



## Ground pine chips pass the media test

These raw materials could be the answer to bark shortages.

Acquiring media for nursery production can prove to be a challenge.

The vast majority of container nursery crops in the eastern half of the country are produced in pine bark substrates. But pine bark is notorious for becoming short in supply.

The price of peat, another common ingredient, can vary widely due to many market factors. Most peat producers in North America are in Canada, so transportation costs can be substantial.

Many potential media alternatives have been investigated including animal wastes, cotton gin waste, wood byproducts, municipal leaf and sewage sludge, rice hulls, coconut coir and residential refuse. These products show promise, but they vary in their availability. The physical properties of these products can also vary.

Looking for a consistent, inexpensive alternative, we looked at ground pine chips. These are produced from debarked loblolly pine logs ground in a hammer mill.

Loblolly logs are renewable, reasonably priced and widespread geographically. This means the product could be produced near growers, which reduces transportation costs. There is also the possibility that growers could purchase their own mills, buy the debarked logs and produce the material themselves.

Our research showed that comparable nursery crops can be produced in ground pine chips and traditional pine bark mixes. Like any new mix, growers would have to experiment to determine optimum fertility and irrigation regimens, but pine chips appear very suitable for the job.

### Screen test

In our initial trials in Virginia, chips were ground and passed through a 1/4-inch screen and used to produce a variety of crops in No. 1 containers. The pine chip media were amended with calcined clay (16/30 particle size) and calcium sulfate. Media were also topdressed with a 15-9-12 slow-release fertilizer.

Eighteen taxa were planted in the pine-chip- and pine-bark-based media in April. With 15 of these species -- including Green Giant arborvitae, *Ilex crenata* Soft Touch and *Nandina domestica* Firepower -- there was virtually no difference in growth. Crape myrtles and *Viburnum dilatatum* Asian Beauty grew slightly larger in pine bark substrates, but liriopse was actually larger when grown in the pine chip medium.

A subsequent trial looked at pine chips ground and passed through different-sized screens. Particle size is an important factor in any substrate since it affects air space and water-holding capabilities.

Pine chip media passed through a 1/16-inch screen had nearly four times the fine particles (less than 1/2 millimeter) than that passed through a 1/4-inch screen. Media passed through the finer screen also had more water-holding capacity.



Plants grew fastest in the media passed through the 1/16-inch screen. This is probably due to this substrate's improved ability to maintain fertilizer levels without leaching them out.

We also found that the pine chips passed through the 1/16-inch screen can perform equally as well as a peat/perlite/vermiculite/pine bark mix.

### Fertilizer research

If growers plan to switch to pine-chip-based substrates, they need to trial fertilizer programs. A higher rate of fertilizer is required to achieve plant growth in pine chips comparable to pine-bark media.

There are several reasons that may explain this. First, pine chips are more porous and have lower cation-exchange capacities than pine bark. This probably results in more nutrient leaching with pine chips. Also, pine chips have a higher carbon:nitrogen ratio compared to pine bark, which could lead to increased microbial nitrogen immobilization.

We need to investigate ways to increase the cation-exchange capacity of pine chips as well as reduce the porosity of this material to prevent excess leaching. Pine chips will also decay at a slower rate than pine bark, and this also needs to be looked at if the material is to become a mainstream container substrate.

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