PNREC95-053

NEBRASKA POTATO EYES

Technical News Reports for the Nebraska & Wyoming Potato Industry

Vol. 7
Issue 2
Summer/Fall 1995

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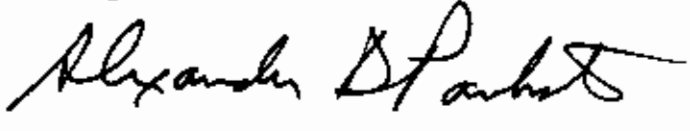
Editor's Note

Risky Business? — The actual level of risk of accidental deaths by many causes are ranked for actuarial guidelines. Some examples are: 3rd highest risk of death is motor vehicles, #6 = motorcycles, #8 = swimming, #14 = hunting, #19 = commercial airline travel, and #24 = skiing. According to this ranking of risk, pesticides are #28, just two notches higher than deaths caused by spray cans (#30). Surveys were taken on how several demographic groups perceive the ranking of pesticides: college students ranked pesticides #4 in fatalities, women voters #9, and business people #15. Perception is not fact and this is what growers are fighting every day.

Sprout Inhibition Update — The EPA ruled that all products with maleic hydrazide as the active ingredient (e.g. MH 30) may be re-registered. They were found NOT to pose unreasonable risks or adverse affects to people or the environment. Earlier this year, the potassium salt of MH in a water-soluble granule, Sprout Stop 60WS, received registration for sprout control on potato and onion in storage. The manufacturer is Drexel Chem. Co.

Pesticide Spending — U.S. growers spent 6.13% of their farm expenditures on pesticides in 1993 compared to 4.1% in 1992 and 3.9% in 1991. The top five pesticides purchased based on amount of active ingredient are: atrazine, metolachlor (Dual), sulfur, alachlor, and methyl bromide (a fumigant). Based on jpesticide purchases, weeds are agriculture's biggest pests. There were 20 new compounds registered as pesticides in 1993 — the highest level since 1975.



In This Issue...

Nebraska's Potato Industry

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Nebraska's potato industry has experienced considerable acreage growth since 1992 (Figure 1 on pg. 10). Nebraska currently ranks 11th in fall production; in 1990, it ranked 14th; in 1986, it was 16th. Nebraska's production increased 58% from 1991 to 1994 (Figure 2 on pg. 10). Potato production in the state increased at the rate of 9% per year from 1988 to 1994 versus 0.8% between 1983 and 1988. Nebraska ranks 9th in chipstock shipment. A record high yield was set in 1994 surpassing the previous record set in 1992 (Figure 2 on pg. 10). Nebraska ranks 6th in yield per acre. Yield in the state increased at 3% per year from 1988 to 1994 versus 0.9% per year from 1983 to 1988. The values of sales of the potato crop in 1994 is double the value in 1986.

Figure 1. Fall and Total Potato Acreage in Nebraska

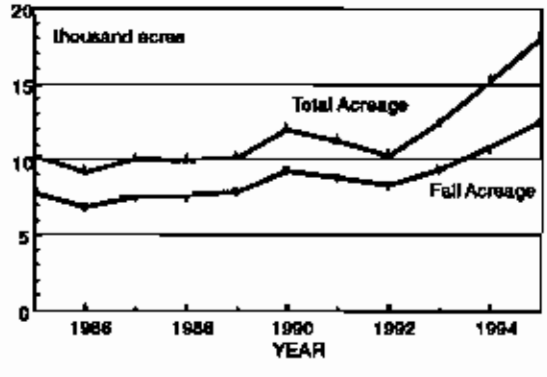
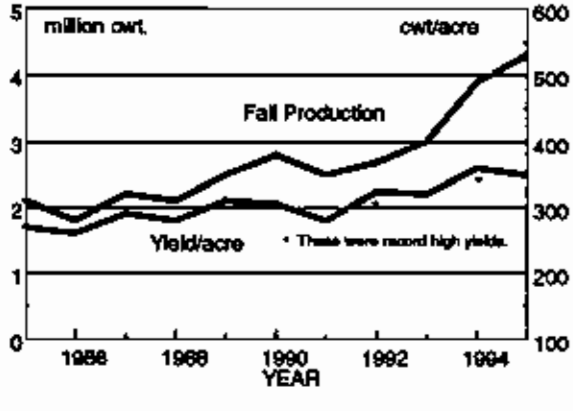


Figure 2. Fall Production and Yield in Nebraska.



Internal Necrotic Disorders Symposium

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At the 79th annual meeting of the Potato Association of America, a symposium titled "Internal Necrotic Disorders of Potato" was given. The highlights are:

Physiological Mechanisms (Howard Davies, Scottish Crop Research Institute) — Internal Brown Spot (IBS) or internal rust spot (IRS) results from resorption of water related to hot and dry weather, temperature fluctuations and soil type. Itis caused by a deficiency in calcium and possibly other nutrients, membrane composition and cell autolysis (kind of cellular suicide). Calcium deficiency when tubers are 'marble' sized promotes brown center or hollow heart. Brown center - hollow heart is inversely related to calcium in the peel. For a given variety, differences in hollow heart expression between tubers is related to calcium. Between varieties, however, there is no correlation between calcium and internal brown center susceptibility.

Improving Quality with Calcium (Jiwan Palta, Univ. Wisconsin)— Why calcium? Calcium gives strength to cell walls by cross-binding with pectin. It gives membrane integrity and aids in maintaining the proper ion balance in and between cells. Increased calcium in tubers correlates with an increase in cell membrane strength, and a decrease in membrane elasticity and plasticity. There is less ion leakage from cells with calcium. In potato production, calcium increased yield only when plants were under heat stress. This is accomplished through the maintenance of stomatal functions by calcium.

Hollow Heart & Brown Center (Rob Thornton, AgriNorthwest, WA) — Among the information presented, possibly the most intriquing was a study on the interaction of planting date and nitrogen application on Russet Burbank. The incidence of hollow heart/brown center was reduced with low preplant nitrogen application and later planting date, and increased with high nitrogen applied preplant and earlier planting date. In other words, if a grower plants early, than the preplant (starter) nitrogen needs to be low and nitrogen added later to reach the desired level. The interaction of planting date and preplant nitrogen on yield, specific gravity and stem number per plant was also presented (see accompanying table).

Other highlights from my notes at the meeting are:

Thresholds — For Colorado potato beetles, the treatment threshold reported was 0.5 adult or 4 small larvae or 1.5 large larvae per plant. For aphids, it was reported to be 10% of the plants infested or at least one (1) winged green peach aphid per plant.

Internal Brown Spot (IBS) — Increasing calcium decreases the incidence of IBS. Low calcium plus increased stress result in more IBS. Increased stress promotes the effect of calcium on IBS. Stress later in the season worsens IBS.

Late Blight — Ground application of Bravo gave better canopy coverage and better control of late blight than did aerial application.

Forecasting for late blight using the North Dakota weather station system indicated that using an 80% relative humidity threshold for calculating severity values expanded the treatment window for fungicide application from seven (7) days to 10-14 days.

Weed Control — USDA studies indicate that mustards (*Brassica* spp.) incorporated into sandy soils as green manures will suppress weeds. The inhibition of weed germination is probably related to the release of allyl isothiocyanate into the soil.

Shatter Bruise — That tuber temperature may play only a minor role in shatter bruise was reported by the Univ. Maine. There seems to be no correlation between shatter and storage temperature which disagrees with popular charts. Other factors seem to be more important to shatter bruise occurrence such as tuber size, weight and maturity.

Flaming — Young potato plants (less than 4 inches tall) recovered from flaming treatments used to control both weeds and Colorado potato beetles, if used early in the growing season.

Seed Tuber Yield — Paclobutrazol, a plant growth regulator, applied to foliage when tuber size was about 0.5 inch, increased the number of harvested tubers that were 1 to 2 inches in diameter. Seed tuber number was increased 29 to 40% in Russet Burbank and 57 to 70% in Shepody.

Interaction of Planting Date and Starter Nitrogen on Russet Burbank.

	Low Starter Nitrogen	Early Planting	High Starter Nitrogen	Late Planting
Hollow Heart	decreased	increased	increased	decreased
Yield	increased	increased	decreased	decreased
Specific Grav.	decreased	decreased	increased	increased
Stem Number	unchanged	decreased	unchanged	increased

Pathology Reports at the PAA

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The following highlights the presentations on potato diseases at the annual meeting of the Potato Association of America in July at Bangor, ME.

Growers are familiar with the dry rot decay caused by the *Fusarium* fungus and storage losses that result from tuber infection by silver scurf, caused by the fungus *Helminthosporium solani*. Losses attributed to these two fungi have increased over the past 5-10 years, possibly because these fungi have become resistant to the post-harvest fungicide Mertect (thiabendazole = TBZ).

Fusarium Dry Rot

"Variability in symptoms caused by *Fusarium* spp. in potato tubers" — Cornell Univ.: Diagnosis of *Fusarium* infection of potato tubers is usually based on symptomatology. A brown to black "dry rot" is considered typical and these symptoms were produced by isolates of *F. sambucinum*, *F. solani*, and *F. oxysporum*. However, diverse symptoms were observed when tubers of several potato cultivars were inoculated with *F. avenaceum*, *F. culmorum*, *F. oxysporum*, *F. sambucinum*, and *F. solani*. For example, some isolates of *F. avenaceum*, *F. culmorum*, and *F. solani* produced a pale or tan rot or necrosis, rather than the typical brown to black rot, and some isolates produced superficial browning, hardening, and collapse of infected tubers. Therefore, symptoms produced by isolates of *Fusarium* species could be mistaken for those normally produced by other fungi, such as *Pythium*.

"Inhibition of *Fusarium* spp. by carbonate and bicarbonate salts *in vitro*" — Cornell Univ.: Because TBZ resistance is widespread in *Fusarium* species, alternative postharvest control strategies are needed for dry rot. Inhibition of Fusarium species by potassium bicarbonate (KBC), potassium carbonate (KC), sodium bicarbonate (NaBC), or sodium carbonate (NaC) was tested in the laboratory. Carbonate salts were significantly more inhibitory to fungus growth than bicarbonate salts. The potential for dry rot control with carbonate salts is being evaluated on potato tubers.

"Distribution of TBZ resistant *Fusarium sambucinum* from potato and its impact on dry rot in storage" — North Dakota State Univ.: Isolates of *Fusarium sambucinum* were recovered from dry rot diseased potato collected from states and provinces throughout the United States, Mexico and Canada and tested for TBZ resistance. Of 504 isolates representing 18 states, 75% were resistant to TBZ. The resistance ranged from 1 to 64 ppm and TBZ resistant isolates were also cross-resistant to thiophanate methyl (Topsin). They also inoculated tubers with Fusarium and then treated them with TBZ in an effort to simulate potato production practices. They concluded that TBZ resistance resulted in increased incidence and severity of dry rot compared to TBZ sensitive isolates.

Researchers at the USDA-ARS tested an alternative method for control of dry rot. Eighteen gram-negative bacteria isolated from suppressive soils were shown to provide biological control dry rot incited by *F. sambucinum*. Growth of these bacteria in liquid culture was investigated to develop an efficient means for mass producing these biocontrol agents. They found that biocontrol of dry rot was significantly better with bacteria taken from 24 or 72 hr old cultures than with bacteria from 96 hr cultures. However, the relative ranking of the 18 bacterial strains did not change significantly. Related studies are underway to determine the impact of culture harvest time on the long-term survival of dried bacterial cells held in storage prior to tuber application.

Silver Scurf

Because silver scurf fungus isolates are commonly resistant to TBZ, plant resistance to the fungus may help manage the disease.

"Resistance to *Helminthosporium solani* in tuber-bearing *Solanum* spp." — North Dakota State Univ.: Two-hundred-fourteen accessions of tuber-bearing *Solanum* species were screened for resistance to *H. solani*. Evaluations were based on counting the number of *H. solani* spore-bearing structures formed per mm² (sbs/mm²) of tuber surface after inoculation. *Solanum demissum*, *S. acaule*, *S. chacoense*, *S. stoloniferum*, *S. bulbocastanum*, *S. brachistotrichum*, *S. fendleri*, *S. jamesii*, *S. kurtzianum*, *S. polytrichon*, and *S. sanctae-rosae* contained resistant accessions with scores ranging from 0.03 to 0.54 sbs/mm². Susceptible accessions were found in the species *S. vernei*, *S. tuberosum* ssp. *andigena*, *S. microdontum*, *S. multiinterruptum*, *S. stoloniferum*, *S. chacoense*, *S. magistacrolobum*, *S. sparsipilum*, *S. incamayoense*, and *S. kurtzianum*, with scores ranging from 1.65 to 8.24 c/mm². Red Norland, Norchip, Gemchip, and Russet Burbank were included as controls and showed scores ranging from 1.52 to 6.41 sbs/mm². This information may make it possible to utilize this resistance in breeding programs.

"Postharvest dynamics of *Helminthosporium solani* spores" — North Dakota State Univ.: showed dispersal of Silver Scurf spores occurred in the potato storage. Seed, table stock and processing storages were monitored to determine the postharvest dynamics of spore production and infection. Although spores were produced in all storages, numbers were generally greater in storages with processing potatoes versus storages with table stock or seed potatoes.

Spore counts increased with storage temperature and RH values greater than 99%. Spores were first detected soon after potatoes entered storage and detection increased with time. The number of spores was positively correlated with movement of potatoes in storage. Healthy tubers placed in storage became infected after exposure for one week. Results suggest that spore production and spread may be especially important in seed storages because contaminated seed may be the primary source of inoculum for disease in the field.

Early Dying

"Effect of drought and *Verticillium dahliae* on severity of potato early dying and yield of potatoes" — Oregon and Pennsylvania State Universities: A mobile rain shelter was used to study the cv. Katahdin. Treatments of drought (none, early season, late season) and inoculum density of *Verticillium dahliae* (none, 25 cfu/g of soil) were tested. Early season drought was imposed by withholding irrigation water prior to tuber initiation and, irrigation was withheld at tuber bulking for the late season treatment. Early season drought significantly reduced the severity of potato early dying relative to the non-droughted plots. In contrast, drought at tuber bulking had no effect on disease severity. Therefore, a mild drought stress early in the season may reduce infection by *V. dahliae* or it may enhance host resistance.

During the 1994 growing season, a total of 38 Idaho potato fields were surveyed by the Univ. of Idaho for factors related to yield and quality of the Russet Burbank potato. *V. dahliae* infections were found to decrease both tuber yield and quality. This relationship was supported by other field studies in 1988 and 1994 which showed a consistent decrease in yield and specific gravity as infection increased. Crop rotations of sweet corn for 2 consecutive years were compared with plots that were fallow for 2 years prior to growing Russet Burbank. Potatoes in corn-rotated plots showed the lowest incidence of infection, specific gravity increased from 1.078 to 1.082 and yields of U.S. #1's increased by 62%. These data show *V. dahliae* infection is a key factor associated with reduction of specific gravity.

Virus Diseases

Research at Oregon State Univ. on the effects of potato virus Y (PVY) infection on yield and quality of Shepody (Sh) and Russet Norkotah (RN) potatoes and potato leafroll virus (PLRV) infection on RN were measured by comparing infected and non-infected hills located in commercial fields. Compared with healthy plants, yields and average tuber weights for Sh were reduced by PVY infections 28.7% and 24.1%, respectively, and for RN, 45.6% and 23.4%, respectively. The specific gravity was also reduced from 1.076 to 1.071 in RN. The number of tubers per plant was not affected for either variety. Seedborne PLRV in RN reduced yield, tubers per hill, and tuber weight by 64.9%, 40.9%, and 41.1%, respectively. Specific gravity was reduced from 1.074 to 1.068 by PLRV.

"Aphid spp. associated with potato virus Y spread in the Red River Valley" — North Dakota State Univ.: In a two-field-season study, nearly 21,000 aphids representing 37 species were collected and identified from 9 sites during the 1992-1994 field seasons. Aphid numbers differed greatly from year to year; the average total trap catch per site was 1,238 in 1992, 205 in 1993, and 1,258 in 1994. Yearly changes in aphid numbers mirrored changes in both the number of PVY infections in bait plants exposed at each site and in state seed potato rejections. Averaging over the three seasons, six species contributed significantly to overall aphid numbers: *Aphis helianthi* (22%), *Lipaphis erysimi* (29%), and four grain aphid species (23%). Although the latter five species are known vectors of PVY, a greenhouse study showed that *A. helianthi* transmitted PVY from infected potato to *Physalis floridana* with an approximate 2% efficiency.

Because PVY is non-persistently transmitted by aphids, standard insecticides are not effective in preventing spread. If effective aphid repellents could be found that prevent feeding or reduce virus transmission, seed producers would have a means of reducing virus spread. Research at the Univ. of Idaho showed that out of 43 compounds tested, ten compounds, including sagebrush (*Artemisia tridentata tridentata*) oil, Absinthe (*Artemisia absinthii*) oil, pulegyle alcohol, yarrow (*Achillea millefolium*) oil, _-citronellol, geraniol, melaleuca oil (commercial formulation), linalool, farnesol and a numbered compound show probable efficacy. Additional field testing will be required to determine if their use is practical.

Research at the Univ. of Minnesota showed that PVY is probably spread by potato cutters and cultivation equipment. Studies of cultural factors, including seedpiece cutting, pre- and post-emergence tillage, in-row cultivation and pesticide application, on transmission of PVY were done over a period of several years. No significant differences in cutting transmission of PVY occurred between Lockwood and Milestone cutters and checks in summer foliage assays of Atlantic, Russet Norkotah and Shepody in 1993. Assays of plants grown from tubers harvested from these plots showed significantly greater PVY in Shepody by Lockwood-cut than by Milestone-cut tubers. However, neither cutter caused significantly more PVY transmission than what occurred in the checks. Post-emergence cultivation across rows and in-row cultivation and pesticide application resulted in statistically significant transmission of PVY in Atlantic potato at one location in 1992, but not at two locations in 1993. In general, it appears that PVY transmission to potato can occur via these cultural practices. However, mechanical transmission was not a consistent source of PVY spread in these experiments.

Nebraska Potato Focus Survey

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In September, 1995, all who attended a Nebraska Potato Focus (NPF) were sent a survey concerning the impact of the meetings and requesting suggestions for future improvements. Six NPFs were given between 1989 to 1994. The number mailed was 204 of which 192 were delivered and of these 21 were returned; this is a response rate of 11% considered a low response rate. The mean number of NPFs attended by respondents was 3.5 (out of 6). Note, 12 people attended all the NPFs and 18 attended five of the six. Also note, in a 1992 survey of growers, the **2nd-highest-ranked** method of getting information was the Nebraska Potato Focus. (**First** was the Nebraska Potato Eyes.) Refer to the tables for the data; the following are some highlights:

- 88% of respondents used the information in their operation and 77% improved their production.
- 75% noted NPFs helped them in dealing with governmental regulations.
- Topics noted as having the most impact on operations were: Disease Control (67%), Weed Control and Vine Kill (57%), Seed Handling and Storage (57%).
- The highest scoring segments of NPF were the Proceedings, Out-of-State Speakers and Industry Speakers.
- 57% of respondents want an NPF every year.
- Comments stated on the surveys were:
  1. (Grower) "... your meetings have been some of the more informative that I have been to. Also they have been geared toward production ag rather than research. I appreciate that!!"
  2. (Grower) "I think the meetings are set up just fine."
  3. (Sales Rep) "Have always enjoyed the meeting."

[Note, there was no negative comment made on any of the surveys.]

Table 2. Summary of evaluations conducted 1989 to 1992, 45 responded.

	Excellent	Good
Overall Meeting	33%	67%
Meeting Scope	24%	76%
Organization	30%	70%
Usefulness	30%	70%
Presentation Quality	37%	63%

By far, the respondents (36%) indicated what was most liked were the speakers — their field experience, practical approach and concern for production. Topics for NPF suggested at that time were: irrigation & chemigation (NPF 1994), herbicides and weeds (NPF 1993), more on fertilization (planned for 1996 or 1997), storage and bruising, and processing requirements.

Table 1. Data from 1995 NPF Survey Questions:

1. Rate NPFs — Score 1 (very little) to 5 (very much):

Question:	Mean Score	% Scored 3,4,or 5	% Scored 4 or 5
a) Informative and Practical Presentation	4.0	95%	81%
b) Gained Useful Information	4.0	95%	86%
c) Used Information in Operation	3.6	88%	50%
d) Information Improved Production	3.4	77%	46%
e) Information Reduced Costs	2.9	62%	38%
f) Information Helped with Regulations	3.8	75%	38%

2. Topics Impacting Operations:

Topic/Area:	% Responding
a) Disease Control	52%
+ Late Blight	67%
b) Weed Control	43%
+ Vine Desiccation	57%
c) Seed Handling	33%
+ Storage	57%
d) Fertilization	33%
e) Pest Identification & Econ. Threshold	29%
f) Regulatory Affairs & Worker Safety	29%
g) Irrigation	24%
h) Insect Control	24%

3. Scoring of NPF Segments: (1 = not important; 5 = most important)

Segment:	Mean Score (1-5)	% Scored as 4 or 5
a) Out-of-State Speakers	3.9	71%[1]
b) Proceedings/Reports	3.9	58%[2]
c) Industry Speakers	3.8	59%[3]
d) Workshops	3.7	69%
e) Symposia/Seminars	3.7	56%
f) Demonstration	3.5	60%
g) Socializing	3.4	59%
h) Tours	3.2	53%
i) Nebraska Speakers	3.2	53%[4]
j) Exhibits	3.1	39%
k) Lunch/Breaks	3.0	33%
l) Banquet	2.6	21%

[1] Scored 4.1 with consultant; 80% of them scored it 4 or 5. (Ranked 1st among consultants and 3rd among growers.)
[2] Scored 4.0 with growers; 63% of them scored it 4 or 5, and 38% scored it 5. (Ranked 2nd among growers.)
[3] Scored 4.0 with growers; 71% of them scored it 4 or 5, and 29% scored it 5. (Ranked 1st among growers.)
[4] Scored high (3.7) with consultants and low (2.6) with growers.

4. Frequency of NPF:
every year = 57%; every other year = 29%*, no opinion = 14%.
*Only consultants expressed this opinion.

5. Changes in NPF:
Only 3 of 21 respondents (14%) suggested changes and 6 of 21 (29%) suggested NPF should not change. The changes suggested were more workshops, tours, outside speakers, speakers (talks) in general and exhibits.

6. Two Phase Program:
1st half on a narrow/specific topic and other half on general update or area.
Yes = 76%, No = 10%, No Opinion = 14%.

7. Request for Involvement:
Yes = 2 respondents (G. Leever and W. Thompson)

8. Topics for future meetings:
#1another disease meeting, specifically highlighting early dying = 50%.
#2fertilization management and nutrient analysis = 42%.
#3processors' requirements = 29% (growers only).
#4grower case history/group discussion = 33%.
Other topics listed include:
crop rotation, herbicide carryover, equipment innovation and new varieties.

Pesticide Use Exemptions

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Federal Exemptions—Emergency exemptions from registration are used when an emergency pest situation arises for which no pesticide is registered. If both federal and SLN registrations would take too long to enact, an emergency registration can be used. Known as Section 18 exemptions, these registrations are handled by the highest governing official involved — usually a state governor or federal agency chief. This provision allows the sale and use of a product for a nonregistered purpose for a specified period of time. Strict controls and record keeping are required for all emergency uses. You must understand all of the special requirements and responsibilities involved whenever you use pesticides with emergency exemptions. The agency which has granted the emergency exemption will supply the necessary rates, safety precautions, and other vital information. Emergency exemptions are initiated by growers or end users. These types of registrations usually do not allow time for committees to review in detail and may be issued by the Governor or the Director of Agriculture.

In determining whether an emergency exists, EPA consults with the Secretary of Agriculture and with the governor of the state making the request. Between October of 1991 and June of 1993, EPA received nearly **1200 requests** for section 18 exemptions. The Administrator is authorized to exempt State and Federal agencies from any provision of FIFRA, if emergency conditions exist.

There are four types of emergency exemptions:

1. *Crisis Exemption*. A crisis exemption may be utilized in an emergency condition when the time from discovery of the emergency to the time when the pesticide use is needed is insufficient to allow for the authorization of a specific, quarantine, or public health exemption. The crisis provisions may not be utilized to authorize a pesticide use if any of the following has occurred:
   - EPA has informed the head of the Federal or State agency, the Governor, or their official designee, to not issue such an exemption;
   - The pesticide use has been suspended under section 6(c) of FIFRA;
   - The pesticide use has been canceled following a notice issued under section 6(b) of FIFRA;
   - The pesticide contains a new chemical; or
   - The application proposes the first food use of a pesticide

   A crisis exemption may be authorized for: (a) only as long as is necessary to control the pest or conditions causing the emergency; (b) no longer than 15 days, unless an application requesting a specific, quarantine, or public health exemption for this use has been submitted to the Agency.
2. *Specific exemption*. A specific exemption may be authorized in an emergency condition to avert a significant economic loss, or a significant risk to endangered species, threatened species, beneficial organisms, or the environment. EPA shall allow the use of a pesticide for no longer than one year.
3. *Quarantine exemption*. A quarantine exemption may be authorized in an emergency condition to control the introduction or spread of any pest new to or not theretofore known to be widely prevalent or distributed within and throughout the United States and its territories. This exemption can last no longer than three years but may be renewed.
4. *Public Health exemption*. A public health exemption may be authorized in an emergency to control a pest that will cause a significant risk to human health. The time limit is one year.

Of the four basic types of emergency exemptions, the most common are specific exemptions and crisis exemptions. The potato late blight emergency exemption, for example, is somewhat unique since it relies on information already prepared by the State of New York. This registration is a "specific exemption" request to EPA.

A Case Example: Due to the unique weather patterns in 1992, Illinois snap bean growers observed the emergence of a serious infestation of puncturevine. This weed poses a severe problem in snap bean production because the seed head contains sharp burrs considered a health hazard to consumers. Any bean field infested with this weed would be considered unharvestable. Earlier research by Dr. Brian Flood, Pest Manager for Del Monte Foods, indicated that Reflex (fomesafen), a commonly used herbicide in soybean production, provided excellent control of puncturevine with little or no injury to the beans. With this and preliminary residue data generated by the Univ. of Arkansas and the IR-4 Program, a crisis exemption was requested from the Illinois Department of Agriculture. By September 4, 1992, the state granted a crisis exemption in time to salvage much of the 1992 snap bean crop.

State Pesticide Registrations — Special local needs registrations (known as SLN or 24(c) registrations) are becoming more common. They allow a state, under some conditions, to register *additional uses* for a federally-registered label. The registrant must provide supplemental labeling for each SLN registration. These registrations are legal only in the state or local area specified in the labeling.

Generally, 24(c) requests originate from the manufacturer with support from growers and users. Generally, these registrations take a fair amount of time to complete and are reviewed by the University of Nebraska Pesticide Advisory Committee and the Nebraska Pesticide Board.

Under FIFRA Section 24(c), states are authorized to register new end-use products or additional uses of federally registered pesticides if the following conditions exist:

1. a special local need for that product's use;
2. the use, if a food or feed use, is covered by an appropriate tolerance or has been exempted from the requirement of a tolerance;
3. registration for the same use has not previously been denied, disapproved, suspended, or canceled by EPA, or voluntarily canceled by the registrant because of health or environmental concerns about an ingredient contained in the product, unless EPA has reversed the original action.

Requests for Special Local Need (SLN) registrations are generally made by pesticide companies to the specific state. Once a state approves the application, the state then forwards notification of the SLN registration to EPA for review. Provided the state has complied with the requirements of FIFRA section 24(c) and 40 CFR Part 162, the registration becomes effective.

The EPA has 90 days from receipt of the SLN notification from the state to disapprove the registration, else it becomes a Federal registration under FIFRA section 3 for use only within the state.

Grounds for EPA disapproval include but are not limited to:

1. the 24(c) will probably create an unreasonable adverse effect upon man and/or the environment;
2. the refusal of the registering State to submit information supporting the registrations;
3. failure of the information submitted by the State to support the State decision to issue the 24(c).

Experimental Use Permits (EUP) — In the United States, Section 5 of FIFRA testing of pesticides on a broad scale before applying for a full federal registration. The EPA issues an EUP only if the applicant "needs such permit in order to accumulate information necessary to register a pesticide." Applicants are usually commercial companies and research agencies. A temporary tolerance may be issued to allow treated food or feed to be sold. Without this tolerance, treated food or feed item has to be destroyed. When EPA grants an EUP, the permit specifies the maximum amount of material to be used, and the time frame for usage. The permit also includes a list of states where the material may be used. Authorized states can issue experimental use permits for the purpose of getting data needed to support the State registration of a pesticide for special local needs, 24(c), and experimentation.

Ag Chemical Use on Potatoes in Nebraska

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In 1992, a survey of speciality crop growers was conducted to determine pesticide use. The speciality crops surveyed were dry beans, proso millet, sugarbeet, sunflower as well as potato. Eighty-seven potato questionnaires were sent out based on the mailing list of the "Nebraska Potato Eyes." Twenty-three surveys were returned and, of these, 10 were usable. Nine counties were represented—Banner, Box Butte, Butler, Chase, Cuming, Garfield, Merrick, Rock, and Scott Bluff.

Five of the usable surveys were from growers of 500 or less acres and the other five from growers of 501 or more acres of potatoes. Of the estimated 12,000 potato acres in 1992, over half of the acres were covered by this survey. Nearly all of this acreage was treated with at least one pesticide.

Insecticides, primarily phorate (Thimet) were used on 99.8% of the acreage; herbicides, predominantly metolaclor+metribuzin (Turbo) were applied on 98.7% of the acres, and fungicides, principally seed dusts, were used on 74% of the acres. No nematicides were used in Nebraska in 1992.

Approximately 30,644 lbs (active ingredient, AI) of herbicides were used on the potato acreage in Nebraska. Multiple treatments were common with the number averaging 1.69 per treated acre. The most used herbicide was metolaclor (18,454 lbs AI) followed by metribuzin and EPTC. Nearly all of the potato acreage was treated with insecticides with the total treatments averaging 2.29/acre. Phorate made up nearly 80 percent of the total insecticides applied to potatoes with 32,881 lbs AI out of 41,002 lbs. Thiophanate-methyl (9,669 lbs AI) and ethylene bisdithiocarbamates (5,858 lbs AI) were the two most used fungicides. Some double applications of fungicides were applied on potatoes. (Editor's note: with the late blight threat in 1994 and 1995, more acres were treated with foliar fungicides.)

Alternate pest control methods actively being used were crop rotation for weed, insect and disease control, varietal selection for diseases (especially common scab), tillage for weeds, and disinfection for diseases.

Pest scouting was regularly done by all responding potato growers. For comparison, only half of dry bean and two-thirds of sugarbeet growers scout regularly.

COOPERATIVE EXTENSION
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF NEBRASKA-LINCOLN
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
LINCOLN, NEBRASKA 68583

Survey summary of potato pesticides in Nebraska, 1992.

	% of Total Treated Acres	Application Rate mean per acre
HERBICIDES:		
Diquat	23.6	.50 qt
Dual	12.0	.88 qt
Eptam	9.7	1.57 qt
Gramoxone	14.7	1.00 qt
Lorox	2.9	.50 qt
Poast	2.9	.50 qt
Prowl	8.5	.75 qt
Roundup	8.3	1.00 qt
Sencor	11.2	.38 qt
Sencor+Dual	14.7	.75 qt+1.0 qt
Treflan	.2	.50 qt
Turbo	59.4	.94 qt

	% of Total Treated Acres	Application Rate mean per acre
INSECTICIDES:		
Ambush	23.9	.20 qt
Asana XL	5.6	.18 qt
Di-Syston 15G	0.8	14.0 lb
Monitor	21.4	.88 qt
Pounce	30.9	.16 qt
Sevin	0.03	1.50 qt
Thimet 20G	98.8	12.8 lb
Thiodan	47.2	1.00 qt
FUNGICIDES:		
Bravo	5.4	.75 qt
Maneb	16.6	2.00 lb
Manzate	18.5	1.00 qt
Micro F	0.2	
Ridomil 2E	16.5	.38 qt
Ridomil MZ 58	24.0	1.75 lb/1/0 qt
Ridomil/Bravo	0.1	2.00 lb
Tops	17.0	17.50 lb

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