An update on resinous characteristics in radiata pine

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A range of resinous characteristics continue to degrade otherwise high value radiata pine.

Research on this problem focused initially on resin pockets and along with investigations into the contributing factors in the development of these resin pockets. However, in the course of this early research it was noted that there was regional variation in the incidence and severity of resin pockets. The sites worst affected were those that were windy and drought prone.

Stress is the main cause

A recent review of resinous characteristics indicated that all resin pocket types result from stress, particularly water stress, and mechanical damage associated with wind sway. The genotype is also thought to play a significant role.

Pockets and needle flecks

Resin patches

More recently the focus of research has changed. Researchers are now investigating the relationships between external evidence of resin on the bark of standing trees or on log ends and subsequent lumber grade and value following processing. These studies have been successful in establishing links between external and internal resinous characteristics and have resulted in the publication of a field guide to assist recognition and classification of resinous defects on the bark of radiata pine. This guide can be purchased from the Wood Quality Initiative (WQI) and was produced for the WQI and Forest and Farm Plantation Management Coop run by Forest Research.

Assessing trees for resinous defects

The main characteristics to look for when assessing trees include bleeding, lesions and the less common galls. Any change to the regular pattern of the bark warrants closer inspection and may include flaking or lifting bark and any change to the normal smooth curvature around the stem. When assessing pruned logs the occlusion scar and associated resin caused by pruning must be ignored.

Lesions with lifting bark

Bleeding

When assessing bleeding it is important to distinguish between juvenile and mature crops. Axial resin canals are a normal component of juvenile bark, as are resin pockets that can appear as bubbles on the outer surface. The presence of resin in juvenile bark is a natural defence mechanism with resultant bleeding not always indicating underlying problems with the wood.

Fresh and older bleeding

As bark matures and the characteristic fissures appear, the bark resin canals no longer function. Bleeding in mature bark is therefore more likely to indicate internal problems with the wood. Fresh resin is clear and sticky and usually observed only on young trees. Very soon it crystallises and appears white, and later turns black in response to a number of contributing factors including the development of mould.

Lesions

Lesions appear as characteristic breaks in the integrity of the normal bark pattern. It is assumed that the cambium has been damaged and there is a resultant characteristic in the wood.

Galls

Although not as common as bleeding and lesions, resin galls are present on some stems, particularly at lower levels. Experience indicates that they are usually associated with trees already showing signs of bleeding and lesions.

Individual and multiple galls

No hard and fast rules

Classification of resin on the bark of radiata pine does not lend itself to hard and fast rules. A subjective assessment is suggested due to -

- The complexity of assessing bleeding, lesions and galls
- Their distribution around and along the log length being assessed
- Their proximity to whorls for unpruned logs with cuttings potential
- Log characteristics such as diameter and shape

For practical reasons, and acknowledging considerable between-tree variation only three broad classes are suggested for trees showing evidence of resin on the bark. The objective of the assessment is to segregate logs or trees based on predicted levels of degradation in appearance due to a mix of resinous characteristics. We therefore need to consider the number and distribution of characteristics.

It is recommended that classification of juvenile stems (pre mid-rotation) should involve separate ratings of bleeding and of lesions and galls, with a combined assessment for mature stands. This recommendation acknowledges that bleeding is not as strong an indicator of potential degrade in appearance products as lesions and galls, particularly at an early age. For those interested, the "Field Guide" provides the levels of bleeding and numbers of lesions and galls allowed within classes and helpful hints to assist identification.

A clean tree

Improving the quality at harvest

Once it has been accepted that external evidence of resin is closely related to potential grade and value opens a range of opportunities for both growers and processors. Screening the genetic resource to identify genetic material potentially unsuitable for appearance products offers a longer term fix with immediate gains from log segregation to better match product requirements. Inclusion in inventory such as MARVL can assist harvest planning and will in time identify site and silvicultural implications. Knowledge of the incidence and severity of external resin can help the tendering process for the pruned resource at harvest. It could also improve the quality at harvest by encouraging the removal of some of the worst affected trees at pruning and thinning.

In all studies to date, clear separation for grade and value has been maintained between externally assessed classes with a batch of severely affected logs showing greater than 50% value loss. In the same studies value loss for clean batches of logs have been negligible. These recent studies have also shown an increase in the number of resinous characteristics on log ends for batches of logs, as evidence of resinous characteristics on the bark increase.

Clean log

Clean timber

Removing the worst trees

A further opportunity exists for small growers managing their own blocks where the trees are yet to have final silvicultural operations performed. Selection to remove the worst affected trees in conjunction with pruning and thinning has already been mentioned as has been the implications of wind sway. Multiple thinnings in the windiest areas to reduce maximum stem growth and wind sway could reduce the incidence of resinous characteristics in the final crop. Maintaining a variable stocking within limits, with higher numbers of trees in the more windy locations could also have benefits in terms of clearwood quality and value.

The author has applied these suggestions to his own block of trees but apart from thinking the correct decisions have been made no cost benefit analyses is available to confirm this.

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