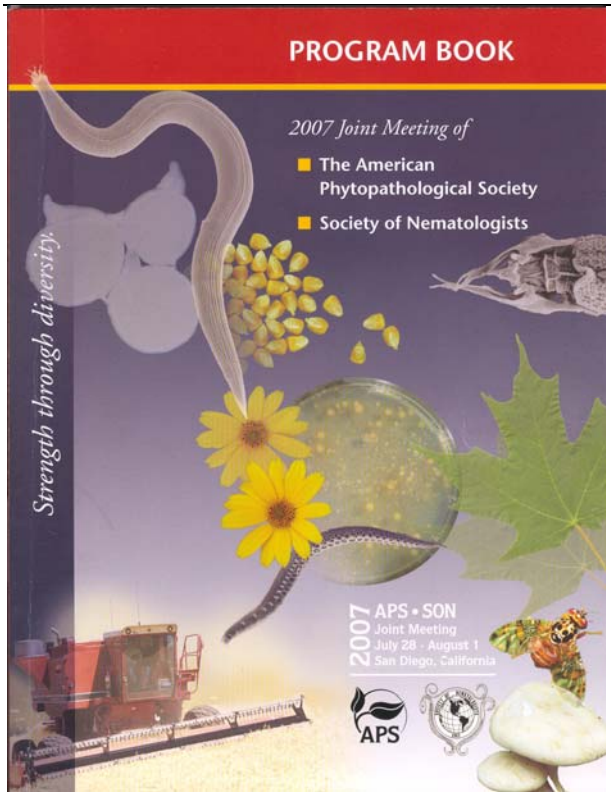
CropHealth Advising & Research
Kelowna, B.C. www.crophealth.com

To Date

Thursday August 9, 2007

4 pages from Mario Lanthier



The annual meeting of the American Phytopathological Society was held in San Diego (California), July 28 to August 1 (see http://meeting.apsnet.org).

The meeting was attended by almost 1000 persons, mostly scientific researchers from the United States and Europe, plus a few industry persons.

The program is very technical, a mixture of pure research (especially at the molecular level) and applied science (this society makes a point of being "relevant" to grower problems).

Because of the quality of technical information, this is one of the most useful conference that I attend during the year.

Climate change (plenary session)

Dr. Diana Wall, Colorado State University. Member of the "Intergovernmental Panel on Climate Change" (United Nations). The latest report (release in Paris earlier this year) was prepared in 2004 by 12 experts, reviewed in 2005 by 600 scientists, then a second draft reviewed in 2006 by another 600 scientists and policy makers.

The final report states: *"Warming is unequivocal"*. Atmosphere temperature is going up, sea level is going up, snow cover is going down, glacier mass is going down.

The conclusion: *"Most of the global warming measured since the 1920s is very likely due (90% confidence) to increases in CO_2 emissions (greenhouse gases)"*.

Sources of CO_2: energy industries (36%) / transport (27%) / industries (21%) / household (15%). Natural factors contribute 30 times less than human activities.

If "business as usual" until 2099: global warming of 2.8^{o}C / sea level up 6 meters / more extreme weather events (wet areas become wetter, dry areas become drier).

SOILS AND DISEASE SUPPRESSION

Sunday and Monday July 29-30, two symposia sessions, total of 9 presentations.

Oscillations in soil microbes

Ariena Van Bruggen, Wageningen University, The Netherlands

A healthy soil is defined as stable, high biological activity, low available C and N.

- After adding a cover crop, manure, or compost, soil microbe numbers increase rapidly in the presence of new substrate (food). As food is used, the numbers decrease.
- This is called "oscillation", similar to the waves created by a rock in the pond.

Both beneficial and noxious soil microbes are impacted by cover crop.

- Cover crop of grass – clover was incorporated into field (amendment 1% by volume).
- Microbial population was monitored daily for 60 days.
- Soil bacteria increased for 5 days, then lowered, then slight changes but mostly stable.
- Afterwards, increases in bacterial-feeding nematodes, *Pythium* damping off, flax wilt.
- Damping-off was highest 8 days after incorporation, lowest 35 days after incorporation.

Implications for field production.

- Avoid planting a field crop for at least 12 days following cover crop incorporation.

Stimulating disease-suppressive soils

Linda Kinkel, University of Minnesota

Streptomyces bacteria are prevalent in disease-suppressive soils.

- They produce antibiotics which inhibit root diseases and reduce disease severity.
- Disease-suppressive soils have greater density (numbers) and diversity (types).

Green manure can enhance the natural populations of Streptomyces.

- Field research: significant reduction of Phytophthora root rot and Verticillium wilt.
- Best green manure (grass cover crop) were buckwheat, oat and sorghum-sudangrass.

Implications for field production.

- Use cover crop to increase numbers and inhibition activity of native *Streptomyces*.

Cornell soil health test

George Abawi, Cornell University, New York

A new laboratory report (2007) for "soil health", $45 per sample.

- A total of 15 measures are made, including standard physical and chemical.
- The report includes 4 biology measures, including active carbon and mineral nitrogen.

For more information, visit http://soilhealth.cals.cornell.edu/.

DMI FUNGICIDES: RESISTANCE MANAGEMENT

Tuesday July 31, full-day session on this topic, total of 15 presentations.

- More information: Fungicide Resistance Action Committee (FRAC) at www.frac.info.

About the products

DMI fungicides (demethylation-inhibiting), also called "sterol-inhibiting".

- Inhibit the sequence formation of ergosterol, essential component in cell membrane.
- When used as protectant, the fungicides inhibit germination of fungal spores.
- When used curative, trigger changes in fungal hyphae (become swollen and burst).

There are 25 products registered around the world by 11 companies.

- Registered in ornamentals, tree fruit: Nova, Funginex, Indar, Nustar, Banner, Topas.

Background on resistance

Three mechanisms of resistance have been documented.

- Mutations in CyP51 gene of fungus (prevents proper binding by fungicide).
- Over-expression of CyP51 (increase enzyme production by fungus to offset fungicide).
- Up-regulation of transporter genes (basically "pumping" the fungicide out of the cell).

Resistance development is "step-wise" or continuous.

- After repeated uses, new fungus genotypes appear which are "less sensitive".
- End result: a slow erosion of efficacy, "the product does not work as well as it used to".

Onset of resistance occurs after 45 to 80 applications.

- The number of sprays depends on patterns of use by each grower, and target disease.
- Apple scab: 60 applications "seems to be the limit to reach practical resistance".

Management strategies

Apply DMI fungicides before disease symptoms are visible.

- Risk of mutation is less likely when the population is low, and more likely when high.
- Managers should learn the optimal conditions (temperature and water) that trigger spore production for any disease, and apply a fungicide when those conditions are met.

Use DMI fungicides at the proper time, full label rate, complete plant coverage.

- Use when most effective, typically in early season. Maximum 2 or 3 sprays per year.
- "Low label rate" was developed when the whole population was susceptible. The low rate is likely not effective any more and leads to more rapid resistance development.
- Tank mix with broad-spectrum protectant products (chlorothalonil, captan, sulphur).
- Avoid alternate-row spraying, it allows survival of resistant strains in unsprayed rows.
- Avoid DMI products where there is very high disease or a history of poor results.

TOUR OF VINEYARDS

Above: Overview of a vineyard destroyed by Pierce's Disease. Note the piles for disposal. The disease is caused by a bacteria (Xyllella) spread by sharpshooter, a leafhopper-type insect. In California, hundreds of acres of commercial vineyards were destroyed in the past 5 years. Both the disease and the insect vector are not known to occur in B.C.

Below: Symptoms of Grape Leafroll Virus. Note the characteristic discoloration between veins. The leafroll virus is reported everywhere grapes are grown, including in the Okanagan Valley. In California, disease increased after a change of rootstock to manage phylloxera insects.