Black Army Cutworm

Black army cutworm (cutworm) defoliation is only an issue when the planting of recently burned areas coincides with the emergence of cutworm caterpillars, which feed on a range of hosts, including conifer seedlings. Defoliation of seedlings and ground vegetation is highly visible during outbreaks. Generally, there is no significant seedling damage but in some cases seedling mortality can be severe. This document describes the life cycle, the sequence of events leading to an outbreak, distribution and host susceptibility, and detection and management.

Life Cycle:

Black army cutworm has one generation per year. Adults (moths) emerge and fly from early July to mid-September and lay eggs in the soil approximately two to five weeks after emergence. The eggs hatch in the fall and the newly hatched larvae feed sporadically and then overwinter in the duff. Active larval feeding begins immediately after snow melt (April/May) and occurs at night, but the larvae may feed during daylight if night temperatures are too low. Feeding is completed within six weeks of emergence. Larval development proceeds through five to six instars before pupation. The pupal stage lasts three to four weeks.

Figure 1. Black army cutworm life history.

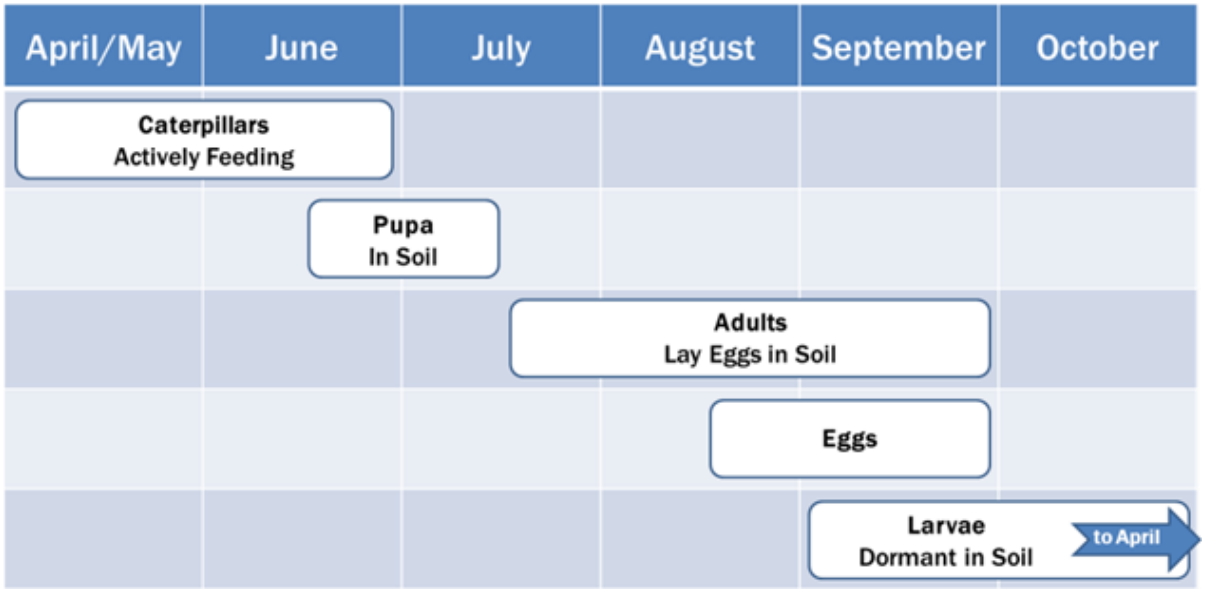


Table 2. Description of the Black Army Cutworm life stages:

Adult:	Blackish brown moth, 40 mm wingspan. Black forewing with pale yellow round kidney shaped patches.
Larva:	Mature cutworm is about 4 cm long, velvety black above, greyish below with two narrow white stripes on each side of its body.
Pupa:	Light glossy brown, 2.5 cm long. Distinctive two-pronged terminal spines.
Egg:	Creamy white, spheroid, flattened on underside, 0.7 mm diameter

Figure 2. Black army cutworm adult (left) and caterpillars (right).

Distribution:

Black army cutworm outbreaks have been recorded throughout the interior of British Columbia (B.C.). Certain biogeoclimatic zones are prone to cutworm outbreaks and considered high hazard zones following wildfire or prescribed burning. These zones include but are not limited to:

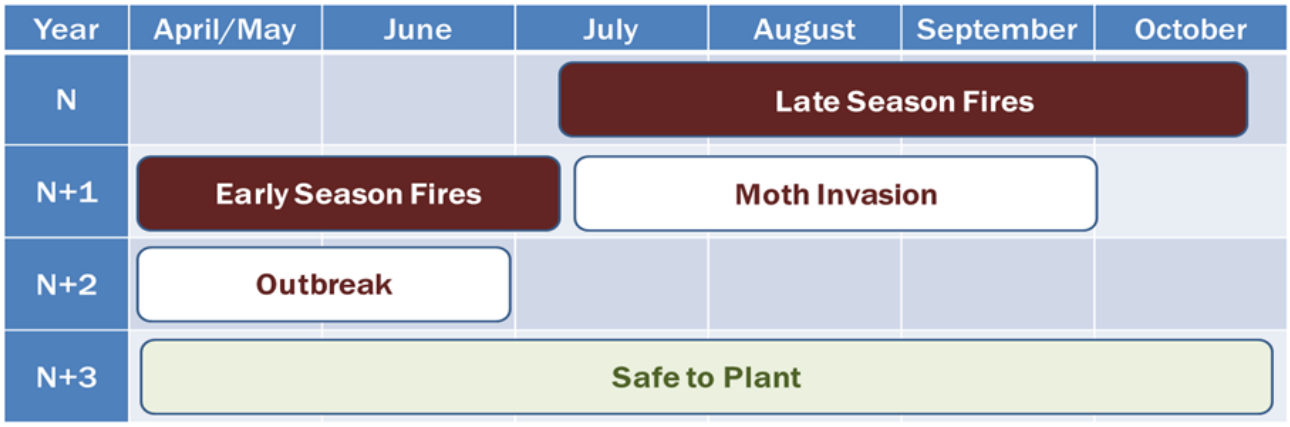
- Engelmann Spruce Subalpine Fir (ESSF),
- Montane Spruce (MS),
- Sub-boreal Spruce (SBS)
- Interior Cedar Hemlock (ICH).

The first signs of cutworm feeding are "shot-holes" in leaves of pioneer herbaceous vegetation. If planting proceeds despite such damage to herbaceous plants, as few as one larva per m^2 (site dependent) can cause serious defoliation and bud damage on conifer seedlings. At the beginning of an outbreak, larval feeding is usually clumped in distinct patches (south facing slopes are more susceptible or drought-prone sites). Little or no sign of feeding can be seen between patches. Patches can enlarge and coalesce if the larvae migrate and consume new plants. Larvae are not normally observed during the day but can be found buried within the litter or hidden within stalks or unopened leaves of certain plants. If palatable food becomes scarce or the soil becomes too wet, larvae can be observed on the surface searching for food.

Relationship with wildfires and prescribed fires:

All cutworm outbreaks have been associated with wildfires or prescribed fires. Moths congregate on sites that have been burned early in the spring or during the previous summer or autumn. If a spring burn has occurred, defoliation is usually noticeable one year later. If a mid- to late fall burn has occurred, defoliation, if it occurs, will not be noticeable until approximately 1.5 years later.

Figure 3. Black army cutworm outbreak timing following late and early season fires.



Host Susceptibility:

Black army cutworm prefers to feed on herbaceous vegetation. If the plantation is well-stocked with herbaceous vegetation, damage to conifers will be minimal except for western larch (*Larix occidentalis)* which is the most preferred conifer. When populations are low, the larvae feed only on preferred plant species; when moderate, damage to seedlings depends to some extent on the abundance of other plant species preferred by the cutworm; when populations are high, foliage of most conifers and deciduous plants are consumed. Preferred species include: valerian, western meadowrue, common horsetail, fireweed, false hellbore, heart-leaved arnica, false solomon's seal, hooker's ferrybelle, rosy twistedstalk, honeysuckle, **western larch**, saskatoon berry, rose, currants, thimbleberries, birch leaved spirea, bunchberry, soopalallie, aspen, willow, **Douglas-fir**, **Engelmann/hybrid spruce** and **lodgepole pine**.

Impacts of cutworm outbreaks may not be as severe as initially thought. However, where significant impacts to conifers occur, they are related to the timing of feeding, the severity of defoliation, bud damage, and stress. Stresses that may cause mortality are drought, poor planting methods and low-quality stock. Survival of stock should be assessed in the fall following planting or the following year.

Detection and Management:

Cutworm damage can only be minimized through preventative measures that are based on moth monitoring and susceptibility rating. If monitoring was not completed it is recommended that ground surveys be completed prior to spring planting to identify potential cutworm risks and plan for flexibility with planting operations.

Sites experiencing poor growth and those prone to drought are the most susceptible to significant conifer damage. These zones should undergo moth monitoring using pheromone traps during the fall, immediately following a wildfire or prescribed burn.

By early July, pheromone traps should be placed on susceptible burned sites. It is recommended that Multipher II traps are used with a Vapona strip in the bottom of the trap to immobilize trapped moths.

Trap catches collected in early fall will predict the potential population of insects on the site in the following spring (Table 1). If outbreaks do occur, planting crews should be moved to alternate, unattacked blocks until the insects have pupated. A few cutworm larvae should be collected and, using table 2, estimate the length of delay before planting may be resumed.

Table 2. Risk rating based on pheromone trap catches using green Multipher II traps.

Number of moths caught per trap	Risk Rating	Recommended Tactic
<350	Low	No change to planting schedule
350-1200	Medium	Monitor larval feeding in spring before planting. If feeding observed with 14 or more days feeding left (see Table 2), delay planting.
>1200	High	Monitor larval feeding in spring; prepare for planting delay by finding alternate planting sites

The relationship between trap catches, cutworm populations and damage should be recorded to calibrate the hazard and risk rating system to local conditions.

Table 3. Estimation of planting delay based on larval development.

Larval Head CapsuleWidth (mm)	Instar	Planting Delay (Days)*
0.34 - 0.36	I	42 to 60
0.51 - 0.54	II	35 to 50
0.70 - 0.90	III	28 to 40
1.02 - 1.38	IV	21 to 30
1.77 - 2.16	V	14 to 20
2.42 - 3.35	VI	7 to 10

*Duration is approximate and can vary considerably with weather

The use of chemical insecticides to control cutworm is not recommended since it is neither operationally feasible nor warranted. No other direct control methods are available.