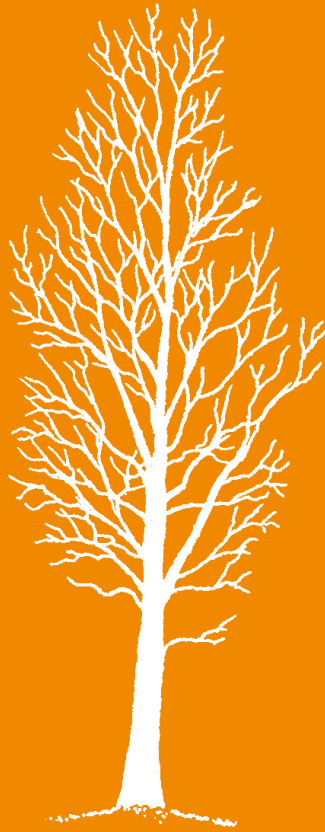
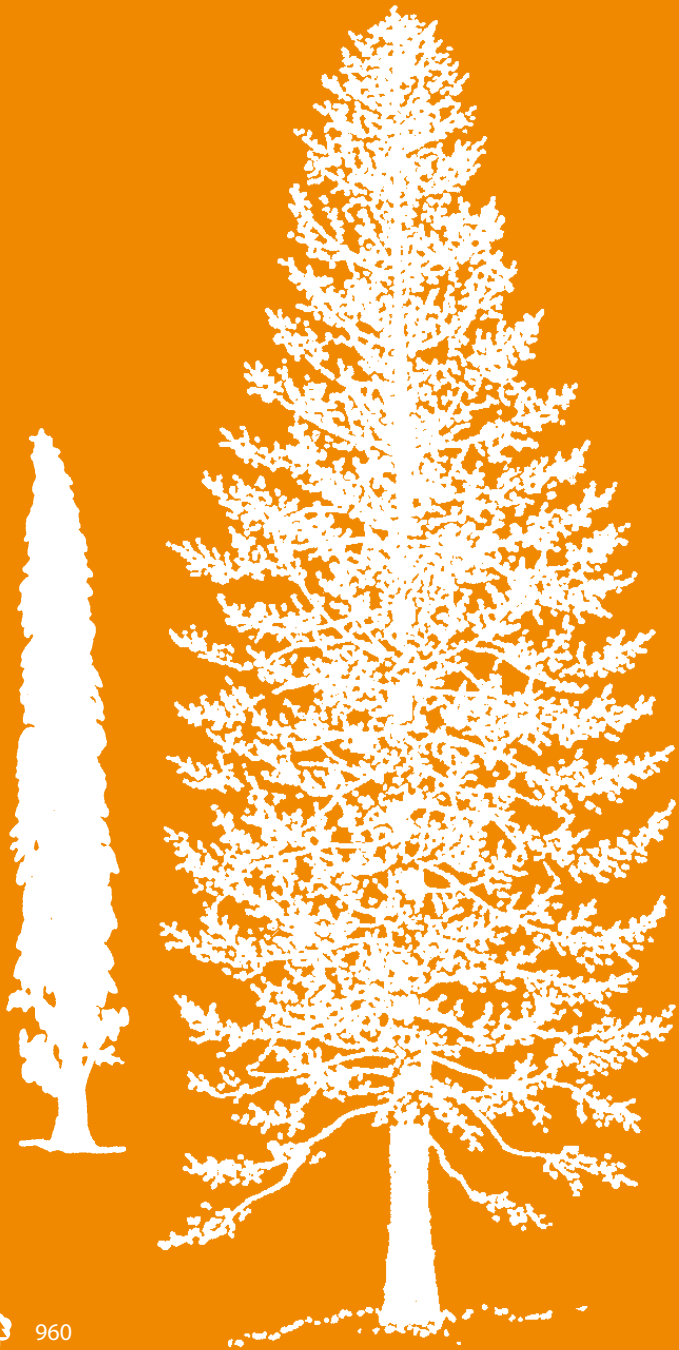


Planning tips Trees and Shrubs

Characteristic and demands





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.



1. Deciduous trees

Genus/species/variety

Reaction to shade

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





28 Plants that need light

1. Deciduous trees

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

2. Shrubs

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

3. Climbers

Genus/species/variety	Reaction to shade
Campsis tagliabuana	no flowers
Clematis texensis	no flowers
Jasminum nudiflorum	no flowers
Wisteria species and varieties	few flowers, thinned out

4. Conifers

Genus/species/variety	Reaction to shade
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	extremely crooked habit
Juniperus species and varieties	thinned out or loses its leaves
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

Shade-tolerant plants 29



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	Genus/species/variety	Semi-shade	Full shade
1. Deciduous trees					
Acer campestre	+		Magnolia stellata varieties	(+)	
Acer platanoides in green-leaf varieties	(+)		Mahonia species and varieties	+	+
Acer freemanii	+		Mespilus germanica	+	
Acer griseum	+		Osmanthus heterophyllus	+	+
Acer japonicum varieties	+		Pachysandra terminalis	+	+
Acer pensylvanicum	+	+	Philadelphus species and varieties	+	+
Acer rufinerve	+		Photinia villosa	+	
Acer neglectum 'Annae'	+	(+)	Pieris species and varieties	+	+
Carpinus betulus varieties	+	(+)	Prunus laurocerasus varieties	+	+
Cornus species and varieties	+		Prunus lusitana	+	+
Crataegus species and varieties	+		Prunus padus	+	
Fagus sylvatica all green varieties	+	+	Ptelea trifoliata	+	+
Fraxinus americana	+		Rhamnus species and varieties	+	+
Fraxinus pennsylvanica	+		Rhododendron species and varieties	+	
Ilex aquifolium and varieties	+	+	Rhodotypos scandens	+	+
Malus sylvestris	+		Ribes alpinum varieties	+	+
Ostrya carpinifolia	+	+	Ribes aureum	+	
Prunus padus	+		Ribes divaricatum	+	
Sorbus aucuparia	+	+	Rosa arvensis	+	
Sorbus domestica	+		Rosa multiflora	+	
Sorbus torminalis	+	+	Rubus species and varieties	+	+
Stewartia pseudocamellia	+		Sambucus species and varieties	+	
Tilia americana varieties	+		Skimmia japonica and varieties	+	+
Tilia platyphyllos	+		Sorbus species and varieties	+	
Ulmus carpinifolia	+		Sorbaria sorbifolia	+	+
Ulmus glabra	+		Spiraea species and varieties	+	
2. Shrubs					
Acer palmatum varieties	+		Staphylea colchica	+	
Aesculus parviflora	+		Stranvaesia davidiana	+	
Aronia species and varieties	+		Stephanandra species and varieties	+	
Aucuba japonica and varieties	+		Stewartia pseudocamellia	+	
Berberis species and varieties	+		Vaccinium corymbosum	+	
Buxus semeverns varieties	+	+	Vaccinium vitis-idaea varieties	+	+
Cornus species and varieties	+	(+)	Viburnum species and varieties	+	
Corylus avellana	+		Viburnum tinus	+	+
Crataegus species and varieties	+		Vinca species and varieties	+	+
Daphne mezereum varieties	+		Weigela species and varieties	+	
Elaeagnus ebbingei	+		3. Climbers		
Euonymus species and varieties	+		Actinidia species and varieties	+	
Euonymus fortunei varieties	+	+	Akebia quinata	+	
Fothergilla species	+	+	Aristolochia macrophylla	+	+
Gaultheria species and varieties	+	+	Celastrus orbiculatus	+	+
Hydrangea species and varieties	+	(+)	Clematis alpina	+	
Ilex altaclarensis varieties	+	+	Clematis tangutica	+	
Ilex aquifolium varieties	+	+	Clematis vitalba	+	+
Ilex meserveae varieties	+		Clematis viticella	+	
Kalmia species and varieties	+		Euonymus fortunei varieties	+	+
Kerria japonica	+	+	Hedera colchica varieties	+	+
Leucothoe walteri	+	+	Hedera helix varieties	+	+
Ligustrum species and varieties	+	(+)	Hydrangea petiolaris	+	
Lonicera species and varieties	+	+	Lonicera species and varieties	+	+
Explanation of symbols: (+) = of limited usefulness					





29 Shade-tolerant plants

Genus/species/variety	Semi-shade	Full shade	Genus/species/variety	Semi-shade	Full shade
3. Climbers					
Rosa arvensis	+		Picea species and varieties (when young)	+	
Rubus caesius	+	+	Sciadopitys verticillata	+	+
Rubus fruticosus	+	+	Sequoia sempervirens	+	+
Rubus henryi	+	+	Sequoiadendron giganteum	+	+
4. Conifers					
Abies species and varieties (when young)	+	+	Taxus species and varieties	+	+
Chamaecyparis species and varieties	+		Thuja species and varieties	+	+
			Thujopsis dolabrata	+	+
			Tsuga species and varieties	+	+

Explanation of symbols: (+) = of limited usefulness

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.

Genus/species/variety	Extreme areas	All exposures	Genus/species/variety	Extreme areas	All exposures
1. Indigenous species					
Acer campestre	+	+	Prunus spinosa	+	+
Acer platanoides	+	+	Pyrus communis		+
Acer pseudoplatanus	+	+	Quercus petraea		+
Alnus glutinosa		+	Quercus robur		+
Alnus incana	+	+	Rhamnus species		+
Amelanchier ovalis	+	+	Rosa canina	+	
Berberis vulgaris	+	+	Rosa glauca	+	
Betula pubescens	+		Rosa pimpinellifolia	+	
Carpinus betulus	+	+	Rosa rubiginosa	+	
Castanea sativa		+	Salix species and varieties		+
Clematis vitalba		+	Sambucus species and varieties		+
Colutea arborescens		+	Sorbus species and varieties		+
Cornus mas		+	Ulex europaeus	+	+
Cornus sanguinea	+	+	Ulmus species and varieties		+
Crataegus laevigata	+	+	Viburnum species and varieties	+	
Crataegus monogyna	+	+	2. Indigenous Conifers		
Euonymus europaeus		+	Abies alba		+
Fagus sylvatica	+	+	Juniperus communis varieties		+
Fraxinus excelsior	+	+	Larix decidua	+	+
Hippophae rhamnoides	+		Pinus cembra	+	+
Ilex aquifolium		+	Pinus mugo	+	
Juglans regia varieties		+	Pinus sylvestris		+
Ligustrum vulgare	+	+	Taxus baccata		+
Malus sylvestris		+	3. Park trees and decorative shrubs		
Myrica gale	+		Acer freemanii		+
Populus alba		+	Acer monspessulanum		+
Populus nigra varieties		+	Alnus cordata	+	+
Populus tremula	+	+	Alnus spaethii		+
Prunus mahaleb		+			



Wind resistant plants 30

Genus/species/variety	Extreme areas	All exposures	Genus/species/variety	Extreme areas	All exposures
Amelanchier species and varieties	+	+	Sorbus species and varieties		+
Aronia species and varieties		+	Spiraea species and varieties		+
Bamboo species and varieties		+	Syringa vulgaris	+	
Betula species and varieties		+	Zelkova serrata		+
Caragana arborescens		+	4. Climbers		
Corylus columna		+	Actinidia arguta		+
Cotoneaster (summer green)		+	Celastrus orbiculatus		+
Crataegus species and varieties		+	Clematis tangutica		+
Elaeagnus species and varieties		+	Hedera helix		+
Forsythia species and varieties		+	Hydrangea petiolaris		+
Fraxinus americana		+	Parthenocissus quinquefolia		+
Fraxinus ornus varieties		+	5. Conifers		
Fraxinus pennsylvanica		+	Abies species and varieties		+
Juglans nigra	+	+	Araucaria araucana	+	+
Kolkwitzia amabilis		+	Cedrus species and varieties		+
Ligustrum species and varieties		+	Chamaecyparis species and varieties		+
Lonicera korolkowii zabelii		+	Cupressocyparis leylandii varieties	+	+
Lonicera ledebourii		+	Ginkgo biloba		+
Lycium barbarum	+		Juniperus species and varieties		+
Philadelphus species and varieties		+	Larix kaempferi	+	+
Photinia villosa		+	Metasequoia glyptostroboides		+
Physocarpus opulifolius		+	Microbiota decussata		+
Platanus acerifolia		+	Picea sitchensis	+	+
Ptelea trifoliata		+	Pinus species and varieties		+
Pyracantha species and varieties		+	Sequoia sempervirens	+	+
Pyrus calleryana varieties		+	Sequoiadendron giganteum		+
Pyrus salcifolia		+	Taxus species and varieties		+
Quercus cerris	+	+	Thuja species and varieties		+
Quercus species and varieties		+	Thujopsis dolabrata		+
Ribes divaricatum	+	+	Tsuga species and varieties		+
Sorbaria sorbifolia		+			
Sorbus americana		+			

Plants for damp and flooded soil 31

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	Short floods	Long floods
1. Deciduous trees			
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 and varieties	+	+	-
Betula nigra	+	+	-
Betula pubescens	+	+	-
Carpinus betulus		+	-
Catalpa bignonioides	+	+	-
Cercidiphyllum japonicum		+	-





31 Plants for damp and flooded soil

Genus/species/variety	Tolerates dampness	Short floods	Long floods
1. Deciduous trees			
Corylus columna	+	+	-
Fraxinus excelsior varieties	+	+	-
Gleditsia triacanthos varieties	+	+	-
Gymnocladus dioicus	+	+	-
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	-	+	-
Genus/species/variety	Tolerates dampness	Short floods	Long floods

2. Shrubs			
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	+	+	+
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	+	+	+
Azaleen-hybrids	+	+	-
Rubus caesius	+	+	+
Rubus fruticosus	+	+	-
Rosa arvensis	+	+	-
Salix species and varieties	+	+	+
Sambucus nigra	+	+	-



Plants for damp and flooded soil 31

Genus/species/variety	Tolerates dampness	Short floods	Long floods
2. Shrubs			
Sorbaria sorbifolia	+	+	-
Stephanandra incisa 'Crispa'	+	+	-
Symphoricarpos albus laevigatus	+	+	-
Vaccinium corymbosum	+	+	+
Viburnum opulus varieties	+	+	+
Genus/species/variety	Tolerates dampness	Short floods	Long floods
3. Climbers			
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	Short floods	Long floods

4. Conifers			
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	+	-	-

Plants that withstand drought 32

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	Genus/species/variety	Response to drought
1. Deciduous trees			
Acer tataricum	resistant	Acer tataricum	resistant
Acer buergerianum	resistant	Ailanthus altissima	sensitive when young
Acer campestre varieties	resistant	Alnus cordata	sensitive when young
Acer cappadoicum	resistant	Alnus incana	sensitive when young
Acer ginnala	resistant	Alnus spaethii	resistant
Acer monspessulanum	resistant	Amlanchier arborea	resistant
Acer negundo	only as shrub	Betula jacquemontii	resistant
Acer rubrum	resistant	Betula nigra	sensitive when young





Genus/species/variety **Response to drought**

<i>Castanea sativa</i>	grows poorly
<i>Carpinus betulus</i>	resistant
<i>Celtis australis</i>	resistant
<i>Corylus colurna</i>	grows poorly
<i>Crataegus</i> species and varieties	tree-grid must remain open
<i>Fraxinus ornus</i>	resistant
<i>Fraxinus pennsylvanica</i> varieties	resistant
<i>Gleditsia triacanthos</i> varieties	not very susceptible to breaking
<i>Koeleruteria paniculata</i>	resistant
<i>Liquidamber styraciflua</i>	resistant
<i>Magnolia kobus</i>	resistant
<i>Malus tschonoskii</i>	sensitive when young
<i>Morus alba</i>	very resistant
<i>Morus nigra</i>	sensitive when young
<i>Nyssa sylvatica</i>	resistant
<i>Ostrya carpinifolia</i>	resistant
<i>Parrotia persica</i>	resistant
<i>Paulownia tomentosa</i>	very resistant
<i>Populus</i> species and varieties	only as shrub, short-lived
<i>Prunus fruticosa</i> 'Globosa'	sensitive when young
<i>Pyrus nivalis</i>	resistant
<i>Pyrus</i> species and varieties	more resistant when mature
<i>Pyrus salicifolia</i>	more resistant when mature
<i>Quercus cerris</i>	crooked stem, only as shrub
<i>Quercus frainetto</i>	sensitive when young
<i>Quercus macranthera</i>	resistant
<i>Quercus palustris</i>	resistant
<i>Quercus petraea</i>	crooked stem, only as shrub
<i>Quercus turneri</i> 'Pseudoturineri'	bushy
<i>Rhus</i> species and varieties	more runners
<i>Robinia</i> species and varieties	grows poorly
<i>Sophora japonica</i> varieties	more resistant when mature
<i>Sorbus aria</i> varieties	sensitive when young
<i>Sorbus domestica</i>	grows poorly
<i>Sorbus thuringiaca</i> 'Fastigiata'	sensitive when young
<i>Sorbus torminalis</i>	grows poorly
<i>Tilia platyphyllos</i> varieties	resistant
<i>Tilia tomentosa</i>	sensitive when young
<i>Ulmus holandica</i> varieties	resistant
<i>Zelkova serrata</i> varieties	resistant

2. Shrubs

<i>Acanthopanax sieboldianus</i>	grows poorly
<i>Amelanchier ovalis</i>	leaves fall early
<i>Berberis ottawensis</i> 'Superba'	thinned out
<i>Berberis thunbergii</i> varieties	thinned out
<i>Berberis vulgaris</i>	very resistant
<i>Buddleja</i> species and varieties	flowers wither faster
<i>Caragana arborescens</i>	resistant
<i>Cercis siliquastrum</i>	more resistant when mature
<i>Colutea arborescens</i>	sensitive when young
<i>Cornus mas</i>	sensitive when young
<i>Cornus sanguinea</i>	resistant
<i>Cotinus coggygria</i> varieties	more resistant when mature
<i>Cotoneaster dielsianus</i>	sensitive when young
<i>Cotoneaster divaricatus</i>	sensitive when young
<i>Cotoneaster franchetii</i>	sensitive when young
<i>Cotoneaster sternianus</i>	grows poorly
<i>Crataegus</i> species and varieties	resistant
<i>Cytisus</i> species and varieties	resistant
<i>Elaeagnus</i> species and varieties	very resistant

Genus/species/variety **Response to drought**

<i>Genista</i> species and varieties	resistant
<i>Hippophae rhamnoides</i>	needs residue moisture
<i>Ilex</i> 'Nellie R. Stevens'	resistant
<i>Lespedeza thunbergii</i>	more resistant when mature
<i>Ligustrum</i> species and varieties	sensitive during planting
<i>Lycium barbarum</i>	resistant
<i>Mespilus germanica</i>	more resistant when mature
<i>Osmanthus heterophyllus</i>	grows poorly
<i>Perovskia</i> species and varieties	stands on its own better
<i>Physocarpus opulifolius</i>	sensitive when young
<i>Prunus mahaleb</i>	very resistant
<i>Prunus spinosa</i>	twigs have more thorns
<i>Prunus lusitanica</i> varieties	resistant
<i>Pyracantha</i> hybrids	twigs have more thorns
<i>Rhamnus catharticus</i>	like thickets
<i>Rhus</i> species and varieties	more runners
<i>Robinia</i> species and varieties	resistant
<i>Rosa carolina</i>	grows poorly
<i>Rosa gallica</i>	forms runners
<i>Rosa glauca</i>	very resistant
<i>Rosa pimpinellifolia</i>	loses its foliage bearly
<i>Rosa rubiginosa</i>	grows poorly
<i>Rosa rugosa</i>	very resistant
<i>Rosa rugotida</i>	very resistant
<i>Salix repens argentea</i>	needs residue moisture
<i>Spiraea decumbens</i>	resistant
<i>Syringa vulgaris</i>	resistant
<i>Tamarix</i> species and varieties	very resistant
<i>Ulex europaeus</i>	resistant
<i>Viburnum lantana</i>	resistant

3. Climbers

<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>	resistant
<i>Parthenocissus quinquefolia</i>	thinned out, sensitive when young

4. Conifers

<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	resistant
<i>Pinus contorta</i>	sqat
<i>Pinus densiflora</i> 'Umbraculifera'	resistant
<i>Pinus jeffreyi</i>	grows poorly
<i>Pinus leucormis</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	resistant
<i>Pseudotsuga menziesii caesia</i>	grows poorly



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

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

2. Shrubs

<i>Acanthopanax sieboldianus</i>	resistant
<i>Amelanchier ovalis</i>	resistant
<i>Berberis</i> species and varieties	resistant
<i>Buddleja</i> species and varieties	resistant
<i>Buxus sempervirens</i> varieties	resistant
<i>Caragana arborescens</i>	resistant
<i>Caryopteris</i> species and varieties	resistant

<i>Ceanothus delilianus</i> 'Gloire de Versailles'	resistant
<i>Cercis siliquastrum</i>	resistant
<i>Chionanthus virginicus</i>	resistant
<i>Colutea arborescens</i> varieties	resistant
<i>Cornus mas</i>	resistant
<i>Cornus sanguinea</i>	resistant
<i>Corylus</i> species and varieties	resistant
<i>Cotinus coggygria</i> varieties	resistant
<i>Cotoneaster</i> species and varieties	resistant
<i>Crataegus</i> species and varieties	resistant
<i>Cytisus beanii</i>	resistant
<i>Cytisus decumbens</i>	resistant
<i>Cytisus kewensis</i>	resistant
<i>Cytisus nigricans</i> varieties	resistant
<i>Cytisus purpureus</i>	resistant
<i>Daphne</i> species and varieties	resistant
<i>Elaeagnus</i> species and varieties	resistant
<i>Erica carnea</i> varieties	resistant
<i>Euonymus europaeus</i>	resistant
<i>Euonymus planipes</i>	resistant
<i>Forsythia</i> species and varieties	resistant
<i>Genista radiata</i>	resistant
<i>Hitocus syriacus</i> varieties	resistant
<i>Hippophae rhamnoides</i>	resistant
<i>Hypericum kalmianum</i> 'Gemo'	resistant
<i>Laburnum</i> species and varieties	resistant
<i>Lavandula angustifolia</i> varieties	resistant
<i>Ligustrum</i> species and varieties	resistant
<i>Lonicera japonica</i> repens	resistant
<i>Lonicera korolkowii</i> zabelii	resistant
<i>Lonicera xylosteum</i> varieties	resistant
<i>Lycium barbarum</i>	resistant
<i>Malus</i> species and varieties	resistant
<i>Mespilus germanica</i>	resistant
<i>Osmanthus heterophyllus</i>	resistant
<i>Perovskia abrotanoides</i>	resistant
<i>Philadelphus</i> species and varieties	resistant
<i>Prunus</i> species and varieties	resistant
<i>Ptelea trifoliata</i>	resistant
<i>Pyracantha</i> hybrids	resistant
<i>Rhamnus catharticus</i>	resistant
<i>Rhus typhina</i> varieties	resistant
<i>Ribes</i> species and varieties	resistant
<i>Rhodotypos scandens</i>	resistant
<i>Rhus</i> species and varieties	resistant
<i>Robinia hispida</i> varieties	resistant
<i>Rosa arvensis</i>	resistant
<i>Rosa canina</i> varieties	resistant
<i>Rosa gallica</i>	resistant
<i>Rosa glauca</i>	resistant
<i>Rosa moyesii</i>	resistant
<i>Rosa multibracteata</i>	resistant
<i>Rosa pimpinellifolia</i>	resistant
<i>Rosa rubiginosa</i>	resistant
<i>Rubus calycinoides</i>	resistant
<i>Rubus idaeus</i>	resistant
<i>Salix elaeagnos</i>	resistant
<i>Salix hastata</i> 'Wehrhahnii'	resistant

<i>Salix purpurea</i> varieties	resistant
<i>Salix repens argentea</i>	resistant
<i>Salix viminalis</i>	resistant
<i>Sambucus canadensis</i> varieties	resistant
<i>Sambucus nigra</i>	resistant
<i>Sorbaria sorbifolia</i>	resistant
<i>Spiraea bumalda</i> varieties	resistant
<i>Spiraea decumbens</i>	resistant
<i>Spiraea japonica</i> varieties	resistant
<i>Spiraea nipponica</i>	resistant
<i>Spiraea vanhouttei</i>	resistant
<i>Staphylea colchica</i>	resistant
<i>Syringa</i> species and varieties	resistant
<i>Tamarix</i> species and varieties	resistant
<i>Viburnum bodnantense</i> 'Dawn'	resistant
<i>Viburnum burkwoodii</i>	resistant
<i>Viburnum carlcephalum</i>	resistant
<i>Viburnum farreri</i>	resistant
<i>Viburnum lantana</i>	resistant
<i>Viburnum opulus</i>	resistant
<i>Viburnum rhytidophyllum</i>	resistant
<i>Viburnum tinus</i>	resistant
<i>Vinca</i> species and varieties	resistant

3. Climbers

<i>Actinidia arguta</i>	resistant
<i>Aristolochia macrophylla</i>	resistant
<i>Campsis radicans</i> varieties	resistant
<i>Clematis</i> species and varieties	resistant
<i>Euonymus fortunei</i> varieties	resistant
<i>Hedera</i> species and varieties	resistant
<i>Jasminum nudiflorum</i>	resistant
<i>Lonicera</i> species and varieties	resistant
<i>Parthenocissus quinquefolia</i> varieties	resistant
<i>Polygonum aubertii</i>	resistant
<i>Rosa</i> - Climbers	resistant

4. Conifers

<i>Abies concolor</i>	resistant
<i>Cedrus atlantica</i> varieties	resistant
<i>Cedrus libani</i>	resistant
<i>Chamaecyparis nootkatensis</i> varieties	resistant
<i>Ginkgo biloba</i>	resistant
<i>Juniperus chinensis</i> varieties	resistant
<i>Juniperus communis</i> varieties	resistant
<i>Juniperus media</i> varieties	resistant
<i>Juniperus sabinia</i> varieties	resistant
<i>Juniperus squamata</i> varieties	resistant
<i>Juniperus virginiana</i> varieties	resistant
<i>Larix decidua</i>	resistant
<i>Microbiota decussata</i>	resistant
<i>Picea orientalis</i> varieties	resistant
<i>Picea pungens</i> varieties	resistant
<i>Pinus aristata</i>	resistant
<i>Pinus leucormis</i>	resistant
<i>Pinus mugo</i> varieties	resistant
<i>Pinus nigra austriaca</i> varieties	resistant
<i>Taxus</i> species and varieties	resistant
<i>Thuja occidentalis</i> varieties	resistant





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).

1. Deciduous trees

Acer freemanii varieties
Acer griseum
Acer japonicum varieties
Acer negundo varieties
Acer pensylvanicum
Acer rubrum
Acer rufrinerve
Acer saccharum
Acer saccharinum varieties
Ailanthus altissima
Alnus glutinosa
Amelanchier species and varieties
Betula species and varieties
Castanea sativa
Cornus alternifolia
Cornus controversa
Cornus florida varieties
Cornus kousa and C. kousa chinensis
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
Styrax japonicus
Styrax 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 calycinoides
Rubus fruticosus
Salix aurita
Salix balsamifera mas
Salix cinerea
Salix helvetica
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 'Glaucua'
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 schweini
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



Plants for light, sandy soil 35

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.

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
Koeleruteria 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





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 Weihenstephan 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 dioicus
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 serotina varieties
Pterocarya fraxinifolia
Quercus palustris
Quercus robur
Rhamnus catharticus
Salix species and varieties
Tilia species and varieties
Zelkova serrata 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
Liquidambar styraciflua
Lonicera ledebourii
Lonicera maackii
Lonicera xylosteum
Mahonia aquifolium varieties
Philadelphus species and varieties
Physocarpus opulifolius
Potentilla species and varieties
Prunus spinosa
Pseudosa 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

3. Climbers

Aristolochia macrophylla
Celastrus orbiculatus
Clematis tangutica
Clematis vitalba
Euonymus fortunei 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

2. Shrubs

Aralia elata
Bamboo species and 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.



Plants resistant to industrial pollution 37

Genus/species/variety	Resistant to industrial pollution	Negative Experience
1. Deciduous		
Acanthopanax sieboldianus	++	
Acer campestre	++	*
Acer freemanii	+	
Acer ginnala	++	
Acer negundo	++	*
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	+	*
Castanea sativa	++	
Catalpa bignonioides	++	
Cercidiphyllum japonicum	+	
Chaenomeles japonica	+	*
Chaenomeles speciosa	+	
Chionanthus virginicus	++	
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 'Carrieri'	++	*
Crataegus monogyna	++	
Crataegus prunifolia	+	*
Daphne mezereum	+	
Deutzia scabra varieties	+	
Elaeagnus angustifolia	++	
Elaeagnus commutata	++	*
Elaeagnus pungens varieties	+	
Erica carnea	+	

Genus/species/variety	Resistant to industrial pollution	Negative Experience
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 dioicus	+	
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	+	*
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 petraea	++	
Quercus palustris	++	

Explanation of symbols: ++ = sufficiently resistant to industrial pollution / + = resistant to industrial pollution / * = contradictory or mostly negative experience





37 Plants resistant to industrial pollution

Genus/species/variety	Resistant to industrial pollution	Negative Experience
Quercus rubra	++	
Quercus turneri 'Pseudoturneri'	++	
Ribes alpinum	++	*
Ribes aureum	+	
Rhododendron catawbiense varieties	+	
Rhododendron - Japanese Azaleas	+	
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	+	
Syringa vulgaris	++	*
Tamarix ramosissima	++	
Tilia americana varieties	+	
Tilia cordata	++	*
Tilia tomentosa	+	*

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
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 and varieties	++	
Ginkgo biloba	++	
Juniperus species and varieties	++	*
Larix kaempferi	+	*
Metasequoia glyptostroboides	++	
Picea omorika	+	*
Picea pungens glauca	++	*
Pinus species and varieties	+	*
Pseudotsuga menziesii in Formen	++	*
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).

1. Deciduous trees	Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
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	+		*	

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



Salt-tolerant plants 38

1. Deciduous trees	Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
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	++		*	+
Robinia species and varieties	++		*	+
Salix alba	+			
Salix alba 'Tristis'	++			
Salix caprea	+			
Salix matsudana 'Tortuosa'	++			
Sophora japonica	++			
Sorbus aria varieties	+			
Sorbus aucuparia	+			
Ulmus hybrids	+		*	

2. Shrubs	Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
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	+		*	

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





38 Salt-tolerant plants

2. Shrubs	Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
	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++*+
	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+*+
3. Climbers	Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
	Campsis radicans varieties	.....++	.....	.....+
	Celastrus orbiculatus	.....++	.....	.....+
	Parthenocissus quinquefolia	.....	.....	.....+
	Polygonum aubertii	.....	.....	.....+
	Wisteria sinensis	.....	.....	.....+
4. Conifers	Genus/species/variety	Salt tolerant	Contradictory experience	Tolerance of salty air
	Juniperus communis	.....+	.....	.....+
	Juniperus horizontalis varieties	.....+	.....	.....+
	Juniperus media 'Pfitzeriana'	.....+	.....	.....+
	Juniperus sabinna 'Tamariscifolia'	.....	.....	.....+
	Juniperus virginiana++*+
	Picea pungens glauca++*+
	Pinus banksiana	.....++	.....	.....+
	Pinus mugo++*+
	Pinus nigra austriaca++*+
	Pinus ponderosa	.....+	.....	.....+
	Pinus sylvestris+*+

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

