

A General Operations Guide For Saskatoon Orchards

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Timing		Operation						
Month(s)	Bud or Crop Developmental Stage	Pruning*	Irrigation*	Weed Control*	Fertilization*	Insect Pest & Disease Monitoring*	Insecticide/ Fungicide Application*	Harvest*
September - April	Dormant (buds tightly enclosed by brown bud scales)	- stem thinning; removal of excess suckers; pruning for disease control	- monitor soil moisture levels; irrigate if necessary (when soil moisture tension reaches 20-40 cbars); irrigate prior to soil freeze-up if orchard is dry &/or exposed	- Casoron applied before soil freeze-up in fall; <u>or</u> linuron applied to dormant plants	- soil test in September or October if not done in spring	- monitor buds for insect eggs, stems & branches for canker		
April/May	Silver Tip (stage immediately following dormancy where the brown bud scales have split open, & are falling off; bud beneath appears silver because of presence of many hairs)	- stem thinning; removal of excess suckers; pruning for disease control	- monitor soil moisture levels; irrigate if necessary (20 - 40 cbars soil moisture tension)	- linuron applied to dormant plants, if not applied in fall	- soil test may be done	- monitor buds for bud moth larvae	- first application of Kumulus at bud-break; subsequently at 10 - 14 day intervals -application of Bartlett Superior '70' Oil	
May	Green Bud or Green Tip (flower bud cluster is visible; flower buds are very small & tightly packed together; entire cluster appears green in color)	- pruning for disease control	- monitor soil moisture levels; irrigate if necessary (20 - 40 cbars soil moisture tension)	- cultivation; mowing; spot applications of RoundUp if necessary	- first fertilizer application, either surface-broadcast or via drip system (if necessary) - fertigation may be continuous through May & June	- monitor flower clusters for bud moth larvae, other caterpillars, lygus bugs	- first application of Decis (no later than this bud stage) - application of Kumulus as required	

	<p>White Tip (flower bud cluster has expanded so that individual buds are no longer tightly pressed against each other; white petals of individual flowers are visible as a small cone)</p>			- cultivation; mowing; spot applications of RoundUp if necessary		- monitor flower clusters for bud moth larvae, other caterpillars, lygus bugs; leaves for spider mites	- application of Funginex (no later than this stage) - first application of Topas	
	<p>Tube/Balloon (petals of individual buds have elongated to form a tube or cylinder; subsequently, tube of petals loosens & petals begin to separate)</p>			- cultivation; mowing; spot applications of RoundUp if necessary		- monitor flower clusters for bud moth larvae, other caterpillars, lygus bugs, sawflies; leaves for spider mites, & lace bugs	- second application of Decis (no later than balloon stage) - first application of Nova	
	<p>Full Bloom (petals have fully expanded)</p>			- cultivation; mowing; spot applications of RoundUp if necessary		- monitor flower clusters for bud moth larvae, other caterpillars, lygus bugs, sawflies, brown fruit rot; leaves for spider mites, lace bugs & powdery mildew	- no applications of any fungicide or insecticide	
May/June	<p>Petal Drop/Fruit Set (petals fall off of flower & ovary begins to swell, indicating fruit set)</p>	- pruning for disease control	- monitor soil moisture levels; irrigate if necessary (20 - 40 cbars soil moisture tension)	- cultivation; mowing; spot applications of RoundUp if necessary		- monitor flower & fruit clusters for caterpillars, sawflies, apple curculio, brown fruit rot; leaves for spider mites, lace bugs & powdery mildew	- second application of Topas	

June	Green Fruit	- pruning for disease control	- monitor soil moisture levels; irrigate if necessary (20 - 40 cbars soil moisture tension)	- cultivation; mowing; spot applications of RoundUp if necessary	- second surface-broadcast fertilizer application - fertigation may be continuous through June - monitor new shoots & leaves for iron chlorosis & other possible nutrient deficiencies	- monitor fruit clusters for caterpillars, sawflies, apple curculio, brown fruit rot; leaves for spider mites, lace bugs, Entomosporium leaf & berry spot, saskatoon-juniper rust, powdery mildew; shoots for fireblight	- third application of Topas (38 day PHI) - third application of Decis (21 day PHI) - second & third applications of Nova (14 day PHI) - application of Kumulus as required	
July	Mature Fruit	- pruning for disease control	- monitor soil moisture levels; irrigate if necessary (20 - 40 cbars soil moisture tension)	- cultivation; mowing; spot applications of RoundUp if necessary		- monitor fruit clusters for caterpillars, sawflies, apple curculio, brown fruit rot; leaves for spider mites, Entomosporium leaf & berry spot, saskatoon-juniper rust, powdery mildew; surface roots for woolly elm aphid	- application of Kumulus as required	- begin harvest when half to two-thirds of branches or plants are fully ripe; two to three harvests may be best if ripening is very uneven
July - September	Post-Harvest	- pruning for disease control; stem-thinning & removal of excess suckers; in late-fall	- monitor soil moisture levels; irrigate if necessary (20 - 40 cbars soil moisture tension); irrigate prior to soil freeze-up if orchard is dry and/or exposed	- cultivation; mowing; spot applications of RoundUp if necessary	- leaf tissue analysis following harvest, but no later than mid-August - soil test in September or October if not done in spring	- monitor surface roots for woolly elm aphid (mid-July to late-August); stems & branches for canker in September/October	- application of orthene to non-bearing plants (mid-July to early-August)	

*Notes:

Bud or Crop Developmental Stages - note that there is variability in these stages from branch to branch within plants, from plant to plant, from location to location, and from year to year. Consistent warm temperatures speed up the developmental stages, whereas consistent cool temperatures slow development down. The developmental stages are easier to distinguish where temperatures have been consistently cool.

Pruning - preferably late-March to early-May, prior to budbreak: 1) remove dead, damaged or diseased stems; 2) cut back weak or spindly growth; 3) remove stems greater than 2.5cm in diameter at ground level; 4) remove excess suckers; if orchard is machine-harvested, prune out damaged stems following harvest to avoid infection by canker; pruning for disease control may be carried out anytime between late-winter & late-fall; pruning for control of canker & blackleaf may be easiest in autumn after leaf-fall because, at this time, it is easy to see the split bark symptomatic of canker, & the infected leaves symptomatic of blackleaf that remain attached to the stems.

Irrigation - soil moisture levels should be monitored continuously from the time the soil thaws until close to soil freeze-up; some form of soil moisture meter is very useful & strongly suggested; irrigation may be carried out when soil moisture tension in the root zone is between 20 & 40 cbars; soils that are dryer (soil moisture tension greater than 40 cbars) will inhibit growth & may severely stress plants; irrigation may be necessary after leaf-drop in the fall, but prior to freeze-up in order to reduce dessication over the winter & to reduce the development of canker; for newly-established plants, monitor moisture status of root plug carefully & frequently; irrigation of newly-established plants should be frequent so as not to allow the root plug to dry out.

Weed Control: a) Linuron - applied as a pre-emergent herbicide in early-spring or late-fall when saskatoons are dormant; apply only to established plantings at least 1 year old; do not apply more than once per season, nor within 50 days of harvest; b) Casoron - apply only to established plantings at least 1 year old; apply before freeze-up in late-fall; application must not be made within 9 months of harvest (Do Not apply both Casoron & linuron in same growing season); c) RoundUp - spot application as necessary; a wick applicator is best; open wounds & fresh pruning cuts facilitate absorption of glyphosate; extreme care should be taken to avoid contact of spray with such regions.

Fertilization - if soil & leaf tissue analyses indicate that fertilizer is necessary, fertilizer should be applied in at least 2 split applications (one pre-bloom, one post-bloom) if surface-broadcast; if soluble fertilizers are applied through a trickle irrigation system, then fertilizer applications will have to be made on a more continuous basis; a maximum of 40 lbs/acre of nitrogen per season should be sufficient; very sandy soils and/or large amounts of rainfall may lead to greater requirements for N; surface-broadcast phosphorus will be quickly immobilized in the soil before it reaches the root zone; if required, phosphorus should be applied prior to planting, & then subsequently a soluble form may be injected or applied via the drip system; it is important not to apply excessive amounts of nitrogen because this will produce excessive vegetative growth at the expense of flower bud production; excessive amounts of potassium could negatively affect fruit production & quality.

Leaf Tissue Analyses - leaves should be collected after harvest, between late-July & mid-August.

Soil Analyses - composite samples taken in fall or spring.

Monitoring for Disease & Insect Problems - buds, flower & fruit clusters, leaves, stems & branches should be examined weekly from the time of bud break for signs of insect pests or disease; a magnifying glass is very useful; clusters may be tapped gently on a white sheet of paper to shake out insect pests & the buds; flowers or fruit may also be pulled off of the cluster to make examination easier.

Applications of Insecticides/Fungicides: PHI = pre-harvest interval when the specific pesticide **may not** be applied; no tank mixes may be used; refer to pesticide labels to ensure that proper rates are used; rates that are too low may reduce efficacy of the pesticide; rates that are too high may be toxic to the crop, and/or may create toxic residue levels; shorter pre-harvest intervals also may create toxic residue levels. For control of Entomosporium leaf and berry spot, use either Kumulus or Topas; however, if Topas is used, an application of Kumulus prior to harvest may be necessary.

Harvest - begin when branches or plants are half to two-thirds fully ripe; this depends on plant source (seedling or clonal), cultivar, season & method of harvest; two to three harvests may be more economical if ripening is very uneven.

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