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Apple Production

Rough Estimate of Nitrogen Fertilizer on Apple Trees

- 1 year old add 0 - 1/8TH lb per tree
- 2 year old add ¼ lb per tree
- 3-5 year old add ¼ - 1/3 lb per tree
- 6-7 year old add 1/3 - ½ lb per tree
- > 7 year old add 150-200 lbs per TREATED AREA per SOIL SAMPLE.
- NOTE: YOU ARE TREATING BY TREE DENSITY OF PLANTING. If there are 388 trees per ac, then the lbs. N per ac would be lower than on a denser planting with 500 trees per ac.

Factors Affecting Nitrogen Program

Non-bearing Trees:

- Young, non-bearing trees will often benefit more from higher N programs than older bearing trees.
- The goal with young trees is to produce wood and vegetative growth.

Bearing Trees:

- Control vegetative growth to control pruning.
- The goal with bearing trees is strong yields of high quality fruit.

Low Nitrogen Requirement Varieties
(Leaf N levels 1.8% - 2.2%)

- Cortland, Empress, Britemac, Jerseymac, Jonathan, Jonamac, Macoun, McIntosh, Mutsu, Paulared, Spartan, Tydeman Red, Turley, Jerseyred, Gravenstein, Starr, Crispin, Ginger Gold.
- Included are other early ripening, softer varieties and/or those typically intended for fresh market.

High Nitrogen Requirement Varieties
Leaf N Levels 2.2% - 2.4%

- Empire, Idared, Golden Delicious, Liberty, Melrose, Jonathan, RI Greening, Rome, Stayman, Red Delicious, Rome Beauty, York Imperial, Honey Crisp, Granny Smith, Braeburn, Gala
- Included are other **hard varieties** or soft varieties if that fruit is intended for processing.

Other Leaf N Related Items to Understand

- Keep balance between N and K
- Low N trees 1.25 : 1 K vs High N trees 1.5 : 1 K
- Larger trees take more N than dwarf stock
- Heavily pruned trees reduce N demand
- Very high density plantings can balance the need

Phosphorus

New Plant

Soil test Status:	Low	Medium	Good	High
Recommendation lb/A :	200	100	60	0

Established Trees

Soil test Status:	Low	Medium	Good	High
Recommendation lb/A:	90	60	30	0

Potassium

New Plant

Soil test Status:	Low	Medium	Good	High
Recommendation lb/A:	300	200	90	0

Established Trees

Soil test Status:	Low	Medium	Good	High
Recommendation lb/A:	150	120	90	0

Boron

Soil Test Level	Boron Rate
Low	3.0 lb/A
Medium	2.0 lb/A
High	1.0 lb/A
Very High	0 lb/A

- If no soil test or Leaf analysis < 35 ppm add 2 lb/A

Boron Deficiency

Zinc

- If soil test level is low, add 20 lbs. soil applied
- Foliar apply from late dormant to silver tip bud
- (Caution! no oils and be careful if freezing has or can take place)
- Zinc can be tricky, so call and ask when in doubt for timing and amount before you apply.

Sulfur

Not often a concern, Lighter soils may be the exception. If leaf symptoms or plant analysis call for Sulfur use 30 lbs. soil applied per acre to correct. (6 gallons AccesS).

Magnesium

Watch soil tests and CEC. K & Mg ratio should not exceed 1.5 lbs./ac. Dolomitic lime can correct if lime is needed. I believe AgroLiquid Mg as a foliar could work well even though other chelates have had low success.

Apple Recommendation

Typical Agro Liquid Recommendations:

Banded next to trees (per acre):

High NRG-N	15 gallons
Pro-Germinator	5 gallons
Sure-K/Kalibrate	5 gallons
eNhance	0.5 gallons
Micro 500	0.5 gallons
MicroLink Manganese	0.125 gallons
MicroLink Boron	0.125 gallons

Foliar Application (per acre):

Liberate Ca	0.25 gallons
Fase2	0.5 gallons
ferti-Rain	0.5 gallons

(applied after fruit set x 3 applications)

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FASE 2

- Foliar applications in orchards and vineyards
- Formulated to trigger growth while promoting greater fruit set and bud retention
- Increased trunk girth, greater lateral development, more vertical growth
- Reach production size sooner or enhance yields in first year production

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Spring 2014 Grower Standard

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Spring 2014: Pre-Treated w/ Fase 2

3 applications at 2 qt/A in 2012

FASE 2

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Fall 2014 – 1st Tree Comparisons

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1st Tree – Harvest comparisons

Grower Standard

FASE 2

Premium Pack out AgroLiquid Treated GALA Apples in Washington

Separate orchards Packed out at:

96%

98% Premium

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Example Apple Fertilizer Program Emphasizing Fase 2 and LiberateCa (New York)

Pre Bloom *Drench*

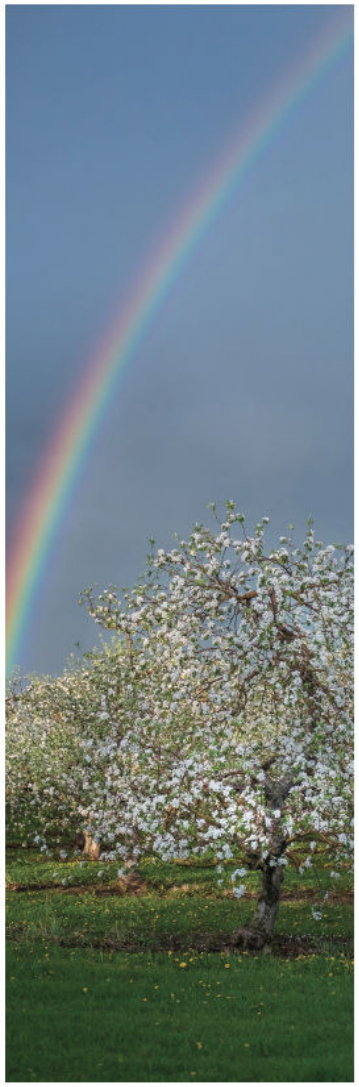
High NRG-N	12 gal
Sure-K	6 gal
Pro-Germinator	6 gal
Micro500	3 qts
Boron	1 pt

Bloom *Foliar*

Pro-Germinator	2 qt
LiberateCa	1 qt
Micro500	1 qt
Boron	1 pt
NResponse	2 qt
Fase2	2 qt

Petal Fall *Foliar*

LiberateCa	1 qt
Micro500	1 qt
NResponse	3 qt
Pro-Germinator	1 qt



Foliar Applications

Fase2 LiberateCa	2 qt 1 qt	1st Cover (10 days after PF)
Fase2 LiberateCa	2 qt 1 qt	2nd Cover (10 days after 1st)
Fase2 LiberateCa	2 qt 1 qt	3rd Cover (10 days after 2nd)
Fase2 LiberateCa	2 qt 1 qt	4th Cover (14 days after 3rd)
Fase2 LiberateCa	2 qt 1.5 qt	5th Cover (14 days after 4th)
Fase2 LiberateCa	2 qt 1.5 qt	6th Cover (10 days after 5th)
Fase2 LiberateCa	2 qt 1.5 qt	7th Cover (14 days after 6th)
Fase2 LiberateCa	2 qt 1.5 qt	8th Cover (10 days after 7th)
Fase3	1.5 ga	7 - 10 days before harvest

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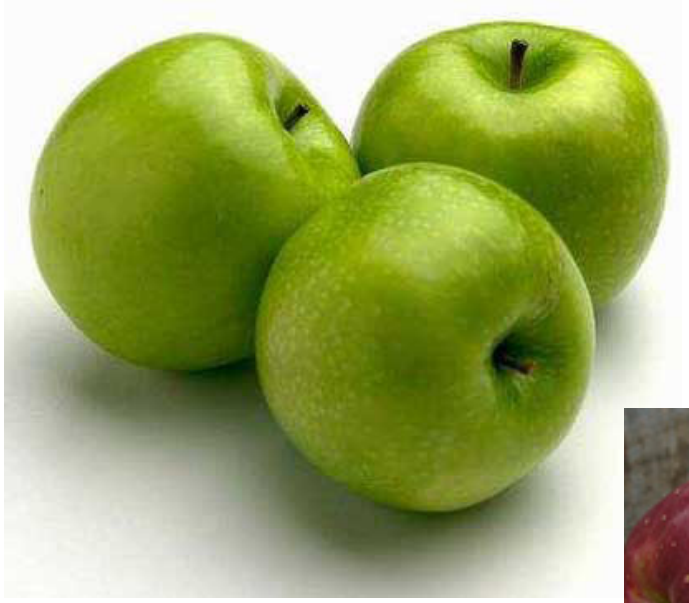
Fase2 For Apple Production: Quincy, PA (2015)

Granny Smith



Check: 690 bu/A
Fase2: 736 bu/A

Fase 2 qt/A
2014
3 Application 2015
3 Applications

Golden Delicious

Check: 1518 bu/A
Fase2: 1564 bu/A

Ramey York

Check: 690 667 bu/A
Fase2: 1334 1104 bu/A

Knouse Fruitland, 15-20 year old blocks of apples.
All other soil and foliar applications were the same.

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Bitter pit showing up pre-harvest

Know the Conditions that create shortage

1. Low soil levels
2. Low pH
3. High levels of competing cations K, Mg, NH4

Early onset of calcium deficiency

Conditions that affect apple calcium status

Apple roots are slow to absorb and translocate calcium. The tree out-competes the fruit for Ca, making foliar a MUST.

Tree management: Fertilization

- Excess N stimulates vegetative growth, increases Ca demand
- Excess K or Mg competes with Ca uptake
- Boron deficiencies reduce Ca movement (translocation)

Calcium deficiency shows up in storage and on the shelf

Treatment: "Super Sauce"
Foliar application made 10 days pre harvest @ 2 qts per acre

Treatment: AGRO-K
Foliar applications made weekly @ 2qts per acre

Treatment: MicoLink Calcium
Foliar applications made weekly @ 2qts per acre

Treatment: FT-15
Foliar application made 10 days pre harvest @ 1.5 gallons per acre

Treatment: Liberate Calcium
Foliar applications made weekly @ 2qts per acre

Treatment: "Apple Mix"
Foliar application 10 pre harvest @ 1.5 gallons per acre

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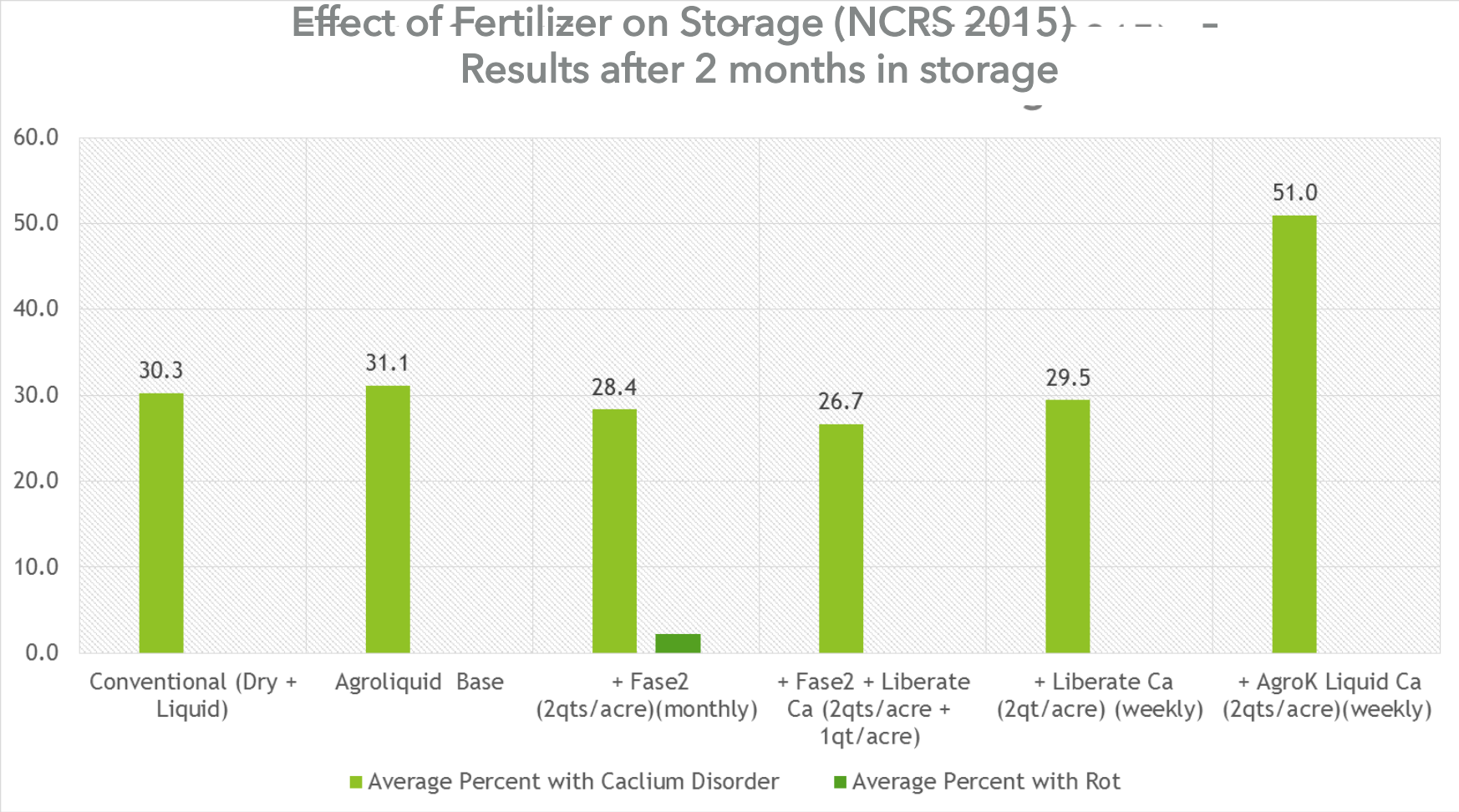
STORAGE QUALITY OF HONEYCRISP APPLES



**Average of 4 replications with 15 apples per replication. A total of 60 apples from each treatment in storage.*

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FASE 3

Increases uniformity of fruit coloring in apples
Apply 7 – 10 days prior to anticipated harvest at 1.5 gallons/acre
Do not use with other growth regulators as tank mix partners

Honey Crisp Apples – not treated

Honey Crisp Apples with Fase3

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Improving color: Development of the “RED” Honeycrisp

- In 2014 we discovered a foliar to help induce color in apples.
- Sprayed a week before harvest on Honeycrisp
- Saw results in three different orchards in MI
- Spray contains N,P,K, Fe, & Ca
- Is surface contact dependent

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Fase3 is a contact Product

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EARLIER TRIALS IN TRI-CITIES WA.
BY: STEVE HOLLAND 2015

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Example of Canadian Supermarket Gala Display

Very common sight in most years for this varietal

Both bins have color but the ones on the right were picked from FASE3 Acre's. Deeper Reds can equal higher prices.

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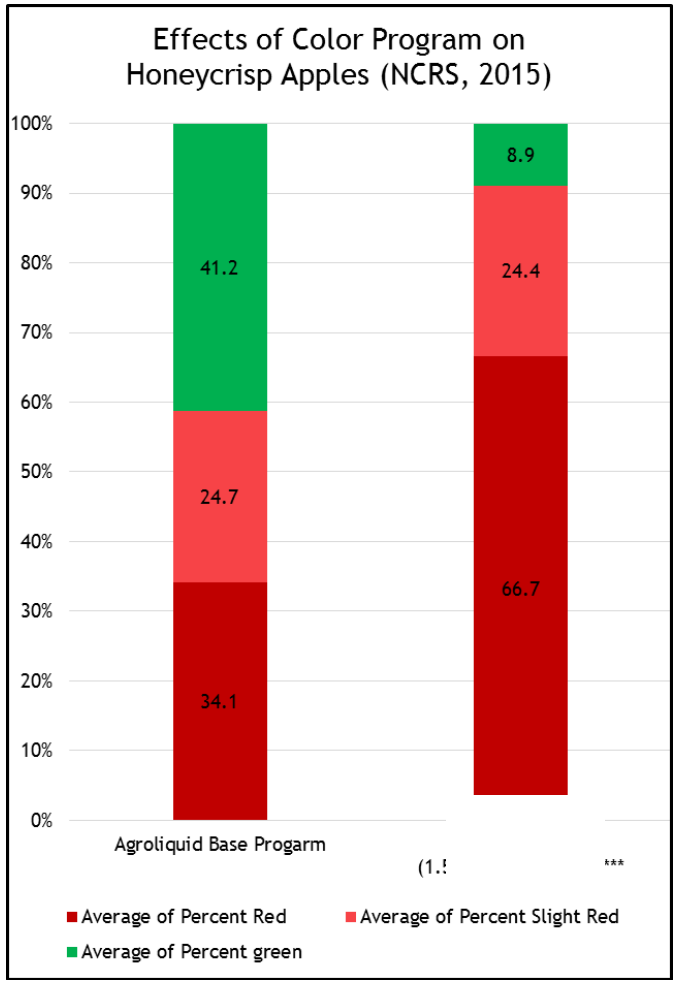
APPLE QUALITY FROM FASE3 APPLICATIONS: ST. JOHNS, MI (2015-16)

	Check	Fase3
Sugar/A	17.7	17.2
Pressure (lbs)	9.4	10.3

* *quality values from 2016*



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