

**POLYPHENOL OXIDASE-MEDIATED RESISTANCE TO
COMMON CUTWORM**

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Polyphenol oxidases (PPOs), catalysing the oxidation of phenolics to quinones, have been shown to confer resistance to *Pseudomonas syringae* and to lepidopteran insects including common cutworm (*Spodoptera litura* (F.)), beet armyworm (*Spodoptera exigua* (Hübner)) and cotton bollworm (*Helicoverpa armigera* (Hübner)). Transgenic tomato (*Lycopersicon esculentum* Mill.) plants constitutively expressing a sense PPO construct (OP) exhibited 5.3 to 5.7-fold higher PPO activity levels whereas the antisense PPO transgenic plants (SP) exhibited 2.1- to 2.4-fold lower PPO activity levels than nontransformed (NT) controls. Relative growth rates of the third instar were higher on the SP plants and lower on the NT and OP plants. In addition, efficiency of conversion of ingested food and efficiency of conversion of digested food of larvae feeding on OP leaves were up to 1.9 and 2.8 times lower than those of larvae feeding on NT and SP plants. PPO-mediated resistance was not associated with the antifeedant properties since larvae feeding on OP plants consumed relatively more than those feeding on NT plants. When common cutworm fed on leaflets at node 4 of tomato plants, PPO activity was locally induced, and PPO B and D were transcriptionally upregulated in leaf and stem tissues. These results substantiate the role of PPOs in insect resistance for integrated pest management programmes.