

# QUANTIFICATION OF THE PROTECTION FROM SOLAR ULTRAVIOLET RADIATION PROVIDED BY TREE SHADE

A.V. Parisi

Centre for Astronomy and Atmospheric Research, University of Southern Queensland,  
Toowoomba, 4350, Australia. Ph: 61 7 46 312226. FAX: 61 7 46 312721. Email:  
parisi@usq.edu.au

*The effect of tree parameters on the solar erythemal UV and UVA in tree shade on a horizontal plane at ground level during a Southern Hemisphere summer was measured. The parameters investigated were tree canopy transmission in the visible waveband ( $V_T$ ), tree canopy width, tree height and height of the start of the tree canopy ( $C_H$ ). Of these factors, the  $V_T$  and  $C_H$  have an influence on the UV irradiances in the tree shade with the others not having any significant effect. The shade ratios (defined as the ratio of the UV in the tree shade to that in full sun) for erythemal UV ranged from 0.71 to 0.42, 0.54 to 0.29 and 0.63 to 0.41 for morning, noon and afternoon respectively. The shade ratios for UVA ranged from 0.61 to 0.28, 0.50 to 0.22 and 0.49 to 0.29 for morning, noon and afternoon respectively. The UV exposures in the tree shade decreased with the  $V_T$ . The spectral shade ratio decreased with increasing wavelength. For the sample of trees investigated, the decrease in the spectral shade ratio was approximately 42% at 400 nm compared to the shade ratio at 300 nm. Despite the protection by the tree shade, significant UV in the tree shade of approximately 4 MED (minimum erythemal dose) were received for the latitude in this research on a cloud free summer day on a horizontal plane over a two hour period centred about solar noon.*