

Bugs and PLANT HEALTH

Plant health is **your** health.



Insects such as bees and butterflies are responsible for pollinating three out of four crops, contributing to about **one-third of the food we eat.**



Glassy-winged sharpshooter and the wine industry

- The glassy-winged sharpshooter (GWSS) is a large leafhopper first observed in California in 1989 that feeds on a wide range of plants, including citrus, almonds, and grapes.
- GWSS is a vector for the bacterium that causes Pierce's disease of grapes, threatening the \$30 billion wine industry in the United States.
- GWSS is managed with insecticides and parasitic wasps. Research continues to find alternative ways to manage GWSS.

Growers spend **more than \$1 billion annually** in chemical control of spider mite pests, but insects that prey on these pests can be used instead as a biological control to reduce the mite population.



Some plant diseases are vectored by insects that spread pathogens such as viruses and bacteria in crop fields. **More than 70% of all plant viruses are transmitted by insects** such as aphids, whiteflies, and plant hoppers.

Insect pests damage crops, urban landscapes, forests, and wildlands. **Globally, invasive insect pests cost \$70 billion annually** in prevention, treatment, and damage.



Sources: Data from Hogenhout et al., 2008 (www.annualreviews.org/doi/pdf/10.1146/annurev.phyto.022508.092135); Eigenbrode et al., 2018 (www.annualreviews.org/doi/abs/10.1146/annurev-en-020117-043119); Bradshaw et al., 2016 (www.nature.com/articles/ncomms12986); Deutsch et al., 2018 (<https://science.sciencemag.org/content/361/6405/916>); Wojcik, 2016 (www.epa.gov/sites/production/files/2016-08/documents/vicki_wojcik_6-23-16.pdf); UN Food and Agriculture Organization, 2020 (www.fao.org/3/I9527EN/i9527en.PDF); UC Riverside, Center for Invasive Species Research, n.d. (<https://cisir.ucr.edu/invasive-species/glassy-winged-sharpshooter/>); Kyrkou et al., 2018 (www.frontiersin.org/articles/10.3389/fmicb.2018.02141/full#B61); USDA-ARS, n.d. (<https://pdfs.semanticscholar.org/a082/90f0df930f14bc052485188bf9363340a492.pdf>); Center for Food Safety, n.d. (<https://pdfs.semanticscholar.org/a082/90f0df930f14bc052485188bf9363340a492.pdf>); Oerke, 2006 (www.cambridge.org/core/journals/journal-of-agricultural-science/article/crop-losses-to-pests/AD61661AD6D-503577B3E73F2787FE7B2); Pimentel, 2009 (https://doi.org/10.1007/978-1-4020-8992-3_3); Kenis et al., 2017 (<https://doi.org/10.1007/s10530-017-1414-4>); and EurekAlert! 2011 (www.eurekalert.org/pub_releases/2011-11/igdc-sms112311.php).



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