

Salix cinerea

INTRODUCTION

Salix cinerea is a species of willow native to Europe and western Asia. It is a deciduous shrub or small tree, it is generally branched from the base but can sometimes be found with a distinct trunk.



Photo: www.commanster.eu

GENERAL INFORMATION

Scientific name: *Salix cinerea*

Common name(s): Grey willow; Grey sallow (English), Salice cinereo, salice cenerino (Italian)

Family: *Salicaceae*

Habitat description: humid woods, wetlands; (0-1000 m);

World range: Europe – North Morocco - Eastern Russia – Arabian peninsula

DESCRIPTION

Height: 4-15 m

Crown shape: rounded or flattened

Growth rate: fast-growing

Bark: dark grey-brown, it becomes fissured with age



Photo: www.commanster.eu

Root habit

Plants have an extensive root system and are used to stabilize waste tips and old slag heaps.



Photo: www.commanster.eu

Foliage

Leaf arrangement: spirally arranged, simple

Leaf shape: obovate, broad leaves, above and

Leaf margin: crenate

Leaf color: grey-green above, intense grey, hairy on underside, with contrasting red veins.

Flower

The flowers are produced in early spring in catkins 2–5 cm long; it is dioecious with male and female catkins on separate plants. The male catkins are silvery at first, turning yellow when the pollen is released; the female catkins are greenish-grey, maturing in early summer. It is in flower from March to April.



Fruit, Seed

The fruits are capsules that split open in early summer to release the numerous minute seeds. embedded in white cottony down which assists wind dispersal.

The seeds ripen from May to June.

CULTURE

Light requirement: . full sun, It cannot grow in the shade

Soil tolerance: The plant prefers light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. The plant prefers acid and neutral soils. It requires moist or wet soil.

Wind tolerance: high

Aerosol salt tolerance: low

Soil salt tolerance: low

Subspecies:

There are two subspecies:

- *Salix cinerea* subsp. *cinerea*. Central and eastern Europe, western Asia. Shrub to 4–6 m (rarely 10 m) tall, with smooth bark. Leaves

densely hairy below with pale yellow-grey hairs; stipules large, persistent until autumn.

- *Salix cinerea* subsp. *oleifolia* (Sm.) Macreight (syn. *S. atrocinerea* Brot.). Western Europe, northwest Africa. Shrub or tree to 10–15 m tall, with furrowed bark. Leaves thinly hairy below with dark red-brown hairs; stipules small, early deciduous.

USE AND MANAGEMENT

Plants have an extensive root system and are used to stabilize waste tips and old slag heaps. The seeds are very light and so can travel some distance in the wind.

It is a good pioneer species and, except in wetter and moorland-type soils, will eventually be largely out-competed by the other woodland trees. Its main disadvantage as a pioneer plant is that it has an extensive root system and is quite a greedy plant, thus it will not help as much in enriching the soil for the other woodland plants as other pioneer species such as the alders.

The fresh bark of all members of this genus contains salicin, which probably decomposes into salicylic acid (closely related to aspirin) in the human body. This is used as an anodyne and febrifuge.

PESTS AND DISEASES

Melampsora epitea

Stigmella salicis

Coleophora potentillae

Several Tenthredinidae (Galls)

USE IN PHYTOREMEDIATION

-----Experiment 1-----

Contaminants of concern

Zn, Cd

Plant species

Salix cinerea

Interaction of plant and contaminants:

Tolerant plant (enhancement of microbial community) / phytoremediation

Mechanism involved:

Phytostabilisation/rhizodegradation/phytoaccumulation/phytodegradation/phytovolatilization/evapotraspiration

Types of microorganisms associated with the plant

Laboratory/field experiment

Initial contaminant concentration

Length of Experiment

Post-experiment contaminant content

Post-experiment plant condition

Significant relation was found between soil total Zn or Cd and foliar Zn or Cd; it makes willows useful bioindicators.

Phytoaccumulation

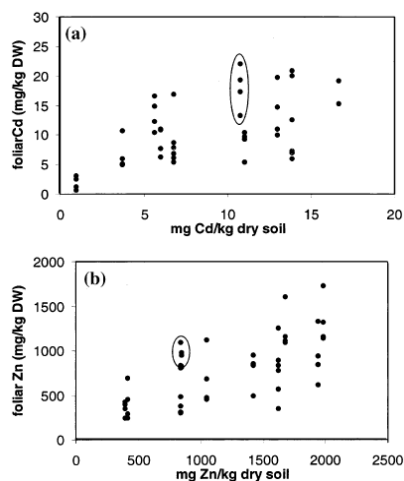
Not reported in the publication

Field experiment

Soil Cd and Zn concentrations varied between 1,1 and 13,9 mg/kg DW for Cd, and between 397 and 1766 mg/Kg DW for Zn, according to the landfill sites where willow was sampled

4 years (To determine temporal variability of the foliar concentrations, samples were taken yearly during 4 years)

The graphic below shows the foliar Cd (a) and Zn (b) concentrations expressed on a dry weight base relative to soil concentrations for willows sampled (*S.Alba*, *S.Cinerea*, *S.viminalis* and *S.caprea*) on 12 dredged sediment landfills. The graphic has been extrapolated from the reported publication.



Not reported in the publication

Soil characteristics

Polluted dredged sediment landfills characterised by high clay and organic matter content.

The table below (from the reported publication) shows soil properties (minimum and maximum) of the landfills where volunteer willow vegetation was established

	Min.	Max.
Clay (%)	18	58
Silt (%)	34	55
Sand (%)	0	48
P (g/kg DM)	1.7	4.7
S (g/kg DM)	0.7	6.8
N (g/kg DM)	1.7	6.4
CaCO ₃ (%)	3.7	11.0
OC (%)	1.8	6.3
pH-H ₂ O	7.1	7.6
pH-CaCl ₂	6.9	7.4
EC (μS/cm)	143	2070

Age of plant at 1st exposure

(seed, post-germination, mature)

Not reported in the publication.

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

B. Vandecasteelea, B. De Vosa, F. M.G. Tack, 2002. Cadmium and Zinc uptake by volunteer willow species and elder rooting in polluted dredged sediment disposal sites . The Science of the Total Environment 299; 191–205