An Using and Designing Strategies of Perennial Plants on Urban Planting Design

Cengiz Acar¹, and Hilal Kahveci²

¹Prof., Karadeniz Technical University, Trabzon, Turkey; ²Res. Asst., Karadeniz Technical University, Trabzon, Turkey.
E-Mail: hilalakkaya_61@hotmail.com

Abstract:

The plants are the most important elements that are used in design and planning on landscape studies. Planting and design are very important for creation to the open spaces and human spaces. When you consider the planting, planting compositions which are suitable for the purpose is understood. However, for the better adaptation of the species that will be used in planting compositions, to the area, selection of plant species, position of plants and contunity are important. Besides, ecological conditions of selected species such as climate and soil structure is extremely important in terms of obtaining adopted materials to the area. Elements in urban ecosystem such as dense structuring, industry facilities, climate changes, increasing population and appropriate usage for urban life vary in compare to natural ecosystem. These differences also affect developments and life spam of the plants negatively. To solve this, countries that have long history and experience of practice of landscape, cultivate the plants and use the new species in urban areas by reclaiming them. Because natural plants are not known adequetly in our country, they are not used exactly at landscape practices. However, the woody and herbacous species of our country have great potential at landscape studies with compositions that are formed at different bio-geographical regions and different cultivating conditions. Perennial plants which are member of naturel plants are recently used at urban parks and gardens because they are effective throughout year, not needed to plant repeatedly and have different colour options. In the world, especially at the urban environments in the developed countries, qualified planting examples formed with perennial plants can be seen. This study based on the advises given for the usage of perennial plants that grow naturely in Turkey by giving examples on usage of these plants at the urban areas from the developed countries such as England, Germany and Holland. Also, serious potential of the perennial plants in our country and designing strategies,depended on assessment of this potential related to location, aim and function of urban areas,will be discussed.

Key Terms: perennial plants, urban planting design, landscape architecture

Introduction:

In modern cities, ways related to ecological planning and designing and seeking legal precautions increase in order not to lose open areas, to protect the ecological balance and create livable environment. The importance of open and green areas doubled because of the rapid development of cities as a result of increase in population and dense construction. The use of natural plant species is extremely important ecologically and economically at the choice of plant species in the green and open areas that are planned in the cities and close areas (Arslan, 2010).

As in the whole, in our country fact of living together with rapid increase in population causes unorganized development of cities and dense construction. In this density, we need urban open-green areas to form a relation between human and nature and to fulfil the several natural, cultural and aesthetic needs of public. So, planting objects and mass, the most important components to create urban open-green areas, are very important in that respect. Because the basic principal in planning green areas is to have reflection of quality in cities as much as volumetric feature of green areas out of the city (Acar, 1997).

The importance and benefits of plants in urban to form open and green areas is multi-faced. Plants are the things that we not only use in unconstructed areas in cities or organics that we benefit from their fruits, beside urban ecology and aesthetic, they also function to prevent some environmental pollution (noise, dust, gas, visual pollution), to the planting of slopped areas to gain identity and describe the place (Acar, 1997).

Materials and Methods:

Perennial plants comprise the material of the research. In the carried out researches in a lot of countries, we come face to face with green
area settings in which natural plants used and that nature rules over the urban green areas. Especially gardens and parks that have perennial plants give the opportunity of creating several habitats in the same place.

Results and Discussion

Perennial plants:

Herbaceous perennials are plants that renew their above-ground parts on an annual basis and do not produce woody tissues. Most are winter deciduous but there are also evergreen species (Hitchmough and Fieldhouse, 2004).

A hardy perennial is one that can be expected to survive and thrive for several years in the area where you live and garden. Of course, the definition of a ‘hardy perennial’ can become complicated because soil, aspect, shelter or exposure can all determine hardiness and success in growing. The opposite of hardiness, but equally important when selecting perennials and grasses for your garden, is the factor of tolerance-of extreme heat, drought and humidity. Some non hardy perennials can be treated as annuals and grown for one season (Bloom, 2010).

Plants are divided into different groups, such as annuals, perennials and bulbs, or trees and shrubs. However, the definition of “perennial” seems to have become something of a minefield. The normal definition of “perennial” is a plant that lives for more than two seasons. This definition distinguishes a perennial from an annual or biennial, both of which die after flowering (an annual within one growing season and biennial in its second season, after overwintering). Perennials add not only flowers and color to a garden but also attractive foliage, architectural shapes, intriguing textures, and beautiful fragrances. No longer are these outstanding plants restricted to the “herbaceous border”- now they are grown among shrubs, under trees, mixed with bulbs and rock-garden plants, and in containers (Roth and Courtier, 2008).

Most perennials will grow and flower each year, maintaining a live but dormant rootstock (subject to cold and heat tolerance), in contrast to most annuals, which grow and produce flowers and seed in the same year before dying. A herbaceous perennial is essentially an non-woody plant that grows each year after dying back in winter. As always, there are exceptions to this rule; some perennials retain their evergreen foliage until the following spring when new growth begins. These plants, including Helleborus, Bergenia and Epimedium, provide a longer period of interest-especially when their leaf colour changes from green in summer to an intense purple-red or ruby in winter, as is the case for some bergenias (Bloom, 2010).

The size and shapes of perennial are as varied as any other group plants. Eupatoriums, many grasses and bamboos can tower well above your head, while thymes, sedums remain below knee and even ankle height. The flower heads of many perennials are their most significant features, and when these are slim and upright they attract attention, functioning as visual full stops (King, 2006).

Using areas of perennial plants:

Most herbaceous plants do not put out new growth until late spring, when they are very ornamental with their fresh greenery, for example Paeonia or Euphorbia polygroma. Most perennials bloom between June and September. In order to span the period between October and May, when little is in bloom, it is necessary to include other species, such as (mostly spring) flowering bulbs and tubers, evergreens or winter green perennials (e.g. Bergenia cordifolia), as well as winter-flowering perennials (e.g. Helleborus niger) (Messer, 2008).

Suitable for tenders with perennial plantings are for example the following themes

• **Beds and borders** (whether you prefer a traditional border with straight lines or one with flowing curves, beds, and borders)

• **Herbaceous borders** (This is the traditional way to grow perennials-in wide, straight borders)
• **Island beds** (Instead of displaying perennials in a traditional herbaceous border, they can be shown off in an island bed- a great way to see perennials at every angle)

• **Mixed borders** (Growing different among other types of plants together in a mixed border helps to overcome many of the drawbacks associated with traditional herbaceous border. Using a combination of plant types can extend the season of interest, reduce the amount of maintenance required, and provide shelter and support for plants that less staking is needed).

• **Background for perennials** (The flowers of perennial plants are best appreciated when they are displayed against a plain background. For this reason traditional herbaceous borders were often backed by tall, dark evergreen hedges)

• **Planted meadows**, eventually in combination with sowing

• **Planted prairies**

• **Mille-Fleur-plantings** (seasonal bedding with small inflorescences, in well balanced color combinations)

• **Woodland underplanting** (mixes with lower diversity in species)

• **Marginal plantings in ponds** (reed forming plants shall be combined with only filler plants or rather shade tolerant ground coverers)

• **Traffic islands and roundabouts** as well as small plots between asphalt sealed surfaces

• **Narrow beds** along fences, walls and buildings

• **Rock gardens and dry stone walls** (plant lists divided into differentiated habitats like sunny gaps, shady gaps, mural crown etc.)

• **Extensive roof gardens**

• **Plantings between pavement crevices** (URL 1; Roth and Courtier, 2008). Perennials offer a huge variety of flowers, foliage, and form. With so many choices, deciding which perennials to plant and figuring out how to combine them can be overwhelming.

• **Height, Shape, and Texture**: Flowers are not the whole story when creating a perennial garden- you should consider the height, shape, and texture of the plants when planning planting and how they will work together

• **Using Color**: Whether you want to create an exuberant explosion of color or a restrained monochromatic planting scheme, you'll be using color in your design. To create the best effect, you’ll need to understand how color design works.

• **Foliage Effects**: Many perennial are grown especially for their decorative foliage- for example, hostas, coral bells (*Heuchera* spp.), and many ferns and grasses.

• **Plants for Fragrance and Wildlife**: No garden should be without the extra dimension added by sweet-scented plants. Another important element in any garden is wildlife, and by attracting animals and insect to your garden, you’ll also be attracting some natural pest controllers.

• **Soil**: Perennials will generally grow in most types of soil, but some species do have definite preferences and will give a much better show if the soil meets their deeds.

• **Hot and Sunny Sites**: Whether or not excess heat is a problem depends on where you are gardening, but even cool, temperate regions can increasingly find conditions becoming too hot for the optimum growth of some plants.

• **Exposed sites**: Exposed sites are those that have little shelter from wind, which can cause a variety of problems for plants.

• **Seaside areas**: A planting area near the sea can be a dream come true, but there are several conditions that will need to be considered when planning.

• **Perennials in Containers**: Containers are more often planted with annuals (or at least plants that are treated as annuals) than perennials, but many perennial plants make
excellent container subjects (Roth and Courtier, 2008).

**The use of perennial plants in the world:**

Naturalistic regulations that appeared in England, as a reaction to human effect on landscape and formality as a result of that effect that belongs to Renaissance and Baroque which is accepted as starting point of landscape architecture, reaches its climax in 19th century and widespread at Victorian period in England. In 15th century the number colonies increased, horticulture unions were formed in England and growing plants methods were published. As a result of it, there had been a rapid increase in the number of plant species used in garden design. To the end of the 19th century, works which are about plant that can be used garden regulations and basic principles of their usage were published. The pioneers of this trend William Robinson and his follower Gertrude Jeckyll’s works are the most important ones (Akdoğan, 1974).

In recent years a new informality of planting has become popular as some gardeners turn away from plantings that are conspicuously horticultural and develop more naturalistic styles based on meadows and woodlands (RHS, 2006).

Landscape designers and managers have shown increasing interest on naturalistic plantings of native and exotic (non-native) herbaceous perennials. In the United Kingdom impetus has been given to this movement by a number of publications and conferences in Northern Europe. This trend coincides with a period of stasis and in some cases decline in the funding of public greenspace, which has encouraged landscape professionals to look to more cost effective and sustainable means to achieve seasonally changeable, visually and biologically diverse urban vegetation. This has generally involved using ecologically inspired planting which is selected to grow satisfactorily under the conditions prevailing on the site instead of the traditional, horticultural approach of manipulating the site to allow specific plants to thrive. This ecological approach often allows a shift to less intensive forms of management with a corresponding reduction in maintenance costs. This process also results in vegetation's that differ in appearance from those normally employed in urban landscapes, challenging the preconceptions of both landscape professionals and users (Hitchmough and Woudstra, 1999).

**The use of perennial plants in the England:**

During the past decade landscape designers have become increasingly interested in using herbaceous planting in public parks, gardens and other urban landscapes in Britain. During the same period, budgets for the maintenance of plantings and the skills available to achieve this, have remained static or declined. Outside of gardens, this has resulted in a gap between what is desired and what is possible; opportunities to use traditional plantings of cultivated forbs (non-grassy herbaceous plants) and grasses are few. At the same time, a perception has developed amongst some landscape and garden designers that herbaceous planting that mimics the structural and spatial form of semi-natural vegetation is less expensive to manage, and visually more exciting than traditional herbaceous planting (Hitchmough et al. 2004).

There is much more interest in horticulture in Great Britain than in Germany or other European countries. In well known gardens such as Sissinghurst Gardens or Hidcote Manor, which are run by organizations such as the National Trust, the Royal Horticultural Society, or the National Plant Collection, the main focus is on using perennials (Messer, 2008).

In British wholesale nurseries, approximately 1500 species and cultivars of herbaceous perennials are typically available. When specialist (mostly retail) nurseries are added to this, this number rises well above 5000. Some of the species grown by specialist nurseries are less robust than those in the mainstream wholesale list, but there are many exceptions. New species or cultivars with outstanding appearance or reliability gradually move from
specialists to wholesale nurseries (for example, Geranium ‘Patricia’), but many do not. This represents a lost opportunity for designers who are not aware of this diversity. You are unlikely to see Ferula communis in a wholesale list, but it is a tall emergent species with fantastic design lines that can be obtained in small numbers from retail specialist identified through The RHS Plant Finder (Hitchmough and Fieldhouse, 2004).

The RHS Chelsea Flower Show, formally known as the Great Spring Show, is a garden show held for five days in May by the Royal Horticultural Society (RHS) in the grounds of the Royal Hospital Chelsea in Chelsea, London. It is the most famous flower show in the United Kingdom, and perhaps in the world, attracting visitors from all continents (URL 2).

**The use of perennial plants in the Germany:**

The Berlin Royal Botanic Garden was moved to Dahlem in 1897. Adolf Engler, the then director, and Ignatz Urban, his deputy, oversaw this move. The German landscape designer and teacher Willy Lange started to teach at the Royal Horticultural College Berlin-Dahlem after its move from Wildpark-Potsdam in 1903, when the new Berlin-Dahlem botanic garden first opened to the public (Dunnet and Hitchmough, 2004).

The planted vegetation in public areas in Germany and other countries is frequently limited to a small number of related species of shrubs, in most cases evergreen ground cover and summer flowers. Increasingly, cultivation of public green spaces suffers from lack of personnel and sinking levels of employee qualification for the care of perennials. The situation is exacerbated by the use of inappropriate plants as mentioned above and by budget cuts and reduced funding for the authorities responsible for public green space. Concepts are needed for low-maintenance, easy-to-care-for plantings (Messer, 2008).

Investigations for example from Germany indicate that the presence of appealing, well tended green spaces in cities, for example with attractive ornamental shrubs, flowering bulbs, summer flowers and plantings of herbaceous perennial, results both in higher real estate values and more tourism. In the German-speaking countries Austria, Switzerland and Germany, there is a trend toward planting less cost-intensive mixtures of herbaceous perennials and to make optimal use of these in public plantings (Messer, 2008).

**The use of perennial plants in the Netherlands:**

In the Netherlands, native species were first officially employed in 1925 in the design of Thijssse’s Hof garden in Bloemendall. Jacobus Pieter Thijssse and Eli Heiman, two naturalists and teachers from Amsterdam, were pioneers of this form of plant use. Thanks to their publications and insights, it was possible to establish native perennials in public green spaces (Messer, 2008).

In recent years, the Netherlands, carried out an important studies for the use of perennial plants. One of them is the World Horticultural EXPO 2012 held in Venlo, the Netherlands. Under the theme “Be part of the theatre in nature, get closer to the quality of life,” the World Horticulture Expo Floriade 2012 presents horticulture in all its facets from architecture and landscape gardening to ornamental and agricultural plants. They combined the multifaceted world of horticulture in the thematic areas of Environment, Education & Innovation, Green Engine, Relax and Heal and World Show Stage and explore each of these in the various aspects of the Floriade. From the landscape design, planting and display costs of the Floriade parks, gardens of the participating nations and horticultural sectors to the small and individual gardens, the complete horticultural spectrum is presented and offers inspiration for personal garden design (Boon et al. 2012).

Famous landscape architect Piet Oudolf cultured a lot of perennial species and used them in urban gardens and parks. He put signature to designs such as Hesmerg Garden, Boon Garden, Witteveen Garden in Rotterdam, Oudolf Garden in Hummelo in Holland at which perennial plant were used (Oudolf, 2010). Oudolf challenges conventional
approaches to gardening that rely on short-lived burst of colour and constant maintenance and shows the delights of working with versatile, expressive perennials to create lasting, ecologically sound panoramas that relate to the greater landscape and the shifting seasons (Kingbury, 2010).

The use of perennial plants in Turkey:

Diversity of species in urban planting in our country is limited with main species. You meet with the same plant almost in every city. And also most of the used plants are exotic plants. Production and transportation of these plants involve much expense. Yet, to use plants which belong to that region and can be evaluated in terms of aesthetic in urban planting areas will benefit notably to urban ecology and economy (Acar, 1997; Var, 1992).

Perrenial plants comprise the substantial part of natural grown plants. Unfortunately, the use of these plants have not been achieved in urban areas succesfully. Because it is seen that municipalities use the same couple of plants(seasonal) that have attractive flowers but lose their effects and disappear as in perrenal plants.

Because of this conception, not only natural plants that can form better compositions are not used but also by using seasonal plants, of short duration planting which needs labour force and expense appears.

Turkey is still known as one of the richest floristic centre of the world. Till 1960 3000-5000 takson was known that grows naturally, according to last 40 years researches this number is almost 11000 at the present day. So Turkey can be counted as a rich country in terms of plants. When Turkey’s flora is compared with European countries’ flora, in terms of taxon Turkey is richer. Today Europe has 12000 taxon as in whole continent. Just 2750 of them are endemic. In Turkey 3708 of total taxon is epidemic and peculiar to our country. East Blacksea region which is a part of our research has naturally the %25 of our country’s flora and it has %23 in respect of endemism (Anşin, 1980; Uzun, 2002).

Table 1. Some Perennial Plants identified on Eastern Black Sea Region

<table>
<thead>
<tr>
<th>Some Perennial Plants identified on Eastern Black Sea Region</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Aconitum orientale</td>
<td>Epimedium pubigerum</td>
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<tr>
<td>Alchemilla barbatiflora</td>
<td>Epimedium pinnatum</td>
</tr>
<tr>
<td>Astilbe sp.</td>
<td>Euphorbia squamosa</td>
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<tr>
<td>Aruneus sp.</td>
<td>Eupatorium cannabinum</td>
</tr>
<tr>
<td>Calamintha sylvatica subsp. sylvatica</td>
<td>Helleborus orientalis</td>
</tr>
<tr>
<td>Calamintha grandiflora</td>
<td>Lysimachia verticillaris</td>
</tr>
<tr>
<td>Calamintha nepeta subsp. nepeta</td>
<td>Malva sylvestris</td>
</tr>
<tr>
<td>Campanula latifolia</td>
<td>Nepeta sp.</td>
</tr>
<tr>
<td>Cistus salvifolius</td>
<td>Osmanthus decorus</td>
</tr>
<tr>
<td>Delphinium formosum</td>
<td>Paeonia mascula</td>
</tr>
<tr>
<td>Epilobium montanum</td>
<td>Paeonia mascula (L.) Mill. subsp. arietina</td>
</tr>
<tr>
<td>Epilobium ponticum</td>
<td>Phlomis fruticosa</td>
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<tr>
<td></td>
<td>Phlomis russelliana</td>
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<td></td>
<td>Pachypragama macrophyllum</td>
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<tr>
<td></td>
<td>Salvia glutinosa</td>
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<td></td>
<td>Salvia verticillata L. subsp. verticillata</td>
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<tr>
<td></td>
<td>Symphytum asperum</td>
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<tr>
<td></td>
<td>Trachystemon orientalis</td>
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<tr>
<td></td>
<td>Osmanthus decorus</td>
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<td></td>
<td>Verbascum sp.</td>
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</tbody>
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Planning Strategies for Perennial Plantings:

There are different planning strategies for large-scale perennial plantings in public green spaces. These design schemes are described individually below;
Table 2. Planning Strategies for Perennial Plantings (Messer, 2008).

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monoplantings</td>
<td>Planting a single variety, or monoplanting, is one of the most common conventional strategies. Among the typical species used in monoplantings are Geranium, Salvia, Lavandula etc.</td>
</tr>
<tr>
<td>Group or Block plantings</td>
<td>Block planting is essentially a more complex version of the above and is perhaps the most common approach to landscape planting. Block plantings consist of several different species planted for effect in groups of three to five or more.</td>
</tr>
<tr>
<td>Drifts</td>
<td>Drifts contain groups of plants arranged in extremely narrow rows running more or less parallel to the main direction of the bed. This arrangement enhances the depth effect, but is more expensive to plan and maintain. Drift planting was used with great skill by Gertrude Jekyll in herbaceous and mixed borders.</td>
</tr>
<tr>
<td>Planting by sociability</td>
<td>This planting strategy is applicable to perennials with a more indigenous or natural effect. Plants of low sociability levels are set individually or in small groups of three to five or nine.</td>
</tr>
<tr>
<td>Random plantings</td>
<td>Distribution and placement of the plants is then carried out randomly following a list. The exact position of every plant is not predetermined in a planting plan, but determined by chance or by the gardener. This planting strategy gives a natural effect.</td>
</tr>
</tbody>
</table>

Conclusions and Suggestions:

People, the reason of urbanization, are also want planting in urban areas. Because they benefit from plants in several ways. According to researches, they do not only want them at their gardens but also in their living areas. The reason is they feel calm and comfortable around plants (Todorova et al. 2004). Perennial plants’ long vegetation period offers visually effective planting (with its components like flowers and leaves, wide range of colours, and different forms, size and texture).

It is rare to see a research on this subject and works on cultivating technics because use of perennial plants in urban areas is newly accepted. Tıktık (2009) searched perennial plants grows naturally and their habitats in Istanbul in 2009. In this research around Istanbul great deal of perennial plants were identified. And also it is seen that in East Blacksea region has a lot of perennial plants and much more searches should be done (Anşin 1980; Acar, 1997; Terzioğlu 1998; Uzun 2002; Palabaş Uzun 2009; Acar 2001; Kahveci, 2009).

Despite being in the position of exporting outdoor plant, our country keeps importing. But, countries that we import use the plants that grow on their own natural environment. For example, in England a lot of species that grow in Trabzon naturally are used. In accordance with the research, advises on use of prennial plants listed below;
• After deciding the perennial plants which is going to be used in urban areas, the producing and cultivating technics of these plants should be researched.
• It should be aimed to protect the plant species which are endangered because of human effects or natural effects and to use them as a material at landscape designs.
• Instead of importing exotic plants, we should apply the natural plant species in a better and productive way to the urban areas. By this way, our country benefit from economically, urban areas will have aesthetic and ecology.
• Natural perennial plants should be cultured and awareness should be raised among municipalities, green house operators and public about this subject.

Also, according to relations of location, aim and function;

• Several features of perennial plants such as form, length and texture can be used to put an emphasis on city centers. For example, using Salvia which is effective with its vertical form, with Pholox that grows horizontally creates contrast and it can be helpful to comprise a place of interest.
• Designs should be done by considering the natural growing conditions of the perennial plants at different habitats (sunny, half shadowy, under tree) in urban.
• In the urban region where traffic is busy, perennial plants which are resistant to air pollution can be used at traffic island.
• Perennial plant lots can be formed to take an interest in green areas or to provide dynamism to the area.
• By using natural perennial plants ‘naturalistic’ affects can be provided. So, not only the city gain its identity but also people can feel the sense of spontaneity.

Figure 1. Using perennial plants on urban areas in England and Germany.

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URL 1.

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