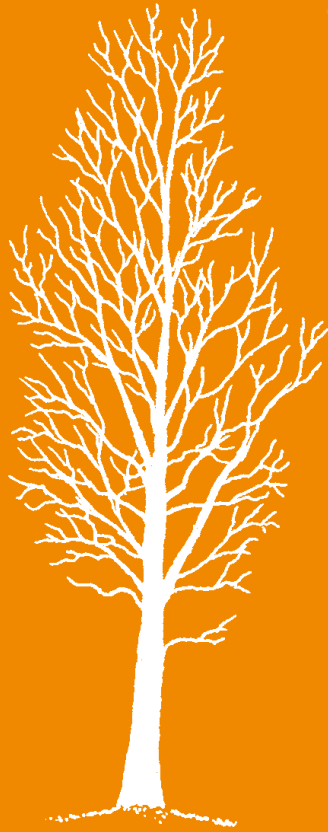
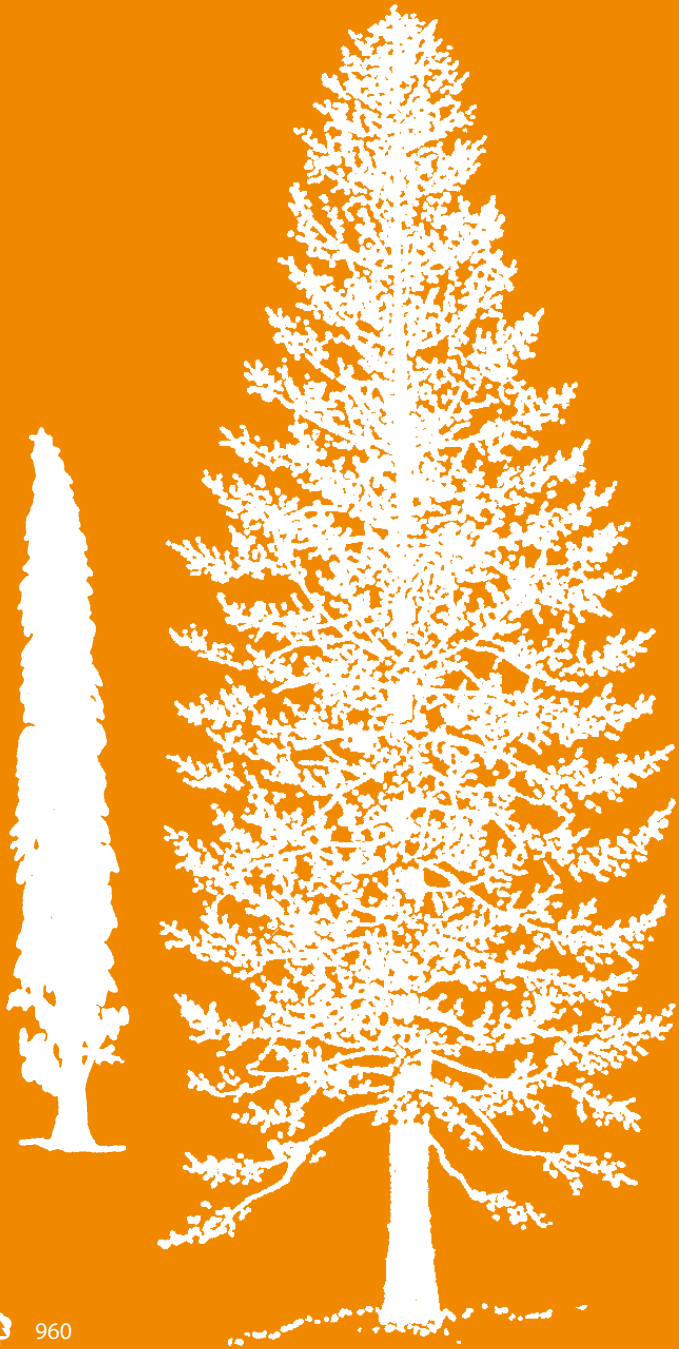


Planning tips Trees and Shrubs

Use 





Plant species indigenous to central Europe are usually not spread across the whole region, but rather often found in certain sections. Some are exclusive to particular areas owing to their special abilities. In order to use the plants completely in accordance with their proper landscape, such special origins must be carefully observed to prevent the contamination of flora in critical plantings where plant types foreign to the vegetation are introduced. To this end, special studies of the location are recommended. It should, however, be kept in mind that the centuries of use of the wild species makes it difficult to pinpoint the original boundaries for many species.



Groups according to size and growth rates see Tabel no. 1

1. Deciduous trees Genus/species/variety Found everywhere Found in regions Found in special areas

Acer campestre+		
Acer platanoides+		
Acer pseudoplatanus+		
Alnus glutinosa+		
Alnus incana+		
Betula pendula+		
Betula pubescens+		
Carpinus betulus+		
Castanea sativa+		
Fagus sylvatica+		
Fraxinus excelsior+		
Juglans regia+		
Malus sylvestris+		
Populus canescens+		
Populus nigra+		
Populus tremula+		
Prunus avium+		
Prunus padus+		
Pyrus communis+		
Quercus petraea+		
Quercus robur+		
Salix alba+		
Salix caprea+		
Salix daphnoides+		
Salix fragilis+		
Sorbus aria+		
Sorbus aucuparia+		
Sorbus domestica+		
Sorbus intermedia+		
Sorbus torminalis+		
Tilia cordata+		
Tilia europaea+		
Tilia platyphyllos+		
Ulmus carpiniifolia+		
Ulmus glabra+		
Ulmus laevis+		

2. Shrubs Genus/species/variety Found everywhere Found in regions Found in special areas

Amelanchier ovalis+		
Arctostaphylos uva-ursi+		
Berberis vulgaris+		
Buxus sempervirens+		
Calluna vulgaris+		
Colutea arborescens+		
Cornus mas+		
Cornus sanguinea+		
Corylus avellana+		
Crataegus laevigata+		
Crataegus monogyna+		
Cytisus nigricans+		
Cytisus scoparius+		
Daphne cneorum+		
Daphne mezereum+		
Empetrum nigrum+		
Erica carnea+		



39 Indigenous plants

2. Shrubs

Genus/species/variety	Found everywhere	Found in regions	Found in special areas
Erica cinerea+
Erica tetralix+
Euonymus europaeus+
Genista sagittalis+
Genista tinctoria+
Hippophae rhamnoides+
Ilex aquifolium+
Ledum palustre+
Ligustrum vulgare+
Lonicera caerulea+
Lonicera xylosteum+
Mespilus germanica+
Myrica gale+
Prunus mahaleb+
Prunus padus+
Prunus spinosa+
Rhamnus catharticus+
Rhamnus frangula+
Ribes alpinum+
Rosa arvensis+
Rosa canina+
Rosa gallica+
Rosa glauca+
Rosa pimpinellifolia+
Rosa rubiginosa+
Rubus fruticosus+
Rubus idaeus+
Salix aurita+
Salix cinerea+
Salix daphnoides varieties+
Salix elaeagnos
Salix purpurea+
Salix repens+
Salix rosmarinifolia
Salix smithiana+
Salix triandra
Salix viminalis+
Sambucus nigra+
Sambucus racemosa+
Ulex europaeus+
Vaccinium vitis-idaea+
Viburnum lantana+
Viburnum opulus+

3. Climbers

Genus/species/variety	Found everywhere	Found in regions	Found in special areas
Clematis alpina+
Clematis vitalba+
Hedera helix+
Lonicera caprifolium+
Lonicera periclymenum+
Rosa arvensis+
Rubus fruticosus+

4. Conifers

Genus/species/variety	Found everywhere	Found in regions	Found in special areas
Juniperus communis+
Juniperus sabina+
Larix decidua+
Picea abies+
Pinus cembra+
Pinus mugo+
Pinus sylvestris+
Taxus baccata+



Freely growing indigenous hedges 40

For natural hedges, both in open landscapes and in settled areas, plants are needed that like light and warmth, tolerate drought and wind, and shoot prolifically. Most of the species named form such a dense canopy of leaves that no weeds can grow under the hedges. Perennials are useful only at the edges where more light enters.

1. Deciduous trees

Genus/species/variety	Height	Likes light	Tolerates shade	Thorns/Prickles	Good for birds
Acer campestre	..... 8 - 12 m	.....+	.....+	.....	.....+
Carpinus betulus	..... 5 - 20 m	.....+	.....+	.....	.....+
Fraxinus excelsior	..... 20 - 35 m	.....+	.....	.....	.....
Malus sylvestris	..... 5 - 10 m++++
Populus tremula	..... 10 - 15 m	.....+	.....-	.....	.....
Prunus avium	..... 15 - 20 m	.....+	.....	.....	.....+
Prunus padus	..... 3 - 10 m	.....+	.....+	.....	.....+
Quercus petraea	..... 20 - 35 m	.....+	.....+	.....	.....+
Quercus robur	..... 30 - 35 m	.....+	.....+	.....	.....+
Rhamnus catharticus	..... 2 - 3 m++++
Salix caprea	..... 3 - 8 m	.....+	.....-	.....	.....
Sorbus aucuparia	..... 5 - 10 m	.....+	.....+	.....	.....
Ulmus carpiniifolia	..... 25 - 35 m	.....+	.....	.....	.....

2. Shrubs

Genus/species/variety	Height	Likes light	Tolerates shade	Thorns/Prickles	Good for birds
Amelanchier ovalis	..... 1 - 3 m	.....+	.....-	.....	.....+
Berberis vulgaris	..... 1 - 3 m++++
Cornus mas	..... 3 - 6 m	.....+	.....+	.....	.....+
Cornus sanguinea	..... 1 - 5 m	.....+	.....+	.....	.....+
Corylus avellana	..... 4 - 6 m	.....+	.....+	.....	.....+
Crataegus laevigata	..... 2 - 5 m	.....	.....+	.....+	.....+
Crataegus monogyna	..... 2 - 6 m	.....+	.....+	.....	.....+
Euonymus europaeus	..... 2 - 6 m	.....+	.....+	.....	.....+
Ilex aquifolium	..... 2 - 5 m	.....	.....+	.....+	.....+
Ligustrum vulgare	..... 2 - 5 m	.....	.....+	.....	.....+
Lonicera caerulea	..... 0.5 - 1.5 m	.....	.....+	.....	.....+
Lonicera xylosteum	..... 1 - 2 m	.....	.....+	.....	.....+
Prunus mahaleb	..... 3 - 6 m	.....+	.....	.....	.....+
Prunus spinosa	..... 1 - 3 m+-++
Rhamnus catharticus	..... 2 - 3 m++++
Rhamnus frangula	..... 2 - 5 m	.....+	.....+	.....	.....+
Rosa canina	..... 1 - 3 m++++
Rosa gallica	..... 0.5 - 1 m	.....	.....+	.....	.....+
Rosa glauca	..... 1 - 3 m+-++
Rosa pimpinellifolia	..... 0.5 - 2 m	.....	.....+	.....+	.....+
Rosa rubiginosa	..... 2 - 3 m	.....	.....-	.....+	.....+
Rubus fruticosus	..... 1 - 2 m++++
Sambucus nigra	..... 2 - 7 m	.....	.....	.....	.....+
Viburnum lantana	..... 2 - 4 m	.....	.....	.....	.....+
Viburnum opulus	..... 2 - 4 m	.....	.....	.....	.....+

3. Climbers

Genus/species/variety	Height	Likes light	Tolerates shade	Thorns/Prickles	Good for birds
Clematis vitalba	..... 5 - 15 m	.....+	.....+	.....	.....+
Lonicera caprifolium	..... 2 - 5 m	.....	.....	.....	.....+
Lonicera periclymenum	..... 1 - 3 m	.....	.....	.....	.....+
Rubus fruticosus	..... 1 - 2 m	.....	.....	.....	.....+





Apicultural plants are good for honey production and feeding the honeybees and wild bees. This list concerns the flower nectar and pollen, but also the honeydew.

Genus/species/variety	Nectar	Pollen	Honeydew
1. Deciduous trees			
Acer campestre	++		*
Acer platanoides	++	+	*
Acer pseudoplatanus	+++	+	*
Aesculus hippocastanum	++	+	
Aesculus carnea	++	+	*
Acer tataricum	+++		
Alnus species		++	*
Betula species		+	*
Carpinus betulus			*
Castanea sativa	++	+	*
Euodia hupehensis	+++		
Fagus sylvatica		++	*
Fraxinus excelsior		+	*
Juglans regia		+	*
Malus species and varieties	+++	+++	
Populus species and varieties		++	*
Prunus species and varieties	+++	+++	*
Prunus padus	+	+	
Pyrus species and varieties	+	++	
Quercus petraea		+	*
Quercus robur		++	*
Rhamnus catharticus	+		
Robinia species and varieties	+++	+	*
Sophora japonica	++	+	
Sorbus aria	+		*
Sorbus aucuparia	++	++	
Sorbus domestica	++	++	
Sorbus torminalis	++	++	
Salix species and varieties	+++	+++	
Tilia americana			
Tilia cordata	+++		*
Tilia euclora	++		
Tilia europaea	++		*
Tilia flavescens			
Tilia herryana	+++		*
Tilia mongolica	++		*
Tilia platyphyllos	++		*
Tilia tomentosa	+++		*
Ulmus carpinifolia		++	
Ulmus hybrids		++	*
Ulmus laevis		++	*
2. Shrubs			
Amelanchier species and varieties	+		
Berberis species and varieties	+		
Buddleja species and varieties	+		
Buxus sempervirens varieties	++		
Calluna vulgaris varieties	+++		
Caryopteris species and varieties	+		
Cornus sanguinea	+		
Cornus mas	++	+	
Corylus species and varieties		++	*
Cotoneaster species and varieties	++		
Crataegus species and varieties	+	+	
Cytisus species and varieties	+	+	
Elaeagnus species and varieties	+		
Erica species and varieties	++	++	
Euonymus europaeus	+		
Ligustrum vulgare	+		
Lonicera xylosteum	+		
Lycium barbarum	+	+	
Malus varieties	+++	+++	
Mespilus germanica	+		
Prunus species and varieties	+	+	
Rhamnus catharticus	++		
Rhamnus frangula	++	+	
Ribes species	+		
Rosa species and varieties		++	
Rubus fruticosus	++	++	
Rubus idaeus	+++	++	
Salix species and varieties	+++	+++	
Sambucus nigra	+	++	*
Spiraea species and varieties	+		
Viburnum species and varieties	+		
3. Conifers			
Larix decidua		+	*
Picea abies			*
Pinus sylvestris	+++		*
Taxus baccata		+	

Explanation of symbols: +++ = very suitable/ ++ = quite suitable/ + = recommended/ * = proliferous



Almost all plant fruits are accepted by some type of bird, some by very many (such as Sambucus nigra or Sorbus aucuparia), others only by one type of bird (such as Lonicera xylosteum). The number of visiting birds is not, however, the only criterion for selection. Often, the birds are common and not picky about their feed. Plants that are only frequented by a few types of birds are also indispensable for the overall biological cycle. The plants listed here are very popular among many birds. The thorns and dense branching contribute to the protection of nests. This information is based on many years of observation in the test garden at Weihestephan near Munich.

Genus/species/variety	Visited often	Thorns/ Prickles	Preferred for nests
1. Deciduous trees			
Acer species and varieties	+		+
Alnus species and varieties	+		
Amelanchier species and varieties	++		
Betula species and varieties	+		
Carpinus betulus	+		+
Crataegus species and varieties	+	+	+
Fagus sylvatica	+		
Fagus sylvatica - cut			++
Malus species and varieties	+		
Morus species and varieties	+		
Prunus species and varieties	+		
Quercus species	+		
Robinia pseudoacacia		+	
Sorbus species and varieties	++		
Tilia species	+		
2. Shrubs			
Acer campestre - cut			++
Amelanchier species and varieties	++		+
Aronia species and varieties	+		
Berberis species and varieties	+	+	+
Carpinus betulus - cut			++
Chaenomeles species and varieties	+	+	
Cornus species and varieties	+		+
Corylus species and varieties	+		
Cotoneaster species and varieties	+		
Crataegus species and varieties	+	+	+
Crataegus monogyna - cut			++
Elaeagnus species and varieties	+	+	
Euonymus species and varieties	+		
Hippophae rhamnoides	+	+	+
Ilex species and varieties	+	+	+
Ligustrum species and varieties	+		+
Lonicera species and varieties	+		+
Lycium barbarum	+	+	
Mahonia species and varieties	+	+	
3. Climbers			
Clematis species and varieties			+
Euonymus fortunei varieties	+		+
Hedera species and varieties	+		+
Lonicera species and varieties	+		+
Parthenocissus species and varieties	+		+
Rosa - Climbers	+	+	+
Rubus fruticosus	+	+	++
4. Conifers			
Abies species	+		+
Cedrus species and varieties	+		+
Chamaecyparis species and varieties			+
Juniperus species and varieties	+		+
Larix species	+		+
Picea species and varieties	+		+
Pinus species and varieties	+		+
Pseudotsuga menziesii caesia			+
Taxus species and varieties	+		+
Taxus baccata - cut			++
Tsuga species and varieties	+		+
Tsuga species	+		+

Explanation of symbols: ++ = visited very frequently/ + = visited frequently





43 Plants to hold soil on embankments and slopes

Plants that hold top soil on embankments and slopes have to have a robust, intense root system, which should also be resistant to mechanical loads. Plants that form many runners are very useful. Incorrectly formed embankments or loose material cannot, however, be held together with plants alone. To do this, additional technical measures have to be taken.

A In open landscapes

1. Deciduous plants	Genus/species/variety	Roots	Runners	Resistance to covering
	Acer campestre	intense		moderate
	Acer platanoides	intense		moderate
	Acer pseudoplatanus	deep		very good
	Alnus glutinosa	very intense		very good
	Alnus incana	very intense	++	very good
	Berberis vulgaris	intense	+	very good
	Betula pendula	very intense		sensitive
	Carpinus betulus	intense		moderate
	Clematis vitalba	intense		good
	Cornus mas	intense		moderate
	Cornus sanguinea	very intense	+++	moderate
	Corylus avellana	intense	+	good
	Crataegus laevigata	intense		good
	Crataegus monogyna	deep		good
	Cytisus scoparius	deep		moderate
	Fagus sylvatica	extremely intense		sensitive
	Fraxinus excelsior	deep		good
	Hedera helix	intense		good
	Hippophae rhamnoides	deep	+++	good
	Ligustrum vulgare	intense	+	very good
	Lonicera xylosteum	intense		moderate
	Malus sylvestris	intense	+	moderate
	Populus alba varieties	very intense	+++	good
	Populus canescens	very intense	+++	good
	Populus tremula	very intense	+++	very good
	Prunus padus	intense	+++	good
	Prunus spinosa	intense	+++	good
	Pyrus communis	deep	++	good
	Quercus petraea	deep		good
	Quercus robur	deep		good
	Rhamnus catharticus	deep	+	good
	Rhamnus frangula varieties	intense	+	moderate
	Rosa arvensis	deep		good
	Rosa canina	deep	++	moderate
	Rosa glauca	deep		good
	Rosa pimpinellifolia	intense	+++	good
	Rosa rubiginosa	deep		good
	Rubus fruticosus	intense	+	good
	Salix alba	intense		very good
	Salix caprea	intense		very good
	Salix cinerea	intense		very good
	Salix elaeagnos	intense		very good
	Salix fragilis	very intense		very good
	Salix purpurea	deep		very good
	Salix triandra	intense		very good
	Salix viminalis	intense		very good
	Sambucus nigra	intense	+	very good
	Sambucus racemosa	intense		very good
	Sorbus aucuparia	intense	+	good
	Rubus idaeus	intense	++	very good
	Tilia cordata	very intense		sensitive
	Ulmus carpiniifolia	intense	+	moderate
	Ulmus glabra	intense		moderate
	Viburnum lantana	intense		good
	Viburnum opulus	intense	+	good
	Vinca major	intense		good
2. Conifers	Genus/species/variety	Roots	Runners	Resistance to covering
	Larix decidua	deep		good
	Pinus sylvestris	deep		good

Explanation of symbols: +++ = very strong / ++ = strong / + = slight



Plants to hold soil on embankments and slopes 43

The following list is for alternative and complementary beds in urban areas. Basically, indigenous species are preferred for such tasks within settlements. Extreme local conditions that indigenous forest trees and shrubs cannot handle justify resorting to foreign plants.

B In settled areas

1. Deciduous plants	Genus/species/variety	Roots	Runners	Resistance to covering
	Acer negundo	intense		moderate
	Acer saccharinum	very intense		good
	Ailanthus altissima	intense	+++	good
	Alnus cordata	intense		good
	Alnus spaethii	intense		good
	Amelanchier lamarckii	intense		moderate
	Berberis ottawensis varieties	intense		very good
	Buddleja davidii varieties	deep	++	good
	Cercis siliquastrum	intense	++	moderate
	Chaenomeles hybrids	intense	+	moderate
	Caragana arborescens	deep		good
	Cornus alba	intense		good
	Cornus stolonifera 'Flaviramea'	very intense	++	good
	Cotinus coggygria	intense		moderate
	Cotoneaster species	intense		good
	Crataegus coccinea	deep		good
	Crataegus lavallei 'Carrierei'	deep		good
	Elaeagnus angustifolia	very intense		good
	Elaeagnus commutata	very intense	+++	good
	Forsythia varieties	intense		very good
	Gaultheria shallon	very intense	+++	sensitive
	Hypericum calycinum	intense	+++	moderate
	Ligustrum ovalifolium	intense		good
	Lonicera japonica repens	intense		moderate
	Lonicera ledebourii	intense		good
	Lycium barbarum	intense		good
	Philadelphus coronarius	intense		good
	Physocarpus opulifolius	intense		moderate
	Platanus acerifolia	very intense		very good
	Populus balsamifera	very intense		very good
	Populus berolinensis	very intense	++	very good
	Populus canadensis	very intense		very good
	Potentilla fruticosa	intense		moderate
	Prunus serotina	intense		moderate
	Pterocarya fraxinifolia	extremely intense	+++	good
	Quercus rubra	very intense		sensitive
	Ribes divaricatum	intense		good
	Robinia pseudoacacia	extremely intense	+++	moderate
	Rosa carolina	intense	+++	moderate
	Rosa multiflora	intense		good
	Rosa nitida	intense	+++	good
	Rosa rugosa	intense	+++	good
	Rosa rugotida	very intense	+++	good
	Symphoricarpos species	very intense	++	good
	Syringa vulgaris	very intense	++	good
2. Conifers	Genus/species/variety	Roots	Runners	Resistance to covering
	Larix kaempferi	deep		moderate
	Metasequoia glyptostroboides	very intense		moderate
	Pinus nigra	deep		good

Explanation of symbols: +++ = very strong / ++ = strong / + = slight





44 Plants for biological engineering methods

Layers of bushes are used to secure embankments, dams, and slopes. The branches of strong-shooting plants are introduced. Layers of hedges are used in similar ways. For this, plants are needed that are known to form adventive roots and known for their obvious resistance to covering with soil. This, however, is often only seen with young plants.

(Literature: M. SCHIECHTL, 1973; U. SCHLÜTER, 1986)

Table with 5 columns: 1. Trees, Genus/species/variety, Bush layers, Hedge layers, Cuttings, etc. Lists various tree species like Acer, Alnus, Betula, etc.

Table with 5 columns: 2. Shrubs, Genus/species/variety, Bush layers, Hedge layers, Cuttings, etc. Lists various shrub species like Berberis, Caragana, Cornus, etc.

Explanation of symbols: (i) = indigenous



Plants for biological engineering methods 44

Table with 5 columns: 2. Shrubs, Genus/species/variety, Bush layers, Hedge layers, Cuttings, etc. Lists various shrub species like Rosa, Salix, Sambucus, etc.

Table with 5 columns: 3. Climbers, Genus/species/variety, Bush layers, Hedge layers, Cuttings, etc. Lists climbing plant species like Clematis, Rubus.

Explanation of symbols: (i) = indigenous

Nitrogen-collecting plants 45

Many plants live symbiotically with bacteria that collect nitrogen (such as Lupine) or actinobacillosis (such as sea buckthorn). The activity of these micro-organisms binds the nitrogen in the air and enriches the soil with the metabolism of the roots of these higher plants. This behaviour is, above all, advantageous in sterile or poor soil for initial planting to facilitate the settlement of other plants later on.

Note: Initial fertilisation will lead to the exact opposite effect for the plants listed as the micro-organisms that collect nitrogen become lazy and no longer actively produce nitrogen. Fertilisation may even lead to depressed habits.

The nitrogen compounds produced are not always good for the following plants. The nitrogen produced by robinias, for instance, hampers beeches and birches while it helps elders, nettles, and others.

Table with 5 columns: Genus/species/variety, Wide local range, Narrow local range. Lists nitrogen-collecting plants like Cercis, Laburnum, Robinia, etc.





46 Pumping plants

Pumping plants are used to drain damp areas biologically when the source of the water is local and limited. To do so, trees and shrubs are needed that have high rates of evaporation with usually large leaf laminae and a high water consumption during the vegetation period.

1. Trees

Acer negundo
 Acer platanoides
 Acer pseudoplatanus
 Acer saccharinum
 Aesculus hippocastanum
 Alnus glutinosa
 Alnus incana
 Alnus spaethii
 Fraxinus excelsior
 Juglans nigra
 Populus alba varieties

Populus canadensis varieties
 Populus canescens
 Populus nigra varieties
 Prunus padus
 Salix alba varieties
 Salix caprea
 Salix smithiana
 Salix fragilis
 Ulmus species and varieties

2. Shrubs

Euonymus europaeus
 Physocarpus opulifolius

Prunus padus
 Rhamnus frangula
 Salix acutifolia 'Pendulifolia'
 Salix aurita
 Salix caprea
 Salix cinerea
 Salix smithiana
 Salix viminalis
 Sambucus canadensis
 Sambucus nigra
 Sorbaria sorbifolia
 Viburnum opulus

47 Village and courtyard trees

A number of central European and naturalised species have long been used in landscapes or settlements with regional and traditional variations and preferences. In the course of the development of the settlement, traditional tree types have been replaced by new tree types. Within the framework of urban renewal projects, the traditional tree types are being used more and more.

Genus/species/variety	Conspicuous flowers	Genus/species/variety	Conspicuous flowers
1. Deciduous trees			
Acer platanoides	+	Pyrus communis varieties	+
Acer pseudoplatanus	+	Quercus petraea	
Aesculus hippocastanum	+	Quercus robur	
Alnus glutinosa		Robinia pseudoacacia	+
Alnus incana		Salix alba	
Betula pendula		Salix daphnoides 'Praecox'	+
Carpinus betulus		Salix fragilis	
Castanea sativa	+	Sorbus aucuparia	+
Crataegus laevigata 'Paul's Scarlet'		Sorbus domestica	+
Fagus sylvatica		Sorbus intermedia	+
Fraxinus species		Tilia cordata	+
Fraxinus excelsior		Tilia platyphyllos	+
Juglans cinerea		Tilia europaea	+
Juglans regia		Ulmus carpinifolia	
Malus varieties	+	Ulmus laevis	
Platanus species			
Populus alba varieties		2. Conifers	
Populus canescens		Larix decidua	
Populus nigra		Picea abies	
Prunus avium	+	Pinus sylvestris	



Ground-covering plants 48

Flat-growing plants that spread quickly are used as quick, long-lasting, and low-maintenance greenery for large areas. Ground-covering varieties should not be mixed among themselves, though, as they may suppress each other reciprocally if both are strong competitors. Good varieties are those that spread with layers (shoots above ground that take root upon contact with the ground) or runners (subterranean root sprouts). The larger or denser the leaves, the better the cover. Small or fine-leaf ground-covering plants should not be used for large areas as they require too much care.

If the plan calls for the planting of new shrubs and trees in areas with existing ground-covering plants, the quick development and competitiveness of the plants must be kept in mind. Experience has shown that only large shrubs or trees survive. Small ones are often no match for the ground-covering plants, which smother or cripple them. This is especially true for the "invasive ones", i.e. ground-covering plants such as dwarf bamboo that grow rampantly through the root systems of other plants.

Note:

The indications of growth rate are taken from comparison with Cotoneaster dammeri 'Skogholm', the strongest growing ground-covering plant of all.

1. Deciduous plants	Genus/species/variety	Leaves	Runners	Layers	Growth rate	Number/m ²
	Arctostaphylos uva-ursi	e		+	moderate	3 - 5
	Berberis buxifolia 'Nana'	e			slight	6 - 9
	Berberis candidula	e			slight	3 - 5
	Berberis frikartii 'Verrucandi'	e			moderate	3 - 5
	Berberis thunbergii 'Atropurpurea Nana'	sg			slight	6 - 9
	Berberis verruculosa	e			moderate	3 - 5
	Buxus sempervirens arborescens	e			slight	16 - 40
	Calluna vulgaris varieties	e	+	+	slight	9 - 16
	Chaenomeles hybrid varieties	sg	+	+	moderate	1 - 3
	Cornus canadensis	sg	+		slight	9 - 16
	Cornus stolonifera 'Kelsey'	sg	+		moderate	3 - 5
	Cotoneaster adpressus	sg		+	slight	6 - 9
	Cotoneaster dammeri varieties	se - e		+	slight/strong	3 - 12
	Cotoneaster horizontalis	sg		+	strong	1 - 3
	Cotoneaster microphyllus 'Cochleatus'	e		+	slight	3 - 5
	Cotoneaster praecox	sg		+	slight	3 - 6
	Cotoneaster salicifolius 'Parkeppich'	se - e		+	moderate	3 - 5
	Cytisus beanii	sg		+	slight	3 - 6
	Cytisus decumbens	sg		+	slight	5 - 6
	Cytisus kewensis	sg			slight	5 - 6
	Cytisus purpureus	sg		+	slight	3 - 6
	Daboecia species and varieties	e		+	slight	9 - 12
	Daphne cneorum	e		+	slight	4 - 6
	Deutzia gracilis	sg			slight	3 - 5
	Empetrum nigrum	e		+	moderate	5 - 9
	Erica carnea varieties	e		+	slight	12 - 16
	Erica vagans varieties	e		+	slight	9 - 12
	Euonymus fortunei varieties	e		+	slight	3 - 12
	Gaultheria procumbens	e		+	moderate	9 - 16
	Gaultheria shallon	e		+	strong	4 - 6
	Genista lydia	sg			slight	4 - 6
	Genista radiata	sg			slight	3 - 5
	Genista sagittalis	sg		+	slight	9 - 16
	Hedera helix varieties	e		+	slight	3 - 9
	Hypericum calycinum	se - e		+	strong	6 - 9
	Hypericum 'Hidcote'	se - e			moderate	3 - 5
	Hypericum moserianum	se			moderate	5 - 6
	Ilex crenata varieties	e		+	slight/moderate	3 - 6
	Kerria japonica	sg		+	moderate	3 - 5
	Lavandula angustifolia varieties	e			slight	5 - 9
	Ledum palustre	e			slight	3 - 5
	Leucothoe walteri	e		+	moderate	3 - 6
	Ligustrum vulgare 'Lodense'	se			slight	5 - 8
	Lonicera japonica repens	se - e		+	strong	2 - 4
	Lonicera nitida 'Elegant'	se - e			moderate	3 - 5

Explanation of symbols: sg = summer green / se = semi-evergreen / e = evergreen





48 Ground-covering plants

1. Deciduous	Genus/species/variety	Leaves	Runners	Layers	Growth rate	Number/m ²
	Lonicera nitida 'Maigrün'	se - e			slight	4 - 6
	Lonicera pileata	se		+	moderate	3 - 5
	Pachysandra terminalis	e	+		moderate	9 - 16
	Pleioblastus pumilus	e	+		strong	1 - 3
	Potentilla fruticosa varieties	sg		+	slight/strong	3 - 6
	Prunus laurocerasus varieties	e			strong	1
	Pyracantha 'Red Cushion'	se - e			strong	1 - 2
	Rhododendron carolinianum varieties	e			slight	2 - 4
	Rhododendron Japanese Azaleas	se			slight	3 - 5
	Rhododendron impeditum	e			slight	3 - 6
	Rhododendron keleticum	e			slight	4 - 6
	Rhododendron Wild varieties	e			slight	6 - 8
	Rhododendron Repens hybrids	e			slight	6 - 8
	Rhododendron Yakushimanum hybrids	e			slight	3 - 6
	Ribes alpinum 'Schmidt'	sg		+	moderate	3 - 5
	Rosa nitida	sg	+		moderate	3 - 6
	Rosa rugotida	sg	+		strong	2 - 5
	Rosa - Ground Cover varieties	sg		+	moderate/strong	1 - 4
	Rubus calycinoideus	e		+	moderate	5 - 7
	Rubus fruticosus	sg - se	+	+	strong	1 - 3
	Salix purpurea 'Pendula'	sg		+	strong	1 - 2
	Salix repens argentea	sg		+	moderate	3 - 5
	Salix rosmarinifolia	sg		+	moderate	2 - 3
	Sasa veitchii	e	+		strong	3 - 5
	Spiraea betulifolia 'Tor'	sg			slight	3 - 5
	Spiraea bumalda varieties	sg			moderate	2 - 4
	Spiraea decumbens	sg	+		slight	9 - 12
	Spiraea japonica varieties	sg			slight/moderate	3 - 8
	Stephanandra incisa 'Crispa'	sg			moderate	4 - 6
	Symphoricarpos chenaultii 'Hancock'	sg		+	strong	1 - 3
	Vaccinium macrocarpon	e		+	slight	6 - 9
	Vaccinium vitis - idaea varieties	e	+		slight	8 - 12
	Viburnum davidii	e		+	slight	3 - 5
	Vinca major	e		+	strong	5 - 7
	Vinca minor varieties	e		+	slight	10 - 15

2. Conifers	Genus/species/variety	Leaves	Runners	Layers	Growth rate	Number/m ²
	Juniperus communis 'Hornbrookii'	e			strong	1
	Juniperus communis 'Repanda'	e			moderate	1 - 2
	Juniperus horizontalis varieties	e		+	moderate	2 - 5
	Juniperus sabina 'Tamariscifolia'	e			moderate	3 - 5
	Pinus mugo pumilio	e			moderate	2 - 3
	Taxus baccata 'Repandens'	e			moderate	1 - 2

Explanation of symbols: sg = summer green / se = semi-evergreen / e = evergreen

49 Hedges, espalier and borders

Trimmed hedges and tall hedges take up little space as living fences and borders. Hedges and trained espaliers are used to provide greenery against the façades of buildings instead of, or in addition to, vines and other climbers. Borders bring a geometrical order to farm and front gardens, and cemetery plantings, and can be used to enclose small areas.

Numbers per linear meter (single row)

	Height	Number/per m
1. Tall hedge	2xv 100 - 125 cm 125 - 150 cm 150 - 175 cm 175 - 200 cm 200 - 250 cm	2 - 3
2. Espalier hedge	2xv 40 - 60 cm 60 - 100 cm	3 - 4
3. Normal hedge	2xv 80 - 100 cm 100 - 125 cm 125 - 150 cm 150 - 175 cm	4 - 5
4. Border - high	2xv 30 - 40 cm 40 - 60 cm 60 - 80 cm 60 - 100 cm	3 - 7
5. Border - low	2xv 15 - 20 cm 20 - 25 cm 25 - 30 cm 30 - 40 cm 40 - 50 cm	5 - 8



Hedges, espalier and borders 49

1. Deciduous trees	Genus/species/variety	Tall hedge	Espalier hedge	Normal hedge	Border
	Acer campestre	+		+	
	Carpinus betulus	+	+	+	
	Crataegus species and varieties	+		+	
	Fagus sylvatica varieties	+		+	
	Malus species and varieties		+		
	Platanus acerifolia	+			
	Quercus cerris			+	
	Quercus petraea	+		+	
	Quercus robur	+	+	+	
	Robinia hispida 'Macrophylla'		+		
	Sorbus aria			+	
	Tilia cordata	+	+	+	
	Tilia flavescens 'Glenleven'	+			
	Tilia platyphyllos	+	+	+	
	Tilia europaea	+	+	+	

2. Deciduous Shrubs	Genus/species/variety	Tall hedge	Espalier hedge	Normal hedge	Border
	Berberis species and varieties			+	+
	Buddleja davidii varieties		+		
	Ceanothus species and varieties		+		
	Chaenomeles species and varieties		+	+	
	Cornus mas		+		
	Cotoneaster species and varieties		+	+	+
	Crataegus species and varieties		+		
	Deutzia gracilis		+		+
	Escallonia species and varieties		+	+	
	Forsythia species and varieties		+	+	
	Hydrangea quercifolia		+		
	Ligustrum species and varieties		+	+	+
	Lonicera tatarica			+	
	Lonicera xylosteum			+	
	Magnolia liliiflora varieties		+		
	Magnolia soulangiana varieties		+		
	Malus hybrid varieties		+		
	Potentilla fruticosa varieties		+	+	+
	Prunus cerasifera 'Nigra'		+	+	+
	Prunus spinosa			+	
	Ribes sanguineum varieties		+		
	Ribes species and varieties		+	+	+
	Rosa species and varieties		+		
	Spiraea bumalda varieties			+	+
	Spiraea japonica varieties			+	+
	Symphoricarpos albus laevigatus			+	
	Syringa chinensis			+	
	Syringa hyacinthiflora varieties		+		
	Syringa vulgaris			+	

3. (Semi-) evergreen Shrubs	Genus/species/variety	Tall hedge	Espalier hedge	Normal hedge	Border
	Berberis species and varieties			+	+
	Buxus sempervirens varieties	+		+	+
	Ceanothus species and varieties		+		
	Cotoneaster species and varieties		+	+	+
	Elaeagnus species and varieties		+		
	Euonymus fortunei 'Vegetus'		+	+	+
	Ilex species and varieties	+		+	+
	Lavandula angustifolia			+	+
	Ligustrum species and varieties		+	+	+
	Lonicera nitida varieties		+	+	+
	Lonicera pileata			+	+
	Mahonia aquifolium			+	+





49 Hedges, espalier and borders

3. (Semi-)evergreen Shrubs	Genus/species/variety	Tall hedge	Espalier hedge	Normal hedge	Border
	Osmanthus heterophyllus	+	+		
	Prunus laurocerasus varieties		+	+	
	Pyracantha hybrids varieties	+	+		+
	Viburnum burkwoodii	+			
	Viburnum 'Pragense'	+			
	Viburnum rhytidophyllum	+			
	Viburnum tinus		+	+	+

4. Conifers	Genus/species/variety	Tall hedge	Espalier hedge	Normal hedge	Border
	Chamaecyparis species and varieties	+		+	
	Cupressocyparis leylandii varieties		+	+	
	Ginkgo biloba		+		
	Juniperus chinensis varieties	+		+	
	Juniperus communis varieties			+	
	Juniperus virginiana			+	
	Larix species	+		+	
	Metasequoia glyptostroboides	+		+	
	Picea abies	+		+	
	Picea omorika			+	
	Pinus mugo			+	+
	Taxus baccata	+		+	
	Thuja occidentalis varieties	+		+	+
	Thujopsis dolabrata			+	
	Tsuga canadensis			+	

50 Climbers

Climbers need support or walls to develop optimally. Dimensions and appearance depend on the shape of the climbing aids. According to the type of climbing, two main groups can be distinguished.

Both groups are further subdivided according to the climbing method:

- A. Trellis climbers
- B. Self climbers

A. Trellis climbers	Genus/species/variety	Leaves	Flowers	Fruit	Height
1. Twining climbers					
	Actinidia arguta	sg	white	green, sweet	3 - 6 m
	Actinidia chinensis	sg	white	brown, sweet	8-10 m
	Actinidia kolomikta	sg	white	green	2 - 3 m
	Akebia quinata	sg - se	pink	green, sweet	4 - 6 m
	Aristolochia macrophylla	sg	brown	green, poisonous	8 - 10 m
	Celastrus orbiculatus	sg	green	yelloworange	8 - 12 m
	Humulus lupulus	sg	green	green	3 - 8 m
	Lonicera japonica repens	se - e	white	red	2 - 3 m
	Lonicera brownii 'Dropmore Scarlet'	sg	orange	orange	2 - 3 m
	Lonicera caprifolium	sg	white	red	2 - 5 m
	Lonicera heckrottii	sg	pink	red	2 - 4 m
	Lonicera henryi	e	yellow	blue	5 - 7 m
	Lonicera periclymenum	sg	white	red	1 - 5 m
	Lonicera tellmanniana	sg	yellow	orange	4 - 6 m
	Polygonum aubertii	sg	white	white	8 - 15 m
	Wisteria floribunda	sg	blue	green	6 - 8 m
	Wisteria sinensis	sg	blue	green	6 - 15 m
2. Sarmentous plants without suction pads					
	Clematis alpina varieties	sg	blue	silvery	1 - 2 m
	Clematis hybrid varieties	sg	viele	silvery	2 - 4 m
	Clematis macropetala varieties	sg	viele	silvery	2 - 3 m
	Clematis montana varieties	sg	white	silvery	5 - 8 m

Explanation of symbols: sg = summer green (no leaves in winter) / se = semi-evergreen / e = evergreen



Climbers 50

A. Trellis climbers	Genus/species/variety	Leaves	Flowers	Fruit	Height
	Clematis montana 'Rubens'	sg	pink	silvery	3 - 10 m
	Clematis orientalis 'Orange Peel'	sg	yellow	silvery	3 - 5 m
	Clematis tangutica	sg	yellow	silvery	4 - 6 m
	Clematis texensis varieties	sg	pink	silvery	1 - 1,5 m
	Clematis vitalba	sg	white	silvery	10 - 20 m
	Clematis viticella varieties	sg	blue	silvery	2 - 5 m
	Vitis coignetiae	sg	green	black	6 - 8 m

3. Splayed climbers	Genus/species/variety	Leaves	Flowers	Fruit	Height
	Jasminum nudiflorum	sg	yellow		2 - 3 m
	Rosa arvensis	sg	white	orange-red	1 - 2 m
	Climbing roses	sg	red	red	2 - 3 m
	Rubus fruticosus	sg - se	white	black	1 - 3 m
	Rubus henryi	e	pink	black	2 - 3 m

B. Self climbers	Genus/species/variety	Leaves	Flowers	Fruit	Height
1. Plants with suction pads					
	Parthenocissus quinquefolia	sg	green	black	10 - 15 m
	Parthenocissus quinquefolia 'Engelmannii'	sg	green	black	15 - 18 m
	Parthenocissus tricuspidata 'Veitchii'	sg	green	black	15 - 18 m

2. Climbers with suction roots	Genus/species/variety	Leaves	Flowers	Fruit	Height
	Campsis radicans	sg	red	green	6 - 15 m
	Campsis radicans 'Flava'	sg	yellow	green	4 - 5 m
	Campsis tagliabuana 'Mme. Galen'	d	red		3 - 5 m
	Euonymus fortunei radicans	e			2 - 5 m
	Euonymus fortunei 'Vegetus'	e	green	orange	3 - 6 m
	Euonymus fortunei varieties	e		orange	1 - 3 m
	Hedera colchica	e	yellow	black	6 - 8 m
	Hedera helix	e	yellow	black	10 - 20 m
	Hedera helix 'Woerner'	e	yellow	black	10 - 15 m
	Hedera helix hibernica	e	yellow	black	5 - 20 m
	Hydrangea petiolaris	sg	white	brown	8 - 12 m

Explanation of symbols: sg = summer green (no leaves in winter) / se = semi-evergreen / e = evergreen

Plants for roof garden with good maintenance 51

This selection is only for roof gardens in unprotected areas exposed to wind. For a selection of plants for protected roof gardens or courtyards, no special sensitivities need to be considered thanks to the protection provided by the building on all sides.

For a special selection:

1. select plants with several stems as they withstand wind pressure and turbulence better than single-stem plants,
2. loose crowns that allow air to pass instead of compact trees or shrubs which have great wind resistance,
3. small-leaf varieties are damaged less than large-leaf ones,
4. do not use plants that break easily,
5. do not use plants that have aggressive roots (such as Hippophae) lest they take advantage of errors in the use of insulation sheets,
6. do not set up a luxurious supply of nutrients for the higher the soil moisture and amount of nutrients, the flatter the roots and the more luxurious the parts above ground will be.

Note:

The habit sizes and limitations listed here concern the response of the plants to roof gardens and are not identical to behaviour on level ground! Almost all climbers are useless on roof gardens as they are too sensitive to wind. Usually they do not accept the supports, but rather wind their way into other plants. Climbing aids should be very stable. Climbing plants that have fallen down have to be cut back hard to further new shoots as old shoots no longer climb. The base of the plant has to be in the shade.

(For further information, see publications by KIERMEIER, P., KOLB/SCHWARZ, KRUPKA, B., LIESECKE/LÖSKEN etc., various editions)





51 Plants for roof garden with good maintenance

1. Deciduous trees and large Shrubs	Genus/species/variety	Height	Limitations
	Acer campestre	3 - 10 m	
	Acer ginnala	3 - 6 m	
	Acer neglectum 'Annae'	6 - 10 m	...may be too big
	Amelanchier laevis	3 - 5 m	...flowers not wind resistant
	Amelanchier lamarkii varieties	3 - 5 m	
	Cornus mas	3 - 6 m	
	Corylus avellana	3 - 5 m	...sensitive when exposed to wind
	Crataegus lavalley 'Carrierei'	5 - 8 m	
	Crataegus coccinea	5 - 7 m	
	Crataegus crus galli	5 - 7 m	
	Fraxinus ornus varieties	4 - 8 m	...very sensitive to frost, flowers not wind resistant
	Philadelphus inodorus grandiflorus	3 - 4 m	...flowers not wind resistant, needs thinning out
	Physocarpus opulifolius	3 - 4 m	
	Prunus mahaleb	3 - 6 m	...many seedlings
	Prunus serotina	5 - 10 m	...troublesome seedlings
	Pyrus salicifolia	4 - 6 m	...sensitive to frost, flowers not wind resistant
	Salix acutifolia 'Pendulifolia'	4 - 6 m	...break easily, cut back to keep young
	Salix caprea	3 - 6 m	...flowers brown from July on during droughts
	Sorbus aria varieties	5 - 8 m	
	Sorbus aucuparia	5 - 8 m	...loses its leaves early during droughts
	Sorbus hybrida 'Gibbsii'	4 - 6 m	...early leaf loss due to stagnant dampness
	Sorbus intermedia	8 - 10 m	...may be too big

2. Medium to large Shrubs	Genus/species/variety	Height	Limitations
	Berberis ottawensis 'Superba'	2 - 4 m	
	Berberis thunbergii varieties	0.5 - 2 m	...loses its leaves early during droughts
	Buddleja alternifolia	2 - 3 m	...very overhanging, sensitive to frost
	Buddleja davidii varieties	1 - 2 m	...sensitive to frost, cut back yearly
	Buxus sempervirens 'Bullata'	1 - 2 m	...occasionally sensitive to frost
	Chaenomeles Arten and varieties	1 - 2 m	...flowers not wind resistant
	Cornus alba	2 - 3 m	
	Cornus alba 'Sibirica'	1 - 2 m	
	Cornus stolonifera 'Kelsey'	0.5 - 1 m	...not in hot, dry areas
	Cotinus coggygria	2 - 3 m	...sensitive to frost
	Cotoneaster bullatus	2 - 3 m	...occasionally sensitive to frost
	Cotoneaster dielsianus	1 - 2 m	
	Cotoneaster divaricatus	1 - 2 m	
	Cotoneaster acutifolius	1 - 2 m	
	Cotoneaster multiflorus	1 - 2 m	...occasionally sensitive to frost
	Cotoneaster praecox	1 - 1.5 m	...occasionally sensitive to frost
	Deutzia species and varieties	0.5 - 2 m	...not in hot, dry areas
	Euonymus alatus	0.2 - 2 m	...not in hot, dry areas
	Hypericum 'Hidcote'	0.5 - 1 m	...sensitive to frost, cut back yearly
	Hypericum patulum henryi	0.5 - 1 m	...sensitive to frost, cut back yearly
	Ilex meserveae varieties	1 - 2 m	...sensitive to frost, may lose all their leaves
	Kerria japonica varieties	1 - 2 m	...sensitive to frost
	Kolkwitzia amabilis	2 - 3 m	...age quickly, thin out often
	Ligustrum obtusifolium regelianum	1 - 2 m	
	Ligustrum ovalifolium	2 - 3 m	...sensitive to frost
	Ligustrum vulgare varieties	2 - 3 m	
	Lonicera ledebourii	2 - 3 m	...not in dry areas
	Lonicera tatarica	2 - 3 m	...cut back occasionally
	Lonicera xylosteoides 'Clavey's Dwarf'	2 - 3 m	
	Lonicera xylosteum	1 - 2 m	...not in hot, dry areas
	Lycium barbarum	2 - 3 m	...very overhanging
	Perovskia abrotanoides	1 - 1.5 m	...cut yearly
	Philadelphus coronarius	2 - 3 m	...cut back occasionally
	Philadelphus hybrids	1 - 2 m	...flowers not wind resistant, thin out often
	Potentilla fruticosa varieties	0.5 - 1.3 m	...all varieties are sometimes sensitive to frost, thin out
	Potentilla 'Goldfinger'	0.5 - 1.5 m	



Plants for roof garden with good maintenance 51

2. Medium to large Shrubs	Genus/species/variety	Height	Limitations
	Potentilla 'Goldteppich'	0.5 - 1 m	...avoid planting too closely
	Potentilla 'Sommerflor'	0.5 - 1 m	
	Prunus laurocerasus 'Otto Luyken'	1 - 2 m	...many vein weevils on humic substrates, then hard to control! Occasionally sensitive to frost
	Prunus laurocerasus 'Zabeliana'	1 - 2 m	
	Prunus tenella	0.5 - 1.5 m	...flowers not wind resistant, cut yearly
	Pyracantha 'Red Cushion'	0.5 - 1 m	...sensitive to frost, turn back when cold
	Pyracantha 'Red Column'	2 - 3 m	...sensitive to frost, moderate amount of fruits
	Pyracantha 'Soleil d'Or'	1 - 2 m	...sensitive to frost
	Ribes alpinum 'Schmidt'	0.5 - 1 m	...not in hot, dry areas
	Ribes aureum	1 - 2 m	...fällt auseinander, not in hot, dry areas
	Ribes divaricatum	2 - 3 m	...not in hot, dry areas
	Rosa glauca	1 - 2 m	...no competition, loses first leaves starting in August
	Rosa multiflora	1 - 2 m	
	Rosa rubiginosa	1 - 2 m	...somewhat sensitive to wind
	Rosa varieties	0.5 - 1 m	...yearly care, sensitive to frost
	Salix species and varieties	...	...as a rule unsuitable as they lose their leaves early
	Salix purpurea 'Pendula'	0.5 - 1 m	...slow-growing, prostrate
	Salix rosmarinifolia	1 - 1.5 m	...not in hot, dry areas
	Spiraea bumalda varieties	0.5 - 1 m	...cut back often
	Spiraea japonica varieties	0.3 - 0.5 m	...cut back often
	Spiraea vanhouttei	1 - 2 m	...flowers sensitive to wind, sensitive to drought
	Symphoricarpos albus laevigatus	1 - 2 m	...troublesome runners
	Symphoricarpos chenaultii	1 - 1.5 m	...occasionally sensitive to frost
	Symphoricarpos orbiculatus	1 - 1.5 m	...occasionally sensitive to frost
	Syringa chinensis	2 - 3 m	...can shoot from below graft
	Syringa microphylla 'Superba'	1 - 1.5 m	
	Tamarix species	2 - 3 m	...sensitive to frost, cut back frequently
	Viburnum farreri	2 - 3 m	...flowers sensitive to frost, need thinning out
	Viburnum lantana	2 - 3 m	...occasionally stripped bare by birds
	Weigela hybrid varieties	1 - 2 m	...thin out regularly, not in hot, dry areas

3. Small and dwarf shrubs, ground-cover plant	Genus/species/variety	Height	Limitations
	Cornus stolonifera 'Kelsey'	0.5 - 1 m	...not in hot, dry areas
	Cotoneaster adpressus	0.2 - 0.5 m	...very low-growing
	Cotoneaster dammeri varieties	0.2 - 1.2 m	...sensitive to frost, broze when cold
	Cotoneaster salicifolius 'Parkteppich'	0.3 - 1 m	...sensitive to frost
	Euonymus fortunei varieties	0.3 - 1 m	...sensitive to frost, not for hot, dry extreme areas (colourful varieties susceptible), many fir tree weevils in humic substrates, then hard to stop
	Hypericum calycinum	0.2 - 0.3 m	...sensitive to frost
	Hypericum moserianum	0.3 - 0.5 m	...sensitive to frost
	Ilex crenata varieties	0.3 - 1.5 m	...sensitive to frost, not good in hot, dry areas
	Ligustrum vulgare 'Lodense'	0.5 - 0.7 m	...very low-growing, broze when cold
	Lonicera nitida 'Maigreen'	0.5 - 0.8 m	...sensitive to frost
	Lonicera pileata	0.5 - 1 m	...sensitive to frost
	Mahonia aquifolium 'Apollo'	0.5 - 1 m	...sensitive to frost, avoid sun
	Philadelphus 'Erectus'	0.5 - 1 m	...flowers not wind resistant
	Potentilla 'Goldteppich'	0.5 - 1 m	...avoid planting too closely
	Potentilla 'Sommerflor'	0.5 - 1 m	
	Pyracantha 'Red Cushion'	0.5 - 1 m	...sensitive to frost
	Rosa - Ground Covering	0.3 - 1.2 m	...occasionally sensitive to frost, sensitive to wind sometimes roots shoot, year round attention
	Symphoricarpos chenaultii 'Hancock'	0.8 - 1.2 m	...occasionally sensitive to frost

4. Climbers	Genus/species/variety	Height	Limitations
	Clematis montana 'Rubens'	2 - 5 m	...sensitive to frost, flowers sensitive to wind
	Clematis tangutica	2 - 3 m	
	Euonymus fortunei radicans	1 - 3 m	...sensitive to frost, not in hot, dry areas
	Hedera helix	3 - 8 m	...does not always climb, sensitive to frost





51 Plants for roof garden with good maintenance

5. Conifers	Genus/species/variety	Height	Limitations
	Juniperus communis 'Hornibrookii'	0.5 - 1 m	
	Juniperus communis 'Repanda'	0.3 - 0.5 m	
	Juniperus horizontalis 'Wiltonii'	0.2 - 0.3 m	
	Juniperus sabina 'Tamariscifolia'	0.5 - 0.8 m	
	Picea abies 'Nidiformis'	1 - 1.5 m	.....only in shady areas
	Picea abies 'Pumila Glauca'	0.3 - 0.5 m	.....only in shady areas
	Pinus leucormis	4 - 6 m	.....sensitive to stagnant water
	Pinus mugo varieties	1 - 2 m	
	Pinus parviflora 'Glauca'	4 - 6 m	.....may be too big
	Pinus parviflora 'Negishi'	1 - 1.5 m	
	Pinus sylvestris 'Watereri'	3 - 5 m	
	Taxus baccata varieties .....		.....many vein weevils on humic substrates, hard to control!
	Taxus baccata 'Dovastonianae'	2 - 4 m	.....may be too big
	Taxus baccata 'Nissens Corona'	1 - 3 m	.....see above
	Taxus baccata 'Nissens Präsident'	2 - 3 m	.....see above
	Taxus baccata 'Repandens'	0.5 - 0.7 m	.....see above
	Taxus cuspidata 'Nana'	1 - 2 m	.....see above

52 Low-maintenance roof gardens

Lignifying plants are not recommended for low-maintenance roof gardens as the strong layers of the substrate (approx. 3-8 cm) are too shallow. With low-maintenance roof gardens, the plants are neither watered nor regularly fertilised; both of these processes are, however, necessary for large lignifying plants to live long lives.

Lignifying plants for simple, high-maintenance roof gardens

To minimise the requirements of maintenance, plants that need great care, such as regular pruning, should not be selected. The thickness of the layers should be increased – “piled up” – as needed, with approx. 1 m² is planned for each plant. As a rule, the plants should not be larger than 0.8-1.0 m for simple intensive greenery in order to avoid frequent watering or fertilisation. For the growth rates, keep in mind that the average ultimate sizes cannot be reached on roofs. Only about 2/3 of the usual height can be expected, accompanied by loose leaves and fewer flowers.

The selection of plants corresponds to the high-maintenance roof gardens in section 3 (small and dwarf plants) and section 5 (conifers), though all plants taller than 1 m should be avoided.

53 Trees for shady courtyards

The opening of inner-city courtyards for residents requires new considerations in the selection of plants. In most narrow, shady quads, large trees can rarely be planted as they could cast the courts into greater darkness than they already have. In such court situations where direct light seldom shines or only does so for brief periods, the trees rarely reach their optimal height. Often, they grow towards the light (crooked), or characteristic crown shapes are lost due to the lack of light. In addition, leaves, fruits and flowers are less plentiful.

Problems also occur when the ground is paved too close to the stems of the trees as most varieties lift the pavement.



Trees for shady courtyards 53

1. Deciduous trees

Acer campestre varieties
Acer palmatum
Acer pensylvanicum
Acer platanoides in green-leaf varieties)
Acer rufrinerve
Acer neglectum 'Annae'
(Amelanchier lamarckii varieties)
Carpinus betulus varieties
(Cercidiphyllum japonicum)
Cornus alternifolia
Cornus controversa
Cornus florida and varieties
Cornus kousa and varieties
(Cornus mas)

Crataegus laevigata
Crataegus lavalleyi 'Carrierei'
Crataegus monogyna
Crataegus coccinea
Fagus sylvatica in green-leaf varieties
(Fraxinus excelsior in slender-crown varieties)
Ilex aquifolium varieties
(Malus hybrids in green-leaf varieties)
Ostrya carpinifolia
(Parrotia persica)
Prunus padus
(Quercus petraea)
Cornus kousa and varieties
Sorbus aria varieties

Sorbus arnoldiana varieties
Sorbus aucuparia varieties
(Sorbus intermedia varieties)
(Sorbus torminalis)
(Tilia americana varieties)
(Tilia cordata varieties)
(Tilia europaea varieties)
Ulmus carpinifolia
Ulmus hollandica 'Lobel'

2. Conifer

Chamaecyparis species and varieties
Taxus species and varieties
Thuja species and varieties

Heath gardens 54

“Heaths” are not only understood to be endless heath meadows with Junipers and white, shimmering birches, but also include dwarf shrub formations in areas with high humidity on substrates with little nutrition, which do not necessarily have to be on acidic sandy soil. The most conspicuous heaths are primarily small-leaf Ericaceae, dwarf and rod shrubs such as broom and related varieties, and numerous conifers shrubs and trees such as common hawthorn and birches also grow on heaths. As these plants suppress the herbaceous heaths, they must be used carefully. Heaths do not withstand autumn leaf loss or large amounts of shade. Thus, the herbaceous heaths generally occur around conifers as the needles do not damage them. They should not, however, be used for ground cover under trees and shrubs; rather, use other shade-tolerant Ericaceae such as the Vaccinium species.

A. Heaths near coasts

1. Deciduous plants

Genus/species/variety	Needs light	Tolerates shade
Betula pendula varieties	+	
Betula pubescens	+	
Cytisus scoparius varieties	+	
Crataegus monogyna		+
Empetrum nigrum	+	
Genista sagittalis	+	
Genista tinctoria varieties	+	
Myrica gale	+	
Rhamnus frangula		+
Salix repens argentea	+	
Sorbus aucuparia varieties		+
Ulex europaeus	+	

2. Varieties of Ericaceae

Genus/species/variety	Needs light	Tolerates shade
Calluna vulgaris varieties	+	
Erica cinerea	+	
Erica tetralix	+	
Erica vagans varieties	+	
Vaccinium vitis-idaea varieties		+

3. Conifers

Genus/species/variety	Needs light	Tolerates shade
Juniperus communis varieties	+	
Pinus sylvestris varieties	+	

Note:

Broad-leaf plants should not be used in true heaths. Rather, slender-leaf species – especially grasses – are ideal complements. The recommended varieties are Deschampsia flexuosa, Festuca ovina, Festuca tenuifolia and Molinia caerulea. In shady areas, ferns can also be used. For more, see planting tips for perennials, list of heath plants.





B. Alpine rose heaths

Heaths in mountainous regions are similar to those in plains, though the species usually differ.

1. Deciduous plants	Genus/species/variety	Needs light	Tolerates shade
	Clematis alpina	.....	+
	Crataegus monogyna	.....	+
	Cytisus purpureus	.....+	.....
	Daphne cneorum	.....+	.....
	Lonicera caerulea	.....	+
	Ribes alpinum	.....	+

2. Varieties of Ericaceae	Genus/species/variety	Needs light	Tolerates shade
	Arctostaphylos uva-ursi	.....+	.....
	Empetrum nigrum	.....+	.....
	Erica carnea varieties	.....+	.....
	Rhododendron ferrugineum	.....	+
	Rhododendron hirsutum	.....	+
	Vaccinium vitis-idaea varieties	.....	+

3. Conifers	Genus/species/variety	Needs light	Tolerates shade
	Juniperus communis varieties	.....+	.....
	Larix decidua	.....+	.....
	Picea abies varieties	.....	+
	Pinus cembra	.....+	.....
	Pinus mugo varieties	.....+	.....
	Pinus nigra varieties	.....+	.....
	Pinus sylvestris varieties	.....	.....

C. Heath-like formations from foreign countries

1. Deciduous plants	Genus/species/variety	Needs light	Tolerates shade
	Aronia species and varieties	.....	+
	Betula species and varieties	.....+	.....
	Clethra alnifolia	.....	+
	Cornus canadensis	.....	+
	Cornus stolonifera 'Kelsey's'	.....	+
	Cytisus species and varieties	.....+	.....
	Daboecia species and varieties	.....	+
	Elaeagnus pungens varieties	.....	+
	Fothergilla gardenii	.....	+
	Genista species and varieties	.....+	.....
	Hebe species and varieties	.....+	.....
	Ilex crenata varieties	.....	+
	Ilex meserveae varieties	.....	+
	Ilex verticillata	.....+	.....
	Rubus calycinioides	.....+	.....
	Skimmia japonica varieties	.....	+
	Sorbus species and varieties	.....	+
	Spiraea betulifolia	.....	+
	Spiraea prunifolia	.....+	.....

2. Ericaceae varieties	Genus/species/variety	Needs light	Tolerates shade
	Gaultheria procumbens	.....	+
	Gaultheria shallon	.....	+
	Kalmia angustifolia 'Rubra'	.....	+
	Kalmia latifolia varieties	.....	+
	Leucothoe walteri	.....	+
	Pernettya mucronata varieties	.....	+
	Pieris floribunda	.....	+
	Pieris japonica varieties	.....	+
	Rhododendron Wild species	.....	+
	Rhododendron impeditum varieties	.....+	.....
	Rhododendron keleticum	.....+	.....
	Rhododendron minus	.....	+
	Rhododendron - Japanese Azaleas	.....	+
	Vaccinium macrocarpon	.....	+

3. Conifers	Genus/species/variety	Needs light	Tolerates shade
	Juniperus species and varieties	.....+	.....
	Larix kaempferi	.....+	.....
	Pinus contorta	.....+	.....
	Pinus densiflora 'Umbraculifera'	.....+	.....
	Pinus leucormis	.....+	.....
	Pinus parviflora 'Glauca'	.....+	.....
	Pinus pumila 'Glauca'	.....+	.....
	Thuja standishii	.....+	.....
	Tsuga diversifolia	.....	+
	Tsuga mertensiana	.....	+

Plants for tubs and pots 55

As attractive as potted plants are, they need a lot of care in the final analysis. It does not suffice to set up decorative pots in pedestrian zones, atriiums, squares or terraces. A main problem is the surplus of organic material in most substrates that results in a decrease in the mass of the soil between 30-50%. The plants lose their stability and even starve. Plants that need humus thus are rarely good in pots. It is extremely necessary to add material that stabilises the structure and to calculate for 10-20% loss from the outset. Many potted plants are clearly stymied after the first year if they only live in root ball material and no nutrients are added. Slow-release fertilisers are recommended. Regular watering is a primary requirement for the survival of the plants. Plants sensitive to frost are more so in a pot than in a bed. Thus, the location has to be selected with care. The size of the pot depends on the size of the plants and their number. Too many plants or plants that are too big will cramp each other and gradually become gaunt.

As a rule, the diameter of the pot should be at least one third of the mean diameter of the largest plant selected with a minimum substrate depth of 40-60 cm. The more the better, as less soil means more maintenance.

1. Deciduous trees

Acer ginnala	Cytisus species and varieties	Pyrus salicifolia
Acer japonicum 'Aconitifolium'	Elaeagnus species and varieties	Quercus pontica
Acer rufrinerve	Genista species and varieties	Rhodotypos scandens
Amelanchier lamarckii	Hydrangea arborescens varieties	Robinia 'Casque Rouge'
Berberis ottawensis varieties	Lonicera tatarica varieties	Robinia hispida varieties
Berberis thunbergii 'Atropurpurea Nana'	Mahonia aquifolium varieties	Rosa glauca
Catalpa bignonioides 'Nana'	Malus 'Red Jade' and other varieties	Salix purpurea 'Pendula'
Clerodendron trichotomum fargesii	Nothofagus antarctica	Sorbus serotina
Cotinus coggygria varieties	Perovskia abrotanoides	Sorbus thuringiaca 'Fastigiata'
Cotoneaster species and varieties	Philadelphus 'Erectus'	Spiraea betulifolia varieties
Crataegus lavalleyi 'Carrierei'	Potentilla fruticosa varieties	Spiraea bumalda
Crataegus coccinea	Prunus fruticosa 'Globosa'	Spiraea decumbens
	Ptelea trifoliata	Spiraea japonica varieties





55 Plants for tubs and pots

1. Deciduous trees

Spiraea nipponica varieties
 Staphylea colchica
 Stephanandra incisa 'Crispa'
 Symphoricarpos chenaultii 'Hancock'
 Syringa meyeri 'Palibin'
 Syringa microphylla 'Superba'
 Syringa patula 'Miss Kim'
 Tamarix parviflora

2. Evergreen broad-leaf shrubs

Berberis buxifolia 'Nana'
 Berberis candidula
 Berberis frikartii varieties
 Berberis gagnepainii varieties
 Berberis media varieties
 Berberis verruculosa
 Buxus sempervirens varieties
 Cotoneaster species and varieties
 Daphne cneorum

Elaeagnus species and varieties
 Erica carnea varieties
 Hedera colchica varieties
 Hedera helix varieties
 Hypericum species and varieties
 Ilex species and varieties
 Lavandula angustifolia varieties
 Ligustrum delavayanum
 Ligustrum ovalifoium 'Aureum'
 Lonicera nitida varieties
 Lonicera pileata
 Osmanthus heterophyllus
 Prunus laurocerasus varieties
 Pyracantha hybrid varieties
 Rhododendron Japanese Azaleas
 Rhododendron impeditum varieties
 Rhododendron keleticum
 Rhododendron Wild varieties
 Rubus henryi
 Skimmia japonica varieties

Viburnum davidii
 Viburnum tinus
 Vinca major

3. Conifers

Chamaecyparis obtusa 'Nana Gracilis'
 Juniperus communis 'Repanda'
 Juniperus horizontalis varieties
 Juniperus sabina varieties
 Microbiota decussata
 Picea abies 'Nidiformis'
 Picea abies 'Pumila Glauca'
 Pinus densiflora 'Umbraculifera'
 Pinus mugo varieties
 Pinus nigra varieties
 Pinus parviflora varieties
 Pinus sylvestris 'Watereri'
 Taxus species and varieties

56 Plant weights

Plant weights and root ball sizes can only be approximated as many factors influence weight and root ball size. The shape of the root ball, the specific weight of the soil or substrate, the water saturation, and other factors leave a lot of leeway. The information below is based on experience and can be used to extrapolate transport weights.

Size in cm	Approx. weight in kg/plant	Rootball-diameter in cm	Size in cm	Approx. weight in kg/plant	Rootball-diameter in cm
Ground-covering shrubs			Branched-trunk trees		
1,5 l Container	1,3		2 xtr, bare root, 80 - 100	0,6	
2 l Container	1,7		2 xtr, bare root, 100 - 125	0,8	
Evergreens			2 xtr, bare root, 125 - 150	1	
20 - 30 tall	3		2 xtr, bare root, 150 - 200	1,5	
30 - 40 tall	4		2 xtr, bare root, 200 - 250	2	
40 - 50 tall	6		3 xtr, rootballed, 80 - 100	8	
50 - 60 tall	9		3 xtr, rootballed, 100 - 125	9,5	
60 - 80 tall	13		3 xtr, rootballed, 125 - 150	11	
80 - 100 tall	18		3 xtr, rootballed, 150 - 175	14	
100 - 125 tall	25		3 xtr, rootballed, 175 - 200	18	
125 - 150 tall	40		Streetworks and standards		
150 - 200 tall	60		3 xtr, rootballed, 12 - 14	50	40
Roses			3 xtr, rootballed, 14 - 16	100	45
A quality	A 0,2		3 xtr, rootballed, 16 - 18	150	50
Rhododendron			3 xtr, rootballed, 18 - 20	200	60
30 - 40 tall	3		4 xtr, rootballed, 20 - 25	270	70
40 - 50 tall	4,5		4 xtr, rootballed, 25 - 30	350	80
50 - 60 tall	6		5 xtr, rootballed, 30 - 35	500	95
60 - 70 tall	8		5 xtr, rootballed, 35 - 40	650	100
70 - 80 tall	11		5 xtr, rootballed, 40 - 45	850	125
80 - 90 tall	16		5 xtr, rootballed, 45 - 50	1100	130
90 - 100 tall	25		6 xtr, rootballed, 50 - 60	1600	140
100 - 120 tall	40		6 xtr, rootballed, 60 - 70	2500	160
120 - 140 tall	60		6 xtr, rootballed, 70 - 80	4000	180
Decorative shrubs and hedges			6 xtr, rootballed, 80 - 90	5500	190
2 xtr, bare root, 80-100	0,5		6 xtr, rootballed, 90 - 100	7500	210
2 xtr, bare root, 100 - 150	1		6 xtr, rootballed, 100 - 120	9500	220
2 xtr, bare root, 150 - 200	2				
3 xtr, rootballed, 80-100	8				
3 xtr, rootballed, 100 - 125	12				
3 xtr, rootballed, 125 - 150	18				
3 xtr, rootballed, 150 - 175	25				

