

From the Ground Up Part II

Roots serve three basic functions:

- Anchor top growth to the earth

- Absorb and transport water and nutrients throughout the top growth

- Store food and nutrients during times of dormancy and stress

Roots help plants recover after top growth has been damaged by drought, browsing, weather events and dormancy

Fine root hairs along the bigger roots help extend the area a plant draws from

These hairs die back significantly during dormancy, exposure and times of stress but will regrow under favourable conditions

In an actively growing plant root hairs comprise over 60% of the entire root system

A relationship exists between mycorrhizal fungi and many plants which help extend the roots ability to draw nutrients and water from a larger surrounding area

Taproots are well suited to dry nutrient poor soils and will rot easily in moister soils

- Roots burrow deeply accessing minerals, nutrients and moisture

- Are difficult to transplant as they break easily

Tap-rooted perennials establish slowly as they direct their energy into establishing their root system first

- Can store up to 10% of annual rainfall in their root system

Perennials with taproots: Oriental poppies, globe thistle, (Echinops) prairie crocus (Pulsatilla), Butterfly weed (Asclepias), Baptisia, Sea Holly (Eryngium)

Trees with taproots: Burr Oaks, Pin Oaks

Division and Propagation

Most perennials require division at some point in their lives to keep them:

- Vigourous- centers die out, flowering decreases, death might occur as growth decreases

- Keeps their size in check- some spread rapidly

 - Yarrow (*Achillea*), *Lamium*, Lily of the Valley (*Convallaria*), Daylilies (*Hemerocallis*)

- Prevents over crowding and promotes flowering

A few perennials resent transplanting

- Peony, Large Sedum, Obedient Plant, *Scabiosa*, Lupin

- Can take root, stem or leaf cuttings to make more

Plants need division when the center dies out, flowering decreases, too many thin and weak stems or the plant is spreading into unwanted areas

Tips for Dividing Plants

Water the plant well the day prior to division

Dig up whole plant or if possible take a slice from in ground plant

When dug up always keep the roots covered and moist

Divide into smaller, younger, more vigourous, healthy sections

- Keep sections a reasonable size so plant will recover quickly

Mix organic matter into the native soil and water new hole well prior to planting division

Plant at the same depth before division or pot up extras

Mulch surface with more compost and top with mulch

Keep well watered until established

Dividing plants can be as easy as breaking root systems apart by hand or challenging

Ornamental grasses will require an axe or a sturdy sharp knife

Daylilies are equally challenging: get them sopping wet and then roll inside a tarp to help break up the roots

Planting vertical rhizomes like Bearded Iris

Form a mound in the center of the planting hole and place rhizome on top spreading roots out and down side of mound evenly

Cover with soil, top of rhizome should not be covered and mulch around, not over, rhizome

Bulbs

Term used to describe 4 different underground growth structures

-True bulbs, corms, tubers, tuberous roots

Act as storage organs for energy reserves

Can withstand extreme drought and cold

Come from a variety of inhospitable environments

-alpine, Mediterranean, desert, woodland

Growth patterns and life cycles vary with each type of bulb

Minor bulbs is a term used to refer to early and small flowering types

True bulbs have scales arranged around a solid base (basal plate)

Scales can be tightly or loosely arranged, have a dry tunic covering and store well

Inside each bulb is a perfectly formed flower

If stored incorrectly bulb will grow but the embryonic flower will be damaged or die

True bulbs include: tulips, daffodils, onions, lilies, grape hyacinths, fritallaria

Set offset bulbs (bulblets) around base of mother bulb

Large tulips: bulb splits and loses it's ability to flower unless separated and grown on

Corms are similar to bulbs but:

Are slightly flattened at the top

Have a solid interior and a fibrous tunic

Can have one or more growth points

Mother corm uses up all it's energy and dies by the end of the season

A new corm develops under the old mother corm, smaller corms may develop alongside

Corms: crocus, gladiola, *Colchicum*, *Bulbocodium*, Trout lilies (*Erythronium*), Blazing Star (*Liatris*)

Tubers are similar to corms but:

Are irregularly shaped

Have multiple growth points at top and bottom of corm

No basal plate or tunic

Can be difficult to determine what is up or down so plant on side if uncertain

Tubers include: potatoes, begonias, anemone, Jack in the Pulpit (*Arisaema*)

Tuberous roots differ from a tuber in that new shoots arise from old stem tissue

Most are tender in our climate and can be a challenge to store

Swollen roots radiate from a central crown (octopus-like) where a network of finer roots grown over over the surface

They store nutrients

Includes: dahlias, foxtail lilies (*Eremerus*) and *Alstromeria*

Rhizomes grow horizontally or just below the soil surface

They do not have a basal plate or a tunic

Can't be stored above ground for long

Can be thick and rigid or thin and wiry

Roots develop on the underside while growth points occur along the leading edge and along the rhizome body

Includes: iris, Trilliums and canna lilies

Shrubs

Are a wide variety of shrubs that are hardy and occupy all exposures

Can be small to very large with some able to be trained into small trees

Act as part of the bones of the garden landscape and add colour for the whole growing season

Supply most of our Spring bloom

 Spirea, cherry species, fruiting shrubs, forsythia, viburnum, lilac

Summer bloomers

 Shrub roses, potentilla, weigela, hydrangea, spirea, ninebark

Pruning Shrubs

Prune in late winter, early spring while still dormant and can see structure

Goal of pruning is to:

 Improve air circulation

 Remove suckers and thin out thin sticky growth

 To promote flowering and fruiting by removing older less vigorous branches

Renewal pruning: done gradually to reinvigorate an older over grown shrub

 Involves removing approximately 1/3 of the older branches each year

Hard pruning: done to control size or promote younger more colourful growth

 Involves cutting all branches back close to the ground

Trees

Deciduous: trees that lose their leaves and go dormant for the winter

Conifer: a variety of evergreen shrubs and trees that have needles

Are relatively few hardy trees as compared to shrubs for our zone

Along with shrubs provide the bones of the garden, conifers provide winter interest and colour

Before planting research mature height and width and place accordingly

Trees are an investment as they take many years to mature

 Fast growing trees tend to have weaker wood and are more likely to be damaged in storms

 Mayday and other cherry species, Swedish aspen, maple, willow, poplar

 Slow growing trees grow less than 30 cm/ year but are sturdier

 Elm, oak, hawthorne, tree lilac, crabapple, pear

Pruning Trees

Goal is to :

 Maintain an open center for good air circulation

 Remove dead or diseased branches

 Thin out crossing and interior branches

 Train and direct growth in desired form

 Espalier- young trees trained to grow flat

 Enhance fruit production by encouraging fruiting spurs

Best time to prune is late winter/early spring

Maple and birch in late spring due to sap running earlier

Elm- Oct 31-Mar 31 to prevent infection by Dutch Elm Disease

Fruit trees: winter pruning encourages new growth

mid summer pruning encourages fruiting spurs to develop

Prune off branches at the branch collar to allow trees to heal

Planting and Post Care

Water tree well prior to planting

Dig hole 3x as wide as the root ball but the only slightly deeper than the root ball

Loosen any entwining roots and spread them out in the hole

Cover with soil up to where the roots flare out from the trunk

Mulch (stay 10 cms away from trunk) and water in well

Water regularly for the next tow years using drip irrigation

A good rule of thumb is 2.5 cm of water / 30 cm of height

Form

Perennial growth habits

Creeping- low growing and spreading

Spike/Upright- tall and pointy like grasses or Siberian Iris

Mounding- rounded non-spreading growth habit

Tree and Shrub growth habits

Columnar, upright or fastigate- growth is taller than wide

Weeping: growth is downward or cascading

Rounded: similar to mounding form

Prostrate: low growing along the ground

Starting from Seed

Seed packets have all the information needed to grow the plant

When to seed, depth of planting and days to maturity

Starting indoors

Use a fine seedling mix, extra humidity until germinated, provide 14-16 hours of light/day

Seedlings will need to be acclimated to the outdoors before planting out

Direct sowing in late spring

Can sow directly into the ground from early to late spring and throughout growing season

Cool season crops and flowers can be direct seeded in fall, late winter or very early spring

Crops and flowers that prefer warmer temperatures need to wait until the soil warms up

Pre-germinating: enhances germination time before planting in the garden

Works for larger seeds

Place between damp paper towel and place in a sealed plastic bag

Will see a small white root emerging from seed coat in a few days

Seeds must be planted immediately at this time

Edibles

Cool season crops like to germinate in cool soil, flower, fruit then go to seed when the weather warms

Includes: all greens, beets, carrots, peas, cabbage, broccoli, Brussels sprouts, snap peas, fava beans, radishes

Warm season crops like warmer soil (15C) to germinate in, will rot in cool wet soil

May have difficulty maturing in our short growing season so choose short maturity dates

Includes: beans, fennel, squash, melons, cucumbers

Tomatoes, peppers, eggplant, celery should be planted out as transplants to get fruit

Companion planting is the practice of planting certain crops together to benefit each other in some way

Helps create biodiversity

Enhances the flavour or growth of its companion crop

Attracts pollinators and beneficial insects to keep pests under control

Repels and/or confuses pests with their scents

Include flowers and herbs amongst edible crops to help bring in beneficial insects to pollinate crops and control pesky insects

Crop rotation is the practice of planting crops in different places to:

Thwart pests and disease that might linger in the soil from previous seasons

Prevents the depletion of soil nutrients as some crops are heavy, mid or light feeders

Goal is to plant: Root crops after shallow rooted crops

Heavy feeders after light feeders

Soil builders (legumes, peas, beans, favas) after heavy feeders

Avoid planting crops in the same family in the same spot

Try for a three year rotation between planting the same crop in the same place

Fertility and Cover cropping

Due to the intensive growing conditions in vegetable gardens particular attention has to be paid to the nutrient levels in the soil as they can be depleted

To grow nutrient rich food need to have nutrient rich soil

Cover cropping involves planting quick germinating crops that help:

Cover bare soil preserving the fertile top soil

Adds humus when tilled lightly back into the soil

Deep rooted crops bring up nutrients deep in the soil

Nitrogen fixers help improve soil fertility

Good cover crops include: clovers, vetch, cereal crops, legumes (small seeded fava beans, field peas)

Season extenders use a variety of covers to help extend the season in early spring and in late summer to give crops extra time to mature

Provides frost protection warming the interior growing environment

Provides wind protection for newly planted tender seedlings

Includes: frost blankets, cold frames, portable covers, Cozy Coats

Seasonal tasks:

Spring:

Order seeds, sets, summer bulbs and supplies before planting season

Start seeds indoors

Prune shrubs and trees while still dormant

Cut back perennial tops later in spring before growth starts

Old growth shelters the crown and provides shelter for beneficial insects

Clean up beds slowly as weather warms

Remove perennial and annual weeds

Direct seed cold tolerant annuals and vegetables

Can seed over top of snow, as melts will anchor seeds into the soil

Late spring: plant warm season crops as soil warms

Summer

Early: plant annual transplants replacing worn out cool season crops

Weed and water new plantings

Deadhead annuals and cut back annuals to promote more blooms

Water and fertilize containers

Harvest cool season crops and replant for second short season crop

Kick back and enjoy the fruits of your labour

Fall

Harvest crops, seed cover crops

Plant spring bulbs and garlic

Take advantage of end of season sales

Last chance to plant trees, shrubs and perennials

Spread compost on beds

Late Fall: water conifers in well before freeze up

Apply mulch

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