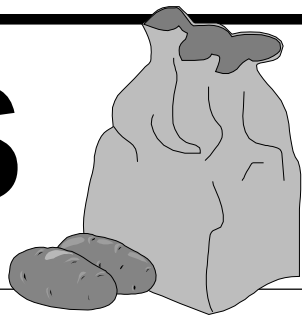
PHREC 2002-05c

NEBRASKA

POTATO EYES

Vol. 14, Issue 3, Autumn 2002 • Alexander D. Pavlista, Ph.D., Extension Potato Specialist



Nebraska's Potato Industry

1985-2000

Recently, I was asked to prepare a brief analysis of the growth of the potato industry in Nebraska over the past several years. I thought that you too might be interested and an overview of this growth that I reported.

As part of the Univ. Nebraska-Lincoln continued efforts into Extension and Research potato programing, emphasis was placed on improved production with the mission to rebound Nebraska's declining potato industry. The most demonstrable and measurable success of this program is the increase in potato acreage, yield and production over the past 16 seasons, 1985 to 2000.

1. Acreage increased 2.5-fold with the continued support by UN-L.

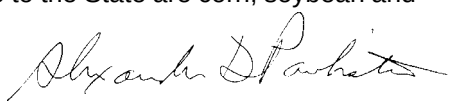
2. Record yields were set in 1992, 1994, 1997 and 1999. Currently yields are 50% greater than they were 12 years ago.

3. The 1942 production record of 7.55 million cwt was surpassed in 1997 by a million cwt on less than a third of the 1942 acres. Production continued to increase in 1998 and 1999.

4. In 1988, Nebraska ranked 16th in total production and 14th in fall ('main-crop') production. In 2000, Nebraska ranked 11th in total and 10th in fall productions. (The difference in ranking is due to the winter and spring productions in California.) Currently, Nebraska ranks ahead of New York and behind Michigan in main crop production.

5. The value of the 1999 production was over $52 million. The Nebraska potato crop is sold to other States and relatively little is consumed internally. Therefore, value represents primarily imported dollars.

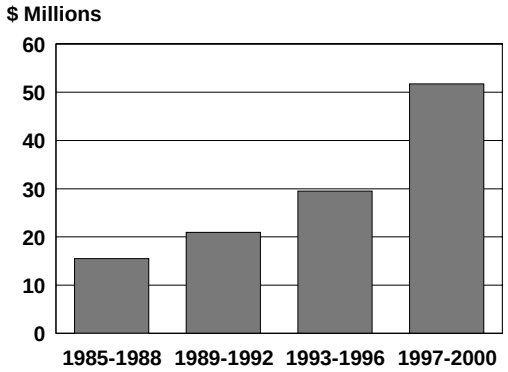
6. The current value of potato production in Nebraska is comparable to that of dry bean, sorghum and sugar beet, and more than double that of irrigated winter wheat. The only annual crops in Nebraska that significantly exceed (2x or greater) potato's value to the State are corn, soybean and wheat.



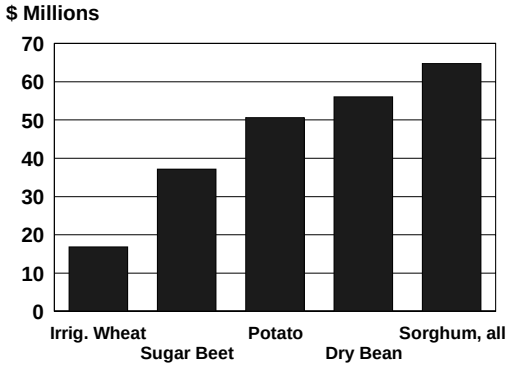
4-Year Period	Planted Acres ($x10^3$)	Harvested Acres ($x10^3$)	Yield (cwt=100lb) (cwt/acre)	Production (cwt=100lb) ($x10^6$ cwt)
1985-1988	10.35	9.83	276	2.718
1989-1992	11.23	10.93	299	3.256
1993-1996	15.83	15.43	320	4.966
1997-2000	25.80	25.15	396	9.948

[source: NASS]

Value of the Potato Crop in Nebraska, 1985-2000



Value of Selected Crops in Nebraska, 1999-2000



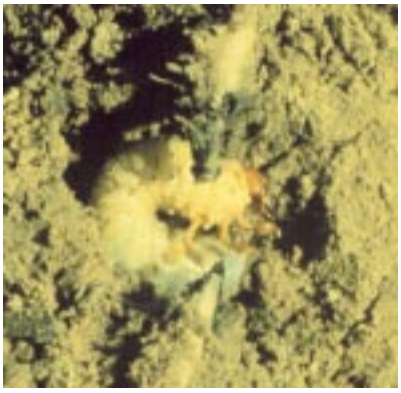
Inside this issue...

Sand Chafer - White Grub

White grubs, in general, refer to several species in the "May" or "June" beetle family injuring primarily grass crops. These grubs are commonly on a three-year cycle with the larval stage remaining the soil. However, these do not seem to affect potatoes or corn. The annual white grub that seems to affect potatoes is referred to as the "sand" chafer (*Strigoderma arboricola*) because it is associated with sandy ground. There are other chafer whose adults may be found in potato fields, most notably the "rose" chafer (*Macrodactylus spinosus*) and the "masked" chafer (*Cyclocephalia* sp.), but these do not seem to produce the white grubs that affect potato tubers.

Description

Adult sand chafers are shiny black with rusty-red wing covers. They appear bronze or copper from reflecting light when seen from above. Their length is about three-eighths of an inch, similar in size and shape to Japanese beetles and half the size of June beetles.



White Grub (larvae)

Eggs are deposited in the ground and hatch as larvae commonly called white grubs and these remain under the ground. White grubs are dirty white and partially transparent. They are small, fat and worm-like, and are about an inch long. Their head is brown and behind the head near the front of the grub are six prominent legs.

Life Cycle

The sand chafer has an annual life cycle, going through one generation per year, unlike that of the June beetles. Adults emerge from the ground in early summer, latter half of June and early July. They are highly attracted to light and will land on light-colored clothing, get under clothes and tangle in one's hair. Adults live about 11 to 31 days. Upon emerging from the ground, adults mate and eggs are deposited in the ground. Peak egg laying time is July. Eggs hatch after 11 to 25 days in August. Hatched from eggs are the larvae or white grubs. These feed on potato tubers in August and September depending on ground temperature. They overwinter deep in the soil for five to 10 months and become active again as the ground warms up in the spring then they pupate and transform into adults. Adults are the only stage in the life cycle that is above ground; all other stages are below ground.

Damage

The damaging stage of the life cycle is the larvae or white grub. The overwintered grub feeds little before pupating; there have been a few reports of grub feeding of seed-pieces. Damage occurs on the tubers to be harvested late in the season. As the newly-hatched grubs enlarge, feeding increases. Reports indicate that the worst damage occurs after vine desiccation when done in late August. Vine desiccation reduces ground shading and indirectly allows the ground to warm up more. They move up in the soil due to warmth and encounter the tubers. It has also been suggested that the white grubs feed on the root hairs of the potato plant inflicting little damage but, after vine desiccation, the hairs dry up and the grubs go to the tubers to feed. Damage appears as large, shallow, irregular and ridged gouges. Gouges are usually a quarter to a half inch deep running along the surface of the tuber and not drilled into the tuber as one would see with wireworm holes. White grub feeding ceases as the soil cools and they move deep into the ground to overwinter.

Sand Chafer Adult

[In corn, white grubs of the sand chafer feed on the root system.]

Control

Sustainable Agriculture --- White grubs of the sand chafer affect corn as well as potatoes; large populations are especially found in corn fields planted after soybeans. Since both of these crops are commonly used in rotation with potatoes, crop rotation has little effect in reducing sand chafer populations. Sand chafer and white grub infestation seem to be worst in soils with high organic matter and on ground treated with manures. Otherwise, there is very little known on controlling this pest with cover crops or other methods of sustainable agriculture. When possible, the best is to vine desiccate as late as possible, mid-September and later.

Chemical Management ---

As with sustainable agriculture, there is little known about chemical control of sand chafers and their white grubs. Retired Colorado State Univ. entomologist, Dr. Stan Pelcher who identified the sand chafer as a source of white grubs affecting potatoes in the mid-1990s, found this pest to be tolerant to most available insecticides. As of now, I know of no anti-insect product with sand chafer or white grub on its label, although there are a few with rose chafer on theirs. The most effective treatment so far has been using carbofuran (Furadan by FMC). In 1999, in a conversation with Dr. Pelcher, he noted that Furadon worked best in laboratory tests showing three to four days of activity against the grub that phorate (Thimet) applied in-furrow

Sand Chafer - White Grub, continued

followed by Furadan application showed about a 20% reduction of population.

The best program used by Nebraska growers in recent years has been applying Furadan by air on adults in early July followed by a late season application of Furadan for white grubs. The late season application should be between mid-August and mid-September, preferably shortly after vine desiccation. NOTE, Furadan can NOT be applied within 14 days of harvest (14-day pre-harvest interval, PHI) and has a 14-day restricted entry interval (REI). Application should be with a ground rig followed quickly by 0.1 to 0.2 inches of irrigation water from a sprinkler to incorporate Furadan down a few inches to the grubs. Furadan works best when incorporated at the end of the season, and it readily moves in water, will leach and spread in wet soil. NOTE, Furadan is NOT labeled for sprinkler irrigation (chemigation) as it will accumulate on the center pivot and poison birds that may wash in or drink from it. Anecdotal reports this year suggest that imidacloprid (Tops MZ Gaucho, Genesis, Admire, Provado) applied at planting in conjunction with a later Furadan application may be quite effective in reducing white grub damage on harvested tubers. This would still need to be verified.

Potato tuber showing white grub feeding.

Quick Review

Appearance:

- Adults - shiny bronze or copper, ¼-½ long
- Larvae - white grubs, 1 inch long

Life Cycle:

- annual, one generation
- Adults - late June to early July
- Grub - August to September (overwinters)

Damage:

- Adult - none
- Grub - gouges along tuber surface

Environmental Management:

- Crop Rotation - no control after corn
- Desiccation - after September 10
- Manure - avoid application

Chemical Control:

- Admire/Genesis etc - at planting against emerging adults/grubs
- Furadan - early to mid-season against adults
- Furadan - late season against white grub
- combinations of above

Potato Insects

For more on potato insects, a new extension publication has just been released by the University of Nebraska Cooperative Extension Service: “Biology and Management of Potato Insects,” by R. Wright, G. Hein, W. Hoback, and A. Pavlista, Nebraska Cooperative Extension Circular #02-1565.

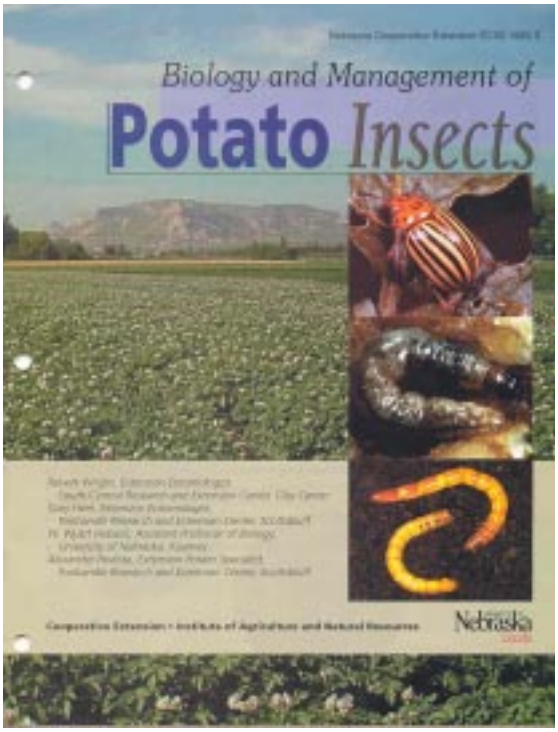
It may be purchased at $3 each from:

Univ. Nebraska Publication Distribution
105 Ag Communication Bldg
P.O. Box 830918
Lincoln, NE 68583-0918

or better yet, call them at 402-472-9713.

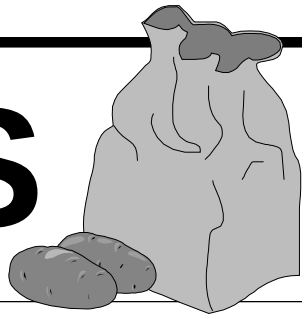
Insects Covered:

- Wireworms
- White Grubs
- Flee Beetles
- Seedcorn Maggot
- Colorado Potato Beetle
- Cutworms
- European Corn Borer
- other foliar pests such as cabbage looper
- Aphids: Green Peach and Potato
- Potato Leafhopper
- Aster Leafhopper
- False Chinch Bug
- Tarnished Plant Bug
- Potato Psyllid
- Whiteflies
- and lots of great pictures.



University of Nebraska
Panhandle Research and
Extension Center
4502 Avenue I
Scottsbluff, NE 69361

NEBRASKA POTATO EYES



The Nebraska Potato Eyes is on the WWW at:
www.panhandle.unl.edu/peyes.htm