Science Update

Pioneer Entomologist's Notes Go Public

About 800 pages of handwritten notes by a 19th-century entomologist can now be read at a website called "Resurrecting Asa Fitch's Aphid Notes: Historical Entomology for Application Today."

Born in 1809, Fitch became the first professional entomologist appointed by a state when New York hired him in 1854. He went on to publish more than 200 reports and articles on insects and related topics. After he died in 1879, his entomological collection and library were sold to collectors and the U.S. National Museum. Fitch's observations pertaining to about 190 species of aphids, together with some specimens, are now part of the National Aphidoidea Collection. These materials can be accessed at www.ars.usda.gov/services/docs.htm?docid=12851. *Gary L. Miller, USDA-ARS Systematic Entomology Laboratory, Beltsville, Maryland; phone (301) 504-6896, e-mail gmiller@sel.barc.usda.gov.*

Better Plant-Based Crankcase Lubes

The problem with today's biobased lubricants is that many can't match the cost, oxidative stability, or cold-weather performance of petroleum-based formulations. They're normally made by modifying an edible oil, such as soy oil, to produce desired industrial products like grease or hydraulic fluid. But estolides are different. They're made from only the fatty acid components of high-oleic oils derived from such plants as lesquerella, rapeseed (canola), and sunflower. Researchers produced and tested branched chains of saturated or unsaturated oleic estiolides and found that they performed as well as, or better than, mineral-oil-based lubes.

For example, an unsaturated oleic estolides formulation was still pourable at –22°F, and a saturated one was pourable at –40°F, compared to 0.4°F for a soy-based lube. In a standard oxidative-resistance test, the two estolide formulations withstood breakdown for 200 minutes (unsaturated) and 400 minutes (saturated), compared to 200 minutes for the mineral oil used in cars. Now a cooperative research and development agreement has been signed to explore the creation of canola-based estolides. *Steven C. Cermak, USDA-ARS New Crops and Processing Technology Research Unit, Peoria, Illinois; phone (309) 681-6233, e-mail cermaksc@ncaur.usda.gov.*

Dreaming of Jeanne—the Gooseberry

Gooseberry enthusiasts may soon have a new, high-quality gooseberry to appreciate. This dark, sweet, dessert gooseberry is highly resistant to both white pine blister rust and powdery mildew, the fruit's biggest disease threat. The robustness of this new variety, named "Jeanne," protects it from insects, as well, including aphids and sawflies.

Jeanne's green berries ripen to a deep red as they mature to 5-gram size, yielding about 3.3 pounds per plant. Suited for desserts, juices, and jams, Jeanne blooms and fruits 1-2 weeks later than other red gooseberries, thereby extending the production season. Potentially ideal for both home and commercial use in the Pacific Northwest and similar temperate climate zones, propagating material has been provided to nurseries, and cuttings are available for further research. *Kim E. Hummer, USDA-ARS National Clonal Germplasm Repository, Corvallis, Oregon; phone (541) 738-4201, e-mail khummer@ars-grin.gov.*

Potato Pest Vulnerable to Insect Virus

A type of insect-infecting pathogen called a "granulovirus" appears promising for biological control of the potato tuber moth that's been plaguing northwestern potato growers. When ingested by a caterpillar, the virus multiplies in the tissues and ultimately liquefies the insect's insides, killing it in 10-20 days. The granulovirus is a highly specific pathogen that infects a few other potato-tuber moth relatives, but no other insects, mammals, or humans. It's already being used in other countries to protect stored potatoes from infestation. But only limited research has been done to evaluate the pathogen's preharvest potential, and it's not commercially available in the United States.

Work on the potato tuber moth granulovirus has been done cooperatively with Oregon State University's Hermmiston Agricultural Research and Extension Center and the International Potato Center in Lima, Peru, with funding assistance from the Washington State Potato Commission. It's now being field-tested under a USDA Animal and Plant Health Inspection Service importation permit, along with other candidate microbial controls. *Lawrence A. Lacey, USDA-ARS Yakima Agricultural Research Laboratory, Wapato, Washington; phone (509) 454-4463, e-mail llacey@yarl.ars.usda.gov.*

Modeling CO_2's Effects in the Field

Crop yield-prediction models based on data obtained from carbon dioxide (CO_2) enclosure studies—with their trapped heat, poor airflow, high humidity, and other abnormal conditions—show skewed outcomes. It's been thought that more accurate predictions might be possible from experiments using free-air concentration enrichment, or FACE, to simulate actual field conditions under higher CO_2 levels. Indeed, new findings from FACE studies suggest that yield-stimulating effects anticipated from rising atmospheric CO_2 levels may not be sufficient to offset the yield-reducing effects of elevated temperatures that are expected to accompany a future CO_2 rise.

When corn and soybeans were grown and monitored under FACE conditions, the effect of CO_2 on yields—the so-called CO_2 fertilization effect—was found to be half that obtained in chamber simulations. Work also needs to be done that takes into account other potential climate changes, such as ozone pollution. *Donald R. Ort and Elizabeth A. Ainsworth, USDA-ARS Photosynthesis Research Unit, Urbana, Illinois; phone (217) 333-2093 [Ort], (217) 265-9887 [Ainsworth], e-mail d-ort@uiuc.edu, ainswort@uiuc.edu.*