

2013 International Crop Expo

by Willem Schrage, North Dakota State Seed Department

The potato educational meetings of the International Crop Expo in Grand Forks, North Dakota held on February 20th and 21st were organized by Dr. Andy Robinson, Extension Potato Agronomist, NDSU/UMN.

National Potato Council

The meeting started with John Keeling, Executive Vice President and CEO of the NPC who has four staff members in Washington, DC working on behalf of the potato industry. Mr. Keeling mentioned the gridlock in Washington. He said that only when a so-called "cliff" occurs something gets done. "Something may be done about immigration, because republicans need to reach out to the Hispanic part of the population," he mentioned. He was concerned that funding had not been extended for research on potatoes, such as zebra chip and acrylamides. Another topic that needs attention is the position of the USDA to allow WIC vouchers to be used for any fruit and vegetables except white potatoes. Mr. Keeling mentioned the Potato Expo in January in Las Vegas, Nevada and was grateful to have been able to welcome about 1,900 potato people. The 2014 Potato Expo will be held in San Antonio, Texas.

United States Potato Board

Ritchey Toevs, Co-Chairman of the USPB International Marketing Committee announced a positive new strategy that seems to be working. "We lived through negative publicity," he said, "And now the potato

nutrition image has improved." The new game plan is to identify what is critical to the future of the potato industry, such as market access for seed and fresh potatoes in Egypt, Japan and Vietnam. Arguments used in the export market for processed potatoes to "buy US" is that US fries give more servings per unit and the US federal standard on fries is unique and helps to promote US French fries. "Export is important, because one in five rows of the potato crop is exported," he said.

The strategy in the domestic market is reaching the typical consumer, the so called Linda. The retailers are approached with results of a study that indicate that people who buy potatoes in the grocery store, spend more time and money in the store.

The USPB is also involved in the National Fry Processing Trials, where many clones with reduced acrylamide are evaluated. The USPB Chip Program Variety Trials were also mentioned. USPB works with the Culinary Institute of America Seminar to promote the versatility of the potato. In Food-Aid it was found that potato products can be very easily fortified to help people in need. The USPB will have more representation from the North Central and North West United States.

Don Ladhoff, US Potato Board, reported on what potato retailers are looking for. The USPB works with retailers in two main ways: One encompasses retailer communica-

tions, retail outreach meetings, and a newsletter. The second way is in the form of personal relationships and conversations, retail partnership programs, test & learn programs. Increases in markets came in the special categories such as: Micro/Steamer +31.6%, Single Wrapped +12.7%, Petite Potatoes +4.5%, Fingerlings, Purples & Medleys: +12.7%.

Shoppers want to know "where does my food come from?" and the retailer likes to help their customers to understand how potatoes are grown, harvested and handled. There is a desire to increase confidence (for example safety) in the foods they carry and the quality of the produce they provide. The USPB provides videos, photos, "meet the grower" stories and other relevant content on the USPB consumer website.

There is emphasis amongst consumers to buy local. Shoppers will switch stores for a better local food selection – 30% say they consider purchasing food elsewhere if their preferred store does not carry local foods, but also much more can be done to encourage shoppers to try new types.

The USPB can provide digital content and resources: Potatogoodness.com: Facebook, YouTube, Pinterest., Potato Goodness e-cookbook, Available in both .epub (iPad) and .mobi (Kindle) formats.

The Industry website is www.uspota-

toes.com. The consumer website is: www.potatogoodness.com and the retailer website is www.potatoretailer.com.

United Growers of America

Jerry Wright, United Potato Growers of America emphasized the declining domestic consumption in fresh, dehy and frozen categories. "We need a "holistic" view of supply and demand in each sector of the Industry," he said, "because we are interdependent." The continuous increase in production per acre means that even when we do not increase acreage we still produce more potatoes than what the market absorbs, resulting in a low price. By 2017, planting the same US and Canadian acres as today produces 32,500,000 cwt in excess of today's projected demand. That means 71,570 fewer acres will be needed in 2017 to produce the same supply.

Common Scab

Dr. Gary Secor, North Dakota State University, said that common scab occurs wherever potatoes are grown: in America, Europe, Africa and Asia. It effects tubers, lower stem, roots and stolons. The main damage is due to the formation of lesions on the surface of tubers that detract from appearance and can lead to market rejection. That means: it only affects grade and quality not yield. The symptoms may resemble those of powdery scab, and laboratory examination is required to determine the cause. It also affects other soil crops including beets, carrots, parsnips, radishes, rutabagas, turnips, sugar beets, sweet potatoes and peanut pods. The traditional cause of common scab is *Streptomyces scabies*.

Within the last few years other species of *Streptomyces* causing potato scab have been described (Wanner). The pathogen is tuber-borne and also a soil inhabitant. It is not a visitor. The infection occurs through lenticels, stomata, wounds and insect feeding injury. It overwinters in the soil and on the tubers. Unfortunately it persists many years; one may say indefinitely. Thaxtomin is the main toxin responsible for pathogenicity and symptoms. It inhibits cellulose biosynthesis enzymes and prevents normal cell wall synthesis resulting in cell death.

Dr. Secor indicated that the control of scab needs some creative work. Scab free seed is preferred in virgin fields, but may be difficult to find. There is no indication what a threshold should be. Chemical control has not worked consistently. The fungicides Mancozeb, coppers, streptomycin, PCNB seed treatment or in furrow application are purported to reduce scab, but were generally neither effective nor consistent. They may reduce seed-borne inoculum, but have no effect on soil-borne inoculum, which is probably the main source of the insecticide. Mocap (etheprop) was purported to reduce scab by controlling soil insects (springtails, flea beetle larvae) that feed on tubers causing injuries becoming entry sites. Their importance is unknown. Many soil amendments have been sold, but most do not work. "Grower beware!" said Dr. Secor. Soil fumigation with Vapam (sodium isothiocyanate) may actually make scab worse by killing suppressive soil micro-organisms. Continuing work is done with chloropicrin (tear gas) showing good

control of pitted scab in Ontario, Wisconsin, Michigan and Florida.

Many cultivars with resistance have been released, but the resistance may vary between locations: Resistance is a major effort by most breeding programs according to Dr. Secor.

The best cultural practices to reduce scab are an even and high soil moisture beginning at tuber initiation and continuing 4-6 weeks. That means there is a need for irrigation. Adjusting soil pH with lime or sulfur is difficult and expensive and does not seem to be a good option.

There are many unanswered questions and challenges such as: How important is seed-borne inoculum? Is there a threshold of coverage that contributes to disease of progeny tubers? There is a need for a seed treatment that controls seed-borne inoculum. We need an understanding of soil antagonists and suppressive soils.

Herbicide Damage

Dr. Andy Robinson, North Dakota State University/University of Minnesota mentioned the many uses of glyphosate such as in glyphosate-resistant alfalfa, canola, corn, soybean, and sugar beets as well as pre-harvest treatment on small grains and canola and spot treatments around or within fields. The herbicide is also used on rights-of-way, roadsides, railways, and around homes. Because potatoes are so sensitive to glyphosate the many uses of the chemical give ample opportunities to cause damage. Dr. Robinson explained how particle drift depends on droplet size. For example a fog

takes 66 minutes to drop 10 feet and can be spread 3 miles, whereas a rain drop falls in 1 second and only drifts 4.7 feet by a 3mph wind. Low levels of glyphosate may not cause visible injury in the foliage or tubers of the potato crop, but damage can come later in the form of cracks in the tuber and lack of sprouting in the next seed potato crop. He showed symptoms of glyphosate residues in seed potatoes as an erratic and slow emergence pattern, with bending, twisting, and yellowing of leaves and multiple shoots from an eye and/or cauliflower or candelabra formation of shoots, or enlarged shoots. There may be prolific roots or reduced rooting. However he could announce that trials had shown that glyphosate residues do not carry over to granddaughter tubers.

Dr. Robinson suggested some management strategies such as ample communication with staff, neighbors, and local contractors. Also one should consider having a dedicated sprayer for seed potatoes and ensure that custom applicators use clean sprayers. One should avoid planting field edges and one should leave suitable headlands or plant boarder crops around potatoes.

When damage occurs a herbicide injury checklist should be made to document potato injury symptoms and patterns and check pesticide application history. One has to contact the applicator or chemical representative and photograph injury symptoms. People can send samples to a laboratory for confirmation. It is good to check growing points to determine plant recovery potential. "Please count damaged plants to

determine the extent of injury and map areas of the field damaged," he said. Also keep records of crop yield losses. He warned that both states have a short period to file a complaint, for example in North Dakota one has to notify the applicator within 28 days or prior to 20% of crop being harvested. In Minnesota a complaint needs to be filed within 45 days of suspected incident.

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Potato Viruses

Dr. Ian MacRae, University of Minnesota Northwest Research and Outreach Center spoke about vector management for viruses, for example PVY and PLRV. The most important factor to consider, he claimed was starting with low virus inoculum, which means starting with clean seed. There is no rescue treatment and very little resistance is available.

Therefore vector control is what is left for the grower to keep virus content of the crop down. Virus spread is mainly done by winged aphids. All aphids in the crop are wingless females, who produce aphids at an alarming rate until the host plant senesces or an overcrowding occurs. Then winged aphids appear and travel to other plants, where they leave only one or two aphids behind if it is a host plant.

Potato Leaf Roll Virus (PLRV) is a persistent virus, which means that it takes an aphid hours to acquire the virus and hours to transmit virus. That is the reason it can be controlled by insecticides. The aphid has to stay long enough to be killed.

The non-persistent virus PVY is picked up in seconds and transmits in seconds, before an insecticide has any effect. PVY is mostly vectored by winged aphids moving quickly from plant to plant. In earlier days aphids landed on edges of fields, because they recognize the contrast. Border crops seemed to work well, because aphids would lose their virus. Rye has been used for example, in alley ways between seed lots. Application needs



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to be done at least once a week, because new growth is coming on. Green peach aphids stayed on the edge of the field where they could be controlled by targeted applications.

The world changed, when the symptomless varieties for PVY came on and new PVY-strains appeared that were less symptomatic. The soybean aphid, a new vector entered the fray for the first time in 2000. This aphid can transmit PVY and flies in such tremendous numbers that there is no edge effect and targeted insecticide applications provide no control.

Dr. MacRae stated that crop borders may still work to improve the situation, but it's important to remember these don't help when there is existing inoculum in the field. Crop oils will also help when the first application is done before the first aphid flights and the spray schedule is kept up, however border treatments, which were originally only recommended for PLRV control, are considered to be less effective, because there are lots of soybean aphid in the mix. That non potato aphid spends so little time at the edge.

Pithium Leak and Pink Rot

Dr. Neil Gudmestad, North Dakota State University, started with reviewing the most important potato storage rots, such as dry rot, that usually occurs after a dry season and poor digging conditions, causing bruising. Then he mentioned bacterial soft rot, but stated that this rot is most frequently a secondary disease following other wet rots. Late blight tuber rot can follow a late blight foliar infection, but the probably most important water rot is pink rot.

Leak is difficult to control and can

lead to significant secondary rot. Leak is primarily caused by *Pythium ultimum*, which is a soil borne fungus, while the infections are primarily through wounds made at harvest. The most important thing to remember about Pithium leak is that any tuber temperature above 65°F favors a leak infection. Mefenoxam provides moderate control, but resistance to mefenoxam in *P. ultimum* has been reported in Washington state. Phosphorous acid does not control leak.

Pink rot is caused by *Phytophthora erythroseptica*, and one should realize that infection also occurs through stolons, eyes, and wounds made at harvest. Here also high soil moisture favors infection. There is some cultivar resistance but chemical control is important: either by mefenoxam or phosphonates. Mefenoxam provides excellent control of sensitive *P. erythroseptica*. Unfortunately, resistance in the pink rot organism is prevalent in Idaho, Minnesota, Maine and is present in North Dakota, Michigan and Wisconsin.

One should realize that resistant pink rot to mefenoxam may have more pink rot with the chemical applied than without. Snowden is moderately leak resistant and Dakota Russet has a good resistance to pink rot and leak.

Recommendations for leak control were to harvest potatoes when tuber pulp temperatures are below 65°F and to minimize wounds and bruising at harvest. Under irrigated potato production, make sure soil moisture is ~80% available soil moisture. One should use a mefenoxam/metalaxyl based fungicide in furrow at planting.

If leak develops in storage one should reduce the relative humidity and run fans as much as one feasibly can.

Seed Potato Treatments

Kevin Thorsness, Bayer Crop Sciences, introduced a new potato seed treatment i.e. Emesto Silver. He announced that Bayer now has a new, complete liquid fungicide potato seed-piece treatment for protection against diseases in one package. The active ingredients are penflufen + prothioconazole + red colorant.

Penflufen is a new pyrazole carboxamide fungicide that works through inhibition of succinate dehydrogenase (SDHI fungicide). He claimed a superior activity against seed-borne *Rhizoctonia* (black scurf and stem and stolon canker) and an excellent *Fusarium* tuber rot activity (including currently resistant strains) as well as a good activity on silver scurf.

David Ross, Syngenta, introduced a new quality preservation tool for potato storage that was called Stadium. It has three active ingredients: Azoxystrobin, Fludioxonil, Difenoconazole. He claimed that Stadium has an enhanced efficacy and improved resistance management, because the ingredients have an equivalent or comparative efficacy and similar properties with a different mode of action. There is said to be *Fusarium* and silver scurf control. He suggested to apply good management practices such as excellent coverage and reduced bruising. He told the growers: "You want to put a good quality crop into storage and maintain the best possible environment and enhance the quality with a product such as Stadium".

North Dakota Seed Potatoes

by Willem Schrage, North Dakota State Seed Department

The 2012 North Dakota post-harvest test was carried at the Dunn Brothers' Farm in Homestead, Florida. The emergence and plant growth were very good. The dormancy was short, which is expected to have been caused by the early planting and warm summer season in 2012. A long dormancy variety such as Sangre had sprouts at planting and had a 100% emergence. Growers have been made aware that they can expect early sprouting this spring. Growers were informed that in earlier years some seed growers have applied approved chemicals to delay sprouting in seed potatoes with good results.

The virus results were slightly better than the year before. The earlier generations in outlying areas have considerably less virus pressure.

The acreage covered by the post-harvest test went from 9840.98 acres in 2011 to 9,580.35 acres in 2012. The

percentage of eligible acres went from 49.2% in 2011 to 50.2% in 2012.

In the summer all seed fields had been ELISA tested for PVY. The average percentage of PVY in the summer in 2011 was 0.24% and in 2012 was 0.58%. Taking the results of the summer

ELISA test as a basis the average percentage in the post-harvest test becomes an indication how much current season infection has occurred over the growing season. Those average winter-test percentages were 1.47% in 2011 and 1.40% in 2012. The higher summer average in 2012 did not translate in a higher average PVY percentage in the winter

test, but it is still an indication that PVY has been spread over the summer season. The absence of the soybean aphid and the green peach aphid were compensated by flights of grain aphids.

Symptom expression of PVY for a potato variety is



Unlike most other years Sangre samples were well sprouted.

not the same over the whole country. The different strains of PVY also have different expression. When North Dakota inspectors submit samples to have their inspection findings confirmed by ELISA, confirmation is generally the results. However, varieties such as Silverton and Alpine Russet have created even more of a challenge than Russet Norkotah, Shepody and CalWhite. That was one reason North Dakota seed potato growers decided to expand ELISA testing of leaves from their post harvest test to try to reduce the probability that symptomless carriers will become more of a source of inoculum for PVY.

Because of market requirement winter test lots were ELISA tested for PVA, no positive PVA was found.

The results of the North Dakota Post-Harvest Test can be found at <http://www.nd.gov/seed/> and click on "POTATO DIRECTORY".



The plant growth of Sangre was better than most years. This may alert seed potato growers that seed potatoes may sprout early this year.