

20-10-20 Water Soluble Fertilizers, An Industry Work Horse

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The 20-10-20 fertilizer formulation is probably the most common water soluble fertilizer used by greenhouse growers in the South East. It is a versatile fertilizer and is used in the production of many types of greenhouse crops. Most fertilizer manufacturers that market water solubles in the greenhouse industry offer the 20-10-20 formulation, although a few companies produce slightly different formulations that are offered as a 20-10-20 substitute. Masterblend, Plantex, Peters, Total-Gro, Pro-Sol and Olympic have 20-10-20 formulations, Techni-Gro offers a 20-9-20.

Although there are some slight differences, 20-10-20 fertilizers supply approximately 60% of the Nitrogen as Nitrate-N and 40% as Ammoniacal-N. This formulation contains no Urea. The guaranteed analysis expresses Nitrogen as Total Nitrogen(N). Phosphorus (P) and Potassium (K) are expressed as Available Phosphoric Acid (P_2O_5) and Soluble Potash (K_2O). Convert the P_2O_5 and K_2O to P and K and you will observe that a 20-10-20 supplies 20% N, 4.4% P and 16.7% K. In most cases, the 60/40 Nitrate-Ammonium ratio is perfectly acceptable for greenhouse use in the South East. The 20-10-20 formulation supplies more P than most plants require. This is rarely a problem with bedding plant crops but long term pot crops and stock plants may accumulate fairly high P levels when this fertilizer is used exclusively. Potassium levels supplied with a 20-10-20 are very appropriate for rapidly growing plants, but you may want to consider using a fertilizer lower in N and higher in K when finishing a long term crop such as Poinsettias. Poinsettia finishers, however, are less acidic than the 20-10-20 and if you have persistent high pH problems avoid the finisher and stick with the 20-10-20.

All 20-10-20 water soluble fertilizers will list Ammonium Phosphate, Potassium Nitrate and Ammonium Nitrate as the primary nutrient sources. Use of the term Ammonium Phosphate is somewhat ambiguous. Is the source Mono-Ammonium phosphate (MAP) or Di-Ammonium Phosphate (DAP) or a blend of the two? Note that the primary nutrient source statement provides no indication of the grade of the fertilizer components used. All 20-10-20 will have a label similar to Fig. 1, but you and I both know that 20-10-20's can differ greatly in solubility. If technical grade Potassium Nitrate and Ammonium Phosphate are used, the 20-10-20 formulation is very soluble. Lower grades of the fertilizer components contain impurities that can affect solubility. You should be able to dissolve

approximately 4 lbs of a good quality 20-10-20 in hot water. Fertilizer solubility problems are not always due to the quality of the components used. Most fertilizers absorb energy when dissolved in water and this causes the temperature of the water to decrease. Dissolve 2 lbs of a 20-10-20 in a gallon of 80 degree water and the temperature will decrease to about 60 degrees. Dissolve the same amount of fertilizer in 60 degree water and the final solution temperature will be near freezing. Even the best quality fertilizers have reduced solubility at low temperatures.

The potential acidity of a 20-10-20 water soluble varies from around 390-430 lbs of Calcium Carbonate per ton. Potential acidity indicates the amount of Calcium Carbonate required to neutralize the acidic characteristics of the fertilizer. 20-10-20 fertilizers are moderately acidic and about 80% of the growers in the SE growers will observe a slow decrease in media pH with continuous use of this fertilizer. This is normally not a problem with short term crops, but it is not unusual to see pH values in the low 5's or high 4's when a 20-10-20 is used continuously with long term crops.

There are a number of subtle differences between the various 20-10-20 fertilizers. Fertilizer suppliers often add 'buzz words' to the fertilizer label to indicate the micronutrient levels supplied in the fertilizer. These 'buzz words' are not consistent brand to brand and you should insist that your fertilizer supplier explain the meaning of the terms used. Table 1 lists the micronutrient levels and 'buzz words' used by several fertilizers marketed in the S. E. Masterblend produces a 20-10-20 'All Purpose' and a 20-10-10 designated 'For Soilless Growing Media.' Both of these quality fertilizers have the same primary nutrient sources but the 'All Purpose' supplies much lower micronutrients.

The Peters equivalent to Masterblend's 'All Purpose' is 'General Purpose' and the equivalent of Masterblend's 'For Soilless Growing Media' is Peters 'Peat-Lite Special.' Total-Gro's 20-10-20 'General Purpose,' contains substantially more micronutrients than Peters 'General Purpose' and is very similar to Masterblend's 'For Soilless Growing Media' and Peters 'Peat-Lite Special.' To add just a little more confusion, 20-10-20's may also be designated as 'Florida Special', Plus, PLS or High Nitrate.

Many 20-10-20 manufacturers add a small amount of Magnesium Sulfate (Epsom Salts) to the fertilizer. Sometimes this will be indicated on the label but sometimes it is not. Total Gro specifically states in their product manual that they do not add Magnesium Sulfate to their water soluble fertilizers. Techni-Gro's 20-9-20 and Masterblend's 20-7-20 provide Nitrate/Ammonium ratios similar to the 20-10-20 but are more acidic and also provide a significant amount of Sulfur. They are excellent substitutes for the 20-10-20 when a grower needs a slightly more acidic fertilizer.

Most 20-10-20 water soluble fertilizers are excellent fertilizers for greenhouse use, but there are differences that can affect plant growth. When changing from one brand to another take a close look at the label and make

sure that you have a similar product. The label may not provide you with all the information you need so discuss the product with distributor or manufacturer.

20-10-20 fertilizers are extremely useful fertilizers and have been the standard fertilizer in the greenhouse industry for many years. This fertilizer formulation, however, does not provide all of the essential plant nutrients. When using this fertilizer consider providing supplemental Calcium, Magnesium and Sulfur. Magnesium Sulfate (Epsom Salts) can be added directly to the 20-10-20 stock solution. Calcium containing fertilizers are not compatible with the 20-10-20 formulation. A fertilizer rotation including 20-10-20 + Epsom Salts and a 15-0-15 will supply all of the essential plant nutrients.

Figure 1: Typical 20-10-20 Label

20-10-20	
Guaranteed Analysis	
Total Nitrogen (N) -----	20%
Nitrate Nitrogen-----	12.00%
Ammoniacal Nitrogen-----	8.00%
Available Phosphoric Acid (P₂O₅) -----	10%
Soluble Potash (K₂O) -----	20%
Primary Nutrient Sources:	
Ammonium Phosphate, Potassium Nitrate, Ammonium Nitrate.	
Potential Acidity: 425 Calcium Carbonate Equivalent Per Ton	

Table 1: Buzz Words And Micronutrients Supplied By Various 20-10-20 Water Soluble Fertilizers					
Element	All Purpose Masterblend	General Purpose Peters	General Purpose Total Gro	For Soilless Growing Media Masterblend	Peatlite Special Peters
Boron as B	.0068%	.0068%	.02 %	.02%	.02%
Copper as Cu	.0036%	.0036%	.05%	.01%	.01%
Iron as Fe	.05%	.05%	.10%	.10%	.10%
Manganese as Mn	.0031%	.025%	.05%	.056%	.056%
Molybdenum as Mo	.0009%	.0009%	.01%	.01%	.01%
Zinc as Zn	.0025%	.0025%	.05%	.0162%	.0162
Magnesium as Mg	.05%	.05%	0.0%	.15%	.15%