

July 22nd, 2013
Bear River, NS

Questions from the Farm

What would a
sustainable
potting mix be
made of?



This leaflet presents an on-farm experiment, based on local knowledge and farmers' experience. This is very site-specific as it is intended to provide information to small-scale organic vegetable growers in Nova Scotia. The goal is to determine the kind of potting mix composition that would guarantee a high germination rate and healthy seedling growth by using, as much as possible, locally sourced materials while abiding by organic standards.



Creating the optimal potting mix...

Growing transplants is an integral component towards market farmers reaching self-sufficiency. Germination and seedling emergence are critical stages in plant development and have strong influence on the future health and vigor of the plant.

In the spring of 2013, as an intern on the Just Food! Farm in Grand Pré, NS, I had the opportunity to grow organic vegetable seedlings and became aware of issues related to their growth. Observations of seedling emergence and seedling vigor led me to focus my research interest on potting mix composition. Consistent commercial potting mixes are increasingly difficult to find and can be costly. Many market farmers have looked to creating their own potting mix not only to increase self-reliance but to better

understand which ingredients are essential to plant health.

Many new entrants to market farming begin using Eliot Coleman's potting mix recipe as described in the *New Organic Grower*. Many of the recipes collected from Nova Scotian farmers are variations of Eliot Coleman's but have substituted local ingredients. Similarly, with recent interest in the book by Jean-Martin Fortier, *Le jardinier-maraîcher*, I included his recipe as well.

I decided to test 6 potting mix recipes: 5 farm-made and 1 commercial mix (see Table 1). All potting mixes were analyzed for nutrient composition (see Appendix) and were then seeded with broccoli. The aim was to determine how long each potting mix could provide adequate nutrients for healthy growth based on visual scoring.



- Just Food! Farm - Grand Pré, NS -

Potting mix recipes, cost, and source

(In litres, for approximately
100 litres of potting mix)

	Broadfork Farm	Jardins de la Grelinette	Waxwing Farm	Waldegrave Farm	Pro-Mix ^(a)	Just Food! Farm	SOURCE
Peat Moss ^(b)	33.5	37.5	33	57.5	85	38	Annapolis Valley Co. (NS)
Limestone (26% Ca ; 6% Mg)	0.1	0.1	0.35	1.2	1	0.1	Mosher Limestone (NS)
Vermicompost	50	25	-	1.5	-	-	Growing Green (NS)
Mushroom compost ^(b)	-	-	50	29	-	38	Valley Mushroom (NS)
Perlite	-	25	-	10	10	-	Perlite Canada (QC)
Vermiculite	-	-	16.5	-	-	-	Perlite Canada (QC)
Sand	16.5	-	-	-	-	19	Shaw Resources (NS)
Kelp Meal (Fucaceae)	0.2	-	0.7	0.6	-	0.5	Tidal Organics (NS)
Blood Meal	-	0.2	0.35	-	-	-	Sanimax (ON)
Soil ^(b)	-	12.5	-	-	-	2	On the spot!
Greensand	0.2	-	-	-	-	-	Fertrell Co. (PA, USA)
Bone Meal	0.05	-	-	-	-	-	Grow Chemless Inc. (ON)
Calphos	0.1	-	-	-	-	-	Canton Mills Inc. (MN, USA)
COST ^(c)	\$ 27	\$ 17	\$ 10	\$ 8	\$ 16	\$ 12	

^(a) - Also contains gypsum, an organic wetting agent, organic fertilizers and Mycorrhizae™.

^(b) - Sifted through a 1/4-inch mesh.

^(c) - Estimated according to the producers (for limestone, vermicompost, mushroom compost and kelp meal), to Halifax Seed (for Pro-Mix) and to Scotian Gold in Kentville, Nova Scotia (for any other ingredient); does not include shipping.

- From raw materials to potting mix -



- Major roles of the ingredients within potting mixes -

	N*	P*	K*	Ca*	Mg*	Trace elements	Effect on pH	Holds moisture	Airflow, drainage	Soil life
Peat Moss							lowers	✓		
Limestone				✓	✓		raises			
Vermicompost	✓	✓	✓	✓	✓	✓	buffers	✓	✓	✓
Mushroom compost										
Perlite										
Vermiculite			✓		✓			✓	✓	
Sand										
Kelp Meal	✓		✓			✓				
Blood Meal	✓									
Soil										✓
Greensand			✓			✓				
Bone Meal		✓		✓						
Calphos		✓		✓						

* N = Nitrogen (→ Leaves); P = Phosphorus (→ Roots); K = Potassium (→ Fruits); Ca = Calcium; Mg = Magnesium

What I did and what I saw...

Four organic vegetable farmers from Nova Scotia shared their own potting mix recipe and I chose to include one from Québec (Jardins de la Grelinette). Using a 4-litre bucket and a bulk scoop, I would fill the bucket to the top and pack it down until the desired volume was reached. Peat moss and limestone were mixed together to balance pH, followed by kelp meal (if part of the recipe) and vermiculite or perlite or sand. Thoroughly mixing again compost and any other kind of ingredients were added and mixed until a homogeneous mix was achieved.

In addition to these mixes, Pro-Mix from Premier Tech Horticulture (MP OrganikMycorrhizae) was treated as a control.

All potting mixes were analyzed using the saturated paste method at the NS Department of Agriculture Soils lab.

In each potting mix, broccoli (variety *De Cicco*, open-pollinated from Johnny's Selected Seeds) was seeded in black plastic flats of 128 cells. All attempts were made to ensure temperature, airflow and moisture were similar for all treatments. No supplemental fertilizer was applied. The experiment lasted for 3 weeks.



















- Seedling scoring on day 21 -



Following the sowing date (Day 0) observations were made daily with visual scoring of seedling vigor on Day 7, Day 14 and Day 21. Above-ground plant health was assessed using a visual scoring method that included several indicators such as leaf color, size of cotyledons and true leaves, seedling height, seedling vigor. Scoring ranged from 1 (yellow; stunted, and weak) to 5 (green, tall, and vigorous).

- Sowing broccoli for the experiment -



		Broadfork Farm	Jardins de la Grelinette	Waxwing Farm	Waldegrave Farm	Pro-Mix	Just Food! Farm
Germination Rate (%)		82%	89%	81%	87%	64%	82%
Visual Score	Day 7	 4.5	 4	 2	 3.5	 1	 3
	Day 14	 4	 4.5	 3.5	 2.5	 1.5	 3
	Day 21	 3.5	 4	 4.5	 2	 2.5	 1.5

(*) Only includes healthy seedlings that would be transplanted.

(High  Low score)

What does it all mean?

After 3 weeks, visually significant differences appeared between the 6 mixes. The potting mix recipe from **Waxwing Farm** provided the healthiest conditions for seedling growth and was relatively inexpensive. Moreover, many of the ingredients in the mix can be sourced locally. Depending on your practices and goals different options can be considered for other mixes. If you are looking for a local mix, you should use the one of **Just Food! Farm** (only sourced in NS) or if you are looking for the most cost-effective one then **Waldegrave Farm**'s recipe may be best. However, in both recipes a supplemental source of N at 2 weeks may be required. If you are willing to pay more, the mixes of **Broadfork Farm** and **Jardins de la Grelinette** provide good conditions for a vigorous growth. Conclusions cannot readily be drawn concerning the **Pro-Mix** other than it should not be used as a stand alone potting mix. The role of compost as an integral ingredient was evident.

In any case, making your own potting mix raises your farm **self-sufficiency**. Understanding the role of every ingredient may give you the tools to adapt your current recipe if you need to improve it. Good luck and may your seedlings be as healthy as you wish!

Appendix : Chemical analysis of the different potting mixes

	Broadfork Farm	Jardins de la Grelinette	Waxwing Farm	Waldegrave Farm	Pro-Mix	Just Food! Farm
Conductivity (mmhos)	1.7	1.2	3.3	1.5	0.9	1.5
pH	5.2	5.5	6.3	6.9	5.5	6.6
N (ppm)	136	96	227	39	35	42
P (ppm)	56	34	70	43	25	53
K (ppm)	57	28	257	125	125	147
Ca (ppm)	154	52	242	84	88	108
Mg (ppm)	73	29	94	31	33	34

High
 Correct
 Low
 Compared to references given by the lab (NS Department of Agriculture)

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“The compost does seem to be the linchpin.”

Cammie Harbottle,
Waldegrave Farm.



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