

## DISTRIBUTION AND STATUS OF *GRATIOLA OFFICINALIS* L. IN LATVIA

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*Gratiola officinalis* L. is a plant species of Scrophulariaceae family which in Latvia reaches the northern limit of its distribution area. In the middle of the 20th century 18 localities of *G. officinalis* were found in Latvia, and they were evenly dispersed across the whole Daugava River Valley. The building of the hydroelectric stations is the main factor causing loss of species localities, as it noticeably raised the water level in the Daugava. Now in Latvia there are seven localities of *G. officinalis*. Five out of seven localities lie in the territory of the Daugavas Loki (Daugava Bends) Nature Park and in the Augšdaugava (Upper Daugava) Protected Landscape Area.

Key words: *Gratiola officinalis*, Latvia

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### Introduction

Latvian flora is rich in species from Scrophulariaceae family. Till now in Latvia there are 65 species of Scrophulariaceae family. *Gratiola officinalis* is the only species of genus *Gratiola* in Latvian flora. It is perennial herb, stems are from 15 – till 45(80) cm, hollow, erect from a creeping and rooting base, in down part in violet or purple colour. Leaves are about 20 - 50 mm long, linear or lanceolate, serrate to subentire, glandular – punctate. Flowers are solitary in the leaf – axils. Bloom from June to August. Its habitats in Latvia are stony places and floodplain meadows in the narrow zone of the bank of the Daugava River (Cepurīte 2003).

It is an endangered species in Latvia and is included in Red Data book of Latvia in the Category 2 (vulnerable species decreasing in number, their distribution area decreases due to natural reasons or the human influence, or both). Included in the Latvia Red Data book in 1995. Records in the protected nature areas – nature parks Daugavas ieleja and Daugavas loki.

Protected by law in Latvia according to the Regulations of the Cabinet of Ministers Nr.396 (www.mk.gov.lv).

This species is also included in the Red Data Book of Lithuania and the Baltic region and in the list of endangered species of Schleswig-Holstein (Red Data Book of the Baltic Region. 1993), (Stankevičūtė 2007.).

It is species of Eurasia (Europe and western Asia), found from meridional to temperate zone It's distribution area covers the largest part of Europe. The species is found in Austria, Belgium, Bulgaria, Czech, Germany, Greece, Hungary, Italia, Lithuania, Poland, Romania, and Turkey. Common habitats in Eurasia are ditches, riverbanks and wet meadows. The species is absent in Estonia. In Lithuania there are only two localities on the banks of the Nemunas River and all populations are impoverished with only a few individuals remaining. In Latvia the species reaches the northern limit of its distribution area. (Fig.1).

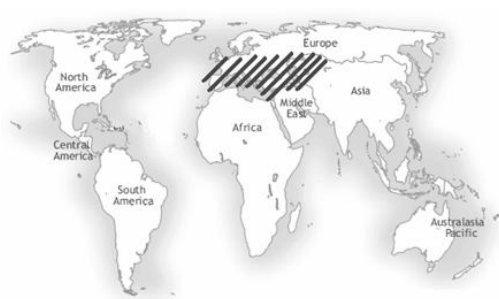


Fig. 1. Distribution of *Gratiola officinalis* L. in the world

The aim of this work is to specify the habitats of *G. officinalis* in Latvia in order to monitor changes in species number in the future.

### Material and methods

The historical distribution data of *G. officinalis* are based on literature and herbarium materials in Latvia. The most recent data about Krāslava District were obtained from the project „Rare plants inventory in Krāslava District” carried out in 2006 by the Society of Latvian Botanists and author’s studies in 2007 and 2008. The excursions-routes method was used for the studies. Main parameters collected were as follows: site location, soil structure, habitat type, population size and changes, co-occurring species.

### Results and discussion

The first specimen of *G. officinalis* in the Latvia was found in the surroundings of Staburags in 1838 by Flieshner and Lindemann and was published in their book “Flora”. In Rīga for the first time species was recorded in Andrejsala in 1848 (on the bank of Daugava River) by Heugel.

Since then *G. officinalis* was found in Salaspils (1878), Ciemupe (1958), Skrīveri (1900, 1970), Aizkraukle (1955), Koknese (1852, 1897, 1906, 1913, 1924, 1926, 1938, 1947, 1952, 1953, 1958, 1961, 1963), Rīteri (1953, 1961), Sēlpils (1985), Pļaviņas (1897, 1958), Vīgante, Staburags (1838, 1883, 1911, 1953), Krustpils (1888), Laši (1982), Sīķele (1895), 0,5 km west from Krāslava (1977,



Fig. 2. Distribution of *Gratiola officinalis* L. in the middle of the 20<sup>th</sup> century

1979), Krāslava (1884), Indrica (1895) (Āņņāšā Č. č āš. 1986), (Rafaloviča, Sondore 1984) (see in Fig. 2).

According to the references in literature and herbarium materials in the middle of the 20<sup>th</sup> century 18 localities of *G. officinalis* were found in Latvia, and they were evenly dispersed across the whole Daugava River Valley. Majority of localities was flooded in 1965 and 1974, when three hydroelectric stations on the Daugava River (Rīgas, Ķeguma and Pļaviņu) were built. The construction of the hydroelectric stations must be mentioned as the main factor in the destruction of species localities, as it noticeably raised the water level in the Daugava, as a result of which the most suitable habitats disappeared. Localities near the Koknese Castle ruins, near the mouth of Pērse River, in the proximity of Staburags and in the lower reaches Rīterupīte were destroyed by construction works of the reservoir of Pļaviņas (Cepurīte 2003).

After the building of three hydroelectric stations on the Daugava River and construction works of the reservoir of Pļaviņas, almost all of the species localities were destroyed. Now in Latvia there are only seven localities of *G. officinalis* left (see Fig. 3). Currently part of localities are flooded only in spring, which is a natural process species is adapted to.

The short description of seven existing species localities is given below. First locality - Near Laši in Jēkabpils, in 1982 according to literature data

Second locality - Jēkabpils District, Dunava Municipality, near the estuary of the Eglaine River into the Daugava, found in 2007. Third locality - In Daugavpils on the bank of Daugava River near the bridge; in 1976 a herbarium was collected, which is kept in the DU ISB Herbarium. Fourth locality - Krāslava, Adamova Path, on the banks of the Daugava; the locality was studied and species found in 2006 and a herbarium was collected, which is kept in the DU ISB Herbarium. Soil type in locality – mineral soil. Locality is situated 10 m from river, in a stony place. There were 15 stands and area was 13 -15 m<sup>2</sup>, 50 m long. Co-occurring species – *Allium schoenoprasum* L., *Euphorbia virgata* Waldst. et Kit., *Galium boreale* L., *Inula britannica* L. Fifth locality - Daugavpils District, Naujene Municipality, on the Slutišķi Embankment; found in 1996 and repeatedly surveyed and found in 2007. Soil type in locality – mineral soil. Grows in separate group in stony flood plain meadow. Size of stand is 0,5x 0,5 m, 1 m<sup>2</sup>, about ten flowering shoots. Co-occurring species – *Carex acuta* L., *Potentilla reptans* L., *Allium schoenoprasum*, *Poa angustifolia* L., *Gallium boreale*. Sixth locality - Krāslava District, near Vilmaņi Cemetery; species was found repeatedly in 2006. Soil type in locality – mineral soil. Grows in a separate group in a floodplain meadow. Co-occurring species - *Allium schoenoprasum*, *Galium boreale*, *Inula britannica*. Recommendation in this locality – do not allow make camp site and lungs in this meadow. Seventh locality - Krāslava District, near the estuary of the Indrica River; the species found in 1991 (Suško 1991, 2002) and

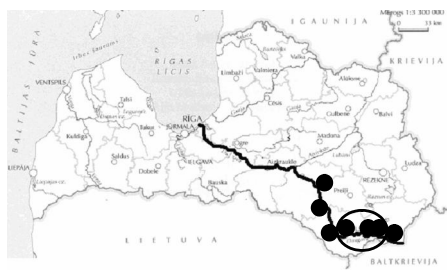


Fig.3. The current distribution of *Gratiola officinalis* in Latvia

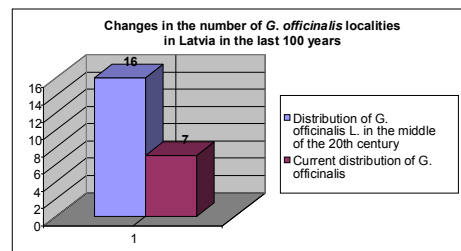


Fig.4. Changes in the number of *G. officinalis* localities in Latvia in the last 100 years

repeatedly found in 2006. Soil type in locality – mineral soil. Grows in dry, stony floodplain meadow. Size of locality was 1 m<sup>2</sup>. Co-occurring species – *Vicia cracca* L., *Allium schoenoprasum*, *Juncus tenuis* Willd.

Nowadays the main reason for species extinction is the overgrowing of open banks with reeds and shrubs. Water erosion, the alteration of natural river banks, and dam construction are other factors negatively influencing species long term survival.

Five out of seven deposits are located in the especially protected nature areas in Latvia: three in the Daugavas Loki Nature Park (Daugava Bends) and two in the Augšdaugava (Upper Daugava) Protected Landscape Area. Daugavas Loki Nature Park is located within the Augšdaugava Protected Landscape Area. Therefore, Augšdaugava Protected Landscape Area is the most important territory of *G. officinalis*, as it hosts the largest part of the population of *G. officinalis* in Latvia.

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