CORRIGENDUM

TRANSPIRATION IN MOUNTAIN BEECH ESTIMATED SIMULTANEOUSLY BY HEAT-PULSE VELOCITY AND CLIMATISED CUVETTE

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In the above paper, the authors apply numerically derived results of Swanson and Whitfield (1980) to estimating sap flow from heat pulse velocities. The calculations of true heat pulse velocities in contrast to those obtained from the direct application of Marshall's (1958) idealised theory is accomplished by a two-dimensional numerical approximation analysis of the appropriate physical case of finite-propertied sensors and interrupted sap flow about them. HPVR's, corresponding to those imposed during the numerical solutions are obtained from a set of 2nd order equations expressing the graphically displayed relations in Fig. 1. The shape of these curves is such that HPVR becomes increasingly sensitive to small changes in uncorrected HPV's at large wound widths such as those encountered in the mountain beech installations.

During pre-publication reviews of Swanson and Whitfield (1980), a minor error in the manner in which heat pulse sensor physical characteristics (thermal conductivity, density, and specific heat) were mathematically accommodated was found. The analyses have since been re-run using the corrected technique. These new runs produced relatively minor absolute changes in the results at all wounds, but as would be expected from Fig. 1, the error in HPVR becomes relatively large at the greater wound widths.

The values given for correcting uncorrected HPV to HPVR for wound widths .44 and .50 cm were — coefficient a, 1.525 and 1.630; b, 1.225 and 1.611; and c, 0.280 and 0.300 respectively. The values that should be used are — a, 2.506 and 2.715; b, 0.764 and 0.787; c, 0.349 and 0.466 respectively. The application of these new coefficients result in calculated sap flows of 11.5 L at w= 0.44 cm and 14.4 L at w= 0.50 cm. These estimates still compare favourably with the 12.2 L extrapolated from cuvette twig transpiration to the tree crown and do not alter the fundamental conclusions of the paper. These results do illustrate the necessity for accurate wound width determination in applying the heat pulse technique.

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REFERENCES

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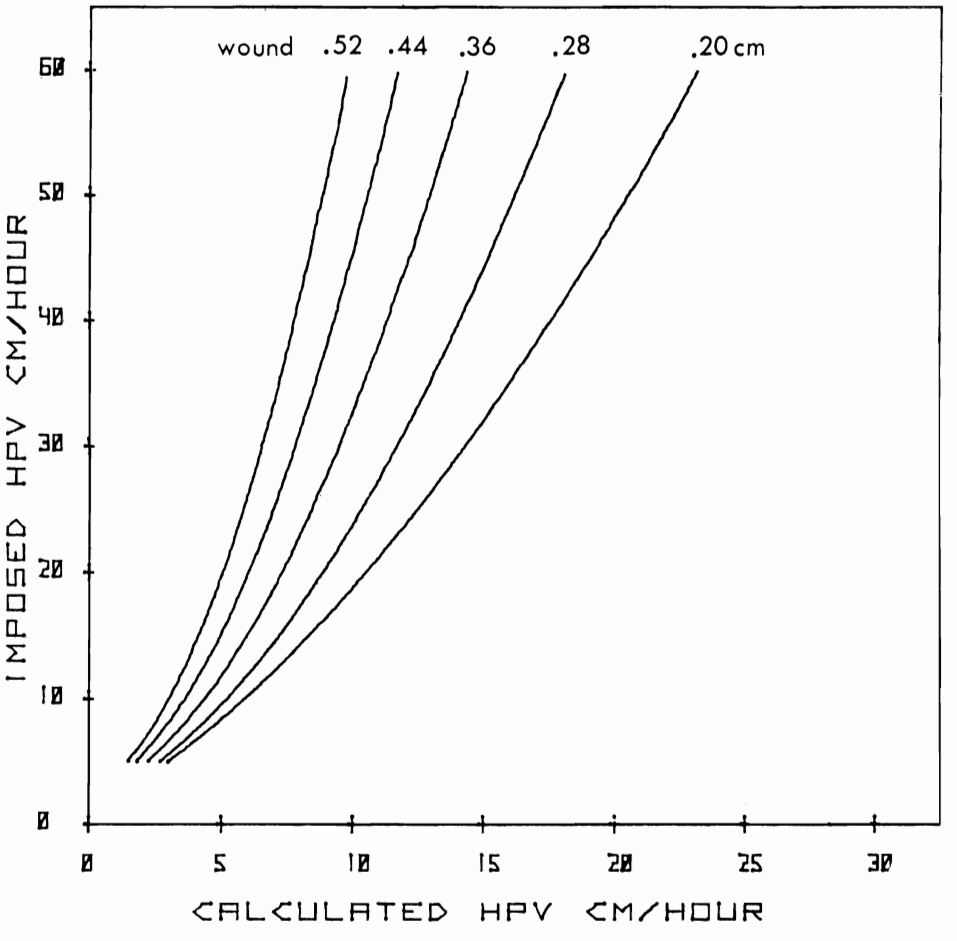

FIG. 1—Numerically derived relationship between heat pulse velocities calculated from idealised theory and those imposed during numerical analysis. The calculated HPV values correspond to the field data of Swanson, Benecke and Havranek; the imposed HPV corresponds to that presumably present in the tree at the time of the field measurement.