

Yellowstone National Park
White Pine Blister Rust Control

Analysis of
White Pine-Ribes Distribution-Disease Survey - 1965
Bryce Canyon National Park-Cedar Breaks National Monument, Utah

By

John N. Reeves, Forestry Technician
Malcolm J. Berg, Camp Superintendent

INTRODUCTION

A systematic white pine ribes distribution and disease survey, recommended by the Directors of the Midwest and the Southwest Regions and park staff officers concerned, was conducted within Bryce Canyon National Park and Cedar Breaks National Monument. This survey, proposed and initiated by Forester John C. Gynn (deceased), was completed by the Forestry Technician and experienced blister rust control personnel from Yellowstone National Park.

PURPOSE

The purposes of the survey were to determine if the fungus disease Cronartium Ribicola (White Pine Blister Rust) is present; the amount and distribution of the two white pine species, Pinus flexilis and P. aristata; and the amount and distribution by species of the genus Ribes, the alternate host plant for White Pine Blister Rust. Topography and other pertinent data, as to micro areas, that may indicate favorable conditions for inception of the disease is included, enabling the use of this report and maps in the planning and execution of future scouting inspections.

SURVEY PROCEDURES

The data was taken on continuous strips transecting the area at regular intervals of 10 chains in high use areas and at intervals of 20 chains in the remaining area, representing approximately a 1 percent cruise. The main roads at Bryce Canyon National Park and Cedar Breaks National Monument were used as a base and strips were run generally at right angles to the road, stopping at the canyon rim or the boundary. Due to the hazard and difficulty of surveying in the canyon areas, only random checks and observations were made below the rims of the canyons.

Additional checks were made in selected areas outside the boundaries where micro conditions indicated favorable condition for inception of the disease.

The resulting data was plotted on 8 inch to 1 mile maps for purpose of analysis and future scouting. Four maps were needed for Bryce Canyon and one at Cedar Breaks. These maps were sub-divided where indicated by white pine concentrations to further aid analysis.

ACKNOWLEDGEMENTS

We are grateful for the assistance of the following people:

Chief Ranger Bob Morris and Park Ranger Harold Thompson at Bryce Canyon, and Park Ranger William Binnewies at Cedar Breaks of the National Park Service, and Foresters Galen Trostle and Alfred Tegethoff of the U. S. Forest Service, Intermountain Region.

BRYCE CANYON NATIONAL PARK

Bryce Canyon is represented on four maps with the strips at 20 chain intervals and ten chain intervals in the headquarters area, running east and west from park boundary to canyon rim. Various drainages in the Podunk Creek-Sevier River area were also examined. The maps and areas are numbered to correspond. The entire area has scattered clumps and groves of white pine, reaching greater concentrations per acre in the areas above 8,500 feet (areas 3 and 4) and along the canyon rim and various knolls and points visible from the rim at similar elevations. Ribes cereum was the predominate species found with no other species reported within the park. Scattered R. inerme and R. setosum were found adjacent to the park in the Podunk drainage, and R. aureum in the vicinity of Tropic, Utah. White pine averaged 9.2 trees per acre sampled and ribes averaged 19.1 per acre. No infection was found on white pine or ribes in Bryce Canyon.

In general, the low susceptibility of R. cereum and the relative scarcity of the plant seem to preclude the likelihood of infection in Bryce Canyon. However, despite low susceptibility and unfavorable sites for development of rust, one species could carry enough rust to cause damage to closely associated pine over a period of years.

Furthermore, the nearby area, with regard to ribes species and possible infection, could contribute to the possibility of infection in Bryce Canyon.

Future scouting and surveillance would seem to be advisable.

Area Number 1

Area number 1 (map 1) is the northernmost area surveyed, beginning at the park boundary and encompassing the headquarters and village area and overlooking Campbell and Fairyland Canyons. The 1,800 acre area is transected by the main park road from north to south. This road served as the base for the survey strips located at 10 chain intervals throughout this high use area.

For the purpose of analysis, the area was divided into smaller blocks.

Block number 1, consisting of 650 acres, is predominately ponderosa pine with only scattered white pine over the area and along the canyon rim.

Block number 2, containing 1,150 acres, encompasses the headquarters area. Ponderosa pine predominates, but white pine is scattered throughout the area, averaging about 4.8 white pine per sample acre. The white pine seems to be in concentrations and patches over the area and along the rim of the canyon. Because of the concentrations, especially along the rim and those in view at higher elevations in the canyon, these areas could be protected by individual canker treatment by antibiotic and by selective pruning should infection occur and control be deemed advisable.

The area averages 4.1 white pine per sample acre. Excluding block 1, the remaining headquarters area averages 4.8 white pine per sample acre.

Area Acres	1,800
Strip Acres	21.3
Total White Pine	87
White Pine Per Sample Acre	4.1
Percent of Cruise	1.1 of 1 percent

Area Number 2

Area number 2 (map 11) adjoins the headquarter unit on the north and includes the scenic overlooks; Paria View, Bryce Point, Inspiration Point, and Sunset Point. The area overlooks Bryce Canyon and the northern drainages of Sheep Creek. The main park road transects this 4,000 acre area and was used as the base for the survey strips located at 20 chain intervals.

For analysis, the area was divided into three blocks.

Blocks 2 and 3 (total acreage 2,490) are predominately ponderosa pine with scattered white pine averaging about .6 pine per acre sampled. Again, the canyon rim and areas in the canyon visible from the rim have the higher concentrations.

Block 1, containing 1,510 acres, contains the scenic points and overlooks Bryce Canyon. Ponderosa pine predominates, but white pine is present in groves at a much higher concentration than blocks 2 and 3, averaging 8 trees per acre sampled. This block joins the headquarters area on map 1 and the same scattering of white pine seems to continue through both units.

Block 1 would lend itself to individual canker treatment and selection pruning should infection occur.

Area Acres	4,000
Strip Acres	41.5
Total White Pine	148
White Pine Per Sample Acre	3.6
Percent of Cruise	.01 of 1 percent

Area Number 3

Area number 3 (map III) is a 2,270 acre area overlooking Swamp Canyon and Willis Creek. This area approaches the 8,500 foot mark in elevation so the dominant ponderosa pine is replaced by a spruce-fir type interspersed with white pine. Because of the consistency of the white pine in this area, it was not divided, but examined as a whole.

This area averages 10.1 white pine per sample acre and follows the general pattern established in the northern portions of scattered clumps and groves in the area and along the canyon rim and in the canyon itself where visible at similar altitude.

Area Acres	2,270
Strip Acres	18.4
Total White Pine	186
White Pine Per Sample Acre	10.1
Percent of Cruise	.8 of 1 percent

Area Number 4

Area number 4, consisting of 2,260 acres, is the southernmost area surveyed, adjoining the canyon rim from Agua Canyon to Rainbow Point.

Since this area contained 21.4 white pine per acre sampled, it was not divided for analysis but considered as a whole. White pine are scattered throughout the area in groves with concentrations along the canyon rim following the pattern established in the northern areas. Areas 3 and 4, situated above 8,500 feet, show a marked increase in pine per acre as does area 4 in comparison with area 3.

Although areas 3 and 4 have higher concentrations of white pine, antibiotic treatment of individual cankers and selective pruning would be effective in the areas along the road and in the canyon rim overlook areas. Establishment of a protection zone might require a more extensive control program such as a basal stem method.

In conjunction with this unit, drainages of the Sevier River to the west were examined. White pine and ribes concentrations similar to area number 4 were found. These areas might bear watching for future infection occurrence.

Area Acres	2,260
Strip Acres	26.5
Total White Pine	568
White Pine Per Sample Acre	21.4
Percent of Cruise	.012

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Summary

Bryce Canyon

AREA		WHITE PINE				TOTAL OTHER SPECIES	RIBES				
ACRES	STRIP ACRES	BRISTEL- CONE	LIMBER	TOTAL	PER ACRE		RIBES MONTIGENUM	RIBES CEREUM	RIBES SETOSUM	TOTAL	PER ACRE
10,330	107.7	104	885	989	9.2	29,699		2,053		2,053	19.1

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Summary

Bryce Canyon

AREA				WHITE PINE				TOTAL OTHER SPECIES	RIBES				
NUMBER	BLOCK	ACRES	STRIP ACRES	BRISTLE - CONE	LIMBER	TOTAL	PER ACRE		MONTIGENUM	CEREUM	SETOSUM	TOTAL	PER ACRE
1	1	650	2.4			5	2						
2	2	1,150	18.9			82	4.8						
TOTAL		1,800	21.3	62	25	87	4.1	4,997		13		13	.6
1	1	1,510	16.8			133	7.9						
2	2	1,660	16.4			10	.6						
3	3	830	8.3			5	.6						
TOTAL		4,000	41.5	32	116	148	3.6	8,460		250		250	.6
3													
TOTAL		2,270	18.4	10	176	186	10.1	6,688		943		943	51.3
4													
TOTAL		2,260	26.5		568	568	21.4	9,554		847		847	31.2
ALL AREAS TOTAL		10,330	107.7	104	885	989	9.2	29,699		2,053		2,053	19.1

CEDAR BREAKS NATIONAL MONUMENT

Survey strips at Cedar Breaks were run at 20 chain intervals from boundary to the canyon rim. Because of the difficult terrain, only general scouting was done in the amphitheater. Ashdown, Arch, and Shooting Star drainages were examined in this manner. White pine occurs along the rim and in the area between the road and boundary. There are also clumps and solitary trees in the amphitheater area. The average per acre sampled is 7.9 trees concentrated on or near the rim and generally decreasing to the north. The ribes found were R. montigenum in masses, approximately 1,200 per acre sampled, throughout the area and occasional R. cereum in the area.

As in the Bryce Canyon area, blister rust infection is possible. Though susceptibility of R. montigenum is low, the susceptibility of limber pine is high. Infection could be introduced through long exposure to nearby infection and favorable climatic conditions. Ribes species and relative susceptibility in surrounding areas and possible infection of ribes or pine in these areas might reinforce the potential of blister rust infection in Cedar Breaks. Scouting inspections should be performed.

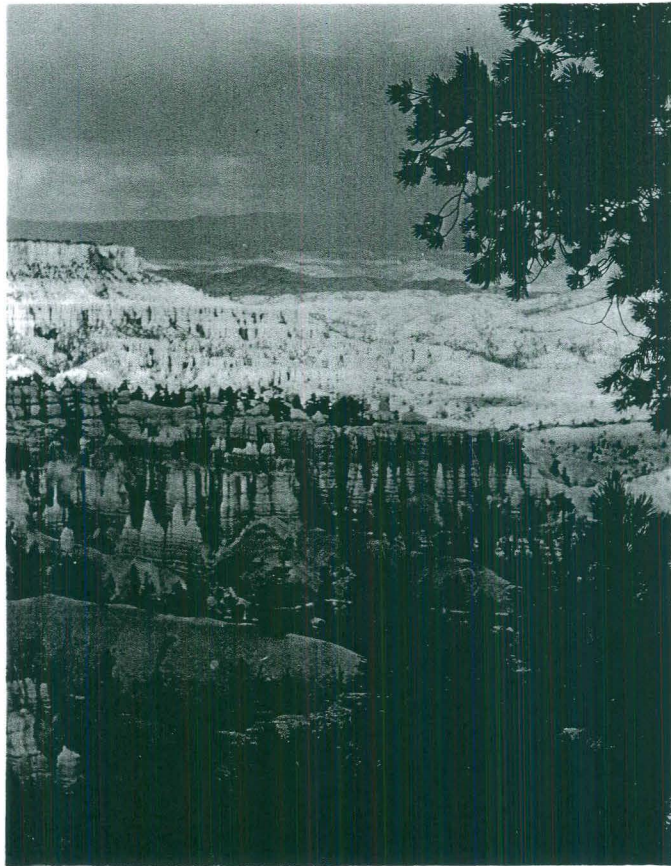
Total Acres	1,550
Strip Acres	17.3
Total White Pine	136
White Pine Per Acre Sample	7.9
Percent of Cruise	1.1 of 1 percent

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Summary

Cedar Breaks

AREA		WHITE PINE				TOTAL OTHER SPECIES	RIBES				
ACRES	STRIP ACRES	BRISTLE- CONE	LIMBER	TOTAL	PER ACRE		RIBES MONTIGENUM	RIBES CEREUM	RIBES SETOSUM	TOTAL	PER ACRE
1,550	17.3	74	62	136	7.9	4,451	21,136	43		21,179	1,224



Bryce Canyon National Park. Limber pine at one of the many view points along the canyon rim.



Cedar Breaks National Monument. Examining bristlecone pine and ribes for white pine blister rust.

