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Growing Reforestation Conifer Stock: Utilizing Peat/Sawdust Medium

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Western Forest Systems, Incorporated (WFS) (Lewiston, ID) has been utilizing a peat/sawdust blended mix as our growing medium for the past 10 years. Our decision to change from a peat/vermiculite blend to a peat/Douglas-fir (*Pseudotsuga menziesii*) sawdust blend involved worker health and safety issues, seedling culture, seedling production, and economic impact.

WFS began making a concerted effort to find an alternative to 50:50 peat:vermiculite (v:v) forestry blend when vermiculite was found to be contaminated with tremolite and actinolite, both of which are very toxic forms of asbestos. The U.S. Environmental Protection Agency (EPA) in Region 10 showed some vermiculite products contained asbestos. Consumers have no way of knowing which vermiculite products are contaminated (EPA 2000). Verification of testing of the vermiculite in the product being purchased by WFS was never granted or a hard copy received.

WFS began a slow transition to 70:30 peat:sawdust forestry mix on ponderosa pine (*Pinus ponderosa*). Transition to this mix was made for all pine species, while tests began on western larch (*Larix occidentalis*), Douglas-fir, and true fir species (*Abies* spp.). The transition took approximately 5 years to complete.

No major cultural ramifications were noted by changing from 50:50 peat:vermiculite to 70:30 peat:sawdust soilless mix. Similar soil mix challenges occurred with occasional pathogen detection of *Pythium* spp. and *Fusarium* spp. WFS purchases growing media in 0.08 m³ (2.8 ft³) bags, and testing is always done prior to sowing. Growth regimes have not changed significantly, although the peat:sawdust mix may retain more water volume. Annual historical data shows block weights to be slightly heavier (from 1% to 5%) with this mix, but plant tissue and media analysis do not show any significant differences.

Production challenges occur when utilizing our Gleason flat filler. Large debris in the peat:sawdust mix is an issue. WFS used Styroblock™ systems ranging in size from 65 cm³ (4 in³ [313B]) to 330 cm³ (20 in³ [615A]). Large Douglas-fir bark splinters make it difficult to fill the smaller cavity openings in the 313B Styroblock™ cells. As cavity diameters increase, the problem decreases. The filler needs to be cleaned more often to remove “dams” of splinters from the block hopper area. The employee removing filled blocks from the machine must clear splinters and remove large sticks prior to blocks reaching the return auger. Splinters also jam in the dibble plate, causing blocks to occasionally stick to the plate. To reach ideal cell compaction, the filler vibration settings had to be increased when the mix was changed from peat:vermiculite to the peat:sawdust mix.

Nurseries are not immune to the current economic issues in agriculture production. Forestry blends containing vermiculite have elevated in price at a faster rate than other blends. According to our supplier, this is driven by increased transportation costs and fluctuations in vermiculite supply. Vermiculite is currently being shipped to the United States from South Africa. Costs to transport media from suppliers to our greenhouse have increased by 33% from the first quarter of 2007 to the first quarter of 2008, plus an additional US\$ 100 for State of Idaho fuel surcharge. Table 1 shows the cost per seedling changes over a 10-year time frame. All data are specific to our nursery in Lewiston, ID.

We attempted to address as many variables as possible in order to increase the success of our transition.

Table 1. Comparison of 50:50 peat:vermiculite mix to 70:30 peat:sawdust mix.

Crop year	Cost/ft ^{3*} (US\$)		Cost/10,000 ft ^{3*} (US\$)		Cost/seedling (US\$) for	
	peat:vermiculite	peat:sawdust	peat:vermiculite	peat:sawdust	peat:vermiculite	peat:sawdust
1998	2.40	1.35	24,000	13,500	0.001	0.005
2003	3.16	1.82	31,600	18,200	0.011	0.007
2008	4.07	2.34	40,700	23,400	0.015	0.008

*1 ft³ = 0.03 m³

Reference

[EPA] U.S. Environmental Protection Agency. 2008. Sampling and analysis of consumer garden products that contain vermiculite. URL: <http://yosemite.epa.gov/r10/owcm.nsf/asbestos/vermiculite-home> (accessed 15 Aug 2008).

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