

From the Ground Up: Part I

Challenges of the Chinook Zone:

Inconsistent snow cover through the winter

Low annual moisture: around 43 cm/ year or 19 in/ year

Not evenly spaced throughout the season

Majority falls between Feb and June

Considered a semi- desert climate

Short growing season with, at times, extreme temperature fluctuations

Windy: stressful for large leaved plants and evergreens

winter burn on conifers

Positives of Chinook gardening:

Cool nights so blooms last longer with more intense colors

Elevation and latitude provide longer days with more sun during the growing season

Dry climate prevents disease occurrence

Harsh climate means fewer pests

Calgary is a unique zone: confluence of alpine, foothills and prairies

Allows plants from many different environments to grow and do well here

Seasons:

Spring is the most unpredictable: cool, short and lots of precipitation (snow and rain)

Summer: hot and dry

Thunderstorms are chief form of moisture. Heavy short-lived downpours occasionally with hail.

Fall: usually long and warm but with cool nights, frost starting usually by late September

Winter: long, unreliable snow cover, Chinooks

Areas of the city:

NW- highest elevation and coolest, good moisture

NE- cool and moist

SE- warmest and driest

SW- warm

Latin Nomenclature:

Kingdom, Phylum, Class, Order, Family, Genus and Species

A useful mnemonic phrase: King Peter Can Only Find Green Spinach

A system of identifying organisms through common characteristics

Provides useful information as to a plant's origins, growth habit, preferred habitat and colour

Soil: four properties of:

Texture: refers to the size of soil particles

Soil is composed of percentages of sand, silt, clay and organic materials

Sand particles are largest, then silt, clay particles are smallest and compact together easily

Clay soils are mineral rich, hold moisture, can drain poorly, warm up slowly

Loam is a balanced mixture of all the different particles plus a percentage of organic matter

Structure:

Soil is made up of organic and mineral particles, water and air

Particles combine to form aggregates

Aggregate size is important because:

- Allows air and water to move through the soil

- Allows roots to travel freely resulting in a wider base to absorb nutrients and water

Soil tests:

Ribbon test: roll a piece of moist soil into a snake, determines percentage of clay content

Jar test: fill a quart jar half full of soil, fill with water, shake well and allow to separate

Can determine percentage of clay, silt, sand and organics in the soil

pH:

Refers to acidity or alkalinity based on a scale from 1-14 with 1 being acidic 14 alkaline, 7 is neutral

Calgary soil and water has an alkaline pH over 7

Most plants grow best between 6.5-7.5

pH can be a concern as it affects the ability of plants to absorb minerals from the soil

- Of concern when growing edibles

- Commonly seen in shrub roses is Iron chlorosis where leaves are yellow

Soil Fertility:

Major nutrients are: Nitrogen- used for growth of green leafy parts of the plant

- Phosphorus- used for production of roots, flowers, seeds and fruit

- Potassium- used for ripening and a host of necessary cellular processes

Minor nutrients include: magnesium, boron, copper, iron, zinc, manganese, sulfur, molybdenum

Balance of nutrients affects pH and nutrient quality of edible crops

Soil Food Web:

Dr Elaine Ingham discovered soil ecosystem composed of a variety of creatures

Healthy soil is full of a diverse population of microscopic organisms that help break down nutrients

- making them available for plants to absorb

All members play an important role in maintaining soil health

- Bacteria break down green organic materials quickly releasing nutrients for roots

- Fungi break down tougher materials. Often seen as white filaments throughout soil or compost

- Larger microbes, etc. eat smaller ones releasing nutrients into the root rhizosphere

- Larger creatures help build soil structure enhancing root's ability to obtain food and moisture

- Balance of good and bad microbes improves plant immunity to disease and pests

Composting:

Made up of green and brown materials 1:3 ratio

Greens include: fresh lawn clippings, kitchen waste, weeds and clippings

Browns include: dry leaves, straw, hay, dry grass clippings, shredded paper, sawdust, cardboard

Brown and greens should be layered with a little clay soil added

Pile should be approximately 1 cubic meter or more.

Pile needs to be moist and kept aerated at all times for aerobic decomposition to occur

Pile will heat up quickly as bacteria start to break down materials, needs oxygen to keep pile cooking

Turn pile every week or so while really active. Keep moist but not wet.

When things go wrong:

Failure to compost, ants or rodents living in it- too dry
Foul smell- too wet
Weeds growing in pile- too cool, needs oxygen
Not heating up or too hot- ratio of green to brown is off

Humus and Humic Acid:

Result of organic material decomposition
Humus is composed of long convoluted strands that are electrically charged, and act like a sponge to hold water and nutrients, as well as provide a safe haven for smaller microbes to reside
Humic acid is a by-product of decomposition that buffers soil and helps balance soil pH

Water and the soil

How water moves through the soil:

Three parts: flushes old air and water out; fills deep reserves then fills surface pores
Maintaining soil moisture requires a combination of strategies
Mulches, high soil humus content, dense planting to shade soil, drip irrigation, rain harvesting

Rain gardens uses plants that tolerate periodic flooding and drying out for short periods

Helps slow water down and runoff from hard surfaces allowing water to soak into the soil

Swales are shallow trenches filled with a moisture absorbing material that traps runoff allowing water to soak into the soil slowly

Irrigation:

Avoid overhead irrigation:

A high percentage of water evaporates before reaching the ground

Increases foliar diseases

Uses more water and less efficiently

Use drip irrigation: uses significantly less water, can hook up to rain barrels

Watering guidelines:

Water deeply and slowly and only when needed

Use plants that don't require high moisture levels and tolerate drought

Use multiple strategies to maintain moisture levels in the soil

Collect and use rain water as much as possible

Water roots not foliage

Water in the morning before it gets hot and never when it is windy (even with drip)

Mulch:

Soil should always be kept covered

Mulch helps to:

Keeps roots cool and moist and decreases weeds

Conserves top soil fertility and feeds soil microorganisms as it breaks down (organic mulches)

Organic mulches include: compost, shredded bark, leaves, dry grass, straw or hay, living cover crops

Inorganic mulch: rock products

Weeds:

Anything growing in the wrong place

Purpose is to quickly cover empty soil. Perennial weeds can indicate mineral deficiencies in soil

Prevention is the best cure:

Keep soil mulched, don't let them go to seed, disturb soil as little as possible, use cover crops and dense plantings

Disease:

Prevention is the best: Be proactive vs reactive

Encourage beneficial insects in the garden by planting a diverse array of plants and eliminating chemicals

Predator/Prey cycle- is a lag period before beneficial insects arrive to prey upon pest species

The three U's of prevention:

- 1) **Unacceptable-** fertilize wisely, correct pH, companion planting
- 2) **Unavailable-** floating row covers, timing, interplanting, succession planting, crop rotation
- 3) **Unsurvivable-** check your plants, attract beneficial insects, birds, beneficial microbes
(Bt, nematodes, milky spore, and many others)

Maintain healthy plants by meeting all of their cultural needs. Right plant. Right place.

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Annuals:

Germinate, grow, flower and set seed or fruit in one growing season

Includes vegetables, herbs and flowers.

Can be cool or warm season: determines when they can be put out (before or after frost)

Can be direct seeded or transplants depending on preferences and length to maturity

Some annuals are actually perennial in warmer climates so only survive one season here

Biennials: Grow for two seasons

First season germinate and grow then go dormant for winter

Second season: grows, flowers, sets seed then dies

Perennials: Live for more than 3 seasons

Are usually herbaceous- tops die for winter but roots go dormant and survive underground

Utilize a variety of root structures and tolerate a wide variety of habitats

Choosing Perennials: (holds for annuals and biennials too)

Research a plants origins and cultural requirements

Soil, exposure and moisture requirements

Plant hardiness: Usually based on zones but much more to it

Calgary is considered Zone 3 (-30 to -40C) but is changing due to climate warming

Hardiness refers to a plant's ability to withstand drought, temperature fluctuations, soil type, wind, etc

Microclimates:

Refers to different areas with varied growing conditions around a property

Sheltered areas: protect from wind, extreme temperature fluctuations, holds snow or stays moist longer

Can use to grow plants that might not be reliably hardy for our climate

Can create microclimates by:

Planting near hard surfaces to improve drainage or increase heat release at night

Incorporate grit or add organic material to amend soil

Utilizing different types of mulch

Planting against a warm wall, using walls or fences for protection

Planting hedges and trees as wind breaks

Exposure:

Full sun is considered at least 6 hours:

South exposure, more east then west exposure is preferred by most plants

Shade: can be full, part, bright or filtered, dry or moist

Can be made from a hard structure or by trees

Caring for your plants:**Planting:**

Hardening off: refers to gradually exposing plants to increasing levels of sun or wind

Takes roughly 4-5 days to prevent plant stress, move from shade to sun, protected to exposed

Steps to plant:

Water plants well and the planting site well the day before planting

Try and choose a cooler time of day when it's not windy

Gently loosen roots and remove as much potting soil as possible (plants adjust to native soil better)

Water in well, provide protection if needed for the first few days

Keep well watered for the first growing season

Pinching: removing growing tips to encourage side shoots and bushy growth

Used primarily with young perennials and annuals (all types)

Deadheading: refers to the removal of finished flowers to prevent seed development

Promotes flowering and can prolong the life of short-lived perennials

Some new varieties of annuals are self cleaning meaning they do not require deadheading

Copywrite:

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