



Salt and wind tolerance of landscape plants for Hawaii

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Landscaping near the ocean in Hawaii can be challenging and frustrating because of sea salt and wind. Salt can be deposited on leaves and in soils by wind carrying ocean spray, by high surf, or by irrigating with brackish water. Also, high water tables in some coastal areas result in severe soil salinity.

Landscape professionals, property managers, and homeowners are concerned with the survival, growth, and appearance of landscape plants. Damage to plants resulting from high levels of salt usually appears as a burning of the margins or tips of the leaves, followed by defoliation and death of sensitive species. The leaves may sometimes be bluish, whitish, or off color, and the plant may wilt easily even though soil water is adequate.

Excessive salt levels most often damage plants by causing dehydration. Because of the salt, water moves out of the roots or leaves through a process called osmosis. In addition, plants may accumulate sodium or chloride ions, and these can eventually reach toxic levels. Research has shown that plant tolerance of salt results from one or more of the following mechanisms, whereby the plant either

- prevents the absorption of sodium or chloride ions by its roots or leaves,
- tolerates the accumulation of sodium or chloride ions in its tissues, or
- tolerates the osmotic stress caused by salt in the soil or on its leaves.

The tolerance or response of plants to salt can vary with cultivars, the plant age and growth stage, environmental conditions, cultural practices, irrigation manage-

ment, soil fertility, and the intensity of other stresses on the plant. Also, some plants may be tolerant of salt in the soil but intolerant of salt deposited on their leaves, or vice versa.

Wind can be as injurious to plants as salt. When the two are combined near the ocean, plants suffer even greater damage.

The following tables were compiled by the authors and reflect both research findings and years of observation of plants in Hawaii's landscapes. The tables should help landscape professionals and homeowners select suitable plant materials for coastal sites.

The tables list the botanical name, common name, and height of many common (and some uncommon) landscape plants in Hawaii. Each plant category is divided into zones according to salt tolerance.

Zone 1 plants are highly salt and wind tolerant and can be used in exposed locations, such as areas near the beach receiving direct winds from the ocean. These plants are tolerant of soil salinity and wind-borne salt. During severe storms and hurricanes, even plants listed in Zone 1 may experience moderate to severe salt and wind injury.

Zone 2 plants are moderately tolerant of soil salinity and usually tolerate light salt spray but should not be used in exposed locations. They may be sensitive to wind or to medium or heavy salt spray. These plants do best when protected by buildings, fences, or plantings of Zone 1 species. Zone 2 plants and more sensitive plants may be damaged if seaside wind buffers are removed to enhance an ocean view. Zone 2 plants would likely be suitable for landscapes irrigated with brackish water.

Key: n = Native or indigenous Hawaiian plant
p = Polynesian introduced or “heritage” plant

Groundcovers — Zone 1

	Botanical name	Common name	Height (inches)
	<i>Aloe</i> spp.	Aloe	18
	<i>Asparagus setaceus</i>	Asparagus fern	variable
	<i>Asparagus densiflorus</i> ‘Sprengeri’	Sprenger asparagus fern	variable
n	<i>Capparis sandwichiana</i>	Maiapilo, pua pilo	48
	<i>Carissa grandiflora</i>	Dwarf Natal plum	24
	<i>Epipremnum aureum</i>	Pothos	8
n	<i>Euphorbia degeneri</i>	Beach spurge, akoko, koko	5
	<i>Glottiphyllum depressum</i>	Fig marigold	6
n	<i>Heliotropum anomalum</i>	Hinahina ku kahaki	6
n	<i>Ipomoea pes-caprae</i>	Beach morning glory, pohuehue	6
n	<i>Jacquemontia sandwicense</i>	Pa uohi iaka	4
n	<i>Lipochaeta integrifolia</i>	Nehe	12
n	<i>Lycium sandwicense</i>	Ohelo kai, ae ae	6
	<i>Mallotonia gnaphalodes</i>	Sea lavender	60
n	<i>Nama sandwicense</i>	Hawaiian nama	4
	<i>Phyla nodiflora</i>	Lippia	2
	<i>Portulaca</i> spp.	Purslane	6
n	<i>Portulaca lutea</i>	Ihi, native yellow portulaca	36
n	<i>Sesbania tomentosa</i>	Ohai	12
n	<i>Sesuvium portulacastrum</i>	Akulikuli	12
n	<i>Sporobolus virginicus</i>	Aki aki	12
	<i>Vitex ovata</i>	Beach vitex, pohinahina	24
	<i>Wedelia trilobata</i>	Wedelia	12

Groundcovers — Zone 2

	Botanical name	Common name	Height (inches)
	<i>Alternanthera amoena</i>	Joy weed	12
	<i>Asystasia gangetica</i>	Coromandel	12
	<i>Bidens mauiensis</i>	Ko oko olau	36
	<i>Carpobrotus edulis</i>	Hottentot fig	6
	<i>Ficus pumila</i>	Creeping fig	2–12
	<i>Gaillardia pulchella</i>	Blanket flower	18
	<i>Helianthus debilis</i>	Beach sunflower	18
	<i>Hemerocallis</i> spp.	Daylily	24
n	<i>Jacquemontia ovalifolia</i>	Pa uohi iaka	48
	<i>Kalanchoe</i> spp.	Kalanchoe	12–24
	<i>Lantana montevidensis</i>	Weeping lantana	18–24
	<i>Liriope spicata</i>	Lilyturf	8
	<i>Lonicera japonica</i>	Japanese honeysuckle	variable

Groundcovers — Zone 2 (continued)

	Botanical name	Common name	Height (inches)
	<i>Ophiopogon japonicus</i>	Mondo grass	6
	<i>Rhoeo spathacea</i>	Oyster plant	12
	<i>Sansevieria trifasciata</i>	Snake plant	30
	<i>Senecio confusus</i>	Mexican flame vine	variable
	<i>Setcreasea pallida</i>	Purple queen, purple-heart	24
n	<i>Sida fallax</i>	Ilima papa	6
	<i>Tecomaria capensis</i>	Cape honeysuckle	72
	<i>Trachelospermum jasminoides</i>	Confederate jasmine	variable
	<i>Vitex trifolia</i>	Beach vitex, pohinahina	4
n	<i>Wikstroemia uva-ursi</i>	Akia	18
	<i>Zamia pumila</i>	Coontie	24
	<i>Zebrina pendula</i>	Wandering jew	6

Palms — Zone 1

These palms will survive in sites exposed to salt and wind, but their appearance is much better when they are provided with some wind protection. Plant palms in groups or combine them with extremely salt-tolerant plants for protection.

	Botanical name	Common name	Height (feet)
	<i>Coccothrinax argentata</i>	Silver palm	20
p	<i>Cocos nucifera</i>	Coconut	80
	<i>Dictyosperma album</i>	Princess palm	30
	<i>Dictyosperma rubrum</i>	Hurricane palm	40
	<i>Hyophorbe lagenicaulis</i>	Bottle palm	15
	<i>Phoenix dactylifera</i>	Date palm	50
	<i>Phoenix reclinata</i>	Senegal date palm	25
n	<i>Pritchardia affinis</i>	Kona loulu	25
	<i>Pritchardia pacifica</i>	Fiji Island fan palm	25
	<i>Pritchardia thurstoni</i>	Masai palm	25
	<i>Sabal palmetto</i>	Cabbage palmetto	30
	<i>Serenoa repens</i>	Saw palmetto	8
	<i>Thrinax parviflora</i>	Thatch palm	20
	<i>Thrinax radiata</i>	Florida thatch palm	20
	<i>Thrinax microcarpa</i>	Brittle thatch palm	12
	<i>Washingtonia robusta</i>	Washingtonia palm	80

Palms — Zone 2

Many recent palm introductions are adapted to Zone 2.

	Botanical name	Common name	Height (feet)
	<i>Acoelorrhapha paurotis wrightii</i>	Paurotis palm	20
	<i>Acrocomia armentalis</i>	Acrocomia	40
	<i>Butia capitata</i>	Pindo palm, butia	30
	<i>Chamaerops humilis</i>	European fan palm	10
	<i>Dypsis lutescens</i>	Areca palm, butterfly palm	30
	<i>Elaeis guineensis</i>	African oil palm	60

Palms — Zone 2 (continued)

	Botanical name	Common name	Height (feet)
	<i>Hyphaene thebaica</i>	Gingerbread palm	25
	<i>Latania loddigesii</i>	Blue latan palm	40
	<i>Livistona chinensis</i>	Chinese fan palm	30
	<i>Phoenix canariensis</i>	Canary Island date palm	30
n	<i>Pritchardia</i> spp. (~30 species)	Loulu palm	30
	<i>Ptychosperma elegans</i>	Solitaire palm	20
	<i>Roystonea elata</i>	Royal palm	80
	<i>Veitchia merrillii</i>	Manila palm	15

Shrubs — Zone 1

	Botanical name	Common name	Height (feet)
	<i>Agave americana</i>	Century plant	4–8
	<i>Ardisia escallonioides</i>	Marlberry	10
	<i>Batis maritima</i>	Akulikuli kai, pickleweed, salt wort	3
n	<i>Capparis sandwichiana</i>	Maiapilo	4
	<i>Carissa grandiflora</i> (dwarf cvs. available)	Natal plum	10
	<i>Chrysobalamus icaco</i>	Coco plum	10
	<i>Cortaderia selloana</i>	Pampas	8
	<i>Gardenia taitensis</i>	Tiare gardenia	15
	<i>Myrica cerifera</i>	Wax myrtle	12
	<i>Nerium oleander</i>	Oleander, dwarf oleander	15, 3
n	<i>Osteomeles anthyllidifolia</i>	Ulei	2
	<i>Pittosporum tobira</i> ‘variegata’	Variegated Japanese pittosporum	5
	<i>Pittosporum tobira</i> ‘wheeleri’	Wheeler’s dwarf pittosporum	4
	<i>Russelia equisetiformis</i>	Coral plant	4
n	<i>Scaevola frutescens</i>	Naupaka	10
n	<i>Sesbania tomentosa</i>	Ohai	2
	<i>Vitex agnus-castus</i>	Chaste tree	15
	<i>Yucca aloifolia</i>	Spanish bayonet	15
	<i>Yucca elephantipes</i>	Spineless yucca	15
	<i>Yucca smalliana</i>	Adam’s needle	3

Shrubs — Zone 2

	Botanical name	Common name	Height (ft)
	<i>Acacia farnesiana</i>	Acacia	10
	<i>Acalypha wilkesiana</i>	Acalypha	8
	<i>Alpinia nutans</i>	Shell ginger	6
	<i>Caesalpinia pulcherrima</i>	Dwarf poinciana, ohai alii	9
	<i>Callistemon citrinus</i>	Red bottlebrush	20
	<i>Cestrum nocturnum</i>	Night-blooming jasmine	8
	<i>Crassula argentea</i>	Jade plant	3
	<i>Cuphea hyssopifolia</i>	Cuphea	2
	<i>Cycas circinalis</i>	Queen sago palm	15

Shrubs — Zone 2 (continued)

	Botanical name	Common name	Height (feet)
	<i>Cycas revoluta</i>	Sago palm	10
	<i>Dracaena arborea</i>	Tree dracaena	10
	<i>Dracaena draco</i>	Dragon tree	15
	<i>Dracaena fragrans</i>	Dracaena fragrans	20
	<i>Dracaena marginata</i>	Dracaena marginata	15
	<i>Duranta repens</i>	Golden-dewdrop	10
	<i>Eranthemum pulchellum</i>	Blue sage	4
	<i>Euphorbia milii</i>	Crown-of-thorns	2–5
	<i>Feijoa sellowiana</i>	Pineapple guava	12
	<i>Ficus carica</i>	Common fig, piku	15
	<i>Ficus micropcarpa</i>	Wax fig	12
	<i>Fortunella japonica</i>	Kumquat	10
	<i>Hamelia patens</i>	Scarlet bush	10
	<i>Holmskioldia sanguinea</i>	Chinese hat, cup-and-saucer plant	15
	<i>Homalocidium platycladum</i>	Ribbon bush	5
	<i>Ilex vomitoria</i> (and cultivars)	Yaupon holly, dwarf yaupon holly	12, 4
	<i>Ixora coccinea</i> (and cultivars)	Ixora	2–10
	<i>Lantana camara</i>	Lantana	6
	<i>Leucophyllum texanum</i>	Texas sage	10
	<i>Ligustrum japonicum</i>	Japanese privet	12
	<i>Malpighia coccigera</i>	Singapore holly	3
	<i>Malvaviscus arboreus</i>	Turk's cap	12
n	<i>Osteomeles anthyllidifolia</i>	Ulei	2
	<i>Pedilanthus tithymaloides</i>	Devil's backbone	5
	<i>Pentas lanceolata</i>	Pentas	4
	<i>Phormium tenax</i>	New Zealand flax	6
	<i>Plumbago capensis</i>	Plumbago	5
	<i>Podocarpus macrophyllus</i>	Podocarpus	15
	<i>Podocarpus nagi</i>	Broadleaf podocarpus	15–20
	<i>Pseuderanthemum atropurpureum</i>	Pseuderanthemum	5
	<i>Rhapiolepis indica</i>	Indian hawthorn	6
	<i>Russelia equisetiformis</i>	Fountain plant	6
	<i>Sesbania punicea</i>	Rattle box, False poinciana	6
	<i>Severinia buxifolia</i>	Box thorn	6
	<i>Strelitzia reginae</i>	Bird-of-paradise	4
	<i>Suriana maritima</i>	Baycedar	10
	<i>Synadenium grantii</i>	African milk bush	10
	<i>Tetrapanax papyriferus</i>	Rice paper plant	15
	<i>Thevetia peruviana</i>	Be-still tree, lucky nut	15
	<i>Triphasia trifolia</i>	Lime berry	12
	<i>Viburnum odoratissimum</i>	Sweet viburnum	15
	<i>Viburnum suspensum</i>	Sandankaw viburnum	10
	<i>Vitex trifolia</i>	Beach vitex, pohinahina	4

Trees — Zone 1

	Botanical name	Common name	Height (feet)
	<i>Araucaria columnaris</i>	Cook pine	60
	<i>Araucaria heterophylla</i>	Norfolk Island pine	80
	<i>Barringtonia asiatica</i>	Hutu	60
	<i>Bucida buceras</i>	Geometry tree, black olive	30
	<i>Bursera simaurubra</i>	Gumbo limbo	30
	<i>Callistemon lanceolatus</i>	Bottlebrush	20
p	<i>Calophyllum inophyllum</i>	Kamani	40
	<i>Casuarina equisetifolia</i>	Australian pine, common ironwood	60–70
	<i>Clusia rosea</i>	Autograph tree, pitch apple	20
	<i>Coccoloba diversifolia</i>	Pigeon plum	30
	<i>Coccoloba uvifera</i>	Sea grape	20
	<i>Conocarpus erectus</i>	Buttonwood, silver buttonwood	30
	<i>Cordia sebestena</i>	Geiger tree, kou haole	25–30
p	<i>Cordia subcordata</i>	Kou	20
	<i>Euphorbia tirucalli</i>	Pencil tree	10–15
	<i>Ficus macrophylla</i>	Morton Bay fig	50
	<i>Guaiacum sanctum</i>	Lignum vitae	15
	<i>Heritiera littoralis</i>	Looking glass tree	30
p	<i>Hibiscus tiliaceus</i>	Hau	30
	<i>Kigelia pinnata</i>	Sausage tree	35
	<i>Manilkara roxburghiana</i>	Coastal red milkwood	35
n	<i>Myoporum sandwicense</i>	Naio	15–20
	<i>Morinda citrifolia</i>	Noni, indian mulberry	10
	<i>Myrica cerifera</i>	Wax myrtle	20
	<i>Noronhia emarginata</i>	Madagascar olive	25
	<i>Ochrosia elliptica</i>	Ochrosia	25
n	<i>Pandanus odoratissimus</i>	Pandanus, hala	15
	<i>Pandanus utilis</i> (and spp.)	Screw pine	25
	<i>Pandanus variegatus</i>	Variiegated pandanus	15
	<i>Rhizophora mangle</i>	Red mangrove	20–40
	<i>Swietenia mahagoni</i>	Mahogany	40
	<i>Tamarix aphylla</i>	Tamarisk	30+
	<i>Terminalia catappa</i>	Tropical almond	60
p	<i>Thespesia populnea</i>	Milo	30
	<i>Tournefortia argentea</i>	Beach heliotrope, tahinu	12–15

Trees — Zone 2

	Botanical name	Common name	Height (feet)
p	<i>Aleurites moluccana</i>	Kukui, candlenut	40
	<i>Araucaria bidwillii</i>	Bunya-bunya	60
	<i>Beaucarnea recurvata</i>	Pony tail	30
	<i>Bischofia javanica</i>	Bischofia	40
	<i>Brachychiton acerifolium</i>	Australian flame tree	40
	<i>Brassaia actinohylla</i>	Octopus tree	30
	<i>Callistemon citrinus</i>	Red bottlebrush	20
	<i>Calocarpum sapota</i>	Mamey sapote	30

Trees — Zone 2 (continued)

	Botanical name	Common name	Height (feet)
	<i>Casimiroa edulis</i>	White sapote	30
	<i>Casuarina glauca</i>	Grey ironwood	40
	<i>Casuarina stricta</i>	Ironwood (longleaf)	40
	<i>Chrysophyllum cainito</i>	Star apple	30
	<i>Chrysophyllum oliviforme</i>	Satin leaf	30
	<i>Cinnamomum camphora</i>	Camphor tree	50
	<i>Cordyline australis</i>	Giant dracaena	40
	<i>Crescentia cujete</i>	Calabash tree	30
	<i>Dalbergia sissoo</i>	Sissoo	80
	<i>Datura arborea</i>	Datura	15
	<i>Delonix regia</i>	Royal poinciana	50
	<i>Diospyros dignyna</i>	Black sapote	25
	<i>Enterolobium cyclocarpum</i>	Earpod tree	80
	<i>Erythrina crista-galli</i>	Coral tree	25
n	<i>Erythrina sandwicensis</i>	Wiliwili	30
	<i>Erythrina variegata 'orientalis'</i>	Tiger's claw	35
	<i>Eucalyptus</i> spp.	Eucalyptus	variable
	<i>Eugenia dombeyi</i>	Grumichama, Brazilian plum	15
	<i>Ficus benghalensis</i>	Indian banyan	80
	<i>Ficus lyrata</i>	Fiddle leaf fig	35
	<i>Ficus microcarpa</i>	Chinese banyan	50
	<i>Grevillea robusta</i>	Silk oak	60
	<i>Hernandia sonora</i>	Lantern tree	50
	<i>Hibiscus elatus</i>	Cuban bast	50
	<i>Ilex vomitoria</i>	Yaupon holly	20
	<i>Jatropha hastata</i>	Rose-flowered jatropha	15
	<i>Ligustrum lucidum</i>	Glossy privet	30
	<i>Malpighia glabra</i>	Barbados cherry	20
	<i>Mammea americana</i>	Mamay apple	40
	<i>Mangifera indica</i>	Mango	50
	<i>Manilkara zapota</i>	Sapodilla	30
	<i>Melaleuca quinquenervia</i>	Paper bark, cajeput tree, punk	25–30
	<i>Olea europaea 'africana'</i>	Olive	30
	<i>Parkinsonia aculeata</i>	Jerusalem thorn	30
	<i>Pithecellobium dulce</i>	Opiuma	50
	<i>Plumeria</i> spp.	Plumeria, frangipani	20
	<i>Podocarpus gracilior</i>	African fern pine	20
	<i>Pongamia pinnata</i>	Pongamia	50
	<i>Prosopis pallida</i>	Kiawe	50
	<i>Psidium cattleianum</i>	Strawberry guava	20
	<i>Psidium guajava</i>	Guava	25
	<i>Schinus molle</i>	California pepper	30
	<i>Schotia brachypetala</i>	Schotia	30
	<i>Senna surratensis</i>	Kolomona	20
	<i>Sophora tomentosa</i>	Silver bush	15

Trees — Zone 2 (continued)

Botanical name	Common name	Height (feet)
<i>Spathodea campanulata</i>	African tulip tree	50
<i>Strelitzia nicolai</i>	White bird-of-paradise tree	18
<i>Syzygium cumini</i>	Jambolan plum	40
<i>Syzygium jambos</i>	Rose apple	30
<i>Tabebuia argentea</i>	Golden trumpet, yellow tecoma	30
<i>Tamarindus indica</i>	Tamarind	30
<i>Thevetia peruviana</i>	Be-still tree, yellow oleander	25
<i>Tipuana tipu</i>	Tipu, rosewood	40

Vines — Zone 1

Botanical name	Common name
<i>Cryptostegia grandiflora</i>	Rubber vine, purple allamanda
<i>Epipremnum aureum</i>	Pothos
<i>Hylocereus undatus</i>	Night-blooming cereus
n <i>Ipomoea pes-capre</i>	Beach morning-glory, pohuehue
<i>Tecomaria capensis</i>	Cape honeysuckle

Vines — Zone 2

Botanical name	Common name
<i>Allamanda</i> spp.	Allamanda
<i>Bougainvillea</i> spp.	Bougainvillea
<i>Congea tomentosa</i>	Wooly congea
<i>Ficus pumila</i>	Creeping fig
<i>Hedera canariensis</i>	Algerian ivy
<i>Jasminum multiflorum</i>	Downy jasmine
<i>Jasminum nitidum</i>	Star jasmine
<i>Mandevilla splendens</i>	Pink allamanda
<i>Petrea volubilis</i>	Queen's wreath
<i>Philodendron</i> spp.	Philodendron
<i>Senecio confusus</i>	Mexican flame vine
<i>Solandra guttata</i>	Chalice vine
<i>Trachelospermum jasminoides</i>	Confederate jasmine

Turf — Zone 1

Botanical name	Common name
<i>Cynodon dactylon</i>	Bermudagrass
<i>Paspalum vaginatum</i>	Seashore paspalum
<i>Stenotaphrum secundatum</i>	St. Augustine grass

Turf — Zone 2

Botanical name	Common name
<i>Zoysia japonica</i>	Japanesegrass
<i>Zoysia matrella</i>	Manilagrass
<i>Zoysia tenuifolia</i>	Templegrass, mascarenegrass, koreangrass