

Summary.

A limited investigation in 56 year old Sitka spruce suggests that the presence of markedly swollen butts is not related to the presence of heart rot, and that estimates of the proportion of affected trees in a standing crop based on observations from recent thinnings are apt to be exaggerated.

A Note on Damage caused to Apples by Storage in *Thuja plicata* Boxes

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IT was brought to our notice by Mr. F. V. Grennan, Horticultural Inspector, County Limerick, that Bramley Seedling apples stored in "red" wood boxes suffered damage not readily associated with fungal attack, while those stored in "white" wood boxes were not so affected. Also it was reported that where any "red" wood was used mixed with "white" wood in the same box similar damage occurred in apples in contact with the "red" wood and not in those touching "white" wood.

On microscopic examination the "red" wood was identified as being *Thuja* spp., presumably *Thuja plicata* Donn and the "white" wood was of *Abies* spp. An experiment was set up to test the hypothesis that the damage occurred as a direct result of using *Thuja* timber. Newton Wonder apples were stored in boxes of *Thuja plicata* Donn and in boxes of *Picea sitchensis* (Bong.) Carr. Further, apples were immersed in aqueous extracts of *Thuja*, Sitka spruce and in distilled water.

On termination of the experiment, while some apples stored in both types of boxes showed rot caused by a *Penicillium* fungus, the damage typical of that reported was not evident in Sitka spruce boxes, occurred in 39.3% of apples in mixed spruce and *Thuja* boxes, and was found in 54.9% of apples in *Thuja plicata* boxes. All apples immersed in *Thuja* extract were damaged while no damage was found in apples either in spruce extract or in water.

In appearance the damage first showed as an orange to light-brown blemish. After a while the skin shrivelled slightly, the affected area was depressed and developed a mid-brown colour. The damaged area remained quite firm and it was only after secondary infection by *Penicillium* and other fungi that a soft rot developed.

These findings are in agreement with those of Calhoun *et al.* (1961) who studied this problem independently at Queen's University. Trees of the genus *Thuja* are well known for their durability which is associated with natural preservatives contained in the heartwood.

Gardner and Barton (1958) made a study of these, and apart from finding many phenols, isolated three isomers of thujaplicin. Thujaplicin is extremely toxic and Calhoun and Parks (1963) showed that it produced damage to apples similar to that indicated above. Thus it would appear that the highly toxic Thuja extractives are very damaging to apples in storage. Calhoun *et al.* (1961) found this damage also associated with redwood boxes (*Sequoia sempervirens* (D. Don) Endl.), but only to a lesser degree in partly seasoned, and not at all in one year old boxes of Thuja. It is evident that *Thuja plicata*, when fresh, is most unsuited for apple boxes and should not be used in their manufacture.

References:

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