

# “SISTER” NURSERIES: A PERSON-TO-PERSON APPROACH TO TECHNOLOGY TRANSFER<sup>1</sup>

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Most people have heard of the Sister City program where cities in two different countries agree to a cultural exchange to promote mutual understanding. But, how about a Sister Nursery? Tom and Raúl have worked on several nursery projects in Mexico over the past several years but became increasingly discouraged by the steadily decreasing governmental funding and layers of bureaucracy. So, they came up with the idea of a more direct one-on-one program in which nurseries in the USA or Canada could give technical and financial assistance to nurseries in other parts of the world.



Figure 1—The Sister Nursery concept was born during visits to the Yucatan Peninsula of Mexico.

## HOW WE GOT INVOLVED

Back in 1992, the USDA Forest Service and the Secretaría de Recursos Hidráulicos (SARH) of the Mexican government signed a Memorandum of Understanding (MOU). Under the MOU, Working Groups (WG) consisting of teams of US and Mexican foresters worked together on projects in Mexico. Tom and Raúl were part of the Forest Plantations WG and they spent several weeks in the spring of 1994 visiting nurseries and plantations across Mexico (fig. 1).

The WG also agreed upon long-range and short-range objectives. One of the long-range objectives was to teach a

series of nursery and reforestation training sessions at five locations across the different forest regions of Mexico. The first of these training sessions was held in the summer of 1994 when a 3-week Nursery and Reforestation Training Course was taught by the Center for the Reforestation of the Americas (CEFORA). We didn't know it at the time but this was the financial high point because, unfortunately, WG funding began to decline precipitously in subsequent years. As a result, the remaining training sessions were never scheduled although some field work was done from 1995 to 1998 (table 1).

## THE BIRTH OF THE SISTER NURSERY CONCEPT

During a tour of nurseries in the Yucatan peninsula, Tom and Raúl met Patricia, who had been doing forestry research in the area for many years. One of her studies was with some local nurseries and she did a survey of reforestation survival. To her dismay, she found seedling survival rates of as low as 18 percent and so she wanted to learn how to help improve outplanting performance.

One of the groups that Patricia was working with was the Organization of the Forest Ejidos of the Mayan Zone (OEPFZM) which manages over 250,000 ha. (620,000 acres) of dry tropical forests in the Yucatan region. “Ejidos” are communal organizations which own most of the forest land in Mexico and many are composed of indigenous people working to improve their economic self sufficiency. The semi-tropical forests of the OEPFZM contain several native trees such as Honduras mahogany (*Swietenia macrophylla*) and Spanish cedar (*Cedrela odorata*) which are highly prized for their beautiful high-quality wood. Unfortunately, these species have historically been severely overcut and very few large trees survive in the forest. The OEPFZM is working to establish sustainable harvests of these two valuable timber species and, at the same time, enhance the biodiversity of the remaining tropical forest. When we began working with them, the OEPFZM had just established the Chulul nursery in the town of Felipe Carrillo Puerto where mahogany and Spanish cedar seedlings are grown to implement their enrichment planting programs in the jungle of the surrounding communities.

One of the results of the Nursery and Reforestation Training Session was that we found out that Mexico did not have a established system for monitoring outplanting success. So, using funds from the Forest Plantations WG, CEFORA

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Table 1—Funding for The Forest Plantations Working Group was supplied by the International Forestry Branch of the USDA Forest Service

Fiscal year	Funding	Purpose and location of projects
1994	\$140,000	Teach nursery and reforestation training course in Morelia, Michoacan
1995	40,000	Establish outplanting trials in Federal District, the State of Mexico, and the State of Quintana Roo
1996	15,000	Monitor outplanting trials and establish nursery trials in Quintana Roo
1998	7,500	Continue monitoring nursery and outplanting trials

foresters began a series of nursery and outplanting trials in 1995 including some on OEPFZM lands (table 1). Crops of mahogany and Spanish cedar seedlings were grown at the local Instituto Nacional de Investigaciones Forestales y Agropecuaria (INIFAP) nursery to test the effects of fertilization and outplanting technique. Height and root collar diameter measurements taken at the time of harvest showed little positive effect on either species. Of course, the true test of seedling performance is after outplanting so samples of these seedlings were outplanted to test survival and growth. The outplantings were measured at 8 and 28 months of age and results are very encouraging for the Mahogany seedlings grown under improved polybag culture. The results Spanish cedar bareroot stock were disappointing, however, and it may be best to grow this species in containers in the future. Survival of the fertilized mahogany seedlings averaged around 80 percent which is a four-fold increase over those of Patricia's initial survey. Subsequent seedling growth has been phenomenal with the fertilized mahogany seedlings averaging over 8 feet and almost 20

mm in diameter after only 2 years (table 2). These results vividly demonstrate the tremendous growth potential of the ejido forest lands.

The ejido workers have traditionally used long sharpened poles to dig holes to plant their seedlings in the jungle. Another trial involved testing several outplanting tools from the US as well as a modified metal blade (a "talacho") that fit on the end of a pole. The results of these tests showed that the talacho was the best and also the most inexpensive. The talacho made it easy to cut through the mesh of roots and remove the numerous rocks in the jungle soil while digging a hole deep enough to avoid root deformation.

But, US government funding continued to decrease in spite of these positive results (table 1). Because they wanted to continue working with the Chulul nursery, Tom and Raúl came up with the idea of an informal person-to-person relationship that would not rely on government sponsorship

Table 2—Preliminary results of nursery and outplanting experiments with mahogany and Spanish cedar seedlings in southern Quintana Roo, Mexico (Mexal 1998)

Species	Stock type	Treatment	Survival		Height			Diameter		
			8 mo	28 mo	Initial	8 mo	28 mo	Initial	8 mo	28 mo
			-- -- % -- --		-- -- -- cm (ft) -- -- --			-- -- -- mm -- -- --		
Mahogany	Polybag	Fertilized	80	75	43	75	246	5	16	19
					(1.4)	(2.5)	(8.1)			
Mahogany	Polybag	Unfertilized	85	85	41	56	192	5	11	12
					(1.3)	(1.8)	(6.3)			
Cedar	Bareroot	Fertilized	55	10	19	14	43	3	6	6
					(0.6)	(0.5)	(1.4)			
Cedar	Bareroot	Unfertilized	25	10	22	18	37	3	7	9
					(0.7)	(0.6)	(1.2)			

Table 3—An initial donation of \$1,000 from Microseed nursery helped accomplish a considerable amount of work at the nursery and on the outplanting sites

Amount of "seed money"		Expenditures at the Chulul Sister Nursery, QR MEXICO
US	NP	
\$437.50	\$3500.00	Purchase of water for the 1998 growing season (the well pump was broken)
\$237.50	\$1900.00	Labor for nursery work, outplanting, and installation of test plots
\$125.53	\$1004.30	Transportation (gasoline and bus tickets) to the nursery and outplanting sites
\$100.00	\$800.00	Meals for students while doing research work
\$47.09	\$376.75	Tools and supplies

or funding. And so, the Sister Nursery concept was born. Interestingly enough, "sister nursery" translates to *vivero hermano* ("brother nursery") in Spanish because the gender of the modifier must agree with the noun.

### Sister Nursery Projects

There was no shortage of ideas for technical assistance. Copper-coated polybags have improved root morphology with other species in Mexico and so some operational trials were set-up in the Chulul nursery in 1998. Another exciting possibility was using copper landscape cloth as a root growth barrier under polybags and under the traditional raised bareroot seedbeds. Other ideas include developing a compost-based growing media, and improving the method of harvesting and transporting of seedlings to the field. As you can see, there are plenty of possibilities.

In addition to technical assistance, we wanted to provide financial help to the Chulul nursery which could be used for both practical research as well as day-to-day nursery production. To give you an idea of how far a small contribution can go, consider that a day's wages for a nursery worker is about 25 pesos (US\$3.00), and a kilo of poly bags costs 17 pesos (\$ 2.09). Raúl provided the seed money for the sister nursery project by donating \$1,000 from his Microseed nursery (table 3).

We are currently looking for other ways to provide financial support other than direct donations, and are also investigating getting nonprofit status for tax purposes. Raúl and Tom are doing some consulting work and plan to donate any profits to the sister nursery fund. Following this presentation at the joint meeting of the Forest Nursery Association of British Columbia (FNABC) and Western Forest and Conservation Nursery Association meeting, the sister nursery project was discussed at the FNABC business meeting and the group voted to donate \$1,000 to the Chulul nursery project. This money will allow us to make further improvement in the nursery irrigation system such as repairing the pump and buying pipe.

### THE FUTURE

There has been considerable interest in the sister nursery concept from people in both the US and Canada. The J.H. Stone Nursery in Medford, OR has sponsored a foreign intern program for several years and are considering establishing a sister nursery relationship with the indigenous ejidos in the states of Michoacan and Chihuahua in Mexico. There are many possibilities for sister nursery relationships around the world. While conducting nursery training on the island of Pohnpei in Micronesia, Marla Schwartz of Northwoods Nursery came up with the idea of becoming their sister nursery.

In conclusion, we feel that the Sister Nursery concept has application for technical assistance and cultural exchange in many places around the world. All that is needed is the desire to share some of your technical knowledge about growing plants.

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