



BRITISH
COLUMBIA



CLASSIFICATION OF BEETLE-ATTACKED TREES — MOUNTAIN PINE BEETLE

CATEGORY	ATTACK CODE	DESCRIPTION
Current attack	C	Successful attack from the most recent beetle flight. Foliage is green. Usually pitch tubes on lower trunk of tree. Reddish brown boring dust around base of tree. Boring dust gives pitch tubes a reddish or orangish colour and granular texture. Blue stain may be present. Woodpecker activity may occur on the tree trunk, leaving bark flakes on the ground or snow. Any eggs present in "niches" along the parent gallery or any mountain pine beetle larvae present in side galleries developing at right angles to the parent gallery.
Two-year Cycle: One-year-old attack with brood	Y1	Attack from second most recent flight. Symptoms similar to brood flown (Y2) trees, foliage is yellow to red but live beetles are still present ; removal of bark reveals characteristic gallery pattern with brood larvae and/or adults present. Some pupae and emergence holes may also be present.
Brood flown	Y2	Attack from second most recent flight. Foliage is red, and no live beetles are present. Boring dust mixed in hard, dry, dark yellow pitch tubes. Some checking may have occurred. Woodpecker feeding on bole likely. Blue stain obvious. Pupal chambers must be present to indicate past successful MPB activity. Emergence holes present.
Strip attack	S	Identifies trees on which attack covers less than 50% of the circumference of the bole. Strip attack may be combined with other attack codes.
Pitchout	P	Unsuccessful attack. Combine with other codes if not from most recent flight. With pitch-filled parent galleries and no brood production. Trees may have green foliage. Little or no boring dust on bole. Pitch tubes are smooth creamy yellow in colour with little boring dust mixed in. Peel the bark to determine if the tree has sealed off attack. No successful blue stain.
Grey attack	X	Trees attacked two or more years ago. Foliage is sparse, and the tree will not be confused with Y1 or Y2 trees in the next year's aerial surveys. Empty galleries without live brood. Exit holes present.
Healthy	H	Unattacked.



CLASSIFICATION OF BEETLE-ATTACKED TREES — SPRUCE BEETLE

ATTACK CODES 1- 2: MOST RECENT YEAR OF FULL ATTACK: 19____ (CODE 2 IF < 50% OF STEM ATTACKED.)

SURVEY DATE:	JULY - AUGUST		SEPTEMBER - OCTOBER*		NOVEMBER - MAY*	
INDICATOR:	2-YR. CYCLE	1-YR. CYCLE†	2-YR. CYCLE	1-YR. CYCLE†	2-YR. CYCLE	1-YR. CYCLE†
PITCH TUBES	sticky	still pliable	still pliable	stiffening	stiffening	stiffer
FRASS	dark brown powder	between bark scales	between bark scales	scarce	scarce	scarce
WOODPECKER	light - moderate	light - moderate	moderate	moderate - heavy	heavy	heavy
EXIT HOLES	--	--	--	variable	--	variable
PARENTS	alive	alive	dying	dying	dead	dead
LARVAE	3 - 7 mm	6 - 7 mm	5 - 7 mm	--	5 - 7 mm	--
PUPAE	--	many	--	few	--	dead
IMMATURE	--	some	--	many*	--	many*
OTHER INSECTS	few	some predators and other beetles				
SAPWOOD	still moist	drying	drying	dry	dry	dry
BLUE STAIN	light - shallow	moderate - deepening	moderate - deepening	heavy - deepening	heavy - deepening	heavy
CROWN SYMPTOMS	none	none	none	none	none	none

* check root collar

† note percentage of population on one-year cycle in comments



CLASSIFICATION OF BEETLE-ATTACKED TREES — SPRUCE BEETLE

ATTACK CODES 3 - 4: SECOND MOST RECENT YEAR OF FULL ATTACK: 19__ (CODE 4 IF < 50% OF STEM ATTACKED.)

SURVEY DATE:	JULY - AUGUST		SEPTEMBER - OCTOBER*		NOVEMBER - MAY*	
	2-YR. CYCLE	1-YR. CYCLE†	2-YR. CYCLE	1-YR. CYCLE†	2-YR. CYCLE	1-YR. CYCLE†
PITCH TUBES	stiffening	stiff	stiff	brittle	brittle	brittle
FRASS	--	--	--	--	--	--
WOODPECKER	moderate	moderate - heavy	heavy			
EXIT HOLES	--	some - many	variable	many	variable	many
PARENTS	dead / dying	dead	dead	dead	dead	dead
LARVAE	5 - 7 mm	--	--	--	--	--
PUPAE	many	--	some	--	--	--
IMMATURE	some	few*	many*	--	many*	--
OTHER INSECTS	predators and secondary beetles					
SAPWOOD	very dry	very dry - some check				
BLUE STAIN	moderate - heavy	heavy - deep				
CROWN SYMPTOMS	none	none	thinning?	thinning?	thinning? discoloured?	

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* check root collar

† note percentage of population on one-year cycle in comments



CLASSIFICATION OF BEETLE-ATTACKED TREES — SPRUCE BEETLE

ATTACK CODES 5 - 6: THIRD MOST RECENT YEAR OF FULL ATTACK: 19__ (CODE 6 IF < 50% OF STEM ATTACKED.)

SURVEY DATE:	JULY - AUGUST		SEPTEMBER - OCTOBER		NOVEMBER - MAY	
INDICATOR:	2-YR. CYCLE	1-YR. CYCLE	2-YR. CYCLE	1-YR. CYCLE	2-YR. CYCLE	1-YR. CYCLE
PITCH TUBES	pitch tubes are brittle - yellow					
FRASS	--	--	--	--		
WOODPECKER	heavy	heavy	heavy	heavy		
EXIT HOLES	many	many	many	many		
PARENTS	dead	dead	dead	dead		
LARVAE	--	--	--	--		
PUPAE	--	--	--	--		
IMMATURE	--	--	--	--		
OTHER INSECTS	ambrosia beetles and wood borers					
SAPWOOD	very dry with some check					
BLUE STAIN	heavy and deep					
CROWN SYMPTOMS	thinning - grey	thinning - grey	grey	grey		



CLASSIFICATION OF BEETLE-ATTACKED TREES — DOUGLAS-FIR BEETLE

CATEGORY	ATTACK CODE	DESCRIPTION †
Current attack	C	Attack from most recent flight. Trees with live stages of bark beetle development. Approximately 25-30% of these trees will show foliage colour change by July - August, and 50% by December of year of attack. A few exit holes may be visible.
Active	Y1	Second most recent flight. Trees with fading green, yellow, orange, red or no foliage. Second most recent flight, still containing viable beetles.
Brood flown	Y2	Third most recent flight. Trees without live brood. Empty galleries and exit holes common. One year old, and usually red or no foliage.
Strip attack	S	Attack covers less than 50% of the circumference of the bole. Strip attack may be combined with other attack codes.
Pitchout	P	Unsuccessful attack. Combine with other codes if not from most recent flight. With pitch-filled parent galleries and no brood production. Trees usually have green foliage. Peel the bark to determine if the tree has sealed off attack. No blue stain.
Grey attack	X	Trees attacked two or more years ago. Foliage is sparse, and the tree will not be confused with Y1 or Y2 trees in the next year's aerial surveys. Empty galleries without live brood. Exit holes present.
Healthy	H	Unattacked.

* Western larch blowdown must also be noted and assessed. Infested standing western larch must be noted in field cards, reports and maps. Currently infested standing Lw must be ribboned if > 20 m from a currently-infested Douglas-fir.

† See notes on next page.

GROUND DETECTION NOTES DOUGLAS-FIR BEETLE

MARCH - APRIL:

- Overwintering adult beetles are ready to emerge. 99 percent of attacked trees will show some colour change, varying from yellow to "grey" as needles gradually fall off. Current-attack trees sometimes drop needles with minimal colour change.
- Many grey and red trees, without obvious external evidence of bark beetle emergence, will still contain beetles and should be checked to ascertain whether beetles are present.
- Exit holes are round 2.5 - 3.0 mm holes coming straight out of the bark, produced when beetles emerge in spring.

MAY - JUNE:

- The obvious evidence of new attack is bright reddish-brown boring dust on bark at the entrance holes of galleries.
- Fresh pitch may be visible streaming down the bole. No pitch tubes are formed.
- Trees newly killed by *Armillaria* root disease may have red foliage at the time of beetle attack.

CHECK THE SHADED SIDE OF TREES.

JULY AND AUGUST:

- 25 to 30 percent of current-attack trees will be detectable through foliage colour change.
- A few exit holes may be present on current-attack trees following re-emergence of some females.
- Most grey and red trees with large numbers of emergence holes, major checks and sloughing bark will probably not contain beetles. Some frass on bark. Watch for BARK MINERS, AMBRROSIA BEETLES, WOOD BORERS.
- Look for frass on upper bole (> 2 m height), which should indicate Douglas-fir beetle attack.

DECEMBER:

- By mid-winter approximately 50 percent of the current-attacked trees will be red, and 15 percent grey.
- Woodpecker activity on the upper bole is a good indicator of bark beetle attack.