

## ***PROTOCOLS, PROCEDURES FOR INDICATOR PLANTS***

### ***I. Environmental:***

***Objective:*** A better understanding of the environmental conditions in a particular greenhouse and the need to have an indication of the key data points as it relates to light, temperature, water, nutrients and gases. (Are these key areas optimal for the growth and development of the plants, or are changes needed?)

**Goal:** To use indicator plants to determine the status of the environmental conditions in a greenhouse.

This particular subject has been discussed numerous times, but has not been developed in a clear, defined manner that the plants can be used to provide information which can directly give indication of the status of the environment in a particular greenhouse.

SUGGESTED PLANTS TO BE USED:

### ***Impatiens***

Use this crop to monitor the following environmental data points:

#### Water/Gases

- lack of oxygen in the roots shown by inhibited root hairs and poor root development
- lack of truncated root system – also an indication of compacted media and insufficient amount of oxygen

#### Humidity

- hydroponic root – insufficient oxygen and probably a lack of photosynthesis due to high humidity
- poor stem development – too much water, lack of potassium, lack of calcium *because the humidity of the air is too high*

#### Light

- cupped leaves
- enrolled cupped of leaves

#### Nutrients

- too much phosphorus - stretch
- lack of phosphorus – stunting and dark green

### ***Pansies***

Use this crop to monitor the following environmental data points:

#### Water/Gases

- too much water – poor germination, poor root development
- etiolation of the hypocotyl
- soft growth

#### Humidity

- poor stem development

- lack of calcium uptake due to high Humidity (humidity over 85% during the night)

Light

- inhibition of growth – cupped severe gnarled leaves

Nutrients

- pH of 5.0 *stunting of plants*
- *poor root development – yellow and chlorotic*
- *low pH can cause as many problems on pansies*
- yellow leaves
- high pH – Thielaviopsis root rot

Note: These are only *two* examples of how these plants can be used to determine the overall status of the environment primarily as it relates to temperature, light, gases, etc....

SUGGESTED TRIALING:

At a few greenhouse sites, do the following:

1. raise indicator crops along with the major crop
2. monitor the indicator crops closely for problems
3. send images of the indicator crops with the designated crop for an analysis on the environmental conditions of the greenhouse

Fill in the other crops listed below on how they can be used as indicator plants for specifically as it relates to less than optimum environmental conditions.

***Ageratum***

Water/Gases  
Humidity  
Light  
Nutrients

***Petunias***

Water/Gases  
Humidity  
Light  
Nutrients

***Vinca***

Water/Gases  
Humidity  
Light  
Nutrients

***Begonias***

Water/Gases  
Humidity  
Light  
Nutrients

***Snaps***

Water/Gases  
Humidity  
Light  
Nutrients