

## Sixty-third Annual Study Tour Galicia 10-16 September 2006

Thirty Nine Society members assembled on Sunday 10 September 2006 at Dublin Airport to begin the 63rd study tour to Galicia in North West Spain. The flight was to Oporto in Portugal.

Dr Marina Amurrio, our guide for the week welcomed us at Oporto. Marina was assisted for part of the tour by Dr Almudena Pérez. They worked tirelessly and efficiently to look after the needs of the group and the Society is deeply indebted to them. The Society is also indebted to Dr Agustín Merino for putting together such an interesting and varied programme for the week. Our host for the week was the University of Santiago de Compostella (USC) at their Lugo Campus. All the staff of the forestry faculty that we met did a wonderful job during our stay there.

As we drove north to our first night's accommodation in Pontevedra we were able to see first hand the devastation of the large number of fires that occurred during August. All through the week we saw the enormous damage with 80,000 ha or 6 million cubic metres - the total annual production - burned.

Over the next six days the group visited Galicia, which has an area of three million ha, about half the size of the Republic of Ireland. There was surprise among the group to find that almost 70% of the land area of Galicia is forested. There was also surprise at the greenness of the landscape; the reason becoming apparent during the week as the rain began to fall.

Galicia is an autonomous region of Spain and, like Ireland, has Celtic influences. The language is Galician, which is similar to Portuguese. The tour overnighted at the Galicia Palace Hotel, Pontevedra.

*John Mc Loughlin, Tour Convenor*

### **Monday 11 September**

The group made the short journey from the Hotel Galicia Palace in Pontevedra to the Forest Research Centre and Botanic Gardens, Lourizán. The visit to Lourizán provided the group with an opportunity to receive an overview of forestry in Galicia and to assess the performance of a range of tree species growing in the Botanic Gardens. Our guide was Francisco J. Falez de Ana Magán, President of the Asociación Forestal de Galicia (AFG), a body that represents private individual growers and private communes.

Virtually all of Galicia's forests are owned by either private growers or communes. While foresters in Ireland often bemoan the problems of harvesting and managing privately owned forests because of their small average size (around 10 ha), the average size of private forests in Galicia is only 2 ha. Nobody knows for sure how



*Galicia study tour group.*

many owners there are, but it is believed that the 1,385,000 ha of private forest is owned by between 400,000 and 600,000 individuals. About 1,070,000 ha are classed as productive forests. On the other hand, the average size of communal forests is over 200 ha, although little over half are categorised as wooded area.

AFG represents private and communal owners and promotes a range of educational and research projects both in Galicia and internationally. It established the Selga Galician Forestry Company Ltd in 2002, which allows AFG members to be more commercially focused in relation to timber sales, processing and renewable energy projects. Selga sells the timber for the owners at prices that are subject to annual reviews. Close to 90% of Selga's capital belongs to AFG. Given the huge land base, Galicia's forest owners are exploring wood energy, but are also using the land resource to maximise solar and wind energy. They are currently evaluating the potential of residues and biomass with other partners in the 'Atlantic area' including Portugal, Galicia, northern Spain and south-west France.

Like Ireland a wide range of species grow well in Galicia, especially exotics. Francisco de Ana Magán outlined the species that perform well commercially and later during a guided tour of the nearby forest research centre and botanic gardens. Here, there are over 400 tree species and a further 100 species of ornamental shrubs. The gardens were founded in 1942. Originally a farm that supported grain and orange production, the soil is an acid brown earth, over a granite base and is ideal for tree growth.

The two main species grown in Galicia are well represented in the gardens.. Two thirds of the forest area in Galicia comprises either *Eucalyptus globulus* or maritime pine (*Pinus pinaster*). All in all there are 56 eucalypt species growing in the gardens, including *E. globulus*. It was introduced to Galicia at the beginning of the last century. Research is being carried out on other eucalyptus species including *E. regnans*, which is resistant to frost, and is ideal raw material for fibre board manufacture.

While the performance of over 60 pine species is being monitored, Galician foresters are likely to persist with maritime pine, although Radiata pine (*P. radiata*) is growing in popularity and Scots pine (*P. sylvestris*) is also planted, albeit in small lots. Norway spruce (*Picea abies*) performs well in Lourizán but it is dwarfed by *E. regnans* and other eucalypts.

Native broadleaves are also well represented in Galician forestry. Close to 27% of the forest area comprises pedunculate and rebollo oak (*Q. robur* and *Q. pyrenaica*) – and Spanish chestnut (*Castanea sativa*). Cultivated hybrids of *Castanea* have been developed for fruit production.

The group was introduced to other species, including rimu (*Dacrydium cupressinum*) with its beautiful weeping foliage and kauri (*Agathis australis*), both native to New Zealand, and coast redwood (*Sequoia sempervirens*) planted in 1954.

After lunch in the Botanic Gardens the group went south to visit the Communal Forest of Tuy or Tui, where we were met by our guide Julio Ruiz Cagigal, AFG.

The forest has an area of 580 ha and is ‘owned’ by 600 people living in the area. The concept of ownership of communal forests is similar in some ways to commonage ownership, except that each communal forest is run professionally, with an administrative and accounting system. The commune elects its own officials who decide policy. The administration carries out the operations, including planting, coppicing, maintenance, forest protection and harvesting which are outlined in a management plan. Profits are reinvested to administer the forest or to improve the local community. For example, the impressive community hall we stopped off in for coffee was built from the profits of the forest.

The species mainly comprised *Eucalyptus globulus* – to produce fibre for either pulp or panel board - maritime pine and Spanish chestnut, with smaller areas of Douglas fir (*Pseudotsuga menziesii*) and oak (including red oak (*Q. rubra*)).

*E. globulus* coppices freely after clearfelling, which takes places at about age 15; the best stems are selected for final crop production very early on in the rotation. To maximise natural regeneration harvesting must be carried out before the summer. After the fourth rotation, (every 60 years) regeneration is carried out by planting 1,250 stems/ha, at a spacing of 2 x 4 m.

The forest is 500 m above sea level, and while the main objective is wood production, strong emphasis is placed on provision of recreation. The fire risk is high and water reservoirs are strategically positioned in the forest. We stopped at one reservoir near a recreation area, it was normally full of water in September but was almost empty - it had been months since there was any significant rainfall.

Unlike the rest of Spain, Galicia is green and it rains throughout the year, but not in 2006. The summer had been the driest in memory, and the inevitable fires that

followed in August destroyed close to 100,000 ha of forest. Eucalyptus and pine forests were ravaged by fire and between six and seven million cubic metres had been destroyed, equal to the total annual harvest for Galicia, or half of Spain's annual cut.

*Donal Magner*

## **Tuesday 12 September**

In the morning the party departed Ourense, the capital of the province of the same name. Ourense is a major route centre and gateway to Galicia.

The first stop of the day was the wood research centre – CIS Madeira, which is state owned. It is engaged in developing technologies, with the intention of promoting innovation in the wood industry. The centre works on its own research programmes, and in cooperation with other forest centres. One of the areas under investigation is the determination of wood quality using non-destructive testing.

Fernando Sanz Infante and Manuel Touza Vazquez took the party on a guided tour of the centre and explained the various processes involved in the research work. The main area of research in recent years has been the study of stresses in logs; this work is carried out through various projects.

The impact of the introduction of Eucalyptus to the Galicia area, over one hundred years ago, is causing some anxiety to silviculturalists and environmentalists, the centre is researching the species under the 'Eucalyptus in a changing world' project. Results of the research will influence the future position of the species in Galician silviculture. To date, the research shows it to be a good strong timber which grows in a short time. The environmental drawback is the almost complete absence of vegetation on the forest floor, and negligible leaf-fall.

The party travelled to the Douglas fir plantation owned by Tino Moneiras. The land has been in the Moneiras family since 1848, it was farmed until 1960 when the family began to establish forests comprising mainly of chestnut and maritime pine. In 1970 30 ha were planted with Douglas fir at a stocking of 800/ha. Establishment was successful and the trees now have a fine cylindrical form. Different growth rates were apparent due to changing soil conditions over the site. Due to the wide spacing branching is very strong.

Elaborate fire precautions are in place in event of an outbreak. Several water-traps were set up throughout the plantation. On average, there is a 2-3 month dry period each summer.

The owner does not intend to fell the plantation, he intends to allow it to grow on indefinitely, because, as the English-speaking guide informed the party, 'he does not need money and loves his trees'.

The final stop of the day was at Tragsa Viveros Nursery at Ourence. Tragsa is a company specialising in rural development and nature conservation. Operations are mechanised and concentrated over a relatively small area, comprising greenhouses (3.2 ha), mobile shade covering (2.5 ha) and hardening areas (11.0 ha).

The Agro-Environmental Development and Improvement Centre (CEMDA) are located beside the nursery. The facilities have been designed to enable technology to

assist with in-vitro culture, grafting, softwood cutting and acclimation. The intricate nature of the nursery operations and the laboratory techniques were explained by Beatriz Cuenca, Blanca Lopez and Juan Antonio Gomez.

Following the nursery visit the party set off to overnight in Lugo, Galicia's oldest provincial capital, which retains an intact Roman wall.

*Frank Nugent*

### **Wednesday 13 September**

We drove to Begonte, Lugo and were met by our leaders for the morning, Professors Roque Soalleiro, Agustin Merino and Martin Santalla (Forest administration, Galicia).

First stop was a thinning trial in Radiata pine which had the aim was of improving knowledge of thinning effects, and of encouraging private growers to thin their plantations.

The thinning trial was established on a high quality, community owned wood, planted in 1990 at a spacing of 3 x 2 m. A local seed source and a New Zealand source were also being compared, to determine qualitative and quantitative differences between the different genotypes.

Four separate thinning treatments were employed with three replications:

1. Heavy from below – 80% basal area retained, with selection aimed at removing crooked and diseased stems.
2. Heavy with crop tree designation – 80% basal area retained final crop trees identified and marked in advance, with thinning aimed at favouring them.
3. Light – 90% basal area retained.
4. Control – no thinning.

Next a harvesting site was visited where a mechanical harvester was seen carrying out a first thinning of Radiata pine. One line in twelve was being removed, with selective thinning in the remaining lines (selection was by machine operator). A volume of 50 m<sup>3</sup>/ha was being removed (not considered to be unduly heavy by local managers). A standing price of €40/ m<sup>3</sup> per was being obtained. As a general rule, first thinning is at 12-14 years, second at 22-25 years, followed by clearfelling at 30-35 years.

The next stand visited was established using natural regeneration, using two techniques: mechanical brush control and fire control. To date, fire control has proved to be better, with a stocking of 2000 stems/ha compared with 1000/ha for mechanical control. The low stocking associated with mechanical preparation will require expensive remedial work in the future.

In the afternoon we visited a Finsa MDF mill which employs three hundred people, producing the following products:

- MDF boards
- Flooring
- Profiled boards
- Melamine boards

The mill has two separate lines to cope with the different properties of pine and eucalyptus. In the log yard, both species are stored separately. All logs are chipped to the specified size, and clean chips are cooked (pine bark is burned for energy) to break up the fibre, which is then compressed to remove excess water. When the fibre is ready, it is fed on to a belt at different thicknesses, depending on the end product required, and travels to a chamber which compresses it to the required dimension. The board is quite hot at this stage and cooling machines are used to cool it evenly and efficiently. After cooling, the board is sanded and cross cut and edged to achieve final dimensions. The mill has a capacity to produce approximately 600 m<sup>3</sup> of product per day.

*Paddy O'Kelly*

## Thursday 14 September

### *Pedunculate oak in Galicia*

Pedunculate oak is distributed throughout most of Europe and is the dominant tree species in the native forests of northwest Spain. At present there are 188,000 ha in pure stands in Galicia. In terms of area, the species is second only to maritime pine, while annual roundwood production, at 0.069 million m<sup>3</sup>, puts it in fourth place behind eucalyptus (2.450 million m<sup>3</sup>), maritime pine (2.032 million m<sup>3</sup>) and radiata pine (0.505 million m<sup>3</sup>).

Historically, pedunculate oak forests were subjected to selective exploitation felling to supply ship building timber for the Spanish Navy, and as a source of charcoal. The species has had a low priority in modern Galician silviculture, which has concentrated on fast growing species such as *Eucalyptus globulus*, maritime pine and radiata. This combination probably explains the poor quality of stands, with very few good stems. Most oak stands (85%) are coppice-with-standards, only 12% are high forest - 3% are coppice. The species has had a low priority in reforestation: only 400 ha were planted during the period 1998-2003, mainly on moist sites, through plantations of fast growing species.

Pure stands of oak are only found on poor soils, the better quality sites are used for agriculture or have been planted with fast growing conifers or eucalyptus. It is considered that growing oak for quality wood production is only possible on the best sites that have deep, rich soils where rotations of 100 years are possible. The mean annual increment of oak in Galicia varies from 1.9 to 5.7 m<sup>3</sup>/ha/year.

Recent years, however, have seen increasing interest in the management of broadleaves such as pedunculate oak. The stimulus is the current emphasis on biodiversity conservation. Although it is forbidden by law, replacement of oak by eucalyptus still occurs in Galicia. Pedunculate oak forest is mainly in private ownership (86%).

### *The hill-fort of Viladonga*

The hill-fort (*Castro*) of Viladonga is situated 70 km from Lugo on national route 640 to Vegadeo, in the municipality of Castro de Rei. It consists of ramparts and ditches

enclosing two terraces, on which the remains of houses, enclosures, and other buildings have been excavated, beginning in 1971. The houses are of two distinct types: round houses that were thatched, and rectangular houses with tiles, which point to Roman influence in their design.

The earliest occupation of the site dates from the Bronze Age between the seventh and the fifth centuries BC. The hill-fort culture continued at Viladonga to about the middle of the first century AD, by which time Galicia was part of the Roman Empire.

The Roman conquest did not lead to the immediate abandonment of the hill-fort culture, but rather to a process of gradual change. By the end of the first century BC many hill-forts were abandoned and a large part of the population had settled in the valleys. Some hill-forts such as Viladonga were reoccupied from the third to the fifth centuries AD.

The economy of the Viladonga hill-fort was based on cereal crops, cattle, pigs and horses.

There is an interpretive museum at Viladonga and a selection of the many and varied finds uncovered by the archaeological excavation are on display. These include tools, weapons, pottery, gold jewellery, coins, games, glass and decorative items of harness wear. An impressive model of the hill-fort is on display.

#### *Souto de Retorta*

There are sixty six reserves, one national park, six natural parks and four natural monuments included in the Galician conservation of biodiversity programme. Souto de Retorta is one of the four natural monuments. It comprises 3.2 ha of mature eucalyptus forest, located immediately adjacent to the town of Chavin de Viveiro. It is 45 m above sea level, about 5 km inland. The mean annual temperature is 15°C, with an annual rainfall of 960 mm.

*Eucalyptus globulus* became popular in Galician forestry from about 1950 because of its high growth rate. Rotation length is 12-16 years depending on site quality. Planting of the species is confined to areas up to 400 m above sea level, as it is susceptible to frost damage. It is easy to establish. Second rotation crops are often established from coppice shoots. Some of the eucalypts at Souto de Retorta are among the tallest trees in Europe. The tallest tree in the reserve stands at 66 m, with a volume of 28.6 m<sup>3</sup>. The tree with the greatest volume - 76 m<sup>3</sup> - is 'El Abuelo'; it reaches 62 m in height. When a branch fell from the tree in 1998 it was measured at 18 m<sup>3</sup>! The tree with the greatest girth is 188 cm at breast height, is some 53 m tall, and has a volume of 47 m<sup>3</sup>.

*Bob Dagg*

#### **Friday 15 September**

The group was devastated on Friday morning with news of Joe Tracey's passing during the night. The programme for the remainder of the day was cancelled and the group attended a special mass for Joe at the Cathedral of Santiago de Compostela at 7.30 in the evening. This mass was kindly arranged by the staff of the University of Santiago de Compostela.

Overnight Hotel Universal, Santiago de Compostela

*John Mc Loughlin*

### **Saturday 16 September**

In the morning the tour headed south to Oporto Airport for the journey home.

*John Mc Loughlin*

### **Participants**

Marie Aherne, Peter Alley, John Brady, PJ Bruton, Michael Bulfin, (President), John Conneff, John Connelly, Jim Crowley, Bob Dagg, Ken Ellis, Pat Farrington, Jerry Fleming, Brigid Flynn, Eugene Griffin, Christy Hanley, George Hipwell, Kevin Kenny, PJ Lyons, Donal Magner, Tony Mannion, Pat McCloskey, Kevin McDonald, Tom McDonald, John Mc Loughlin, (Convenor), PJ Morrissey, Liam Murphy, Jim Neilan, Frank Nugent, Dermot O'Brien, Michael O'Brien, Pat O'Callaghan, Liam O'Flanagan, Paddy O'Kelly, Tim O'Regan, Denis O'Sullivan, Joe Tracey, Trevor Wilson, Coleman Young.