

POTATO EYES



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Updates

Announcement

The No. Amer. POTATO LATE BLIGHT workshop will be held from January 8 to 11 (1997) in Tucson, Arizona. The purposes are to present current knowledge and to discuss future research and educational needs. The workshop will be at the Holiday Inn (4550 Palo Verde Blvd.). Rooms are \$69/night (special workshop rate), both single and double; make reservations by calling 520 746-1161 (FAX=520-741-1170) and state that you are attending the workshop. Registration is \$110 until December 15 and \$200 thereafter. Contact Dr. Bill Brown, Col. St. U., at 970-491-6470 (FAX=970-491-3862) for details.

TOPICS are Identification, Life History, Genetics, Epidemiology, Host-Plant Resistance, Cultural Control, Regulatory Aspects, Forecasting, Chemical Control, and Education/IPM.

Product Registrations

We've had success this year with the late blight systemic products and Dithane ST for seed going into storage

Currently I'm working on:

- 1/ RENEWING SECTION 18 on ACROBAT MZ, CURZATE M-8 and TATTOO C for LATE BLIGHT.
- 2/ NEW SECTION 24c on BRAVO Zn et al. for a 16 gal/acre accumulated application per season in place of the current 12 gal/acre maximum
- 3/ NEW SECTION 24c or FULL REGISTRATION for 2,4-D to be used on RED TABLE POTATOES to PROMOTE COLOR.
- 4/ AVAILABILITY of MATRIX in Nebraska.
- 5/ INCREASING LABELLED RATE of PROGIBB (gibberellic acid) for SPROUT PROMOTION of SEED POTATOES to 2 ppm. Current maximum label is 1 ppm.
- 6/ Other products that I'm exploring are ANCHOR, DIVA, MAXIM, CRYMAX, and 5504. If you come across any product that you want to use, contact me and I'll pursue the possibility.
- 7/ RIDOMIL/BRAVO labels have been changed to allow a 9-month interval between the last application and the planting of corn. It was 12 months previously.

Chip Exports

US exports of potato chips has soared since 1990. Product value in \$ millions was in 1990 = 50, 1991 = 65, 1992 = 90, 1993 = 130, 1994 = 200, and, in 1995, it's about \$240 million.

HACCP

The HACCP System means "hazards, analysis, critical, control, points." It deals with contaminants. For potato, the contaminants normally of concern include: metal, glass, rodenticides, oil, corn cobs, corn crowns, bones, wire, dump items, rodents, dead animals, alfalfa root, wood, pesticides, pop cans, herbicides, hydraulic fluid, plastic, and farm implements. Why is potato HACCP needed?

1. Customer Requirements. Customers demand a product that is as safe as reasonably possible.
2. Regulatory Initiatives. Although not yet law, there is movement in that direction for many/all processed food products.
3. Moral Responsibility. No one wants inattention to cause injury or illness.
4. Financial Impact. Not controlling contaminants early will cost more later.

HACCP is defined as a preventive system aimed at controlling microbial, chemical and physical food hazards. Under this system, a grower certifies:

Planting and Digging

1. Potatoes are not planted in a field known to be a former dump site or otherwise contaminated.
2. Visual inspection occurs either on the digger or at a transload site. All glass metal, plastic, etc. found in the field is placed in a refuse container and removed to avoid recontamination of the field.
3. Planting, digging and transport equipment has been inspected to assure that all loose metal and wood is removed and fluid leaks are repaired. Lights and light covers are in good condition so glass will not contaminate the field.
4. All pesticides and herbicides have been applied in accordance with product labels and records are maintained in compliance with current Government requirements.

Storage Operations

1. Building has been inspected prior to loading with potatoes. Storage site is properly graded to control excess water. All lights are protected with shatterproof covers. All walls are in good repair with no loose insulation, damaged metal and/or splintered wood.
2. The floor of the building has been inspected for foreign material prior to loading with potatoes. There are no residues of fuel, oil, pesticides or fertilizers on the floor or in the building which could contact the potatoes. The floor has been dragged with a magnet to pick up tramp metal.
3. Piling and loading equipment has been inspected and all loose parts and/or leaks have been repaired. Lights on piling equipment are properly protected with nonbreakable shields to prevent glass from contaminating the potatoes.
4. Toilets and waste/garbage collection facilities are available for workers during storage of potatoes.
5. Pest control doesn't include the use of poison bait inside storage buildings. Wind-up or spring type traps are acceptable.

In This Issue...

- Andover and Pike:
New releases from New York and Pennsylvania

New Potato Chip Cultivar Releases from New York and Pennsylvania

CULTIVARS: ANDOVER

The release of Andover was announced in March, 1996 by Cornell University (New York) and The Pennsylvania State University. Andover is released primarily for the potato chip market but is also receiving acceptance in the tablestock market.

ANDOVER (NYE55-44) was selected in 1981 in New York from a cross between Allegeny (female) and Atlantic (male). Selection and early testing was done by Dr. Robert (Bob) Plaisted at Ithaca, NY. Andover has been tested in the Northeast Regional Variety Trials (NE107) and the Snack Food Assoc. Chipping Trials.

The following is a summary of its properties and the tables summarize some of the data.

Summary of Properties:

Purpose – Chips; sloughs with boiling and mealy with baking

Maturity – early-medium

Emergence – rapid

Vine – erect, rapid, vigorous growth

Flowers – abundant, white

Eyes – number = below average; fairly shallow

Tuber – white flesh, white, slightly-textured skin like Superior, large

Set – light and early

Dormancy – two weeks longer than Atlantic

Yield – similar to Superior as a summer crop, less than Atlantic and similar to Monona as a fall crop,

Specific Gravity – slightly less than Atlantic and higher than Monona

Chip Color – excellent light color; lighter than Atlantic and Monona, chips light after 6 months at 45 F and one day reconditioning at 70 F

External Defects – seldom

Internal Defects – relatively free; little hollow heart or internal necrosis

Disease – susceptible to common scab like Atlantic and Snowden; resistant to powdery scab in Pennsylvania

Herbicide Sensitivity – none to metribuzin (Sencor/Lexone) observed

Fertilization – 150 lb nitrogen/acre at planting possibly some side-dressed;

needs supplemental nitrogen if under heat stress to maintain vigor

Irrigation – suggested due to sensitivity to heat and drought stress

Other – Full season yields are limited due to sensitivity to heat and drought stress; leaves show a necrosis, probably physiological, that looks similar to early blight when vine is under stress.

Conclusions and Comments

Full-harvest, US#1 yield of Andover was generally less than Atlantic and Snowden, but higher than Norchip. Specific gravity

CULTIVARS: PIKE

The release of Pike was announced in March, 1996 by Cornell University (New York) and The Pennsylvania State University. Pike is released primarily for the potato chip market.

PIKE (NYE55-35) was selected in 1981 in New York from a cross between Allegeny (female) and Atlantic (male). Selection and early testing was done by Dr. Robert (Bob) Plaisted at Ithaca, NY. Pike has been tested in the Northeast Regional Variety Trials (NE107) and the Snack Food Assoc. Chipping Trials.

The following is a summary of its properties and the tables summarize some of the data.

Summary of Properties:

Purpose – Chips; after-cooking darkening when boiled

Maturity – medium-late, earlier than Snowden

Emergence – average, slower than Andover

Vine – longer lag period than Andover followed by rapid, vigorous growth

Flowers – white, medium number

Eyes – shallow (deeper than Andover); denser due to small tubers

Tuber – white flesh; white, slightly-textured skin like Superior smoother than Snowden; smaller than Atlantic; round

Set – heavy with small tubers

Dormancy – two weeks longer than Atlantic and Monona

Yield – similar to Atlantic and Snowden greater than Monona in New York, slightly less than Atlantic in Pennsylvania;

Specific Gravity – like Atlantic and Snowden

Chip Color – similar to Monona after 50-55 F storage; chips light after 6 months at 45 F without reconditioning

External Defects – rare

Internal Defects – relatively free; little hollow heart (6% for Pike versus 20% for Atlantic and 11% for Snowden)

Disease – very resistant to common scab similar to Superior

Herbicide Sensitivity – none to metribuzin (Sencor/Lexone) observed

Fertilization – 150 lb nitrogen/acre for best yield and specific gravity, over that prolongs maturity

Irrigation – less sensitive to drought stress than Andover

Other – recommend 10-inch plant spacing; has good vine kill if not over-fertilized

Conclusions and Comments – PIKE

Full-harvest, US#1 yield of Pike was about the same or slightly less than of Atlantic and Snowden, but higher than Norchip. Specific gravity (dry matter content) for Pike was about the same as that of Atlantic and Snowden, and higher than of Norchip. Chips made from Pike were about the same in color as from Atlantic and Norchip, but slightly darker or about the same as from Snowden tubers. Out of storage chip color was about like Atlantic and darker than Snowden. The incidence of hollow heart plus internal heat necrosis in US#1 yield from Pike were less

SNACK FOOD ASSOCIATION TRIALS Relative performance of Andover and Pike compared to Atlantic and Norchip in selected trials. Means of eleven trials conducted in 1991, 1992 and 1993 at Michigan, Pennsylvania, Washington and Red River Valley

cultivar	Yield US#1 cwt./acre	Specific Gravity	Ch.p Color Agron E-10
Andover	275 A ¹	1.083 B ¹	58 a ²
Pike	246 AB	1.095 A	57 ab
Atlantic	284 A	1.094 A	55 b
Norchip	226 B	1.082 B	56 ab

¹ significantly different at 95% probability level

² significantly different at 90% probability level

PENNSYLVANIA TRIALS Relative performance of Andover and Pike compared to Atlantic and Snowden in selected trials. Means of three trials conducted in 1993, 1994 and 1995

cultivar	Yield US#1 cwt./acre	Specific Gravity	Ch.p Color Chart ¹
Andover	278 ²	1.083 b ¹	3.7 B ⁴
Pike	269	1.091 a	3.7 B
Atlantic	320	1.090 a	5.3 A
Snowden	308	1.089 a	3.3 B

- 1 = lightest, 10 = darkest; less than 6 = acceptable. Readings were taken after short storage at 55F. In the 1993 trial readings were also taken after storage at 45F, the results were Andover = 4%, Pike = 7, Atlantic = 7 and Snowden = 5%

¹ not significantly different

² significantly different at 95% probability level

⁴ significantly different at 90% probability level

PENNSYLVANIA TRIALS Relative performance of Andover and Pike compared to Atlantic. Means of 30 trials conducted from 1989 to 1994

cultivar	Yield 2-4 in. cwt./acre	Specific Gravity
Andover	257 C-	1.077 B ¹
Pike	286 B	1.086 A
Atlantic	326 A	1.087 A

¹ significantly different at 95% probability level.

MICHIGAN TRIALS Relative performance of Andover and Pike compared to Atlantic and Snowden in selected trials. Means of three August-harvest and three September-harvest trials conducted in 1991, 1992 and 1993.

cultivar	Yield US#1 cwt./acre	Specific Gravity	Chip Color ¹ SFA Chart
<i>early harvest:</i>			
Andover	354 a ²	1.076 c ²	1.0
Pike	274 b	1.082 b	1.0
Atlantic	358 a	1.088 a	1.5
Snowden	223 c	1.082 b	1.0
<i>late harvest:</i>			
Andover	341 b ²	1.074 B ¹	
Pike	371 ab	1.085 A	
Atlantic	471 a	1.090 A	
Snowden	409 ab	1.086 A	

¹ result from one trial in 1993

² significantly different at 95% probability level

³ significantly different at 90% probability level

NEW YORK TRIALS Relative performance of Andover and Pike compared to Atlantic and Snowden. Means of 14 trials conducted from 1992 to 1996.

cultivar	Yield US#1 cwt./acre	Specific Gravity	% Tubers with HH + IHN ⁴
Andover	276 B ¹	1.084 C ¹	3 B ¹
Pike	320 A	1.093 A	4 B
Atlantic	318 A	1.093 A	14 A
Snowden	331 A	1.091 B	10 AB

¹ significantly different at 95% probability level

⁴ HH = hollow heart, IHN = internal heat necrosis

NEW YORK TRIALS Relative performance of Andover and Pike compared to Atlantic. Means of 16 trials conducted from 1988 to 1994

cultivar	Yield US#1 cwt./acre	Specific Gravity	% Tubers with HH + IHN ⁴
Andover	309 B ¹	1.082 B ¹	3 B ¹
Pike	319 B	1.088 A	5 B
Atlantic	382 A	1.088 A	22 A

¹ significantly different at 95% probability level

⁴ HH = hollow heart, IHN = internal heat necrosis

NEW YORK TRIALS Chip color (Agron M600) and scab severity of Andover and Pike compared to Atlantic and Snowden. Means of 6 trials for chips conducted from 1993 to 1995 and means of 7 trials for scab rating conducted in 1994 and 1995

cultivar	Chip Color ¹ 45 F	Scab ^{2*} 40 F	Severity
Andover	52 A ¹	46 BC ¹	2.2 B-
Pike	49 A	47 B	1.2 C
Atlantic	44 B	42 C	3.3 A
Snowden	53 A	53 A	3.3 A

¹ significantly different at 95% probability level

¹ Tubers were stored for 5-6 months, reconditioned for 1 month and chipped. Chip color was measured with an Agron M600, lighter chips gave higher readings; greater than 50 was desirable

^{2*} Scab severity rating was 0 (none) to 5. 1 = occasional tuber with surface scab, 2 = tubers with surface scab but no pits, 3 = tubers with shallow scab and occasionally pits, 4 = some tubers with pits, and 5 = most tubers have pits

NEBRASKA TRIALS Relative performance of Andover and Pike compared to Atlantic and Snowden. Means of seven trials - 1993 and 1995 at east and west of Alliance, 1995 at Central City, and 1996 at Kearney and Imperial

cultivar	Yield US#1 cwt./acre	Specific Gravity	Chip Color Agron E-10
Andover	281 ¹	1.080 B ²	63 a ²
Pike	306	1.087 A	59 ab
Atlantic	334	1.087 A	58 b
Snowden	293	1.082 B	59 ab

¹ not significantly different at 90% probability level

² significantly different at 95% probability level

³ significantly different at 90% probability level

NEBRASKA STORAGE EVALUATIONS FOR CHIP COLOR Chip color of Andover and Pike compared to Atlantic and Snowden after two-month storage. Means of two Alliance trials in 1993

cultivar	Chip Color (Agron E-10)	5 months @ 60F ¹	5 months @ 40F ¹
Andover	63	59	61
Pike	58	59	58
Atlantic	60	62	58
Snowden	61	64	62

¹ followed by one month reconditioning at 60F

NEBRASKA

POTATO EYES



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New Cultivar Releases: Andover

(dry matter content) was consistently lower for Andover than for Atlantic and Snowden, and similar to Norchip. Chips made from Andover after pre-conditioning (heating) tended to be slightly lighter in color than Atlantic's and Norchip's chips, and similar to those from Snowden. Chip color after several months storage was lighter for Andover than Atlantic, and slightly darker or the same as Snowden. Scab severity, and the incidence of hollow heart plus internal heat necrosis in US#1 yield from Andover were less than in yield from either Atlantic or Snowden.

Andover's principle strength is its ability to chip light out of storage. Other strengths are rapid emergence and growth, and its resistance to common scab and hollow heart compared to Atlantic and Snowden. Its lower yield and specific gravity, and its sensitivity to heat and drought are weaknesses.

New Cultivar Releases: Pike

than in yield from either Atlantic or Snowden. Scab severity in Pike was less than these standards and less than Andover as well.

Pike's principle strength is its ability to chip light out of 45F storage and its scab resistance. Other strengths are rapid emergence and growth, and its resistance to hollow heart compared to Atlantic and Snowden. Its yield and specific gravity being comparable to Atlantic may make it an acceptable substitute. Its longer growing season may be a weakness in some areas.

