Seasonal Changes in Hydroponics Crop Nutrition and Winter Mixes.

Plants are sensitive to changes in day length, low light and temperatures. These changes increase the plant's requirements for potassium (K) and phosphorus (P) and decrease the rate at which they use nitrogen (N). Several changes in the management of nutrient solutions are required so plants do not suffer from low levels of P and K or are forced into excess growth by excessively high levels of accumulating N. In some years a change to a winter mix can be made (for growers in New Zealand) after the end of March. In other years, when days are clear and warm, the change may be delayed until May. Growth characteristics of crops and declining nutrient use is an indication of when change is needed. The extent and timing of the nutrient modifications will vary depending on the seasonal 'severity' of the weather.

Shading should be reduced or removed from green houses about the end of March, depending on the crop's requirements. Delay removal if hot sunny summer conditions prevail. Do this first before modifying nutrient solutions. Still expose seedlings to maximum UV exposure from natural light that can be done without radiation injury.

A winter type mix should be in use when any two of the following are present:

✳From the end of March when day length gets progressively shorter than night.

✳During prolonged periods of cooler cloudy weather with reduced levels of light.

✳From when night temperatures fall markedly, associated with frosty conditions.

✳When daytime temperatures fall to close to the crop's minimum.

Changes that are required may include one or more of the following:

✳Change acid mixes to incorporate a small amount of phosphoric acid with the nitric acid. This automatically increases P when plants are actively growing.

✳The cF of the solution may be increased by about 50%. This is especially true if the daytime cF has been reduced in summer conditions to help reduce calcium deficiencies (e.g. tip burn, blossom end rot etc).

✳Increase the supply of P and K with added monopotassium phosphate.

✳Increase the levels of K and decrease the supply of N. This has the effect of increasing the K:N ratio for winter. Usually additional monopot may be an adequate winter supplementation in Northern and milder areas. In colder areas a new Winter mix has often been required required.

Nutrient use is best monitored from analyses conducted in New Zealand by Hills Laboratories Ltd and it is suggested that commercial growers undertake a Basic Nutrient (BN) test, for new mixes, at least once in Summer and again in Winter. These, along with the Routine Water analyses, enable mixes to be matched (and fine tuned) closely to crop requirements which vary considerably from property to property.

There is a long term trend in plant requirements that may be related to volcanic activity and light quality. Over the last 20 years there has been a gradual decrease in plants' use of P and an increased requirement for K that is most noticeable in winter conditions. Some of this change may also be linked to the increasingly warmer climatic conditions but during the recent variable summer plants have required higher than normal levels of potassium.

These changes may often be achieved, by using a Vegetech™ **'Winter Supplemented'** mix when additions of monopot of 550-650g/ 20Kg nutrient pack are added to the B Drum Mix. **Vegetech™** is a premium grade, batched hydroponic nutrient supplied internationally by Pure Hydroponics Ltd. For cooler areas a **'Winter Mix'** may be required to satisfy the plants' needs. Recommended acid mixes are listed with the mixing directions supplied with each mix and involve, in winter, the addition of diluted phosphoric acid to the nitric acid using from 1 volume of dilute Phosphoric acid added to between 2 to 6 volumes of Nitric acid. If weather reverts to the warmer earlier conditions of autumn, it is possible to go back to a summer mix. The mix concentrates can be combined if it is necessary to make these changes while some left over mix remains in the system. The sequence of changes from autumn are usually to first remove shade, next add winter supplement and then alter the acid ratio, continuing to adjust the mix according to winter conditions. The reverse is true from August to early October when the summer mix is re-introduced.

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