

## Chapter 10. 6110\* *Rupicolous calcareous or basophilic grasslands of the Alysso–Sedion albi*

### 10.1 Characteristics of the Habitat Type

#### 10.1.1 Brief Description

Habitat type 6110\* *Rupicolous calcareous or basophilic grasslands of the Alysso–Sedion albi* (referred to as *rupicolous grasslands* in the text) is characterised by sparse xerothermic pioneer communities on superficial calcareous soils, dominated by annual plants and succulents. In most cases this habitat develops on horizontal or inclined (but not vertical) dolomite and limestone outcrops. Habitat corresponds to areas where the outcrop slope is equal to or lower than 45 degrees.

In Latvia, the habitat is close to its northern range of distribution. Currently there are less than 10 known localities, which are mostly concentrated

in the Daugava River Valley between Pļaviņas and Koknese (Rūsiņa 2013c) (Fig. 10.1.1). The total area of this habitat in the European boreal region is 230 ha, of which 1 ha is in Latvia and the rest in Sweden.







Based on vegetation composition and environmental conditions, EU protected habitat type 6110\* *Rupicolous calcareous or basophilic grasslands of the Alysso–Sedion albi* can be divided into two variants (Auniņš (ed.) 2013) (Table 10.1.1).

The largest locality of this habitat type is found on the banks of the River Lielupe near Bauska (Fig. 10.1.2) It occurs in the Daugava River Valley near Dzelmes (Fig. 10.1.3), but is in bad condition – heavily overgrown with trees and shrubs and adversely affected by nutrient runoff from adjacent agricultural land.

#### 10.1.2 Vegetation, Plant and Animal Species

**Plants and vegetation.** Habitat is characterised by xerothermic plants that form as pioneer communities on calcareous rock outcrops. The herb layer is usually very low (up to 20 cm) and sparse (total

Table 10.1.1. Variants of habitat type 6110\**Rupicolous calcareous or basophilic grasslands of the Alysso–Sedion albi*. Photo: S. Rūsiņa, B. Laime (*Erophila verna*), A. Priede (typical variant of habitat type).

Typical variant, 6110*_1	Variant of gravelly soils, 6110*_2
<p>Develops on dolomite and limestone outcrops. Hay yield lower than 0.5 t ha<sup>-1</sup>.</p>	<p>Created mainly artificially by digging hillsides or removing topsoil, as well as in areas (steep hillsides facing south or south-west), where topsoil has been washed off by natural erosion. Hay yield lower than 0.5 t ha<sup>-1</sup>.</p>
	
 <p><i>Jovibarba globifera</i></p>	 <p><i>Saxifraga tndaculites</i></p>
 <p><i>Erophila verna</i></p>	 <p><i>Acinos arvensis</i></p>

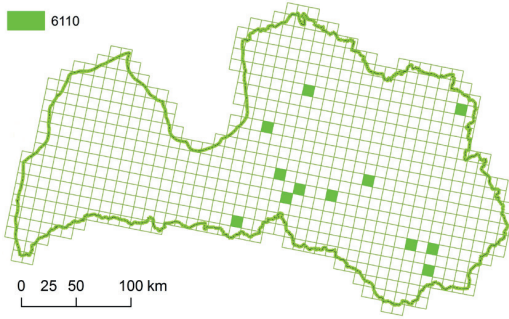


Fig. 10.1.1. Distribution of EU protected habitat type 6110\* *Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi* in Latvia (Anon. 2013a).



Fig. 10.1.2. Rupicolous grassland in "Bauska" Nature Park. Photo: S. Rūsiņa.



Fig. 10.1.3. Rupicolous grassland in "Dzelmes" Micro-reserve. Photo: S. Rūsiņa.

cover under 80%), there is no turf because the soil layer is very shallow (a few centimetres), so herbs are rooted mostly in dolomite and limestone crevices (Rūsiņa 2013c). Dominated by succulents: *Sedum acre* and *Jovibarba globifera*, annual plants: *Erophila verna*, *Veronica verna*, *Cerastium semidecandrum*, *Arabis* spp., in some places there can also be a pronounced layer of mosses (usually *Abietinella abietina*, species of *Pottiaceae*) and lichens (*Cladonia* spp. and *Peltigera* spp.). The most common perennial herbs are species with decumbent and creeping shoots and long, strong roots that can take root in crevices (for example, *Potentilla arenaria*, *Potentilla reptans*, *Medicago falcata*) (Rūsiņa 2013c).

**Birds.** Habitat is too rare and its continuous area is too small to be significant for any particular bird species, however it can be used as a feeding ground by birds that nest in other habitats near it.

**Invertebrates.** The typical variant of the habitat is inhabited by specific invertebrate fauna. Characteristic soil inhabitants that depend on a high calcium content in soil are millipedes *Diplopoda* (Spunģis 2010; Voigtländer 2011) and woodlice *Oniscoidea* (Spunģis 2008a). *Armadillidium pulchellum* is common, it is saproxylophagous, but sometimes also lives in the soil. Habitat is abundant in flowering plants, which provide anthophilous insects with a permanent feeding source. The composition of anthophilous species depends on adjacent habitats because the habitat is limited in area.

### 10.1.3 Important Processes and Structures

Habitat develops on horizontal and inclined dolomite and limestone outcrops or steep and gravelly hill slopes. In the conditions of Latvia, it usually develops in places facing south or southwest that provide more heat than on average in climatic conditions of Latvia. The substrate is calcareous and very dry.

Major environmental factors are drought and very shallow, nutrient-poor soil. This habitat has a similarity to dry grasslands in calcareous soils. Many plants are only found in these conditions because they are so adapted that in mesic places, where they could have enough moisture, they cannot outcompete larger and more competitive plant species. Species-rich plant communities form in warmer south-facing areas. More solar energy is accumulated there and conditions are suitable for species which are mainly distributed south of Latvia (Central Europe and Eastern European steppes). Dry conditions are also provided by wind. The stronger the wind the greater the water evaporation. Therefore it is very important for the habitat not to

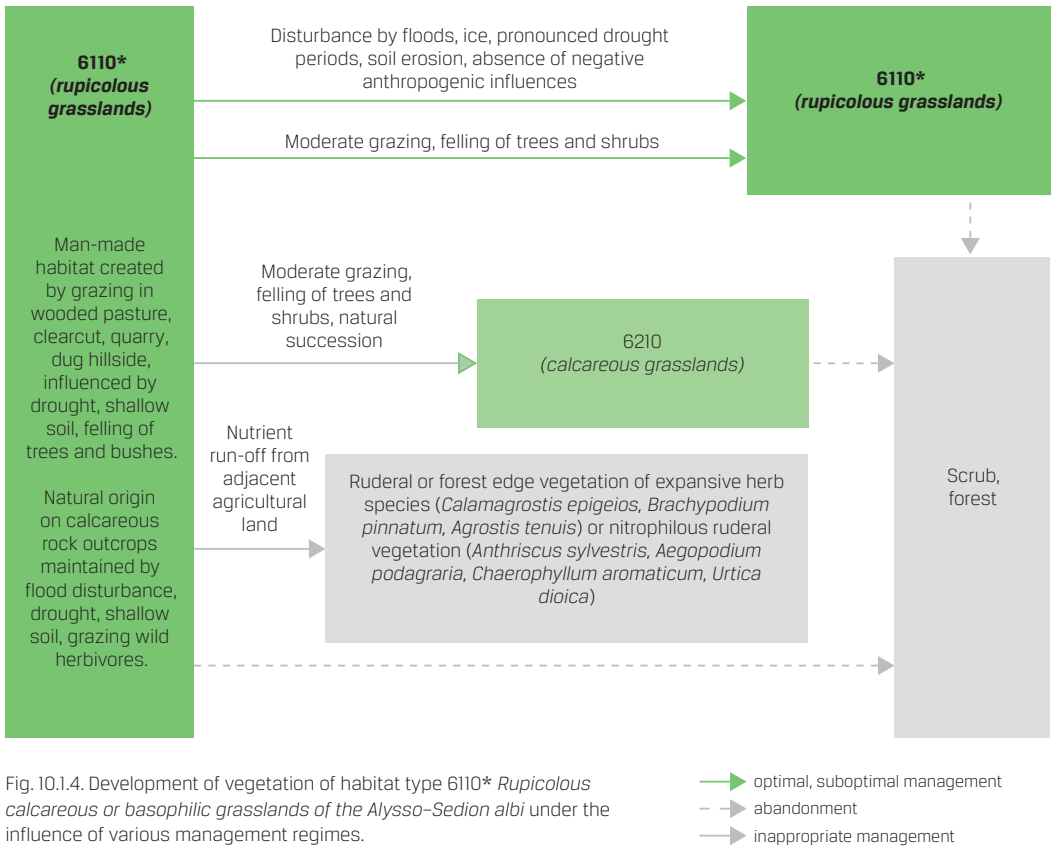


Fig. 10.1.4. Development of vegetation of habitat type 6110\* *Rupicolous calcareous* or *basophilic* grasslands of the *Alyso-Sedion albi* under the influence of various management regimes.

have forests around or many trees and shrubs in the grassland, as they create shade and reduce habitat suitability for species of dry and sunny places (Rüsiņa 2013c).

### 10.1.4 Succession

Natural succession is ensured by the gradual weathering of dolomite and limestone and topsoil development. It happens very slowly in natural conditions. Constant increase in soil depth leads to the replacement of annual and succulent plant communities with calcareous grassland vegetation and introduction of trees and shrubs (Fig. 10.1.4).

### 10.1.5 Pressures and Threats

Among the pressures that are relevant for the majority of EU protected grassland habitats (see Chapter 3), habitat type 6110\* *Rupicolous calcareous* or *basophilic* grasslands of the *Alyso-Sedion albi* is most adversely affected by eutrophication, which causes overgrowth with expansive plant species and shrubs.

Habitat-specific threats are:

- mineral extraction – a specific threat is dolomite and limestone extraction because it destroys the habitat. In abandoned quarries, habitat can develop again, but it is a long process;
- rock climbing – mechanical disturbance with excessive walking or rock climbing can completely destroy the vegetation over time and remove the entire layer of soil, leading to very slow vegetation recovery;
- frequent water level changes in rivers – habitat is subject to erosion risk in areas influenced by hydroelectric power plants. Coast erosion under the influence of water and frost is faster than in normal conditions, leading to the gradual destruction of habitat. Outcrop walls become vertical and the conditions become unsuitable for the most characteristic species. This influence prevents the formation of the habitat 8210 *Calcareous rocky slopes with chasmophytic vegetation*, because the rapid erosion does not allow the outcrop to be colonised by rupicolous grassland characteristic species (Fig. 10.1.5, 10.1.6).



Fig. 10.1.5. Erosion promoted by water level fluctuations caused by a hydroelectric power plant. A completely vertical dolomite wall forms, where vegetation does not evolve. Photo: S. Rūsiņa.



Fig. 10.1.6. Erosion caused by natural factors. Photo: S. Rūsiņa.

Table 10.3.1. Signs of well-managed habitat 6110\* *Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi*.

Parameter	Habitat (grazed or naturally existing)
Litter	Litter covers no more than 30% of the land
Vegetation	Sparse herb vegetation, covering 20–50% of the ground. Sward consists of species characteristic of the habitat, for example: <i>Jovibarba globifera</i> , <i>Potentilla arenaria</i> ; many annual plant species – <i>Erophila verna</i> , <i>Cerastium semidecandrum</i> , <i>Saxifraga tridactylites</i> , <i>Androsace septentrionalis</i> .
Plant species	Succulents ( <i>Jovibarba globifera</i> , <i>Sedum acre</i> ) in at least 25% of the herb cover.
Vegetation structure	No signs of overgrazing or trampling. <i>Medicago falcata</i> covers no more than 30%, habitat-characteristic moss and lichen occurs in patches, bare substrate up to 50% of the total area.

## 10.2 Conservation and Management Objectives of Rupicolous Grasslands

- Ensuring the habitat characteristic ecological processes, creating the preconditions so that the diversity and quality of the ecosystem services offered by the habitat do not decrease.
- Promoting the improvement in the number and condition of habitat typical and rare and vulnerable species by restoring suitable habitats for them in degraded sites.
- Restoring and maintaining the diversity of invertebrate, lichen, moss and vascular plant species and communities in suitable habitats: this is the only habitat for the moss species *Mannia fragrans* (Jermacāne, Laiviņš 2001), which only has one known locality in Latvia (it is also the only known locality in the eastern Baltic region). An important habitat for rare plant species: *Jovibarba glo-*

*bifera*, *Saxifraga tridactylites* (Rūsiņa 2013c).

## 10.3 Maintenance and Restoration of Rupicolous Grasslands

If the habitat is in a favourable condition, restoration is not necessary and only maintenance is sufficient. If there are any indications of the opposite (see Chapter 10.3.3), restoration is necessary. Before habitat restoration, the territory must be surveyed, nature values clarified, management plan developed (see Chapter 7), considering the legal framework of habitat management (see Chapter 7.2).

### 10.3.1 Rupicolous Grasslands Requiring Maintenance

If rupicolous grasslands are in a good conservation status, management is only necessary if the natural

conditions cannot ensure the long-term maintenance of this status. Habitat in a favourable condition is open, trees and shrubs cover less than 30%, there are dolomite and limestone outcrops without vegetation, patches with mosses and lichens, and sparse herb vegetation (Table 10.3.1). Habitat develops and exists due to naturally superficial soil and dry conditions. Favourable condition is indicated by pioneer plant communities of *Jovibarba globifera* and annual plants.

### 10.3.2 Optimal, Suboptimal and Inappropriate Management

Management is not necessary for habitat in good conservation status. Extensive grazing is permitted, grazing by sheep or goats is especially suitable (0.1–0.2 LU ha<sup>-1</sup>). Mowing is usually not possible due to very low and sparse vegetation. If trees and shrubs start to establish, they must be removed. If constant eutrophication occurs, for example, nutrients enter the habitat with runoff from adjacent agricultural land, and it cannot be avoided, continuous management is necessary – annual mowing and grass removal. This will reduce the impact of eutrophication. It is recommended to create at least a 5 m wide buffer zone between the fertilised agricultural land and the habitat, by mowing it every year with hay removal twice per year.

### 10.3.3 Rupicolous Grasslands Requiring Ecological Restoration

Habitat needs restoration if it has one or more of the following indications:

- thick layer of litter;
- overgrown with trees and shrubs;
- sward is dominated by one or several expansive species such as *Brachypodium pinnatum*, *Calamagrostis epigeios*, *Elytrigia repens*, *Medicago falcata*;
- there are many invasive species, such as *Saponaria officinalis*, *Solidago canadensis*, *Helianthus tuberosus*, *Rumex confertus*, *Lupinus polyphyllus*, *Bunias orientalis*;
- no mosses or lichens occur;

- less than 15% of the area is covered with herbs and more than 75% is bare substrate (dolomite, limestone, gravel);
- succulents are absent.

### 10.3.4 Restoration Potential

Before commencing habitat restoration or maintenance, a management plan must be developed (see Chapter 7). Necessary restoration methods are summarised in Table 20.1 of Chapter 20 and in Chapter 21.

Contemporary rupicolous grasslands mainly suffer from accelerated natural succession caused by human-induced eutrophication and insufficient grazing. To maintain the habitat in a favourable condition, over-growth processes need to be averted.

In overgrowing habitat, the felling of trees and shrubs and burning of litter is usually sufficient. Afterwards, extensive grazing should be performed once per season (livestock is kept in the habitat for only a few days) or shrub shoots should be cut as necessary 1–2 times per season for several years in a row. To decrease shrub regrowth, deciduous trees should be girdled rather than felled.

Invasive species should be limited by mowing or pulling them out and removing them from the habitat. Fragmentation poses a serious problem for the restoration of these habitats. If the habitat before restoration is fully overgrown with forest and there are no habitats of this type, nor other dry grassland habitats nearby (6120\* *Xeric sand calcareous grasslands*, 6210 *Semi-natural dry grasslands and scrubland facies on calcareous substrates*), the introduction of species should be encouraged by sowing seeds or spreading hay containing seeds, which can be collected in the abovementioned habitats in a favourable condition. Fragmentation may be reduced by creating conditions suitable for habitat development in old quarries, where suitable substrate (e.g., dolomite, limestone, gravel) remains. The natural succession should be permitted in these places and only the establishment of trees and shrubs should be limited.