Forestry Research Programme
Research Summary 009
Cashing in on the wedding tree
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Carlos Delgado (to the right) outside an experimental coffee and laurel plantation on his farm in Costa Rica. © John Beer

In Latin America, many small farmers don't have the option of saving money in the bank. Their insurance is the timber tree *Cordia alliodora*. By cultivating this species, poor farmers have a financial reserve that is unaffected by market crashes.

Cashing in on the wedding tree

Carlos Delgado owns a three-hectare coffee plantation in the Turrialba valley of Costa Rica. In most years, Mr Delgado's main income comes from coffee sales, but profits are also provided by the highly valued Latin American laurel, *Cordia alliodora*. Whenever he has a need for extra money - perhaps a family wedding or repairs to his house - Mr Delgado harvests a laurel tree and sells the logs or planks. This timber fetches a price 30 per cent higher than that of most other trees grown in Costa Rica, including cypress, eucalyptus and the country's national ear pod tree, guanacaste.[1]

Mr Delgado is one of more than 200,000 small-scale farmers who manage coffee plantations in Central America.[2] For them, and other small-scale farmers who tend cacao and fruit tree plantations, timber trees like laurel provide an alternative income that insures livelihoods against low global commodity prices, or lost crops. For example, timber sales supported Costa Rican cacao producers through several years of tough financial times in the early 1980s, when black pod disease decimated cacao production.[2]

As a timber tree in agroforestry systems, laurel has many advantages. Its narrow open crown allows light to pass to understorey crops and the species grows very quickly on the fertile soils used for coffee and cacao. Laurel is also self-pruning, meaning that branches fall naturally, even in open environments. This further reduces light competition with crops and leaves a clean stem that produces high quality logs. These logs are easy to saw and have few knots that cause problems for carpenters.

Projects R3158, R4101, R4274 and R4484 Funded by DFID through the Forestry Research Programme

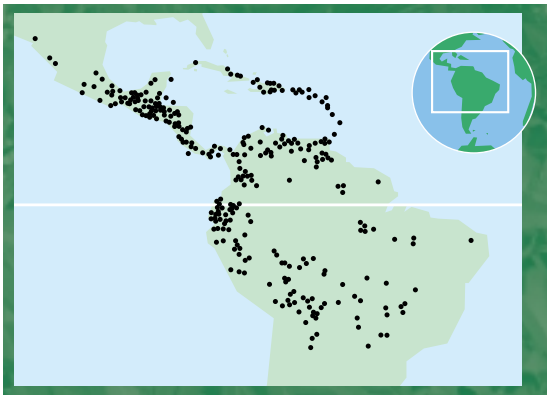
Projects conducted by the Oxford Forestry Institute and the Tropical Agricultural Research and Higher Education Center

But if laurel trees are to provide a high yield of straight, saleable logs, they must be grown from seed with an appropriate genetic blueprint, suited to the environmental conditions of the locality. Given that growth rate and tree form vary considerably in even a small stand of laurel, seed collection and tree breeding could be the best way to improve seed for future planting. Indeed, laurel produces fertile seed at an early age, which makes it an ideal species for selective breeding in specialised orchards.

"In my village, we value the laurel tree very highly. Traditionally, the tree is sold to pay for a wedding and set up a bride and groom in their new home."

Carlos Delgado, coffee farmer
La Suiza, Turrialba valley, Costa Rica

In order to pursue the genetic improvement of *Cordia alliodora*, the Forestry Research Programme (FRP) of the UK Department for International Development funded the Oxford Forestry Institute and the Tropical Agricultural Research and Higher Education Center (CATIE) to collect laurel seed, investigate genetic diversity and establish laurel orchards. This research is important for the development of agroforestry systems that support farmer livelihoods and reduce pressure on virgin rainforest in Latin America and therefore complies with Goals 1 and 7 of the UN Millennium Development Goals; namely to "eradicate extreme hunger and poverty" and "ensure environmental sustainability".



Map showing the natural distribution of Cordia alliodora *in Latin America.*

Source: Boshier, D H and Lamb, A T (1997) Cordia alliodora*: genetics and tree improvement. Tropical Forestry Paper No. 36. Oxford Forestry Institute, UK.*

Assessing genetic diversity

FRP-funded research on *Cordia alliodora* began in 1976 when a research team based at the Commonwealth Forestry Institute (now the Oxford Forestry Institute) initiated seed collections in Central America. Seed was gathered from laurel trees in contrasting locations, ranging from the Pacific and Atlantic coasts to mountain regions, and sent to research organisations for trials in more than 20 countries in the Americas, Asia and Africa.[3] Seven of these trials were analysed in the following decade by the Oxford Forestry Institute (OFI).[4]

In 1988, David Boshier, a forest geneticist at OFI, led a complementary project researching the breeding systems of *Cordia alliodora*.[5] Working with CATIE in Costa Rica, Dr Boshier observed yearly variation in flowering and seed production, and carried out trials in controlled cross- and self-pollinations. In conjunction with the University of Massachusetts in Boston, the team performed laboratory tests to analyse genetic differences in natural stands of *Cordia alliodora*.

Informing seed collection and tree improvement programmes

The FRP-funded projects provide important insights into the genetic characteristics of laurel from various locations. One key finding was that, on a range of trial sites, seed collected from wet-zone locations tended to produce quicker growing,

straighter and less forked trees than seed collected in drier regions. The research also identified successful sampling procedures that ensure a wide genetic base when collecting laurel seed. Such genetic diversity is paramount if inbreeding, and subsequent reduced fertility and slower growth rates, are to be avoided in laurel seed orchards.

Key research findings and recommendations were communicated through articles, leaflets and reports to research organisations and foresters in Latin America. Much of this literature has been published in both English and Spanish. For example, CATIE collaborated with the Danida Forest Seed Centre in Denmark to produce a leaflet detailing the seed collection, processing and germination techniques used by the Oxford Forestry Institute.[6] The OFI itself published two Tropical Forestry Papers on *Cordia alliodora* and how it can be genetically improved.[7, 8]

Findings from the FRP-funded research have informed seed collection and tree improvement programmes in several Latin America countries. In Costa Rica, where the original research was based, work continued under the CATIE Tree Improvement Project, which established laurel seed orchards. This research was funded first by the Norwegian Agency for Development Cooperation (NORAD) and the Forestry Research Programme and subsequently by Danida within its Proyecto de Semillas Forestales (PROSEFOR).[9]

The FRP-funded research has proved useful to forestry organisations elsewhere in Latin America. In Colombia, the Corporación Nacional de Investigación y Fomento Forestal (CONIF) in conjunction with the Federación Nacional de Cafeteros, used David Boshier's methodology to establish seed orchards and improve laurel seed for coffee farmers. Laurel seed orchards are also being established in Ecuador. Here, information provided by the Oxford Forestry Institute was used by the Juan Manuel Durini Forestry Foundation, which has now planted almost 1,700 hectares of the species.

> "The work by Dr Boshier has been very useful for us. We now have a seed orchard in Quindio, Colombia and think this a useful source of seeds in a short time. For coffee farmers, planting trees like cordia is a good way of making cultivations more productive."
>
> *Victor Nieto*
> *CONIF, Colombia*

Information on laurel generated by the Oxford research has been incorporated into a source book for extension workers in Central America. This book provides a definitive account of current knowledge on indigenous tree species and their role in on-farm planting, ecological restoration and natural regeneration. The book is accompanied by a CD-ROM and training programme for local development workers and farmer associations.[10]

Creating sustainable livelihoods

The Oxford Forestry Institute carried out its FRP-funded research on *Cordia alliodora* between 1976 and 1992. Despite this, the work adheres to most criteria of DFID's Sustainable Livelihoods Approach, formulated in the mid 1990s. Firstly, the work is **people-centred**, concentrating on a timber tree of importance to smallholder farmers across Latin America. Secondly, the research **responds** to the need of many farmers to reduce their reliance on coffee

and cacao in the face of changing global markets and potential crop failure.

Although, due to the priorities of the time, the research did not take a **multi-level** approach or always involve the **participation** of local farmers, the FRP-funded CATIE Tree Improvement Project that followed did include a number of workshops for farmers, researchers and foresters in Central America. The *Cordia alliodora* research itself took a **partnership** approach; staff at OFI worked in conjunction with CATIE in Costa Rica and also fed information to research bodies in other Latin American countries, most notably Colombia and Ecuador.

Laurel boards drying in the sun on a farm in Ecuador.
© Eric Boa

Through its research, the Oxford team aimed to promote the planting of improved *Cordia alliodora* in cacao and coffee agroforestry systems as a **sustainable** alternative to monoculture plantations. By planting and managing Latin American laurel on commercial crop plantations, farmers can provide greater financial security for their families, and in addition, create valuable habitats for wildlife. Such a diverse agroforestry system is crucial if small farmers are to survive in an environment where market prices and crop performance are unpredictable and **dynamic**.

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