

Violet Copper (*Lycaena helle*) – Luxembourg



Photo: James Lindsey at Ecology of Commanster.

Conservation status	LU: U2 (x)
Protection status	HD: Annex II and IV CMS: Appendix I Bern Convention: Appendix II
Population (2007-12)	EU27: 15,800 – 89,000 individuals LU: Unknown
MS with genuine improvement	LU (post 2012)
Other MS	AT, BE, DE, FI, FR, LT, PL, PO, RO, SE

Summary: The Violet Copper butterfly (*Lycaena helle*) has scattered populations from the Pyrenees to northern Europe and east to Central Asia. It requires marshes and wet grassland areas sheltered from strong winds, and the presence of bistort, its only larval food plant. Over most of Europe, its population has declined greatly, becoming extinct in some countries, mainly due to human-induced pressures such as agricultural intensification and the loss of wet grassland habitats. In Luxembourg, the Eislek LIFE project was carried out from 2012 to 2017, to support nationally endangered species such as the Violet Copper, through the restoration of suitable grassland and wetland habitats in eleven Natura 2000 sites. Actions taken under the project included the clearance of shrubs and trees, restoration of meadows, measures to support the mowing and grazing of grasslands (e.g. modified machinery and fencing) and the development of Natura 2000 management plans for key sites. Consultations were also held with farmers and management measures extended for grassland habitats through the development of agri-environment contracts. Overall, the project successfully restored 60.75 ha of land suitable for the butterfly, with additional benefits for other local species.

Background

Status and EU occurrence

The Violet Copper (*Lycaena helle*)¹ is a Palearctic butterfly that is a glacial relict species with scattered populations from the Pyrenees to northern Europe and Central Asia (van Swaay et al., 2010; LMD, 2013). Due to pressures on the species, it has suffered strong declines (>30%) in countries such as Belarus, Germany, Luxembourg and Ukraine, and has been reported extinct in the Czech Republic, Hungary, Italy, Latvia and Slovakia, making it one of Europe's most threatened butterfly species (van Swaay et al., 2010; LIFE Eislek, 2018). Declines of 6-30% in both the distribution and population size of the species were reported in Austria, Belgium, Finland, France, Lithuania, Norway, Romania, Sweden and Switzerland (van Swaay et al., 2010). The species' threat status has not been assessed by IUCN at a global level. In Europe it is considered to be endangered, because of the rapid population declines, especially the former population strongholds in Belarus and Ukraine, whilst in the EU-27 the species' threat status is least concern as its decline has not exceeded more than 25% in the last ten years (van Swaay et al., 2010).

Although currently not considered anymore as being threatened in the EU, the conservation status of the Violet Copper over 2007-2012 was reported as being unfavourable in all three biogeographical regions and all eleven Member States in which it occurs (Annex 1). Furthermore, its trends were declining, or unknown, in most countries, and it was assessed as having an unfavourable-bad status in Germany, Finland, Luxembourg and Sweden. Although Luxembourg's overall assessment of the species' status was unfavourable-bad, as it was also for the species' habitat (see pressures and threats section), its population status was assessed as unfavourable-inadequate and its range was assessed as favourable (ETC-BD, 2018). No trend qualifier was reported by Luxembourg at the time, but information provided more recently by the nature authorities as part of the current study indicated that its population has since undergone a genuine improvement as a result of conservation measures.

¹ Natura 2000 species code 4038

Ecological requirements

The Violet Copper butterfly prefers swampy, wet grasslands or marshlands along creeks, rivers and lakes (Kayser, 2015). On average, humid grasslands and tall herb communities account for 37% of this species' habitat; water-fringe vegetation 8%; fens, transition mires and springs 8%; dry calcareous grasslands and steppes 5%; and mesophile grasslands 5% (van Swaay et al., 2010). Large groupings are often found in small sites and locations with suitable rough vegetation near water sources. Central European populations lay their eggs on the underside of leaves of the plants Common Bistort (*Polygonum bistorta*) and Viviparous Bistort (*Polygonum vivipara*). The caterpillars consume the leaves and then pass the winter as pupa before emerging as butterflies. Depending on the climate in different parts of its range, the Violet Copper can have one or two reproduction cycles (van Swaay et al., 2010; Kayser, 2015).

In Luxembourg, the species only occurs in small isolated populations in abandoned or very extensively managed wetlands with sufficient protection from the wind and with appropriate cover of the Common Bistort, the larvae's only food source (LIFE Eislek (2018)). Sites where Luxembourg's Violet Copper butterfly are known to inhabit include the wetlands of the Ösling, including the high plateaus of Troisvierges (Woltz Valley and tributaries) and Winrange (Tretterbaach Valley and tributaries), the Wiltz Valley and the Syrbaach-Betherbaach Valleys and tributaries near Surré. Isolated site locations within Luxembourg include Wahlhausen (near Hosingen), Grendel marsh (near Colpach-Bas), and point of the three borders (near Lieler) (LMD, 2013).

Pressures and threats

According to the Member State Article 17 reports, the most common highly important pressures and threats affecting the Violet Copper over the 2007-2012 period were the modification of cultivation practices, mowing or cutting of grasslands, vegetation succession and other ecosystem changes (EEA/ETC-BD, undated). In addition, van Sway et al (2010) have noted that the small and isolated nature of Central European populations make it hard for the species to recolonise former sites.

The main pressures on the Violet Copper in Luxembourg are similar to elsewhere, and include grassland removal and land drainage (i.e. conversion) for arable land, intensive grazing, reduction in dispersal, agricultural intensification, intensive mowing or intensification, and fertilisation (Luxembourg Article 17 report; Kayser, 2015). Of these, land drainage and agricultural improvements are considered to be the most important (natur&ëmwelt, 2017). For example, agricultural abandonment allows natural succession that leads to meadows becoming overgrown with rough vegetation, and over time trees and shrubs, resulting in the loss of suitable habitat for the species (natur&ëmwelt, 2017). Future threats are expected to be similar to recent pressures, with the main ones being associated with agricultural intensification and grassland conversion to arable land, but additional threats are temperature changes (higher temperatures and extremes), habitat shifting and alteration, and desynchronization of processes (Luxembourg Article 17 report).

According to the Article 17 report for Luxembourg, the distribution of suitable habitat for the Violet Copper was modelled at a fine resolution. The results of the modelling indicated that habitats such as wet meadows with Marsh Marigold (*Calthion palustris*) associations, as well as marshes and poor fens, were the most suitable for the species within the country. Wet meadows with Marsh Marigold associations are mostly in favourable condition (69% of habitat area), but a much smaller proportion of marshes and poor fens have a favourable condition (24%). Furthermore, as the species is restricted to north western Luxembourg where these habitats are mostly in unfavourable-bad condition, experts have agreed that the quality of the habitat for the Violet Copper in Luxembourg is bad.

Drivers of improvements: actors, actions and their implementation approaches

Organisers, partners, supporters and other stakeholders

The principal conservation measures that have led to the increase in the population of the Violet Copper butterfly were carried out as part of the LIFE Eislek project (Annex 2), which aimed to restore the traditional mosaic of habitats (i.e., wet fallow land, extensive pastures and hay meadows with delayed cutting regimes) in 11 of Luxembourg's Natura 2000 sites for nationally endangered species, including the Violet Copper (LIFE Eislek, 2018; Kayser, 2015; natur&ëmwelt, 2018). The project, which ran from September 2012 to August 2017, was coordinated by natur&ëmwelt – fondation Hëllef fir d'Natur in partnership with natur&ëmwelt a.s.b.l., the National Committee for Social Defense (Comité national de défense sociale (CNDS)) through its branch CNDS-Naturaarbechten, and the competent authority of Luxembourg's Chambre of Agriculture. The project also collaborated with local farmers and foresters to improve awareness and adoption of management practices

suitable for the restoration of the study areas, as well as Luxembourg’s Ministry of Sustainable Development and Infrastructure (MDDI) for the Natura 2000 management plans, and with the Administration de la gestion de l'eau (AGE; Water Administration) on specific actions and issues raised during the project’s lifetime (Thomas Wouters pers comm, 2018).

Contributions / relevance of strategic plans

Luxembourg’s Ministère du Développement durable et des Infrastructures – Département de l’environnement published an action plan for the conservation of the Violet Copper in 2013 (LMD, 2013). The action plan, entitled ‘Plan national pour la protection de la nature- Plans d’actions espèce: Plan d’action Cuivré de la Bistorte, *Lycaena helle*’ (translated: National Action Plan for the Protection of Nature- Species Action Plan: Violet Copper, *Lycaena helle*), was written by natur&ëmwelt – fondation Hëllef fir d’Natur. This action plan was an output of the LIFE Eislek project, in conjunction with the restoration measures.

Measures taken and their effectiveness

Luxembourg’s Article 17 reporting on actions taken to conserve the Violet Copper provides limited information for the 2007 to 2012 period (see table below). However, other sources have highlighted that habitat management measures involved the migratory herding and grazing of large flocks of sheep (LMD, 2013; Kayser, 2015; Michelle Clemens pers comm, 2018).

Application of conservation measures for the Violet Copper butterfly for 2007-2012 in Luxembourg

Measure	Type	Ranking	Inside / outside N2k	Broad evaluation
Establish protected areas/sites	Legal	Medium	Both	Maintain, Enhance, Long-term
Legal protection of habitats and species	Legal	Medium	Both	Maintain, Enhance, Long-term
Maintaining grasslands and other open habitats	Contractual Recurrent	Medium	Both	Maintain, Enhance
Other species management measures	Contractual Recurrent	Medium	Both	Maintain, Enhance

Source: Luxembourg Article 17 report 2013 at <https://bd.eionet.europa.eu/article17/reports2012/>

The LIFE Eislek project had multiple objectives, which broadly aimed to restore Luxembourg’s Ardennes wetlands and improve the habitats of three target species: the Violet Copper and two bird species, the Whinchat (*Saxicola rubetra*) and the Red-backed Shrike (*Lanius collurio*). Its actions and outcomes are summarised below according to the project’s reports (LIFE Eislek, 2018; natur&ëmwelt, 2018). The project purchased 32.56 ha of land with the intention of expanding available habitat for the three target species. Site-specific restoration measures included the improvement of cutting and grazing conditions through the modification of mowing equipment and the installation of grazing-related structures (e.g. fences, livestock crossings, cattle shelters, and drinking troughs). Project actions also included (1) clearing encroaching scrub and mowing on 10 ha of abandoned or fallow farmland, (2) clear-felling of 4 ha of spruce trees and conversion of 14.6 ha of previously deforested plantations to extensive grassland, (3) restoration of 10 ha of meadows with Common Bistort and Meadowsweet (*Filipendula ulmaria*) through a mixture of sowing, hay transfer and replanting of rhizomes, and (4) planting of 7,000 hedges and solitary trees to act as wind buffers. To restore appropriate water conditions, the project restored the hydrology of the alluvial plains along 1.8 km of waterways and removed 500m of existing drains. Overall, the project succeeded in restoring 60.75 ha of land suitable for the Violet Copper (Claude Schiltz pers comm, 2018).

Supporting conservation measures included contributing to the technical preparation of the Natura 2000 management plans of key sites, in collaboration with other stakeholders. These plans and recommended actions include the optimisation of grazing and cutting management for over 135 ha of state-owned and n&ë – Fondation HfN owned wet meadows. In conjunction, the project implemented a monitoring programme for the three target species. The monitoring is now undertaken by the Luxembourg Institute of Science and Technology (LIST), and the data will feed into both national and international databases, such as Recorder and the European Butterfly Monitoring Scheme (Thomas Wouters pers comm, 2018). Furthermore, the project consulted with farmers to implement the extension of habitat management measures through agri-environmental schemes, successfully negotiating contracts covering 70.6 ha of grassland habitat. To spread information about the

restoration of these sites, the project established a trail with information boards, organised 20 events (6 working events and 14 guided tours) and initiated the publication of 78 articles. These and other actions helped generate new information and raise environmental awareness of the general public and farmers in the area.

Funding sources (current and long-term) and costs (one-off and ongoing)

The total budget for the LIFE Eislek project amounted to €1,766,775, of which the EU contributed 50% (€883,387). The rest of the financial support came from national co-financing from the Ministère du Développement durable et des Infrastructures – Département de l'environnement (€665,887) and from contributions from the project beneficiaries (€202,501) (Life Eislek, 2018; natur&mwelt, 2018).

The species action plan for the Violet Copper in Luxembourg mentions the availability of financing for conservation efforts, as ensured through national regulation (i.e. the National Action Plan for the Protection of Nature). Possible funding sources for conservation initiatives include the Grand-Ducal Regulation of 20 September 2012 establishing a series of aid schemes to safeguard biological diversity in rural, wine growing and forestry areas, and the Grand-Ducal Regulation of 18 March 2008 on aid for the improvement of the natural environment. Other sources mentioned within the plan include LIFE+ funds and national co-financing by MDDI-DE, state budgets for the acquisition of land, and budgets allocated to the national biodiversity monitoring system. The specification of amounts available for such work were not mentioned (LMD, 2013).

Future actions

Luxembourg's National Action Plan for the protection of the Violet Copper proposes grazing of their sites (i.e. mainly within Natura 2000 areas) for *Lycaena helle* as the sole management option and considers mowing as less ideal (LMD, 2013). The plan's concrete actions include implementation of adequate management of bistort grasslands, including prohibiting drainage, all types of tree plantings (such as poplars, spruces and alders), application of insecticides and ploughing or reseeding in the meadows (LMD, 2013). The plan encourages the occasional brushing or trimming of trees in management sites, so as to allow adequate wind and sunlight exposure (LMD, 2013). For grazing, the plan states that light, late and time-limited grazing by cows or ponies (sheep are less suitable) is compatible to conserve the Violet Copper butterfly. This encourages uneven vegetative cover, providing a mosaic of short and tall grasses after grazing is completed. Grazing should be limited to summer and autumn periods (i.e. July or August to the end of October), with only one cow or pony per hectare for three months so as not to exceed 0.2 LU/ha/year if possible. Pasture should be applied every other year and livestock should be removed once grass cover drops below 8 cm (LMD, 2013). Though mowing is cautioned to cause heavy losses if not done correctly, if used, mowing should only be done once after August 15th and should be done as part of a three-year rotation (i.e. to maintain 2/3 of habitat in a refuge zone) (LMD, 2013). Other actions encouraged within the management plan include (a) establishing aid schemes to safeguard biological diversity in rural, wine growing and forestry areas; (b) extending the Natura 2000 habitat site 'Upper Valley of the Sûre' (LU0001007) to the valley of the Betlerbaach, the Sirbach and Herthem & unter den Träken near Surré; and (c) continue the acquisition field campaigns by the Luxembourg government, municipalities and natur&mwelt – fondation Hëllef fir d'Natur (n&ë – Fondation HfN) (LMD, 2013).

Lastly, a new 5-year project has been successfully introduced by natur&mwelt – fondation Hëllef fir d'Natur and Fonds pour la Gestion de l'Environnement, which plans to continue the efforts in the LIFE Eislek project, including the concrete actions mentioned above, monitoring and dissemination (Clemens, M. pers comm, 2018).

Achievements

Impacts on the target species

The LIFE Eislek project reports an increase in biodiversity in the Natura 2000 sites due to the restoration activities (natur&mwelt, 2017; LIFE Eislek, 2018), but its impacts on the Violet Copper have not been quantified, and may take some time to become apparent. However, given the significant scale of habitat restoration achieved, as described above, an increase in the species is likely to have occurred.

Other impacts (e.g. other habitats and species, ecosystem services, economic and social)

The LIFE Eislek restoration activities can be expected to have benefitted other species in the area, especially considering that the Violet Copper is an umbrella species in the region. For example, waders profited from the wetland restoration as open water spaces appeared, and, for the first time in 20 years, the Lapwing (*Vanellus vanellus*) bred in the north of Luxembourg at a recently-mown site with a specially-converted mower (Clemens, M., pers comm, 2018). In addition the creation of ponds and the hydrological restoration measures increased

the area of open water, which benefited species such as dragonflies and amphibians. The hydrological restoration has also led to improvements in water quality through filtration processes, and increased retention of water that could otherwise contribute to flooding downstream (natur&ëmwelt, 2017).

Conclusions and lessons learnt

The key targeted conservation measures that led to the improvements

- Clearing encroaching scrub and mowing abandoned or fallow farmland.
- Clear-felling of spruce trees and conversion of previously deforested plantations to extensive grassland.
- Restoration of meadows with Common Bistort and Meadowsweet through a mixture of sowing, hay transfer and replanting of rhizomes.
- Planting hedges and solitary trees to act as wind buffers.
- Restoration of hydrological conditions of the alluvial plains and removal of existing drains.
- Consultations with farmers to implement the extension of conservation measures through agri-environment schemes, and negotiating contracts for grassland habitats.
- Raising environmental awareness of the general public and farmers in the area.

Conservation measures that have not been sufficiently effective

- Solely protecting areas and species without subsequent proper management or habitat restoration for targeted species.
- The previous methods for the grazing of sheep, which was identified as not being the most appropriate or best means of grazing if done for too long, at inappropriate times or over too large of an area.

Factors that supported the conservation measures

- Development of Natura 2000 management plans for key sites, in collaboration with the government and local stakeholders.
- The willing involvement of key stakeholders, including government authorities and local farmers.
- Financial assistance to perform restoration activities from the EU LIFE Programme, local authorities and project beneficiaries.

Factors that constrained conservation measures

- Access to areas of interest, as it was not always possible to purchase crucial parcels of land or convince the owners to participate in conservation measures.
- Conflicts between conservation goals in certain areas.

Quick wins that could be applied elsewhere for the species

- Clearing encroaching scrub and mowing abandoned or fallow farmland.
- Clear-felling of spruce trees and conversion of previously deforested plantations to extensive grassland (as this can be aided by selling the wood to local foresters).
- Raising environmental awareness of the general public and farmers in the area.

Examples of good practice, which could be applied to other species

- Development of the Natura 2000 management plans for key sites, in collaboration with government and local stakeholders.
- Consultation with key stakeholders to implement or extend measures or negotiate biodiversity contracts.
- Raising environmental awareness of the general public and key stakeholders.

References

- EEA/ETC-BD (undated) *Lycaena helle*. European Environment Agency / European Topic Centre on Biodiversity Factsheet.
<https://bd.eionet.europa.eu/article17/reports2012/species/summary/?period=3&group=Arthropods&subject=Lycaena+helle®ion=>
- ETC-BD (2018) Member State Article 17 reports for *Lycaena helle* as compiled by ETC-BD on EIONET.
<https://bd.eionet.europa.eu/article17/reports2012/species/summary/?period=3&group=Arthropods&subject=Lycaena+helle®ion=> accessed on 07/02/2018
- Kayser, M (2015) Determining the population connectivity of the endangered lycaenid butterfly *Lycaena helle* (Denis & Schiffermüller, 1775) in Luxembourg <http://life-eislek.eu/wp-content/uploads/2015/01/Final-Version-1-11.pdf> on 21/03/2018
- LIFE Eislek (2018) Life Eislek: restoration of wetlands and associated endangered species. <http://life-eislek.eu/english-summary/> on 21/03/2018
- LMD (2013) Plan national pour la protection de la nature- Plans d'actions espèce: Plan d'action Cuivré de la Bistorte, *Lycaena helle*. Luxembourg's Ministère du Développement durable et des Infrastructures Département de l'environnement
http://environnement.public.lu/content/dam/environnement/documents/natur/plan_action_especes/lycaena_helle.pdf on 21/03/2018
- natur&ëmwelt (2018) LIFE Eislek: Restoration of wetlands and associated endangered species.
http://www.naturemwelt.lu/natur-an-emwelt_ShowNews_News.13-1-197-0.html on 21/03/2018
- natur&ëmwelt (2017) LIFE Eislek: Restoration of wetlands and associated endangered species. Final report for the LIFE project <http://www.naturanemwelt.lu/forcedownload.php?iddownload=9801298040424&type=pdf> on 21/03/2018
- van Swaay, C, Wynhoff, I, Verovnik, R, Wiemers, M, López Munguira, M, Maes, D, Sasic, M, Verstrael, T, Warren, M and Settele, J (2010) *Lycaena helle*. The IUCN Red List of Threatened Species 2010: e.T174383A7061808. <http://www.iucnredlist.org/details/174383/1> on 07/02/2018

Authorship

Prepared by Katrina Abhold of the Ecologic Institute, as part of the European Commission study on identifying the drivers of successful implementation of the Birds and Habitats Directives (under contract ENV.F.1/FRA/2014/0063), carried out by the Institute for European Environmental Policy, BirdLife International, Deloitte, Denkstatt, Ecologic, ICF Consulting Services and PBL Netherlands Environmental Assessment Agency.

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Annex 1. Status of the Violet Copper butterfly (*Lycaena helle*) at Member State and biogeographical levels

Favourable	FV	Unknown	XX	Unfavourable - inadequate	U1	Unfavourable - bad	U2
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Qualifier (+) improving (-) deteriorating (=) stable (x) unknown (n/a) not reported

	2001-06	2007-12				
	Overall	Range	Population	Habitat for species	Future	Overall (with trend)
AT (ALP)	N/A	U1	U1	U1	U1	U1 (-)
DE (ALP)	U2	U2	U2	U1	U1	U2 (=)
FR (ALP)	FV	FV	U1	U1	XX	U1 (-)
SE (ALP)	XX	U2	U2	U1	U1	U2 (x)
EU overall (ALP)	U2	U2	U2	U1	U1	U2 (-)
FI (BOR)	U2 (-)	U1	U2	U2	U2	U2 (-)
LT (BOR)	XX	U1	U1	XX	XX	U1 (=)
SE (BOR)	U2 (-)	U2	U2	U2	U2	U2 (-)
EU overall (BOR)	U2	U2	U2	U2	U2	U2 (-)
BE (CON)	U2	U1	U1	U1	U1	U1 (-)
DE (CON)	U1	U1	U2	U1	U1	U2 (-)
FR (CON)	U2	FV	U1	U1	XX	U1 (=)
LU (CON)	N/A	FV	U1	U2	U2	U2 (x)
PL (CON)	U1	FV	XX	U1	U1	U1 (x)
RO (CON)	N/A	FV	U1	U1	U1	U1
EU overall (CON)	U2	U1	XX	U1	U1	U1 (-)

Source: Member State Article 17 reports as compiled by ETC-BD on EIONET
<https://bd.eionet.europa.eu/article17/reports2012/>

Annex 2. The LIFE Nature Project in Luxembourg that aimed to help conserve the Violet Copper butterfly (*Lycaena helle*)

Project Title	Project N°	MS	Type of Beneficiary
LIFE Eislek – Restoration of wetlands and associated endangered species in the Eislek Rwegion	LIFE11 NAT/LU/000858	LU	NGO-Foundation

Source: Life Programme database