

DEFOLIATION.

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The first effect of the defoliation of a tea bush is to stop down the manufacturing processes which find their chief centres of activity in the leaf until such time as new leaves are put out. It is commonly believed that the damage resulting from defoliation is not confined to a temporary loss of flush, but is also to be observed in the wood growth of the bush. The purpose of this article is to set out the known facts on this subject, in view of the interest that has been displayed in the defoliation resulting from insect attacks.

The large reserves of starch and manufactured foods found in the roots of a normally healthy bush enable it to continue attempts to put forth fresh leaves in the face of steady defoliation for a considerable time. A bush was completely defoliated in August 1930, since when every bud as it appeared has been rubbed off. It is just beginning to die back from the tips of the branches after enduring a leafless state for over a year. Under these circumstances the bush is in a state of enforced dormancy, no growth of stems in thickness or length occurring.

Harper ⁽¹⁾ examined the cumulative effects of annual defoliation of Larch by the Larch Sawfly (*Nematus erichsoni*). The cocoons hatch in May, the eggs are laid on the tips of the shoots and the resulting larvae destroy the whole leaf surface of the tree. The only manufacturing is done by a second crop of leaves just before winter sets in. As a result the tree becomes weaker and finally dies.

The annual rings of growth in affected trees were found to be narrower than in unaffected trees, while the amount of material used in the construction of the constituent cell walls was also found to be reduced. Less "mechanical" tissue in proportion to water conducting tissue was found in these trees, while in some cases additional "annual" rings were formed, showing that such rings of growth may result from other causes than the onset of dormancy.

Magness ⁽²⁾ showed that the defoliation of a portion of an apple tree had very little effect on the remainder of the bush, the non-defoliated portion growing normally, while the defoliated portion acted as though it was a completely defoliated tree. He found that the removal of the subtending leaf resulted in the formation of a very weak bud, which either remained dormant or only produced weak growth the next season. This latter point is of considerable interest in relation to the plucking of tea and is therefore under investigation by the Institute.

The effect of defoliation upon the growth of the apple was further examined by Proebsting⁽³⁾. He found that undefoliated branches continued to increase in thickness until the middle of July. Defoliation in May or June immediately checked the thickening, preventing any further increase in diameter during that growing season. The effect upon the microscopic structure of the wood was similar to that found by Harper for Larch, a diminution of the amount of starch stored in the twig being also observed.

It is impossible to draw conclusions from these observations that may with certainty be applied to tea. In the case of deciduous trees there is growth only during a portion of the year, growth in length and thickness being almost entirely confined to the first three months of this growing season, the remainder of the season being spent in laying down starch, hemi-celluloses etc. In tea there is a continuous growth in this climate, and it is probable that the laying down of reserves is not so markedly a seasonal process.

In order, therefore, to determine what damage to the growth of the bush may be expected from, say, a defoliation by a severe insect attack, experiments are being started in which the effect of defoliation for varying periods upon wood growth and flush will be examined.

(1) Harper, A. G.—Ann. Bot. 27, p. 261, 1913.

(2) Magness, J. R.—Bull., Oregon Agr. Coll. Expt. Sta., 139 pp. 46-77, 1917.

(3) Proebsting, E. L.—Hilgardia, 1, 5, 1925.