PHREC 97-05d

NEBRASKA POTATO EYES

Vol. 9, Issue 4, September 1997 • Alexander D. Pavlista, Extension Potato Specialist

Dealing with Chemophobia

Several agrichemical companies established a Consumer Information Program to deal with the public's fear about agrichemicals. This program conducted a survey on the public's perceptions on pesticides. Cancer was concern #1. There was a desire for organic farming to increase and felt that the technology was available but ignored by farmers. One outcome of this survey was to determine what information may ease the public's anxieties and what information does not. Statements that help relieve chemophobia concerns:

1. Pesticides undergo a rigorous testing process. There are more than 120 separate tests taking 8-10 years at a cost of $35-50 million that must be passed.

2. Only about one in 20,000 compounds make it to the farm. Monitoring of agrichemicals continues even after chemical registration.

3. The National Cancer Institute has stated that there is NO scientific evidence that pesticide residues on produce causes cancer in people.

4. A 40-lb child would need to eat 340 oranges each day for a lifetime and still would not consume enough pesticide residue that would cause a health problem in a mouse.

People's confidence in pesticides greatly increased when they learned about the amount of initial and ongoing testing performed on each chemical. Most people do not know or understand the strict regulatory criteria used on pesticides. An explanation of requirements gives more confidence in how a chemical gets to the agricultural market.

Arguments that do not help relieve concerns:

1. Risk comparisons such as one in a million aren't effective. It implies that a person could be that one and note there are 8 million people in New York City and in Los Angeles.

2. The world needs to be fed and pesticides are an integral part of farming does not work.

3. There are far more naturally-occurring chemicals that are really dangerous such as cyanide, strychnine and many natural carcinogens. The public assumes that people can break these down, metabolize, in the body system since we live with these chemicals.

4. The fact that organic food supplies have serious drawbacks doesn't help. It's better to explain integrated pest management (IPM) and sustainable agriculture.

[adapted from "Pesticide Notes" published by Michigan State Univ.]

Cull Potato Nutritional Value for Cattle

Some growers in the past year have asked me about the nutritional value of potato tubers as a cattle feed. This question came up even before the diversion program of 1997. The following information was put together by Dr. Ivan Rush, Beef Cattle Specialist, and myself.

Feeding and nutritional value of potatoes for cattle in comparison to field corn:

Feeding cattle whole, healthy tubers is not recommended because of the risk of choking. Tubers need to be crushed such as disced or put through a manure spreader. Adding 200 lb of straw to a ton (20 bags) of tubers is roughly equivalent to silage corn of the same weight.

	fresh potato	field corn (ears)
% dry matter (DM)	20%	85.5%
% crude protein (CP)	9.5%	10.0%
% total digestible nutrition (TDN)	82.0%	90.0%

[source = "Nutrient Requirements of Domestic Animals"]

Dry Matter Energy Equivalents:
Field Corn = 85.5% (DM) x 90% (TDN) = 0.770
Fresh Potato [20% moisture] = 20% (DM) x 82.0% (TDN) = 0.164

Comparison: fresh potato versus field corn: 0.770 / 0.164 = 4.7
or 4.7 lb potato = 1 lb corn

Another method to evaluate a comparison based on energy is to compare TDN on a dry weight basis. Thus, 82% / 90% (%TDN / %TDN) = 91% or potato tubers have 91% the value of field corn ears.

Some additional, practical notes

1-The potatoes need to be well aerated since rot pathogens do not like air.

2-Exposure to light should be avoided so they don't turn green.

3-Freezing should be avoided, this will affect the outside of the pile, turning potatoes to mush.

4-There is no disease of potatoes that will affect animals, livestock or people.

5-Diseases that may breakdown the pile are primarily *Erwinia* blackleg (nothing to do with cattle) and *Pythium* leak, both need warmth, wetness and lack of air.

6-The potatoes are best chopped up for the cattle and mixed with straw. Besides being the best for the cattle, it will help limit light exposure, disrupt the greening mechanism, and keep the potatoes dry.

Inside this Issue...

Potato Seed Spacing Accuracy

AireCup[1] versus pick planters

The performance of planters is affected by the ability of the holding/planting mechanism to hold and drop seed-pieces at the desired spacing set on the planting mechanism. The holding/ planting performance is also affected by the planter's ground speed, seed-piece spacing, and seed-piece size and shape. Over the past several years, a vacuum mechanism was developed for planting corn and sugarbeet. Recently, a vacuum planter was developed for planting potato seed-pieces, the AireCup[1] planter.

Planting accuracy of potato seed-pieces was determined by measuring actual stand after plant emergence. In tests conducted in the Columbia River Basin recently, parameters included comparison with pick planters operated at varying planter speeds. Plots were single rows. Evaluation methodology was: Total row lengths were divided by desired plant spacing giving the number of theoretical spaces between seed-pieces at perfect planting accuracy. A space is defined as the distance between two plants. The number of optimal spaces is counted as the total spaces that are within two inches of the planned distance between plants. Skips were any space varying more than two inches from the desired distance between plants times the number of optimal spaces skipped. Spaces that were four inches or less were considered double drops. The remaining spaces were less than the optimal but greater than four inches (a skip).

Columbia Basin Tests

In 1996, dealer test were conducted comparing the Lockwood AireCup planter and pick planters. Samples were randomly taken, 18 from AireCup planted rows and 23 from rows planted with pick planters. The speeds used for the pick planters were from 2.6 to 5.2 mph and, for the AireCup planters, 3.5, 4.5 and 5 mph. The seed-piece spacing for which planters were set were 9.5 to 12 inches for the pick planters and 10 to 11 inches for the AireCup planters. Combining all the data showed an overall accuracy of 82% for the AireCup planters versus a 51% for the pick planters (Table 1).

Table 1. Columbia Basin, 1996

	AireCup	pick
optimal spacing	82%	51%
skips	3%	12%
doubles	2%	>3%

The data were analyzed based on planter speed, eliminating single-point data. With pick planters, as the speed increases, there is a drop in planting accuracy. Accuracy at 5 mph is significantly (at 90% level) lower than at 3.2 mph (Figure 1, letters). For the AireCup planters, there was no drop in accuracy comparing 3.5 to 5 mph planting speed. The AireCup planters significantly (at 99+% level) improved planting accuracy at the two speeds analyzed, 3.5 and 5/5.2 mph (Figure 1, asterisks).

Comparing the effects of planting at different desired seed-piece spacing, there is a significant (at 85% level) drop in accuracy at a 10-inch spacing compared to 10½-inch spacing (Figure 2). This drop was not significant with AireCup planters whose accuracy remained above 80% at a 10-inch spacing. The AireCup planters significantly (at 99+% level) improved accuracy over pick planter at 10 and 10½-inch spacings, the two spacing statistically compared (Figure 2). (The 14-inch spacing data came from a trial conducted in Wisconsin and is included for a trend comparison.)

1 - Mention of a trade name does not imply product endorsement.

Figure 1. Planting Speed AireCup vs. pick planters Columbia Basin, 1996

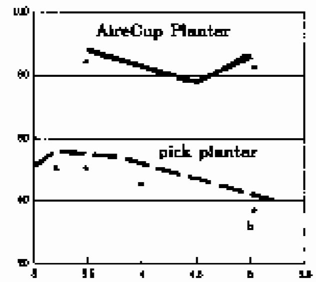


Figure 2. Planting Spacing AireCup vs. pick planters Columbia Basin, 1996

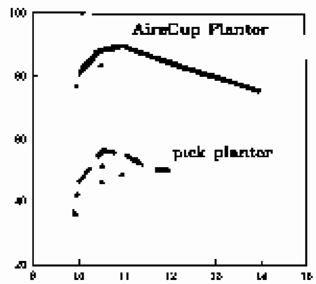
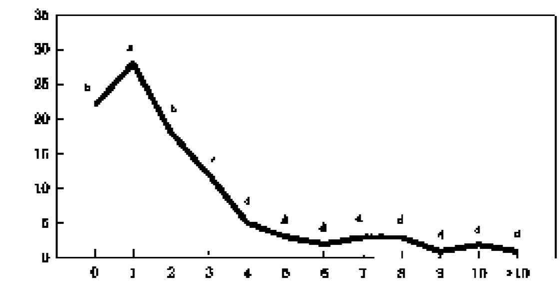


Figure 3. Plant Spacing with AireCup Planter



Points marked by the different letters are significantly different at the 99.9% level.

Wisconsin Tests

In Wisconsin in 1997, duplicate trials were conducted on the AireCup planter at speeds of 3.5-4, 5 and 6 mph. Seed-pieces were 1.5 to 2.5-inch cut Russet Burbanks planted at a desired plant spacing of 14.5 inches. Spacing between plants were measured at 1-inch intervals above and below 14.5 inches.

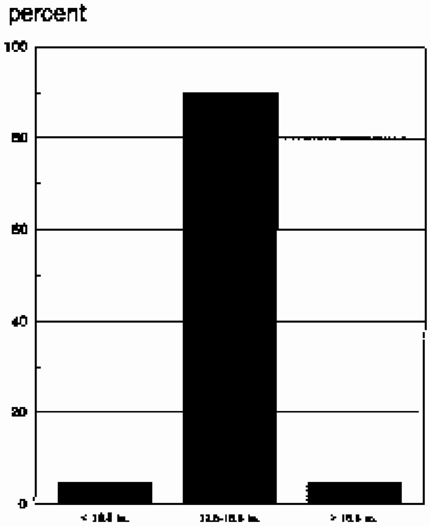
There is a slight trend to lower planting accuracy (% of spaces within two inches of 14.5-inch desired spacing) as the AireCup planter speed increased from 3.5-4 mph to 6 mph, but the accuracy remained above 75% at 6 mph and above 80% at 5 mph (Graphs 1a, 1b, 1c).

One trial was conducted with Ranger Russet seed-pieces planted at 3.5-4 mph with a desired plant spacing of 11 inches. The accuracy was 83% of the spaces were between 9 and 13 inches. Spaces that were less than 9 inches comprised 15% of the total and those greater than 13 inches were 2% of the total.

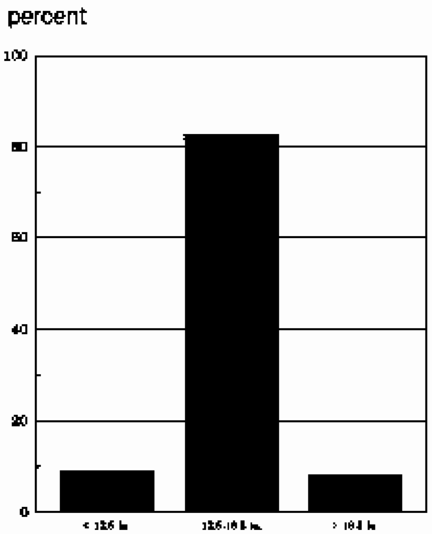
Idaho Tests

At Burley, ID, last fall, seven tests were conducted over a three-day period on the Lockwood AireCup planter. Ground speeds ranged from 3.5 to 6 mph. Seed-piece spacing was set to a desired 11 inches. One hundred spaces were measured to the nearest inch to determine the distribution of seed-pieces and range of accuracy. As Figure 3 shows, 68% of the plants were within 2 inches of the desired spacing and 80% were within 3 inches. There were 4% skips (less than 5 inches between seed-pieces) and 6% doubles (more than 17 inches between seed-pieces) (data not shown).

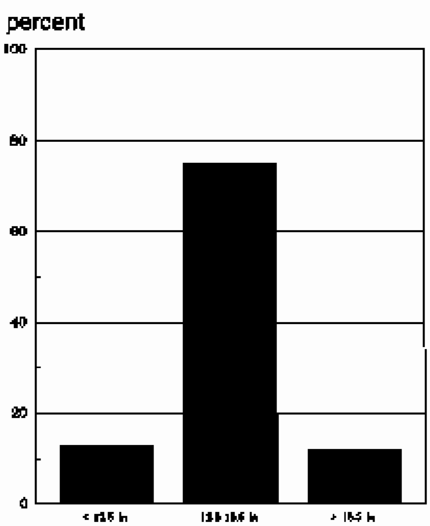
Graph 1a. Plant spacing with AireCup Planter at 3.5-4 mph and space setting in 14.5 inches russet Burbank, Wisconsin, 1997



Graph 1b. Plant spacing with AireCup Planter at 5 mph and space setting in 14.5 inches russet Burbank, Wisconsin, 1997



Graph 1c. Plant spacing with AireCup Planter at 6 mph and space setting in 14.5 inches russet Burbank, Wisconsin, 1997

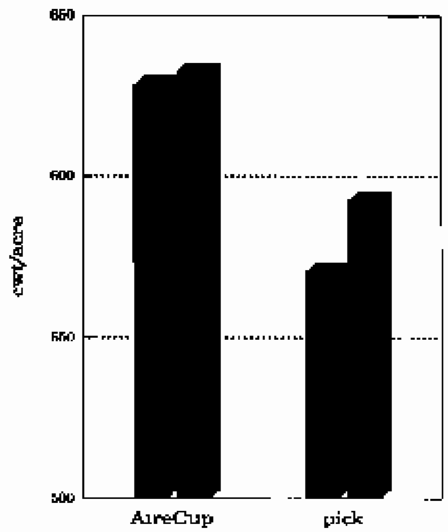


BOTTOM LINE

Proper spacing is a BIG PLUS for weed control and other management practices BUT what does it mean for **YIELD.** Yield and grade trials are being established comparing the Lockwood AireCup Planter from Agromac International and pick planters.

HOT-OFF-THE-PRESSES - Total (ungraded) yield data have just come in from trucks in the Columbia Basin. The replicated harvests of about one acre each showed the yield from the AireCup planter was 49 bags (cwt) per acre greater than for the pick planter (Graph 2). That's an 8.5% increase (significant at the 95% level) just from planter accuracy.

Graph 2. Potato Yield with AireCup Planter versus a pick planter, one acre plots Columbia Basin, October, 1997



Vacuum Planters

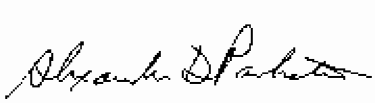
Vacuum planters are unique in that they use vacuum to hold seed-pieces on the planting wheel (specifications, Table 2). The planting mechanism has one moving part, the vacuum valve which gives the vacuum seal. To counteract forward movement, there is rear-ward drop velocity. These partially explain the high planting accuracy maintained at higher planting speeds the vacuum planters used for corn, sugarbeet and, now, potato.

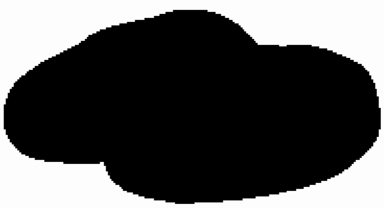
A concern expressed by growers is the possible clogging of the vacuum mechanism by seed dusts and dirt. If buildup is allowed to reach a point where the tubes are choked off and vacuum levels fall, performance may suffer. To avoid a buildup, an automatic cleaning attachment was developed that sprays high pressure water through the arms from the inside out. This attachment proved effective in even the worst conditions such as when seed-pieces were cut fresh, treated with excess seed dust and planted under high humidity. In less severe conditions, periodic cleaning with a pressure washer was all that was required.

AireCup Specifications

# planting rows	4	6
row spacing	32 to 38 inch	
seed capacity	6000	9000
planting wheel	30-inch diameter	
arms/row	20 arms / row	
feeding mech.	twin feed chains	
seed level control	return chain	
closing disc	14-inch diameter	
planting speed	3.5 to 5.5 mph	
est. HP, min.	140	180
height	76 inches	
base length	138 inches	
base weight	7500 #	11000 #
transport width	185 inches	

For detailed specifications, contact Agromac International in Gering, Nebraska.





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Late Blight Highlights @ PAA

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The late blight fungus may spread to healthy tubers during seed handling (University of Maine). Healthy cut seedpieces required approximately an 8-hour contact with cut infected seedpieces before infection occurred. Inoculation of healthy seed tubers required approximately 9-15 days before sporulation was evident.

Section 18 fungicides were evaluated as potential seedpiece treatments (Oregon State University). After treatment with fungicide dips, seedpieces were artificially inoculated with the late blight fungus and planted in the greenhouse and field. Fungicide dips significantly increased stand by preventing seedpiece decay. However, it is not clear if seedpiece treatments will reduce seedpiece transmission of late blight or may enhance foliar late blight in some situations because infected seedpieces persist for longer periods of time. Plants that emerged from treated seedpieces were susceptible to foliar infection by the late blight fungus.

Seven fungicide spray programs that included registered fungicides and "Section 18" fungicides were evaluated for late blight control at ten locations across the United States (Washington State University with others). Fungicide programs (repeated applications at 7-day intervals starting at closure within rows) reduced total foliar disease by 84% to 90%, compared to nontreated foliage. The mancozeb/copper foliar program tended not to be as effective as the other fungicides. Programs with "Section 18" products did not outperform programs that only contained registered fungicides. No fungicide program totally prevented late blight from developing and all fungicides tended to be less effective with increasing disease pressure.

Two different application intervals (7 and 14 day) of fungicide (mancozeb) were compared for late blight management on a moderately resistant variety, Russet Burbank, and a highly susceptible variety, Russet Norkotah (Washington State University). Foliar disease severity and tuber yield were not significantly affected by application interval. However, plots treated at the 7-day application interval had significantly less tuber blight. Therefore, shorter application intervals may help manage the tuber phase of late blight.

A World Wide Web site is being developed on management decisions for late blight by Oregon and Washington State Universities.