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Unexpected diversity of moths (Lepidoptera) in the Gardens of Trauttmansdorff Castle (Prov. Bolzano-South Tyrol, Italy)

Abstract

As part of comprehensive surveys of the moth fauna (Lepidoptera excl. Papilionoidea) of the Gardens of Trauttmansdorff Castle, a total of 513 species from 48 families were recorded from May 2021 to November 2022. Of the ten most diverse families, Noctuidae encompass 100 species, followed by Geometridae (65 species), Tortricidae (53 species), Crambidae (32 species), Gracillariidae (29 species), Erebidae (29 species), Pyralidae (29 species), Gelechiidae (22 species), Nepticulidae (19 species), and Notodontidae (15 species). *Phyllocnistis valentinensis* M. Hering 1936 (Gracillariidae) and *Apodia martinii* Petry 1911 (Gelechiidae) are recorded for the first time in Italy. 13 additional species are first confirmed records for South Tyrol. Sixteen species are migratory, and further 11 species are neozoa, originating from other continents. In addition, 17 species of butterflies are listed from the study area. A detailed analysis of ecological guilds and the degree of phagism of all species underline the importance of semi-natural habitats. The most diverse habitats are dry grassland (263 species) and different forest habitats, especially oak forests (270 species). In contrast, the importance of intensively used garden areas for moths is low.

Keywords: Botanical garden, ecological guilds, faunistics, neozoa, new records

1. Introduction

Botanical gardens are considered an epitome of presenting plant diversity of native species, often with a strong global aspect (Mounce et al. 2017). They are not only of interest from a botanical and floristic perspective but also for fungi and fauna, with diverse pollinator communities.

One of the potentially important insect groups in botanical gardens are moths, which mainly include nocturnal species of a wide taxonomic range. In Italy alone, about 5,000 species of moths are known, in Europe the number even exceeds 10,000 (Karsholt & Nieukerken 2013). Key aspects of their role and function include pollination and decomposition. Furthermore, moths and their preimaginal stages are an exceptionally important food source for numerous predators such as birds, bats, or predatory invertebrates. Many species, however, are increasingly threatened with declining populations. The causes of endangerment range from intensive land and forestry use, including the use of pesticides, to urbanization and infrastructure development leading to extensive light pollution, as well as climate change (Huemer 2016, Wagner et al. 2021). The role of urban habitats that are still somewhat close to nature in promoting and conserving moth communities should not be underestimated. Gardens in general, and botanical gardens in particular, can potentially have positive effects on the diversity of moths in urban environments, despite being shaped by human activity and largely unsealed (Butterfly Conservation 2024). In return, visitors can benefit from this diversity through various educational programs. Therefore, there are indeed good reasons to scientifically survey

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moth communities. The Gardens of Trauttmansdorff Castle have clearly demonstrated their responsibility as biodiversity refuges and educational institutions by initiating a study on the diversity of moths, which primarily addresses the following questions:

1. Does the predominantly anthropogenically created plant diversity of botanical gardens also reflect in the fauna of moths?
2. Are such gardens completely impoverished or, on the contrary, significant as a refuge for this group?
3. Or are they even a possible source of introduction of undesirable non-native species?

Comprehensive investigations into these questions are the exception rather than the rule. Only in recent years have surveys of Lepidoptera as one of the megadiverse insect orders been conducted in several Botanical Gardens across the globe (Byun et al. 2005, Owada et al. 2005, Prudic et al. 2022).

In the Gardens of Trauttmansdorff Castle, one of the main tourist attractions in South Tyrol, there has been a growing focus on compiling inventories of selected groups of animal life representing an essential part of local biodiversity. Unpublished studies focused so far on diurnal pollinators and birds, however, nocturnal insects were not considered before. Therefore, a survey of the particularly diverse and ecologically valuable insect order of Lepidoptera, with a taxonomic focus on nocturnal moths, conducted in 2021 and supplemented in 2022, aimed to make an important contribution to answering the above-mentioned questions.

2. Materials and methods

The Gardens of Trauttmansdorff Castle (Meran, South Tyrol, Italy) cover around 12 hectares and contain more than 80 different garden landscapes. Many of these anthropogenic habitats are of minimal relevance for native moths due to the floristic composition, which often includes species from other continents, i.e., in the northern part of the Gardens. Conversely, the Gardens, with their integration into a natural amphitheatre of different native plant communities also potentially provide high-quality habitats for moths. Due to limited resources, surveys focused primarily on these areas. Overall, 10 different habitat types, mostly from the thematic focus area "Landscapes of South Tyrol," were sampled (Table 1, Fig. 1).

Table 1: Recording sites within the grounds of the Gardens of Trauttmansdorff Castle with details of the habitat studied (in brackets the abbreviations used in the text) and the coordinates (geogr., WGS84).

Locality, habitat	elevation	°N	°E
wetland – OW	335 m	46.658	11.186
riverine forest – RI	340 m	46.659	11.186
dry grassland – DG	345 m	46.658	11.186
holm oak forest – HO	380 m	46.66	11.188
water lily pond – palm garden – WP	350 m	46.659	11.185
apple orchard, vineyard, meadows – AV	350 m	46.659	11.185
succulents – SU	365 m	46.66	11.186
downy oak forest – DO	380 m	46.659	11.186
beech forest – BF	340 m	46.659	11.187
mediterranean sun garden – MS	360 m	46.66	11.185

The aim of the study was to document a representative species inventory, integrating standard methods and a closely staggered survey program. The use of artificial light sources has been proven in numerous studies as a key method for recording moth faunas (e.g., Huemer et al. 2011; Brehm et al. 2021). Mobile, battery-operated lighting devices with UV lamps are increasingly being used today. The advantages are obvious, as the use of several devices enables the simultaneous sampling in different habitats.

Fig. 1: Major sampling localities in the Gardens of Trauttmansdorff Castle (abbreviations refer to Table 1).

Fig. 2: Nocturnal survey with fluorescent gauze tower (Photo: P. Huemer).

In this research project, usually three to four gauze light pyramids (Fig. 2) and occasionally a gauze light tower were used. 2 × 20 W UV tubes for the pyramids and 1 × 20 W UV tube for the towers served as light sources. The survey took place on average every two to four weeks, especially in the summer months with increased frequency (8 May 2021, 20 May 2021, 5 June 2021, 19 June 2021, 7 July 2021, 17 July 2021, 23 August 2021, 29 September 2021, 20 October 2021, 31 October 2021). Additional sampling, mainly to cover early spring and late autumn species, was carried out in 2022 (18 February 2022, 18 March 2022, 29 March 2022, 26 May 2022, 26 August 2022, 22 October 2022). In addition, flowering plants in the gardens were sporadically checked for pollinators, using headlamps in the late twilight and early hours of the night. The recording of diurnal and twilight-active moths, as well as of some butterflies, was carried out as part of supplementary surveys in the late afternoon and early evening hours. Larvae and in particular leaf-mines were recorded during the day by selective visual controls. All species and relative frequencies were recorded on site. Identification was mainly based on morphology, such as phenotypic characters of the adults like wing patterns, or in the case of larvae mostly from specific habits such as leaf-mines and host plants. Few species were identified based on genitalia morphology in the laboratory. In addition, a larger number of taxonomically difficult samples were identified using DNA barcode sequences (for methods see Huemer & Hebert 2016). Reference material is kept in the Natural History Collections of the Tyrolean State Museums in Hall, Tirol.
About 1000 records were digitized with the BioOffice2 software and integrated into the databases of the Tyrolean Federal State Museums. The species inventory is mainly based on recent surveys from 2021 and 2022, but a few earlier data, especially on butterflies, were also included.

3. Results

3.1 Species inventory – overview

A total of 513 moth species from 48 families were identified (Appendix), but the number of resident species is likely to be considerably higher than this account. The ten most diverse families are Noctuidae (100 species), Geometridae (65 species), Tortricidae (53 species), Crambidae (33 species), Gracillariidae (29 species), Erebidae (29 species), Pyralidae (29 species), Gelechiidae (22 species), Nepticulidae (19 species), and Notodontidae (15 species). The remaining 119 species belong to 38 families, most of which are represented by a moderately low species diversity.
Of the total species inventory, 232 species from 12 families, or 45.2 %, belong to the so-called Macrolepidoptera whereas with 281 species from 36 families (54.8 %) the majority of the species belong to the Microlepidoptera.

3.2 Remarkable species

3.2.1 First national and provincial records

The surveys conducted in the Gardens of Trauttmansdorff Castle revealed 15 first species records for South Tyrol, including 3 species that were previously unknown from Italy! The discovery of some of these species is surprising, particularly given that the Gardens of Trauttmansdorff Castle are largely anthropogenic and located in a mostly urbanized and agricultural area of South Tyrol. Further, the Italian fauna has been extensively studied in recent decades, making such discoveries all the more remarkable. A detailed discussion of new faunistic records is provided below (for *Coleophora texanella* and *Phthorimaea operculella*, see the subchapter on Neozoa).

***Zimmermannia amani* (Svensson, 1966) (Nepticulidae)**
Material examined: Gardens of Trauttmansdorff Castle, riverine forest, 1 June 2021, 3 specimens (DNA barcode ID TLMF Lep 30893, DNA barcode ID TLMF Lep 30894).
Biology: The caterpillar of this species is most likely a bark miner that lives in the branches and trunks of elm trees. Although successful breeding of the species has not yet been achieved, suspected mines have been regularly found in the moth's habitat (Nieukerken et al. 2010).
Distribution: Originally described from Sweden and for a long time only known only from a few countries, this species has been discovered in several parts of Europe and in the Far East, from China to Japan, in recent years. Therefore, expansion of its range is possible (Nieukerken et al. 2010). First record for South Tyrol!

***Phyllocnistis valentinensis* M. Hering, 1936 (Gracillariidae)** (Fig. 3)
Material Examined: Gardens of Trauttmansdorff Castle, riverine forest, 31 October 2021, approximately 15 leaf-mines.

Fig. 3: Epidermal leaf-mine of *Phyllocnistis valentinensis* (photo: P. Huemer).

Biology: The larvae inhabit a distinct epidermal leaf mine on the underside of various narrow-leaved willow species, namely *Salix alba*, *S. fragilis*, *S. sepulcralis*, and *S. triandra*.
Distribution: The present distribution of *Phyllocnistis valentinensis* is still inadequately understood. Isolated sightings extend from Kazakhstan to Spain and parts of Central Europe (Slovakia, Austria, Germany), Belgium, and the Netherlands. The discovery in the Gardens of Trauttmansdorff Castle represents the first published sighting for Italy. Nonetheless, the species was already recorded in 2017 at two locations in the province of Torino (Nieukerken in litt.). First record for South Tyrol and first published record for Italy!

Apatema mediopallidum Walsingham, 1900 (Autostichidae)

Material examined: Gardens of Trauttmansdorff Castle, downy oak forest, 5 June 2021, 1 specimen (DNA barcode ID TLMF Lep 30792).
Biology: The biology is inadequately understood, and information on it is not secured due to the numerous confusions with other species.
Distribution: The species is probably more widespread in Southern Europe, although there is significant taxonomic research needed. Many individuals previously identified as *Apatema mediopallidum* actually belong to valid other species that have been synonymized with this taxon. Earlier records of alleged *A. mediopallidum* from South Tyrol are largely, if not exclusively, attributable to congeners upon sample checks.

Apodia martinii Petry, 1911 (Gelechiidae)

Material Examined: Gardens of Trauttmansdorff Castle, dry grassland, 19 June 2021, 1 specimen (DNA barcode ID TLMF Lep 30873).
Biology: The caterpillar of *Apodia martinii* is monophagous and feeds exclusively on the flower heads of *Pentanema hirtum* (= *Inula hirta*) (Petry 1911); however, its biology is still insufficiently understood and according to Gregersen & Karsholt (2023) it also feeds on *Inula salicina*, *I. conyzae*, *Pulicaria dysenterica,* and *Tripolium pannonicum*, host-plants which are normally attributed to *Apodia bifractella* (Duponchel, 1834). The flight time of the adults starts a month before that of this closely related and often confused species.
Distribution: The species status of *Apodia martinii* was uncertain for a long time and was only confirmed with the support of molecular data (Huemer & Karsholt 2020). As a result, the distribution of both species is not well known. *A. martinii* was previously known with certainty only north of the Alps and appears to be the only representative of the genus in certain regions, such as Finland. The first record of *A. martinii* in South Tyrol and Italy suggests a possibly wider distribution of the species in southern Europe.

Coleophora albitarsella Zeller, 1849 (Coleophoridae)

Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 7 July 2021, 1 specimen (genitalia slide).
Biology: The caterpillar lives in a single generation and creates distinct larval cases while feeding on various members of the mint family, including *Stachys* spp. and *Thymus* spp. It prefers warm and open habitats, such as dry grasslands.
Distribution: The species is found throughout large parts of Europe but represents the first record for South Tyrol.

Coleophora prunifoliae Doets, 1944 (Coleophoridae)

Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 19 June 2021, 1 specimen (DNA barcode ID TLMF Lep 30881).
Biology: The caterpillar inhabits woody Rosaceae and has been found in particular on *Prunus spinosa* and other *Prunus* spp., as well as on apple (*Malus*). After initially mining, it constructs a larval case that is indistinguishable from that of the related *Coleophora coracipennella* (Hübner, 1796) and feeds on leaves. .
Distribution: This species has been sporadically observed in Europe, but it is probably often overlooked as it can easily be mistaken for other species. This is the first record for South Tyrol.

***Cosmopterix pulchrimella* Chambers, 1875 (Cosmopterigidae)**
Material examined: Gardens of Trauttmansdorff Castle, downy oak forest, 31 October 2021, 1 specimen.
Biology: The caterpillar of this species feeds exclusively on *Parietaria* spp. and, outside of Europe, also on *Pilea pumila*. It creates characteristic blotch-mines in the leaves. The sequence of generations is still largely unknown, but it is likely that *Cosmopterix pulchrimella* has several generations.
Distribution: The species was originally described from the USA where it is widespread there. In Europe, it is primarily restricted to the Mediterranean region but has also been recorded in northern regions in recent years, including the British Isles and Belgium (Meert 2019, Parsons 2002). It is presumably classified as a neozoon, but it is uncertain whether it was introduced into Europe from the USA or vice versa.
Note: The first published evidence of this species in South Tyrol, from the Gardens of Trauttmansdorff Castle, is supplemented by a photograph from Bozen on Lepiforum (2008–2019).

***Vulcaniella pomposella* (Zeller, 1839) (Cosmopterigidae)**
Material Examined: Gardens of Trauttmansdorff Castle, water lily pond – palm garden, 19 June 2021, 3 specimens (DNA barcode ID TLMF Lep 30889).
Biology: The pre-imaginal stages and ecology of the species are unknown. However, based on adult records, it appears to be restricted to dry grasslands.
Distribution: The species is widely distributed in large parts of the Mediterranean and, to a lesser extent, in temperate regions of Europe. This is the first record for South Tyrol.

***Dichrorampha senectana* Guenée, 1845 (Tortricidae)**
Material examined: Gardens of Trauttmansdorff Castle, riverine forest, 23 August 2021, 1 specimen.
Biology: The caterpillar feeds in a single generation in the roots of *Chrysanthemum* sp. and therefore prefers extensively cultivated or semi-natural open land.
Distribution: Widespread in temperate Europe from the British Isles and Spain to the Balkans. This is the first record for South Tyrol.

***Dichrorampha vancouverana* McDunnough, 1935 (Tortricidae)**
Material Examined: Gardens of Trauttmansdorff Castle, dry grassland, 7 July 2021, 1 specimen.
Biology: The caterpillar of this species has a single generation and inhabits the rootstock of *Achillea millefolium*. It is mainly found in dry grasslands but can also be found in anthropogenic habitats such as gardens.
Distribution: The species was originally described from Canada, where it is considered as an introduced species. It is widely distributed throughout Europe. This is the first record for South Tyrol.

***Prochoreutis sehestediana* (Fabricius, 1776) (Choreutidae)**
Material examined: Gardens of Trauttmansdorff Castle, riverine forest, 6 September 2013, 2 specimens collected by Timo Kopf.
Biology: This species inhabits moist areas with stands of *Scutellaria galericulata*, which is the caterpillar food-plant, as well as other species of the same genus. The adults are active during the daytime.
Distribution: This species is found across a vast area spanning from Europe to East Asia. This is the first record for South Tyrol!

3.2.2 Taxonomic reassessment

Two species have been misidentified in previous literature in South Tyrol and they occur either in addition to or instead of their closely related species in the province.

Anarsia innoxiella Gregersen & Karsholt, 2017 (Gelechiidae)

Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 19 June 2021, 3 specimens.

Biology: The caterpillar of this species feeds on *Acer campestre*, although it may also feed on other maple species. This distinguishes it significantly from the closely related *Anarsia lineatella*, which feeds on woody Rosaceae. The adults are easily attracted to artificial light.

Distribution: The detailed distribution pattern of this species, which was only recently differentiated from *A. lineatella* Zeller, 1839 (Gregersen & Karsholt 2017), still requires further investigation. According to the original description, *A. innoxiella* occurs in large parts of Europe, with the exception of the Iberian Peninsula, and extends into Turkey. Specimens from South Tyrol have been known for some time (Huemer & Hebert 2016) but were previously misidentified as *A. lineatella*. Both species have been found in sympatry in the Gardens of Trauttmansdorff Castle.

Elegia atrifasciella Ragonot, 1825 (Pyralidae)

Material examined: Gardens of Trauttmansdorff Castle, downy oak forest, 17 July 2021, 2 specimens.

Biology: The larvae are known to inhabit various oak species, but due to confusion with *Elegia fallax* (Staudinger, 1881), their biology has not yet been adequately described.

Distribution: Previously published records from Europe under the name *Elegia fallax* mostly correspond to *E. atrifasciella*, except for material from the Iberian Peninsula and potentially the Balkans. All confirmed reports from Italy also belong to this species (Slamka 2019).

3.2.3 Neozoa

Due to the presence of diverse non-native flora, botanical gardens have the potential to serve as habitats for a larger number of Neozoa, which are non-native species that arrived in new areas with direct or indirect support from humans, following the discovery of America in 1492. In the Gardens of Trauttmansdorff Castle, several Lepidoptera species have been found, which were introduced to Central Europe either intentionally or unintentionally. This group includes 11 species that are discussed in more detail in this article. Mediterranean species, such as *Choreutis nemorana* (Hübner, 1799), which have a strong tendency to spread northwards, are not included in this discussion.

Aspilanta oinophylla (van Nieukerken & Wagner, 2012) (Heliozelidae) (Fig. 4)

Material examined: Gardens of Trauttmansdorff Castle, apple orchard, vineyard, meadows, 23 August 2021, 29 September 2021, several leaf-mines.

Biology: *Aspilanta oinophylla* is a well-established pest on European grapes and can be easily identified by its blotch-mine and the oval excavation in the last larval stage. It inhabits cultivated wine (*Vitis vinifera*) and ornamental wine (*Parthenocissus* spp.).

Distribution: It is found in North America and northern Italy, and it is expected to spread to other wine-growing regions of Europe in the future.

Note: *Aspilanta oinophylla* was first discovered in northern Italy, and it was identified three years later by Baldessari et al. (2009). The suspicion that it might be of North American origin was confirmed in the subsequent description by Nieukerken et al. (2012), which also provided evidence of its occurrence in eastern North America based on genetic samples. Although *A. oinophylla* has not yet been specifically recorded in South Tyrol's lepidopterological literature, it has been known to occur in the province since at least 2014 (pers. Observation).

Fig. 4: Leaf-mine of *Aspilanta oinophylla* an introduced species from North America on grape (Photo: P. Huemer).

Cameraria ohridella Deschka & Dimić, 1986 (Gracillariidae)

Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 19 June 2021.
Biology: The species is known as a leaf-miner on various species of *Aesculus* incl. cultivars, but it prefers Horse Chestnut (*Aesculus hippocastanum*). Isolated observations on *Acer pseudoplatanus* are always associated with the simultaneous occurrence of the main host plant.
Distribution: Since its description in 1986, the species has spread to large parts of Europe. It first arrived in North Macedonia in 1984 and then in Upper Austria in 1989. Well-known as the "Beer Garden Moth," it has caused numerous headlines. The main problems associated with regular outbreaks are early leaf loss and autumn flowering of Horse Chestnuts, which increases the risk of frost damage.

Macrosaccus robiniella (Clemens, 1859) (Gracillariidae)

Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 7 July 2021; downy oak forest, 20 October 2021.
Biology: The species primarily inhabits folded mines on the leaf underside of the North American Black Locust (*Robinia pseudoacacia*) and occasionally of the Bristly Black Locust (*Robinia hispida*).
Distribution: The Black Locust leaf-miner, which was introduced to Europe from North America, was first documented in northern Switzerland in 1983 and as early as 1988 in northern Italy (Whitebread 1990).

Phyllocnistis vitegenella Clemens, 1859 (Gracillariidae)

Material examined: Gardens of Trauttmansdorff Castle, apple orchard, vineyard, meadows, 7 July 2021, 23 August 2021, and 29 September 2021, several leaf-mines.
Biology: This species produces epidermal leaf mines on grapevines (*Vitis vinifera*) and possibly also on related taxa such as *Parthenocissus* spp. Furthermore, it is highly likely to affect other indigenous *Vitis* spp. in North America.
Distribution: Originally from North America, this species was first detected in Europe (Italy) in 1995 (Marchesini et al. 2000). Since then, it has slowly spread across wine-growing regions, including southern Switzerland, Austria, Slovenia, and Bulgaria. It has also been reported in South Tyrol in Lepiforum (2008–2019).

***Phyllonorycter issikii* (Kumata, 1963) (Gracillariidae)**
Material examined: Gardens of Trauttmansdorff Castle, holm oak forest, 29 September 2021, several leaf-mines.
Biology: This species is a leaf-miner of lime trees (*Tilia cordata*, *T. platyphyllos*, and cultivated *Tilia* spp.) in Europe.
Distribution: Originally described from Japan in 1963, this species has now become established in the Far East and has rapidly spread over large areas of Europe within a few decades. Its introduction to Moscow was probably a secondary one. As early as 2006 it was recorded in South Tyrol.

***Blastobasis glandulella* (Riley, 1871) (Blastobasidae)**
Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 19 June 2021, 17 July 2021; downy oak forest, 20 May 2021, 19 June 2021, 20 October 2021; holm oak forest, 20 October 2021; riverine forest, 17 July 2021; wetland, 19 June 2021, 7 July 2021; apple orchard, vineyard, meadows, 23 August 2021; water lily pond – palm garden, 19 June 2021.
Biology: The larvae live inside the fruits of *Quercus* spp. and *Castanea sativa*. However, the sequence of generations is still unclear. Adults are easily attracted to artificial light.
Distribution: The species was first identified in Croatia in the 1980s as a new record for Europe but was erroneously re-described. In fact, it was described from North America over 100 years earlier. It has since established itself in many southern European countries, and its distribution now extends from Spain to Romania and as far north as Germany. The species was first recorded in South Tyrol in 2000 (Huemer 2001).

***Coleophora texanella* Chambers, 1878 (Coleophoridae)**
Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 19 June 2021, 1 specimen (DNA barcode ID TLMF Lep 30897), 17 July2021, 1 specimen (DNA barcode ID TLMF Lep 30839).
Biology: This species lives as a monophagous leaf-miner on *Portulaca oleracea* and is regularly attracted to artificial light.
Distribution: *Coleophora texanella* has established itself in several southern European countries in recent years, but the species originates from North America (Landry et al. 2013). The first records from Italy were published under the erroneously new name of *C. coxi* (Baldizzone & van der Wolf 2007). First record for South Tyrol!

***Phthorimaea operculella* Zeller, 1873 (Gelechiidae)**
Material examined: Gardens of Trauttmansdorff Castle, downy oak forest, 31 October 2021, 1 specimen.
Biology: The species is an important pest on various Solanaceae including tobacco.
Distribution: This neotropical species, originally from the Americas, is now widespread in Europe, particularly in the Mediterranean region. It becomes increasingly rare towards the north and cannot survive the winter north of the Alps. First published record for South Tyrol!
Note: The first published record for South Tyrol from the Gardens of Trauttmansdorff Castle is supplemented by a photograph from Bozen in Lepiforum (2008–2019).

***Ditula angustiorana* (Haworth, 1811) (Tortricidae)**
Material examined: Gardens of Trauttmansdorff Castle, downy oak forest, 5 June 2021, 1 specimen; apple orchard, vineyard, meadows, 23.viii.2021, 2 specimens.
Biology: The caterpillar is polyphagous and feeds on a large number of different woody plants, and occasionally herbaceous species, particularly those that are favoured in horticulture. Its host plants include *Hedera helix*, *Buxus sempervirens*, *Thuja* spp., and *Taxus baccata*.
Distribution: This species is probably widely introduced, with records from large parts of Europe, as well as North Africa, Asia Minor, and North America.

Cydalima perspectalis (Walker, 1859)

Material Examined: Gardens of Trauttmansdorff Castle, dry grassland, 7 July 2021; downy oak forest, 6 June 2021, 7 July 2021, 26.viii.2022; riverine forest, 23.viii.2021; apple orchard, vineyard, meadows, 7 July 2021; mediterranean sun garden, 17 July 2021.
Biology: In Europe, the Box Tree Moth feeds exclusively on the genus *Buxus*, particularly the partially native *Buxus sempervirens*, including numerous cultivated forms. The larvae live well-protected between spun leaves and may also gnaw the bark of the host-plant in cases of heavy infestation. Pupation takes place in spun leaves. The species has at least two generations, while in South Tyrol, it may have up to three generations, but reliable data are still lacking.
Distribution: The invasive Box Tree Moth, which was originally introduced from China, is considered a serious threat to the box tree, which is particularly common in gardens. It is widespread in its native range in East Asia. The species was first discovered in southern Germany in 2007 (Lepiforum 2008–2019) and has since rapidly spread across large parts of Europe, but there are still no records of its presence in Scandinavia.

Samia cynthia (Drury, 1773) (Fig. 5)

Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 7 July 2021, 1 specimen.
Biology: Larvae of *Samia cynthia* feed exclusively on *Ailanthus altissima*, a host-plant with origins in China and North Vietnam. This invasive neophyte is now widespread worldwide under suitable climatic conditions. *S. cynthia* occurs together with the host-plant, even in urban areas.
Distribution: Originally described from East Asia, the species was introduced into Europe and North America for silk production and established itself primarily through active exposure and secondarily through colonization of new habitats in warmer areas. In Europe it is currently known from eastern Austria, northern Croatia and Spain, parts of France, southern Switzerland, and northern Italy. In South Tyrol it is only known from a few observations.
Note: Gredler (1866) had already reported on the breeding of *Samia cynthia* in South Tyrol for the purpose of silk production. The efforts, which were ultimately unsuccessful from an economic point of view, led to the release of the species in northern Italy and other areas of Europe.

Fig. 5: The spectacular *Samia cynthia* was attracted by artificial ligth (Photo: P. Huemer).

3.2.4 Migratory species

A significant portion of the moth inventory consists of migratory species (Table 2). These species migrate more or less annually from southern regions, particularly neighbouring Mediterranean countries, but generally do not survive the winter in more northern areas. In addition to the listed moths, a few butterflies from the research area are also well-known migratory species, namely *Vanessa cardui* (Linnaeus, 1758) and *Vanessa atalanta* (Linnaeus, 1758). However, due to the lack of detailed data, two migratory species reported from the gardens without further information (Kompatscher in litt.), namely *Acherontia atropos* (Linnaeus, 1758) and *Daphnis nerii* (Linnaeus, 1758), have not been included. Apart from these long-distance migrants, several species exhibit a tendency to migrate within their distributional area, such as species that migrate to higher altitudes during the summer.

Table 2: Migratory moth species observed in the Gardens of Trauttmansdorff Castle; arranged in alphabetical oder of families and species

Species	Family
Nomophila noctuella (Denis & Schiffermüller 1775)	Crambidae
Palpita vitrealis (Rossi 1794)	Crambidae
Udea ferrugalis (Hübner, 1796)	Crambidae
Uresiphita gilvata (Fabricius 1794)	Crambidae
Catocala nymphagoga (Esper 1787)	Erebidae
Dysgonia algira (Linnaeus 1767)	Erebidae
Autographa gamma (Linnaeus 1758)	Noctuidae
Helicoverpa armigera (Hübner 1808)	Noctuidae
Macdunnoughia confusa (Stephens 1850)	Noctuidae
Mythimna albipuncta (Denis & Schiffermüller 1775)	Noctuidae
Mythimna l-album (Linnaeus 1767)	Noctuidae
Mythimna vitellina (Hübner 1808)	Noctuidae
Phlogophora meticulosa (Linnaeus 1758)	Noctuidae
Xestia c-nigrum (Linnaeus 1758)	Noctuidae
Agrius convolvuli (Linnaeus 1758)	Sphingidae
Macroglossum stellatarum (Linnaeus 1758)	Sphingidae

3.2.5 Examples of further noteworthy species

Out of the many species that are interesting for various reasons, such as striking biology, endangered, protection status, etc., five species are briefly discussed.

***Elophila nymphaeata* (Linnaeus, 1758) (Crambidae)** (Fig. 6)

Material Examined: Gardens of Trauttmansdorff Castle, water lily pond – palm garden, 23.viii.2021, 1 specimen.

Biology: *Elophila nymphaeata* is one of the few European Lepidoptera species with submerged larval behaviour, meaning they live underwater in spun-together plant parts. The larvae prefer to feed on *Nymphaea* spp., *Nuphar* spp., and *Potamogeton* spp. Oxygen is absorbed through specially developed tracheal gills. The adults have fully developed wings and can be attracted to artificial light or active at dusk.

Distribution: The species is widespread in large parts of Europe and Asia, with its range extending to the Far East.

***Euplagia quadripunctaria* (Poda, 1761) (Erebidae)**

Material examined: Gardens of Trauttmansdorff Castle 17 July 2021, 1 specimen; 23.viii.2021, 4 specimens, dry grassland (17 July 2021), riverine forest (23 August 2021, 1 specimen), downy oak forest (26 August 2022, 2 specimens), and succulents (23 August 2021, 1 specimen).

Fig. 6: *Elophila nymphaeata* is famous for its semiaquatic life habits (Photo: P. Huemer).

Biology: *Euplagia quadripunctaria* is a polyphagous species that feeds on various herbaceous plants and occasionally on shrubs. The moth prefers humid forest edges and clearings, and can be found in late summer, especially on the nectar-rich flowers of *Eupatorium cannabinum*. In the Gardens of Trauttmansdorff Castle, adults were regularly observed on *Buddleja davidii*.
Distribution: This species is widespread, particularly in central and southern Europe, and can be found as far east as the Middle East and the Urals.
Note: This species is listed with priority protection status under the EU Habitats Directive.

Episema glaucina (Esper, 1789) (Noctuidae)

Material examined: Gardens of Trauttmansdorff Castle, dry grassland, 29 September 2021, about 10 specimens.
Biology: This species shows considerable external variation with different colour forms. Larvae live on various lily plants, such as *Muscari* spp. and *Ornithogalum* spp., but most likely on grass lily (*Anthericum* spp.) in the study area. They feed on all parts of the host plant, including leaves, stems, tubers, and bulbs. The moth appears late in the year and is easily observed near light sources.
Distribution: Widespread from southern Europe to the Urals, but becomes increasingly rare northward and is absent from the British Isles and northern Europe.

Cerura erminea (Esper, 1783) (Notodontidae)

Material Examined: Gardens of Trauttmansdorff Castle, downy oak forest, 5 June 2021, 1 specimen.
Biology: The larvae feed on *Salix* spp. and *Populus* spp. (Salicaceae). They are characterized by an exceptional defensive behaviour and can even spray formic acid. Moreover, red tubes protrude from the fork-like extensions at the end of the abdomen for further deterrence.
Distribution: The species has a sporadic distribution from southern and central Europe to Japan, but is absent from the northern parts of the European continent.
Note: This species is very rare in South Tyrol and is considered endangered according to the regional Red List (Huemer 1994).

Fig. 7: With the increasingly rare *Saturnia pyri* the largest European moth was recorded (Photo: P. Huemer).

***Saturnia pyri* (Denis & Schiffermüller, 1775) (Saturniidae)** (Fig. 7)
Material examined: Gardens of Trauttmansdorff Castle, downy oak forest, 8 May 2021, 1 specimen, 20 May 2021, 1 specimen.
Biology: The impressive caterpillar feeds on a variety of deciduous trees, but prefers Rosaceae species such as *Prunus* spp., *Pyrus* spp., and *Malus domestica*. It can be found in both semi-natural woodlands and anthropogenic habitats such as gardens. Pupation takes place in a pear-shaped cocoon which is typical for members of this moth family.
Distribution: *Saturnia pyri* is more or less restricted to southern parts of Europe.
Note: *Saturnia pyri* is the largest native Lepidoptera species in Europe, with a wingspan of up to 15 centimetres.

3.3 Checklist of butterflies

Few butterfly species were previously documented in a 2013 study on pollinator surveys with a focus on wild bees conducted by Mag. Timo Kopf, as well as through occasional observations by visitors and staff of the gardens, and the author's personal observations in recent years. This unpublished list has now been updated with the first records of *Libythea celtis* and *Favonius quercus* in 2021. In total, 17 butterfly species have been identified in the Gardens of Trauttmansdorff so far (Table 3).

Table 3: Records of butterflies in the Gardens of Trauttmansdorff Castle; arranged in alphabetical oder of families and species

Species	Family
Ochlodes sylvanus (Esper 1777)	Hesperiidae
Cacyreus marshalli Butler 1898	Lycaenidae
Favonius quercus (Linnaeus 1758)	Lycaenidae
Polyommatus icarus (Rottemburg 1775)	Lycaenidae
Scolitantides orion (Pallas 1771)	Lycaenidae
Aglais io (Linnaeus 1758)	Nymphalidae
Argynnis paphia (Linnaeus 1758)	Nymphalidae
Libythea celtis (Laicharting 1782)	Nymphalidae
Vanessa atalanta (Linnaeus 1758)	Nymphalidae
Vanessa cardui (Linnaeus 1758)	Nymphalidae
Iphiclides podalirius (Linnaeus 1758)	Papilionidae
Anthocharis cardamines (Linnaeus 1758)	Pieridae
Colias sp.	Pieridae
Leptidea sp.	Pieridae
Pieris brassicae (Linnaeus 1758)	Pieridae
Pieris napi (Linnaeus 1758)	Pieridae
Pieris rapae (Linnaeus 1758)	Pieridae

3.4 Habitat requirements

3.4.1 Imaginal habitat associations

The species records from the present survey are mostly based on adult observations. As a result, although moths have been found and associated with specific habitats, their larval habitats may not necessarily correspond (Table 4). Nonetheless, the number of adult records in a particular habitat still indicates the diversity of the habitat, since the flight activity of most taxa is in proximity to their later larval habitat.

Table 4: Species number per habitat type in the study area of Gardens of Trauttmansdorff Castle.

Habitat type	Species no.
open wetland – OW	65
riverine forest – RI	142
dry grassland – DG	263
holm oak forest – HO	77
water lily pond – palm garden – WP	18
apple orchard, vineyard, meadows – AV	66
succulents – SU	17
downy oak forest – DO	270
beech forest – BF	25
mediterranean sun garden – MS	36

Irrespective of the varying intensity of sampling efforts, it is noticeable that there is a significantly increased number of species in semi-natural dry grassland and downy oak forests. On the other hand, species diversity is low in more anthropogenic substitute habitats. This trend was observed in several methodologically comparable simultaneous surveys. In fact, due to ongoing transformations and plantings, classic gardens appear to be of limited use for the majority of species as nectar habitat for adults and especially as potential larval habitat. However, some Neozoa or species from initially anthropogenic habitats can potentially permanently settle in these gardens.

3.4.2 Ecological guilds

Assigning species to so-called ecological guilds and, therefore, to species communities with similar ecological requirements, provides a good proxy for assessing the importance of different habitats, compared to relying solely on imaginal observations. Species are categorised into various habitats within the study area based on the autecological requirements of their pre-imaginal stages. Highly specialized species are restricted to a single habitat, while less specialized species can develop in different habitats, and multiple records are possible in such cases.
Overall, the species found in forested areas and dry, warm grasslands are of crucial importance for the species diversity. The identified species are assigned to their respective habitats following Aistleitner (2006) and Huemer et al. (2022) (Appendix).

Limnic Megabiome

- Limnic ecosystem (limn): This refers to species that inhabit standing or flowing water. Associated species: 1.

Terrestrial and Semiterrestrial Megabiome

Woody corridors:
Forest edge communities are not considered separately.

- Silvicol-hygrophilous (silv-hygro): Refers to various types of wooded areas with high groundwater levels, such as floodplain, swamp forests, and moor forests. Associated species: 156.

- Silvicol-mesophilous (silv-meso): Refers to species of wooded areas in moderately humid locations, especially boreal coniferous forests and temperate deciduous forests, as well as hedges. Associated species: 186.
- Silvicol-xerophilous (silv-xero): Refers to types of heat-favoured woody areas in dry and sunny locations, in particular pine forests of different types, mountain pine bushes, and types of thermophilous oak forests. Associated species: 150.

Grassland corridors:

- Praticol-hygrophilous (prat-hygro): Refers to species of herbaceous plant communities in moist to wet sites. Associated species: 19.
- Praticol-mesophilous (prat-meso): Refers to species of moderately moist anthropogenic meadows and pastures, and intensive agricultural grassland. Associated species: 63.
- Oreocol-praticol-mesophilous (oreo-prat-meso): Refers to species of high montane to alpine grassland. Associated species: 2.
- Praticol-xerophilous (prat-xero): Refers to species of herbaceous plant communities in dry and warm sites, especially dry grassland. Associated species: 91.

Initial ecosystems:

- Initial-natural (init-nat): Refers to species of natural pioneer stages or of permanent communities with low productivity below the alpine-nival altitude level, in particular rock biotopes and riverine gravel flats. Associated species: 25.
- Initial anthropogenic (init-anth): Refers to unstable agricultural production areas as well as ecosystems in urban areas, especially gardens, fields, and ruderal grassland. Associated species: 43.

Indifferent species:

- Indifferent (indiff): Refers to ubiquitous and synanthropic species. Associated species: 26.
- Indifferent-immigrant (indiff-immig): Refers to immigrant species. Associated species: 17.

3.5 Phagism – specialists versus generalists

Lepidoptera, as a largely phytophagous insect order, are essentially dependent on their food sources. In the adult stage, they predominantly feed on flowers as a source of nectar, or in exceptional cases, pollen. Often, the mouthparts of adults are reduced and therefore no feeding takes place at this stage. However, the presence of suitable caterpillar foodplants is always of particular importance. Only in exceptional cases does this stage feed more or less indiscriminately on various plants. Rather, food selection is specific and restrictive, limited to a plant genus or even just a single plant species. Jaroš & Spitzer (2002) classified Lepidoptera larvae into trophic categories that show the extent of specialization (Table 5).

Table 5: Trophic categories according to Jaroš & Spitzer (2002) and number of assigned species recorded in the Gardens of Trauttmansdorff Castle.

Definition	Description	Recorded species
monophagous (1)	species feed on a single plant species	38
monophagous (2)	species feed on a single plant genus	111
oligophagous (3)	species feed on a group of closely related plant genera	69
oligophagous (4)	species feed on a single plant family	15
polyphagous (5)	species feed on more than one plant family (woody plants)	60
polyphagous (6)	species feed on more than one plant family (herbaceous plants)	67
polyphagous (7)	species feed on more than one plant family (woody and herbaceous plants)	42
mycophagous (8)	species feed on lichens, algae, fungi (deadwood), or moss	28
detritivorous (9)	species feed on detritus (including keratophagous species)	24

4. Discussion

4.1 General remarks

The Gardens of Trauttmansdorff Castle, despite being situated in a predominantly urban and intensely cultivated area (particularly apple orchards and vineyards), serve as a relatively valuable relic habitat for nocturnal moths, with a documented species count of 513. However, compared to similar forested locations in South Tyrol, the observed diversity appears to be degraded. For instance, in a botanically comparable site in Montiggl (municipality of Eppan), a total of 828 species (including butterflies) were recorded over a period of nearly 20 years (Huemer 2012). Nevertheless, within each survey period between 1993 and 2010, the number of species was limited to a maximum of 500, which is largely consistent with the diversity recorded in the Gardens of Trauttmansdorff Castle.
However, making a direct comparison of species diversity at a regional level proves difficult, if not impossible. In one of the few extensive studies in Central Europe, Pernstich & Krenn (2004) identified over 600 animal species within the botanical garden of the University of Vienna, including 104 species of Lepidoptera, among which were 83 moth species. These numbers seem unusually low and are probably attributed to methodological issues and the neglect of important and species-rich groups such as microlepidoptera. For instance, long-term inventories of nocturnal moths in two approximately 60-hectare botanical gardens in Hungary yielded around 800 species each (Szabóky 2007, 2013), while Ronkay & Tóth (personal communication) documented 465 species (with only a few microlepidoptera identified) in an area of 27 hectares. Similarly, in another extensive long-term inventory of moths at Treborth Botanic Garden in Wales, United Kingdom, approximately 500 species with over 300,000 individuals have been recorded since 1989, primarily using a continuously operated light-trap (https://treborth.bangor.ac.uk/moths.php.en). However, it's important to note that the species inventory includes only about 100 microlepidoptera species, which are likely to be significantly under-represented. Nevertheless, the study still shows a concentration of woodland and grassland species, similar to what has been observed in the Gardens of Trauttmansdorff Castle. Taking the extended survey periods into account, the species diversity at both locations appears to be similarly high.
The still significant number of faunistic discoveries, despite intensive surveys in comparable habitats (Huemer 2012; Huemer & Hebert 2012), surprises and highlights the often localized niche occupation in microhabitats, such as *Phyllocnistis valentinensis*, aswell as probable new colonizations or introductions, as observed in *Coleophora texanella*. Conversely, cryptic species have been identified using molecular methods (Huemer & Hebert 2016), including *Apodia martinii*.
The fact that regionally endangered species have also been detected (Huemer 1994) further demonstrates the high value of the Gardens of Trauttmansdorff Castle and, at the same time, calls for a focus on zoological diversity alongside fundamental botanical and floristic tasks and the implementation of measures for long-term conservation.

4.2 Conservation aspects

Large parts of the Gardens of Trauttmannsdorf Castle are characterized by intensive anthropogenic use. This is not surprising, as the attractiveness of the gardens for visitors is essentially determined by various and constantly changing aspects of flowering plants, often from other countries or even continents. Although hardly any adaptations in favour of the moth fauna are possible here, the considerable extent of the entire area allows at least occasional improvements for moths and other insects groups.

- Extensification of lawn use: the meadow areas currently being worked with a robotic lawn mower are practically and largely worthless for moths. An extensification concept should be developed in this part of the meadows, which could be designed to be attractive for visitors.

- Leaf removal: fallen leaves in the area of the natural habitats (downy oak forest, riverine forest) should not be removed, but deposited after cleaning the paths in the adjacent habitats (protection of leaf-miners).
- Light pollution: the currently used artificial lighting should be reduced to a minimum and activated only during visiting hours. Apart from the light sources used (preferably in the long-wave range) (see Brehm et al. 2021), the sealing of the lights should be checked regularly, to ensure moths and other insects do not enter and become trapped.

Zusammenfassung

Im Rahmen umfassender Untersuchungen zur Schmetterlingsfauna (Lepidoptera exkl. Papilionoidea) der Gärten von Schloss Trauttmansdorff in Meran (Südtirol) wurden von Mai 2021 bis November 2022 insgesamt 513 Arten aus 48 Familien erfasst. Von den zehn artenreichsten Familien umfassen die Noctuidae 100 Arten, gefolgt von den Geometridae (65 Arten), Tortricidae (53), Crambidae (32), Gracillariidae (29), Erebidae (29), Pyralidae (29), Gelechiidae (22), Nepticulidae (19) und Notodontidae (15n). *Phyllocnistis valentinensis* M. Hering 1936 (Gracillariidae) und *Apodia martinii* Petry 1911 (Gelechiidae) werden erstmals für Italien gemeldet. 13 weitere Arten sind Neufunde für die Provinz Bozen-Südtirol. Sechzehn Arten gehören zu den nicht bodenständigen Wanderfaltern, und weitere elf Arten sind Neozoa, die ursprünglich aus anderen Kontinenten stammen. Darüber hinaus werden 17 Arten von Tagfaltern aus dem Untersuchungsgebiet aufgeführt. Eine detaillierte Analyse der ökologischen Gilden und des Phagismusgrades aller Arten unterstreicht die Bedeutung der halbnatürlichen Lebensräume. Bei weitem am vielfältigsten sind Trockenrasen mit 263 Artnachweisen sowie verschiedene Waldlebensräume, insbesondere Flaumeichenwälder mit 270 Arten. Im Vergleich dazu ist die Bedeutung intensiv genutzter Gartenbereiche für Nachtfalter gering.

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Appendix

Species inventory, habitat, ecological guilds and trophic categories

Taxa in alphabetical order (family/genus/species); OW – MS = habitat type (abbreviations see Table 1); EGIL = ecological guilds (abbreviations see subchapter ecological guilds); TC = trophic category, (1) – (9) (abbreviations see Table 5).

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Adelidae												
Nematopogon schwarziellus		x									silv-hygro	(9)
Alucitidae												
Pterotopteryx dodecadactyla			x						x		silv-meso, silv-xero	(1)
Argyresthiidae												
Argyresthia amiantella			x								silv-meso	(1)
Argyresthia bonnetella		x	x	x							silv-hygro, silv-xero	(3)
Argyresthia conjugella			x			x		x		x	silv-hygro, silv-meso	(3)
Argyresthia goedartella		x	x								silv-hygro	(3)
Argyresthia pruniella			x					x			silv-hygro, silv-meso	(2)
Argyresthia spinosella								x			silv-xero, init-anth	(2)
Autostichidae												
Apatema apolausticum			x					x			silv-xero	(9)
Apatema mediopallidum								x			silv-xero	(9)
Symmoca caliginella								x			silv-xero, prat-xero, init-nat	(9)
Symmoca signatella	x		x			x		x			silv-xero, prat-xero	(9)
Bedelliidae												
Bedellia somnulentella		x									prat-hygro, init-anth	(3)
Blastobasidae												
Blastobasis glandulella			x					x			silv-xero, silv-meso	(3)
Hypatopa segnella			x								silv-xero	?
Bucculatricidae												
Bucculatrix cidarella		x									silv-hygro	(2)
Bucculatrix nigricomella		x			x						prat-meso	(2)
Bucculatrix ulmella			x					x			silv-xero	(2)
Chimabachidae												
Diurnea fagella								x	x		silv-hygro, silv-meso, silv-xero	(5)
Choreutidae												
Choreutis nemorana										x	init-anth	(1)
Prochoreutis sehestediana	x										silv-hygro, prat-hygro	(2)
Coleophoridae												
Coleophora ahenella								x			silv-hygro, silv-meso	(5)
Coleophora albitarsella			x								prat-hygro	(3)
Coleophora anatipennella			x								silv-xero	(3)
Coleophora binderella		x									silv-hygro	(3)
Coleophora deauratella								x			prat-meso	(3)
Coleophora flavipennella		x	x					x			silv-xero	(2)
Coleophora galbulipennella								x			prat-meso, prat-xero	(3)
Coleophora laricella								x			silv-meso, silv-xero	(1)
Coleophora lineolea			x								silv-xero, prat-xero	(3)
Coleophora lutipennella			x					x			silv-xero	(2)
Coleophora ornatipennella				x							prat-meso, prat-xero	(6)
Coleophora prunifoliae								x			silv-meso, silv-xero	(5)
Coleophora texanella								x			init-anth	(1)
Coleophora zelleriella			x								silv-hygro	(2)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Cosmopterigidae												
Cosmopterix pulchrimella								x			init-nat, init-anth	(3)
Vulcaniella pomposella			x		x	x				x	prat-xero	(3)
Cossidae												
Cossus cossus		x	x					x			silv-hygro, silv-meso, init-anth	(5)
Zeuzera pyrina			x								silv-hygro, silv-meso	(5)
Crambidae												
Agriphila inquinatella			x					x			prat-meso, prat-xero	(6)
Agrotera nemoralis								x			silv-meso	(5)
Anania coronata			x								silv-hygro	(5)
Anania crocealis		x									prat-meso	(6)
Anania terrealis				x							prat-meso	(6)
Catoptria falsella	x	x	x	x				x	x		silv-hygro, silv-meso	(8)
Catoptria lythargyrella			x								prat-xero	(3)
Catoptria myella	x		x					x			prat-xero, init-nat	(8)
Chrysoteuchia culmella								x			prat-meso, init-anth	(6)
Crambus lathoniellus								x			indiff	(3)
Crambus pascuella	x										prat-meso	(6)
Crambus perlella	x	x	x				x	x			indiff	(3)
Crambus uliginosellus	x								x		prat-hygro	(4)
Cydalima perspectalis		x	x			x		x		x	init-anth	(2)
Ecpyrrhorrhoe diffusalis			x								prat-xero	(6)
Elophila nymphaeata					x						limn	(6)
Eudonia lacustrata		x	x			x		x			silv-hygro, silv-meso	(8)
Eudonia mercurella		x				x		x			silv-hygro, silv-meso	(8)
Metasia ophialis		x	x			x		x			silv-xero, prat-xero	?
Nomophila noctuella	x					x					indiff-immig	(6)
Ostrinia nubilalis	x		x			x					prat-meso, init-anth	(6)
Palpita vitrealis			x			x		x			indiff-immig	(7)
Patania ruralis		x	x								prat-meso, init-anth	(6)
Pediasia contaminella			x								prat-xero	(3)
Pediasia luteella	x					x		x			prat-xero	(3)
Platytes cerussella			x								prat-xero	(6)
Pyrausta aurata						x					prat-meso	(3)
Pyrausta despicata		x				x		x		x	prat-meso	(6)
Pyrausta sanguinalis						x					prat-xero	(3)
Sitochroa verticalis						x		x			prat-meso	(6)
Udea ferrugalis	x	x	x	x		x		x		x	indiff-immig	(6)
Uresiphita gilvata			x								indiff-immig	(4)
Xanthocrambus saxonellus			x					x			prat-xero	(3)
Drepanidae												
Habrosyne pyritoides			x								silv-hygro, silv-meso, silv-xero, prat-hygro	(2)
Ochropacha duplaris	x										silv-hygro	(5)
Thyatira batis			x								silv-hygro, silv-meso, silv-xero, prat-hygro	(2)
Watsonalla binaria		x				x		x			silv-meso	(5)
Elachistidae												
Elachista consortella			x					x			prat-meso, prat-xero, init-anth	(3)?
Elachista juliensis			x					x			silv-xero, prat-xero	(1)
Elachista occidentalis			x					x			prat-meso	(3)?

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Elachista occulta			x					x			silv-xero, prat-xero	(2)
Haplochrois ochraceella								x			silv-xero	?
Epermeniidae												
Epermenia pontificella			x					x			prat-xero	(2)
Erebidae												
Amata phegea			x								silv-xero, prat-xero	(6)
Calliteara pudibunda	x										silv-hygro, silv-meso	(5)
Catephia alchymista			x					x			silv-meso, silv-xero	(2)
Catocala nupta								x			silv-hygro, silv-meso	(3)
Catocala nymphagoga								x			indiff-immig	(2)
Coscinia cribraria			x			x					prat-xero, init-nat	(6)
Dysgonia algira			x	x				x			indiff-immig	(7)
Eilema caniola	x		x			x	x	x			prat-xero, init-nat, init-anth	(8)
Eilema depressa		x	x				x	x			silv-meso, silv-xero	(8)
Eilema lurideola										x	silv-meso	(8)
Eilema sororcula			x					x			silv-hygro	(8)
Euplagia quadripunctaria		x	x				x			x	silv-hygro, silv-meso	(7)
Herminia grisealis		x	x					x			silv-hygro, silv-meso	(7)
Herminia tarsicrinalis		x									silv-hygro, silv-meso	(9)
Hypena proboscidalis			x	x							indiff	(6)
Hypena rostralis		x	x	x				x			indiff	(6)
Idia calvaria			x					x			silv-meso	(6)
Lithosia quadra		x									silv-hygro	(8)
Lygephila craccae		x	x			x		x			prat-meso, prat-xero	(3)
Lygephila procax			x								silv-xero, prat-xero	(3)
Lygephila viciae	x	x		x							prat-meso, prat-xero	(3)
Lymantria dispar		x	x					x			silv-meso	(5)
Minucia lunaris			x					x			silv-xero	(2)
Paracolax tristalis		x						x			silv-xero	(9)
Phragmatobia fuliginosa			x				x	x		x	prat-meso	(6)
Scoliopteryx libatrix								x			silv-hygro, silv-meso	(4)
Spilarctia lutea	x	x									prat-meso	(6)
Zanclognatha zelleralis	x	x	x			x		x		x	silv-xero, prat-xero	(9)
Eriocraniidae												
Dysericrania subpurpurella			x					x			silv-xero	(2)
Gelechiidae												
Acompsia cinerella						x					prat-meso, init-nat	(8)
Anarsia innoxiella		x	x								silv-meso, silv-xero	(3)
Anarsia lineatella		x						x			silv-xero, init-anth	(3)
Apodia martinii			x								prat-xero	(1)
Aproaerema anthyllidella			x					x			prat-meso	(3)
Carpatolechia decorella			x	x				x			silv-meso, silv-xero	(5)
Carpatolechia fugacella		x									silv-meso, silv-xero	(2)
Carpatolechia proximella		x									silv-hygro	(3)
Caryocolum proximum			x								silv-xero	(3)
Caryocolum viscariella			x								silv-xero, prat-xero	(3)
Dichomeris alacella	x	x								x	silv-hygro, silv-meso	(8)
Dichomeris derasella								x			silv-xero	(3)
Klimeschiopsis discontinuella		x									init-nat	?

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Klimeschiopsis kiningerella		x	x					x			silv-meso	(2)
Monochroa nomadella			x					x			prat-xero	?
Neofaculta infernella		x									sil-xero	(5)
Oxypteryx libertinella			x					x			prat-xero, init-nat	(3)
Oxypteryx wilkella								x			prat-xero, init-nat	(1)
Phthorimaea operculella								x			indiff	(3)
Psoricoptera gibbosella	x		x					x			silv-meso, silv-xero	(5)
Recurvaria nanella			x		x	x		x		x	silv-meso, silv-xero	(3)
Stomopteryx remissella			x								prat-xero	(6)
Geometridae												
Agriopis marginaria			x					x			silv-hygro, silv-meso	(5)
Alcis repandata			x							x	indiff	(7)
Aplocera plagiata			x	x				x			prat-meso, prat-xero	(2)
Ascotis selenaria			x	x					x		silv-xero, prat-xero	(7)
Biston betularia	x		x								silv-hygro	(7)
Biston strataria		x	x					x			silv-hygro, silv-meso	(5)
Campaea margaritaria			x								silv-hygro, silv-meso	(5)
Charissa variegata			x						x		prat-xero, init-nat	(6)
Chiasmia clathrata								x			prat-meso	(6)
Chloroclysta siterata			x	x				x	x		silv-meso	(5)
Chloroclystis v-ata									x		silv-hygro, silv-meso, init-anth	(7)
Colostygia olivata			x								init-nat	(6)
Cosmorhoe ocellata	x							x			prat-hygro, prat-meso	(2)
Cyclophora linearia			x								silv-meso	(5)
Dysstroma truncata		x	x								silv-hygro	(7)
Ecliptopera capitata				x							silv-hygro	(1)
Ectropis crepuscularia	x	x						x	x		silv-hygro	(7)
Entephria caesiata					x						silv-meso	(2)
Epirrhoe alternata		x		x		x		x			prat-meso	(2)
Eulithis populata			x								silv-meso	(5)
Eupithecia dodoneata								x			silv-xero	(2)
Eupithecia extraversaria			x								prat-meso	(3)
Eupithecia haworthiata			x					x	x		silv-hygro, silv-meso	(2)
Eupithecia impurata					x						prat-xero	(2)
Eupithecia lariciata								x			silv-meso	(1)
Eupithecia ochridata									x		prat-xero	(1)
Eupithecia pyreneata			x								silv-meso	(2)
Eupithecia tantillaria						x		x			silv-meso, silv-xero	(3)
Gnophos furvata			x					x			prat-xero	(7)
Gymnoscelis rufifasciata			x								silv-hygro, silv-meso, silv-xero	(7)
Hylaea fasciaria										x	silv-meso	(4)
Hypomecis punctinalis	x	x	x	x		x		x	x		silv-hygro, silv-meso	(5)
Idaea aversata	x	x	x					x			silv-hygro	(9)
Idaea biselata		x	x								silv-hygro, silv-meso	(9)
Idaea degeneraria			x								silv-xero	(7)
Idaea moniliata			x					x			silv-xero, prat-xero, init-nat	(9)
Idaea pallidata			x								silv-meso, prat-meso	(9)
Idaea rusticata		x									prat-xero	(9)
Idaea straminata			x								silv-meso	(6)
Idaea typicata					x						prat-xero, init-nat	(9)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Ligdia adustata			x								silv-hygro, silv-meso	(1)
Lobophora halterata				x							silv-hygro, silv-meso	(5)
Lomaspilis marginata		x									silv-hygro, silv-meso	(5)
Lycia hirtaria		x	x					x			silv-hygro, silv-meso	(5)
Macaria alternata		x	x					x			silv-hygro, silv-meso	(5)
Macaria liturata	x		x					x		x	silv-meso	(5)
Melanthia procellata			x	x							silv-hygro, silv-meso	(2)
Menophra abruptaria								x			silv-hygro, silv-meso, silv-xero	(5)
Minoa murinata								x			prat-xero, init-nat	(2)
Peribatodes rhomboidaria	x	x	x	x		x		x	x		silv-hygro, silv-meso	(7)
Petrophora chlorosata						x					silv-hygro, silv-meso	(3)
Phigalia pilosaria		x									silv-hygro, silv-meso	(5)
Scopula marginepunctata			x	x				x		x	prat-xero	(6)
Scopula submutata		x									prat-xero	(3)
Selenia lunularia			x	x				x			silv-meso	(5)
Selenia tetralunaria		x	x					x			silv-meso	(5)
Tephronia sepiaria								x			silv-xero, init-nat	(8)
Thera britannica			x								silv-meso	(3)
Thera juniperata			x					x			silv-xero	(2)
Thera obeliscata				x							silv-meso, silv-xero	(2)
Thera variata			x								silv-meso	(5)
Triphosa dubitata								x			silv-xero	(5)
Xanthorhoe biriviata		x		x							silv-hygro	(1)
Xanthorhoe fluctuata			x	x				x			silv-hygro, silv-meso	(6)
Xanthorhoe montanata										x	oreo-prat-meso	(7)
Glyphipterigidae												
Acrolepiopsis assectella			x					x			prat-xero, init-anth, indiff	(2)
Glyphipterix equitella								x			prat-meso	(2)
Gracillariidae												
Caloptilia alchimiella		x	x	x							silv-xero	(2)
Caloptilia elongella		x									silv-hygro	(2)
Caloptilia falconipennella		x									silv-hygro	(2)
Caloptilia fidella		x	x					x			silv-hygro	(1)
Caloptilia stigmatella		x									silv-hygro	(2)
Cameraria ohridella		x	x					x			init-anth	(1)
Macrosaccus robiniella			x					x			silv-xero, init-anth	(2)
Micrurapteryx kollariella								x			silv-xero, prat-xero	(3)
Parectopa ononidis								x			prat-meso, prat-xero	(3)
Parornix anglicella			x					x			silv-xero	(2)
Parornix devoniella		x									silv-hygro, silv-meso	(1)
Parornix torquillella			x					x			silv-xero	(1)
Phyllocnistis valentinensis		x									silv-hygro	(1)
Phyllocnistis vitegenella						x					init-anth	(1)
Phyllonorycter aemula								x			silv-xero	(1)
Phyllonorycter blancardella						x					init-anth	(2)
Phyllonorycter cerasicolella			x								silv-hygro	(2)
Phyllonorycter coryli		x									silv-hygro, silv-meso	(1)
Phyllonorycter emberizaepenella		x									silv-hygro, silv-meso	(3)
Phyllonorycter froelichiella		x									silv-hygro	(1)
Phyllonorycter issikii				x							silv-meso	(2)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Phyllonorycter kleemannella		x									silv-hygro	(2)
Phyllonorycter lantanella	x										silv-xero	(2)
Phyllonorycter maestingella									x		silv-meso	(1)
Phyllonorycter messaniella		x									silv-meso, silv-xero	(5)
Phyllonorycter millierella		x									silv-xero	(1)
Phyllonorycter rajella		x									silv-hygro, silv-meso	(2)
Phyllonorycter stettinensis		x									slv-hygro	(2)
Phyllonorycter strigulatella		x									silv-hygro	(1)
Heliozelidae												
Aspilanta oinophylla						x					init-anth	(3)
Hepialidae												
Triodia sylvina						x					prat-meso, init-anth	(6)
Lasiocampidae												
Phyllodesma tremulifolia		x	x					x			silv-meso, silv-xero	(5)
Lecithoceridae												
Lecithocera nigrana								x			silv-xero	(5)
Lyonetiidae												
Leucoptera laburnella								x			silv-xero	(3)
Leucoptera malifoliella						x					silv-xero	(3)
Lyonetia clerkella						x					silv-meso,silv-xero, init-anth	(5)
Momphidae												
Mompha lacteella	x										silv-meso	(2)
Nepticulidae												
Ectoedemia caradjai			x					x			silv-xero	(2)
Ectoedemia contorta			x					x			silv-xero	(1)
Ectoedemia heringi			x					x			silv-xero	(2)
Ectoedemia rufifrontella			x					x			silv-xero	(2)
Ectoedemia spinosella								x			silv-xero	(2)
Simplimorpha promissa								x			silv-xero	(1)
Stigmella aceris		x									silv-hygro, silv-meso	(2)
Stigmella desperatella		x									silv-hygro, silv-xero	(3)
Stigmella floslactella		x									silv-meso	(1)
Stigmella johanssonella			x					x			silv-xero	(1)
Stigmella microtheriella		x									silv-meso	(1)
Stigmella naturnella		x									silv-meso	(2)
Stigmella plagicolella			x								silv-hygro, silv-meso, silv-xero, init-anth	(2)
Stigmella prunetorum								x			silv-meso, silv-xero, init-anth	(2)
Stigmella sp. (Crataegus)								x			silv-xero	(2)
Stigmella sp. (Ulmus)								x			silv-xero	(2)
Stigmella tiliae		x		x							silv-meso	(2)
Zimmermannia amani		x									silv-hygro, silv-xero	(2)
Noctuidae												
Abrostola agnorista		x						x			silv-xero	(1)
Abrostola asclepiadis			x					x			silv-meso, silv-xero	(1)
Acronicta euphorbiae								x			silv-hygro, silv-meso, prat-hygro, oreo-prat-meso	(7)
Acronicta megacephala	x		x	x				x			silv-hygro, silv-meso	(4)
Acronicta psi			x	x				x			silv-hygro	(5)
Acronicta rumicis			x							x	prat-meso, init-anth, indiff	(7)
Agrochola litura								x			silv-hygro	(7)
Agrochola nitida								x			prat-meso	(7)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Agrochola ruticilla								x			silv-xero	(2)
Agrotis exclamationis			x					x	x		indiff	(6)
Agrotis ipsilon		x	x	x	x	x		x	x		indiff-immig	(6)
Agrotis segetum			x	x				x			indiff	(6)
Agrotis trux			x	x							prat-xero	(6)
Ammoconia senex								x			prat-xero, init-nat	(6)
Amphipyra pyramidea	x		x	x		x		x			silv-meso	(5)
Anarta trifolii			x	x							prat-xero	(6)
Anorthoa munda			x					x			silv-hygro, silv-meso, silv-xero	(5)
Antitype chi				x				x			prat-xero, init-nat	(6)
Apamea epomidion		x									silv-hygro, silv-meso	(4)
Apamea monoglypha			x			x		x			prat-hygro, prat-meso, prat-xero, init-anth	(3)
Apamea scolopacina							x				silv-hygro	(3)
Athetis furvula			x								prat-xero	(6)
Athetis gluteosa			x								prat-xero	(6)
Autographa gamma			x	x	x	x	x	x		x	indiff-immig	(6)
Axylia putris	x		x	x		x		x	x		indiff	(6)
Bryophila ereptricula								x			init-nat	(8)
Bryophila raptricula								x			init-nat	(8)
Callopistria latreillei			x					x			silv-xero	(3)
Caradrina aspersa								x			prat-xero	(6)
Caradrina selini			x	x					x		prat-xero	(6)
Cerastis rubricosa			x								silv-hygro, prat-hygro, prat-meso	(6)
Cirrhia gilvago				x							silv-hygro, silv-meso	(7)
Cirrhia ocellaris			x								silv-hygro	(7)
Chloantha hyperici			x								prat-xero	(2)
Colocasia coryli	x		x					x			silv-hygro, silv-meso	(5)
Conisania luteago				x				x			prat-xero	(2)
Conistra erythrocephala								x			silv-meso, silv-xero	(5)
Conistra rubiginea				x				x			silv-hygro	(7)
Conistra rubiginosa								x			silv-hygro, silv-meso, silv-xero	(7)
Conistra vaccinii								x			silv-hygro, silv-meso, silv-xero	(7)
Cosmia affinis		x	x								silv-meso	(2)
Cosmia trapezina			x			x					silv-meso	(5)
Craniophora ligustri		x	x	x			x	x		x	silv-hygro, silv-meso	(3)
Cryphia algae			x					x			silv-hygro, silv-meso	(8)
Deltote pygarga			x			x		x			silv-hygro, silv-meso	(7)
Diachrysia chrysitis				x							silv-xero	(2)
Dryobotodes eremita			x	x				x			silv-xero	(2)
Dypterygia scabriuscula	x		x						x		silv-hygro	(6)
Egira conspicillaris		x						x			silv-hygro, silv-meso, silv-xero, prat-meso	(7)
Elaphria venustula		x									prat-meso	(6)
Emmelia trabealis			x								prat-xero, init-anth	(2)
Episema glaucina								x			prat-xero	(3)
Eupsilia transversa			x					x			silv-hygro, silv-meso, silv-xero	(7)
Euxoa nigricans			x					x			prat-xero, init-nat, init-anth	(6)
Euxoa obelisca			x					x			prat-xero	(6)
Euxoa vitta			x								prat-xero	(6)
Griposia aprilina			x					x			silv-meso, silv-xero	(5)
Hadena magnolii				x				x			prat-xero	(2)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Hecatera dysodea						x					prat-xero	(3)
Helicoverpa armigera							x				indiff-immig	(6)
Heliothis peltigera				x		x					indiff-immig	(6)
Hoplodrina ambigua			x								prat-meso	(6)
Hoplodrina respersa			x					x			prat-meso, prat-xero	(6)
Lacanobia oleracea						x					prat-meso	(6)
Lacanobia suasa			x								silv-hygro, silv-meso, prat-meso	(6)
Lacanobia thalassina			x								silv-hygro, silv-meso, prat-meso	(7)
Lacanobia w-latinum			x					x			prat-meso, init-anth	(6)
Lithophane ornitopus								x			silv-hygro, silv-meso, silv-xero	(5)
Lycophotia porphyrea								x			silv-meso	(1)
Macdunnoughia confusa								x		x	indiff-immig	(6)
Mesoligia furuncula			x								prat-xero	(3)
Moma alpium								x			silv-hygro, silv-meso	(5)
Mormo maura		x									silv-hygro	(7)
Mythimna albipuncta			x	x				x			indiff-immig	(4)
Mythimna ferrago			x								prat-meso	(4)
Mythimna l-album		x	x								indiff-immig	(4)
Mythimna sicula			x								prat-xero	(4)
Mythimna turca		x		x							prat-hygro	(6)
Mythimna vitellina			x								indiff-immig	(6)
Noctua comes			x								silv-meso, prat-meso	(6)
Noctua fimbriata	x		x					x			silv-meso, prat-meso	(7)
Noctua pronuba		x		x	x		x	x		x	indiff	(6)
Ochropleura plecta		x	x	x		x	x	x			indiff	(6)
Oligia latruncula		x		x		x		x			prat-hygro, prat-meso	(4)
Oligia strigilis	x							x			prat-hygro, prat-meso	(4)
Orthosia cerasi			x					x			silv-hygro, silv-meso	(5)
Orthosia cruda								x			silv-hygro, silv-meso, silv-xero	(5)
Orthosia gothica			x								silv-hygro	(7)
Orthosia incerta		x	x					x			silv-hygro, silv-meso, silv-xero	(7)
Orthosia populeti		x									silv-hygro, silv-meso	(3)
Panolis flammea								x			silv-meso, silv-xero	(3)
Phlogophora meticulosa			x	x				x			indiff-immig	(7)
Sideridis rivularis		x									prat-meso	(3)
Sunira circellaris				x				x			silv-hygro, silv-meso	(5)
Syngrapha interrogationis			x								silv-meso	(3)?
Tiliacea aurago				x							silv-meso	(5)
Tiliacea citrago				x							silv-meso	(2)
Trigonophora flammea								x			silv-xero, prat-xero	(7)
Xestia c-nigrum	x		x	x				x			indiff-immig	(6)
Xestia triangulum		x									silv-hygro, silv-meso, prat-meso	(6)
Nolidae												
Bena bicolorana						x		x			silv-hygro, silv-meso	(5)
Earias clorana			x	x							silv-hygro	(2)
Nycteola revayana								x			silv-xero	(2)
Pseudoips prasinana		x						x			silv-meso	(5)
Notodontidae												
Cerura erminea								x			silv-hygro	(4)
Drymonia dodonaea			x	x				x			silv-hygro, silv-meso, silv-xero	(5)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Drymonia ruficornis			x					x			silv-xero	(2)
Furcula furcula								x			silv-hygro, silv-meso	(5)
Harpyia milhauseri								x			silv-hygro, silv-meso, silv-xero	(5)
Notodonta dromedarius				x							silv-hygro, silv-meso	(5)
Notodonta tritophus			x	x							silv-hygro, silv-meso	(2)
Peridea anceps			x					x			silv-xero	(2)
Phalera bucephala				x							silv-hygro, silv-meso	(5)
Pterostoma palpina		x									silv-hygro, silv-meso	(5)
Ptilodon capucina			x								silv-hygro, silv-meso	(5)
Ptilodon cucullina			x		x						silv-meso	(2)
Spatalia argentina			x					x		x	silv-meso, silv-xero	(5)
Stauropus fagi			x								silv-hygro, silv-meso	(5)
Thaumetopoea pityocampa						x		x		x	silv-xero	(2)
Oecophoridae												
Batia lambdella	x		x		x						silv-meso, silv-xero	(8)
Batia lunaris	x		x								silv-meso, silv-xero	(8)
Borkhausenia minutella								x			silv-xero	(9)
Crassa unitella	x	x									silv-hygro	(8)
Dasycera oliviella	x	x									sily-hygro, silv-xero	(8)
Epicallima formosella			x		x			x			silv-hygro, silv-meso	(8)
Harpella forficella		x									silv-hygro	(8)
Metalampra italica		x									silv-meso	(8)
Plutellidae												
Plutella xylostella	x	x	x	x	x	x		x		x	indiff	(3)
Praydidae												
Prays fraxinella	x		x					x			silv-hygro, silv-xero	(1)
Psychidae												
Apterona helicoidella			x								prat-xero	(6)
Bijugis bombycella			x								prat-xero	(9)
Eumasia parietariella			x								init-nat	(8)
Narycia duplicella			x								sylv-xero, prate-xero, init-nat, init-anth	(8)
Psyche casta				x							prat-meso	(7)
Taleporia tubulosa								x			silv-meso, silv-xero	(8)
Pterophoridae												
Capperia fusca		x	x					x			silv-xero, prat-xero	(2)
Cnaemidophorus rhododactyla						x		x			silv-xero, init-anth	(2)
Crombrugghia tristis	x	x						x			prat-xero	(2)
Emmelina monodactyla								x	x	x	prat-hygro, prat-meso, init-anth	(2)
Hellinsia carphodactyla			x								prat-hygro	(2)
Stenoptilia zophodactylus								x			prat-hygro	(2)
Pyralidae												
Acrobasis advenella		x									silv-hygro, silv-xero	(3)
Acrobasis repandana								x			silv-xero	(2)
Ancylosis cinnamomella			x					x		x	prat-xero	(6)
Aphomia sociella		x	x	x				x			indiff	(9)
Assara terebrella			x					x			silv-meso	(1)
Dioryctria abietella	x		x	x	x		x	x		x	silv-meso, silv-xero	(3)
Dioryctria simplicella								x			silv-meso, silv-xero	(2)
Elegia atrifasciella			x					x			silv-xero	(2)
Ematheudes punctellus			x					x			prat-xero	?

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Endotricha flammealis	x	x	x					x			silv-meso, silv-xero	(7)
Ephestia elutella			x	x				x			indiff	(9)
Ephestia kuehniella								x			indiff	(9)
Episcythrastis tetricella			x	x				x	x		silv-hygro, silv-meso	(2)
Euzophera bigella		x	x					x			silv-meso	(7)
Euzophera pinguis		x									silv-hygro	(1)
Glyptoteles leucacrinella								x			silv-hygro, silv-meso	(9)
Hypochalcia ahenella										x	prat-meso	(6)
Hypsopygia costalis	x	x	x					x		x	indiff	(9)
Lamoria zelleri			x								indiff	(1)?
Nephopterix angustella		x							x		silv-hygro, silv-meso	(2)
Nyctegretis lineana		x	x			x					prat-meso, prat-xero	(6)
Oncocera semirubella	x	x	x			x		x			prat-meso	(3)
Phycita roborella	x		x					x		x	silv-hygro, silv-meso	(5)
Phycitodes saxicola			x								prat-xero, init-anth	(3)
Pyralis farinalis		x						x			indiff	(9)
Pyralis regalis		x	x					x	x		silx-xero	(9)
Salebriopsis albicilla			x								silv-hygro	(5)
Trachonitis cristella							x	x			silv-xero	(2)?
Vitula biviella			x								silv-xero	(1)
Saturniidae												
Samia cynthia			x								init-anth	(1)
Saturnia pyri								x			silv-xero	(5)
Sesiidae												
Chamaesphecia empiformis			x								prat-xero	(2)
Sphingidae												
Agrius convolvuli							x				indiff-immig	(2)
Deilephila elpenor			x								prat-meso, init-anth	(6)
Hyles euphorbiae						x					prat-xero, init-anth	(2)
Laothoe populi			x								silv-hygro, silv-meso	(4)
Macroglossum stellatarum						x				x	prat-meso, init-anth	(3)
Mimas tiliae		x						x	x		silv-hygro, silv-meso	(5)
Smerinthus ocellatus		x									silv-hygro, init-anth	(5)
Sphinx pinastri				x							silv-meso, silv-xero	(3)
Stathmopodidae												
Stathmopoda pedella	x										silv-hygro	(2)
Thyrididae												
Thyris fenestrella			x								silv-hygro, silv-meso, silv-xero	(2)
Tineidae												
Cephimallota crassiflavella								x			silv-xero, prat-xero, init-anth	(9)
Infurcitinea albicomella			x					x			prat-xero, init-nat	(8)
Infurcitinea finalis			x					x			prat-xero, init-nat	(8)
Monopis obviella			x		x			x			silv-hygro	(8)
Tinea semifulvella			x								indiff	(9)
Tischeriidae												
Coptotriche angusticollella								x			silv-mrdo, silv-xero	(2)
Coptotriche marginea			x	x							silv-hygro, silv-meso	(2)
Tischeria decidua			x								silv-xero	(2)
Tischeria ekebladella								x			silv-xero	(2)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Tortricidae												
Acleris cristana	x							x			silv-xero	(3)
Acleris forsskaleana		x	x								silv-hygro, silv-meso, silv-xero	(2)
Acleris hastiana	x	x									silv-hygro	(4)
Acleris kochiella		x									silv-meso	(2)
Acleris laterana								x			silv-meso, silv-xero	(7)
Acleris literana								x			silv-xero	(2)
Acleris schalleriana	x	x									silv-hygro	(2)
Aethes smeathmanniana								x			prat-xero	(3)
Aleimma loeflingiana				x				x			silv-meso	(5)
Apotomis turbidana		x									silv-hygro, silv-meso	(2)
Archips podana	x	x									silv-hygro	(7)
Archips xylosteana		x	x	x				x			silv-meso	(7)
Argyrotaenia ljungiana								x			silv-meso, silv-xero	(7)
Celypha flavipalpana			x			x	x	x			prat-xero	(6)
Celypha lacunana		x									indiff	(7)
Celypha striana	x					x			x		prat-meso, prat-xero	(6)
Clepsis consimilana			x		x	x	x	x		x	prat-hygro	(7)
Clepsis rurinana		x	x	x				x			silv-hygro, silv-meso	(5)
Clepsis senecionana								x			silv-meso	(7)
Cnephasia incertana			x	x				x			indiff	(7)
Cnephasia stephensiana	x	x	x								indiff	(6)
Cochylidia heydeniana			x					x			prat-hygro	(2)
Cydia fagiglandana	x		x					x			silv-meso	(1)
Cydia pomonella	x		x					x		x	silv-hygro, silv-meso, silv-xero	(5)
Cydia splendana								x			silv-hygro, silv-meso	(5)
Dichrorampha sp.			x								prat-xero	?
Dichrorampha senectana		x									prat-meso, prat-xero	(2)
Dichrorampha vancouverana			x								prat-meso, prat-xero	(3)
Ditula angustiorana						x		x			indiff	(5)
Eana argentana			x					x			prat-meso	(7)
Enarmonia formosana		x									silv-xero, init-anth	(3)
Endothenia nigricostana		x									silv-hygro	(3)
Endothenia oblongana					x			x			prat-meso, prat-xero	(6)
Epagoge grotiana								x			silv-meso	(5)
Epiblema foenella						x				x	prat-xero, init-anth	(2)
Epinotia abbreviana		x						x			silv-hygro, silv-meso	(5)
Epinotia festivana	x	x	x					x			silv-xero	(2)
Eucosma conterminana		x				x		x		x	prat-meso	(2)
Eudemis profundana			x								sil-meso, silv-xero, init-anth	(5)
Gypsonoma sociana				x							silv-hygro	(3)
Hedya nubiferana	x	x	x					x			silv-hygro, silv-meso, silv-xero	(7)
Notocelia cynosbatella			x	x				x			silv-xero	(2)
Notocelia roborana						x					silv-xero	(2)
Notocelia uddmanniana	x		x								silv-hygro, silv-meso	(2)
Pammene giganteana								x			silv-xero	(2)
Pammene ochsenheimeriana						x					silv-meso	(1)
Pandemis heparana		x						x			silv-hygro	(7)
Pseudargyrotoza conwagana			x					x			silv-hygro, silv-meso	(3)
Ptycholomoides aeriferana	x										silv-meso, silv-xero	(1)

Taxa	OW	RI	DG	HO	WP	AV	SU	DO	BF	MS	EGIL	TC
Rhyacionia pinivorana								x			silv-meso, silv-xero	(2)
Sparganothis pilleriana						x		x			prat-hygro	(7)
Tortrix viridana			x								silv-meso, silv-xero	(5)
Zeiraphera isertana			x					x			silv-xero	(2)
Yponomeutidae												
Cedestis gysseleniella	x										silv-meso, silv-xero, init-anth	(2)
Ocnerostoma piniariella			x								silv-meso, silv-xero	(2)
Parahyponomeuta egregiella								x			silv-xero	(2)
Yponomeuta cagnagella	x		x								silv-hygro, silv-meso	(2)
Yponomeuta evonymella		x	x	x		x	x	x			silv-hygro, silv-meso, silv-xero	(3)
Yponomeuta irrorella			x								silv-hygro, silv-meso	(1)
Yponomeuta padella	x	x				x		x			silv-hygro, silv-xero	(3)
Yponomeuta plumbella	x	x	x			x					silv-hygro, silv-meso	(2)
Yponomeuta sedella			x								init-nat	(3)
Ypsolophidae												
Ypsolopha parenthesella								x			silv-hygro, silv-meso	(5)
Ypsolopha ustella		x	x	x				x			silv-meso, silv-xero	(5)