



Design and Establishment of trees and shrubs for Southern Alberta

By

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Most of the trees you see around yards, fields, streets and boulevards, parks and RV campgrounds were planted in the last 120 years. You may notice on your farms, homes or towns that trees and shrubs on the west side of property may not perform the same as on the east side of the property. Usually, trees on the east and northern side are more vigor, do not get damaged by wind and will have a higher growth and survival rate than on the west side. The reason is always the force of wind exposure.

Establishing trees in southern Alberta is a challenging task due to many factors including:

- higher elevation and different slope exposures
- strong cold jets and warm chinook winds,
- dry summers and winters, low moisture and participation,
- alkaline, sandy and heavy clay soils are dominant soil types
- Deep reach to aquifer and high salinity in water.

Each of these natural challenges requires proper planning to make sure that trees and shrubs survive these harsh conditions.

Tree Establishment Design

Strong winds (Chinook and cold jet streams) from the south-west or northwest direction are the major factor for tree planting design. Trees and shrubs should be carefully selected so that they can survive drought, severe cold and rapid transitions between Chinooks and cold jet streams. You may need to plant only shrub species and let them grow **for 2-4 years prior to planting ANY** tree species.

Below are tree and shrubs establishment design scenarios on 3 major soil types with SW and NW predominant wind directions.

Note: *Avoid plant caragana along creeks, rivers, or lakes due to very aggressive and invasive nature. Caragana can destroy natural native vegetation in the riparian area.*

Design on Clay Soils

Clay is very hard for trees to grow in as dense soil particles do not allow roots to go through and do not provide enough access to oxygen or moisture for roots. Compaction is even worse for trees than heavy clay soil as there are no pores for air or water pockets and roots simply can't go through.

First row (shrubs): caragana, silver buffalo-berry, cotoneasters

Second rows (hardwoods): Manitoba maple, variety of cottonwoods, willows, green ash and hybrid poplars

Third rows (hardwoods): American and Siberian elms, aspen, bur oak and Amur maple

Fourth rows (coniferous): Colorado spruce, Black Hills spruce, ponderosa and scotch pines and Douglas fir

Fourth rows (shrubs and flowering trees): crab apples, lilacs, chokecherries, Nanking cherries, golden currants, Saskatoon's, red osier dogwood, American plum, rosewoods

Design for sandy soils

Sandy soils are very porous, not nutrient-rich and do not hold water at all.

First rows (shrubs): caragana, silver buffalo berry and fragrant sumac (Skunk brush)

Second rows: Rocky Mountain juniper and mugo pine

Third and fourth rows (coniferous): Colorado spruce, ponderosa and scotch pines and Douglas fir

Fifth rows: wolfberry and potentilla or shrubby Cinquefoil, lilacs, golden currants, Saskatoon's, American plum, rosewoods and common juniper

Designs for saline soils

Saline soils are very hard on any tree and shrub species but there are some shrubs and trees that can handle a level of salinities.

First rows (shrubs): silver buffalo berry and Sea buckthorn

Second rows: Caragana, Spreading juniper, Snowberry, Villosa lilac, Hawthorn

Third and fourth rows: Rocky Mountain juniper, Mountain Ash, Ponderosa pine, Green ash, Manitoba maple, Siberian elms, Laurel leaf willow and some apples

Elevation and Slopes

Elevation in southern Alberta ranges from just below 700 meters near the Saskatchewan border to 1100 meters in parts of Calgary and rising further west. This elevation difference impacts how some trees grow, as higher elevations are colder and could be limiting the growth of many trees, especially hardwood species. The slope and prevailing winds are critical factors for determining vegetation. South-facing slopes are warmer and dryer than north-facing slopes. The vegetation on opposing slopes is vastly different from south-facing slopes dominated by cacti, various sages, skunkbrush and few trees such as pines. On the north-facing slopes with more moisture, vegetation is lush with a variety of shrubs and trees.

Water

Water is scarce in the prairies and many trees may not develop deep roots to access water that is further from the surface. Test your water before watering your trees. If it contains high levels of sodium it will kill your trees fast and not provide chances for them to survive. Some trees can handle drought better than others-e.g. pine are more drought tolerant than poplars, elm and many others.

Grouping vs individual trees

The most common mistakes are planting lone individual rows of trees and shrubs in open areas with no protection from wind and heat. Trees and shrubs planted in groups/rows have a way better chance of survival and are more resistant to constant element exposure. Tree and shrub diversity also play a great role in the survival and health of the area planted. This diversity will attract many beneficial insects, viruses, bacteria and fungi that will support each tree and shrubs in a distress situation.

Watering and weed control

Watering and looking out for insects, weeds and diseases is crucial once you plant trees. Water when you must and do not overwater as it will weaken your trees in the long run. Provide deep watering just before freeze (young or old trees). Frozen water is an excellent insulator and will reduce frost penetration to the root zone. Moist soil holds more energy than dry soil. Once the soil is dry, it is easier for the frost to penetrate deep and dry out roots. Without proper weed control, chances of their survival are very limited. If you have a sandy soil, you may fertilize in the spring or the fall on heavy clay soil after the leaves have dropped.

Mulching is a must and the most important root protection that you can do. Mulching provides a few key functions: prevents weeds, protects roots from extreme heat and keeps moisture around trees. Create a donut-shaped wood chip cover around your tree to keep water inside. Applying 2-4 inches (5-10 cm) of wood mulch will greatly reduce soil freeze. A layer of 3-4 inches of woodchips mulch will prevent heaving by maintaining more constant soil temperatures. Instead of disposing of autumn leaves, keep leaves on the ground, mulch or blend them into the soil to retain nutrients. Be very aware if you have some leaves disease (e.g. Leaf spots, bronze leaf disease, etc) you have to rake leaves to avoid future problems with diseases.



Picture 1. Mulching is a must and the most important activity that you can do to prevent root damages from winter freezing and reduce the possibility of root damage and tree mortality. Grouping trees and shrubs provides better chances for survival and overall healthy and growth.

Growing trees and shrubs are very challenging but also very rewarding endeavor. Proper planning, design and establishment with careful tree and shrub selection can pay off in long run.

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