

subscription basis. I support that organization although I make my own as well because I wanted to see them exist. So, for my nursery it's \$200 per year for all the sprays and inoculants I need. It's very inexpensive and very easy to use. I hope to write, in the next year or so, a flow chart of when you do what according to the book and make it easier for people to get into doing it. Then, at that point you have to develop your own feel since every farm is different.

New Woody Plants from Tissue Culture

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***Exochorda serratifolia* 'Northern Pearls'**. A University of Minnesota Landscape Arboretum introduction, which was selected from a seedling population from Beijing Botanic Garden, China. A spectacular display of pearl-shaped buds resembling a string of pearls, open to large, white flowers. Good flower effect and best used as a single specimen against an evergreen backdrop, or massed in the shrub border. Grows 6 to 8 ft tall and 4 to 6 ft wide at maturity, coarse texture, golden-yellow fall color with added winter interest from the persistent fruit which is a 5-valved capsule that changes from green to brown at maturity. 'Northern Pearls' is very hardy (-34F) Zone 4a, drought and heat tolerant, with no serious disease or pest problems. Propagation methods include softwood cuttings and tissue culture. As a member of the Rose family it can be cultured on Woody Plant Medium with BA.

***Sorbus hupehensis* 'Pink Pagoda'**. 'Pink Pagoda' is a University of British Columbia introduction. The wild species is native to China, 'Pink Pagoda' is a selection from Gayborder Gardens in B.C. A deciduous tree growing to 30 ft, with blue-green compound leaves, red twigs and petioles, and white flower clusters in spring. The outstanding feature is the autumn and winter color of the fruit that turn pink by late summer and change to white in mid winter. Foliage turns orange to red in the fall. Use as a specimen tree, or in groups along highways. Good for retail container sales as fruits form early in the production cycle. This cultivar is hardy to Zone 5. Propagation by budding or grafting on rootstocks of *Sorbus aucuparia* or grown on its own roots from tissue culture. A member of the rose family it's tissue cultured on Woody Plant Medium with BA.

***Aronia melanocarpa* 'Autumn Magic'**. A University of British Columbia introduction the species of which is native to the East Coast. A small, deciduous shrub with glossy-green foliage that turns a brilliant red and purple in the fall. Fragrant hawthorn-like white flowers appear in spring followed by lustrous black fruits (they are edible but bitter). 'Autumn Magic' is hardy to Zone 3 and its extreme hardiness and pest-free reputation make it an excellent choice for nursery production. It grows to 4 ft and suckers profusely so it can be used as a hedge plant, and is most effective when it's massed. Might be a good choice for a highway plant as it adapts well to many soil types. Propagation by softwood cuttings and tissue culture. A member of the rose family it grows well in culture on Woody Plant Medium and BA.

Rosa 'Jan's Wedding'. A Neil Adams' hybrid of *R. 'Dornroschen'* × *R. 'Lichtknigin Lucia'* with blooms of yellow, pink, and apricot which are born in huge clusters. Flowers are 2 to 3 in. wide, well-formed, and repeat throughout the summer. Landscape value as a specimen plant or in the shrub border. Hardy to at least -10F, Zone 5 to 9. 'Jan's Wedding' is propagated by softwood cuttings or tissue culture using Woody Plant Medium with BA.

Syringa × laciniata (cutleaf lilac). This species is native to Turkestan and China and is an outstanding species. The lacy, fine-textured foliage is an unusual asset and quite striking. Small, pale lilac, fragrant flowers appear in May, born in 3-in.-long, loose panicles all along the stem. This very floriferous shrub lilac grows to 6 to 8 ft high and as wide. Hardy to at least Zone 4 to 8, this plant displays excellent heat tolerance, undemanding culture, and is free of pests. A member of the olive family this plant can be propagated by softwood cuttings or tissue culture. We culture on a Murashige and Skoog media with BA used in combination with 2iP.

Halesia monticola f. rosea. The species is native to wooded slopes and streambanks of the south east coast. This form is a rare and choice pink form of the mountain silverbell. The pale pink bell-shaped flowers hang gracefully in clusters from the branches in April to early May. *Halesia monticola f. rosea* is best used in shrub and woodland borders set off by an evergreen background, it is used well as a companion to rhododendrons as it prefers acid soil. It grows into a large tree (to 50 ft) with a broad, rounded crown. Exceptionally pest resistant, it is hardy to Zone 4 to 8. Fall color is yellow-green. A member of the *Styrax* family it can be propagated by softwood cuttings and tissue culture. We tissue culture it on Woody Plant Medium with BA.

Oxydendrum arboreum 'Chameleon'. 'Chameleon' is a selection made by Polly Hill. Sourwood is native to the east coast and is an all-season ornamental tree. Good plant habit, grows to 50 ft tall, a pyramidal tree with a rounded top and drooping branches. Flowers are white and urn-shaped (much like *Pieris*) blooming in June to July and practically covering the foliage. Flowers are followed by a brown dehiscent capsule persisting throughout the winter. Foliage is a lustrous dark-green changing to a combination of rich reds, purples, and yellows in fall, all on the same tree. 'Chameleon' should be used as a specimen tree in the landscape. Hardy to Zone 5 to 9. It can be propagated by softwood cuttings and tissue culture. A member of the *Ericaceae* family is can be micropropagated on Woody Plant Media with 2iP or Zeatin.

Finland Rhododendrons. Briggs Nursery is now growing seven selections from the breeding program at the University of Helsinki, Finland. These new rhododendrons have been developed by Peter Tigerstedt based on hardy material that had been naturally selected at the Mustilia Arboretum. The goal was to create winter-hardy cultivars that could tolerate temperatures below -31F. These hardy rhododendrons are recommended for landscape purposes, especially for USDA Zone 1 to 4. They grow well in containers under normal cultural practices for rhododendrons. As members of the *Ericaceae* family they can be propagated by cuttings, grafting, or tissue culture. We culture them on Woody Plant Medium with 2iP.

Rhododendron 'Peter Tigerstedt' (R. brachycarpum ssp. tigerstedtii × R. catawbiense 'Album'). 'Peter Tigerstedt' has decorative, pure white flowers with

blood-red spotting in the upper corolla and curly margins. A vigorous, upright, and spreading plant it grows to 6 ft. Rhododendron hardiness rating of H1.

Rhododendron 'Haaga' (*R. brachycarpum* ssp. *tigerstedtii* × *R. 'Doctor H.C. Dresselhuys'*). The profuse flowers on 'Haaga' are pink. The plant habit is a well-branched and rounded. A vigorous plant growing to 5 to 7 ft. Rhododendron hardiness rating is H1.

Azalea 'Lemon Lights'. A new introduction from the University of Minnesota. Part of the Northern Lights series of hardy deciduous azaleas. 'Lemon Lights' comes from the same cross as 'Golden Lights' and 'Northern Hi-Lights' and was selected for its good yellow color and floriferous habit. Flowers appear in May and cover the shrub. Plants grow to 6 to 7 ft tall and wide, demonstrate good mildew resistance, and are hardy to -40F. Propagation is by cuttings or tissue culture, and like other members of the Ericaceae family we micropropagate it on Woody Plant Medium with 2iP or zeatin.

Desirable Characteristics of Propagation Media

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INTRODUCTION

The field of soilless media is undergoing a rapid technological change and I would like to examine our current use of media components and look ahead to the new possibilities for propagation media. We will focus on the physical, chemical, and biological characteristics of each medium component so you may have a clear understanding of why a particular blend of raw materials may work for your crops.

The propagation medium has three functions: (1) To hold the seedling or cutting in place during the rooting period, (2) To provide moisture for the cutting, and (3) To permit diffusion of air to the base of the cutting (Hartmann and Kester, 1990). In looking at a propagation medium for either seedlings or cuttings, we are usually seeking the proper blend of air porosity and water-holding capacity. If a grower is using a mist system to keep the relative humidity of the air around cuttings high, the medium must have a higher air-filled porosity. Indeed, many of the propagation manuals that specify an air-filled porosity of 15% to 20% were written for mist propagation systems (Handreck and Black, 1994). With the advent of fog systems and the subsequent effect of less water reaching the leaves, a higher moisture content may be desirable for maximum rooting. Seedlings require different degrees of air porosity and water retention depending on the size of the seed and the type of mist system or growth chamber used for germination. In addition to the physical characteristics, a grower needs to know the chemical nature of the media. More recently, emphasis has been on the biological characteristics of growing medium components. Keeping your own system in mind as we proceed, let's examine these characteristics of the most commonly used propagation medium components.

INORGANIC COMPONENTS

Sand was one of the first materials to be used in propagation due to its ready availability and low cost (Table 1). Sand is usually used in conjunction with other