

What Fertilizers Should You Have?

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The fertilizer situation is much confused with brand names, trade names, different analyses, and different ingredients.

Some of the common names of fertilizer materials and their chemical names, if they were pure, are as follows:

<u>Chemical Name</u>	<u>Common Name</u>
Ammonium Nitrate	Ammonium Nitrate
Ammonium Sulfate	Sulfate of Ammonia
Ammonium Phosphate	Ammo-phos
Aluminum Sulfate	Alum
Calcium Carbonate	Limestone
Calcium Hydroxide	Hydrated Lime, Spray lime
Calcium Phosphate	Double or Treble Superphosphate
Calcium Phosphate and Calcium Sulfate	Superphosphate
Calcium Sulfate	Gypsum or Land plaster
Ferrous Sulphate	Sulfate of iron
Potassium Chloride	Muriate of Potash
Potassium Sulfate	Sulfate of Potash
Sodium Nitrate	Chile Saltpeter or Nitrate of Soda
Urea	Urea, Uramon, Ureor

Following are some general rules on fertilizers and fertilization.

Use soluble fertilizers as much as possible for the following reasons:

1. They are easy to apply.
2. They give an even distribution throughout the soil volume.
3. They are fast acting.
4. They can be chosen so that a minimum of inert material is added to the soil.
5. Their original cost is less than for low grade fertilizers for the same amount of plant nutrients.

Carry a minimum number of fertilizers because a few are easier to learn to use and you can save money by buying in larger quantities. Here is a suggested minimum list. The asterisks (*) following the fertilizer indicate solubility. One (*), very soluble; two (**), fairly soluble; three (***), weakly soluble.

<u>Preferred</u>	<u>Good Substitute</u>
Ammonium Nitrate *	Ammonium Sulfate *
Potassium Nitrate *	Potassium Chloride *
Superphosphate ***	Treble Superphosphate **
Limestone (100 Mesh) ***	Hydrated Lime **
Sulphur (100 Mesh)***	Aluminum Sulfate *

When to Apply Fertilizers

The limestone or sulfur and superphosphate, if needed, should preferably be applied in the soil preparation process. They are slow acting. The rates at which they are used depend upon the pH of the soil and, for the superphosphate, the phosphorus content (see New York State Flower Growers Bulletin 31, page 1 and Florist Crop Production and Marketing, page 141). The other fertilizers on the preferred list are readily soluble and should be used as needed and not before. Since nitrogen, as nitrates or ammonia, is used faster than any of the other soil nutrients, it is anticipated that potassium and phosphorus will not usually be added separately but in conjunction with nitrogen. Hence potassium nitrate is suggested. In general, the phosphorus content of the soil should be adequate if superphosphate is used in the soil mixture. If a soluble phosphorus compound is needed, however, ammo-phos is preferred.

Sodium nitrate produces an alkaline reaction and should be added to the list by those growing long-time crops such as roses. Continuous nitrogen fertilization with ammonium sulfate or ammonium nitrate will give the soil a very acid reaction.

Here is an example of how a complete fertilizer is made up by a commercial company. For a 5-10-5 analysis they would incorporate 100 pounds of nitrogen, 200 pounds of P₂O₅, and 100 pounds of K₂O per ton of fertilizer. They could use the following materials:

	<u>Pounds</u>
Ammonium Nitrate.....	75
Ammo-phos (monobasic Ammonium Phosphate)....	450
Potassium Nitrate.....	225
Filler (Sand, clay, limestone, etc.).....	1250
Total.....	2000

This is admittedly an extreme case, but it demonstrates clearly that most mixed fertilizers contain filler. Why not buy the concentrated material and add your own sand or better still use the concentrated soluble material at a lesser rate? In the above example where you would use three pounds of the fertilizer with the filler you could use one pound of the concentrates without the filler and you would have a soluble fertilizer as well. Here is a recipe for a 20-20-20 all soluble fertilizer.

	<u>Pounds</u>
Urea.....	500
Ammonium phosphate (monobasic).....	657
Potassium phosphate (dibasic).....	260
Potassium nitrate.....	583
Total.....	2000

Here is a recipe for an all soluble 15-30-15:

	<u>Pounds</u>
Urea.....	288
Ammonium phosphate (mono- basic).....	960
Potassium phosphate (mono- basic).....	350
Potassium nitrate.....	402
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Total.....	2000

Organic fertilizers, such as blood and milorganite, can be used instead of inorganic materials (urea included as an inorganic) which we have discussed so far. The big advantage of the organic forms is that most of them do not burn the foliage and injury is less likely by a heavy application. However, organic fertilizers are much more costly than inorganics for the same analysis. They are slow acting because they depend on bacterial activity to make them soluble. They have a low analysis and hence you are buying "filler." They cause an increase in the soil bacteria and fungi whose desirability in greenhouse soils is questionable.

Calcium sulfate is frequently used in greenhouses today. Actually its role is mainly that of a soil conditioner rather than a fertilizer or plant nutrient carrier. It is used to improve granulation or "crumbiness." The necessity for its use on greenhouse soils is questionable, especially in regions having "hard" water.

The "minor" elements such as magnesium, iron, zinc, boron, copper, manganese, molybdenum, and sulfur are generally sufficient in soils and waters of the state or are added in sufficient quantity as impurities in fertilizers. Insofar as we know, they may be disregarded in the fertilizer program. Some apparent deficiencies of boron have been noted but convincing evidence of improvement due to addition of this element is lacking at this time.

Proper storage of the soluble fertilizers may save you much work breaking lumps and weighing. Store them as a concentrated liquid in vats or barrels. To a hundred pounds of a given fertilizer, add enough water to make 100 gallons, then every gallon contains one pound of the fertilizer. Since the fertilizers are more or less corrosive, asphalt lined (wooden or metal) containers should be used. The containers should close tightly since evaporation of water changes the concentration and also some of the ammonium compounds are weakly volatile.

Many of the simple soluble fertilizers are hard to get. Perseverance, however, should get you what you want.

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