

Choosing Fertilizers: Chemical vs. Organic

“Chemical fertilizers have

- **provided increased yields,**
- **bolstered farm income, and**
- **brought marginal land into productivity.**

What could possibly be wrong with them?

“Fifty years ago, fertilizers were applied at the rate of 50 pounds per acre. Now, applications of 500-800 pounds are common.”

- **What has caused this increased dependence upon chemical fertilizers?**
- **What other problems are they responsible for?**
- **What alternatives exist?**

–from The Non-Toxic Farming Handbook by Philip A. Wheeler and Ronald B. Ward, *ACRES USA* 1998, p. 65.

Synthesized Fertilizers

Not Condoned by Organic Methods

Name of Fertilizer	Content	Analysis N-P-K	Other Nutrients Supplied
Ammonium sulfate	$(\text{NH}_4)_2\text{SO}_4$	21-0-0	S
Sodium nitrate	NaNO_2	15-0-0	
Calcium nitrate	$\text{Ca}(\text{NO}_3)_2\text{O}$	15-0-0	Ca
Potassium nitrate	KNO_2	13-0-44	
Ammonium nitrate	NH_4NO_2	33-0-0	
Urea	$\text{CO}(\text{NH}_2)_2$	45-0-0	
Mono-ammonium phosphate	$\text{NH}_4\text{H}_2\text{PO}_4$	12-62-0	
Di-ammonium phosphate	$(\text{NH}_4)_2\text{HPO}_4$	21-53-0	
Treble superphosphate	$\text{Ca}(\text{H}_2\text{PO}_4)_2$	0-44-0	Ca

Name of Fertilizer	Content	Analysis N- P- K	Other Nutrients Supplied
Superphosphate	$\text{Ca}(\text{H}_2\text{PO}_4)_2 + \text{CaSO}_4$	0-20-0	Ca + S
Potassium chloride or Muriate of potash	KCl	0-0-60	
Potassium sulfate	K_2SO_4	0-0-50	S
Urea formaldehyde		38-0-0	
Hydrated lime	$\text{Ca}(\text{OH})_2$		Ca

**Feeding a plant artificial fertilizer
is basically the same as
feeding a person intravenously.**

Robert Rodale in Basic Book of Organic Gardening

Synthesized fertilizers:

What are their effects?

- **Encourage hardpan**
- **Provide only the macro nutrients: NPK**
- **Some NPK fertilizer carriers contain heavy metals**
- **Supply no micro-nutrients** such as manganese, iron, calcium, magnesium, zinc, iodine, sulfur, boron, copper, molybdenum
- **Highly water soluble; therefore leach and pollute**
- **Release most of nutrient content early in season**
- **Force feed the plants instead of feed the soil**
- **Make soil acidic**
- **Deplete soil of organic matter.**
- **Repel or kill earthworms**
- **Significantly reduce beneficial microbes in the soil food web**
- **Make crops more prone to disease, deficiency, and pest problems**
- **Crops require more and more fertilizer (yet produce less and less yield over time)**

Goals of Organic Method

- **Steward the soil for the long term**
- **Build soil tilth, fertility, and nutrition**
- **Never deplete, poison, or pollute soil, air, water**
- **Feed the soil, not force-feed the plant**
- **Provide nutrients – both macro and micro – in balanced proportions**
- **Foster a healthy soil food web (high numbers + high diversity)**
- **Imitate nature: aim for complete recycling and long-term sustainability**
- **Optimize soil health to optimize plant health**
- **Optimize plant health to minimize :**
 - **disease**
 - **pests**
 - **drought damage**
- **Increase, not force, productivity in balance with**
 - **nutrition,**
 - **bioregional constraints,**
 - **ecological carrying capacity**
- **Foster a diverse native ecosystem surrounding the growing acreage for stability**

Organic Fertilizers Compared to Synthetics

- **Do not encourage hardpan**
- **Provide macro-nutrients = N PK plus much more**
- **Provide micro-nutrients & Ca and Mg**
- **No “inert” carriers**
- **Not very water soluble**
- **Unlikely to leach and pollute**
- **Release nutrient content slowly and steadily throughout season**
- **Mineral release dependent on soil temperature and microbe activity**
- **Most do not make soils acidic**
- **Foster crops that have minimal disease, deficiency, and pest problems**
- **Do not require ever-increasing doses over the years**
- **Build rather than deplete organic matter**
- **Nourish and stimulate beneficial microbes and earthworms (= a health soil food web)**

About Testing Soil

- **Test the first year.**
- **Then test every 2nd or 3rd year .**
- **Add compost (an excellent soil neutralizer, stabilizer, and fertilizer)**
- **Replenish nutrients with moderate applications of organic fertilizers.**
- **Don't overdo applications.**
- **Foster a healthy soil food web:**
 - **mulches, cover crops, organic matter, and**
 - **minimal soil disturbance.**
- **Decrease your dependence on imported fertilizers.**

After all is said and done...

Since tests vary widely–

1. choose an organic evaluation
2. stay with one company over time.
3. Some experts do not test

However... There is no substitute for

--replenishing of basic nutrients

--replacing organic matter

--fostering a healthy soil food web

Combine

proper nutrients,

organic matter,

soil biology

to:

- unlock minerals present
- deliver them in the forms that your plants need
- maximize health, growth, & yield
- minimize drought, pest, & stress damage