Saskatoon Berry Bud and Bloom Stages – Pests and Pest Management Options

Every year, Saskatoon berry producers are faced with the challenge of preventing and managing pests in their orchards. These pests (whether disease or insect pest) occur naturally in wild stands and, at this point, are essentially present in most orchards on the Prairies. Many of these pests can be tough to recognize or locate in an orchard, as they lurk in hard to reach areas. Management can be challenging, as the most sensitive or most effectively controlled stages are only active for short times. Most controls are protective or preventative, rather than curative.

Most chemical controls are recommended to be applied at specific botanical stages of the Saskatoon berry, which coincide with specific points within pest life cycles or are timed to provide a window of protection for sensitive plant parts. These stages are somewhat generic, but can be used as a guide for effective chemical control application.

The following is a general outline of the different stages of leaf and flower bud development, from bud break through to fruiting, with associated pests and registered chemicals. It should be noted that the rate of development through these stages can vary, depending on seasonal weather conditions and regional climatic influences, and as such, pictures and information should only be used as a general guide. While specific products may be applied at a number of different stages, pesticide labels should be carefully consulted for appropriate application rates and the number of applications that are allowed per season. Application costs should also be considered as well as whether the control product is actually required.

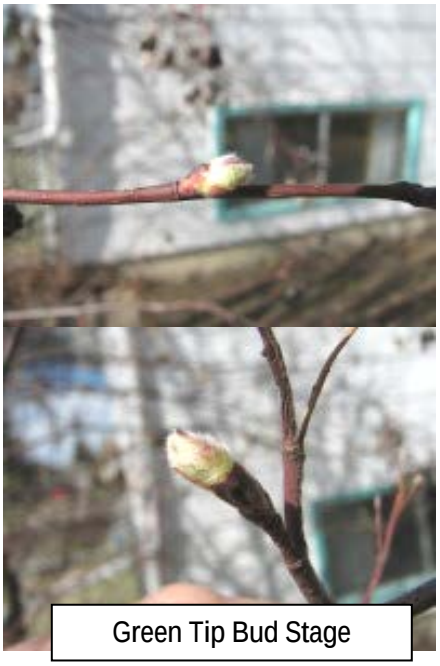
Dormant Bud Stage

NOTE – Listed pesticides are registered for application at the various times indicated, however, producers should consider all relevant factors when making application decisions. Not all applications will be required each season.

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Saskatoon Bud Moth (egg stage), leaf rollers	Bartlett Superior 70 Oil (Dormant Oil) • General Cleanup spray	Apply before or after bud break (this stage or silver tip stage) • Max 1x application/year
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	Apply at bud break & at 10-14 day intervals • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/season
Bacterial Blight (*Pseudomonas syringae*) - suppression	Serenade MAX / ASO / OPTI (Biofungicide - *Bacillus subtilis*)	Apply before fall rains & again during dormancy

Silver Tip Bud Stage

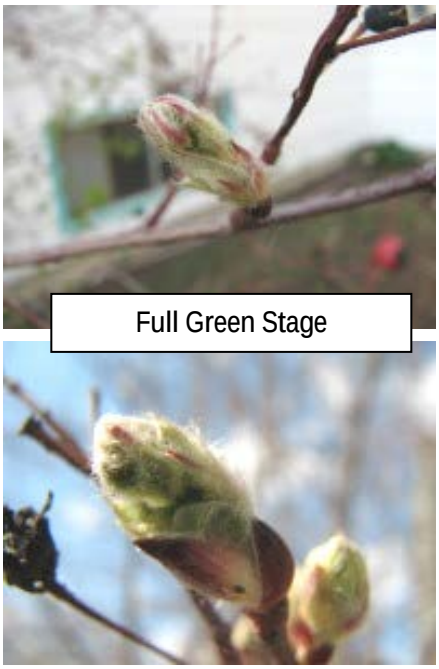
Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Saskatoon Bud Moth (egg stage), leaf rollers	Bartlett Superior 70 Oil (Dormant Oil)	Spray before bud break (apply at dormant or silver tip stage) • Check bud axils for eggs • Max 1x application/year
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year



Green Tip Bud Stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Saskatoon Bud Moth (SBM laying eggs; hatching larvae) Tarnished Plant Bug (wintering TPB adults feeding on fruit buds) Other Plant Bugs	Decis 5.0EC / Poleci 2.5EC (deltamethrin 50g/L / 25g/L)	1st Decis application • May be effective as late as tight cluster stage • 21 day PHI
Saskatoon Bud Moth	Matador 120EC / Warrior (lambda-cyhalothrin 120g/L / 122g/L)	1st of 2 possible applications • Max 2 applications • 21 day PHI • 10-15 days between applications
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year

NOTE – Listed pesticides are registered for application at the various times indicated, however, producers should consider all relevant factors when making application decisions. Not all applications will be required each season.

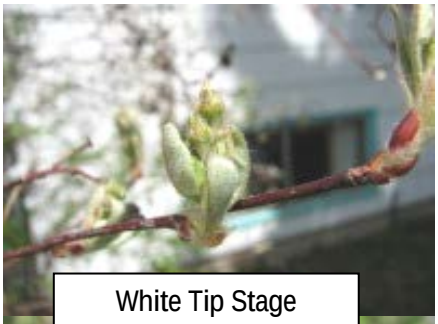


Full Green Stage

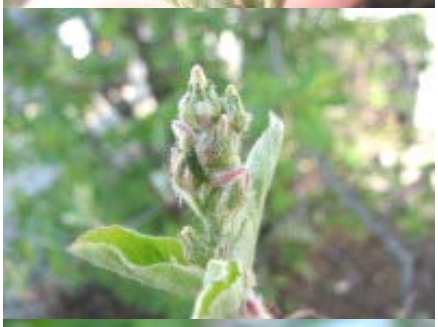
Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Saskatoon Bud Moth	Decis 5.0EC / Poleci 2.5EC (deltamethrin 50g/L / 25g/L) • Delayed timing for SBM control (see Green Tip Stage)	Green tip stage is the preferred stage for application • 21 day PHI
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year

Tight Cluster Stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Saskatoon Bud Moth	Decis 5.0EC / Poleci 2.5EC (deltamethrin 50g/L / 25g/L) • Delayed timing for SBM control (see Green Tip Stage)	Green tip stage is the preferred stage for application • 21 day PHI
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year



White Tip Stage



Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year
Entomosporium Leaf & Berry Spot – suppression	Switch 62.5WG (cyprodinil 37.5% / fludioxinil 25.0%) Cyproflu (cyprodinil 37.5% / fludioxinil 25.0%)	Apply during early bloom – can be applied when petals start to show or earlier (if disease is present) • Max 3x applications/year
Entomosporium Leaf & Berry Spot Saskatoon Berry / Juniper Rust Coincidental control of Brown rot	Fitness / Jade / Prozol / Topas / Propi Speed / Propi Express / Mission 418 EC / Bumper 432EC (propiconizole 250, 418 or 432g/L)	Persistent cool, wet weather • 1st of max 3 applications • Apply to point of runoff • 38 day PHI
	Funginex DC (triforine 190g/L)	Spray to point of drip • 60 day PHI
	Pristine WG (boscalid 25.2% / pyraclostrobin 12.8%)	Apply prior to disease development • 7-14 day interval • Max 4x applications/year (2 recommended) • 29 day REI / 0 day PHI
Oblique-banded leafroller; spanworm; winter moth	Success 480SC / Entrust 80W Naturalyte (spinosad 480g/L / 80%); Entrust Insecticide (spinosad 240g/L)	Apply at time of egg hatch or to small larvae • 7-10 day intervals • Max 3x applications/year • 3 day PHI • Apply higher rate for larger larvae • Larvae may become more exposed as buds flush

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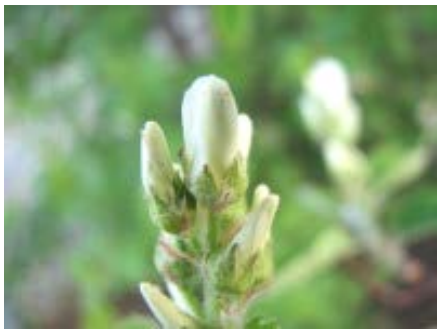


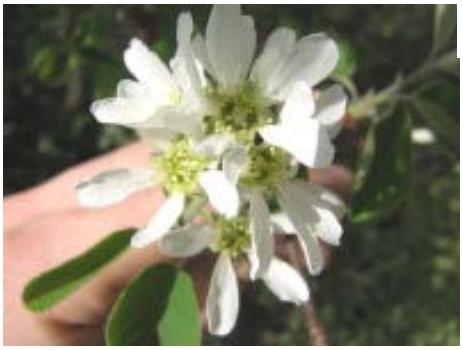
Balloon or Tube Stage

NOTE – Listed pesticides are registered for application at the various times indicated, however, producers should consider all relevant factors when making application decisions. Not all applications will be required each season.

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Saskatoon Bud Moth Tarnished Plant Bug Other Plant Bugs Saskatoon Sawfly Hawthorn Weevil Apple Curculio	Decis 5.0EC / Poleci 2.5EC (deltamethrin 50g/L / 25g/L) • Toxic to most pollinators	2nd of 3 allowed applications • Apply to both sides of orchard rows • Apply prior to 25% bloom • 21 day PHI
Fireblight – suppression	Bloomtime Biological FD Biopesticide (*Pantoea agglomerans*) Kasumin 2L (Kasugamycin 2.00%)	Make 1st of maximum 2 applications at 15-20% bloom • 0 day PHI Begin applications at bloom and continue every 3-7 days
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14d intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year
Entomosporium Leaf & Berry Spot – suppression	Switch 62.5WG (cyprodinil 37.5% / fludioxinil 25.0%) Cyproflu (cyprodinil 37.5% / fludioxinil 25.0%)	Apply during early bloom – repeat after 7-10 days • Max 3x applications • 10 day REI
Entomosporium Leaf & Berry Spot Saskatoon Berry / Juniper Rust	Fitness / Jade / Prozol / Topas / Propi Speed / Propi Express / Mission 418 EC / Bumper 432EC (propiconizole 250, 418 or 432g/L)	May be applied as a late 1st application if weather conditions are favourable for disease development
	Pristine WG (boscalid 25.2% / pyraclostrobin 12.8%)	Apply prior to disease development • 7-14 day intervals • Max 4x applications/year (2 recommended) • 29 day REI / 0 day PHI
Powdery Mildew	Nova 40W (myclobutanil 40%)	Spray until drip • 1st of max 3 apps/year • 14 day PHI Apply preventatively – 7-14d intervals
Powdery Mildew	Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications preventatively • 7-14d intervals • 1 day PHI
Botrytis Gray Mold (*Botrytis cinerea*)	Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications at early flowering • 7-10d intervals • 1 day PHI
Phytophthora Root Rot (suppression)	Phostrol (mono & dibasic sodium, potassium & ammonium phosphites 53.6%)	Begin applications as flower petals begin to emerge • 14 day intervals

Early Flowering Stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Saskatoon Bud Moth Tarnished Plant Bug Other Plant Bugs Saskatoon Sawfly Hawthorn Weevil Apple Curculio	Decis 5.0EC / Poleci 2.5EC (deltamethrin 50g/L / 25g/L) • Toxic to most pollinators	2nd of max 3 allowed applications • Apply prior to 25% bloom • Apply to both sides of orchard rows • 21 day PHI
Fireblight – suppression	Bloomtime Biological FD Biopesticide (*Pantoea agglomerans*) Kasumin 2L (Kasugamycin 2.00%	Make 1st of maximum 2 applications at 15-20% bloom Begin applications at bloom and continue every 3-7 days



Full Flower Stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Insect pollination is considered beneficial for fruit set – pesticide application during flowering can significantly injure pollinators	No pesticides or fungicides should be applied during full bloom	• Insecticides are toxic to pollinators • Some fungicides (e.g. sulphur) can have a repellent effect

Petal Fall Stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Fireblight (suppression)	Bloomtime Biological FD Biopesticide (*Pantoea agglomerans*) Kasumin 2L (Kasugamycin 2.00%	Make 2nd of max 2 applications at full bloom to petal fall • 0 day PHI Begin applications at bloom and continue every 3-7 days
Entomosporium Leaf & Berry Spot – suppression	Switch 62.5WG (cyprodinil 37.5% / fludioxinil 25.0%) Cyproflu (cyprodinil 37.5% / fludioxinil 25.0%)	• Apply 7-10 day intervals • Max 3x applications • 10 day REI
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year
Entomosporium Leaf & Berry Spot Saskatoon Berry / Juniper Rust Some coincidental control of Brown rot may be expected	Fitness / Jade / Prozol / Topas / Propi Speed / Propi Express / Mission 418 EC / Bumper 432EC (propiconizole 250, 418 or 432g/L)	Persistent cool, wet weather • 2nd of max 3 applications • Apply to point of runoff • 38 day PHI
	Pristine WG (boscalid 25.2% / pyraclostrobin 12.8%)	Apply prior to disease development • 7-14 day intervals • Max 4x applications/year (2 recommended) • 29 day REI / 0 day PHI
Botrytis grey mould (*Botrytis cinerea*)	Serenade MAX / ASO / OPTI (Biofungicide - *Bacillus subtilis*) Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications prior to first sign of disease • 7-10 day intervals

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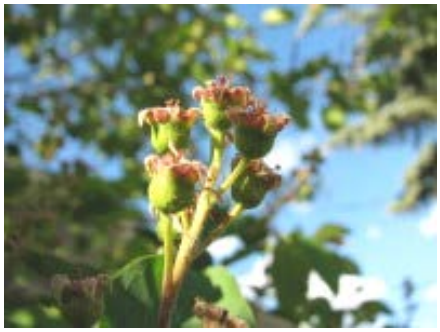
Early Green Fruit Stage



Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Hawthorn Weevil Apple Curculio • adult weevils and ovipositing curculio	Decis 5.0EC / Poleci 2.5EC (deltamethrin 50g/L / 25g/L)	3rd of max 3 allowed applications • Apply 5-10 days after petal fall • Apply to both sides of orchard rows • 21 day PHI
Saskatoon Bud Moth	Matador 120EC / Warrior (lambda-cyhalothrin 120g/l / 122g/L)	2nd possible application (after petal fall) • Max 2 applications • 21 day PHI • 10-15 days between applications
Powdery Mildew	Nova 40W (myclobutanil 40%)	Spray until drip • 2nd of max 3 applications/year • 14 day PHI
Powdery Mildew	Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications preventatively • 7-14d intervals • 1 day PHI
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year
Entomosporium Leaf & Berry Spot Saskatoon Berry / Juniper Rust Some coincidental control of Brown rot may be expected	Fitness / Jade / Prozol / Topas / Propi Speed / Propi Express / Mission 418 EC / Bumper 432EC (propiconizole 250, 418 or 432g/L)	Persistent cool, wet weather • 3rd of max 3 applications • Apply to point of runoff • 38 day PHI
	Pristine WG (boscalid 25.2% / pyraclostrobin 12.8%)	Apply prior to disease development • 7-14 day intervals • Max 4x applications/year (2 recommended) • 29 day REI / 0 day PHI
Botrytis grey mould (*Botrytis cinerea*)	Serenade MAX / ASO / OPTI (Biofungicide - *Bacillus subtilis*) Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications prior to first sign of disease • 7-10 day intervals

NOTE – Listed pesticides are registered for application at the various times indicated, however, producers should consider all relevant factors when making application decisions. Not all applications will be required each season.

Late Green Fruit Stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Powdery Mildew	Nova 40W (myclobutanil 40%)	Spray until drip • 3rd of max 3 applications/year • 14 day PHI
Powdery Mildew	Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications preventatively • 7-14d intervals • 1 day PHI
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • Do not apply within 30 days of mineral oil application • Max 8x applications/year
Entomosporium Leaf & Berry Spot Saskatoon Berry/Juniper Rust Coincidental control of Brown rot may be expected	Pristine WG (boscalid 25.2% / pyraclostrobin 12.8%)	• May be applied at this stage rather than early green fruit stage – disease pressure related • 29 day REI / 0 day PHI
Botrytis grey mould (*Botrytis cinerea*)	Serenade MAX / ASO / OPTI (Biofungicide - *Bacillus subtilis*) Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L /	Begin applications prior to first sign of disease • 7-10 day intervals

Red Fruit Stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • *Not recommended at late stages due to strong sulphur odours* • Do not apply within 30 days of mineral oil application • Max 8x applications/year
Botrytis grey mould (*Botrytis cinerea*)	Serenade MAX / ASO / OPTI (Biofungicide - *Bacillus subtilis*) Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications prior to first sign of disease • 7-10 day intervals

NOTE – Listed pesticides are registered for application at the various times indicated, however, producers should consider all relevant factors when making application decisions. Not all applications will be required each season.

Mature Fruit Stage (approx. mid July) *

** depending on season & location*

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Entomosporium Leaf & Berry Spot	Kumulus DF (80% sulphur) Microthiol Disperss (80% sulphur)	May be necessary if moderate to severe infection in previous year • May be applied at bud break and at 10-14 day intervals (1 day PHI) • *Not recommended at late stages due to strong sulphur odours* • Do not apply within 30 days of mineral oil application • Max 8x applications/year
Woolly Elm Aphid – suppression Woolly Apple Aphid - suppression	Admire 240F (imidacloprid 240g/L) (systemic insecticide) Alias 240SC (imidacloprid 240g/L) (systemic insecticide)	Apply as a soil drench when 75-100% of aphid migration is completed (typically early to mid-July) • 14 day PHI
Botrytis grey mould (*Botrytis cinerea*)	Serenade MAX / ASO / OPTI (Biofungicide - *Bacillus subtilis*) Luna Privilege (fluopyram 500g/L) / Luna Tranquility (fluopyram 125g/L / pyrimethanil 375g/L)	Begin applications prior to first sign of disease • 7-10 day intervals

Post-Harvest Stage

(Late July – Early August) *

** depending on season & location*

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Woolly Elm Aphid Woolly Apple Aphid	Orthene 75% SP (acephate) (systemic insecticide)	Inject with a probe 15cm (6 inch) from plant at 4 locations around each plant • Apply 1x per season (mid-July to early August) • 11 month PHI

Dormant &/or Summer Applications – non-specific or variable stage

Pests that may be controlled at this stage	Chemicals registered for use at this stage	Other comments
Aphids, mites, mealy bugs, scales	Vegol Crop Oil (canola oil 96%)	Dormant and growing season spray • Begin applications when pests appear – repeat at 7-14 day intervals as needed
Aphids	Sivanto Prime (flupyradifurone 200g/L)	Apply as directed foliar spray ensuring thorough coverage • 3 day PHI • Min 7 day intervals • Max 3-4 apps

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