Salix babylonica

INTRODUCTION

Often when one envisions a quiet body of water, the graceful, elegant form of a Weeping Willow is seen at the water's edge, the long, light green, pendulous branches reflected in the water, gently swaying with each little breeze. Though it does well in very moist soils, Weeping Willows may also be successfully used as a fast-growing specimen or screen in drier, more open areas where it should receive regular watering to prevent leaf drop in a drought. It will survive drought but loses some leaves without irrigation. Ultimately reaching a height of 35 to 45 feet with an equal or greater spread, Weeping Willow should be given plenty of room to develop its broad, rounded crown.

Photo: www.i1.treknature.com, by Luciano Gollini

GENERAL INFORMATION

Scientific name: *Salix spp.*
Common name(s): Weeping willow, Babylon weeping Willow (English), Salice piangente (Italian)
Family: *Salicaceae*
Uses: screen; specimen; no proven urban tolerance

DESCRIPTION

Height: 14-21 m
Spread: 14-21 m
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: round; weeping
Crown density: dense
Growth rate: fast
Texture: fine

Root habit

Roots are aggressive and will spread about three times the distance from the trunk to the edge of the canopy and often grow on the soil surface.

Photo: www.en.wikipedia.org . By Alvesgaspar

Foliage

Leaf arrangement: alternate
Leaf type: simple

Leaf margin: serrate; serrulate
Leaf shape: lanceolate; linear
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf color: green
Fall color: yellow
Fall characteristic: showy


Photo: www.en.wikipedia.org

Flower

Flower color: yellow
Flower characteristics: The flowers are arranged in catkins produced early in the spring; it is dioecious, with the male and female catkins on separate trees
Inconspicuous and not showy; spring flowering

Fruit

Fruit covering: dry or hard
Fruit color: brown
Fruit characteristics: does not attract wildlife; inconspicuous and not showy; fruit, twigs, or foliage cause significant litter

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; not particularly showy; should be grown with a single leader; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break

Current year twig color: brown
Current year twig thickness: thin


Photo: www.1.bp.blogspot.com

Culture

Light requirement: tree grows in part shade/part sun, or full sun
Soil tolerances: clay; loam; sand; acidic; alkaline, extended flooding; well-drained.
Drought tolerance: high
Aerosol salt tolerance: high
Soil salt tolerance: good

Other

Roots: surface roots can lift sidewalks or interfere with mowing
Winter interest: no special winter interest
Outstanding tree: not particularly outstanding
Invasive potential: No entries found.
Ozone sensitivity: sensitive or moderately tolerant
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Care should be taken not to locate Weeping Willows near underground water or sewer lines or close to septic tank drain fields where the roots could cause significant damage. Weeping Willows are deciduous, the thin leaves turning yellow before falling. Locate Weeping Willow only where there is adequate space for its large, imposing form. Not for residential lots, it is best located near water where soil will be

undisturbed. It is often planted near retention ponds and lakes for a dramatic softening effect. Willows were used as medicine, the young twigs and bark chewed to relieve headaches. It was later found the active ingredient was salicylic acid, the basis of today's aspirin.

Pests

Some of its pests are scales, caterpillars, borers, and aphids. The willow is a favored host for the gypsy moth.

Diseases

Root rot can occasionally infect root systems and cause decline. Crown gall causes galls to form near the soil line or farther up the plant. Take out infected plants and do not replant in the same area for at least two years. Willow scab attacks and kills young leaves within a very short time. The fungus enters twigs, kills back the young shoots and causes cankers. Olive green spore masses can be seen along the veins on the undersides of leaves. Another fungus, *Physalospora miyabeana*, attacks willow and the two fungi in combination cause willow blight. Prune out infected branches and use resistant species. Black canker causes dark brown spots on the leaves. Whitish gray lesions with black borders appear on the twigs and stems. Prune out infected branches and use resistant species. Weeping willow appears to be resistant. Many fungi cause cankers on willow and infected branches are pruned out. If the trunk is infected and girdled, the tree will die. Keep trees healthy by regular fertilization. Many fungi cause leaf spots but are not serious enough to warrant preventive sprays. Rake up the fallen diseased leaves in the fall. Powdery mildew causes a white coating on the leaves. The disease is usually not serious. Rust causes yellow spots on the lower surface of leaves and, if severe, defoliation. Rake up and destroy leaves from diseased trees. Tar spot causes black, raised spots on leaves which are harmless. Rake up and dispose of fallen leaves from diseased trees at the end of the growing season.

USE IN PHYTOREMEDIATION

----------**Experiment 1**----------

Contaminants of concern	Ethanol-blended gasoline (ethanol and benzene)
Plant species	*S. babylonica*
Interaction of plant and contaminants: Tolerant plant (enhancement of microbial community) / phytoremediation	Phytoremediation
Mechanism involved in phytoremediation: Phytostabilisation/rhizodegradation/phytoaccumulation/phytodegradation/phytovolatilization/ evapotraspiration	Phytovolatilization, evapotraspiration. Microbial transformation (for benzene)
Types of microorganisms associated with the plant	Not reported in the publication.

Laboratory/field experiment	Laboratory experiment (hydroponics)
Initial contaminant concentration	For Ethanol phytotoxicity experiments: ethanol aqueous concentrations = 500, 1000 and 2000 mg/l For ethanol and benzene uptake experiments: ethanol aqueous concentration = 1360 mg/l benzene concentration: 20 mg/l (Benzene and ethanol was added in different experimental sets)
Length of Experiment	5 days.
Post-experiment contaminant content	Ethanol concentrations reduced more than 99% in a 5 day period. Average dropped from 1360 mg/l to about 9mg /l benzene aqueous concentration was reduced by 70% after 1 day, and by more than 99% at experiment 7th day.
Post-experiment plant condition	Plants were only affected when aqueous ethanol concentration reached 2000 mg/l When ethanol concentration ranged between 500 and 1000mg/l, cuttings appeared not to be affected by this concentration range. However, transpiration was markedly reduced when ethanol concentration was increased to 2000 mg/l. Leaf drying and chlorosis were also observed as visible symptoms of phytotoxicity, but cuttings, although keeping reduced rates of transpiration, were able to survive after exposure to 2000 mg/l ethanol.
Solution characteristics	Cuttings were allowed to root hydroponically in a 400 ml half-strength Hoagland's inorganic nutrient solution (Hoagland and Arnon, 1950) supplemented with Murashige and Skoog's formulation for nonessential elements (Murashige and Skoog, 1962). The pH of the solution was adjusted to 6.0.
Age of plant at 1st exposure (seed, post-germination, mature)	Rooted cuttings.
Requirements for phytoremediation (specific nutrients, addition of oxygen)	Not reported in the publication.

Contaminant storage sites in the plant (root, shoot, leaves, no storage)	Not reported in the publication.
Reference	H. X. Corseuil, F. Netto Moreno, 2000. Phytoremediation potential of willow trees for aquifers contaminated with ethanol-blended gasoline. Wat. Res. Vol. 35, No. 12, pp. 3013–3017