

Potato Response to ACA on Several Soils

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ACA

- Zinc Ammonium acetate
- 15% N, 17% Zn
- Recommended rate 0.33-0.67 pt/a

ACA Plus

- 7.5% N, 8.5 %Zn
- More compatible with wide range of fertilizers
- Double rate (0.67-1.33 pt/a)

Awaken

- 16-0-2 + small amounts of B, Cu, Fe, Mn, Mo and Cl
- 2.7% Zn
- Higher rate (1.67-4 qt/a)

Experiment 1

- ACA rate 0-24 oz/a
- Hancock, 1995-1998

Experiment 2

- ACA, ACA Plus and Awaken with starter
- Organic soil (Endeavor) and Hancock, 1997

Experiment 3

- ACA or ACA Plus, several placements
- Hancock and Antigo, 1998

Effect of starter fertilizer and starter fertilizer-placed ACA rate on Russet Burbank total yield, Hancock WI, 1995-1998

| Treatment | | Year | | | | |
|---------------------------|------------|---------------------|------|------|------|------|
| Starter fert ⁺ | ACA rate * | 1995 | 1996 | 1997 | 1998 | Avg. |
| | oz/a | Total Yield (cwt/a) | | | | |
| - | 0 | 347 | 354 | 291 | 307 | 325 |
| + | 0 | 398 | 445 | 402 | 401 | 411 |
| + | 4 | 370 | 502 | 397 | 445 | 431 |
| + | 8 | 438 | 491 | 395 | 413 | 440 |
| + | 16 | 406 | 471 | 432 | 406 | 430 |
| + | 24 | 391 | 504 | 383 | 428 | 433 |
| LSD _{0.05} | | 53 | 57 | 46 | 44 | 24 |

+ Where indicated, plots received 500-600 lb/a starter fertilizer at planting and all plots received 200 lb/a supplemental N split between emergence and hilling.

*ACA sprayed onto starter fertilizer as it was dropped into soils.

Plant Responses

- More fibrous and extensive roots
- More brace roots
- Faster early growth
- Wider leaves
- Tolerate stress
- Increase yield, quality

Recommended Methods of Use

- Mix with anhydrous or liquid fertilizer or impregnate on dry fertilizer
- Not compatible with clear liquids
- Labeled at
 - 4.5 pts/ton NH_3
 - 5.33 oz/a band
 - 10.66 oz/a bdcst

Experimental Measurements:

- Plant evaluations (18-30 June)
 - leaf, stem, root, tuber biomass
 - stem and tuber number
 - plant height and width
- Leaflet and petiole analysis (~50 dae)
- Harvest data

*Effect of starter fertilizer and starter fertilizer-placed
ACA rate on Russet Burbank prime tuber yield, Hancock
WI, 1995-1998*

| Treatment | | Year | | | | |
|---------------------------------|------------|----------------------------------|------|------|------|-----|
| Starter Fertilizer ⁺ | ACA rate * | 1995 | 1996 | 1997 | 1998 | Avg |
| | oz/a | -----US #1, 6-13 oz (cwt/a)----- | | | | |
| - | 0 | 62 | 54 | 73 | 29 | 54 |
| + | 0 | 69 | 88 | 128 | 75 | 92 |
| + | 4 | 56 | 141 | 100 | 76 | 93 |
| + | 8 | 99 | 113 | 127 | 90 | 104 |
| + | 16 | 82 | 106 | 119 | 63 | 91 |
| + | 24 | 75 | 121 | 106 | 81 | 94 |
| LSD _{0.05} | | 29 | 36 | 45 | 26 | 18 |

⁺Where indicated, plots received 500-600 lb/a starter fertilizer at planting and all plots received 200 lb/a supplemental N split between emergence and hilling.

* ACA sprayed onto starter fertilizer as it was dropped into soils.

Effect of starter fertilizer and starter fertilizer-placed ACA rate on potato early-season plant evaluations, Hancock WI, 1996-1998

| Treatment | | Veg. | Root | Tuber | Tuber |
|---------------------|----------|-----------------|------|----------|-------|
| Starter | ACA rate | Wt | Wt | Number | Wt |
| | oz/a | -----g/plt----- | | num./plt | g/plt |
| - | 0 | 203 | 33 | 14 | 97 |
| + | 0 | 293 | 40 | 16 | 124 |
| + | 4 | 300 | 42 | 18 | 123 |
| + | 8 | 282 | 43 | 17 | 115 |
| + | 16 | 298 | 44 | 17 | 122 |
| + | 24 | 338 | 45 | 16 | 108 |
| LSD _{0.05} | | 62 | 9 | NS | 40 |

Evaluations conducted on 19 June 96, 30 June 97 and 23 June 98, respectively.

Effect of several starter fertilizer additives on Dark Red Norland tuber yields and quality on an organic soil, Endeavor WI, 1997

| Starter* | Additive and rate | Total Yield | Grade A | Size grade 6-13 oz | Yield US1A 6-13 oz |
|---------------------|-------------------|-------------|---------|--------------------|--------------------|
| lb/a | | cwt/a | -----% | ----- | cwt/a |
| 0 | 0 | 415 | 87 | 43 | 155 |
| 500 | 0 | 384 | 86 | 37 | 129 |
| 500 | ACA, 8 oz/a | 407 | 86 | 41 | 145 |
| 500 | ACA Plus, 16 oz/a | 403 | 86 | 34 | 119 |
| 500 | Awaken, 48 oz/a | 395 | 87 | 40 | 137 |
| LSD _{0.05} | | NS | NS | NS | NS |

*Starter grade was 6-24-24; all ACA materials were applied onto the starter fertilizer as it was dropped into the soils.

Effect of ACA or ACA Plus placement on Snowden yield and quality at Antigo WI, 1998

| Additive | Treatment ⁺ | | Total Yield cwt/a | Grade A -----%----- | Size grade 6-13 oz | Yield US1A 6-13 oz cwt/a |
|---------------------|------------------------|------------|----------------------|------------------------|-----------------------|--------------------------------|
| | rate oz/a | Placement | | | | |
| Check | 0 | - | 590 | 81 | 44 | 210 |
| ACA | 8 | Starter | 583 | 80 | 43 | 201 |
| ACA | 8 | Seed | 564 | 77 | 44 | 190 |
| ACA | 8 | Foliage* | 580 | 79 | 47 | 215 |
| ACA | 8 | Soil band* | 585 | 77 | 49 | 222 |
| ACA Plus | 16 | Seed | 590 | 80 | 50 | 236 |
| ACA Plus | 16 | Foliage* | 588 | 76 | 44 | 197 |
| LSD _{0.05} | | | NS | NS | NS | NS |

*Sprayed directly over row or along both sides of plants at hooking or early tuberization, 17 June.

+ All plots received 558 lb/a 9-23-30 starter fertilizer and 200 lb N/a supplemental N.

Effect of ACA or ACA Plus placement on Russet Burbank yield and quality at Hancock WI, 1998

| Additive | Treatment ⁺ | | Total Yield cwt/a | Grade A -----%----- | Size grade 6-13 oz | Yield US1A 6-13 oz cwt/a |
|---------------------|------------------------|------------|----------------------|------------------------|-----------------------|--------------------------------|
| | rate oz/a | Placement | | | | |
| Check | 0 | - | 401 | 75 | 25 | 74.7 |
| ACA | 8 | Starter | 413 | 74 | 29 | 90.1 |
| ACA | 8 | Seed | 390 | 70 | 25 | 68.6 |
| ACA | 8 | Foliage* | 405 | 72 | 23 | 67.8 |
| ACA | 8 | Soil band* | 383 | 71 | 21 | 58.0 |
| ACA Plus | 16 | Seed | 389 | 73 | 18 | 52.9 |
| ACA Plus | 16 | Foliage* | 405 | 70 | 20 | 57.6 |
| LSD _{0.05} | | | NS | NS | 7.0 | 22.9 |

*Sprayed directly over row or along both sides of plants at hooking or early tuberization, 28 May.

+ All plots received 600 lb/a 5-10-30 starter fertilizer and 200 lb N/a supplemental N.

Influence on leaf nutrient concentrations:

- No difference between 0 ACA and any ACA treatment
- All levels in normal range
- Zn 36.0-41.1 ppm

Data for 1996 and 1997.

ACA Summary:

- Mixed results with field crops (17% response with corn; avg. +3.3 bu/a)
- Potatoes + 20-30 cwt/a over 4 yrs at Hancock
- Rate not consistent
4-16 oz/a
- “Missed” rate at other locations/ placements
- Acting as PGR? Soil stimulator?
- Easily decomposed, so protect from soil microbes?