

# Large Scabious Mining Bee

(*Andrena hattorfiana*)

A Conservation Action Plan for Luxembourg 2025-2030



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## Introduction

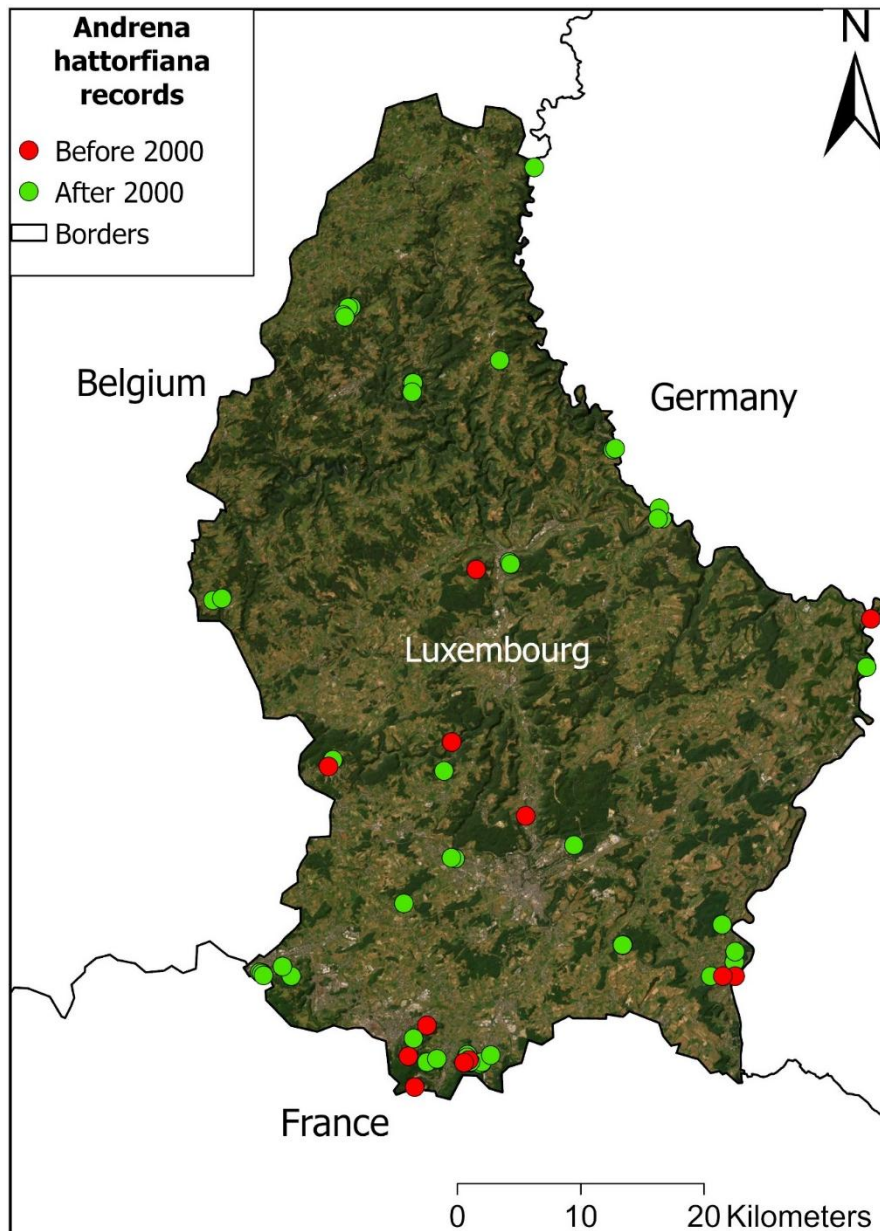
As a signatory to the European Union's Biodiversity Strategy, Luxembourg is required by 2030, to restore and protect habitats of European importance such as extensively managed meadows. In order to make progress on these commitments, detailed conservation planning is needed in the form of national action plans. Action 10 (subsection 10.2 and 10.3) of Luxembourg's National Action Plan for Pollinators states that species specific conservation actions need to be developed for species of European importance. For teasel plant specialised bee species, a European conservation action plan has recently been developed (Michez et al., 2023). The only target species of this action plan present in Luxembourg is the Large Scabious Mining Bee, *Andrena hattorfiana*, (Fabricius, 1775).

The large scabious mining bee is a ~16 mm long species belonging to the family Andrenidae. It is widely distributed in Europe (including in Luxembourg (Fig. 1)), the Caucasus and parts of Asia Minor where it is an important pollinator of various teasel plants, most importantly, of field scabious (*Knautia arvensis*, (L.) Coult.). Even though *Andrena hattorfiana* is not globally threatened, it is nevertheless a good indicator of meadows rich in teasel plants, which are threatened by agricultural intensification (Michez et al., 2023).

The following action plan will detail the specific conservation actions needed to achieve self-sustaining, viable populations of the *Andrena hattorfiana* across the country, so that its role in the ecosystem is ensured.

## Status Review

A comprehensive status review has been presented by Michez et al. (2023). This section, therefore, just focuses on the distribution of *Andrena hattorfiana* in Luxembourg.



**Figure 1:** Geographical distribution of *Andrena hattorfiana* in Luxembourg. Records are based on data uploaded to mdata.mnhn, as well as on the Wild Bee Atlas, BeeLibre and BuzzLines projects.

*Andrena hattorfiana* is widely distributed throughout Luxembourg (Fig. 1). Most occurrences are registered from the south of the country, from the Minett region and Wormeldange. However, many new records registered after 2000, are found in the north of the country, in the Oesling region.

# **Conservation Action Plan**

## **Vision**

Luxembourg maintains a well-connected network of grasslands, rich in teasel plants with associated nesting sites for the Large Scabious Mining Bee and other insects specialised on teasel plants. These patches are free of harmful pesticides and are managed to maintain abundant teasel plant populations. The Large Scabious Mining Bee has self-sustaining, viable populations spread across the country, so that its role in the ecosystem is ensured. Future generations can enjoy them and benefit from the ecosystem services they provide. Authorities, farmers, conservationists and local communities are aware of their importance, the value of their habitats and the threats to their populations and engage in conservation action. High-nature value farming systems support specialist bees and sustain healthy ecosystems for both nature and humans.

## **Goal 1 Governance & Protection**

Governance and protection established and secured for *Andrena hattorfiana*, providing leadership and ensuring the implementation of the conservation plan; as well as protection via recognition in plans for associated protected habitats and pollinators.

### **Objective 1.1**

To establish a steering group by 2025 in order to guide and facilitate implementation of the plan and review progress regularly.

#### ***Action 1.1.1***

*Creation of a steering group*

Purpose: To ensure the implementation of all actions

Note: Regular meetings each year to review progress (more often during the first year)

Who: MECB, MNHN, FFF, Biological Stations, HFN, ANF

Due date: 2025-2030

Resources required: Staff time

Indicator: Regular meetings are held

**Action 1.1.2**

*Develop and secure funding to deliver the plan*

Purpose: To ensure the implementation of all actions

Who: MECB, LIFE, European Fund for Youth Action for Pollinators

Due date: 2025-2027

Resources required: Staff time

Indicator: Funding is secured

**Objective 1.2**

To ensure that wild bee species are assessed on relevant national red lists and that *Andrena hattorfiana* is fully protected under national law.

**Action 1.2.1**

*Conduct national red list (re-)/assessments for wild bees*

How: Hold a series of expert workshops

Who: MNHN/FFF

Due date: 2025

Resources required: Staff time

Indicator: Red list completed

**Action 1.2.2**

*Add *Andrena hattorfiana* to national lists of protected species in Luxembourg*

Purpose: To ensure the target species benefits from national protection

Who: MNHN/FFF, MECB

Due date: 2025

Resources required: Staff time

Indicator: List updated to contain *Andrena hattorfiana*

**Objective 1.3**

To integrate conservation of teasel-plant specialised bees in existing action plans at national and local scales

**Action 1.3.1**

*Ensure consideration of teasel plant specialised bees in National Pollinator Action Plan*

Purpose: To ensure the target species benefits from national protection

Who: MNHN, FFF, MECB

Due date: 2026-2028

Resources required: Staff time

Indicator: National Pollinator Action Plans contain specifications for teasel plant specialised bees

## **Objective 1.4**

To ensure that key populations of *Andrena hattorfiana* are covered by protected areas.

### **Action 1.4.1**

*Conduct a gap analysis to obtain an overview to identify key teasel plant specialised bee populations outside protected areas*

How: Combine field surveys with GIS analysis

Who: MNHN, FFF

Due date: 2026

Resources required: Staff time, travel costs

Indicator: Source populations of *Andrena hattorfiana* outside of protected lands are identified

Note: Define the criteria to identify ‘key populations’

### **Action 1.4.2**

*Inform the designation process of new protected areas including key populations of *Andrena hattorfiana**

How: Work together with ANF to integrate key *Andrena hattorfiana* populations into the protected area planning process

Who: ANF, MECB, FFF

Due date: 2025-2030

Resources required: Staff time

Indicator: New protected area boundaries are outlined and ready for designation

## **Goal 2 Research**

The distribution, population status, ecological requirements and threats of *Andrena hattorfiana* and its host plants in Luxembourg are understood.

### **Objective 2.1**

To improve knowledge of the current population status and distribution of teasel-plant specialised bee populations.

#### **Action 2.1.1**

*Conduct field surveys at localities of all known records of A. hattorfiana in Luxembourg.*

How: Review spatially explicit records of target species presence. Measure ecological variables at those places.

Who: MNHN, FFF

Due date: 2025-2026

Resources required: Staff time, travel costs

Indicator: All localities sampled

#### **Action 2.1.2**

*Conduct a survey of other teasel-plant specialised bee species*

Note: Focus on *Andrena marginata* (potentially also *Nomada armata*).

Who: MNHN, FFF

Due date: 2025-2026

Resources required: Staff time, travel costs

Indicator: Survey completed

#### **Action 2.1.3**

*Study the distribution of teasel-plant rich habitats (in combination with bare ground) as potential habitats.*

How: With knowledge of the target species' ecological requirements, assess and map meadows that provide suitable habitat (grasslands, fallow strips, roadsides); utilise Citizen Science; ask Biological Stations where large stands of *Knautia* occur, also from where the seeds are harvested.

Who: MNHN, FFF, ANF

Due date: 2025-2026

Resources required: staff time, GIS, travel costs

Indicator: An inventory of georeferenced suitable habitat is created

**Action 2.1.4**

*Conduct a survey in teasel-plant rich habitats that might host *A. hattorfiana* and/or other specialised bee species.*

Who: MNHN, FFF

Due date: 2025-2027

Resources required: Staff time

Indicator: Survey completed

**Objective 2.2**

Improving knowledge of the ecological specialisation and habitat preferences of teasel plant specialised bees, including the number of host plants required to maintain a viable bee population, nesting site requirements, population connectivity, and interactions with other species.

**Action 2.2.1**

*Research on habitat preferences (nesting sites, preferred teasel-plant species, microclimate (humidity, temperature), topography) for teasel-plant specialised bee species.*

How: Pollen meta-barcoding, microhabitat analyses

Who: MNHN, FFF

Due date: 2025-2030

Resources required: staff time

Indicator: Paper on habitat preferences published

**Action 2.2.2**

*Research on minimum size of host plant population to maintain a viable bee population*

How: Data by Larsson and Franzén (2007) is available, need to be translated into minimum number of teasel plants and density; phenology needs to be considered

Who: MNHN, FFF

Due date: 2025-2028

Resources required: staff time, travel costs

Indicator: Publication

**Action 2.2.3**

*Study on the consequences of different grassland management regimes (grazing, mowing) on flower and nesting site availability and on populations of teasel-plant specialised bees.*

How: Correlation analysis of bee populations with management regimes. Recording *Andrena* population sizes and the management regimes implemented.

Who: MNHN, FFF, Biological Stations

Due date: 2025-2027

Resources required: staff time, travel costs

Indicator: Study completed

### **Objective 2.3**

Developing and implementing population monitoring for teasel-plant specialised bees as well as monitoring of the effects of conservation measures.

#### **Action 2.3.1**

*Development of a standardised monitoring protocol for teasel-plant specialised bees.*

How: Transect walks on teasel meadows. Alternatively, timed-counts on selected sites are also an option to test

Who: MNHN, FFF, LIST

Due date: 2025-2026

Resources required: staff time, travel costs

Indicator: A step-by-step monitoring protocol is available

#### **Action 2.3.2**

*Establishment of a monitoring scheme for effectiveness of conservation actions for threatened teasel-plant specialised bees in relation to the practical measures implemented.*

How: Combine population monitoring with potential drivers

Who: MNHN, FFF, Biological Stations

Due date: 2027-2030

Resources required: staff time, travel costs

Indicator: Document containing the detailed methodology to test the effectiveness of interventions.

#### **Action 2.3.3**

*Monitoring of population trends of *A. hattorfiana* and other teasel-plant specialised bees*

Note: If a rare bee species is found, a more thorough population size estimate may be needed; data on other factors (drivers) should be recorded as well to understand the responsible factors for population trends (particularly grassland management)

Who: MNHN, FFF, Biological Stations, LIST

Due date: 2026-2030

Resources required: Staff time

Indicator: Monitoring data available

## **Goal 3 Conservation Action**

An increase in large, well-connected, sustainable areas of forage habitat (including large populations of teasel plants, such as *Knautia*, *Scabiosa*) and nesting habitat (bare ground) to increase populations of teasel-plant specialised bees.

### **Objective 3.1**

To implement optimised habitat management for threatened teasel-plant specialised bees and ensure consideration in protected areas and other areas under conservation management.

#### **Action 3.1.1**

*Ensure that existing plans of relevant Natura 2000 sites and other protected areas recognise and integrate action for teasel-plant specialised bees*

Note: Protection of habitats for the target species will likely also promote other threatened insect species associated with these habitats.

How: Identify relevant Natura 2000 sites. Review existing plans, contact authorities, amend plans if necessary, check for conflicts with target species of Natura 2000 sites

Who: Biological Stations, ANF, COPIL, FFF

Due date: 2027-2030

Resources required: staff time

Indicator: Number of plans incorporating teasel-plant specialised bees

#### **Action 3.1.2**

*Adaptation of grassland management to optimise for teasel plants and *Andrena hattorfiana* nesting sites.*

Note: Liaise with the agricultural sector, councillors

How: Identify target locations. Adapt mowing dates or grazing regimes to increase the amount of flowering teasel plants (late cut, leave some areas unmown), promote suitable nesting habitats. Through biodiversity contracts.

Who: Biological Stations, HFN, ANF,

Due date: 2026-2030

Resources required: staff time, equipment, GIS

Indicator: Management adapted on key sites and sites open for future colonisation by *Andrena hattorfiana*.

### **Action 3.1.3**

*Manage Knautia sites in urban green spaces.*

How: Identify target locations, sow seeds if necessary and adapt mowing dates to increase the amount of flowering teasel plants. Simultaneously, promote suitable nesting habitats in parks, and playgrounds. Locate info signs that draw the attention of visitors to the presence of nesting wild bees.

Who: The relevant Service Technique, Biological Stations

Due date: 2026-2030

Resources required: staff time, seeds, mowers, production costs of info signs

Indicator: Management adapted on key sites in urban areas

### **Action 3.1.4**

*Reduce potential conflict between honey bee keepers and conservation management for teasel-plant specialised bees*

Note: Honey bees can threaten wild bees when pollen sources are limited

How: Identify conflict sites (sample teasel meadows with *Andrena hattorfiana* to evaluate the presence of honey bees). Direct negotiations with honey bee keepers are needed to avoid that bee hives are placed in critical areas.

Who: Fédération des Unions d'Apiculteurs du Grand-Duché de Luxembourg (FUAL), FFF

Due date: 2027-2030

Resources required: staff time

Indicator: Honey bee management agreements

## **Objective 3.2**

To improve population connectivity by restoration or promotion of suitable habitat in critical sites for dispersal and expansion of threatened teasel-plant specialised bee populations.

### **Action 3.2.1**

*Identify areas for an optimised habitat network for teasel-plant specialised bees.*

How: Identify areas to best restore habitat using 'Buzz lines' modelling

Who: MNHN/FFF

Due date: 2025-2026

Resources required: staff time

Indicator: BuzzLines modelling completed

### **Action 3.2.2**

*Restore bare ground areas and teasel-plant rich grasslands in potential habitats close to existing populations and/or former occurrences of the species.*

Note: Needs research on potential restoration sites and good information on population status. This action should include the clearance of shrubs and other encroaching late successional vegetation

How: Test whether seed bank is sufficient; sow teasel plants if required; create areas of bare ground; support production of local teasel seeds; ensure adequate habitat management in restored sites (e.g. by maintenance of unpaved roads)

Who: ANF, Biological Stations, MECB

Due date: 2030

Resources required: staff time; equipment

Indicator: Bare ground areas in teasel meadows are restored and kept open to be used as nesting habitats

## **Goal 4 Threat reduction**

A reduction in key threats and improvement of habitat availability for *Andrena hattorfiana* across key sites in Luxembourg

### **Objective 4.1**

To improve management of meadows in the wider landscape by applying teasel-plant specialised bee friendly techniques (late mowing, integrated pest management, nitrogen reduction, restoration of bare ground habitats).

#### **Action 4.1.1**

*Promote late mowing of meadows to benefit teasel-plant rich meadows*

Note: Meadows, road verges, pastures may need different mowing dates/regimes

How: Inform relevant stakeholders about the best mowing regime (timing and intensity) benefitting teasel plants and their pollinators. It is recommended that an optimal start date for the mowing period is the 15th of July

Who: Biological Stations, Biological Contracts

Due date: 2026

Resources required: staff time; equipment

Indicator: Mowing regime implemented across the priority sites

#### **Action 4.1.2**

*Promote late mowing of public spaces (roadsides, power lines, parks, gardens, etc.), and seeding of wildflower mixes including *Knautia arvensis**

How: Inform relevant stakeholders about the best mowing regime for benefitting teasel plants and their pollinators

Who: Biological Stations, City Gardeners, Naturpakt councillors & ANF

Due date: 2026-2030

Resources required: staff time; equipment

Indicator: Mowing regime implemented in public spaces

## **Goal 5 Public awareness**

An increase in awareness of teasel-plant specialised bees, the value of teasel plants (e.g. Scabiosa as medicinal plant) and nesting habitats, and their threats, as well as local communities actively engaged in their conservation.

### **Objective 5.1**

To increase awareness of teasel-plant specialised bees in Europe, their food plants and habitats among the general public, land managers and farmers.

#### **Action 5.1.1**

*Prepare general outreach material (infographics, etc.) on teasel-plant specialised bees, including information on their biology, ecological requirements (e.g., species of plants they rely on), threats and successful conservation action*

How: Upload the outreach material to the websites of stakeholder

Note: Distribution at B&B Weeks, Natur Musée Fest

Who: MNHN, FFF, Biological Stations, ANF, MECB - communication team

Due date: 2025

Resources required: staff time, designer, production costs

Indicator: Outreach material freely available to the public

#### **Action 5.1.2**

*Create information signs in protected areas with occurrence of teasel plant specialised bees to inform about its values, habitats and threats*

How: Develop a sign explaining the importance of the habitat, the ecology of the bee and the measures being undertaken to preserve it

Note: Sign must be weather resistant and should be displayed at protected sites, playgrounds and golf courts where bees are nesting.

Who: FFF, Biological Stations, ANF, MNHN, MECB

Due date: 2027

Resources required: staff time, designer, production and material costs

Indicator: Signs posted at the appropriate locations

#### **Action 5.1.3**

*Create an informative video about teasel plant specialised bees to inform about its values, habitats and threats*

Note: Target audience well defined, information is communicated in a story telling manner

How: Develop a video explaining the importance of the habitat, the ecology of the bee and the measures being undertaken to preserve it

Who: FFF, MECB

Due date: 2027

Resources required: staff time, camera and set up, video editing software

Indicator: Video completed and uploaded online where it is freely accessible to the public

#### **Action 5.1.4**

*Awareness raising with farmers*

How: Meet with local farmers to discuss options to adapt management / Use information material for farmers to promote the conservation of teasel-plant rich meadows

Who: Biological Stations, CONVIS, Agricultural chamber, LTA, MBR

Due date: 2027-2030

Resources required: staff time, travel costs

Indicator: Farmers (adjacent to important teasel meadows) are well aware of the importance of teasel meadows for pollinators such as *Andrena hattorfiana*

### **Objective 5.2**

To provide means for citizens, communities and institutions to engage in the conservation of teasel-plant specialised bees by planting food plants, improving habitat management or contributing to monitoring.

#### **Action 5.2.1**

*Engage citizens in teasel plant habitat maintenance and/or restoration*

How: Organise local habitat management or restoration events (e.g. scything)

Who: Biological Stations

By when: 2028-2030

Indicator: Management event held

Resources required: Staff time, training, event

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