Problem solving

When problems occur there are several areas that have to be looked at.

1/. Insects.

Insects can cause many problems, the main one we will comment on is spreading diseases and causing root rots. Consult the section on Pythium.

2/. Fungal infection.

Fungal problems can often be incorrectly diagnosed as nutritional problems, consult the section on nutritional disorders, as well as a full inspection of the plants both above ground and the root area, often the cause of an apparent nutrient disorder turns out to be a fungal or viral problem.

3/. Nutrient problem.

If changing the nutrient and flushing out the system does not result in the problem being overcome in a few days, consider leaf and nutrient analysis to confirm or deny a nutritional problem. Consult section, Deficiency/toxicity.
This includes checking the CF and pH are correct, and re-calibrating equipment before taking the readings, see section. Calibration.
Re-formulate the nutrient if any deficiency or toxicity is shown in the analysis.

4/. Climatic.

An area too often overlooked, changes in climatic conditions will cause many changes in both the appearance and quality of a crop, they sometimes appear rapidly, frost damage for example, but in many cases a slow cooling down can cause many plants to show stress, while not doing any significant damage to the plants, but any stress is undesirable on any plant.
Fruit can have poor taste, no shelf life; poor colour or even never ripen.

Things to look for include; lack of sun for a few days (dull and overcast) plants stretching for light, thin weak growth, raising the CF can assist during low light, CF is often run higher in winter than summer to avoid thin growth, but also check the light levels, was the roof of the greenhouse cleaned prior to the start of winter, or is there a lot of dust, dirt and algae on the cover, reducing what winter light is available. In summer it may pay to leave any winter grime on the cover, to give a little free shading, but it must be cleaned off prior to winter.

To hot or cold, both air or nutrient, large temperature differences between leaf and root will cause many problems, nutrient cold but air temperature warm can reach a point where the roots are below a temperature that minerals will be taken up, stopping any intake of minerals, growth stops. See section on plant data for root temperatures and air temperatures,(most crops do not like more than a 10 degree C difference between air and root temperature either up or down) Frost protection by air heating is good, but if the root temperature is too low, no growth, but keep the roots at a growing temperature and often no air heating is needed, as many crops can take a frost on the leaf, providing the roots are warm, and most of the heat loss from the root area is lost to the air, giving some frost protection for the plants. There are however many crops, such as Cucumbers that need air heating to avoid fruit problems, hooking or bending of fruit for example.

High humidity stops the plant from transpiration, this will lead to a Calcium deficiency in any new growth, as Calcium will only enter the plant when water is being taken up by the plant, at high humidity this process stops, as the leaf cannot more water through the leaf if the air around the plant has high humidity. Air movement can help, fans, open windows and vents, but if 100% humidity is present in the air used, it does not help a lot, and disease risk at these time is very high.

Carbon Dioxide deficiency, if there is a lack of fresh air over the crop. If a greenhouse is left with all vents closed for long periods, then the Carbon Dioxide level will fall, starving the crop of its main food source. Symptoms such as very large leaf, this is a sign that the plant is growing larger leaves than normal, to try

and extract what little Carbon Dioxide is available, opening vents on timed periods even when its cold outside will overcome this problem, or you may have to consider Carbon Dioxide enrichment.
Carbon Dioxide measuring equipment is available, expensive to buy, but you may be able to hire or borrow equipment from a local school, or laboratory.

5/. System failure.

If there has been any sort of system failure, then there may well be problems to the plants either then or several days or even weeks later, keep a log book or diary of all events, and review to this if problem occur. See section on log book.
If the power was turned off for any extended period of time, or pump failed, then the crop may well be Calcium deficiency and show tip burn in new growing head, this may not show up for three to four days after the problem, but if this was recorded, it may explain the problem, before analysis of the leaf and nutrient is done, there is no cure for Calcium deficiency once its happened, only prevention of it happening again.

Ensuring the oxygenation venturi is working well can avoid many root death problem, but the wrong pH for a period of time may well damage roots and cause a similar visual appearance to that of Oxygen deficiency.

The better the records are kept the more likely it is that an answer will be found.

6/. Changes to the system.

It is very common to see so called deficiencies in a crop after there have been changes to a system, and there are many causes that can be responsible for this. There may now be more plants in the system than the dissolved Oxygen in the system can handle, see Oxygen basics.
There may well be new components added, and some of these may well be Phytotoxic to plants, plastic hoses for example must be made from new plastics, not re-grind or re-cycled, as some of the re-cycled may contain plasticizers that are toxic to plants, so check any added materials for this, not all re-cycled materials are toxic. A very quick check is to take a small piece of the material, place in a cup, pour on boiling water, sniff the cup, if it smells plastic, then suspect the material and change it, if it does not smell, allow it to cool, then sip the water, if it tastes plastic, again change the materials.

Remember, if all else fails check the Basics - the answer will be there.