



Growing the 2480 Graham

SNGPG Spring Seminar

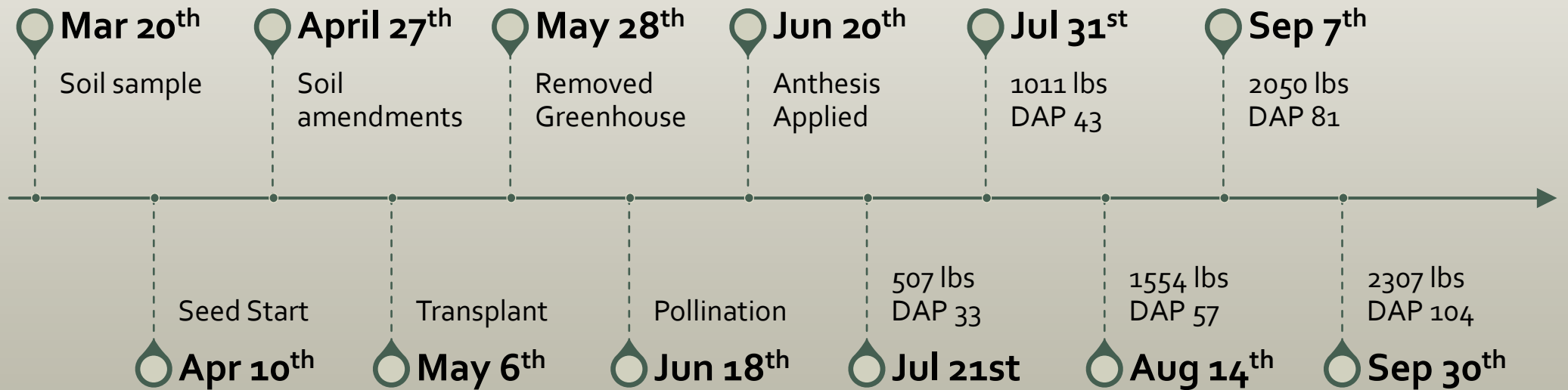
April 1st, 2023

Introduction

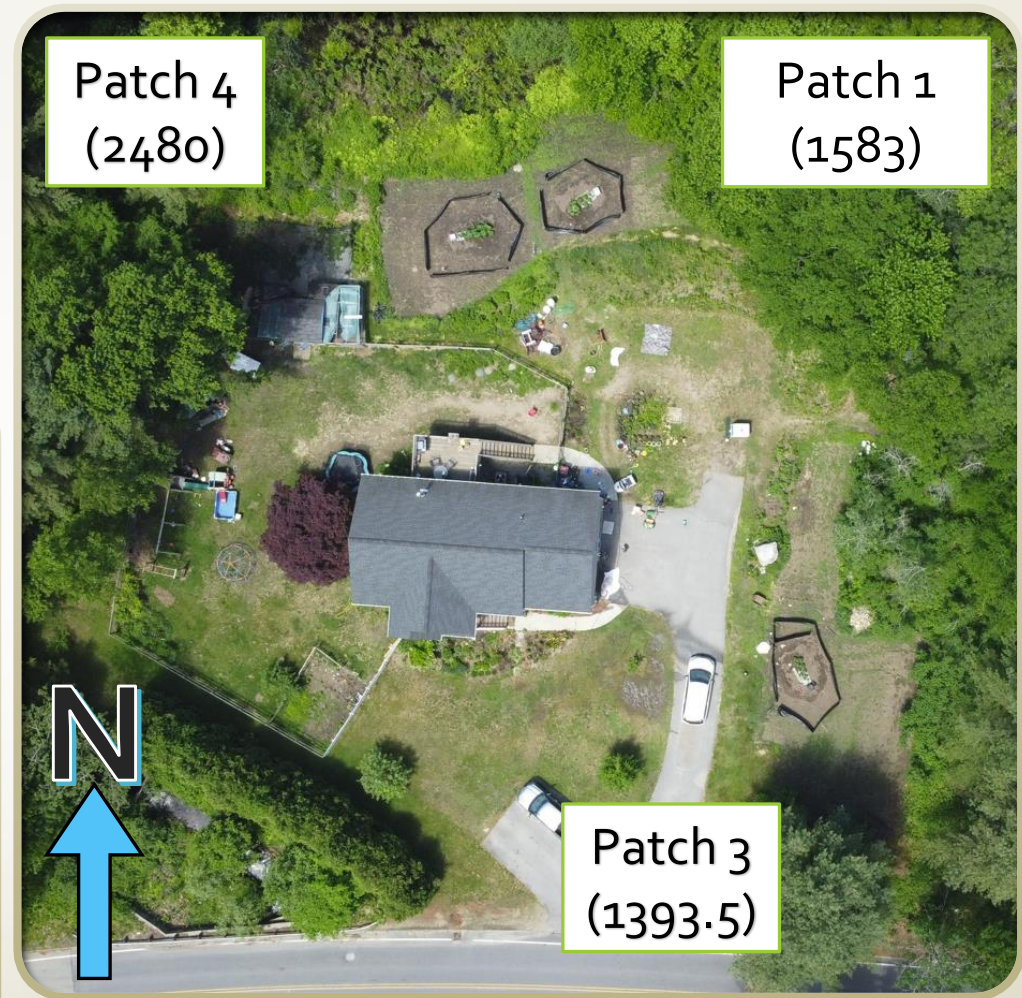
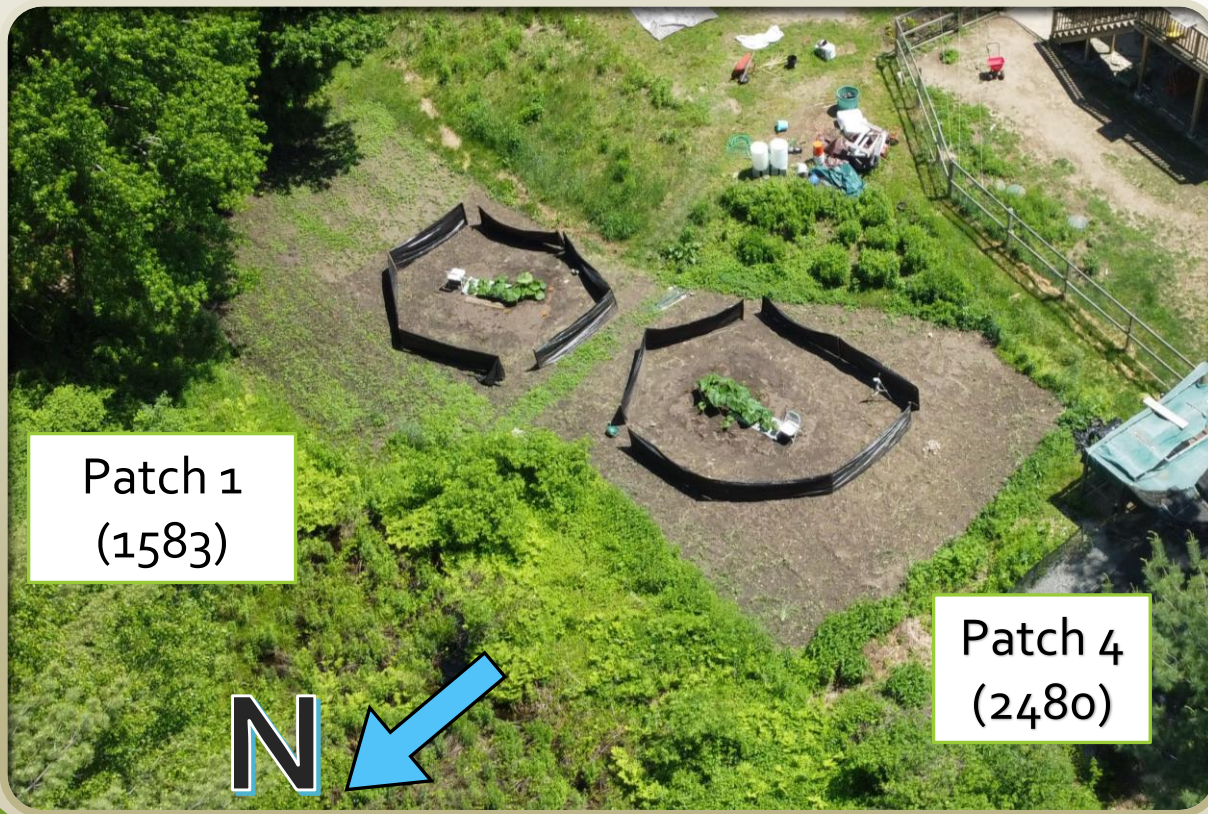
- Jamie Graham
- Growing since 2016
- Tyngsboro, MA



Timeline



Patches



Soil – Testing, Calculating, Amending

- **Fall Prep:** 10 yards leaf compost, Winter Rye Cover Crop
- **Soil testing:** Logan Labs, including micronutrients
- **Soil amendment calculations:** Worksheets in “Intelligent Gardener” by Steve Solomon



Soil Amendment Calculations

- On the left - Soil test results and calculating target amounts
- On the right - Calculating what amendments to add
- Target amounts based on TCEC (the amount of space in the kitchen closet)

Acid Soil Worksheet

Sample Depth 6 inches
TCEC: 9.67

pH: 6.6

OM%: 5.46

TCEC: If TCEC < 7.0, your soil does not hold nutrients well. Balance the soil, but apply small additional amounts of fertilizer regularly. If TCEC is less than 2.5, it is too low. Don't use this worksheet.
pH: If pH is 7.0 to 7.6, go to the Excess Cations Worksheet. If pH of TCEC > 7.8% or Ca% of TCEC > 71% and pH > 7.45 you may have calcareous soil. If it is calcareous, use the Calcareous Soil Worksheet.
Organic Matter %: Target over 7% in cool climates. South of the Mason-Dixon Line target over 4%. Assume an approximate release of 15-25 lb nitrogen per 1% OM. Varies with temperature, moisture and air.

Element	Actual Level	Calculating Target Level Pounds per acre	Target Pounds per acre	Deficit Pounds per acre
Nitrogen N	Unknown	100 to 300 lbs/acre Subtract N contribution of OM%. 15-25 lb Nitrogen per 1% OM $15 \times 5 = 75$	300	225
Trace Minerals	Unknown	Apply 100 lbs/acre Kelp or 100 lbs/acre Azomite, or foliar liquids per label	100 first year	100 first year
Sulfur S	ppm 9	No limit on Ca, Mg, K, Fe, Mn, Cu, Zn in their sulfate forms. pH < 7, TCEC < 10, S = 45, TCEC > 10, S = 70	45	27
Phosphorus P	P ₂ O ₅ 1304 P = 573.8	P = K (Target Level) Calculate using actual P, not phosphate. P = 0.44 x P ₂ O ₅ TCEC x 400 x 0.65 = Initial Target Level If possible, apply agricultural lime in the fall and the balance of the amendments the following spring	303	
Calcium Ca	ppm 2928	TCEC x 240 x 0.12 = Initial Target Level	2630	
Magnesium Mg	ppm 245	K is proportional to TCEC: see chart	278.5	53.5
Potassium K	ppm 256	Na = 0 lbs/acre Sea salt to 1% is optional Salt injury begins at about 3% of TCEC	300 303	47
Sodium Na	ppm 4	B = 2 lb/acre if TCEC below 10 = 4 lb/acre if TCEC above 10	0	
Boron B	ppm 0.54	Fe = 100 lb/acre if TCEC below 10 = 150 lb/acre if TCEC above 10	100	
Iron Fe	ppm 194	Mn = 55 lb/acre if TCEC below 10 = 100 lb/acre if TCEC above 10	55	
Manganese Mn	ppm 37	If TCEC < 10, target 6 lbs/acre. If TCEC > 10, target 10 lbs/acre.	6	
Copper Cu	ppm 345	Zn = 1/10 P (Target Level)	30.3	
Zinc Zn	ppm 16.62	4 lb/acre (optional test, used in NE USA)	2	1.82
Cobalt Co	ppm 0.478	2 lb/acre (optional test, used in NE USA)	1	
Molybdenum Mo	ppm 0.04	1 lb/acre (optional test, used in NE USA)	100	81.4
Selenium Se	ppm 2.56			
Silicon Si	ppm 41.5			

TCEC	Pounds	Potassium Target Levels	TCEC	Pounds	1 meq Calcium	1 meq Magnesium	1 meq Potassium	1 meq Sodium
3	190	13 350 23	459	33	519			
4	210	14 360 24	463	34	523			
5	225	15 380 25	475	35	527			
6	240	16 390 26	481	36	531			
7	255	17 400 27	487	37	535			
8	270	18 410 28	493	38	539			
9	290	19 420 29	500	39	543			
10	310	20 435 30	507					
11	320	21 443	511					
12	335	22 451	515					

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Acid Soil Worksheet, page 2

Patch 4 3/31/2022 Garden Size: 340 sq ft

Deficit From other side of worksheet	Application Limit Per acre/year	Material and Quantity to Add per Acre	Amount for this area	S	Mg	Ca
Nitrogen N	225	489 Urea (46% N)	11.2			
Trace Minerals	100 lbs first year					
Sulfur S	27	Unlimited Sulfates & 100 lbs Ag Sulfur				
Phosphorus P	303	175 lb/acre elemental P				
Calcium Ca		Limit Ag Lime to 8000 lbs/acre				
Magnesium Mg	53.5	No more than 10% of target magnesium	53.5 Epson	12.2	70	
Potassium K	47	200 lb/acre elemental K	112 50P	2.6		
Sodium Na		50 lbs/acre sea salt				
Boron B	1.9	2 lb/acre elemental B	19 Borax	0.43 34		
Iron Fe						
Manganese Mn						
Copper Cu		4 lb/acre elemental Cu				
Zinc Zn		14 lb/acre elemental Zn				
Cobalt Co	3		14.3 Chalk	0.33		
Molybdenum Mo	1.82	0.75 lb/acre	2.05 Molybdate	0.05		
Selenium Se		10 grams/acre				
Silicon Si	81.4		162 Greensand	3.7		

N%	P%	K%	S%	Ca%	Mg%
4.88	0.06	0.06	19	0.03	
10	2	0.6	2.3	0.3	
3	1.5	0.025	0.02	23	1.3
13	0.5				
12		0.35	0.4	0.6	
3	13	1	2.5	12	0.3
6	1.5	1			
4	1	0.7			
3	0.3	2.5	2	2	0.7
				32-39	2
				27	13
				17	20.3
				36	0.03
				29	
				20	
12	23				
		18.2	22	11	
		15.6	23	12	
0.05	6	1.3	1.5-3.0	2-4	
		90			

How much to apply, divide deficit by % available in an amendment, e.g. 4 lbs Zn deficit / 35% Zn in zinc sulfate = 11.4 lbs zinc sulfate to apply
How much of the other elements an amendment provides, multiply the amount to apply by the % available, e.g. 11.4 lbs zinc sulfate x 17% S = 2 lbs sulfur
Amount to apply to your area, multiply by the fraction of an acre your area is, e.g. for 1000 sq ft, 11.4 lbs zinc sulfate / 1000 sq ft / 43560 sq ft/acre = 0.26 lbs
160 sq ft = 4047 sq metres = 0.4047 hectares 1 pound = 1 lb. = 16 ounces = 0.45 kg = 454 grams

Soil Amending – April 27th

- Nitrogen: Urea, Alfalfa Pellets
- Sulfur: Agricultural Sulfur
- Magnesium: Epsom Salts (Magnesium Sulfate)
- Potassium: Sulfate of Potash (SOP) 0-0-50
- Boron: Borax
- Copper: Biomin Copper
- Silicon: Greensand
- Zinc: Zinc Sulfate
- Manganese: Manganese Sulfate Monohydrate
- Cobalt: Cobalt Sulfate Heptahydrate
- Molybdenum: Sodium Molybdate
- Humic Acid: Soil Activator (35% Humic Acid)
- Kelp Meal and Azomite for other micro-nutrients



Seeds

- 2294.5 Noel
- 2200 Geddes
- 1832.5 Graham



The 1832.5

Seed Starting – April 12th

- Overnight soak in 20 parts water : 1 part hydrogen peroxide
- Small cups with seed starting mix, WOW, Azos, Rootshield Plus
- Seed starting mat with thermostat and germination chamber
- Re-potting after few days into 1-gallon pots



Planting Holes

- 4' x 4' planting holes
- Dug 1' then broadforked
- Backfilled with patch soil
- WOW, Rootshield Plus, Azos, Pro Gro 5-3-4
- 48" soil heating cables ~6-8" deep
- Broadforked whole greenhouse area





Greenhouses

- 6' x 8' 2x4 wooden base
- PVC pipe
- New greenhouse film
- Zip ties, duct tape
- Metal stakes
- Wireless temperature monitor
- Space heater

Transplant – May 6th

- 2 per greenhouse
- Double planted at 45 degrees
- WOW, Azos, Rootshield Plus, WOW Starter Packs
- Bamboo for support
- Wireless temperature monitor



Back-Up Culled –
May 24th



Greenhouse
Removed
– May 28th



Watering

- 275-gallon tank, 1.5 hp water sprinkler pump, $\frac{3}{4}$ " hose, brass shutoff valve
- 30-50 gallons per day per plant
- Every day unless it rained
- Overhead by hand
- Avoiding crown and pumpkin
- Less water on older growth





Watering (early September)

Vine Burying

- Main Vine on white landscape fabric
- Secondary Vines in trenches
- Vine burying mix: WOW, Azos, Rootshield Plus, Bonemeal
- CloneX Rooting Gel on root nodes – encourage root branching
- Broadforking ahead of growth – deeper aerated soil
- No walking boards – apart from flower access



Young plant with stakes, weed fabric, chair



Pollination

- Two 1832.5 pollinations (#1 - June 17th, #2 – June 18th)
- 5 lobes
- Pollinated deeply (like bees do) – prevented strawberry shape problem?
- Cool environment – frozen bottles and cooler
- Blossom protection – hydrogen peroxide and fans
- Anthesis – extend cell division time



2480 Plant at
DAP -1
(June 17th)

No vines terminated
1 day before pollination



2480 Plant at
DAP + 1
(June 19th)

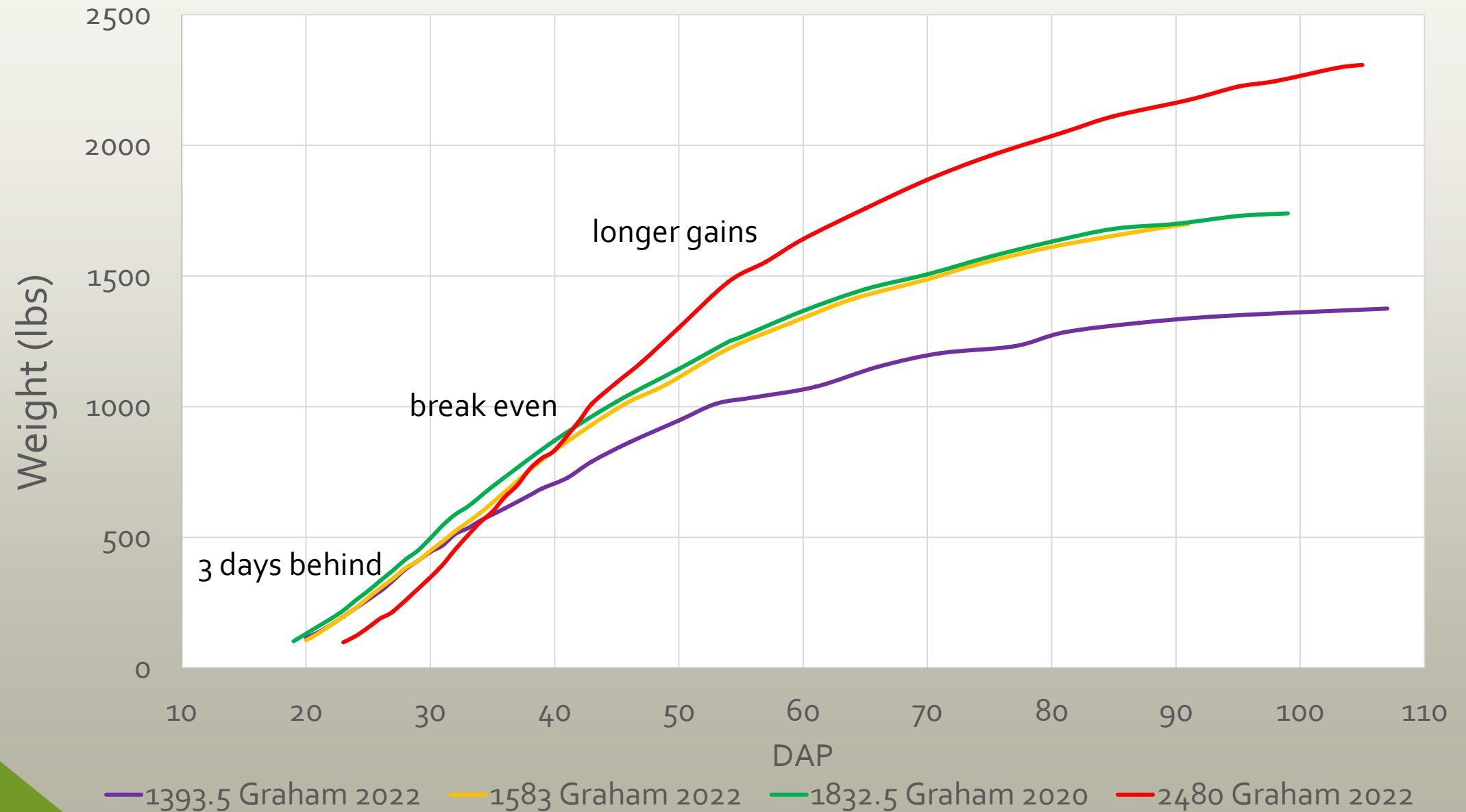
No vines
terminated



Anthesis Application

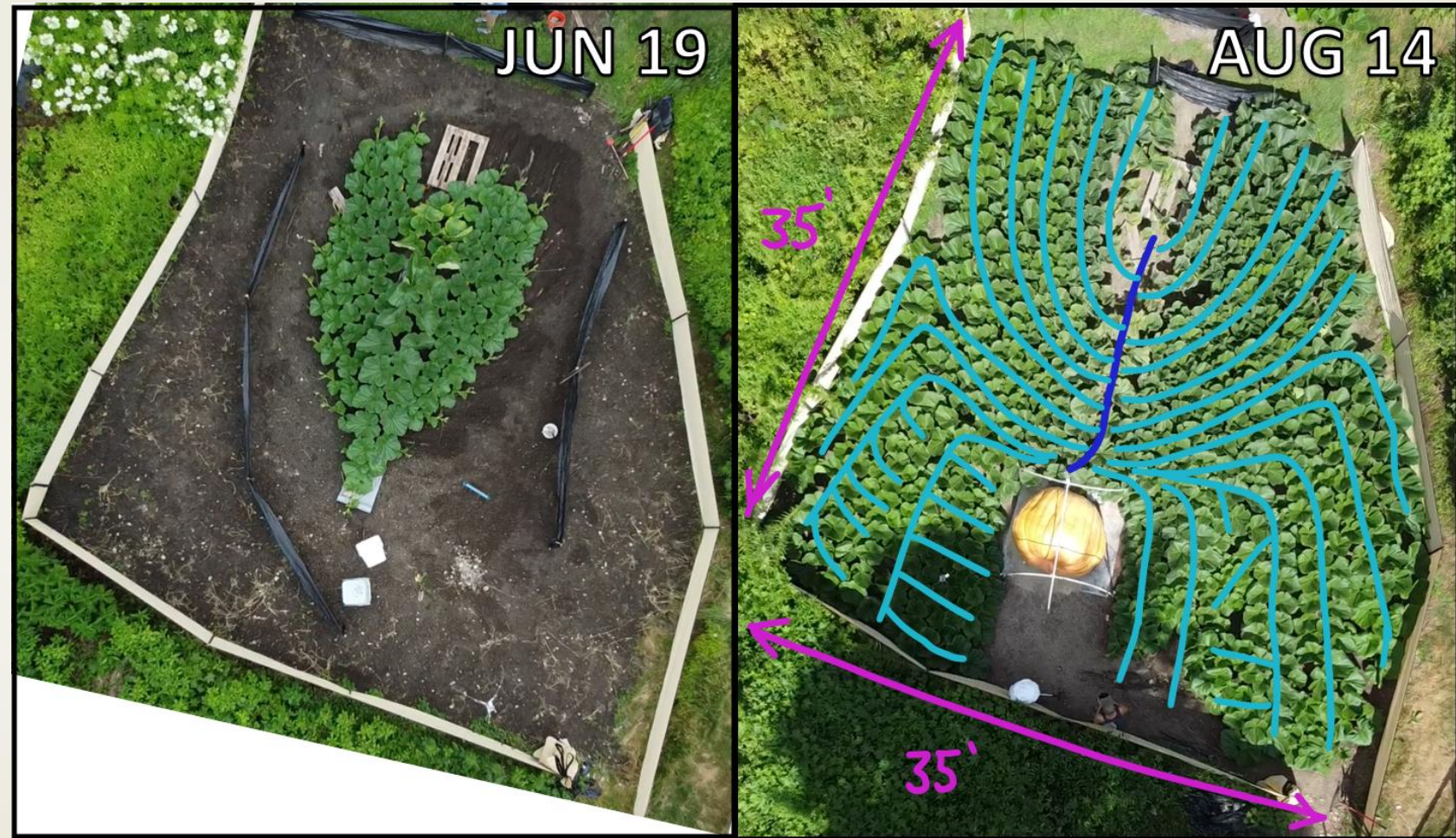
- Applied 48 hours after pollination to pumpkin surface
- Goal: Extend duration of cell division → more cells → bigger fruit
- Will I be using it again? Yes

Growth Chart



Vine Pattern

- Transplanted further into patch – less compaction
- Similar distance along each vine – the “diamond” technique



- Main vine termination – easier vine management, more power to secondaries
- Balancing distribution of plant – if the vine fails how much plant do you lose?

Main Vine Termination



Before
June 24th



After
June 25th

Main Vine Termination



June 25th



In-Season Fertilizing

Masterblend 4-18-38

Epsom Salts

Calcium Nitrate 15.5-0-0

Solubor

Potassium Silicate (Agsil 16 H)

0-10-10 (General Hydroponics)

0-52-32 MOAB

Neptunes Fish and Seaweed

MammothP

Five:Two Humic Acid Kelp

Disease and Insect Control

Patch pressure:

- Powdery Mildew
- Yellow Vine Decline (2017, 2021)
- Squash Bugs
- Cucumber Beetles
- Squash Vine Borers (SVBs)
- Aphids (greenhouses, and isolated location 2022)

Products used:

- Biologicals: Rootshield Plus, Actinovate
- Fungicides: TKO Phosphite (a.k.a. Companion Maxx), Milstop, Dalconil, Eagle 20
- Insecticides: Bonide Tree and Shrub, Criterion 75 WSP, Talstar, Permethrin



Aphids

- Single bad leaf in middle of plant
- Removed bad leaf
- Sprayed adjacent leaves with insecticidal soap
- Paid more attention to spraying



Fertilizer, Insecticide, Fungicide Schedule

Fertilizers	Masterblend 4-18-38	Every drench, Jun-early Aug
	Epsom Salts	Every drench, all season
	Calcium Nitrate 15.5-0-0	Every drench, Jun-Jul
	Solubor	Every drench, all season
	Potassium Silicate	2x per month, Jun-Aug
	General Hydroponics 0-10-10	Every drench, July
	MOAB 0-52-32	Every drench, late Jul-Sep
	TeaLAB Humic/Kelp	Every drench, all season
	Neptunes F&S	Every drench, all season
Biologicals	MammothP	Every drench, all season
	Companion	2x, June
	Actinovate	2x, June
Systemic Insecticides	Bonide Tree and Shrub	1x, late May
	Criterion 75 WSP	2x per month, Jun-Aug
Contact Insecticides	Talstar	Rotation every 10 days, Jun-Aug
	Permethrin SFR	
Systemic Fungicide	Eagle 20EW	Rotation every 10 days, Jun-Sep
	TKO Phosphite 0-29-26	Every drench, Jul-Sep
Contact Fungicides	Milstop	Couple of times in Aug and Sep
	Dalconil	Rotation every 10 days, Jun-Sep

Tissue Testing

- 1st test in late-June
 - Low Phosphorus, Sulphur, Manganese, Copper, Boron
- Corrections
 - Increased fertigation of Phosphorus, Epsom, Solubor
 - Couple applications of Biomin Manganese and Biomin Copper
- 2nd test mid-August
 - Phosphorus and Copper still low
 - Manganese and Boron improved
- Should have done one before pollination too

Tissue Tests:			Late June		Mid August	
PLANT NUTRIENTS	SUFFICIENCY RANGE	YOUR TEST RESULTS	SUFFICIENCY RANGE	YOUR TEST RESULTS	SUFFICIENCY RANGE	YOUR TEST RESULTS
NITRATE NO ₃ - ppm	8165	9111	5525	16449		
NITROGEN N - %	-		-			
PHOSPHORUS P - %	0.81 - 1.2	0.45	0.81 - 1.2	0.39		
POTASSIUM K - %	7.5 - 12.0	13.13	7.5 - 12.0	11.03		
SULFUR S - %	.23 - .5	0.16	.23 - .5	0.24		
CALCIUM Ca - %	.5 - 2.25	1.35	.5 - 2.25	1.68		
MAGNESIUM Mg - %	.25 - .48	0.46	.25 - .48	0.59		
ZINC Zn - ppm	42 - 75	55	42 - 75	56		
MANGANESE Mn - ppm	25 - 75	8	25 - 75	42		
COPPER Cu - ppm	13 - 45	8	13 - 45	10		
IRON Fe - ppm	75 - 500	141	75 - 500	206		
BORON B - ppm	24 - 70	21	24 - 70	32		

Pumpkin Management - Platform



$\frac{3}{4}$ " x 6' x 6' plywood, 2 layers mill fabric, play sand

July 7th – DAP 19
(not on the chart yet)



Pumpkin Management – Stem Split

- July 22nd – DAP 34 - 557 lbs
- 2 stem splits at 3 and 6 o'clock
- Elongated cuts at splits and a vertical cut for drainage
- Hydrogen Peroxide, Sulfur
- Two fans for remainder of season
- (Thanks Woody!)

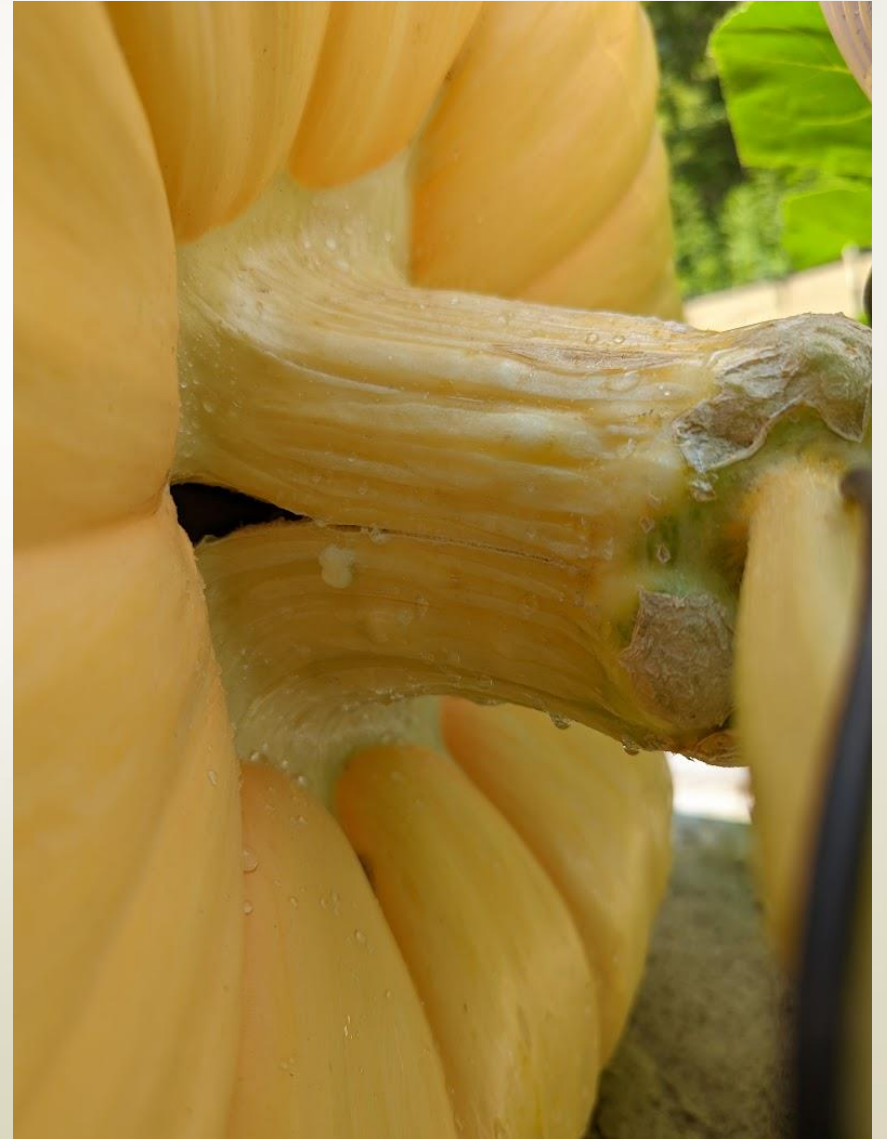
Pumpkin Management – Stem Split

July 22nd - 7:40am



Pumpkin Management – Stem Split

The same day - 1:30pm



Pumpkin Management – Stem Split

At seed harvest



Pumpkin Management – Vine Stress Release

- Pumpkin moved 3-4 times
- Pulling mill fabric
- Come-Along & Straps





Plant – August 14th

Sep 9th – DAP 83 –
approx. 2080lbs



Sep 25th – DAP 99
– approx. 2250lbs



Late Season Protection

- Blankets
- Mouse Traps from early August
- Mouse Deterrent Granules and Spray
- Chili Spray (for Bears)
- Quilt Batting (mouse and rabbit protection, insulation)



Day before harvest
(Sep 29th)



Pumpkin Harvest

- New metal tripod – thanks Alex!
 - 2-piece legs
 - Tested to 3600 lbs
- 2-ton chain hoist
- New rigging rope
 - 1/2", 19,500 lbs breaking strength, spliced loop



Lifting the 1583 Graham

2022's Pumpkins



"Penny"

1393.5 Graham

(2200 Geddes x 1832.5 Graham) -2%



"Sir Seed"

1583 Graham

(2294.5 Noel x 1832.5 Graham) -7%

2022's Pumpkins (continued)



2480 Graham "*Bear Swipe*"
(1832.5 Graham x 2294.5 Noel) +7%

This Season

- No major changes – just doing things better
- Earlier tissue testing and deficiency correction (e.g. phosphorus)
- Better pumpkin positioning / platform for adjustment
- Seeds: 2907 Paton, 2480 Graham, 1461 Rodebaugh (Ruby)
- Terminate main vines again
- Use Anthesis again

Conclusion



SOIL BALANCING



CONSISTENT
WATERING



CONSISTENT
FUNGICIDES AND
INSECTICIDES



ATTENTION TO
NITROGEN



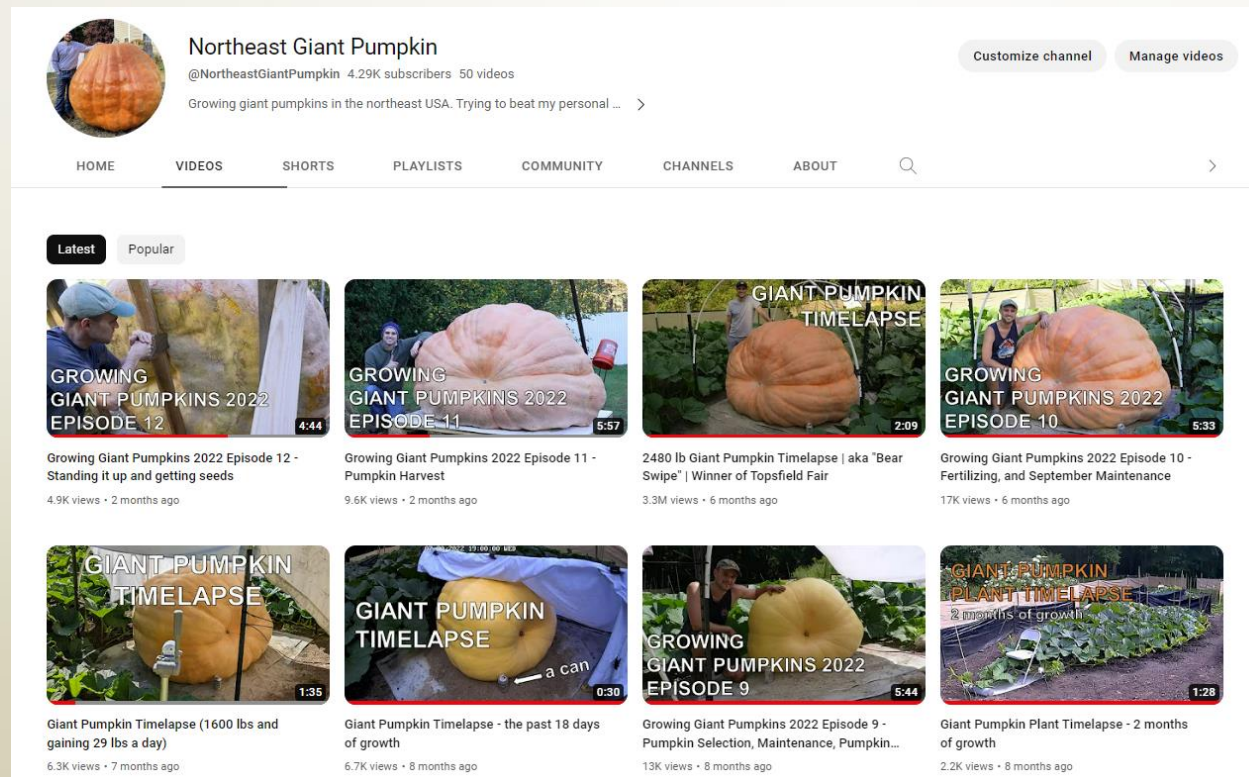
ANTHESIS


Videos

YouTube: <https://www.youtube.com/@NortheastGiantPumpkin>

TikTok: <https://www.tiktok.com/@bigpumpki>

Instagram: <https://www.instagram.com/northeastgiantpumpkin>





Appendix

Growth Chart

2480 Graham Growth Chart				
June 18th pollination				
Date	DAP	OTT	Est. Lbs.	Daily Av. Lbs.
11-Jul	23	160.5	99	
13-Jul	25	188	156	28.3
18-Jul	30	247	348	38.4
23-Jul	35	296	599	50.3
28-Jul	40	331.5	833	46.8
2-Aug	45	364.5	1093	52.0
7-Aug	50	388.5	1302	41.8
11-Aug	54	407	1478	44.0
17-Aug	60	424	1641	27.2
22-Aug	65	436	1758	23.4
27-Aug	70	447.5	1868	22.0
1-Sep	75	456.5	1959	18.2
7-Sep	81	465	2050	15.2
17-Sep	91	477.5	2173	12.3
24-Sep	98	484	2245	10.3
1-Oct	105	490	2307	8.9