

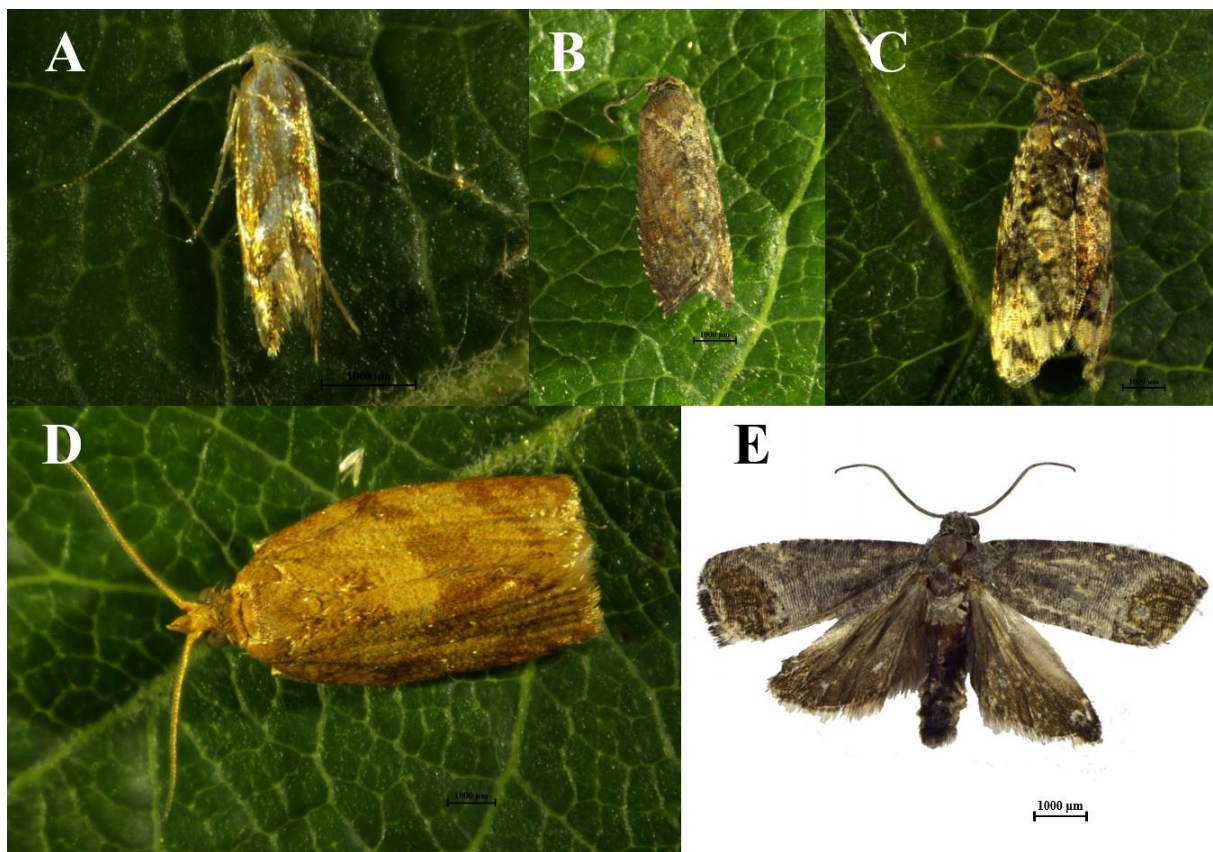


Figure S1. Five other common microlepidopteran species in apple orchards. (A) *Phyllonorycter ringoniella*, (B) *Grapholita molesta*, (C) *Endothenia oblongana*, (D) *Adoxophyes orana*, (E) *Cydia pomonella*.

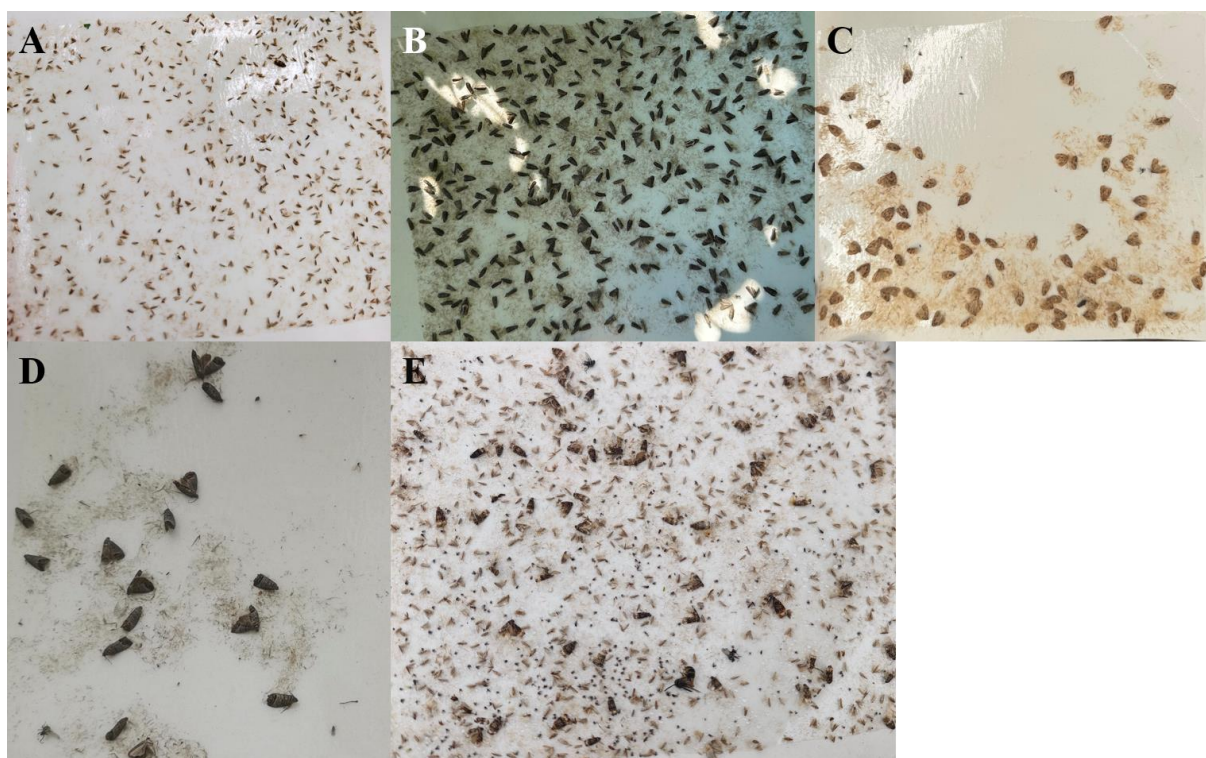


Figure S2. Weekly monitoring results of five common microlepidopteran pests in apple orchards during July. (A) *Phyllonorycter ringoniella*, (B) *Grapholita molesta*, (C) *Adoxophyes orana*, (D) *Cydia pomonella*, (E) *Endothenia oblongana*.

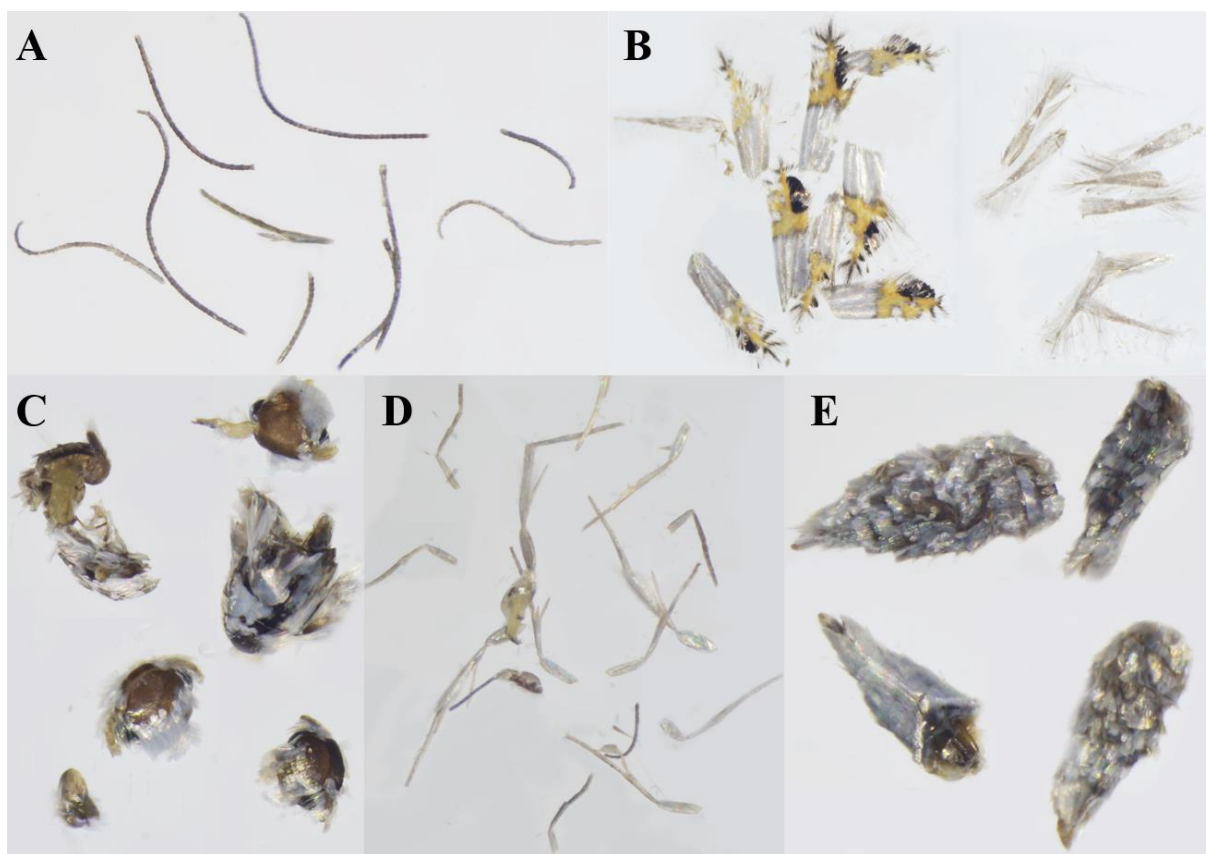


Figure S3. Adult body tissues of *Leucoptera malifoliella* used for evaluating the robustness of the SS-COI assay. (A) Antennae, (B) Wings, (C) Head and thorax (combined), (D) Legs, (E) Abdomen.

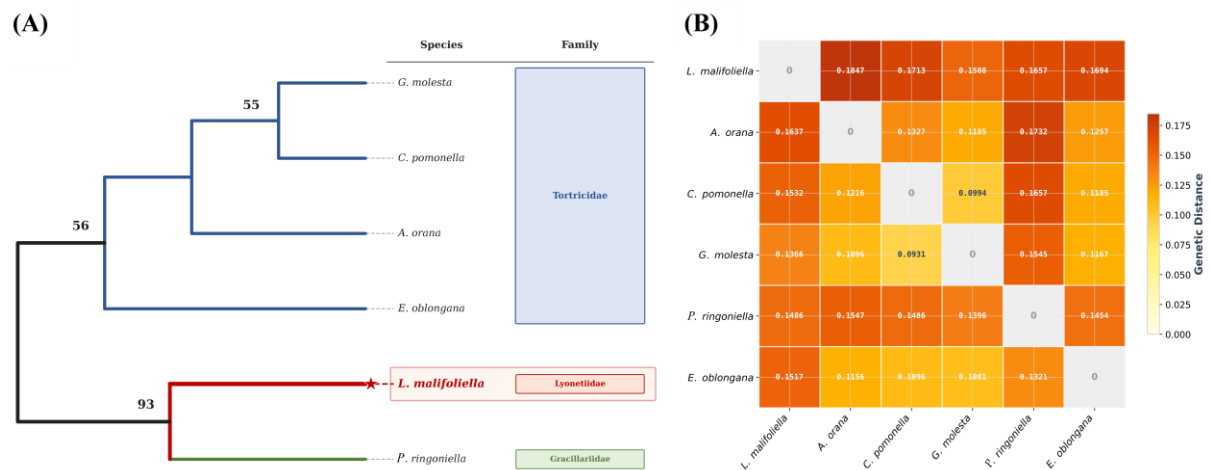


Figure S4. (A) Neighbor-joining phylogenetic tree based on Kimura 2-parameter (K2P) distances of COI sequences from six lepidopteran species. Bootstrap values (1,000 replicates) are indicated at the nodes. *Leucoptera malifoliella* forms a distinct monophyletic clade (bootstrap 93%) clearly separated from all non-target species. (B) Heatmap of pairwise K2P genetic distances among the six species. All interspecific distances exceed the 2% species delimitation threshold.