Crops Committee:: Background Information Relevant to a Guidance Document Relative to Hydroponics and Other Soil-less Growing Systems.

In 1995, the NOSB stated that hydroponic production systems could possibly be conducted as organic operations as long as these systems met the other requirements of OFPA. The NOP's current position is that hydroponic systems are already covered by the existing rule (as has been stated by current program leader Mr. Richard Mathews.) At the October, 2002 NOSB meeting, the board recommended that producers of spirillina be allowed to use Chilean nitrate as the sole source of nitrogen in their systems until October, 2005. However, neither the tap review or the NOSB's decision addressed the issue of whether or not this production system qualifies for organic certification.

Since the hydroponic systems are already covered by the Final Rule, questions can arise as to what systems actually qualify for organic certification by certifiers, and what yardsticks will certifiers use to make these determinations. Moreover, since so much of organic philosophy and production is built around establishing and maintaining healthy soils, how can soil-less systems be effectively evaluated using the organic standards found in the final rule?

Types of Soil-less Systems

Hydroponic systems utilize fertilizers which are dissolved in solution. There are two basic types in commercial production: nutrient film technique (NFT) and drip or substrate systems. The NFT system, which is commonly used in hydroponics, involves a closed, recirculating system (Diver, 2000a). Nutrients from organic sources are available for these systems such as solutions prepared from blood meal, rock phosphate, guano, etc. Aggregate systems involve media mixes in bags, troughs, trenches, or in bench systems and are operated as open , or flood and drain systems. (Diver, 2000b).

Questions to consider with "organic" hydroponic systems:

1. The over-riding question of whether soil-less systems are compatible with organic production (which is relevant to all of the systems discussed in this document.)
2. Source of fertilizers:
3. Leaching problems with open systems
4. Source of media for aggregate systems
5. Composition of inert ingredients
6. Disposal of wastes

Aquacultural systems involve the production of aquatic life plants and animals in somewhat controlled environments. The Aquatic Task Force provided recommendations for the production of most aquatic species of fish. However, the NOSB review of the petition involving the use of Chilean nitrate for spirilina production was assigned to the Crops Committee. Therefore, it is appropriate for the Crops Committee to consider the question of suitability of spirilina production for organic certification.

Questions to Consider (In addition to those cited above)

1. Over the long run, can the systems become more sustainable with less reliance on outside inputs?

Aquaponic systems combine the features of both hydroponics and aquaculture. This is done by recirculating the effluent from fish tanks and using it as a source of nutrients for vegetables grown hydroponically use sand or gravel media (Diver, 2000b). Diver points out several sustainable aspects of aquaponic systems including the following:

- Waste materials from one biological systems are used as a source of food or fuel for a second system;
- The integration of the production of fish and plants increase diversity, and in turn, system sustainability;
- Biological filtration cleanses the water before it leaves the system; and
- It is possible that the only fertility input would be the fish feed.

Questions to consider:

1. Relevance of the source of fish feed (Can the vegetables be considered organic if the fish are not raised organically?).
2. Safety concerns and waiting period between fertigation with fish effluent and harvest of the crops.

Other Soilless Systems:

Bag cultures involve the growing of crops in a soilless media. They can be used within aggregrate hydroponic systems where liquid fertilizers are applied through the drip system. Media for the bags can include vermiculite, peat moss, rice hulls, and other mixes (Diver, 2000a) In non- hydroponic bag cultures, compost is often added to the bag. Vertical towers are another form of bag culture in which long bags full of soiless media are hung from beams or wires, and plants are grown through holes or slits in the sides of the bag.

Questions:

1. Should all soilless bag culture systems be considered along with hydroponics, or should only those involved in hydroponic production be considered?
2. What materials are found in the polyethylene bags that are used?
3. How is leaching prevented from the drainage holes in the bags to the greenhouse soil?

Straw bale cultures were used in the greenhouse much more frequently in the past, before the advent of the nutrient film technique and rock wool (Diver, 2000a). Under this system, the greenhouse floor (which could be concrete, or lined with plastic) is covered with straw bales. The bales were normally wetted

with compost tea mixtures to expedite heating and decomposition. The bales are then covered with a layer of compost. Organic fertilizers are then applied as topdressings to the bale, and plants can also be foliar-fed.

Shallow bed cultures are another form of soilless culture in which a thin layer of compost is placed over a plastic covering woven weed barrier for the production of shallow-rooted herbs and vegetables.

Questions:

1. Should the shallow bed and straw bale cultures be more appropriately considered as soil-bearing cultures, since they both involve the addition of composts? This would also hold true for the bag cultures containing compost.
2. How is leaching of nutrients prevented to the areas surrounding the greenhouse?