Parterres in Southern Sweden: Diversity and Prevalence of Flowers

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Abstract

There are presented results of research performed in 2004 and in 2012 in parterres in Southern Swedish cities: Karlskrona, Ronneby, Karlshamn, and in Kristianstad. It was identified a total of 48 of annual and perennial flower species: in 2004 – 39 species, and in 2012 – 44 species. The greater variety of flowers was identified in parterres, which were equipped in public spaces dedicated for rest, but not in areas dedicated for mass events. During the investigation period the most widespread were *Ajuga reptans*, *Aubrieta x cultorum*, *Begonia* spp., *Hosta* spp., *Lobelia*, *Petunia* (from 26.7 to 60). The highest species diversity divorced *Sedum* genus.

Key words: *parterres, ornamental plants, green areas, city, Sweden.*

Anotacija

Straipsnyje aptariami 2004 ir 2012 metais. pietų Švedijos miestų gėlynuose atliktų tyrimų rezultatai. Karlskronos, Roneby, Karlshamno ir Kristianstado miestų viešose erdvėse įrengtuose gėlynuose iš viso identifikuotos 48 daugiamečių ir vienmečių gėlių rūšys: 2004 metais – 39 rūšys, 2012 metais – 44 rūšys. Didesnė gėlių įvairovė nustatyta gėlynuose, įrengtuose poilsiui skirtuose visuomeninės paskirties erdvėse, nei masiniams renginiams skirtose zonose. Tiriamuoju laikotarpiu labiausiai išplitusios buvo *Ajuga reptans*, *Aubrieta x cultorum*, *Begonia spp.*, *Hosta spp.*, *Lobelia*, *Petunia*. Didžiausia rūšių įvairovė nustatyta *Sedum* genties.

Reikšminiai žodžiai: *gėlynai, dekoratyvieji augalai, želdynai, miestas, Švedija.*

Introduction

The proper assortment of flowers, the relationships of various flowers bio-ecological groups in green areas, and their harmony and proper maintenance, determines the attractiveness of the territory (Dainauskaitė et al., 1988; Hattatt, 1998). Such attractiveness is especially significant for resort cities that are visited by thousands of people during the high-season periods. Research identified that the flower assortment in the green areas of the city is determined by four (4) factor groups: area traditions and possibilities of introduction, characteristics of decorativeness and adaptation possibilities, ecological criteria and seasoning, and reproduction peculiarities and speed (Vaidelys, 2004).

Ornamental parterres appear especially attractive. Unfortunately, this type of parterres is rare, not only in the city parks of Lithuania but also, in other types of green areas. This type of parterres requires significant amounts of care. Meanwhile, in other European countries (e.g., in city parks of Sweden), ornamental parterres are planted on slopes, and even on artificial hills. There, they replace rock gardens. Most commonly found ornaments are representations of various animals, plants, or numbers or letters. The most popular flowers for ornaments are houseleeks (Nekrošienė, 2005; North-east Skåne…, 2004).

The aim – to assess diversity and prevalence of annual and perennial flowers in parterres in four Southern Swedish cities.

Materials and Methods

Research was performed in 2004 and in 2012 in the following southern Swedish cities in Blekinge county: Karlskrona, Ronneby, Karlshamn, and in Kristianstad (the largest city of Skane province). The object of research was the parterres of these cities. Parterres were reviewed in an expedition method in ten (10) parks and in other public areas of the afore-mentioned cities. There

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were observed 30 parterres at all in 2004 and the same parterres were observed in 2012 (29 parterres at all). The research featured the assessment of the variety of species of flowers, their prevalence, and the compositional features of parterres.

$$P = \frac{n \times 100}{N},$$

There:

P – species prevalence, %;

n – number of parterres, in which the species were detected;

N – number of all parterres where research were carried out.

Results and discussion

A long and variable history of Sweden gave birth to the country's particular traditions. In medieval times, Sweden had become a part of the European royal culture. In 1397, Sweden joined Denmark and Norway; and in the 16th century became an independent state. In the 18th century, Sweden experienced a decline, and was defeated by Russia. Neutrality during both World Wars of the 19th century allowed Sweden to change, from a rather poor country into a modern and prosperous European state (Bridge et al., 2000; Coastal…, 1999). Swedes provide great attention for environment preservation awareness of public and recreational activities, especially in urbanised localities. They foster their old town parks, and create new parks by forming luxurious greenery, including ornamental parterres. Ecological tourism has become increasingly popular (Enjoy…, 2004; Gardens…, 2004; North-east…, 2004; Terekhina, 2000).

A wonderful archipelago, fertile fields and meadows, magical pine forests, and splendid lakes and rivers: these are the characteristic features of the Blekinge region. All Blekinge towns are situated on the coast of the Baltic Sea. This location provides them with great distinction and a great amount of attention by foreign tourists. It is no wonder that great attention is provided for recreational activity in all of the towns and cities of Blekinge. All is very clean and orderly everywhere: in city parks, squares, green areas, streets, and alleys. There is a high number of green areas and various other recreational zones in Karlskrona, Ronneby, Karlshamn and Kristianstad, where, not only the city visitors but also, the local residents may have an enjoyable leisure time. Tourists are attracted by the abundance of the cultural and natural heritage, and the diversity of historical parks. There are many excursions featuring a variety of programs (e.g., sailing, trips to the archipelago, fishing, etc.). Fans and researchers of nature may spend their time in national parks and reserves of Sweden; of course, by adhering to the legislation of the mature protection of this country.

Sweden, in 1909, was the first country in Europe to pass laws regulating the protection of the natural environment, and establishing their first nine (9) national parks. Currently, the protected territories occupy more than ten percent (10 %) of all of the area of Sweden. In total, over 2,500 reserves were established, as well as approximately 1,500 other environment protection territories, and 28 national parks (Coastal…, 1999; Terekhina, 2000). The majority of these protected territories are located on approximately 7,600 km of the coastal zone. Because of mandated limitation of the recreational activity in these territories, the major load is experienced by the coastal cities and towns. The interest of holidaymakers in objects offering special entertainment, and in having old traditions, was observed.

One of these objects is Ronneby Mineral Water Park (Brunspark), established in the 19th century. This park is deservedly named 'The Pearl of Blekinge'. It is the first object in Blekinge acknowledged to be of special value: in 2003, the park was awarded the status of a 'culture heritage object'. Currently, it is the most important location of events and a variety of entertainments for local residents and visitors. During the period of project research, the international dog exhibition

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was hosted here. Perfect lawns, interestingly shaped pools, waterfalls, rivulets, fountains, trees of impressive dimensions, and authentic buildings with woodcarvings, all ensure a special aura to the park. There is the rhododendron field (planted in 1912), gardens of roses, convolvulaceous and fragrant plants, and structures supplementing the natural park. This city park gradually turns into a forest park, with a Japanese garden arranged at the outskirts. The park is ideally suitable for excursions, individual strolls, and educational and recreational activities (Nekrošienė, 2008).

A nearby information centre provides all details concerning existing or future events; there are an abundance of information kiosks; picnic sites are equipped from natural materials. The park is oriented to active leisure. Obviously, people are continuously walking in this park, thereby causing harm to green areas. Perhaps for this reason, the lignified plants are the majority of plants in the park; whereas parterres cover only a very small area. More parterres are equipped at the buildings near the streets (Nekrošienė, 2008). A rather low variety of flowers was recorded: only fourteen (14) species of perennial and seven (7) species of annual flowers in 2004 and the same variety in 2012. The following flowers, rarely found in public gardens of Lithuania, are to be mentioned: *Anemone blanda, Armeria maritima, Dorotheanthus bellidiformis, Gentiana acaulis, Leopard's bane, Paeonia suffruticosa*. The more prevailing in 2004 were: *Ajuga reptans, Aubrieta x cultorum, Begonia x tuberhybrida, Hosta, Lobelia, Petunia*, and *Dahlia*. Stonecrops are very popular in Sweden. We found as many as five (5) species in the parterres in 2004 and seven (7) species in 2012: *Sedum acre, Sedum spectabile, Sedum spurium, Sedum telephium, Sedum album, Sedum maximum*, and *Sedum hybridum* (Table).

Table. Diversity and prevalence of ornamental herbaceous plants in green areas of Swedish cities, in 2004 and 2012.
Lentelė. *Žolinių dekoratyviųjų augalų rūšių įvairovė ir pasiskirstymas Švedijos miestų želdynuose, 2004; 2012 m.*

No *Eil. Nr.*	Plant species *Augalo rūšys*	Family *Šeima*	Prevalence in assessment territory, in 2004 / 2012 *Paplitimas tiriamoje teritorijoje 2004 / 2012m.*
1	2	3	4
1.	*Achillea milefolium* L.	*Asteraceae* Dumort.	10.0 / 0.0
2.	*Ageratum houstonianum* Mill.	*Asteraceae* Dumort.	30.0 / 23.3
3.	*Ajuga reptans* L.	*Lamiaceae* Lindl.	53.3 / 24.1
4.	*Anemone blanda* Mix.	*Ranunculaceae* Juss.	16.7 / 10.3
5.	*Armeria maritime* (Mill.) Willd.	*Plumbaginaceae* Juss.	53.3 / 27.6
6.	*Artemisia vulgaris* L.	*Asteraceae* Dumort.	6.7 / 0.0
7.	*Aubrieta x cultorum*	*Brassicaceae* Burnett.	60.0 / 51.7
8.	*Begonia foliosa* Humb., Bonpl. et Kunth	*Begoniaceae* Juss.	0.0 / 6.9
9.	*Begonia rex* Putz.	*Begoniaceae* Juss.	0.0 / 6.9
10.	*Begonia x tuberhybrida*	*Begoniaceae* Juss.	63.3 / 51.7
11.	*Bergenia crassifolia* (L.) Fritsch.	*Saxifragaceae* Juss.	0.0 / 10.3
12.	*Carex hirta* L.	Cyperaceae Juss.	13.3 / 10.3
13.	*Dahlia cultorum* Thorsrud et Reisaeter.	*Asteraceae* Dumort.	53.3 / 27.6
14.	*Dianthus barbatus* L.	*Caryophyllaceae* Juss.	10.0 / 17.2
15.	*Dorotheanthus bellidiformis* (L.) N. E. Br.	*Aizoaceae* F. Rudolphi	30.0 / 24.1
16.	*Euphorbia cyparissias* L.	*Euphorbiaceae* Juss.	16.7 / 0.0
17.	*Gentiana acaulis* L.	*Gentianaceae* Juss.	6.7 / 6.9
18.	*Hemerocalis fulva* L.	*Hemerocallidaceae* R. Br.	16.7 / 24.1
19.	*Hosta caerulea* Tratt.	*Hostaceae* B. Mathew	30.0 / 27.6
20.	*Hosta plantaginea* (Lam.) Aschers.	*Hostaceae* B. Mathew	26.7 / 27.6
21.	*Hosta sieboldiana* Hook.	*Hostaceae* B. Mathew	63.3 / 55.2
22.	*Iris sibirica* L.	*Iridaceae* Rchb.	0.0 / 6.9
23.	*Lavandula angustifolia* Mill.	*Lamiaceae* Lindl.	6.7 / 24.1
24.	*Lobelia erinus* L.	*Lobeliaceae* R. Br.	53.3 / 27.6
25.	*Paeonia suffruticosa* Andrews.	*Paeoniaceae* F. Rudolphi	3.3 / 6.9
26.	*Petunia hybrida* Juss.	*Solanaceae* Juss.	53.3 / 51.7
27.	*Phlox paniculata* L.	*Polemoniaceae* Juss.	16.7 / 24.1

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Lentelės tęsinys

1	2	3	4
28.	*Phlox subulata* L.	*Polemoniaceae* Juss.	6.7 / 6.9
29.	*Ruta graveolens* L.	*Rutaceae* Juss.	0.0 / 6.9
30.	*Salvia officinalis* L.	*Lamiaceae* Lindl.	30.0 / 27.6
31.	*Salvia pratensis* L.	*Lamiaceae* Lindl.	10.0 / 6.9
32.	*Sedum acre* L.	*Crassulaceae* DC.	13.3 / 24.1
33.	*Sedum album* L.	*Crassulaceae* DC.	13.3 / 24.1
34.	*Sedum hybridum* L.	*Crassulaceae* DC.	0.0 / 24.1
35.	*Sedum maximum* (L.) Hoff.	Crassulaceae DC.	0.0 / 17.2
36.	*Sedum spectabile* Boreau	*Crassulaceae* DC.	26.7 / 24.1
37.	*Sedum spurium* M. Bieb.	*Crassulaceae* DC.	53.3 / 55.2
38.	*Sedum telephium* L.	*Crassulaceae* DC.	30.0 / 27.6
39.	*Sempervivum arachnoideum* L.	*Crassulaceae* DC.	46.7 / 27.6
40.	*Sempervivum ciliosum* Craib.	*Crassulaceae* DC.	30.0 / 24.1
41.	*Sempervivum tectorum* L.	*Crassulaceae* DC.	26.7 / 24.1
42.	*Solidago canadensis* L.	*Asteraceae* Dumort.	6.7 / 0.0
43.	*Tagetes erecta* L.	*Asteraceae* Dumort.	36.7 / 41.4
44.	*Tagetes patula* L.	*Asteraceae* Dumort.	46.7 / 41.4
45.	*Tagetes tenuifolia* Cav.	*Asteraceae* Dumort.	30.0 / 24.1
46.	*Verbena hybrida* Voss	*Verbenaceae* J. St. Hil.	6.7 / 10.3
47.	*Vinca minor* L.	*Apocynaceae* Juss.	0.0 / 6.9
48.	*Viola wittrockiana* Gams.	*Violaceae* Batsch.	0.0 / 6.9

Only one (1) additional elaborated ornamental parterre was found in Ronneby Park. There are cacti, dracaenas, agaves, and other thermophillic plants in the lawns; and *Sempervivum tectorum* in the foreground, in the white sand bed, making an ornament consisting of the number representing the year '2004'. A band is framed with *Sempervivum arachnoideum* 'Commander Hay'. Less impressive parterres of three (3) to four (4) species of flowers are in other park areas (e.g., annual dahlia, average-heighted tagetes, and petunias are planted in bands). Fragments formed from eucalyptus (*Eucalyptus gunnii*) were found in parterres.

The small town of Karlshamn (construction initiated in 1664), is recently famous as the organiser of Baltic festivals, and is known also for its splendid parks. Here, visitors are met by the serene and flavoury Rose Garden (park). One may access the sea along the park paths. Another park, Vaggaskogen, is situated near the town. A magnificent atmosphere is created by Svangsta Park. All parks are abundant with parterres. Flower assortment and compositions resemble those in Ronneby Park.

Another impressive town in Blekinge is Karlskrona, is included in the list of UNESCO World Heritage. The town was founded by King Karl XI in 1680. Karlskrona was originally built on several islands. The central town square was established on the high Trosso Hill, encircled with 300-year-old buildings. There is a monument to King Karl XI; parterres are formed around the monument. The variety of flowers is rather unusual: in addition to Canada Goldenrods (*Solidago canadensis*), Common Yarrows (*Achillea millefolium*), Common Wormwoods (*Artemisia vulgaris*), and Hairy Sedges (*Carex hirta*), there are red beets (*Beta vulgaris* subsp. *vulgaris*), and lambsquarters (*Chenopodium album*). There is no clear composition in the parterre; flowers of one or another species are planted in different size areas, completely without adhering to any symmetry or rules of proportion. Nevertheless, the parterre is perfectly maintained, and appears to be extremely natural with the background of ancient buildings that surround the square. The simplicity of the flower assortment is obvious in the Karlskrona town parks (Nekrošienė, 2005; 2008).

Two more parks that are important are in this small town: Admiralty and Hogland. There are few parterres in the Admiralty Park, but over twenty (20) types of rare tree species grow there. Hogland Park was planted by local residents between 1813 and 1825. It was named after the historical Hogland Battle, led by King Karl XIII himself. Currently, it is the most important

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Karlskrona town park, with its orchestra stage, statues, and stylish hedgesand flowerbeds. A huge square, covered with an extra-high quality lawn, is located in the centre of the park. It is framed with the surrounding parterre formed of ten (10) flower species. These are blue and white ageratum (*Ageratum houstonianum*), meadow claries and common sage (*Salvia pratensis, S. officinalis*), common lavender, (*Lavandula angustifolia*), petunia (*Petunia hybrida*), caraway (*Carum carvi*), etc. Flowers are planted with the effect of giving an impression of a slightly wavy parterre. A fountain with the statue, "The Blekinge Girl", is located in front of the stage. Several species of Eglantine roses are planted around the fountain. Cacti and succulent 'grove' are planted near the stage. Pompous ornamental parterres are formed at another park statue, representing the Swedish king Karl XIII wearing a Roman costume. Original compositions of the parterre are nearly as good as the parterres in Kristianstad parks (Nekrošienė, 2005).

Kristianstad is one of the few larger Swedish cities. This city was founded in 1614 by the Swedish king Christian IV, and named after him. Danish cultural heritage objects remain in the city to the present day. Currently, the population is about 40,000 persons. It is the biggest town in Skane province. All town parks in this part of Sweden are markedly contrasting. Here, you can see the parks of different styles, from the French Baroque style, to Japanese minimalism. Gardens of magnolias, rhododendrons, roses, and tulips are especially popular. There many such parks (i.e., gardens) also in Kristianstad. They are all well maintained and ideally adapted for recreational activities. There are many luxurious parterres in the largest parks of Kristianstad. Ornamental parterres are especially popular. They are most often arranged on natural slopes, or on artificial hills. Obviously, such types of parterres are used as an alternative to rock gardens, which are not very popular in Sweden.

The main flowers used in ornamental parterres are houseleeks. Their most common species are *Sempervivum tectorum, S. arachnoideum, S. ciliosum.* Frequent ornaments are letters forming various words. An especially original and huge ornamental parterre representing a red beet was found in the central park of Kristianstad. Houseleeks are planted especially diligently, in ideally even distances, in such parterres. To maintain the perfection of ornamental lines, the flowerbeds are continuously maintained by applying special techniques (e.g., removal of sprouts and trusses).

Conclusions

1. In parterres equipped in Southern Swedish cities public spaces there were identified 48 of annual and perennial flower species: in 2004 – 39 species, and in 2012 – 44 species. Also there were found some interesting plants, which can be described as vegetables or herbs, for example, *Beta vulgaris* subsp. *vulgaris, Carum carvi*.
2. The greater variety of flowers was identified in parterres, which are equipped in public spaces dedicated for rest, but not in areas dedicated for mass events.
3. During the investigation period the most widespread were *Ajuga reptans, Aubrieta x cultorum, Begonia* spp., *Hosta* spp., *Lobelia, Petunia* (P from 26.7 to 60). The highest species diversity divorced *Sedum* genus.

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Gėlynai pietų Švedijoje: gėlių rūšių įvairovė ir išplitimas

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Santrauka

Tyrimai atlikti 2004 ir 2012 metų liepos-rugpjūčio mėn. pietų Švedijos miestuose: Blekingės provincijoje - Karlskronoje, Roneby, Karlshamne ir Skonės (Skåne) provincijos didžiausiame mieste – Kristianstade. Tyrimų objektas – visuomeninės paskirties erdvėse įrengti šių miestų gėlynai. Įvertinta gėlių rūšinė sudėtis, rūšių paplitimas, gėlynų kompoziciniai ypatumai. Tiriamuoju laikotarpiu iš viso identifikuotos 48 vienamečių ir daugiamečių gėlių rūšys. Didesnė gėlių įvairovė fiksuota 2012 metais.

Masiniams renginiams skirtuose Švedijos miestų viešose erdvėse, pvz. Roneby parke, gėlių įvairovė nedidelė, gėlynai užima mažesnę želdynų dalį, nei poilsiui skirtuose parkuose. Paminėtinos šios, Lietuvos gėlynuose rečiau aptinkamos gėlės: darželinė plukė (*Anemone blanka*), pajūrinė gvaizdė (*Armeria maritima*), saulutinė daratėlė (*Dorotheanthus bellidiformis*), bestiebis gencijonas (*Gentiana acaulis*), kaukazinė laumenė, šilinė perkūnropė (*Jovibarba sobolifera*), krūminis bijūnas (*Paeonia suffruticosa*). Labiau išplitusios buvo: šliaužiančioji vaisgina (*Ajuga reptans*), darželinė aubretė (*Aubrieta cultorum*), gumbinė begonija (*Begonia x tuberhybrida*), melsvė (*Hosta*), lobelija (*Lobelia*), petunija (*Petunia*), vienmečiai jurginai (*Dahlia*). Švedijoje ypač populiarūs šilokai. Viešų erdvių gėlynuose aptikta jų net 7 rūšys: aitrusis šilokas (*Sedum acre*), puošnusis šilokas (*Sedum spectabile*), *Sedum spurium, Sedum telephium, Sedum album.* Karlskronoje aplink paminklą karaliui Karlui XI suformuoti gėlynai. Gėlių įvairovė gana neįprasta: šalia kanadinių rykštenių (*Solidago canadensis*), paprastųjų kraujažolių (*Achillea millefolium*), paprastųjų kiečių (*Artemisia vulgaris*), plaukuotųjų viksvų (*Carex hirta*) puikuojasi raudonieji burokėliai (*Beta vulgaris* subsp. *vulgaris*), puoselėjamos baltosios balandos (*Chenopodium album*). Jokios, bent kiek aiškesnės kompozicijos gėlyne neišryškėja, vienos ar kitos rūšies gėlės susodintos skirtingo dydžio ploteliais, visiškai nesilaikant simetrijos ar proporcijų. Tačiau gėlynas puikiai prižiūrimas, atrodo ypač natūraliai aikštę supančių senovinių pastatų fone. Prabangių ornamentinių gėlynų gausa išsiskiria Kristianstado miesto parkai. Dažniausiai suformuojami ornamentai, vaizduojantys įvairius augalus, gyvūnus, išdėliojami skaičiai ar raidės. Populiariausios gėlės, iš kurių formuojami ornamentai yra perkūnropės. Paminėtinos šios rūšys: *Sempervivum tectorum, S. arachnoideum, S. ciliosum*.

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