

## Conservation of Lepidoptera in Finland : recent advances

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### Summary

The conservation of Lepidoptera in Finland is reviewed. The following points are discussed : Organisations, committees, legislation, ecological research, collecting and general threats to the fauna. The threatened and protected species of Lepidoptera in Finland are listed. The listing of species as threatened has only been a starting point for conservation. The close cooperation between the administrative bodies, research and amateurs is leading to efficient measures in the field. Emphasis is now being placed on active conservation and general maintenance of biodiversity, including the butterfly and moth fauna as a whole, rather than passively protecting species and setting up nature reserves.

### Résumé

Exposé sur la protection des Lépidoptères en Finlande. Discussion des sujets suivants : organisations, comités, législation, recherches écologiques, chasse et menaces générales contre la faune. Liste des espèces de Lépidoptères menacées et protégées en Finlande. L'établissement de la liste des espèces considérées comme menacées ne constituait que le point de départ pour leur protection. La collaboration étroite entre administration, chercheurs scientifiques et amateurs a abouti à des mesures efficaces sur le terrain. Le principal souci actuel est de passer des thèmes "espèces menacées et réserves naturelles" à la conservation active et à la gestion générale de la diversité biologique, y compris celles de la faune des papillons, considérée comme un tout.

### Introduction

The conservation of animal and plant species has recently received increasing attention in Finland. Today, protection of threatened species and their habitats is considered a fundamental task of nature conservation. Efforts are no longer restricted to mammals, birds or vascular plants. For instance, the Committee for the Conservation of Threatened Animals and Plants has tried to assess the status in Finland of all

species of animal, plant and fungus, irrespective of their taxonomic group (RASSI & VÄISÄNEN, 1987). Among the otherwise poorly known invertebrates, the Lepidoptera and especially butterflies are probably the best known groups thanks to the great number of amateur lepidopterists (approximately 800 members in the Lepidopterological Society of Finland).

Current reviews on the conservation of Lepidoptera (THOMAS, 1984 ; KUDRNA, 1986 ; ERHARDT, 1991 ; MORRIS & THOMAS 1991) mainly deal with the situation in Britain and Central Europe, while the Nordic countries have received less attention (e.g. MIKKOLA, 1991). The aim of this brief synopsis is to review some recent advances in the conservation of butterflies and moths in Finland. The work carried out by two committees in the Ministry of the Environment is described. Species programmes are now in preparation for the most seriously threatened species. The methods and problems in the preparation of these conservation programmes are reviewed. In this context, the legislation, the organizations, ecological research and the role of collecting are discussed.

The species programmes take the step from proposals to conservation measures, i.e. protection and management of habitats, and elimination of the causes of decline. Emerging from the general outlines for the conservation of fauna (FRY & LONSDALE, 1991), specific national management plans are built up on the basis of new research and international cooperation.

## **Committees**

A national committee specifically associated with the conservation of endangered species in Finland commenced its work in March 1983 and its report was submitted to the Minister of Environment in July 1986. The report of this Committee for the Conservation of Threatened Animals and Plants in Finland was summarized by RASSI & VÄISÄNEN (1987). However, unlike the large Finnish edition, the English summary did not include the section with the 89 proposals to render conservation more effective, such as increasing biological research and the preparation of species programmes.

To continue the work which attracted considerable positive public attention, a Committee for the Monitoring of Threatened Animals and Plants in Finland began its work in 1987. Its objectives included revision of the national list of threatened species, preparation of conservation programmes and coordination of the species conservation in Finland.

Its report is expected to be finished in late 1991. The report will also include provincial lists of the status of each species which is at least vulnerable in any administrative province.

## Concepts and definitions

The basic aim of nature conservation is to conserve the whole biological diversity at genetic, species and ecosystem levels. Threatened species provide a tool for bodies involved in the protection of the environment to approach this complicated task. Species conservation is a supplement to habitat or ecosystem conservation, and a step towards the conservation of biodiversity. The conservation of species essentially involves the preservation of their genetic and ecological diversity.

The concept of threatened or endangered species was originally global, referring to the probability of a species becoming extinct. When this concept is to be applied to individual countries, additional criteria are needed. In assessing the status of species in Finland, the abundance, distribution and history of the species in the country as well as the conservation measures already accomplished were taken into account. Only species native to Finland were considered threatened. This ruled out expansive species that were known to have arrived in the country during the present century (except for some internationally threatened species). Species which were recorded in Finland only recently, but were probably always present, were not excluded from the assessment. The probability of local disappearance or extinction, is in general inversely related to the abundance of a species. One reason for this is the fact that small isolated populations often suffer more seriously from unexpected environmental changes. Special attention was paid to the changes in the distribution and abundance over the past few decades. Threatened species are primarily those that have clearly declined or are in the process of doing so. Species that are highly specialized, e.g. monophagous on rare plants, may be more sensitive than others in regard to changes occurring in their environment.

Conservation tries to act against harmful anthropogenic influences, not against natural phenomena. There are, of course, natural fluctuations of population densities and changes in distributions due to climate (e.g. KAISILA, 1962), but they are considered to be threats only in association with human practices that may have made the populations unnaturally susceptible to otherwise natural changes. In principle, there may be natural disappearances, but human interferences are so far-reaching that it is extremely difficult to rule them out as possible causes.

The concept of threatened species is here used in a general way to mean any species belonging to the categories given below. The following classification system was used for threatened species by the Committees :

**A. No longer occurring in Finland** : Species whose actively reproducing populations have disappeared from Finland and which despite searches have not been encountered after 1960. Thus, although the species may still occur in Finland, there is no evidence for it (cf. Tasmanian Tiger).

**B. Endangered** : Species whose actively reproducing populations are in danger of becoming extinct in Finland in the near future.

**C. Vulnerable** : Species for which the long-term existence of actively reproducing populations in Finland is uncertain and which will become endangered in the near future unless measures are taken to stop their decline.

**D. In need of monitoring** : Species whose status in Finland requires close monitoring, but which for various reasons have not been placed in any of the above classes. These have been split into three categories :

**D.1. Declining** : Species which have drastically declined in Finland but whose populations are not yet in any serious danger.

**D.2. Rare** : Species which, owing to their biological characteristics, occur in Finland only within a limited area, or only at a very few sites, and whose populations for this reason are very small. Here, rarity is associated with a direct or indirect anthropogenic threat. In general, rarity is a natural phenomenon and does not necessarily indicate a need for conservation. Only a small fraction of rare species are in fact classified here. On the other hand, a rare species may become threatened or even disappear so rapidly that there is no time for any conservation measures.

**D.3. Poorly known** : Species that are presumed to be in danger of declining in Finland, or which have even already disappeared from the country, but whose status in the scheme of classification owing to insufficient knowledge is impossible to determine.

Threats are risks to or factors working against the survival of species. They should be controlled and eliminated, if possible, to ensure that species will not disappear due to human interference. Threats do not necessarily have to be the same as the causes of the observed declines, although plenty of evidence may exist to suggest that the threats are real.



## Threatened species of butterflies and moths

The data was gathered from the collections of museums, provincial faunas (e.g. VON BONSDORFF, 1985; HUBLIN & SAVOLAINEN, 1985; JÄRVENTAUSTA et al., 1988; MARTIKAINEN & SEURANEN, 1988; KONTIOKARI, 1990) and other literature (e.g. MIKKOLA et al., 1989; MARTTILA et al., 1990) and above all from lepidopterists at meetings, seminars and from inquiries. The amount of data available has affected the assessment so that several groups of microlepidoptera are apparently underrepresented in the list. The number of lepidopterists studying the microlepidoptera may be less than 100.

Among the 2338 species of Lepidoptera known from Finland, altogether 154 species (or subspecies) of Lepidoptera (i.e. 7%) are regarded as threatened (Table 1), of which 10 are considered no longer to occur, 16 are endangered, 19 are vulnerable and the rest are classified as species in need of monitoring (18 declining, 84 rare and 7 insufficiently known) in Finland. Most of the threatened species occur in southern Finland. One third of the threatened species occur only in one province: 18 species are known only from Lapland, 14 only from Åland, and the rest are restricted to the southernmost provinces.

Table 1

The threatened Lepidoptera in Finland in 1991 (modified from the unpublished report of the Committee for the Monitoring of Threatened Animals and Plants). The species are listed in alphabetical order within the threat categories.

**Habitats**: B - bogs and fens, C - cultivated land, D - dry meadows, F - deciduous forests with rich flora, H - herb-rich meadows (Åland and S Finland), L - Lappish mountains or fells, O - others, P - parks, R - rocky outcrops, S - sand dunes and eskers, U - ruderal sites, V - virgin coniferous or mixed forests, W - wet meadows.

**Threats**: a - changes in agricultural practices, b - building and construction, c - collecting, d - drainage of peatlands, e - mechanical wear of habitat and erosion, f - forestry, m - over-growing of meadows following cessation of grazing and hay cutting, o - other causes, p - air pollution, q - sand and gravel quarrying, t - changes in ratios of tree species (increase of spruce and decline of deciduous trees), ? - cause unknown.

Species	Habitats	Threats
<b>A. Species no longer occurring in Finland :</b>		
<i>Acronicta aceris</i> (LINNAEUS)	P, F	?
<i>Borearctia menetriesii</i> (EVERSMANN)	V	f
<i>Capperia trichodactyla</i> (DENIS & SCHIFFERMÜLLER)	C	b
<i>Catastia kistrandella</i> OPHEIM	L	?
<i>Cyclophora quercimontaria</i> (BASTELBERGER)	F, H	m, t
<i>Hyponephele lycaon</i> (KÜHN)	D	m
<i>Ochsenheimeria taurella</i> (DENIS & SCHIFFERMÜLLER)	C	a
<i>Rhyparia purpurata</i> (LINNAEUS)	D	m
<i>Sciota rhenella</i> (ZINCKEN)	F	?
<i>Scopula decorata</i> (DENIS & SCHIFFERMÜLLER)	S, D	m

Species	Habitats	Threats
<b>B. Endangered species :</b>		
<i>Acronicta tridens</i> (DENIS & SCHIFFERMÜLLER)	F, P, etc.	?
<i>Agonopterix laterella</i> (DENIS & SCHIFFERMÜLLER)	C	a, m
<i>Caryocolum petryi</i> (HOFMAN)	S, D	m, f, c
<i>Catoptria fulgidella</i> (HÜBNER)	S	b, e
<i>Chloroclystis v-ata</i> (HAWORTH)	F	t
<i>Cydia medicaginis</i> (KUZNETSOV)	U	b, m
<i>Cynaeda dentalis</i> (DENIS & SCHIFFERMÜLLER)	D	b, m
<i>Ethmia terminella</i> FLETCHER	D	m, b
<i>Lycaena dispar</i> (HAWORTH)	W	b, m, c
<i>Maculinea arion</i> (LINNAEUS)	S, D	b, m, f, q, c
<i>Melitaea diamina</i> (LANG)	W	a, m, b, c
<i>Metzneria aestivella</i> (ZELLER)	D	m
<i>Photedes brevilinea</i> (FENN)	B	d
<i>Pseudophilotes baton</i> (BERGSTRÄSSER)	S, D	m, f, q, c
<i>Scythropia crataegella</i> (LINNAEUS)	F	t, b
<i>Zygaena osterodensis</i> REISS	D	m, c
<b>C. Vulnerable species :</b>		
<i>Alcis jubatus</i> (THUNBERG)	V, etc.	p, f
<i>Aristotelia brizella</i> (TREITSCHKE)	W	b, m, c
<i>Caryocolum cauliginellum</i> (SCHMID)	D	m
<i>Clossiana titania</i> (ESPER)	H, etc.	m, t, c
<i>Coleophora inulae</i> WOCKE	W	b
<i>Coleophora salicorniae</i> WOCKE	W	m, b
<i>Cucullia absinthii</i> (LINNAEUS)	D	m, b
<i>Diasemia reticularis</i> (LINNAEUS)	W	m, f
<i>Elachista bruuni</i> TRAUGOTT-OLSEN	D	b, q
<i>Isophrictis anthemidella</i> (WOCKE)	D, C	m, a
<i>Lemonia dumii</i> (LINNAEUS)	D	m, b, f
<i>Lopinga achine</i> (SCOPOLI)	B, etc.	f, d, b
<i>Metzneria santolinella</i> AMSEL	D	m, c
<i>Parnassius apollo</i> (LINNAEUS)	R, D	m, f, p, b, c
<i>Poliobrya umovii</i> (EVERSMANN)	V	p, f
<i>Pterophorus tridactylus</i> (LINNAEUS)	S, D	b, m
<i>Pyralis lienigialis</i> (ZELLER)	O	b, o
<i>Scolitantides orion</i> (PALLAS)	R	m, b, c
<i>Scopula corvivalaria</i> (KRETSCHMAR)	B, W	d, c
<b>D.1. Declining species in need of monitoring :</b>		
<i>Acrobasis sodaella</i> (HÜBNER)	F	t
<i>Acronicta strigosa</i> (DENIS & SCHIFFERMÜLLER)	F	t
<i>Aplocera plagiata</i> (LINNAEUS)	R, D	m
<i>Bucculatrix argentsignella</i> HERRICH-SCHÄFFER	D, C	m, a
<i>Cochyls epilnana</i> (DUPONCHEL)	D	m
<i>Depressaria libanotidella</i> SCHLÄGER	D, C	m, a
<i>Digitivalva reticulella</i> (HÜBNER)	D	m
<i>Lycaena helle</i> (DENIS & SCHIFFERMÜLLER)	W	m, d
<i>Maniola jurtina</i> (LINNAEUS)	D	m, b
<i>Melanchra persicariae</i> (LINNAEUS)	F, P	?
<i>Microstega hyalinialis</i> (HÜBNER)	U	b, m
<i>Microthrix similella</i> (ZINCKEN)	F	t
<i>Nemophora cupriacella</i> (HÜBNER)	W	m, b

Species	Habitats	Threats
<i>Neustrotia candidula</i> (DENIS & SCHIFFERMÜLLER)	D	m
<i>Pyrgus alveus</i> (HÜBNER)	D	m, b
<i>Scythris noricella</i> (ZELLER)	D	m
<i>Trachysmia schreibersiana</i> (FRÖLICH)	F, P	f
<i>Zygaena lonicerae</i> (SCHEVEN)	D	m
<b>D.2. Rare species in need of monitoring :</b>		
<i>Acerbia alpina</i> (QUENSEL)	L	o
<i>Acrocercops brongniardellus</i> (FABRICIUS)	F, P	b, t
<i>Agriades glandon</i> (PRUNNER)	L	e
<i>Agrochola nitida</i> (DENIS & SCHIFFERMÜLLER)	F	t, m
<i>Apamea anceps</i> (DENIS & SCHIFFERMÜLLER)	S	b, e
<i>Apeira syringaria</i> (LINNAEUS)	F	t
<i>Aplota kadeniella</i> (HERRICH-SCHÄFFER)	R	b
<i>Aristotelia heliacella</i> (HERRICH-SCHÄFFER)	L	e
<i>Aspitates gilvaria</i> (DENIS & SCHIFFERMÜLLER)	B	d
<i>Baptria tibiale</i> (ESPER)	F	t
<i>Bembecia scopigera</i> (SCOPOLI)	D	m, b
<i>Bucculatrix albedinella</i> ZELLER	P, F	b
<i>Bucculatrix artemisiella</i> HERRICH-SCHÄFFER	D	b, m
<i>Caloptilia leucapennella</i> (STEPHENS)	F	t, b
<i>Calyciphora xerodactyla</i> (ZELLER)	W	m
<i>Cleorodes lichenaria</i> (HUFNAGEL)	H	a, m
<i>Clepsis lindebergi</i> (KROGERUS)	D, H	m
<i>Clossiana improba</i> (BUTLER)	L	e
<i>Clossiana thore borealis</i> (STAUDINGER)	L	b
<i>Clossiana thore thore</i> (HÜBNER)	B, F	d, f
<i>Cochylidia rupicola</i> (CURTIS)	W	b
<i>Coleophora lithargyrinella</i> ZELLER	F	b
<i>Coleophora caelebipennella</i> ZELLER	D, S	m, b
<i>Coleophora unigenella</i> SVENSSON	L	e
<i>Colias hecla</i> LEFEBVRE	L	e
<i>Colias nastes</i> BOISDUVAL	L	e
<i>Conistra erythrocephala</i> (DENIS & SCHIFFERMÜLLER)	F	t, m
<i>Cucullia argentea</i> (HUFNAGEL)	U, D	b, e
<i>Depressaria chaerophylli</i> ZELLER	U	b
<i>Ecliptopera capitata</i> (HERRICH-SCHÄFFER)	F	b, t
<i>Ectoedemia atrifrontella</i> (STANTON)	F	t, b
<i>Entephria flavicincta</i> (HÜBNER)	L	e
<i>Entephria nobiliaria</i> (HERRICH-SCHÄFFER)	L	e
<i>Epirrhoe tartuensis</i> MÖLS	W	d, m
<i>Erebia medusa</i> (DENIS & SCHIFFERMÜLLER)	L	b, p
<i>Ethmia pyrausta</i> (PALLAS)	F	m, t
<i>Eupithecia fennoscandica</i> KNABEN	L	e
<i>Eupithecia dodoneata</i> GUENÉE	F	t, m
<i>Eurodryas aurinia</i> (ROTTEMBERG)	H	m, t
<i>Gastropacha quercifolia</i> (LINNAEUS)	H, etc.	t
<i>Herminia lunalis</i> (SCOPOLI)	H, F	t
<i>Hesperia comma catena</i> (STAUDINGER)	L	e
<i>Hydraecia petasitis</i> DOUBLEDAY	P	b
<i>Hyphoraia aulica</i> (LINNAEUS)	D	b, m, f
<i>Hypodryas maturna</i> (LINNAEUS)	D, W	?
<i>Idaea muricata</i> (HUFNAGEL)	B, W	d
<i>Ipimorpha contusa</i> (FREYER)	F, R	?

Species	Habitats	Threats
<i>Lacanobia w-latinum</i> (HUFNAGEL)	B, S	d
<i>Lamellocossus terebra</i> (DENIS & SCHIFFERMÜLLER)	F	t, f
<i>Lamprotes c-aureum</i> (KNOCH)	F	t, b
<i>Lasionycta leucocycla dovrensis</i> (WOCKE)	L	e
<i>Lasionycta staudingeri</i> (AURIVILLIUS)	T	p
<i>Lithophane ornitopus</i> (HUFNAGEL)	F	t, m
<i>Lobesia euphorbiana</i> (FREYER)	W	b, e
<i>Melitaea cinxia</i> (LINNAEUS)	D, W	m, b
<i>Mendesia farinella</i> (THUNBERG)	D, W	m, b
<i>Mythimna pudorina</i> (DENIS & SCHIFFERMÜLLER)	B, W	d
<i>Nola karelica</i> TENGSTROM	B	d
<i>Nycteola revayana</i> (SCOPOLI)	F	t
<i>Ostrinia palustralis</i> (HÜBNER)	W	b
<i>Panemeria tenebrata</i> (SCOPOLI)	F	f, b
<i>Parnassius mnemosyne</i> (LINNAEUS)	H	m, t
<i>Philereme transversata</i> (HUFNAGEL)	H, F	m, t
<i>Phyllonorycter lantanellus</i> (SCHRANK)	F, H	t, m
<i>Phytometra viridaria</i> (CLERCK)	H	m
<i>Pseudoaricia nicias</i> (MEIGEN)	D, H	m, b
<i>Pseudopanthera macularia</i> (LINNAEUS)	F	t
<i>Pyrausta ostrinalis</i> (HÜBNER)	D	m, b
<i>Pyrgus andromedae</i> (WALLENGREN)	L	?
<i>Scardia boletella</i> (FABRICIUS)	V	f
<i>Sciota lucipetella</i> (JALAVA)	W, D	m
<i>Scopula virgulata</i> (DENIS & SCHIFFERMÜLLER)	B	d
<i>Stigmella dryadella</i> (HOFMANN)	L	e
<i>Stigmella malella</i> (STANTON)	F	t
<i>Sympistis zetterstedtii</i> (STAUDINGER)	T	?
<i>Synanthedon mesiaeformis</i> (HERRICH-SCHÄFFER)	F	b, t, f
<i>Syncopacma wormiella</i> (WOLFF)	D	b, m
<i>Thalera fimbrialis</i> (SCOPOLI)	B, S	d
<i>Tinagma ocnerosomellum</i> (STANTON)	D	b
<i>Trichosea ludifica</i> (LINNAEUS)	F, H	t, b
<i>Trifurcula subnitidella</i> (DUPONCHEL)	S	b, e
<i>Xestia borealis</i> (NORDSTRÖM)	V	f
<i>Xestia brunneopicta</i> (MATSUMURA)	V	f
<i>Xestia lyngei</i> (REBEL)	L	p
<b>D.3. Insufficiently known species in need of monitoring :</b>		
<i>Apterona crenulella</i> (BRUAND)	D	?
<i>Biselachista imatrella</i> (VON SCHANTZ)	D	m
<i>Endothenia nigricostana</i> (HAWORTH)	F	b, f
<i>Eupithecia cauchiata</i> (DUPONCHEL)	D, U	b, m
<i>Eupithecia irriguata</i> (HÜBNER)	F	f
<i>Sesia bembeciformis</i> (HÜBNER)	V, etc.	t, b
<i>Syncopacma taeniolella</i> (ZELLER)	D	b, m



Over the last few decades only 11 species have been lost, while many more species have been gained (12 species in 1987-1991), not only due to the developments in taxonomy, improved collecting equipment and the increased number of lepidopterologists, but apparently also due to real changes in species' ranges. This may be largely related to climatic changes (which may be anthropogenic), but also to alterations in land use and to the cultivation of exotic ornamental plants. Among the lost species, there are no examples of species previously widely distributed in natural habitats and lost due to specific human practices. Some species (*C. trichodactyla*, *H. lycaon*, *M. aestivella*, *O. taurella*) were closely associated with man-made habitats, while others may have disappeared largely due to "natural" reasons. There have been no plans for re-introductions of these species.

The primary aim of the assessment of the status of species is to find out the target species for efficient conservation efforts. In this respect, the species classified as endangered and vulnerable deserve the principal attention. There appear to be certain Finnish habitats of special importance for threatened butterflies, e.g. dry meadows, copse meadows, bogs, fells and other open or semi-open places, as well as deciduous forests with oak, maple, elm, etc. The most significant cause of butterfly decline in Finland is the loss of many of these habitats (e.g. VÄISÄNEN, 1988). Meadows are turning into forests due to natural succession and afforestation. This is at least one threat to every second species listed. Changes in agricultural practices and the loss of herb-rich road verges have contributed. Air pollution, especially nitrogen compounds, may indirectly affect the habitats by acting as fertilizers. This kind of eutrophication may be a serious threat especially to the species of dry meadows and sands. Thermophilous species are most susceptible, since the microclimate becomes more 'northern' in higher vegetation.

Efficient forestry has detrimental effects on several species of deciduous forests, bogs, meadow glades and forest clearings. The draining of peatlands destroys their fauna locally, but although about a half of the Finnish peatlands have been drained, there are only a few threatened species in this type of habitat. In fact, several butterfly species threatened in Central Europe are still common in the Finnish peatlands, at least in the north. Each new construction site has only a local effect, but summed up they represent a significant factor. For example, the valuable sand dune areas have been repeatedly under the threat of construction of e.g. golf courses, buildings and roads. Even on the Lappish mountains, over-grazing by reindeer, tourism, air pollution from the industrial plants on the Kola Peninsula, and the potential climate change may affect the species. In general, collecting has been

considered to have little effect on butterfly and moth populations, but the over-collecting of certain threatened species may affect the survival of small populations.

The use of Lepidoptera can add much information for such assessments of conservation value when used along with vascular plants, birds and other organisms. The national inventory of traditional agricultural landscapes is to be based largely on studies on vascular plants and the Lepidoptera. However, butterflies, or even the whole of the Lepidoptera, should not be used alone as the measure of conservation value of any particular habitat type. For instance, beetles are definitely much more suitable in virgin boreal forests.

## Legislation

The first Nature Conservation Act in Finland was promulgated in 1923 and it has for the most part remained unchanged to the present day. The Act has been used to advantage whenever species have been threatened by hunting, picking or over-collecting. The following 23 species are protected in Finland :

*Agriades glandon* (PRUNNER)  
*Bembecia scopigera* (SCOPOLI)  
*Caryocolum petryi* (HOFMAN)  
*Chloroclystis v-ata* (HAWORTH)  
*Clossiana thore thore* (STAUDINGER)  
*Clossiana titania* (ESPER)  
*Cynaeda dentalis* (DENIS & SCHIFFERMÜLLER)  
*Ethmia terminella* FLETCHER  
*Hesperia comma catena* (STAUDINGER)  
*Lobesia euphorbiana* (FREYER)  
*Lopinga achine* (SCOPOLI)  
*Lycaena dispar* (HAWORTH)  
*Maculinea arion* (LINNAEUS)  
*Melitaea diamina* (LANG)  
*Parnassius apollo* (LINNAEUS)  
*Parnassius mnemosyne* (LINNAEUS)  
*Photedes brevilinea* (FENN)  
*Pseudophilotes baton* (BERGSTRÄSSER)  
*Scolitantides orion* (PALLAS)  
*Scopula corivalaria* (KRETSCHMAR)  
*Scopula decorata* (DENIS & SCHIFFERMÜLLER)  
*Sesia bembeciformis* (HÜBNER)  
*Zygaena osterodensis* REISS

The specific aim of such legislation is to prevent collecting. It is prohibited to collect or even to catch and release protected species (permits may be granted by the Ministry of the Environment for scientific studies). However, the Act has not safeguarded the preservation of habitats, except for those few cases (*A. glandon*, *H. comma catena*, *C. v-ata*, *S. corrivalaria*) in which the habitat was protected as a nature reserve. For example, the picking of certain rare plants was prohibited, while it was possible to take whole eskers away as gravel for road construction. There is as yet no particular legislation on light-trapping (except for that on electrical equipment) or trading (except for CITES, covering export and import of internationally threatened species such as *Parnassius apollo*).

The provincial legislation on the Åland islands includes not only the protection of individuals, but also their habitats. Furthermore, the use of light and sugar bait traps is prohibited, though collecting without traps using light or sugar bait is allowed. The following species are protected in the island province :

*Bembecia scopigera* (SCOPOLI)  
*Bena prasinana* (LINNAEUS)  
*Coleophora inulae* WOCKE  
*Caryocolum cauliginellum* (SCHMID)  
*Depressaria libanotidella* SCHLÄGER  
*Endothenia nigricostana* (HAWORTH)  
*Ethmia pyrausta* (PALLAS)  
*Metzneria aestivella* (ZELLER)  
*Parnassius apollo* (LINNAEUS)  
*Parnassius mnemosyne* (LINNAEUS)  
*Phyllonorycter lantanellus* (SCHRANK)  
*Scythropia crataegella* (LINNAEUS)  
*Syncopacma taeniolella* (ZELLER)

The up-dating of the Finnish conservation legislation has been awaited 30 years. Although a complete revision still remains to be realized, several amendments have improved the Act. The latest changes came into force at the beginning of May 1991 improving especially the possibilities for habitat conservation. The main progress has been in the area of 'species in need of special conservation'. The Government nominates such species. When necessary (i.e. almost always), a species conservation plan has to be prepared for such species. The Ministry of the Environment verifies the plan. Then, the local government officials inform the landowners about the presence of threatened species. The landowner is under an obligation to inform the local government

at least two months in advance of any changes in land use or other practices which could be detrimental to the species or its habitat. During this period, the local government and the Ministry can decide on further measures, including purchasing the land for nature conservation or limitations of the land use. This Act will obviously become a powerful instrument for conservation. The penalties for breaking the law may be as high as two years imprisonment.

Several species of Lepidoptera have already been listed as being in need of special protection (all protected species in Finland, listed above). When the report of the Committee for Monitoring is accomplished, the list will be longer, covering all critical cases known. However, it will be relatively easy to make changes to the list when necessary.

## **Organizations**

The Ministry of the Environment directs nature conservation in Finland, prepares acts and statutes concerning nature conservation, finances research and coordinates conservation measures. The major concern in environment administration is now shifting from threatened species and nature reserves to active conservation and general maintenance of biodiversity including the butterfly and moth fauna as a whole. The provincial governments implement conservation measures and have financed a few small investigations on Lepidoptera. The National Board of Forestry manages nature reserves and other forests owned by the state. It has financed a few surveys on the Lepidoptera in some national parks and nature reserves and has published a code for such inventories (SOMERMA & VÄISÄNEN, 1990).

Under the administration of the Ministry, the Nature Conservation Research Unit coordinates, develops and carries out research on conservation ecology. This means research cooperation with specialists in universities, natural history museums and research institutes as well as with experienced amateurs. The Unit also coordinates the preparation of species conservation plans. The Unit started its work in 1989 at the National Board of Waters and Environment.

The Unit is responsible for up-dating the UHEX register (endangered species register), which includes data bases containing detailed information on threatened species and their habitats for the purposes of conservation and all planning of land use. The UHEX register is a part of the Environment Data System of the Environment Data Center, which also belongs to the National Board. The Finnish Natural History Central Museum collects information on all species (mainly distribu-



tional records). Its huge entomological collections form the basis of the old reference data.

Among the non-governmental organisations, the WWF (World Wide Fund for Nature) Finland has been active in this field working in close cooperation with the Ministry and the Research Unit. It finances conservation measures jointly with the Ministry. The Butterfly Specialist Group in the WWF started its work in 1990. It is a cooperative body between the governmental organisations and amateurs undertaking concrete conservation measures of individual species. The work includes habitat management, faunal surveys and inventories. The Group also participates in the preparation of species programmes. The role of the Group is important in monitoring the status of threatened species.

Furthermore, the Finnish Lepidopterological Society gives an annual report on the members' observations of threatened species. Naturally, the whole conservation of Lepidoptera in Finland is mostly based on the activities of the members of the Society. The Ministry of the Environment orders an annual report on the status of the threatened species from the Society (the supply of records is not financially rewarded, but a small compensation is paid for reporting). Usually one Society meeting per year is devoted to threatened species. *Baptria*, the journal of the Society, plays a major role in communication. Local faunas and reports of interesting records of macro- and microlepidoptera are published annually.

Through these organisations, Finnish lepidopterists have open channels to international organisations such as the Council of Europe, the World Conservation Union (IUCN), *Societas Europaea Lepidopterologica* (SEL), etc. It seems inevitable that this cooperation will increase, especially in the form of joint research programmes, integrated listing and evaluating of the the lists of threatened species as well as in better-coordinated conservation measures.

Today there appears to be a close cooperation between lepidopterologists and (other) conservationists in Finland. At the beginning of this closer cooperation, in the mid-1980's, minor conflicts were common but usually based on mere misunderstandings. Some species have been fully protected, but it has not essentially narrowed the possibilities of collecting Lepidoptera. It is quite clear that the conservation status of individual species is often a matter of opinion. One source of disagreement was the poor availability of information : indeed the secret localities of rare species were not always known by anyone else but a few collectors.

## Ecological research

Ecological research has a long tradition in Finnish lepidopterology, dating back to the Linnaean era. Scientists and amateurs have been interested in conservation ecology for decades (e.g. MIKKOLA, 1979; MARTTILA et al., 1990), and at any one time several projects are running. Here, only a few examples of the governmental research are given. These are projects carried out by the Research Unit in cooperation with the Ministry, the WWF Finland and individual lepidopterologists in universities etc. The primary aim of all these investigations is to provide the scientific basis for the species conservation plans.

The autecology and habitat preferences of several butterflies and moths are so well known that conservation efforts can be directed not only to valuable sites, but also to individual species. Autecological research is a prerequisite of specific conservation and species programmes. This research includes the following steps: 1. Gathering of distributional data and field surveys of these localities. 2. Preliminary delimitation of the populations and the area of suitable habitat with a buffer zone. 3. Study of the habitat preferences, effects of changes in the environment, and need of management paying special attention to vegetation studies. 4. Estimation of the population size, aggregation and vagility using mark-release-recapture techniques.

Such research has been initiated for *Parnassius apollo* (LINNAEUS), *P. mnemosyne* (LINNAEUS), *Pseudophilotes baton* (BERGSTRÄSSER), *Maculinea arion* (LINNAEUS), *Scolitantides orion* (PALLAS), *Melitaea diamina* (LANG) and *Lopinga achine* (SCOPOLI). Sometimes the species is limited to a single locality, when the protection of the habitat can be a sufficient measure, e.g. for *Hesperia comma catena* (STAUDINGER) and *Agriades glandon* (PRUNNER) on the Lappish mountains (VÄISÄNEN & SOMERMA, 1988).

Often the species are too rare for all steps except numbers 1 or 2, e.g. *Zygaena osterodensis* REISS, *Lycaena dispar* (HAWORTH) and several nocturnal moths. In such cases, it would be easier to study species in countries where they are not endangered, and only check and apply this information on the endangered populations. Therefore, there are some plans to conduct ecological studies in Estonia on the species threatened in Finland. Vice versa, it would be reasonable to study *Hypodryas maturna* (LINNAEUS), *Vacciniina optilete* (KNOCH) or *Colias palaeno* (LINNAEUS) in Finland instead of Central Europe, where they are rare.

Belt transect counts have been used for specific purposes (SOMERMA & VÄISÄNEN, 1990), but so far there has been no annual monitoring system based on this method, though such monitoring is planned to be an integral part of the general terrestrial monitoring. On the other hand, more sophisticated studies are planned or ongoing for some species. These include metapopulation dynamics of some butterflies in naturally fragmented landscapes, such as archipelagoes, peatlands and rocky areas. The morphological differentiation of the Finnish populations has currently been studied e.g. in *Parnassius mnemosyne* (VÄISÄNEN et al., 1991) and *Maculinea arion*. It may be added that a large national research programme on biodiversity is in preparation, and this project will probably include research related to the Lepidoptera, although its central issues are cost-effective study design and data analysis including predictive statistical modelling as well as the use of satellite imagery and related techniques.

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## References

- BONSDORFF, R. VON, 1985. Lahden seudun suurperhoset 1947-1983. *Lahden museolautakunta, Selvityksia ja kannanottoja* 25 : 1-86.
- ERHARDT, A., 1991. Zum Schutz der Schmetterlinge in der Schweiz : Die Notwendigkeit eines grösseren, wissenschaftlich fundierten Engagements. *Nota lepidopterologica* Suppl. No. 2 : 13-21.
- FRY, R. & LONSDALE, D., 1991. *Habitat Conservation for Insects & Neglected Green Issue*. 262 pp. The Amateur Entomologists' Society, Middlesex, England.
- HUBLIN, C. & SAVOLAINEN, E., 1985. Pohjois-Savon suurperhoset. *Kulumus* 8 : 1-86.
- JÄRVENTAUSTA, K., FINNEMAN, J., AVANTO, A. & HAARTO, A., 1988. *Varsinais-Suomen suurperhosfauna 1870-1987*. 151 pp. Turku.
- KAISILA, J., 1962. Immigration und Expansion der Lepidopteren in Finnland in den Jahren 1869-1960. *Acta Entomologica Fennica* 18 : 1-452.
- KONTIOKARI, S. 1990. Etelä-Pohjanmaan suurperhoset. *Notulae Entomologicae* 69 : 81-149.
- KUDRNA, O., 1986. *Butterflies of Europe*. 8. Aspects of the Conservation of Butterflies in Europe. 323 pp. AULA-Verlag, Wiesbaden.
- MARTIKAINEN, R. & SEURANEN, I., 1988. Tampereen seudun suurperhoset. *Notulae Entomologicae* 68 : 61-93.

- MARTTILA, O., HAAHTELA, T., AARNIO, H. & OJALAINEN, P., 1990. *Suomen päiväperhoset*. 362 pp. Kirjayhtymä, Helsinki.
- MIKKOLA, K., 1979. Vanishing and declining species of Finnish Lepidoptera. *Notulae Entomologicae* 59 : 1-9.
- MIKKOLA, K., 1991. The conservation of insects and their habitats in Northern and Eastern Europe. In : *The Conservation of Insects and Their Habitats* (Eds N. M. COLLINS & J. A. THOMAS), pp. 109-119. Academic Press, London.
- MIKKOLA, K., JALAS, I. & PELTONEN, O. (Eds), 1989. *Suomen perhoset*. Mittarit 2. 280 pp. Suomen Perhostutkijain Seura, Helsinki.
- MORRIS, M. G. & THOMAS, J. A., 1991. Progress in the conservation of butterflies. *Nota lepidopterologica*, Suppl. 2 : 32-44.
- RASSI, P. & VÄISÄNEN, R. (Eds), 1987. *Threatened animals and plants in Finland*. English summary of the report of the Committee for the Conservation of Threatened Animals and Plants in Finland. 82 pp. Ministry of the Environment, Helsinki.
- SOMERMA, P. & VÄISÄNEN, R., 1990. Luonnonsuojelualueiden perusselvitykset : perhoset. [Basic inventories of nature reserves : Lepidoptera]. *Baptia* 15 : 77-109.
- THOMAS, J. A., 1984. The conservation of butterflies in temperate countries : past efforts and lessons for the future. In : *The Biology of Butterflies* (Eds R. I. VANE-WRIGHT & P. R. ACKERY), pp. 333-353. 11th Symposium of the Royal Entomological Society of London.
- VÄISÄNEN, R., 1988. Human impact on the Finnish insect fauna. *Memoranda Societas pro Fauna et Flora Fennica* 64 : 2-10.
- VÄISÄNEN, R. & SOMERMA, P., 1988. Kaksi uutta perhosten suojelun kannalta merkittävää suojelualuetta — Saana ja Annjalonji. [Two new nature reserves with a remarkable lepidopterological significance in Finnish Lapland — Saana and Annjalonji]. *Baptia* 13 : 75-89.
- VÄISÄNEN, R., SOMERMA, P. & HELIÖVAARA, K., 1991. Morphological variation in *Parnassius mnemosyne* (LINNAEUS) in eastern Fennoscandia (Lepidoptera : Papilionidae). *Entomologica scandinavica* 22 : 353-363.



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