

Happy Hydroponic New Year!

Jim McCaskill's new book will be released soon! With sadness we note the passing away last year of our friend and respected hydroponicist Jim McCaskill. Jim had written two books on Hydroponic Nutrient Formulation.

We graciously were granted permission from his family to combine the two books and publish a new one, with all the contents of both books.

The new book is one of the best available on how to formulate effective Hydroponic nutrients, using common agricultural chemicals.

FOOTHILL HYDROPONICS HAS individual macro elements packaged in 3 lb. containers, and individual micro elements packaged in 4 oz. containers. A complete balanced micro-nutrient formula with chelated iron is also available in 1 lb. containers. Those wanting to try to formulate their own nutrients will find everything they might need!

HYDROPONICS CURRICULUM IS being developed. A group of very special science teachers has teamed up with the California Dept. of Food and Agriculture to develop lessons in science using practical applications of chemistry, physics, and biology to grow plants without soil.

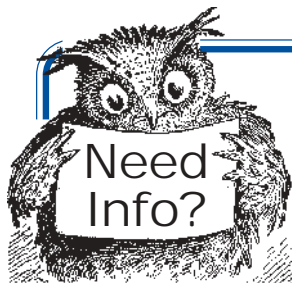
Watch for more news along these lines in the very near future!

COMING IN THE NEXT ISSUE . . .

- Find out about the "Clone Kit"
- Is there such a thing as a "good" fungus?

"To all my dear friends, have a safe and happy New Year!"

*—Mohsen Daha, Manager
Foothill Hydroponics*



Digital Brochures

Foothill Hydroponics has produced more than 130 brochures on various topics, and is digitizing the information. The digital form will be available on CD-ROM, and will be posted on our Web site when it is ready!

Ready, Set, Grow to the MAX!

The HYDROMAX™ 1000/2000 growing systems are complete “ready to grow” systems. All the user must supply is light and seeds! The HYDROMAX system comes with the following supplies:

1. **Nutrient reservoir:** The HYDRO-MAX 1000 holds 16 gallons and measures 15" x 28". The HYDROMAX 2000 holds 26 gallons and is 23" x 43".
2. **Top tray.** Holds Rockwool™, or fired clay pebbles (or pots filled with media).
3. **Optional “plant holder” insert.** May be placed inside the top tray to support larger plants and reduce the growth of algae in the system.
4. **PUMP.** Recycles nutrient and has a timer to control the pump. Fittings and tubing are included. User has the option to either top flood and drain (ebb and flow), or to use individual drip emitters (for top irrigation).
5. **pH test kit and citric acid.** To make pH adjustments.
6. **Xtra-Edge.** A complete, balanced semi-organic nutrient system. Bloom, grow, and micro formulas are included so that complete control of the nitrogen-to-phosphorous and potassium ratios is possible. All necessary trace elements are provided.
7. **Rockwool cubes.** Or fired clay pebbles and net pots.

How does it work?

The bottom reservoir holds the nutrient solution and a submersible pump. The timer turns on the pump for 30 minutes and floods the top tray. The top tray has “overflow drains” so that it will ONLY fill to a certain level. This is controlled by the height of the overflow tube.



Small holes near the base of the drain allow COMPLETE drainage of the top tray so there is no standing water in the plant's root area. This process repeats every two hours during the daylight cycle. No irrigation is needed at night.

The nutrient solution is drained, and the growing media is flushed with plain water every 7 to 10 days. This prevents salt buildup, and ensures that a BALANCED nutrient solution is always available to the plants.

Be ready for plant disease season

The cool, moist weather of late Winter, and early Spring is referred by many plants that like cooler climates. The same conditions also are favorable to many plant diseases, especially fungi and bacterial root rot.

The two main cool weather diseases are Pythium ("damping off" of seedlings, brown roots, or mushy rot), and Botrytis (fluffy "gray mold" on ANY part of the plant.

HOW DO I AVOID THESE DISEASES?

Good sanitation is most important. Remove any dead plant tissue immediately from the growing area. The temperature is also very important.

Root area temperature should NEVER go below 65 degrees Fahrenheit. The preferred root environment is 70 to 80 degrees F., with NO STANDING WATER in the root area. Cuttings and seedlings both benefit from bottom heating, using low-voltage heating mats under the growing trays.

An air pump and air stone combination may be left running constantly, in the nutrient reservoir. This discourages the growth of fungi, and anaerobic bacteria. The increased dissolved oxygen also enables the maximum intake of nutrients. That's why we call this the "Maximizer" technique.

NATURAL ORGANIC FUNGUS CONTROL IS HERE AT LAST!

A proven biological control of many root diseases is called "Mycostop". It is a naturally occurring strain of *streptomyces griseovirdis* that was isolated from Sphagnum peat.



Eija Jakobsson (left) and Timo Juntti of Finland have been using Mycostop™ for four years.

It is not so much a cure, as a preventive. The Mycostop bacteria colonizes plant roots, and prevents other fungi or bacteria from growing.

The wonderful thing about Mycostop is that it causes increased yields, even in plants that are free of disease! One gram will treat up to 2.5 gallons of water. The resulting mixture is used to drench the plant roots.

Another method of application is dusting seeds with the powder, then planting as usual. Mycostop is available in 1, 5, and 25 gram packets. The life of unopened packets is 6 months in cool storage.

May Tam: "I don't like soil!"

Hydro-Profile

For first-grade teacher May Tam growing plants Hydroponically solves a key problem: soil. She doesn't like soil in the classroom. Not only is dirt dirty, it hides the root systems, preventing her students from properly observing the delicate root structures.

"I want the students to be able to see the roots and parts of the plant in the soil," she says. "You can do that with Hydroponics. The roots are clean and white! Unless it's Ruby Red Swiss chard, which has red roots. Or carrots, which have orange roots.

"My kids thought roots were brown or black...now they know!"

Thanks to Hydroponics she can now simply point to the roots in their glass containers, or lift the plants out so that everyone can see the fine root hairs up close.

May, who teaches at Margaret Duff Elementary School, in Rosemead, also wants her students to realize that it isn't the soil that plants need, but rather the nutrient in the soil. Even marbles work well as media. "I was really surprised," says May.

To illustrate this principle, May asks her first-graders to answer some questions at the beginning of the hydroponic project: Will plants grow in Rockwool? In clay rock? In marbles? On a sponge? Each student writes down his or her answer in a journal, and then reviews the answers at the end of the project.

One girl was unhappy with her answer and wanted to change it before the class conducted its final experiment using sponges as a growing medium. "Plants grow in everything," she complained.

"I explained to her that even scientists have to change their hypotheses sometimes," says May.

May has come a long way and has learned a lot about Hydroponics since she encountered soil-less growing several years ago when her class entered the 48th District Agricultural Association's School's Involvement Program. Her class raised strawberries in nutrient solution, but when the students took the plants home during Christmas vacation they didn't know how to properly care for them and all but one of the strawberry plants died.

"I learned not to send plants home," says



May. "Parents don't understand . . . but we didn't either. Part of it was using the wrong nutrient." She credits good training from the 48th DAA, support from her principal, and some trial and error for her success the following year.

After that she felt confident that she could lead her class to successfully complete hydroponic projects, with a little help from other teachers who were also learning the technique.

Soon May had launched a Hydroponics Club for students in grades 4 - 6. The older students were able to conduct more sophisticated experiments to test their own hypotheses. One year they conducted scientific comparisons to see if Rockwool was better than Perlite as a growing medium, and to see which was better, liquid or powder nutrients.

Students also tried to compare plants grown indoors Hydroponically with those raised in soil-filled containers outdoors, but the outdoor plants kept disappearing overnight. Just another reason to dislike soil.

Despite the occasional setbacks, May's students became very enthusiastic about Hydroponics. Most of the sixth-graders from last year's club have asked if they can come back to work with hydroponics as extra-curricular work.

Even the families get involved. One student's grandfather got so excited about his grandson's project that he brought his friends by to see the plants. "He brought me a Chinese newspaper showing how they were growing with Hydroponics in China," says May.

Another student's mother, who was a limousine driver, convinced her employer to provide two stretch-limos to take the whole Hydroponics Club to a fast-food restaurant.

Her students give something back as well, taking the vegetables they raise home to cook and eat, giving their dads seeds from their plants on Father's Day, and even providing lettuce to the cafeteria.

Soon they'll be preparing to compete in this year's School's Involvement Fair, where they'll exhibit the results of their experiments to determine if "fanning" the roots of plants every half hour improves their growth. May explains that this project will help her first graders, who know the hours on the clock pretty well, become more familiar with the trickier concept of half-hours.

In a similar manner May has used Hydroponics to teach math, science and language skills.

For her students, there is quite a bit of prestige on line at this year's fair, after last year's upset when the first-graders won first place over the older students.

May is quick to acknowledge that much of her success is due in part to the help and encouragement she has received from Hydroponic enthusiasts, including Foothill Hydroponics' Mohsen Daha, who has a special way with plants grown without soil. "Each plant is his 'kid'," says May.

"Mohsen is very knowledgeable and helpful," she says. "He really has a feel for it." It wasn't long before she shared that enthusiasm. "I'm not a science major and at the beginning I was intimidated, but the more I got into it, the more I loved it!"



Sad news

Gary Pelland, our sales manager for the last 10 years passed away last year. He was a shining star who left us suddenly last March.

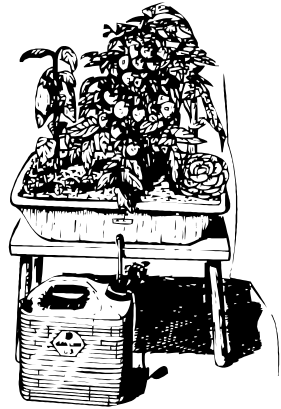
His memory will be respected forever at Foothill Hydroponics. Gary was a friend to all, and will be missed by all his Hydroponic friends who came to the store.

We give our condolences to his family, and wish them the best.

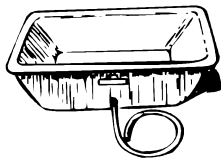


The Green (Tomato) Machine

The Green Machine is a low-cost, low-tech tomato growing system. The low level of technical expertise required makes it ideal as a student science project for younger students. The low cost makes for an affordable teaching device.



The \$29.95 kit includes the following items:



1 Planter
3 square feet of growing area.

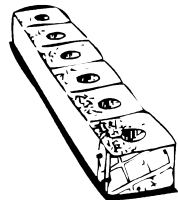


2 Nutrient Tank
A 2-gallon reservoir for the nutrient.

3 Nutrients
A 1 lb. container of plant food with balanced trace elements.



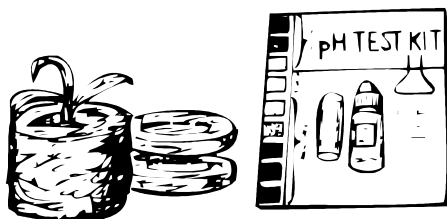
4 Growing media
Rockwool™ cubes, or other media may be used for direct seeding, or for potting of seedlings.



5 Individual containers
These may be used with Rockwool™, or any other inert media.



The unit is irrigated manually, by moving the solution from the nutrient reservoir and pouring it into the growing tray. This **MUST** be done at least once a day. Irrigation may be done as often as every two hours, during daylight hours. The unit may be easily automated, with the addition of a water pump and timer.



pH Test Kit

This starter kit comes with six compressed discs made of Sphagnum peat, in a plastic mesh. All you have to do is dip them in water!