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The Myth of Permanent Peatlands:

"Peat moss is an environmentally friendly organic amendment essential for many horticultural purposes"

The Myth

Peatlands are specialized types of wetlands whose value to human civilization has been recognized for centuries. Perhaps the most continued use of peatlands is as a fuel source: chunks of peat are cut from bogs, dried, and used for cooking and heating purposes. Though many societies have turned to other forms of energy production, this practice continues today especially where other fuel sources are absent.

Peat moss, a principal plant component of peatlands, has also been an important part of the horticulture industry; it's used as a soil amendment both in gardens and container plants and as an aesthetic topdressing for potted plants and floral arrangements. Consisting primarily of *Sphagnum* species, peat moss has an amazing capacity to hold water like a sponge, slowly releasing it as the surrounding soil dries out. Since peat is 100% natural, it must be a truly "green" gardening product – right?

The Reality

The "greenness" of any product is determined both by the environmental friendliness of the product and its method of production. Unfortunately, there is no economically realistic, environmentally friendly way to harvest peat moss. This is a natural resource that accumulates at the glacially slow rate of 0.5 – 1.0 mm per year, or about ¼ of an inch. Peat harvesting involves the removal of deep layers of peat that have literally taken centuries to accumulate. In fact, since harvesting implies sustainability, it is more accurate to describe commercial peat removal as mining.

While peat used for fuel can be necessary for human survival, that used for modern horticultural purposes is not and therefore represents luxury consumption. For consumers to make an informed decision about whether or not to use peat moss requires an understanding of the roles peatlands play in the environment. Like other wetlands, these systems help purify and store water. Perhaps most important is that they are the single largest terrestrial store of carbon, equivalent to 75% of all carbon in the atmosphere (CC-GAP, 2005). Paradoxically, the destruction of peatlands is not yet recognized as a significant part of global climate change.

Most damaging to educational efforts regarding peatland conservation is industry assertions that there are no substitutes for peat moss in horticultural applications. Similarly, there is often a perception that this natural resource cannot be diminished; sales material from one local peat producer claims their supply of peat from a 150-acre lake is "virtually limitless." One industry group asserts that "peat is still the only affordable and readily available substrate that can be used to grow all kinds of plants....It is still the underpinning of the horticulture industry, worldwide."

The focus by many peat moss producers is on restoration of peat bogs with little, if any, mention of viable alternatives.

Peatland restoration

Peatlands degraded by mining activity do not revert to their former functionality; changes in hydrology and physical structure are hostile to *Sphagnum* re-establishment. Recently, degraded peatlands have been restored through the blockage of drainage ditches, seeding with *Sphagnum*, and application of a mulch layer to reduce water loss. When degraded peatlands are restored, the ability to hold water is improved but CO₂ continues to be released by high levels of bacterial respiration, which represents the decomposition of mulch and other organic matter. It takes a number of years for the photosynthetic rate of new peatland plants to outpace the respiratory rate: until this happens, even restored peatlands represent a net loss of carbon to the atmosphere and thus contribute to greenhouse gas production. These results have been reported by more than one research team, representing global peatland research.

Peat moss alternatives

While the efforts to restore degraded peatlands are admirable, it is more environmentally and economically sound to reduce luxury use of peat and promote viable alternatives. Contrary to what some peat moss producers claim, there are many economically feasible, environmentally sustainable substitutes for horticultural peat. International research on peat alternatives dates back at least 30 years and has identified a plethora of materials whose easy availability, low cost, and sustainability make them attractive substitutes for peat moss. These materials, alone or in combination, ranging from traditional materials such as composted bark, yard and agricultural wastes, and livestock manures to more current waste products including brewing waste, coconut coir, olive mill waste, pulp and paper sludge, municipal solid waste and sewage sludge, and even foam cubes. These materials have been used in the rooting and/or production of many plant materials, including vegetables, annual flowers, houseplants, woody ornamentals, and timber species.

Granted, there have been initial problems with some of these materials, including high levels of heavy metals or salts, or suboptimal carbon:nitrogen ratios. Research continues to address these problems, refining the methods needed to produce high-quality alternatives. In fact, many of these alternative substrates have repeatedly performed better than peat in terms of plant vigor and quality. If this isn't enough of an incentive to switch to peat alternatives, consider these other documented benefits:

- Economically sustainable when using locally produced materials
- Reuse of agricultural and timber waste products that otherwise contribute to landfills
- Ability to decrease fertilizer applications by using a more nutrient rich medium
- Increased drought resistance of transplants when grown in media with less water holding capacity than peat moss

Peatland conservation

In 1971 the Ramsar Convention on Wetlands was established in response to public concern over increasing degradation of wetlands, including peatlands. The Convention's mission combines conservation with sustainable use of wetlands through international action and cooperation. The Coordinating Committee for Global Action on Peatlands (CC-GAP) was established by the Ramsar Convention in 2002 "to monitor and guide global action for peatland management." This was a formal recognition that "peatlands are a vital part of the world's wetland resources" as well as their "importance to the maintenance of global diversity and for the storage of water and carbon, which constitute a function vital to the world's climate system." Among the *Guidelines for Global Action on Peatlands* published by CC-GAP are these two:

- "Citizens should be provided with information and educational materials that will enable them to make informed choices concerning lifestyle and consumer behavior compatible with the wise use of peatlands."
- "Research into, and development of, appropriate sustainable alternatives to peat in, for example, horticultural use, should be encouraged."

It is important to recognize that the Ramsar Convention and its affiliated groups do not promote a hands-off approach to peatlands. On the contrary, CC-GAP encourages sustainable use of peatlands, described as "those uses of mires and peatlands for which reasonable people now and in the future will not attribute blame." Such uses balance natural resource conservation and carbon protection with economic needs.

Some countries have more quickly responded to the global crisis of degraded peatlands. In the United Kingdom, for example, much of the peat extraction for horticultural purposes has been reduced or eliminated. The UK Peat Producers' Association and the mushroom industry (the second-largest user of horticultural peat) have commissioned research on peat alternatives and develop peat-free products. Many UK websites, including Kew Gardens, carry information on peat alternatives.

Finally, some countries such as South Africa have neither peatlands nor resources to import peat moss. These countries have managed to find suitable substitutes for horticultural peat moss and have sustainable plant production industries. To suggest these substitutes do not exist is deceptive; to destroy a natural resource for luxury consumption is unconscionable.

The Bottom Line

- Peatlands are biodiverse ecosystems with important environmental functions in water quality and carbon storage
- Degraded peatlands are environmentally non-functional, resulting increased water loss, poorer water quality, and decreased storage of atmospheric carbon
- Restored peatlands are partially functional as they can reduce water loss, but they contribute even more to global CO₂ production than degraded peatlands
- Peat moss is a non-renewable resource whose replacement takes centuries
- Horticultural peat moss can be reduced and/or replaced by using a number of available materials that are both economically feasible and environmentally friendly
- Consumers need to be fully informed as to the environmental function of peatlands as well as alternatives to horticultural peat moss

Additional Web Resources

CC-GAP. 2005. Peatlands. Do You Care? Coordinating Committee for Global Action on Peatlands (CC-GAP). Available at <http://www.imcg.net/imcgpubl.htm>.

Ramsar Convention on Wetlands. <http://www.ramsar.org/>

Ramsar Handbook on Peatlands: Guidelines for Global Action on Peatlands.
http://www.ramsar.org/lib/lib_handbooks_e.htm

K. Weider & D. Vitt. On-line Boreal Peatland Bibliography. Accessed June 29 2006.
http://www.peatnet.siu.edu/BP_A-G%20Lit%20listings.htm

For more information, please visit Dr. Chalker-Scott's web page at <http://www.theinformedgardener.com>.