Abstract: Consumption of plant cell walls requires a suite of enzymes, including cellulases, hemicellulases, and pectinases. Using endogenous genes that encode plant cell wall degrading enzymes (PCWDEs) is less common in insects than establishing symbiosis with microorganisms for plant cell wall degradation. In this study four families of PCWDE genes were identified from the transcriptome of Agrilus planipennis larval midgut and subsequently confirmed in the genome sequence. Phylogenetic analysis and other evidence indicated that these genes were initially acquired by the insect through horizontal gene transfer from microorganisms and later expanded in the genome through gene duplication. Quantitative RT-PCR analysis on four selected genes in three gene families showed that they were almost exclusively expressed in the larval midgut and during larval stages of development. These results, together with the presence of N-terminal signal peptides in the deduced protein sequences, suggest that these gene products are secreted into the larval midgut, facilitating digestion of the host plant cell walls.