



## 28 Plants that need light

Plants that need plenty of light are often also pioneer plants, i.e. they are the first to settle on fallow land. The older they get, the less they tolerate any type of shade. They initially try to grow into the light when they are in the shade. But if shade-tolerant, more dominant plants (even large shrubs) come too close for long periods, they lose their leaves and then die. Plants that form runners, such as *Rhus typhina*, try to get out of the shade with increased production of runners. And the following should be kept in mind: the poorer the location, for instance dry soil that is not nutritious, the more light is needed.

**Note:** All varieties that at least tolerate shade when young or still come to terms with shady areas when old have been left out.

Genus/species/variety	Reaction to shade
<b>1. Deciduous trees</b>	
<i>Acer cappadocicum</i>	crooked stem
<i>Acer freemanii</i>	crooked stem
<i>Acer ginnala</i>	short-lived, crooked habit
<i>Ailanthus altissima</i>	forms runners, crooked stem
<i>Alnus incana</i>	crooked stem
<i>Betula</i> species and varieties	crooked stem
<i>Celtis australis</i>	atypical, broken-up crown
<i>Cercis siliquastrum</i>	crooked stem
<i>Fraxinus americana</i> varieties	crooked stem
<i>Fraxinus ornus</i> varieties	no flowers
<i>Fraxinus pennsylvanica</i> varieties	crooked stem
<i>Gleditsia triacanthos</i> varieties	crooked stem
<i>Hippophae rhamnoides</i>	short-lived, forms runners
<i>Juglans cinerea</i>	crooked stem
<i>Koelreuteria paniculata</i>	extremely crooked habit
<i>Liquidambar styraciflua</i>	atypical, broken-up crown
<i>Morus nigra</i>	atypical, broken-up crown
<i>Nyssa sylvatica</i>	crooked stem, atypical, broken-up crown
<i>Paulownia tomentosa</i>	crooked stem, atypical, broken-up crown
<i>Platanus acerifolia</i>	tolerates light shade
<i>Populus</i> species and varieties	forms runners, short-lived
<i>Prunus</i> species and varieties	atypical, broken-up crown, crooked stem
<i>Pyrus calleryana</i> varieties	sensitive to frost
<i>Pyrus nivalis</i>	short-lived, slow-growing
<i>Pyrus regelii</i>	crooked stem
<i>Pyrus salicifolia</i>	short-lived
<i>Rhus glabra</i>	forms runners, short-lived
<i>Rhus typhina</i>	forms runners, short-lived
<i>Robinia pseudoacacia</i> varieties	crooked stem, short-lived

Genus/species/variety	Reaction to shade
<i>Salix</i> species and varieties	crooked habit, short-lived,
<i>Sophora japonica</i>	crooked stem, sensitive to frost
<i>Tilia euchlora</i>	atypical broken-up crown
<i>Tilia henryana</i>	atypical broken-up crown
<i>Tilia tomentosa</i> varieties	persistent, susceptible to breaking
<i>Ulmus</i> 'Columella'	crooked habit
<i>Ulmus</i> 'Sapporo Autumn Gold'	crooked stem
<i>Ulmus glabra</i> 'Pendula'	less leaves
<i>Zelkova serrata</i>	atypical, broken-up crown

## 2. Shrubs

<i>Buddleja</i> species and varieties	no flowers
<i>Calluna vulgaris</i> varieties	no flowers, shaggy-unkept
<i>Caryopteris clandonensis</i> varieties	short-lived
<i>Chionanthus virginicus</i>	crooked habit
<i>Cotoneaster sternianus</i>	crooked habit
<i>Cytisus</i> species and varieties	short-lived
<i>Elaeagnus</i> species and varieties	crooked habit
<i>Erica</i> species and varieties	short-lived, loses its compactness
<i>Genista</i> species and varieties	no flowers
<i>Hibiscus syriacus</i> varieties	crooked habit, no flowers
<i>Hippophae rhamnoides</i>	short-lived, forms runners
<i>Hypericum kalmianum</i> varieties	short-lived
<i>Lavandula angustifolia</i> varieties	no flowers, short-lived
<i>Lespedeza thunbergii</i>	no flowers
<i>Perovskia abrotanoides</i>	crooked habit, short-lived
<i>Prunus cistena</i>	leaves turn green, crooked habit
<i>Prunus mahaleb</i>	crooked stem, atypical, broken-up crown
<i>Rhus typhina</i> varieties	crooked habit, forms runners
<i>Ribes sanguineum</i> varieties	crooked habit, short-lived
<i>Rosa glauca</i>	crooked habit, short-lived
<i>Salix</i> species and varieties	crooked habit, short-lived
<i>Syringa hyacinthiflora</i> varieties	no flowers
<i>Syringa prestoniae</i> varieties	crooked habit, no flowers
<i>Tamarix</i> species	crooked habit
<i>Ulex europaeus</i>	crooked habit, forms runners
<i>Vaccinium macrocarpon</i>	short-lived

## 3. Climbers

<i>Campsis tagliabuana</i>	no flowers
<i>Clematis texensis</i>	no flowers
<i>Jasminum nudiflorum</i>	no flowers
<i>Wisteria</i> species and varieties	few flowers, thinned out





## 28 Plants that need light

Genus/species/variety	Reaction to shade
<b>4. Conifers</b>	
Abies concolor	turns green
Abies procera 'Glauca'	turns green
Araucaria araucana	
Cedrus species and varieties	loses its leaves
Cupressocyparis leylandii varieties	thinned out or loses its leaves
Ginkgo biloba	extrem crooked habit
Juniperus species and varieties	extremely crooked habit
Larix species and varieties	crooked stem, atypical, broken-up crown
Picea orientalis varieties	thinned out or loses its leaves
Picea glauca varieties	thinned out or loses its leaves
Picea pungens varieties	turns green or thinned out or loses its leaves
Pinus species and varieties	thinned out or loses its leaves
Pseudolarix amabilis	crooked stem, atypical, broken-up crown
Taxodium distichum	atypical, broken-up crown

## 29 Shade-tolerant plants

Few plants like shade. Most varieties may tolerate semi-shade or even full shade when young, but the older they get, the more light they need. Plants in the shade regenerate insufficiently. Generous pruning does not cause them to create new shoots, but stops shooting altogether in the shade. Full shade does not mean dark shade like in a spruce forest, but only far-reaching protection from sun rays with wandering spots of light during the course of the day. Under the deep-reaching branches of large trees or draped shrubs, no long-term underplanting is possible even with shade-tolerant plants.

Genus/species/variety	Semi-shade	Full shade
<b>1. Deciduous trees</b>		
Acer campestre	+	
Acer platanoides in green-leaf varieties	(+)	
Acer freemanii	+	
Acer griseum	+	
Acer japonicum varieties	+	
Acer pensylvanicum	+	+
Acer rufinerve	+	
Acer neglectum 'Annae'	+	(+)
Carpinus betulus varieties	+	(+)
Cornus species and varieties	+	
Crataegus species and varieties	+	
Fagus sylvatica all green varieties	+	+
Fraxinus americana	+	
Fraxinus pennsylvanica	+	
Ilex aquifolium varieties	+	+

Explanation of symbols: (+) = of limited usefulness

Genus/species/variety	Semi-shade	Full shade
Malus sylvestris	+	
Ostrya carpinifolia	+	+
Prunus padus	+	
Sorbus aucuparia	+	+
Sorbus domestica	+	
Sorbus torminalis	+	+
Stewartia pseudocamellia	+	
Tilia americana varieties	+	
Tilia platyphyllos	+	
Ulmus carpinifolia	+	
Ulmus glabra	+	
<b>2. Shrubs</b>		
Acer palmatum varieties	+	
Aesculus parviflora	+	
Aronia species and varieties	+	
Aucuba japonica varieties	+	
Berberis species and varieties	+	
Buxus sempervirens varieties	+	+
Cornus species and varieties	+	(+)
Corylus avellana	+	
Crataegus species and varieties	+	
Daphne mezereum varieties	+	
Eleaegnus ebbingei	+	
Euonymus species and varieties	+	
Euonymus fortunei varieties	+	+
Fothergilla species	+	+
Gaultheria species and varieties	+	+
Hydrangea species and varieties	+	(+)
Ilex altaclerensis varieties	+	+
Ilex aquifolium varieties	+	+
Ilex meserveae varieties	+	
Kalmia species and varieties	+	
Kerria japonica	+	+
Leucothoe walteri	+	+
Ligustrum species and varieties	+	(+)
Lonicera species and varieties	+	+
Magnolia stellata varieties	(+)	
Mahonia species and varieties	+	+
Mespilus germanica	+	
Osmanthus heterophyllus	+	+
Pachysandra terminalis	+	+
Philadelphus species and varieties	+	
Photinia villosa	+	
Pieris species and varieties	+	+
Prunus laurocerasus varieties	+	+
Prunus lusitanica	+	+
Prunus padus	+	
Ptelea trifoliata	+	+





Genus/species/variety	Semi-shade	Full shade
Rhamnus species and varieties	+	+
Rhododendron species and varieties	+	
Rhodotypos scandens	+	+
Ribes alpinum varieties	+	+
Ribes aureum	+	
Ribes divaricatum	+	
Rosa arvensis	+	
Rosa multiflora	+	
Rubus species and varieties	+	+
Sambucus species and varieties	+	
Skimmia japonica varieties	+	+
Sorbus species and varieties	+	
Sorbaria sorbifolia	+	+
Spiraea species and varieties	+	
Staphylea colchica	+	
Stranvaesia davidiana	+	
Stephanandra species and varieties	+	
Stewartia pseudocamellia	+	
Vaccinium corymbosum	+	
Vaccinium vitis-idaea varieties	+	+
Viburnum species and varieties	+	
Viburnum tinus	+	+
Vinca species and varieties	+	+
Weigela species and varieties	+	
<b>3. Climbers</b>		
Actinidia species and varieties	+	
Akebia quinata	+	
Aristolochia macrophylla	+	+
Celastrus orbiculatus	+	+
Clematis alpina	+	
Clematis tangutica	+	
Clematis vitalba	+	+
Clematis viticella	+	
Euonymus fortunei varieties	+	+
Hedera colchica varieties	+	+
Hedera helix varieties	+	+
Hydrangea petiolaris	+	
Lonicera species and varieties	+	
Parthenocissus species and varieties	+	+
Polygonum aubertii	+	
Rosa arvensis	+	
Rubus caesius	+	+
Rubus fruticosus	+	+
Rubus henryi	+	+

Genus/species/variety	Semi-shade	Full shade
<b>4. Conifers</b>		
Abies species and varieties (Youth state)	+	+
Chamaecyparis species and varieties	+	
Picea species and varieties (Youth state)	+	
Sciadopitys verticillata	+	+
Sequoia sempervirens	+	+
Sequoiadendron giganteum	+	
Taxus species and varieties	+	+
Thuja species and varieties	+	+
Thujopsis dolabrata	+	+
Tsuga species and varieties	+	+

## 30 Wind resistant plants

The wind-resistance of plants is not a constant, but depends on exposure, age and soil substrate, with the exposure playing a decisive role. Not every species is capable of growing in extreme, usually westward-oriented areas. Some only survive when other plants surround them or when they are grown on the side of the bed facing away from the wind where shoots, leaves and flowers do not dry out. These reactions are listed in the table along with the varieties that are suitable for all exposed areas – taking into consideration their other needs such as light needs. For most species, the elasticity of the branches and twigs noticeably decreases with age, which may mean that species that have great wind-resistance in the first 30 years eventually lose their elasticity and become extremely susceptible to breaking. When this happens, cutting back to further regeneration may be necessary, or the plant may need to be replaced.

On heavy soil or when the water level is high, many species have a very shallow root system and are not really anchored in the soil so that they lose their stability as they grow. Here, the remedy is the correct selection of species and occasional pruning.

**Note:** In situations with permanent strong winds or vacuums or at outlets for outgoing warm air, no plant can survive.

**See table next page**

Explanation of symbols: (+) = of limited usefulness





## 30 Wind resistant plants

Genus/species/variety	Extreme areas	All exposures
<b>1. Indigenous species</b>		
Acer campestre	+	+
Acer platanoides		+
Acer pseudoplatanus	+	+
Alnus glutinosa		+
Alnus incana	+	+
Amelanchier ovalis	+	+
Berberis vulgaris		+
Betula pubescens	+	
Carpinus betulus	+	+
Castanea sativa		+
Clematis vitalba		+
Colutea arborescens		+
Cornus mas		+
Cornus sanguinea	+	+
Crataegus laevigata		+
Crataegus monogyna	+	+
Euonymus europaeus		+
Fagus sylvatica	+	+
Fraxinus excelsior		+
Hippophae rhamnoides	+	
Ilex aquifolium		+
Juglans regia varieties		+
Ligustrum vulgare		+
Malus sylvestris		+
Myrica gale	+	
Populus alba		+
Populus nigra varieties		+
Populus tremula	+	+
Prunus mahaleb		+
Prunus spinosa	+	+
Pyrus communis		+
Quercus petraea		+
Quercus robur		+
Rhamnus species		+
Rosa canina	+	
Rosa glauca	+	
Rosa pimpinellifolia	+	
Rosa rubiginosa	+	
Salix species and varieties		+
Sambucus species and varieties		+
Sorbus species and varieties		+
Ulex europaeus	+	+
Ulmus species and varieties		+
Viburnum species and varieties	+	

Genus/species/variety	Extreme areas	All exposures
<b>2. Indigenous Conifers</b>		
Abies alba		+
Juniperus communis varieties		+
Larix decidua	+	+
Pinus cembra	+	+
Pinus mugo	+	+
Pinus sylvestris		+
Taxus baccata		+
<b>3. Park trees and decorative shrubs</b>		
Acer freemanii		+
Acer monspessulanum		+
Alnus cordata	+	+
Alnus spaethii		+
Amelanchier species and varieties	+	+
Aronia species and varieties		+
Bambus species and varieties		+
Betula species and varieties		+
Caragana arborescens	+	
Corylus columna		+
Cotoneaster (summergreen)		+
Crataegus species and varieties		+
Elaeagnus species and varieties	+	
Forsythia species and varieties		+
Fraxinus americana		+
Fraxinus ornus varieties		+
Fraxinus pennsylvanica		+
Juglans nigra	+	+
Kolkwitzia amabilis		+
Ligustrum species and varieties		+
Lonicera korolkowii zabelii		+
Lonicera ledebourii		+
Lycium barbarum	+	
Philadelphus species and varieties		+
Photinia villosa		+
Physocarpus opulifolius		+
Platanus acerifolia		+
Ptelea trifoliata		+
Pyracantha species and varieties		+
Pyrus calleryana varieties		+
Pyrus salcifolia		+
Quercus cerris	+	+
Quercus species and varieties		+
Ribes divaricatum	+	+
Sorbaria sorbifolia		+
Sorbus americana		+
Sorbus species and varieties		+
Spiraea species and varieties		+
Syringa vulgaris	+	
Zelkova serrata		+





Genus/species/variety	Extreme areas	All exposures
<b>4. Climbers</b>		
Actinidia arguta		+
Celastrus orbiculatus		+
Clematis tangutica		+
Hedera helix		+
Hydrangea petiolaris		+
Parthenocissus quinquefolia		+
<b>5. Conifers</b>		
Abies species and varieties		+
Araucaria araucana	+	+
Cedrus species and varieties		+
Chamaecyparis species and varieties		+
Cupressocyparis leylandii varieties	+	+
Ginkgo biloba		+
Juniperus species and varieties		+
Larix kaempferi	+	+
Metasequoia glyptostroboides		+
Microbiota decussata		+
Picea sitchensis	+	+
Pinus species and varieties		+
Sequoia sempervirens	+	+
Sequoiadendron giganteum	+	+
Taxus species and varieties		+
Thuja species and varieties		+
Thujopsis dolabrata		+
Tsuga species and varieties		+

## 31 Plants for damp and flooded soil

Although many plants can grow in moist to damp soil, most prefer less damp areas. Too much moisture means insufficient oxygen for the roots of the plants. In such areas, most plants have extremely shallow roots. Floods are not tolerated equally well in all seasons. Trees with full foliage are extraordinarily sensitive to long floods in summer. Excess moisture and week-long floods are best tolerated from late winter into spring.

Genus/species/variety	Tolerates dampness	Floods	
		short	long
<b>1. Deciduous trees</b>			
Acer campestre	-	+	-
Acer negundo	+	+	+
Acer platanoides varieties	-	+	-
Acer pseudoplatanus varieties	+	+	-
Acer rubrum	+	+	+
Acer saccharinum varieties	+	+	+
Aesculus flava varieties	+	+	-
Aesculus hippocastanum	-	+	-
Alnus species and varieties	+	+	+
Aralia elata varieties	+	+	-
Betula nigra	+	+	-
Betula pubescens	+	+	-
Carpinus betulus	-	+	-
Catalpa bignonioides	+	+	-
Cercidiphyllum japonicum	-	+	-
Corylus colurna	+	+	-
Fraxinus excelsior varieties	+	+	-
Gleditsia triacanthos varieties	+	+	-
Gymnocladus dioica	+	+	-
Juglans regia	+	+	-
Liquidambar styraciflua	+	+	+
Liriodendron tulipifera	+	+	-
Magnolia kobus	-	+	-
Malus sylvestris	-	+	-
Nyssa sylvatica	+	+	-
Platanus acerifolia	+	+	+
Populus species and varieties	+	+	+
Prunus padus	+	+	+
Pterocarya fraxinifolia	+	+	+
Quercus palustris	+	+	-
Quercus robur	-	+	-
Salix species and varieties	+	+	+
Sorbus decora	+	+	-
Tilia cordata	-	+	-
Ulmus species and varieties	-	+	-
<b>2. Shrubs</b>			
Aesculus parviflora	-	+	-
Amelanchier species and varieties	+	+	-
Aronia species and varieties	+	+	+
Betula nana	+	+	-
Calycanthus floridus	+	+	-
Chionanthus virginicus	+	+	-
Clethra alnifolia	+	+	+
Cornus alba varieties	+	+	-
Cornus florida	+	+	-
Cornus sanguinea	-	+	-
Cornus stolonifera varieties	+	+	+





## 31 Plants for damp and flooded soil

Genus/species/variety	Tolerates dampness	Floods	
		short	long
<b>2. Shrubs</b>			
Elaeagnus commutata	-	+	-
Erica tetralix	+	-	-
Euonymus europaeus	+	+	-
Euonymus yedoensis varieties	+	+	-
Fothergilla gardenii	+	-	-
Fothergilla major	-	+	-
Gaultheria shallon	+	+	+
Hippophae rhamnoides	+	+	-
Holodiscus discolor ariifolius	+	+	-
Hydrangea species and varieties	+	+	-
Ilex verticillata	+	+	+
Kalmia species and varieties	+	+	-
Ledum palustre	+	+	+
Leucothoe walteri	+	+	-
Lonicera caerulea	+	+	-
Lonicera ledebourii	+	+	-
Magnolia stellata	+	+	-
Myrica gale	+	+	-
Parrotia persica	+	+	-
Pernettya mucronata varieties	+	+	-
Prunus padus	+	+	+
Rhamnus frangula	+	+	+
Azalea hybrids	+	+	-
Rubus caesius	+	+	+
Rubus fruticosus	+	+	-
Rosa arvensis	+	+	-
Salix species and varieties	+	+	+
Sambucus nigra	+	+	-
Sorbaria sorbifolia	+	+	-
Stephanandra incisa 'Crispa'	+	+	-
Symphoricarpos albus laevigatus	+	+	-
Vaccinium corymbosum	+	+	+
Viburnum opulus varieties	+	+	+
<b>3. Climbers</b>			
Actinidia arguta	-	+	-
Akebia quinata	+	+	-
Aristolochia macrophylla	+	+	+
Celastrus orbiculatus	+	+	-
Clematis vitalba	+	+	+
Clematis viticella	-	+	-
Euonymus fortunei varieties	+	+	-
Hedera species and varieties	+	+	-
Lonicera species and varieties	-	+	-
Parthenocissus quinquefolia	+	+	+
Polygonum aubertii	+	+	-
Wisteria sinensis	+	+	+

Genus/species/variety	Tolerates dampness	Floods	
		short	long
<b>4. Conifers</b>			
Juniperus horizontalis varieties	+	-	-
Metasequoia glyptostroboides	+	+	-
Picea sitchensis	+	+	-
Pinus monticola varieties	+	-	-
Pinus sylvestris varieties	+	-	-
Pinus strobus	+	-	-
Pinus wallichiana	+	-	-
Taxodium distichum	+	+	+
Thuja occidentalis varieties	+	+	-
Thuja plicata	+	+	-
Thuja standishii	+	-	-

## 32 Plants that withstand drought

Most of the plants listed cannot be considered drought lovers; rather, they tolerate droughts. Many of them primarily like light and only move into dry areas because more aggressive plants do not follow them there.

The planting phase is critical as the plants have to be watered regularly to grow normally. After planting, they need to be watered regularly in the first few years—more often in dry periods. Stress due to drought means, for most plants, that their growth and foliage are reduced, their autumn colours appear earlier, their frost hardiness is reduced, and the plants are more sensitive to pollution. The plants may also have more insects or mites, which would lead to more difficulties in extreme situations.

**Note:** The plants that are more sensitive after planting or when young have been noted.

Genus/species/variety	Response to drought
<b>1. Deciduous trees</b>	
Acer buergerianum	resistant
Acer campestre varieties	resistant
Acer cappadoicum	resistant
Acer ginnala	resistant
Acer monspessulanum	resistant
Acer negundo	only as shrub
Acer rubrum	resistant
Acer saccharum 'Legacy'	resistant
Acer tataricum	resistant
Alnus cordata	sensitive when young
Alnus incana	sensitive when young
Alnus spaethii	resistant
Amelanchier arborea	resistant
Betula jacquemontii	resistant





Genus/species/variety	Response to drought	Genus/species/variety	Response to drought
Betula nigra	sensitive when young	<b>2. Shrubs</b>	
Castanea sativa	grows poorly	Acanthopanax sieboldianus	grows poorly
Carpinus betulus	resistant	Amelanchier ovalis	leaves fall early
Celtis australis	resistant	Berberis ottawensis 'Superba'	
Corylus colurna	grows poorly	Berberis thunbergii varieties	thinned out
Crataegus species and varieties	tree-grid must remain open	Berberis vulgaris	very resistant
Fraxinus ornus	resistant	Buddleja species and varieties	flowers wither faster
Fraxinus pennsylvanica varieties	resistant	Caragana arborescens	
Gleditsia triacanthos varieties	not very susceptible to breaking	Cercis siliquastrum	more resistant when mature
Koelreuteria paniculata	resistant	Colutea arborescens	Cornus mas
Liquidamber styraciflua	resistant	Cornus sanguinea	
Magnolia kobus	resistant	Cotinus coggygia varieties	more resistant when mature
Malus tschonoskii	sensitive when young	Cotoneaster dielsianus	sensitive when young
Morus alba	very resistant	Cotoneaster divaricatus	sensitive when young
Morus nigra	sensitive when young	Cotoneaster franchetii	sensitive when young
Nyssa sylvatica	resistant	Cotoneaster sternianus	grows poorly
Ostrya carpinifolia	resistant	Crataegus species and varieties	
Parrotia persica	resistant	Cytisus species and varieties	
Paulownia tomentosa	very resistant	Elaeagnus species and varieties	very resistant
Populus species and varieties	only as shrub, short-lived	Genista species and varieties	
Prunus fruticosa 'Globosa'	sensitive when young	Hippophae rhamnoides	needs residue moisture
Pyrus nivalis	resistant	Ilex 'Nellie R. Stevens'	resistant
Pyrus species and varieties	more resistant when mature	Kolkwitzia amabilis	resistant
Pyrus salicifolia	more resistant when mature	Lespedeza thunbergii	more resistant when mature
Quercus cerris	crooked stem, only as shrub	Ligustrum species and varieties	sensitive during planting
Quercus frainetto	sensitive when young	Lycium barbarum	
Quercus macranthera	resistant	Mespilus germanica	more resistant when mature
Quercus palustris	resistant	Osmanthus heterophyllus	grows poorly
Quercus petraea	crooked stem, only as shrub	Perovskia species and varieties	stands on its own better
Quercus pubescens	high drought tolerance	Physocarpus opulifolius	sensitive when young
Quercus turneri 'Pseudoturneri'	bushy	Prunus mahaleb	very resistant
Rhus species and varieties	more runners	Prunus spinosa	twigs have more thorns
Robinia species and varieties	resistant	Prunus lusitanica varieties	resistant
Sophora japonica varieties	more resistant when mature	Pyracantha hybrids	twigs have more thorns
Sorbus aria varieties	sensitive when young	Rhamnus catharticus	like thickets
Sorbus domestica	grows poorly	Rhus species and varieties	more runners
Sorbus thuringiaca 'Fastigiata'	sensitive when young	Robinia species and varieties	very resistant
Sorbus torminalis	grows poorly	Rosa carolina	grows poorly
Tilia platyphyllos varieties	resistant	Rosa gallica	forms runners
Tilia tomentosa	sensitive when young	Rosa glauca	very resistant
Ulmus holandica varieties	resistant	Rosa pimpinellifolia	loses its foliage bearly
Zelkova serrata varieties	resistant	Rosa rubiginosa	grows poorly
		Rosa rugosa	very resistant
		Rosa rugotida	very resistant
		Salix repens argentea	needs residue moisture
		Spiraea decumbens	
		Syringa vulgaris	
		Tamarix species and varieties	very resistant
		Ulex europaeus	
		Viburnum lantana	





## 32 Plants that withstand drought

Genus/species/variety	Response to drought
<b>3. Climbers</b>	
<i>Campsis radicans</i>	grows poorly
<i>Campsis tagliabuana</i>	resistant
<i>Celastrus orbiculatus</i>	slow-growing
<i>Clematis maximowicziana</i>	sensitive when young
<i>Clematis vitalba</i>	slow-growing
<i>Euonymus fortunei</i> varieties	hardly climbs
<i>Hedera</i> species and varieties	sensitive to frost
<i>Jasminum nudiflorum</i>	
<i>Parthenocissus quinquefolia</i>	thinned out, sensitive when young
<b>4. Conifers</b>	
<i>Abies concolor</i>	sensitive when young
<i>Cedrus</i> species and varieties	sensitive when young
<i>Cupressocyparis leylandii</i>	grows poorly, thinned out
<i>Ginkgo biloba</i>	grows poorly
<i>Juniperus</i> species and varieties	very resistant
<i>Picea orientalis</i>	sensitive when young
<i>Picea pungens</i> varieties	
<i>Pinus contorta</i>	squat
<i>Pinus densiflora</i> 'Umbraculifera'	
<i>Pinus jeffreyi</i>	grows poorly
<i>Pinus leucodermis</i>	very resistant
<i>Pinus mugo</i> varieties	sensitive when young
<i>Pinus nigra</i> varieties	sensitive during planting
<i>Pinus peuce</i>	sensitive during planting
<i>Pinus ponderosa</i>	sensitive during planting
<i>Pinus sylvestris</i> varieties	
<i>Pseudotsuga menziesii caesia</i>	grows poorly

## 33 Plants for alkaline soil

Many of the plants named occur on even neutral or slightly acidic soil in the wild without any noticeable problems. Soil humidity, structure and nutrition play important roles in addition to the soil pH. Numerous exotic species do not bind to chalk or alkaline soil in their native habitat, but rather respond with indifference. In contrast, in central Europe they prefer chalky soil where they can withstand more drought, are less damaged by frost, and can compete with strong-growing competition better. In conclusion, it is a complex matter that cannot be stated in general terms for every species.

### 1. Deciduous trees

*Acer campestre* varieties  
*Acer cappadocicum* varieties  
*Acer freemanii* varieties  
*Acer monspessulanum*  
*Acer platanoides* varieties  
*Acer pseudoplatanus* varieties  
*Acer neglectum* 'Annae'  
*Alnus incana*  
*Alnus spaethii*  
*Celtis australis*  
*Corylus colurna*  
*Crataegus* species and varieties  
*Elaeagnus angustifolia*  
*Euodia hupehensis*  
*Fraxinus* species and varieties  
*Gleditsia triacanthos* varieties  
*Gymnocladus dioica*  
*Juglans nigra*  
*Juglans regia*  
*Koelreuteria paniculata*  
*Laburnum* species and varieties  
*Malus* species and varieties  
*Morus* species and varieties  
*Ostrya carpinifolia*  
*Paulownia tomentosa*  
*Phellodendron amurense*  
*Platanus acerifolia* varieties  
*Platanus orientalis*  
*Populus alba* 'Nivea'  
*Populus canescens*  
*Populus nigra* varieties  
*Prunus* species and varieties  
*Pyrus* species and varieties  
*Quercus* species and varieties  
*Rhamnus catharticus*  
*Rhus typhina*  
*Robinia* species and varieties  
*Salix alba* varieties  
*Salix daphnoides* varieties  
*Sophora japonica* varieties  
*Sorbus aria* varieties  
*Sorbus domestica*  
*Sorbus intermedia* varieties  
*Sorbus thuringiaca* 'Fastigiata'  
*Sorbus torminalis*  
*Tilia* species and varieties  
*Ulmus* species and varieties  
*Zelkova serrata* varieties

### 2. Shrubs

*Acanthopanax sieboldianum*  
*Amelanchier ovalis*  
*Berberis* species and varieties  
*Buddleja* species and varieties  
*Buxus sempervirens* varieties  
*Caragana arborescens*  
*Caryopteris* species and varieties  
*Ceanothus deli*. 'Gloire de Versailles'  
*Cercis siliquastrum*  
*Chionanthus virginicus*  
*Colutea arborescens* varieties  
*Cornus mas*  
*Cornus sanguinea*  
*Corylus* species and varieties  
*Cotinus coggygria* varieties  
*Cotoneaster* species and varieties  
*Crataegus* species and varieties  
*Cytisus beanii*  
*Cytisus decumbens*  
*Cytisus kewensis*  
*Cytisus nigricans* varieties  
*Cytisus purpureus*  
*Daphne* species and varieties  
*Elaeagnus* species and varieties  
*Erica carnea* varieties  
*Euonymus europaeus*  
*Euonymus planipes*  
*Forsythia* species and varieties  
*Genista radiata*  
*Hibiscus syriacus* varieties  
*Hippophae rhamnoides*  
*Hypericum kalmianum* 'Gemo'  
*Laburnum* species and varieties  
*Lavandula angustifolia* varieties  
*Ligustrum* species and varieties  
*Lonicera japonica repens*  
*Lonicera korolkowii zabelii*  
*Lonicera xylosteum* varieties  
*Lycium barbarum*  
*Malus* species and varieties  
*Mespilus germanica*  
*Osmanthus heterophyllus*  
*Perovskia abrotanoides*  
*Philadelphus* species and varieties  
*Prunus* species and varieties  
*Ptelea trifoliata*  
*Pyracantha* hybrids  
*Rhamnus catharticus*  
*Rhodotypos scandens*  
*Rhus* species and varieties







Robinia hispida varieties  
 Rosa arvensis  
 Rosa canina varieties  
 Rosa gallica  
 Rosa glauca  
 Rosa moyesii  
 Rosa multibracteata  
 Rosa pimpinellifolia  
 Rosa rubiginosa  
 Rubus calycioides  
 Rubus idaeus  
 Salix elaeagnos  
 Salix hastata 'Wehrhahnii'  
 Salix purpurea varieties  
 Salix repens argentea  
 Salix viminalis  
 Sambucus canadensis + nigra var.  
 Sorbaria sorbifolia  
 Spiraea bumalda varieties  
 Spiraea decumbens  
 Spiraea japonica varieties  
 Spiraea nipponica  
 Spiraea vanhouttei  
 Staphylea colchica  
 Syringa species and varieties  
 Tamarix species and varieties  
 Viburnum bodnantense 'Dawn'  
 Viburnum burkwoodii  
 Viburnum carlcephalum  
 Viburnum farreri  
 Viburnum lantana  
 Viburnum opulus  
 Viburnum rhytidophyllum  
 Viburnum tinus  
 Vinca species and varieties

## 34 Plants for acidic soil

The degree of acidity of the soil depends, among other things, on the original rock type. Acidic soil can be of purely mineral (acidic sand or loam) or organic origin. The degree of acidity is stated as its pH value, with the range for acid-loving plants between pH 4 and pH 6.5. Between pH 6.5 and approx. pH 7.2, one speaks of neutral soil; above that, of alkaline. The pH value on its own does not tell us everything; a slightly acidic soil of pH 6, where air humidity is high and humus is present, is better for plants than a soil of pH 6 would be in a situation where the plants are exposed to heat and drought on non-nutritious sand or gravel.

**Note:** Many of the species named thrive well in neutral soil, some of them even in slightly alkaline soil (see the individual descriptions).

### 3. Climbers

Actinidia arguta  
 Aristolochia macrophylla  
 Campsis radicans varieties  
 Clematis species and varieties  
 Euonyms fortunei varieties  
 Hedera species and varieties  
 Jasminum nudiflorum  
 Lonicera species and varieties  
 Parthenocissus quinquefolia varieties  
 Polygonum aubertii  
 Rosa - Climbers

### 4. Conifers

Abies concolor  
 Cedrus atlantica varieties  
 Cedrus libani  
 Chamaecyparis nootkatensis var.  
 Ginkgo biloba  
 Juniperus chinensis varieties  
 Juniperus communis varieties  
 Juniperus media varieties  
 Juniperus sabina varieties  
 Juniperus squamata varieties  
 Juniperus virginiana varieties  
 Larix decidua  
 Microbiota decussata  
 Picea orientalis varieties  
 Picea pungens varieties  
 Pinus aristata  
 Pinus leucodermis  
 Pinus mugo varieties  
 Pinus nigra austriaca varieties  
 Taxus species and varieties  
 Thuja occidentalis varieties

### 1. Deciduous trees

Acer freemanii varieties  
 Acer griseum  
 Acer japonicum varieties  
 Acer negundo varieties  
 Acer pensylvanicum  
 Acer rubrum  
 Acer rufernerv  
 Acer saccharum  
 Acer saccharinum varieties  
 Acer saccharinum varieties  
 Ailanthus altissima  
 Alnus glutinosa  
 Amelanchier species and varieties  
 Betula species and varieties  
 Castanea sativa  
 Cornus alternifolia  
 Cornus controversa  
 Cornus florida und Formen  
 Cornus kousa/C. kousa chinensis var.  
 Fraxinus americana varieties  
 Fraxinus pennsylvanica varieties  
 Ilex aquifolium  
 Liquidambar styraciflua  
 Liriodendron tulipifera varieties  
 Magnolia grandiflora 'Blanchard'  
 Magnolia species and varieties  
 Nyssa sylvatica  
 Parrotia persica  
 Populus tremula  
 Quercus coccinea  
 Quercus palustris  
 Quercus rubra  
 Salix fragilis  
 Sorbus aucuparia varieties  
 Sorbus americana  
 Sorbus arnoldiana varieties  
 Sorbus decora  
 Sorbus koehneana  
 Stewartia pseudocamellia  
 Styx japonicus  
 Styx obassia

### 2. Shrubs

Acer japonicum varieties  
 Acer palmatum varieties  
 Arctostaphylos uva-ursi  
 Aronia species and varieties  
 Amelanchier species and varieties  
 Berberis thunbergii species and varieties  
 Betula nana  
 Callicarpa bodinieri 'Profusion'  
 Calluna vulgaris varieties

Chaenomeles species and varieties  
 Clethra alnifolia  
 Cornus alternifolia  
 Cornus canadensis  
 Cornus controversa  
 Cornus florida varieties  
 Cornus kousa varieties  
 Cornus nuttallii  
 Corylopsis species and varieties  
 Cytisus hybrids  
 Cytisus scoparius  
 Daboecia species and varieties  
 Empetrum nigrum  
 Enkianthus campanulatus  
 Erica cinerea varieties  
 Erica tetralix varieties  
 Erica vagans varieties  
 Escallonia species and varieties  
 Fothergilla species and varieties  
 Gaultheria species  
 Genista species and varieties  
 Halesia carolina  
 Hamamelis species and varieties  
 Hebe ochracea  
 Hydrangea species and varieties  
 Ilex species and varieties  
 Kalmia angustifolia 'Rubra'  
 Ledum palustre  
 Lespedeza thunbergii  
 Leucothoe walteri  
 Lonicera caerulea  
 Lonicera ledebourii  
 Magnolia species and varieties  
 Myrica gale  
 Parrotia persica  
 Pernettya mucronata varieties  
 Photinia villosa  
 Pieris species and varieties  
 Potentilla fruticosa varieties  
 Rhamnus frangula  
 Rhododendron species and varieties  
 Rosa blanda  
 Rosa carolina  
 Rosa multiflora  
 Rosa rugotida  
 Rosa rugosa varieties  
 Rubus calycioides  
 Rubus fruticosus  
 Salix aurita  
 Salix balsamifera mas  
 Salix cinerea  
 Salix helvetica





## 34 Plants for acidic soil

### 2. Shrubs

Salix lanata  
 Salix repens argentea  
 Salix sachalinensis 'Sekka'  
 Salix triandra  
 Sambucus racemosa  
 Skimmia japonica varieties  
 Spiraea betulifolia varieties  
 Spiraea prunifolia  
 Spiraea thunbergii  
 Stephanandra incisa 'Crispa'  
 Syringa patula varieties  
 Ulex europaeus  
 Vaccinium species and varieties

### 3. Climbers

Hydrangea petiolaris  
 Lonicera periclymenum  
 Rosa multiflora  
 Rubus fruticosus  
 Wisteria species and varieties

### 4. Conifers

Abies balsamea 'Nana'  
 Abies homolepis  
 Abies koreana  
 Abies procera 'Glauca'  
 Abies veitchii  
 Araucaria araucana  
 Cedrus deodara varieties

Chamaecyparis lawsoniana varieties  
 Chamaecyparis pisifera varieties  
 Chamaecyparis obtusa varieties  
 Cryptomeria japonica varieties  
 Cupressocyparis leylandii varieties  
 Juniperus species and varieties  
 Picea breweriana  
 Picea glauca varieties  
 Picea sitchensis  
 Pinus banksiana  
 Pinus contorta varieties  
 Pinus jeffreyi  
 Pinus monticola varieties  
 Pinus mugo  
 Pinus ponderosa  
 Pinus pumila varieties  
 Pinus schwerinii  
 Pinus strobus varieties  
 Pinus wallichiana varieties  
 Pseudolarix amabilis  
 Sciadopitys verticillata  
 Sequoia sempervirens  
 Sequoiadendron giganteum varieties  
 Taxodium distichum  
 Thuja occidentalis varieties  
 Thuja plicata varieties  
 Thuja standishii  
 Thujopsis dolabrata  
 Tsuga canadensis varieties  
 Tsuga diversifolia

### 1. Deciduous trees

Acer campestre  
 Acer ginnala  
 Acer negundo varieties  
 Acer platanoides varieties  
 Acer rubrum varieties  
 Acer saccharinum varieties  
 Acer neglectum 'Annae'  
 Ailanthus altissima  
 Alnus cordata  
 Alnus incana  
 Amelanchier species  
 Betula species and varieties  
 Castanea sativa  
 Cornus kousa  
 Elaeagnus angustifolia  
 Fraxinus ornus  
 Gleditsia triacanthos varieties  
 Hippophae rhamnoides  
 Koelreuteria paniculata  
 Populus species and varieties  
 Prunus mahaleb  
 Prunus serotina  
 Pyrus salicifolia  
 Quercus cerris  
 Quercus coccinea  
 Quercus petraea  
 Quercus rubra  
 Rhamnus catharticus  
 Rhus typhina  
 Robinia pseudoacacia varieties  
 Salix species and varieties  
 Sophora japonica  
 Sorbus aucuparia  
 Sorbus intermedia

### 2. Shrubs

Acer freemanii varieties  
 Acer ginnala  
 Acer monspessulanum  
 Acer tataricum  
 Amelanchier species  
 Arctostaphylos uva-ursi  
 Berberis ottawensis 'Superba'  
 Berberis thunbergii varieties  
 Buddleja alternifolia  
 Calluna vulgaris varieties  
 Caragana arborescens  
 Ceanothus delilianus 'Gloire de Versailles'  
 Chaenomeles speciosa  
 Colutea arborescens  
 Cornus kousa  
 Cornus mas

Cornus sanguinea  
 Cornus stolonifera 'Flaviramea'  
 Cotinus coggygria varieties  
 Cotoneaster dielsianus  
 Cytisus species and varieties  
 Elaeagnus species and varieties  
 Erica cinerea  
 Genista species and varieties  
 Hippophae rhamnoides  
 Hypericum calycinum  
 Hypericum kalmianum 'Gemo'  
 Lespedeza thunbergii  
 Ligustrum species and varieties  
 Lycium barbarum  
 Perovskia abrotanoides  
 Physocarpus opulifolius  
 Potentilla fruticosa varieties  
 Prunus mahaleb  
 Prunus serotina  
 Rhamnus catharticus  
 Rhamnus frangula  
 Rhus species and varieties  
 Ribes aureum  
 Ribes divaricatum  
 Rosa glauca  
 Rosa multiflora  
 Rosa nitida  
 Rosa pimpinellifolia  
 Rosa rugotida  
 Rosa rugosa  
 Rubus calycinoides  
 Salix species and varieties  
 Symphoricarpos species and varieties  
 Tamarix species and varieties  
 Vaccinium vitis-idaea varieties  
 Viburnum lantana

### 3. Climbers

Actinidia arguta  
 Akebia quinata  
 Aristolochia macrophylla  
 Celastrus orbiculatus  
 Jasminum nudiflorum  
 Parthenocissus quinquefolia varieties  
 Polygonum aubertii  
 Wisteria sinensis

### 4. Conifers

Abies concolor  
 Juniperus species and varieties  
 Larix kaempferi  
 Picea sitchensis  
 Pinus species and varieties

## 35 Plants for light, sandy soil

Few plants grow willingly on sandy soil. Those that do are forced into the sand by stronger competitors. If these competitors are absent, most of the plants named are quite able to thrive on normal soil. Almost all of the plants listed grow better if the sandy soil is somewhat fresh or even moist, contains loamy or humic components, and is not too lacking in nutrients. Just because the plants concerned settle on sandy soil does not mean they prefer a lack of nutrients or drought. It should also be kept in mind that sandy soil does not necessarily mean the soil is acidic, for the pH values may be far into the alkaline range.

Plants that have to make do with sandy soil differ from their relatives on better substrates in, among other things, their multiple stems, crooked growth, more plentiful runners, and shorter-lived leaves. Species susceptible to frost or breaking are at an advantage, however, on sandy soil; they are more prone to damage on loam or clay.





## 36 Plants for heavy, loamy soil or clay

Heavy loam, loess, or even clay are not optimal soil substrates for most plants. Plant habits are much smaller than on normal loam. Some trees and shrubs, such as Chaenomeles, react to this poorly aerated soil with chlorosis (yellowing of the leaves), with sensitivity to fungi (such as Juniperus), or with early leaf loss (such as with many Sorbus varieties). Other examples of sensitivity would be the extreme frost damage to Cotoneaster or the weakened habit of Picea abies. Soil improvements and loosening are therefore desirable to prevent or reduce such damage.

**Note:** The list does not include any plants occasionally considered tolerant of clay but that displayed severe defects in the course of decades of observation in the test garden at Weißenstephan near Munich (heavy loess).

### 1. Deciduous trees

- Acer negundo varieties
- Acer platanoides varieties
- Acer saccharinum varieties
- Aesculus species and varieties
- Alnus species and varieties
- Aralia elata varieties
- Betula nigra
- Carpinus betulus varieties
- Crataegus species and varieties
- Fagus sylvatica varieties
- Fraxinus americana microcarpa
- Fraxinus americana varieties
- Fraxinus excelsior varieties
- Fraxinus pennsylvanica
- Gymnocladus dioica
- Ilex aquifolium varieties
- Juglans nigra
- Laburnum species and varieties
- Liquidambar styraciflua
- Lonicera maackii
- Magnolia kobus
- Populus species and varieties
- Prunus avium
- Prunus padus varieties
- Prunus serrulata varieties
- Pterocarya fraxinifolia
- Quercus palustris
- Quercus robur
- Rhamnus catharticus
- Salix species and varieties
- Tilia species and varieties
- Zelkova serrata varieties

### 2. Shrubs

- Aralia elata
- Bambus species and varieties
- Colutea arborescens
- Cornus alba varieties
- Cornus mas
- Cornus sanguinea
- Cornus stolonifera 'Flaviramea'
- Corylus avellana
- Corylus maxima 'Purpurea'
- Cotoneaster species and varieties
- Crataegus species and varieties
- Deutzia species and varieties
- Euonymus europaeus
- Euonymus fortunei varieties
- Euonymus planipes
- Forsythia intermedia varieties
- Hamamelis species and varieties
- Hypericum calycinum
- Ilex aquifolium varieties
- Kerria japonica varieties
- Laburnum species and varieties
- Ligustrum vulgare varieties
- Lonicera ledebourii
- Lonicera maackii
- Lonicera xylosteum
- Mahonia aquifolium varieties
- Philadelphus species and varieties
- Physocarpus opulifolius
- Potentilla species and varieties
- Prunus spinosa
- Pseudosasa japonica
- Rhamnus species
- Ribes species and varieties
- Rosa arvensis
- Rosa canina

- Rosa multibracteata
- Rosa rubiginosa
- Rubus caesius
- Rubus fruticosus
- Rubus idaeus
- Salix species and varieties
- Sambucus species and varieties
- Sorbaria sorbifolia
- Spiraea species and varieties
- Symphoricarpos species and varieties
- Syringa species and varieties
- Viburnum lantana
- Viburnum opulus varieties
- Viburnum plicatum varieties
- Weigela species and varieties

- Hedera helix
- Parthenocissus quinquefolia varieties
- Parthenocissus tricuspidata 'Veitchii'
- Polygonum aubertii
- Rosa arvensis
- Rubus caesius
- Rubus fruticosus

### 4. Conifers

- Abies nordmanniana
- Chamaecyparis species and varieties
- Juniperus media varieties
- Larix species and varieties
- Metasquoia glyptostroboides
- Picea orientalis varieties
- Picea pungens varieties
- Taxus species and varieties
- Thuja species and varieties

### 3. Climbers

- Aristolochia macrophylla
- Celastrus orbiculatus
- Clematis tangutica
- Clematis vitalba
- Euonymus fortunei varieties

## 37 Plants resistant to industrial pollution

Resistance to industrial pollution cannot be stated in set figures. A majority of those on the list are included based on mere observation; few were systematically measured or even tested with exposure to gases. It is thus not surprising that much information is contradictory. These contradictions result from observations dating back to the end of the 19th century, the beginning of the 50s, and the 70s. Tests were carried out in various regions, some even overseas, so that the findings can hardly be compared. In the meantime, air pollution, measurement accuracy, and the assessment of toxins have changed so much that a general review is needed. Furthermore, sensitivity to industrial pollution depends among other things on nutritional conditions and exposure to heat and drought, which means that the same species may respond differently under varying circumstances. Of course, seasonal conditions also play a role.

The table cannot, therefore, give any conclusive answers.

Genus/species/variety	Resistant to industrial pollution	Negative experience
<b>1. Deciduous</b>		
Acanthopanax sieboldianus	++	
Acer campestre	++	*
Acer freemanii	+	
Acer ginnala	++	
Acer negundo	++	*





## 37 Plants resistant to industrial pollution

Genus/species/variety	Resistant to industrial pollution	Negative experience
<b>1. Deciduous</b>		
Acer platanoides varieties	++	*
Acer rubrum varieties	++	*
Acer saccharinum varieties	++	
Aesculus hippocastanum varieties	+	
Aesculus parviflora	++	
Ailanthus altissima	++	
Alnus glutinosa	++	*
Alnus incana	++	*
Amelanchier species	+	
Aucuba japonica	++	
Berberis buxifolia 'Nana'	+	
Berberis gagnepainii lanceifolia	+	
Berberis julianae	+	
Berberis stenophylla	+	
Berberis thunbergii	++	*
Berberis verruculosa	++	
Betula papyrifera	+	*
Betula pendula	++	*
Betula pubescens	+	
Buddleja davidii varieties	+	*
Buxus sempervirens	++	
Calycanthus floridus	++	
Calluna vulgaris	+	
Caragana arborescens	+	*
Carpinus coreana	++	
Castanea sativa	++	
Catalpa bignonioides	++	
Cercidiphyllum japonicum	+	
Chaenomeles japonica	+	*
Chaenomeles speciosa	+	
Chionanthus virginicus	++	
Cladrastis kentukea	++	
Colutea arborescens	+	*
Cornus alba varieties	+	*
Cornus florida varieties	++	
Cornus mas	+	*
Cornus sanguinea	++	*
Cornus stolonifera 'Flaviramea'	+	
Cotoneaster acutifolius	+	
Cotoneaster adpressus	+	
Cotoneaster dammeri	+	
Cotoneaster divaricatus	+	
Cotoneaster horizontalis	+	
Cotoneaster microphyllus 'Cochleatus'	+	
Cotoneaster salicifolius floccosus	+	
Cotoneaster watereri	+	
Corylus avellana	+	
Crataegus lavalleyi 'Carrierei'	++	*

Genus/species/variety	Resistant to industrial pollution	Negative experience
Crataegus monogyna	++	
Crataegus prunifolia	+	*
Daphne mezereum	+	
Deutzia scabra varieties	+	
Elaeagnus angustifolia	++	
Elaeagnus commutata	++	*
Elaeagnus pungens varieties	+	
Erica carnea	+	
Erica vagans	+	
Euonymus europaeus	++	
Euonymus fortunei varieties	+	
Fagus sylvatica	+	
Forsythia intermedia	+	*
Fraxinus excelsior	++	
Fraxinus angustifolia 'Raywood'	+	*
Gaultheria procumbens	+	
Gaultheria shallon	+	
Genista tinctoria	+	
Gleditsia triacanthos	++	
Gymnocladus dioica	+	
Hamamelis japonica	+	
Hippophae rhamnoides	+	
Hypericum calycinum	+	
Ilex aquifolium	++	*
Ilex crenata	+	
Juglans nigra	+	
Kalmia angustifolia	+	
Laburnum anagyroides	+	
Leucothoe walteri	++	
Ligustrum vulgare varieties	++	
Liriodendron tulipifera	++	
Lonicera nitida varieties	+	*
Lonicera pileata	+	
Lonicera tatarica	++	
Lonicera xylosteum	+	
Lycium barbarum	++	
Mahonia aquifolium	+	*
Mahonia bealei	+	*
Malus sylvestris	+	
Malus hybrids	+	
Morus species and varieties	+	
Nyssa sylvatica	++	
Osmanthus heterophyllus	+	
Pachysandra terminalis	+	
Paulownia tomentosa	+	
Phellodendron amurense	+	
Philadelphus coronarius	+	
Philadelphus 'Erectus'	+	
Physocarpus opulifolius	+	*

Explanation of symbols:

++ = sufficiently resistant to industrial pollution / + = resistant to industrial pollution /

\* = contradictory or mostly negative experience





Genus/species/variety	Resistant to industrial pollution	Negative experience
Pieris floribunda	++	
Pieris japonica	+	
Platanus acerifolia	++	
Populus balsamifera	+	*
Populus berolinensis	+	
Populus canadensis varieties	++	*
Populus tremula	++	
Prunus avium	+	
Prunus cerasifera 'Nigra'	+	
Prunus laurocerasus varieties	+	
Prunus mahaleb	+	
Prunus padus	++	
Prunus serotina	++	*
Prunus serrulata varieties	+	
Prunus spinosa	++	
Pyracantha coccinea	++	*
Pyrus calleryana varieties	+	
Quercus alba	++	
Quercus palustris	++	
Quercus petraea	++	
Quercus pubescens	++	
Quercus rubra	++	
Quercus turneri 'Pseudoturneri'	+	
Ribes alpinum	++	*
Ribes aureum	+	
Rhododendron Catawbiense hybrids	++	
Rhododendron Azalea hybrids	+	
Rhodotypos scandens	+	
Rhus species and varieties	++	*
Robinia pseudoacacia	++	*
Rosa canina	++	*
Rosa pimpinellifolia	+	
Rosa rubiginosa	+	
Rosa rugosa	+	
Rubus fruticosus	+	
Salix acutifolia 'Pendulifolia'	+	
Salix alba	++	*
Sambucus nigra	++	
Sambucus racemosa	+	
Skimmia japonica	+	*
Sophora japonica varieties	++	
Sorbus aria	++	
Sorbus aucuparia	++	*
Spiraea bumalda	++	
Spiraea vanhouttei	+	*
Stranvaesia davidiana	+	
Symphoricarpos albus laevigatus	++	
Symphoricarpos chenaultii	+	
Symphoricarpos orbiculatus	+	

Explanation of symbols:

++ = sufficiently resistant to industrial pollution / + = resistant to industrial pollution / \* = contradictory or mostly negative experience

Genus/species/variety	Resistant to industrial pollution	Negative experience
Syringa vulgaris	++	*
Tamarix ramosissima	++	
Tilia americana varieties	+	
Tilia cordata	++	*
Tilia tomentosa	+	*
Viburnum lantana	++	*
Viburnum opulus	++	
Viburnum rhytidophyllum	+	
Vinca species and varieties	+	
Weigela 'Eva Rathke'	++	
Weigela florida	+	

## 2. Climbers

Celastrus orbiculatus	++	
Hedera colchica	+	
Hedera helix	++	
Parthenocissus quinquefolia	+	*
Rubus fruticosus	+	
Wisteria sinensis	+	*

## 3. Conifers

Abies balsamea 'Nana'	+	*
Abies concolor	++	*
Cedrus atlantica 'Glauca'	+	
Chamaecyparis species + varieties	+	
Ginkgo biloba	++	
Juniperus species and varieties	++	*
Larix kaempferi	+	*
Metasequoia glyptostroboides	++	
Picea omorika	+	*
Picea pungens glauca	++	*
Pinus species and varieties	+	*
Pseudotsuga menziesii varieties	+	*
Taxodium distichum	++	
Taxus baccata	++	
Thuja occidentalis	++	
Thuja plicata	++	
Tsuga diversifolia	++	





# 38 Salt-tolerant plants

Experience with plants' salt damage and tolerance varies greatly. That is not surprising as resistance and sensitivity depend on temperatures, precipitation, soil type, and the amount of salt. In cool, rainy areas, the damage is not nearly as severe as in hot, dry areas or in summer.

The completely contradictory information that occurs is due to these factors.

Such contradictions either are not found or are rare in indices of resistance to salty air (sea-side areas).

Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
<b>1. Deciduous trees</b>			
Acer campestre	++	*	
Acer negundo	+	*	
Acer platanoides	++	*	+
Acer pseudoplatanus	++	*	+
Acer rubrum	+	*	
Acer saccharinum	++	*	
Aesculus hippocastanum	+	*	
Aesculus carnea varieties	+		
Ailanthus altissima	++		+
Alnus glutinosa	+	*	
Alnus incana	+		
Betula pendula	+	*	
Carpinus betulus	+	*	
Elaeagnus species and varieties	++		+
Fraxinus excelsior	++	*	
Gleditsia triacanthos varieties	++		
Gymnocladus dioicus	++		
Hippophae rhamnoides	++	*	+
Juglans regia	++	*	
Malus hybrids	+	*	
Malus sylvestris	+	*	
Morus species and varieties	+		
Nyssa sylvatica	++		
Platanus acerifolia	++	*	
Populus alba	++		+
Populus berolinensis	+		
Populus canadensis varieties	++		
Populus canescens	++		
Populus nigra 'Italica'	+	*	
Populus simonii	+		
Populus tremula	++	*	
Prunus avium	++	*	
Prunus serotina	++	*	+
Pyrus calleryana 'Chanticleer'	+		
Quercus robur	++		
Quercus rubra	++		
Rhus species and varieties	++	*	+

Explanation of symbols: ++ = tolerance of (resistant to) salt / + = moderately tolerance of (resistant to) salt  
\* = contradictory or mostly negative experience

Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
Robinia species and varieties	++	*	+
Salix alba	+		
Salix alba 'Tristis'	++		
Salix caprea	+		
Salix matsudana 'Tortuosa'	++		
Sophora japonica	++		
Sorbus aria varieties	+		
Sorbus aucuparia	+		
Ulmus hybrids	+	*	
<b>2. Shrubs</b>			
Acer ginnala	+		
Aesculus parviflora	++	*	
Amelanchier lamarckii	+		
Arctostaphylos uva-ursi	+		+
Aronia species and varieties	++		
Berberis thunbergii 'Atropurpurea'	+		
Calluna vulgaris	+		
Caragana arborescens	++		
Ceanothus delilianus varieties	++		
Clethra alnifolia	+	*	+
Cornus mas	+		
Cornus sanguinea	+	*	
Cornus stolonifera 'Flaviramea'		*	+
Cotoneaster franchetii			+
Cotoneaster horizontalis			+
Crataegus monogyna	+		
Elaeagnus angustifolia	++		+
Gaultheria procumbens	+		
Hippophae rhamnoides	++	*	+
Hydrangea arborescens varieties	+		
Hydrangea hybrids			+
Hydrangea quercifolia	+		
Hypericum kalmianum varieties	++		
Kalmia angustifolia	+		
Ligustrum ovalifolium			+
Ligustrum vulgare	+	*	
Lonicera nitida varieties			+
Lonicera tatarica			+
Lonicera xylosteum	++	*	
Lycium barbarum	++	*	+
Mahonia aquifolium	+		+
Malus hybrids	+	*	
Philadelphus varieties	+		
Physocarpus opulifolius	+		
Potentilla fruticosa varieties	++	*	
Prunus padus	+	*	
Prunus serotina	++	*	
Prunus spinosa	++	*	





Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
Ptelea trifoliata	++		
Pyracantha hybrids	+		+
Rhamnus catharticus	++	*	+
Rhamnus frangula	+	*	+
Ribes alpinum	++		
Ribes aureum	+		
Rosa canina	+	*	
Rosa multiflora			+
Rosa nitida			+
Rosa pimpinellifolia			+
Rosa rubiginosa			+
Rosa rugotida	++		
Rosa rugosa	++	*	
Salix repens varieties			+
Sambucus nigra	++		+
Spiraea arguta	+		
Spiraea bumalda 'Anthony Waterer'			+
Spiraea vanhouttei			+
Symphoricarpos species and varieties	++	*	
Syringa vulgaris			+
Tamarix parviflora	++		+
Tamarix ramosissima	++		+
Vaccinium corymbosum	+		
Vaccinium vitis-idaea varieties			+
Viburnum burkwoodii			+
Viburnum lantana	++	*	
Viburnum opulus	+	*	
<b>3. Climbers</b>			
Campsis radicans varieties	++		
Celastrus orbiculatus	++		
Parthenocissus quinquefolia			+
Polygonum aubertii			+
Wisteria sinensis			+
<b>4. Conifers</b>			
Juniperus communis	+		+
Juniperus horizontalis varieties	+		
Juniperus media 'Pfitzeriana'	+		
Juniperus sabina 'Tamariscifolia'			+
Juniperus virginiana	++	*	+
Picea pungens glauca	++	*	+
Pinus banksiana	++		
Pinus mugo	++	*	+
Pinus nigra austriaca	++	*	+
Pinus ponderosa	+		
Pinus sylvestris	+	*	+

