

Photo Story

DOI: 10.21570/EDGG.PG.54-55.48-58

Gotland — a grassland paradise in the middle of the Baltic Sea

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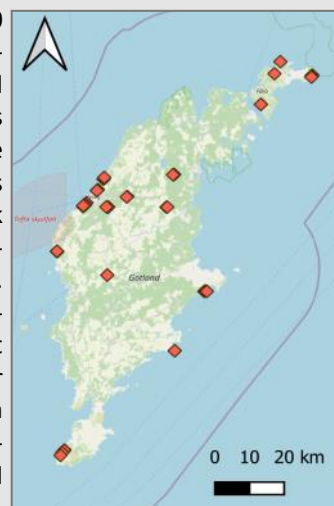
Gotland is Sweden's largest island, over 3,000 km² located in the middle of the Baltic Sea, 90 km east off the Swedish mainland and ca. 130 km west of the Baltic states. With a maximum elevation of 82 m a.s.l., Gotland is a flat island; nevertheless it hosts a large variety of habitats. With only about 60,000 inhabitants the population density is very low. Each year the local population is supplemented by tourists during the summer months.

Agriculture is a mainstay of the economy with the interior of the island supporting fertile soils which in turn support relatively intensive arable farming and sown meadows. Large parts of the island are nonetheless still occupied by natural and semi-natural habitats of a quality that is rare elsewhere in Europe. Due to the predominant limestone bedrock and the sunny subcontinental climate, Gotland hosts a much higher biodiversity than areas of comparable size on the Swedish mainland. There are alone 2,400 vascular plant taxa (including neophytes) known from the island plus large numbers of bryophytes and lichens. Gotland is also famous for its diverse bird fauna.

We visited the island in early June before the peak tourist season. While the early flowering species such as *Pulsatilla pratensis* and *Adonis vernalis* have already set seed by early summer, for biologists it is probably the best season. Gotland is a very good location for bicycle tours and one can easily rent good bicycles close to the harbour of Visby. We visited most of the sites on bike, which proved to be ideal for spotting nice plants next to the road. For those more remote places on the island we rented a car - including our visit to the nearby island of Fårö. Our visit was not only to observe and photograph grassland habitats, but also implemented the EDGG sampling methodology (normal plots and EDGG Biodiversity Plots) to obtain standardised biodiversity data of vascular plants, bryophytes and lichens for the GrassPlot database. The numerous nature reserves on the island make it easy to select places to visit, but there are also plenty of other interesting spots of high nature value along the roadsides.

The vegetation of Gotland shares many commonalities with the Swedish island of Öland and the Estonian island of Saaremaa, both of which are much better known in the scientific literature. The most outstanding feature of all three islands and some other parts of Estonia are the so-called

“alvars” or, in Natura 2000 terminology, the priority habitat “6280 – Nordic alvar and Precambrian calcareous flatrocks”. These alvars are developed over more or less horizontal limestone bedrock with only an extremely shallow or even absent soil layer. They are very rich in bryophyte and lichen species, but also have a unique vascular plant flora composed of an unusual mixture of temperate, arctic-alpine, stepic and (sub)Mediterranean species. However, alvars are not the only interesting type of grasslands in Gotland. In addition, there are also meso-xeric grasslands, some small remnants of species-rich mesic grasslands, mainly in wooded meadows, various sandy grassland types in coastal areas as well as extensive fens that are often grazed or mown.



Map of Gotland with the studied grassland sites marked.

Further reading

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The island



As an island, Gotland offers wonderful views on the sea – The capital Visby is surrounded by one of the longest surviving Medieval walls – Remnants of historic windmills demonstrate the widespread use of renewable energy in the past – Typical countryside house on Gotland – There are numerous nature reserves on the island, all with attractive bilingual information boards. Unlike in most other countries, visitors are usually allowed to leave the paths – except for some bird breeding areas.

Alvars

Alvars, i.e. habitat complexes over Precambrian flatrocks, cover significant parts of the island. They host mixtures of open *Pinus sylvestris* woodlands, *Juniperus communis* shrublands, dry grasslands and wetlands. Where soils are a bit more developed, typical alvar vegetation is a mesoxeric grassland, often rich in *Orchis mascula*.



In parts of the alvars with less soil, only specialised vascular plants occur such as *Globularia vulgaris* and, in rock fissures, *Geranium sanguineum*, while bryophytes and lichens dominate. Bottom left: The coloured lichen community is a typical element, here with *Psora decipiens* and *Fulgensia* sp. Bottom right: The community with *Allium schoenoprasum* var. *alvarense* and *Sedum album* characterizes alvar parts that are temporarily wet and affected by soil disturbance through frost change.

Cliffs and fossile shorelines



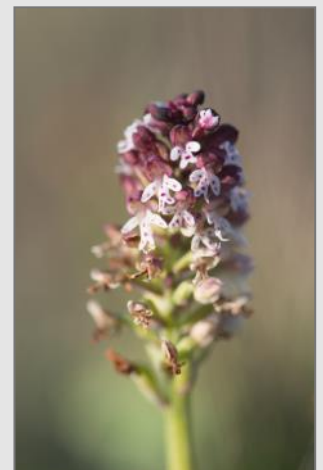
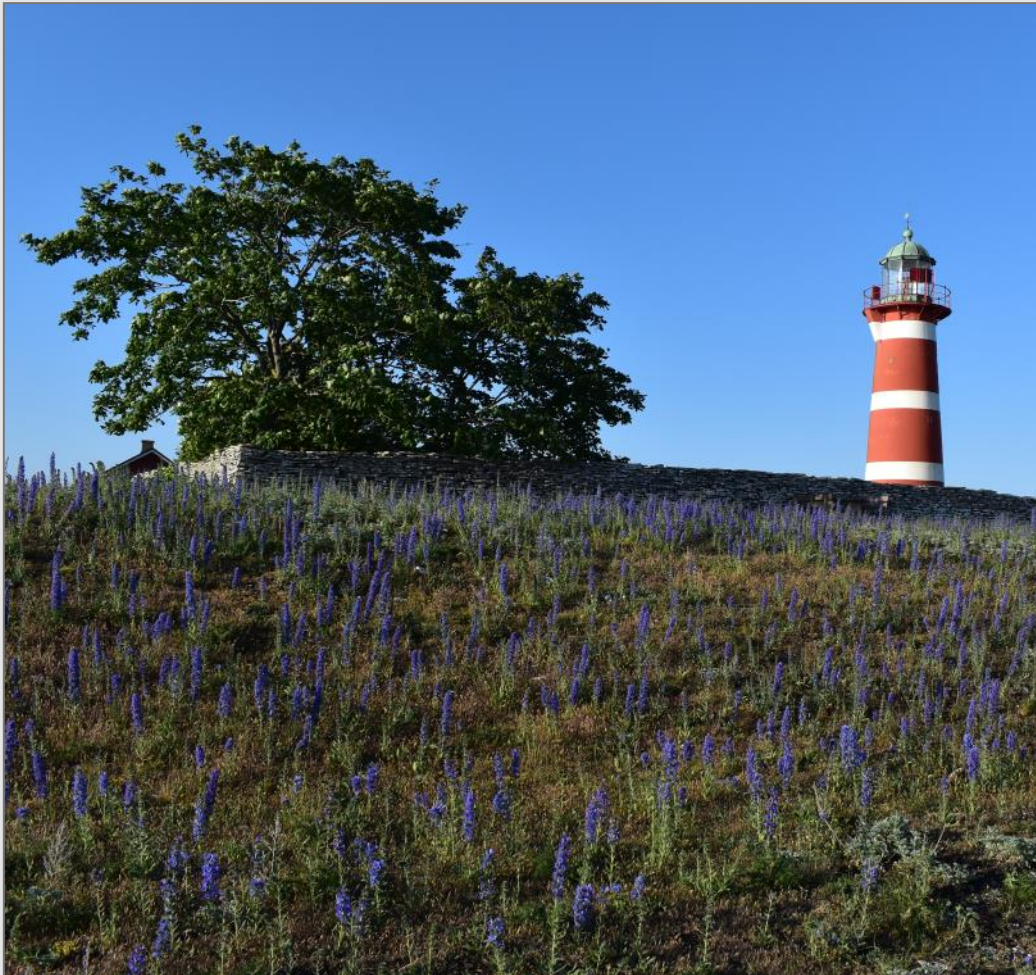
After the end of the last glaciation, Gotland emerged more and more from the sea, in consequence of which large parts of the coast are formed by cliffs and/or fossile shore lines of coarse materials. Upper row: Nature reserve “Langhammars” on Fåö. Mid: limestone cliffs at the West coast south of Visby, nature reserve “Södra hällarna”. Bottom: marl cliff in the nature reserve “Husrygg” in the very south, hosting isolated stands of *Adonis vernalis* and of the *Adonido-Brachypodietum* (*Cirsio-Brachypodion*).

Coastal dunes



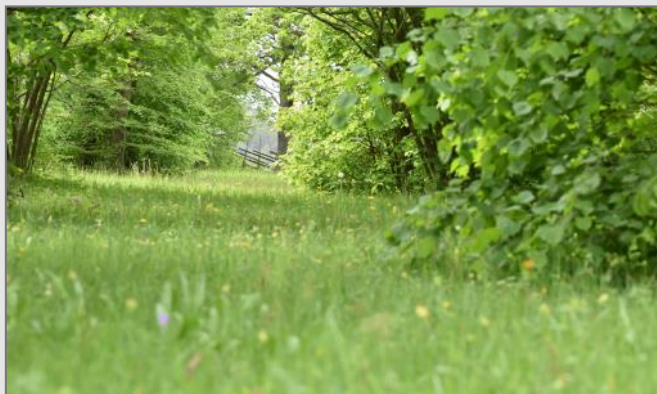
Sand dunes are a relatively rare habitat at Gotland's coasts. Top: Unusual species combination in a coastal dune with two orchid species (*Orchis militaris* and *Epipactis atrorubens*) amidst a lawn of the recently introduced neophyte *Vulpia bromoides*. Mid-left: dune landscape in Tofta strand at the West coast. Mid-right: *Pulsatilla pratensis* is a typical element of the *Festucetum polesicae* (*Koelerion glaucae*). Bottom left: *Corniculario-Corynephoretum* (*Corynephorion canescentis*) with *Corynephorus canescens* and many lichen species. Bottom right: *Lathyrus japonicus* typically occurs at transitions between the *Koelerion glaucae* and *Ammophiletea arenariae* communities.

Nutrient-poor pastures on moraines and marine deposits



Dry, nutrient-poor grasslands do not only occur in the alvars, but also on moraines and some coarse marine sediments. Top and middle: nature reserve “Närkholm” with *Polyommatus* sp. and *Neotinea ustulata*. Bottom: Such sites are often grazed by the typical Gute sheep breed of Gotland.

Wooded meadows



Wooded meadows are a special and nowadays highly threatened habitat type of the hemiboreal zone. They were created by opening the forest and low-intensity haymaking in places where the soil was productive enough to host deciduous forest. They now host some of the most colourful and species rich meso-xeric and mesic grasslands of the island, often rich in orchids. The first four photos are from the nature reserve “Alvena linaräng”, the last from the nature reserve “Fonnsängets”.

Fens



Fens occur in depressions and due to the prevailing bedrock are mostly baserich, hosting vegetation types such as *Molinion caeruleae*, *Caricion davalliana* and *Cladium mariscus* stands. Top: landscape in the nature reserve "Kallgatburg" with a Serengeti-like appearance. Typical species include *Primula farinosa*, *Eriophorum latifolium*, *Lotus maritimus* and *Tringa totanus*.

Typical plants



Pulsatilla pratensis is perhaps the most widespread forb across all types of dry grasslands on the island. In spring, millions of individuals are flowering all over the island, which were fruiting in June, while we could see only few “delayed” flowers. Bottom left: *Orchis mascula*, the most widespread orchid of the island. Bottom right: *Fragaria viridis*.



Top left: *Pinguicula vulgaris*. Top right: *Scorzonera humilis*. Bottom left: *Melampyrum arvense*. Bottom right: *Briza media*.