CAB EXPRESSION IN DOUGLAS-FIR DEMONSTRATES WEAK LIGHT REGULATION

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The cab gene family encodes for the major light-harvesting chlorophyll a/b binding protein of photosystem II. Cab genes are strongly up-regulated by light in all angiosperms studied. It has also been shown that cab transcription rates and steady state levels of cab mRNA fluctuates dramatically during dark and light cycles in a manner that shows a pronounced, circadian rhythm. We find that Douglas-fir (Pseudotsuga menziesii) responds differently to light in comparison to what is generally true for angiosperms. Douglas-fir seedlings appear to maintain relatively high levels of cab mRNA regardless of light and dark treatments. For example, cab mRNA in dark grown seedling is found at about 40% of amounts produced under natural light conditions. We also determined the steady-state mRNA levels in Douglas-fir seedlings at 4-hour intervals throughout a diurnal cycle of 12 hours light and 12 hours dark, and during extended dark and light periods. Our results show that relatively minor fluctuations occur in steady state cab mRNA during light and dark phases and no circadian rhythm is apparent. We hypothesize that there are basic differences between Douglas-fir and angiosperms with respect to factors effecting the photoregulation of certain light responsive genes.