

POTATO EYES

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Updates

Dithane ST

Rohm & Haas informed me that sale of Dithane ST seed treatment will discontinue at the end of the year. A supply is being stored in ND and may be shipped to Nebraska at request. Nebraska has a Section 24c on this product since 1996.

Quadris

As most of you know, a 'crisis' Section 18 on Quadris was invoked last July for early blight treatment. Reports across the State has given Quadris very high marks. Some growers even report a curative action. A full Section 3 registration is expected during the winter for both early and late blight. It's an excellent product. But, one key note of caution is that it attacks a single enzyme site in the fungi and, therefore, resistance could develop easily.

Vine Desiccation

Gramoxone is out of the market for summer kill. I am still trying to see if Zeneca will request a Section 24c, special needs, for Nebraska's summer harvest.

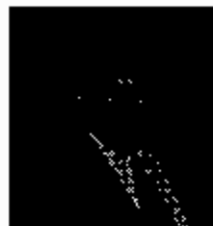
Inferno is a new possible vine desiccant from Griffith. It's an aquatic herbicide and an organic copper. Unfortunately, it did not perform as well as hoped in the summer vine kill trials on Russet Norkotah. The major problem was regrowth.

Green Peach Aphids

Just a reminder to seed growers that, even after vine desiccation, aphids can still transmit potato leafroll virus between plants as long as there is living and infected tissue left. In fields where there were aphids, it's still recommended to treat with an insecticide such as Monitor, Provado, or, possibly Thiodan or dimethoate, depending on population and previous treatments. Treatments are best applied between the two diquat, if that's used, applications. With acid killed vines, there's probably not enough living tissue to matter.

Ron Offutt Honored by PAA

Mr. Ronald D. Offutt was made "Honorary Life Member" of the Potato Association of America at the annual meeting last in July at Fargo, ND. This is the highest award given by the PAA.



Ronald D. Offutt

Ron Offutt, called the "Sultan of Spuds" by Forbes magazine last year, is the founder and CEO of R.D. Offutt Co. & Affiliates. His company includes farming operations in nine States, including Nebraska, and two food processing plants. The operation owns, leases and operates 95,000 acres, most of which, about 50,000 acres is in potatoes producing nearly 20 million hundred-weights.

RDO Co. grows its own seed potatoes that are distributed to its commercial operations throughout the country. In a joint venture with Lamb-Weston Foods Corp., Ron Offutt owns and operates a frozen potato processing plant in Park Rapids, MN. This plant uses 40% of the potatoes produced by these operations. In 1989, RDO Co. purchased the Pillsbury potato dehydration plant at Grand Forks, ND. Ron Offutt is also a partner of Barrel O'run potato chips at Perham, MN. In addition, he operates many John Deere industrial and agricultural dealerships.

Vertical integration is a key to Ron Offutt's success.

Mr. Offutt is also chair of the Board of Regents of Concordia College, his alma mater, and a member of the Board of Directors of several enterprises.

Last May, Ron Offutt received an honorary doctorate degree from North Dakota State University.

CONGRATULATIONS, DR. OFFUTT!!!!

Alexander D. Pavlista

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Purogene

A Section 18 for Purogene, chlorine dioxide, was submitted last month to the EPA. Approval is expected in mid-September following approval for Idaho, Washington, and Oregon. If approval is not received, a 'crisis' Section 18 may be invoked the week of September 18. Purogene, manufactured by Bio-Cide, Inc. out of Oklahoma, is a disinfectant applied directly to potato tubers going into storage and may be applied during storage through the ventilation system.

Target Pests

Data from No. Dakota St. Univ. and USDA in California indicate activity of Purogene on controlling late blight and silver scurf on potatoes in storage.

Application

Purogene applied at 0.5-1 fl. oz. per ton of tubers going into storage. The mix is 2 pints Purogene plus 1 pint of a weak acid such as citric acid into 100 gallons water.

For continual application in high-risk storage, an initial treatment of 1.33 fl oz Purogene may be added to the humidifying water. Following this 1.33 fl oz is added per gallon of humidifying water. Do not add more than 2 gallons of Purogene per month per 500 tons of stored potatoes.

Cost

Purogene will run about \$55-60 per gallon. If all treatments are used, that is, application on tubers going into storage plus two gallons a month for nine months, the cost comes to about 12 cents per hundred-weight.

Duration for Use

The Section 18 request the allowable use period to be from September 1, 1998 to May 31, 1999.

ppm Purogene (9 days, 68F)	% Tubers with Late Blight
0 (check)	28%
5 ppm	12%
10 ppm	6%
50 ppm	0
ppm Purogen (2 days, 68F)	% Germinated Spores Silver Scurf
0 (check)	91%
12.5 ppm	82%
25 ppm	51%
50 ppm	0

Harvest & Storage for Wet Rots

- Pink Rot -Leak - Soft Rot-

With fall crop harvest beginning and potato tubers go into storage, growers have asked about conditions promoting wet rots.

The primary rots are:

- SOFT ROT (bacterial soft rot, blackleg) = *Erwinia carotovora*
- LEAK (Pythium leak, shell rot) = *Pythium* spp.
- PINK ROT = *Phytophthora erythroseptica*

There are no varieties know to be resistant or tolerant of leak or pink rot. Symptoms of these diseases were covered in the July '97 (soft rot) and the November '97 (leak and pink rot) issues of NPE. They won't be covered again here. The conditions during harvest and storage that promote these diseases will be covered, and what can be done to minimize infection.

Coolness - Dryness - Aeration

These are the key factors against these three diseases.

PINK ROT

Closely related to *Pythium* is the genus *Phytophthora* which includes the species causing pink rot, *P. erythroseptica*, and is related to late blight, *P. infestans*. Pink rot fungi live in most soil and survive long periods without any host. Unlike leak, pink rot can be detected in mature plants prior to harvest. It causes a late season wilt starting from the base and moves up the vine. Tubers can be dug up by hand and checked for pink rot before harvest.

Pink rot develops in poorly-drained soils and field areas, or under excessive irrigation/rainfall. Often plants growing next to wheel tracks or wherever there is stagnant water. It's most severe in wet soils that are at 68-86°F. Pink rot only attacks potatoes in Nebraska but it can survive on the roots of small grains.

Infection occurs usually through the stolon and enters tubers through the stem end pre-harvest. However, reports have shown that pink rot can enter tubers also through wounds and swollen lenticels, and have a leak-like phase. As with leak, pink rot-infected tissue can easily be invaded by soft rot, *Erwinia carotovora* and tubers often rot in two weeks. Pink rot may move in storage from tuber to tuber although this is not fully confirmed. Infection of 5% of tubers in storage is considered unmanageable.

Tips to Prevent Pink Rot

- Avoid excessive watering late in season.
- Delay harvest of swampy areas until checked for pink rot.
- Harvest when temperature is below 75°F.
- Avoid mechanical bruising during harvest.
- Apply metalaxyl (Ridomil) during early bulking.
- Cure tubers at 45-50°F.
- Cool tubers rapidly to 40-45°F after curing.
- Use continuous forced and adequate ventilation through pile.

Metalaxyl on Pink Rot Incidence

	Percent Tubers with Pink Rot	
	R. Burbank (NDSU, 1991)	R. Norkotah (CSU, 1994)
no treatment	22%	50%
metalaxyl [applied 2x]	5%	0%

LEAK ('shell rot')

Several species of *Pythium* cause this rancid internal decay of potato tubers. The fungi is strictly soil borne, survives a long time and found in most soils but especially in wet areas where it overwinters in debris. *Pythium* attacks many crops and weeds so it can't be eliminated through crop rotation.

Leak enters tubers during harvest only through wounds — cuts, scrapes, skinning, and shatter. Wounding is absolutely necessary for leak infection; leak is not seen in or on tubers before harvest. Entry of and tuber rot by leak is promoted when air temperature at harvest is 75F and above or when tuber pulp temperature is 65F and a big problem if it's 70F or higher. Infected tubers begin to rot in 36 hours at these temperatures. Tubers harvested from overly wet areas are more prone to leak. In storage, leak doesn't move much from tuber to tuber. But at 50F, leak-infected tubers are easily invaded through lesions by soft rot bacteria (*Erwinia*) which can easily spread in storage among tubers. Late stages of leak can resemble freeze damage.

Tips to Prevent Leak

- Avoid harvesting swampy areas.
- Allow tubers to mature, skins to set.
- Avoid mechanical bruising during harvest.
- Apply metalaxyl (Ridomil) during early bulking.
- Harvest when temperature is below 75°F.
- Don't use a water flume to move tubers.
- Cure tubers for 3 weeks at 45-50°F.
- Cool potatoes rapidly to 40-45°F for storage.
- Keep humidity low during cooling.
- Force air over tubers continuously during cooling.
- Low temperature and humidity will stop leak from growing and dry out infected tubers.

SOFT ROT

Unlike pink rot and leak, soft rot is caused by the bacteria *Erwinia carotovora* that also causes blackleg during the growing season. The soft rot bacteria can be carried on seed pieces, borne in soil, borne in water, carried on insect bodies and equipment. Weeds in the field especially those related to potatoes such as nightshades and buffalo bur can harbor the bacteria. Planting infected seed increases the potential of harvesting infected tubers. Soft rot usually enters through swollen, water-logged lenticels (pores) on tubers. Infected vines release bacteria to the soil and the bacteria can move to new tubers through soil water. Soft rot, however, can also enter tubers through the stem end and wounds.

In storage, soft rot only spreads easily but must enter through wounds either caused mechanically or by fungi such as leak and pink rot. Wet tubers having free water on the surface are very prone to soft rot infection. Chlorinated water will help avoid the spread of soft rot but will not affect bacteria that have already entered tubers. There is little data to support the effectiveness of applying germicides through ventilation or humidification systems. Infection is highest shortly after harvest and declines during storage. The bacteria can survive in debris in storage bins from season to season.

Tips to Prevent Soft Rot

- Do not plant infected seed.
- Control weeds esp. nightshades and buffalo bur.
- Avoid harvesting under wet conditions.
- Harvest mature tubers with set skin.
- Harvest when air and soil temperature is below 70°F.
- Harvest when pulp temperature is below 50°F.
- Avoid bruising.
- Dry tubers quickly.
- Remove vines, clods and soil adhered to tubers before piling.
- Avoid leak and pink rot.
- Sanitize storage facility.
- Eliminate condensation during storage.
- Keep well ventilated in storage.
- Cure tubers for 2-3 weeks at 50-55°F with good air flow.
- Do not wash tubers before storing.
- Dry tubers quickly.
- Monitor storage piles for wet spots.
- If using flume system, use chlorinated water replacing it often.
- Do not let tubers submerge more than 1-2 inches in flumes.
- Dry tubers thoroughly before packing.
- Pack tubers in ventilated bags, having air holes.



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Fall Cover Crop - Triticale

Growers have asked about fall cover crops that may be planted as late as possible after potatoes. Triticale seems to be the best bet for late planting. In most years, planting in mid-October would give little benefit. It would need to be planted more around the 1st of Oct.

Triticale comes up fast, faster than winter wheat, and will give some wind-blowing protection in autumn and be good in spring. It can be mixed with oats which will give some added advantage if there is a little warm weather in autumn.

The best sequence is to harvest potatoes, disc, then water and plant after irrigation. Irrigating before planting will firm up the seed bed and improve the clod structure. Applying starter fertilizer with the drill is recommended since it will give a bit of a push.

Nitrogen should be about 10 to 20 lb/acre and phosphorous about 10 lb/acre. P can be higher (20 lb/acre) if the soil near the surface is low in P. The fertilizer needs to replenish the upper couple of inches of soil.

Seeding rate should be on the high side, 1½ bushels triticale per acre (bushel = 56 pounds), so about 80 lb/acre. Seeding depth should be about 1 to 1½ inches. Use a fast cylinder speed.

Note, wheat growers don't like triticale since they consider it a problem weed on wheat ground. If the landowner objects, then wheat will probably have to be used and that will require an earlier planting.

Check out the Nebraska Potato Eyes on the WWW at: <http://lanrwww.unl.edu/lanr/phrec/Peyes.htm>



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