

Peat v. Coir

New thinking about soil amendments

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Northern Virginia gardeners know all too well the problems of planting in our native clay soil. Although rich in nutrients, clay's tendency to hold water can keep oxygen from reaching plant roots, which can be detrimental to plant health. To improve the situation, gardeners have long turned to peat moss. Mixing it into clay soil allows air to enter and lighten soil structure so that the soil retains moisture without becoming soggy.

But the practice of using peat moss to amend garden soil is no longer the go-to recommendation. While peat is relatively inexpensive and does successfully aerate soil, it is not a sustainable or eco-friendly product.



photo: Washington State University

Coir

Peat moss forms when sphagnum moss compresses and decays in water-saturated bogs—a process that can take thousands of years. Left untouched, peat acts as a carbon sink, absorbing carbon dioxide from the atmosphere. Draining and removing peat, however, reverses the process and releases greenhouse gases (carbon dioxide and nitrous oxide) into the air. In addition, while undisturbed peatlands mitigate and store water during heavy rainfall, removing peat changes water-flow direction, which can contribute to flooding and to nutrient leaching. Because peat harvesting causes these negative environmental issues, many scientists and Cooperative Extension Services no longer recommend using peat as a soil additive.

Scientists looking for an alternative to peat that still offers soil-lightening capabilities seem to have found a viable answer in coir. Coir, also called coir pith or coconut dust, is essentially the waste of the coconut. In parts of the world where coconuts are harvested commercially, huge stockpiles of aged coir readily exist. Peat and coir have similar properties and characteristics, making trading one for the other feasible and, in some cases, preferable:

- Coir has a neutral pH (approximately 6) which differs from the acidic pH of peat. Coir does not need an addition of lime, which would increase the pH above the level for optimum plant growth. At pH of about 4, peat by itself is more acidic than many plants prefer.
- Coir has extremely high potassium content and low calcium content, which means gardeners do not need to add potassium fertilizers but will need to add calcium, such as calcium sulfate (gypsum), to the soil for plant uptake. Coir is rich in various micronutrients including iron, manganese, zinc and copper. Gardeners will need to add nitrogen to coir to compensate for its limited ability to allow nitrogen uptake by plants.
- Coir has high water-retention capacity. Peat retains moisture if kept moist; but once dry, peat is very hard to rewet and will shed water.
- Coir has equal portions of lignin and cellulose and is free of seeds and sticks that are found in peat.

- The particle size distribution for both coir and peat is in the range of 0.25–2.5 millimeters, which is the suggested range for optimal plant growth.

photo: Washington State University



Coir mat for erosion control

In conducting their research, teams of scientists compared the characteristics of vegetables grown in the coir mixtures to those grown in peat mixtures. Individual teams tested tomatoes, pepper, soybean, corn, wheat, radish and broccoli. Several took measurements of chlorophyll content and electrical conductivity and observed periodic growth differences for each of the plant species tested. Electrical conductivity is a measure of soluble salts (salinity) in the media; high levels can reduce plant water potential and growth. Scientists found that chlorophyll concentration, a measure of better plant growth, was unaffected by growth media and not a useful measure for comparison.

For details on the experiments themselves, see the resources listed below. To summarize the results, though, some scientists found that coir is a comparable germination and transplant media to peat for tomatoes and peppers. Others report that coir does not perform better than peat for other plant species. While studies show mixed results, the sustainability and environmental issues have led a growing number of university researchers and Cooperative Extension Services to endorse coir mixtures as a viable and eco-friendly alternative to peat mixtures.

Here are some broad findings of use to gardeners:

1. A mixture of 50 percent coir and 50 percent vermiculite compares well to the industry standard of 75 percent peat and 25 percent perlite for the germination and growth of tomatoes and peppers.
2. All coir mixtures need added calcium (gypsum) for plant growth.
3. The neutral pH of coir is more compatible with a wide range of plants.
4. Water retention of coir is higher than peat and growers need to be mindful not to overwater coir grown plants, especially in winter fruit production.
5. Coir from various parts of the world differ in their salinity (using electrical conductivity testing as a measure). Coir from Sri Lanka appears to have electrical conductivity comparable to peat. In contrast, some coir sources, notably those from Mexico, have higher salinity and some plant species, but not all, can adapt to it.



photo: Texas A&M University

Coir hanging basket

References

- [Coir and an Alternative to Peat in Media for Tomato Transplant Production](#), HortScience 37(2):309–312, University of Florida, Southwest Florida Research Education Center
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- [Coir is Sustainable Alternative to Peat Moss in the Garden](#), Oregon State University Extension Service
- [Soil Amendments](#), Washington State University, Spokane County Extension Master Gardener Program Publication C130
- [Coconut Coir as an Alternative to Peat Media for Vegetable Transplant Production](#), University of Florida, Southwest Florida Research Education Center (SWFREC)
- [Coconut Coir vs Peat Moss](#), Washington State University, Kittitas County Extension, Master Gardener Program