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SNOW BENDING OF SUGAR PINE AND PONDEROSA PINE SEEDLINGS

. . . injury not permanent

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ABSTRACT: Sugar pine and ponderosa pine seedlings in the Sierra Nevada, California, with stems bent by heavy snow loads were photographed the next summer and 10 years later. The photographs show that all trees recovered, leaving no permanent stem crook.

OXFORD: 423.4:174.7 *Pinus lambertiana* + 423.4:174.7 *Pinus ponderosa.*
RETRIEVAL TERMS: Pinus lambertiana; Pinus ponderosa; snow damage.

Heavy snow accumulations often injure young trees at higher elevations in the central Sierra Nevada in California. Bent stems are particularly common. But ponderosa *(Pinus ponderosa* Laws.*)* and sugar *(Pinus lambertiana* Dougl.*)* pine seedlings will recover. And even severely bent stems are straight after a few years. This was concluded from studying snow-bent ponderosa and sugar pine seedlings on the Stanislaus-Tuolumne Experimental Forest, near Pinecrest, Tuolumne County.

OBSERVATIONS

Snowfall in the central Sierra Nevada was heavy and wet in late winter and spring of 1958. At the Stanislaus-Tuolumne Experimental Forest, 1 or more inches of snow fell on 13 of 33 days during the cold and stormy March and early April. The young pines were laden with snow longer than usual. Many stems were bent or broken.

In mid-June 1958, 10 of the bent seedlings—five each of ponderosa pine and sugar pine—growing in a small clearcutting were measured and photographed.[1] Total tree heights and lengths of bent leaders were measured and the photo point staked. The sugar pines averaged 3.5 feet tall, and the ponderosa pines 6.8 feet. Leader length above the bend averaged 1.2 feet for the sugar pines and 2.8 feet for the ponderosa pines. At the time the trees were measured, development of permanent crooks appeared likely because height growth had begun and new leader growth was vertical.

In July 1968, 10 growing seasons later, the trees were remeasured and re-photographed. By then, the sugar pines averaged 11.7 feet in height and 2.6 inches d.b.h.; the ponderosa pines, 25.7 feet in height and 9.0 inches d.b.h. All trees were growing well and

had straightened their stems. None of the ponderosa pines and only two of the sugar pines showed the slightest bend in the stem at the point injured 10 years ago *(figs. 1,2).*

DISCUSSION

Examinations showed that if the tissues are not fractured, no permanent crook should result from bending of stems of sugar and ponderosa pine seedlings by heavy snow loads. Recovery from snow bend can be extremely rapid. Williams[2] observed that most severely bent coniferous seedlings and saplings in the Cascade Range of Oregon had straightened their stems by the third week of bud elongation. Fenton[3] reported similar findings for seedling Virginia pine.

Snow bending should not be ignored, however, because it can significantly reduce height growth. Williams[2] found a marked depression in height growth in the year after injury. The reduction in height growth was most severe in the trees most severely bent. And he found some species to be more susceptible than others to snow damage and, consequently, depression of height growth. We assume, therefore, that young sugar and ponderosa pines whose stems are often bent by heavy snow loads will lose height growth. Other species less susceptible to snow bending might perform better where snowfall is heavy.

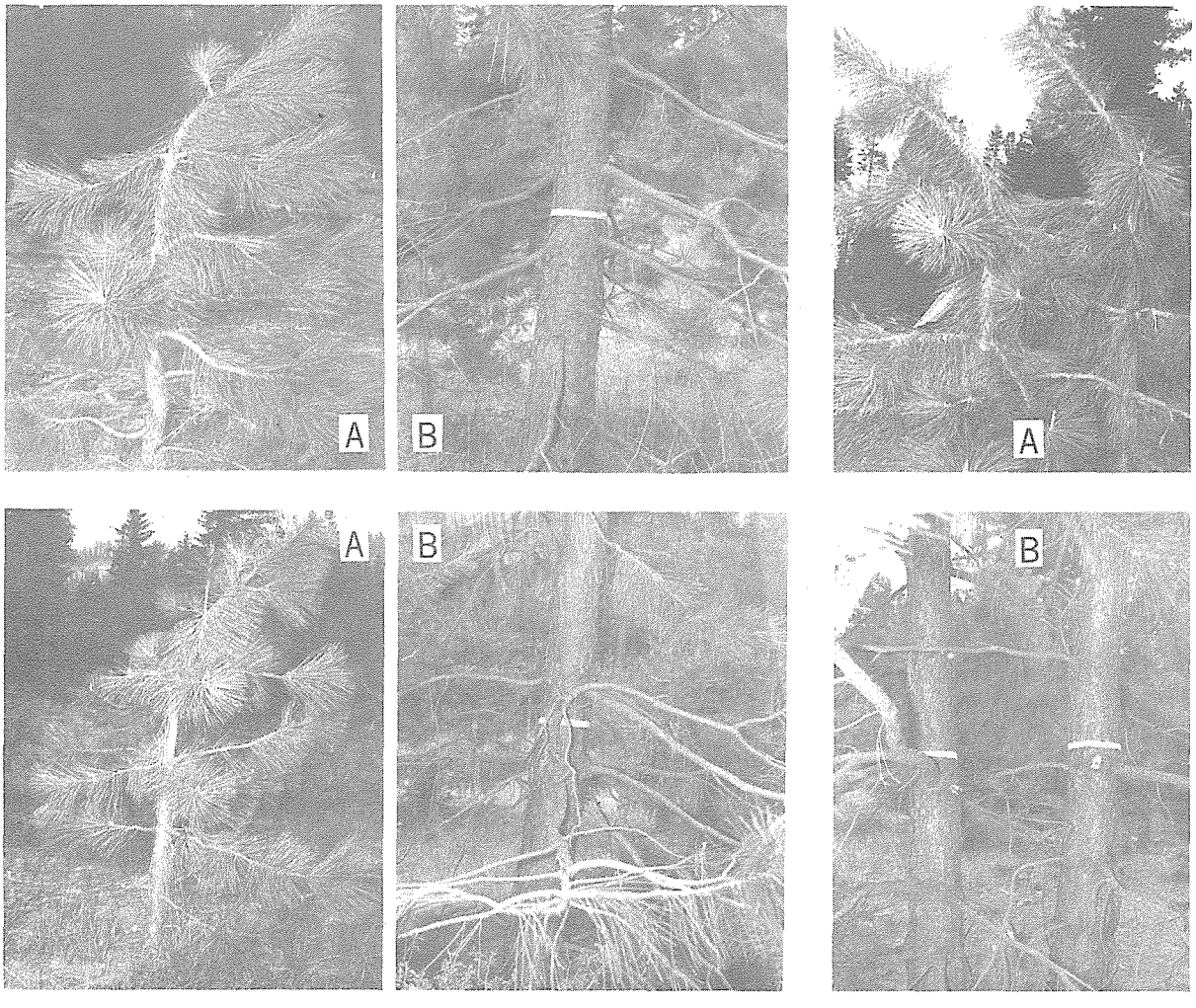

Figure 1—*Three ponderosa pines on the Stanislaus–Tuolumne Experimental Forest:* A, *mid-June 1958–summer after snow-bend damage;* B, *late July 1968–same tree 10 years later (white band shows location of old stem bend).*

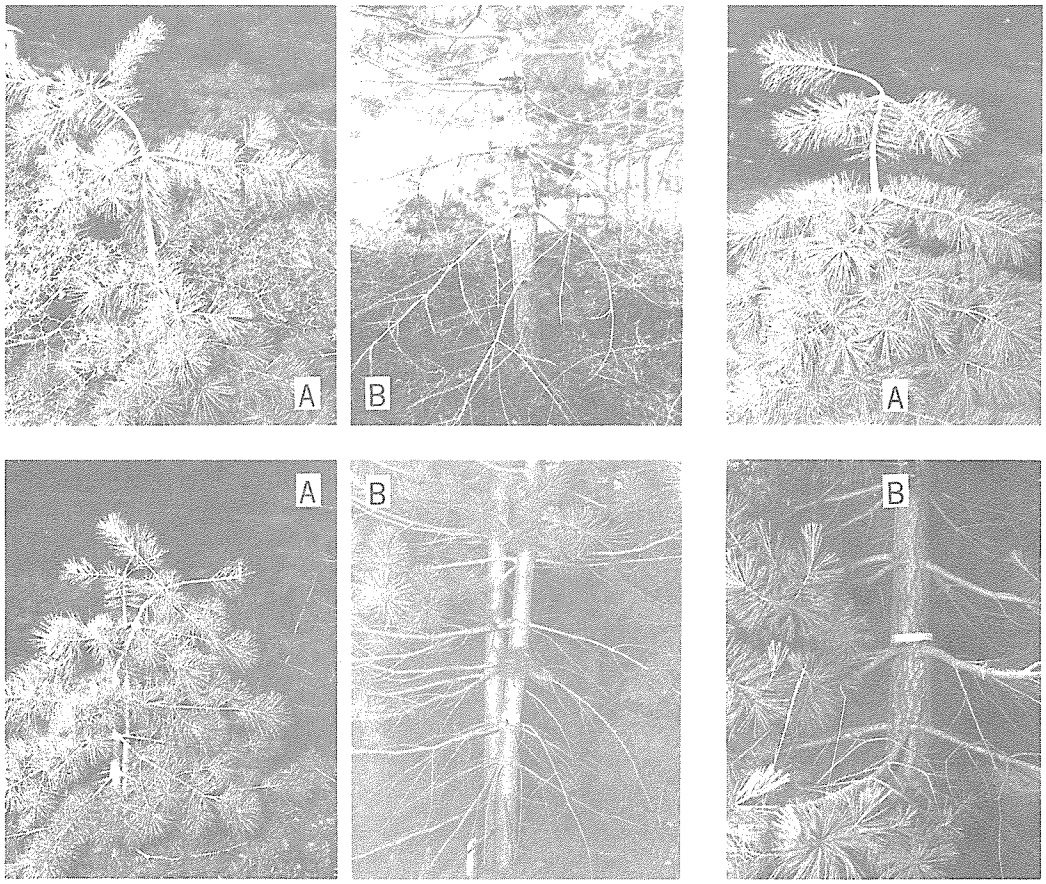

Figure 2—*Three sugar pines on the Stanislaus-Tuolumne Experimental Forest:* A, *mid-June 1958—summer after snow-bend damage;* B, *late July 1968—same tree 10 years later (white band shows location of old stem bend).*

NOTES

[1]Observations were begun in 1958 by Gilbert H. Schubert, then of the Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif., and now of the Rocky Mountain Forest and Range Experiment Station, Flagstaff, Ariz.

[2]Williams, Carroll B., Jr. *Snow damage to coniferous seedlings and saplings.* U.S. Forest Serv. Res. Note PNW-40. Pacific NW. Forest & Range Exp. Sta., Portland, Ore. 10 p. 1966.

[3]Fenton, Richard H. *Heavy snowfalls damage Virginia pine.* U.S. Forest Serv. NE. Forest Exp. Sta., Sta. Pap. 127, 7 p. 1959.

The Author

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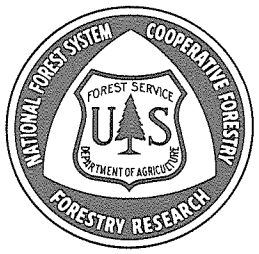

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