)

Mines of *S. ulmivora* are difficult to separate from those of *S. ulmiphaga*, but we believe that at least a part of the mines collected from *Ulmus* belongs to *S. ulmivora*.

42. *Stigmella* sp from *Rosa*

Although the only adult reared from *Rosa* is *S. anomalella*, mines of *S. centifoliella* (Zeller) are possibly also amongst the material collected, but can not be distinguished.

43. *Stigmella amygdali* (Klimesch)

This species was described from Rhodos where it feeds on *Prunus dulcis* (Klimesch, 1978). We only found it on *P. cocomilia* and only in the mountains, mainly above 1000 m. These *Prunus* are not closely related. Near Arakhova we were unable to find mines on the (cultivated) *Prunus dulcis*.

53. *Stigmella* sp near *pyri* (Glitz)

On Evvoia we collected numerous mines on *Pyrus amygdaliformis* which we suppose belonged to *S. embonella* (Klimesch), described from this food-plant. However, the single male which emerged clearly does not belong to this species. It approaches *S. pyri* most, but could be a distinct species. The group of species associated with *S. pyri* presumably forms a complex not separable according to the species of pear on which they are found.

58. *Stigmella* species

This refers to an unknown species with yellow larvae, and remarkable mines. The mine starts as a very narrow underside mine and later becomes a comparatively long linear upperside mine. Most of the mines were already vacated.

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