Land-grant universities aim to protect plant health

Many factors can pose threats to plant health — from diseases and insect pests to soil quality issues and poor management decisions. The Food and Agriculture Organization of the United Nations has designated 2020 the Year of International Plant Health to call attention to these problems, which can reduce yields, hurt farmers’ bottom lines and pose environmental concerns. Land-grant universities around the country are conducting research and outreach activities that are helping mitigate these threats and keep their plants healthy — and productive.

HERE ARE SOME EXAMPLES OF THAT WORK:

• Researchers at multiple universities along with USDA scientists are developing affordable, effective control options for brown marmorated stink bugs. They are a serious pest concern, causing apple yield losses worth $37 million in the mid-Atlantic region in 2010 alone. The stink bugs affect other crops, too. Among the solutions the researchers are studying is biological control. Virginia Tech and Rutgers University (New Jersey) scientists are developing a way to detect samurai wasps, which prey on stink bugs, while Delaware researchers are taking a closer look at parasites that feed on stink bug eggs.

• Potatoes are the third-most consumed food crop in the world. They are susceptible to many pathogens. Oregon scientists are developing disease-resistant varieties that still have traits important to the industry, such as taste and texture.

• Biological control also is a focus of a project in Ohio, where researchers are studying crazy root and other diseases of vegetables grown in hydroponic systems. Crazy root is notoriously difficult to manage; there are no fungicides to control it, so growers must remove and destroy infected plants, which decreases their revenue. Ohio researchers have identified strains of Pseudomonas bacteria that can reduce incidence of crazy root by 80% on hydroponically grown tomatoes.

• North Carolina faculty want to protect their state's $347 million sweet potato industry from another epidemic of black rot — a disease that wreaked havoc on the crop in 2015. Researchers then quickly identified a fungicide to clean up the crisis. Since then, the team has developed integrated management strategies to prevent the spread of the disease in the future and posted web-based resources that have garnered thousands of views.

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• **Oregon** scientists have developed varieties of hazelnuts that are resistant to eastern filbert blight, which nearly wiped out the state’s hazelnut industry in the 1970s. Today, Oregon produces 99% of U.S.-grown hazelnuts, which contribute $92 million to the state’s economy annually. Breeders are continuing to develop disease-resistant varieties, which typically don’t have to be sprayed with fungicides, helping save growers money.

• Researchers in **Tennessee** wanted to find out how to control insects in nurseries without using pesticides. They discovered there were fewer flatheaded apple tree borer attacks in rows of trees that had weeds than those that were kept clean with herbicides. This finding led to a project examining using cover crops in nursery tree rows to deter the borers.

• **California** researchers have led efforts to produce “clean” plant stock for restoring natural areas. The goal is to ensure facilities that produce these plants are not spreading invasive organisms — including a group of some of the most aggressive plant pathogens, Phytophthora — through ecosystems. The scientists have studied management practices to reduce Phytophthoras and shared them with the industry through workshops.

• **Iowa** researchers have developed machine learning tools, including a smartphone app, to automatically identify foliar plant stress symptoms in soybeans. This method is faster and more accurate than scouting fields for signs of damage with the human eye.