only 15 months. *Hebe* is a very large commercial crop in Germany and Denmark where they are produced in glasshouses and sold for Grave Day November 1st.

Dr. Michael Woods asked at a career's guidance night to my class in 1969. "Boys do you know the difference between a farmer and a gardener?" Open mouthed we did not answer. "Well", he says, "the farmer if told he cannot grow something will accept it however the gardener will spend the rest of his life trying to prove you wrong". We will stay with New Zealand plants until they kill me.

Micropropagation of *Syringa*: Tree vs. Shrub Lilacs©

Deborah D. McCown
Knight Hollow Nursery, Inc, Middleton, Wisconsin, 53562 U.S.A.

INTRODUCTION

Lilacs have always been a mainstay of the ornamental shrub repertoire in the temperate zones of the U.S.A. Rapid clonal propagation using cuttings was always a challenge. Increasingly, micropropagation has solved this problem and is being used to generate both stock plants and liners. With the increased interest in lilacs, stimulated both by new introductions and a consumer demand for heirloom plants, lilac propagation using micropropagation has become even more important.

One series of new introductions is the Fiala lilacs (Fiala, 1988). Father John Fiala was a Roman Catholic priest who bred lilacs and crabapples for 50 years in his garden in Ohio. In 1989, Fr. Fiala asked Knight Hollow Nursery, Inc. (KHN) if we would micropropagate his lilac selections and introduce them to the commercial market. We happily agreed since these are really superior selections. Over the years we have added many other members of the genus *Syringa* to our catalog, including both shrub and tree forms.

LILAC MICROPROPAGATION AT KHN

We are currently micropropagating nearly 30 different lilacs (Table 1). Some selections are relatively easy while others present major challenges. In general, the shrub forms are relatively easy to establish in culture and have rapid multiplication rates. A 4-week subculture cycle with a minimum 3-fold increase for the *S. vulgaris* cultivars is common. These rates can also be achieved with the *S.* ×*hyacinthiflora* cultivars. All *S. vulgaris* and *S.* ×*hyacithaflora* cultivars are cultured on 1 µM zeatin with an agar and Gelrite™ (agar substitute) (Monsanto Company) (1:1, v/v) mix as the gelling agents.

Syringa ×*chinensis* 'Lilac Sunday' has proven more difficult even though this plant is a cross of *S. laciniata* × *S. vulgaris*. The most serious problem is the tendency to produce vitreous tissue. Vitreous shoots will not root and simply degrade when stuck in a rooting medium. Two simple changes made significant differences in the growth of 'Lilac Sunday'. First, we changed the gelling agent from a mix of agar and Gelrite™ to straight agar and second, we utilized vented B-caps.

Syringa julianae 'George Eastman' has also been more recalcitrant in culture. Growth in culture is much slower and a subculture cycle of 6 weeks is common. We also find that axillary buds do not break uniformly. We are currently doing some experiments with different hormone levels to see if we can improve growth.

Table 1. *Syringa* selections currently in micropropagation at Knight Hollow Nursery, Inc.

Tree Forms		
Syringa reticulata 'Ivory Silk'		
Syringa reticulata 'Morton' China Snow™ Beijing lilac (syn. *S. pekinensis* 'Morton' China Snow™ Beijing lilac		
Shrub Forms		
Syringa julianae 'George Eastman'		
Syringa pubescens subsp. *microphylla* 'Suberba'		
Syringa vulgaris 'Avalanche'	'Alvin R. Grant'	
'Atheline Wilbur'	'Charles Lindbergh'	
'Albert F. Holden'	'Dwight D. Eisenhower'	
'Arch McKean'	'Frederick Douglass'	
'Fiala Remembrance'	'Frederick Law Olmsted'	
'Letha E. House'	'Margaret Fenicchia'	
'Marie Frances'	'Sesquicentennial'	
'Wedgwood Blue'	'Flower City'	
'Wonderblue'	'Mechta'	
Syringa ×*chinensis* 'Lilac Sunday'		
Syringa ×*hyacinthiflora* 'Angel White'		
'Blanche Sweet'		
'Sister Justina'		
'Vesper Song'		

Incidentally, both *S. pubescens* subsp. *microphylla* and *S. julianae* are in the taxonomic series *pubescens* (Fiala, 1988). While *S. vulgaris*, *S.* ×*chinensis* (*S. lacinata* × *S. vulgaris*), and *S.* ×*hyacinthiflora* (*S. oblata* × *S. vulgaris*) are in the taxonomic series *syringa* which may help to explain why they perform so differently in culture.

The tree lilacs (there are only two species) are in the taxonomic series *ligustrina* and they are significantly more difficult to micropropagate. 'Ivory Silk' is the cultivar we have the most trouble culturing. First, the shoots do not elongate uniformly so that multiplication rates are low. We get only a 50% increase at each subculture cycle. Second, the growth interval required between subculture cycles is much longer than that required for shrub lilacs and is routinely 10 weeks. 'Ivory Silk' also produces significant amounts of callus at the cut end of the shoots which seems to inhibit growth of axillary buds, particularly in nodal segments. All tree lilacs are grown on 5 µM zeatin; lower concentrations yield significantly slower growth. At

higher concentrations of zeatin, shoots develop fastigiate, multiple meristems.

All members of *Syringa* are easily rooted ex vitro using a simple peat and perlite mix. There does not seem to be a direct correlation between ease of micropropagation and rooting of microcuttings as even 'Ivory Silk' roots at nearly 100%. Of course, poor microcutting quality results in poor rooting.

We find that lilacs are one of our more rewarding plants to micropropagate and grow on to superior quality liners. This is especially true when we are able to go out to our plant collections in the spring and pick such fantastic bouquets!

LITERATURE CITED

Fiala, J.L.1988. Lilacs: The genus *Syringa*, Timber Press, Portland, Oregon.

Seed Technologies to Increase Seed Value in Tasmania©

Nadine Donovan, and Robert J. Clark
School of Agricultural Science, University of Tasmania, Hobart, Australia

Sandra Hetherington
Norske Skog Paper Mills, Boyer, Tasmania, Australia

INTRODUCTION

The performance of a seedlot of any species in the field depends on a range of factors. One of these factors is seedlot quality or vigour. It is becoming increasingly clear that seedlot quality is difficult to define and the ability of a seedlot to perform depends partly on the history of the seedlot, and partly on the environmental conditions during germination (Bradford, 1996). Factors including environmental conditions during maturation, harvest time (and thus seed maturity), seed storage, pretreatment prior to sowing, and field conditions during emergence can substantially affect seedlot performance (Coolbear, 1995; Finch-Savage, 1995). Technologies applied to crops grown commercially from seed in Tasmania have the capacity to increase the value of the seed to the producers, by improving the ability of a seedlot to perform in the field. This paper presents some examples of Tasmanian crops, which have benefited from technologies that improve seed quality.

The island State of Tasmania is located off the south east corner of the Australian mainland, within a temperate climate zone. The island experiences relatively consistent rainfall throughout the year, and soils are reasonably fertile. These factors have allowed the development of a strong agricultural sector. The area of Tasmania represents less than 1% of the total area of Australia, yet the State produces 2.3% of the country's agricultural commodities (Australian Bureau of Statistics, 2000). Some of the more valuable crops to the State are potatoes, onion, and carrots. Tasmania is also known for its forestry activities, poppies, and pyrethrum production.

TIME OF HARVEST

The onion seed industry in Tasmania produces about 7 tonnes of seed each year that is primarily used for Tasmania's export onion industry. A small proportion of the