Plant Selection Considerations

Plants have a variety of characteristics that allow them to adapt to an indoor growing environment.

Lighting – Plants use different spectrums of light for vegetation growth (producing the green parts of the plant), flowering (budding and setting flowers) and fruiting (producing the edible plants parts in tomatoes, peppers, squash, strawberries, cucumbers, etc). Without the correct spectrum of light, the correct photoperiod (amount of lightness and darkness), and intensity of light, these functions will be delayed, or not be performed. Therefore in a warehouse environment, installation of adequate lighting will be critical to proper production.

Temperature – Plant species are divided into cold weather crops, cool weather crops and warm weather crops. Attempting to grow plants that demand a significant temperature variation from the one most easily provided in a warehouse building or through a greenhouse will mean additional heating or cooling efforts. For example, lettuce is a cold or cool weather crop and usually bolts over 80^{o}. Therefore growing lettuce during the summer months in a greenhouse is prohibitive, but in the fall, winter and spring it works very well. Tomatoes, squash, peppers and other flowering plants enjoy warmer temperatures and therefore do better in the summer months. Some plants will only flower and set fruit when the temperatures and photoperiod are properly aligned.

Pollination – Leafy vegetables do not require any pollination, but many flower and fruiting plants do (unless they are specifically self-pollinating varieties). Options for indoor growing include human pollination, air circulation, and beneficial insects like stingless bees.

Nutrients – Leafy vegetables have lower nutrient demands than flowering and fruiting plants. The majority of their nutrients and minerals are provided through the effluent water produced by the fish, fish feed and nutrients contained in the water itself. Adding gravel and shells to the growbeds or fish tank (bagged for easy addition and removal), can help provide calcium and other trace minerals. Flowering and fruiting plants like high nitrogen levels during vegetative growth, but may not properly flower or fruit without the addition of more potassium, potash and other specific pH levels or nutrients.

Oxygenation – Plants have shown increased growth rates in hydroponic and aquaponics growing conditions with oxygen provided to the root system by installing air stones in the raft beds.

Air exchange – During photosynthesis plants consume sunlight, water and carbon dioxide and produce oxygen. Since plants don't have the ability to move, they are limited in consuming the air in the space directly around their leaf structure. When the air is stagnant, the plants create an envelope. Once this takes place the plant has very little ability to breath. Moving the air through the growing area is therefore essential. In addition, the air movement will help strengthen the plant.

Market – Determining the plant product(s) that will have a good growth rates, high quality, consistent production levels, and are in demand by the local customer is essential. Determining the price point to produce and the market value will assist the grower in determining what products will earn the highest income or are otherwise desirable for other reasons. Various leaf lettuce, mustard greens, kale and bok choy and herbs such as basil, mint, rosemary, cilantro, and others are popular aquaponics options because they grow fairly rapidly (30-50 day harvest cycles), they can be grown from seeds or cuttings, they in demand year round, and depending upon the varieties can warrant a good market price.