Artificial habitat materials are often used in fish cultivation (aquaculture). Asians have placed tree branches in fish ponds for their aquatic crop for centuries. My initiation to the use of artificial habitat material occurred in the early 1970's when doing research on freshwater shrimp farming. We would sew a pocket along the side of a sheet of polyethylene screen, insert a sealed length of PVC pipe into the pocket to serve as a float, and cut the hanging material into strips. Placing this artificial habitat material into the prawn tanks dramatically improved survival and growth.

Depending upon the species and aquaculture system, the benefits of artificial habitat material can be related to:

1) behavioral interactions - providing shelter and/or spatial separation to reduce aggressive interactions and density-related stress;
2) nutritional effects – providing additional surface area for the growth of algae and microorganisms (the periphyton community) upon which the fish will graze; and
3) water quality improvement – due the to transformation of toxic dissolved nutrients into periphyton biomass and reduced demands for artificial feed.

As the value of artificial habitat material has become more apparent to the fish farmer, off-the-shelf products used for this purpose have become available. The most often-used configuration is slightly buoyant material that is weighted along one edge. This keeps the material oriented upright in the water. As with our old shrimp habitats, the material is slit into strips to increase surface area and allow fish/shrimp to move through it at will. Unfortunately, these off-the-shelf units are too expensive for us.

Rain Garden Ornamentals is a small owner-operated business near Kaneohe, Hawaii which produces fish for the aquarium trade and ornamental plants. The profit margins for both of these commodities are very slim. To be viable, the producer must either move very large volumes or operate with very modest expenditures. Rain Garden Ornamentals definitely uses the later approach. Therefore, when we needed artificial habitat material to improve fish production, we sought an inexpensive alternative to off-the-shelf units. We contacted Jay Wilson, Technical Services Engineer, of LINQ Industrial Fabrics, Inc. about a loosely felted fabric that is slightly buoyant and about one-eighth inch thick. He suggested using a non-woven polypropylene geotextile that is commonly used in erosion control; LINQ 125EX. With the phone numbers he provided, we found it in stock at a local irrigation supply. Even after being shipped to Hawaii, the price was very reasonable and we purchased more than enough for our needs for $90. The savings were enormous!

Since our fish ponds are just over three feet deep, we cut the material into three-foot wide (deep) panels. An inexpensive sewing machine loaded with black nylon size-D thread is used to sew a "pocket" or hem of about one-inch diameter along one side of the panel. One end of this pocket is sewed shut. A funnel is inserted into the other end of the pocket and the pocket is filled with dry sand (if

the sand is not dry it does not pour and pack well). After the pocket is filled, it is sewed or tied shut. The material above the sand-filled pocket is then cut into strips about two to three inches wide. A razor utility knife makes short work of cutting the strips.

And that's it! The habitat unit is ready to place in the pond. Actually, I just throw them into the ponds. The one-inch diameter sand-filled weight carries one edge down to the bottom and the attached strips of material float toward the surface. For wider (deeper) panels or waters with high velocities a larger sand-filled pocket may be needed, but I was trying to avoid unnecessary weight. I did a quick-and-dirty bioassay of the polypropylene material with some shrimp larvae and, as expected, there was no toxic effect. The fish quickly became accustomed to the habitats and some aggressive chasing has stopped. After one week, it is obvious that things are beginning to grow on the material. I expect it will take a month to six weeks for the material to become covered with enough nutritious bits of plant and animal matter to provide meaningful amounts of forage for the fish. Thanks Jay, this has worked out really well for me.