

Another Woodland Heritage Study Tour to Poland

by Ed Clark, Alan Hunt and Jonathan Burke

Day 1:

- Visit Krakow University's Experimental Forestry Unit (EFU) in Krynica-Zdrój which is located at an altitude of 590m in the Beskid Sądecki range of the Carpathian Mountains close to the Slovakian border.

Day 2:

- Visit to 'Reserwat Przyrody Łabowiec', a natural (primeval) forest reserve composed of European Silver Fir (*Abies alba*) and Beech (*Fagus sylvatica*). This has been untouched by management since 1905 and has allowed the natural stand dynamics of these two species to be studied by many of the University's students. Also, visit to nearby Beech seed stands managed as a uniform shelterwood, where seed is collected by climbers every five or six years.
- Visit to 'Obrożyska', a Lime (*Tilia cordata*) coppice-with-standards forest reserve, with an extensive Hornbeam (*Carpinus betulus*) understorey. The local landform and sheltered terrain gives the reserve a warmer microclimate compared with the surrounding forests, meaning these species can exist at an altitude of c.600m.

Day 3:

- Visit to Szczawiczne, a re-established state forest being converted from a Scots Pine (*Pinus sylvestris*) nurse crop to target tree species (European Silver Fir and Beech). Followed by a thinning exercise in an even-aged stand of European Silver Fir (compartment 90b).
- Visit to Mrokowiec, a forest of European Silver Fir (compartment 96b) which is managed by selection system ('plenterwald'). A stand structure very close to an inverse-J has been achieved, with the largest trees being over 20m³ and approx. 200 years old.
- Visit to a stand of European Silver Fir managed by Swiss irregular shelterwood system (compartment 22) which is a widely used silvicultural approach in the region.

Ed Clark's thoughts:

The focus of the trip was: to establish the natural processes facilitating the structures of natural forests by examining non-intervention reserves at Łabowiec and Obrożyska and then to examine how these

processes are utilised in managed forests to achieve silvicultural aims. Silvicultural regimes were presented in the context of how they mimic natural processes, to a greater or lesser extent, depending upon the scale and intensity of interventions.

It is certainly the case that the forests of Southern Poland differ greatly from those in Great Britain. However there are several management principles and take-home messages that can be applied in a British context:

Firstly, *the importance of having a long-term view*. Before travelling to Poland I thought that I had a relatively long-term view as far as forestry was concerned. I am familiar with lowland estate forestry and very comfortable with considering a hardwood rotation in terms of 150 or more years. However, I was impressed with the exceptionally long-term view of the Polish Forest Service who more often consider their management approach in the context of multiple rotations.

For example, at Szczawiczne, a 6,900 hectare new forest had been created on vacated agricultural land between 1947 and 1951. The intended composition of the forest was European Silver Fir and Beech, however it was not considered appropriate to plant either of these shade tolerant species on open farmland, as the high levels of weed competition would make establishment difficult, and the high light availability would cause the trees to suffer from relatively poor form. Therefore, the area was planted with a combination of more light-demanding species such as Scot's Pine, European Larch and Norway Spruce. These were allowed to develop as even-aged plantations, regularly thinned, and then a programme of restructuring was initiated in c.2000 by a combination of thinning and group felling (felling units of 0.05ha, which is the maximum area legally permitted to be felled in a mountain region). Canopy gaps are underplanted with groups of the desired

species (European Silver Fir and Beech) once the site is in forest condition, and this restructuring process is not expected to be completed until 2035.

The first rotation of 'pioneer' conifers is considered to be an integral part of the establishment phase, in essence, a form of site preparation to ensure the correct light levels for the target species in the longer term. This approach made me consider the rationale



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behind woodland creation in the UK, in which we often plant the final target mixture of species first time around, and in some cases struggle with establishment, particularly in a more exposed location. There is merit in this long term view, and perhaps the use of nurse species, or even nurse rotations, could be more regularly explored in a UK context, subject to satisfying the requirements of the various grant schemes.

Another important 'take-home message' from my point of view was: *the importance of viewing CCF as a spectrum of management regimes*. This trip gave some excellent examples of various points along the CCF spectrum, with the uniform shelterwood system presented at Szczawiczne at one end, moving through group and irregular shelterwood systems at Krynica-Zdrój, and the true selection system presented at Mrokowiec at the other end. It was enlightening to see such a variety of management regimes in such a short period of time, which gave the opportunity for direct comparisons which are not always so readily available when visiting CCF stands in Britain.



Uniform shelterwood at Szczawiczne.

Another aspect of great interest to me personally was the use of *species currently outside the traditional mainstream palette of species in British forestry*. Clearly the growing conditions in Poland are different to those at home, for example: the minimum altitude is over 500m, and the growing season is restricted by cold winters and heavy snowfall. However there are also similarities, such as similar rainfall (c. 1,000mm per year), and the majority of the soil is fertile brown earth.

European Silver Fir was by far the most commonly observed tree during the study tour. It is shade tolerant and cold hardy, and could be a viable option in a British context. It has been planted in the country before, but fell out of favour due to attack by a woolly aphid (Adelges nordmannianae). Forest research has



Selection system at Mrokowiec.

recently produced an excellent paper (Kerr et al, 2015), which summarises this chequered history and explains the future potential, particularly for the use of this species in mixtures, and as a component of stands managed by CCF.

Other species which could be used alongside European Silver Fir could include Norway Spruce, Douglas Fir, Western Red Cedar and Western Hemlock.

Beech was widely seen during the tour and is native to southern Britain, and already planted on a fairly large scale. The challenges facing this species are the absence of a premium market for sawlog material, and the extreme likelihood of severe levels of bark stripping by the grey squirrel. However, if effective grey squirrel control can be practised then the shade tolerant nature of this species makes it a potential component for inclusion in mixed species CCF stands.

Hornbeam is planted throughout Europe and used extensively as an understorey species, which is also how it was observed in Poland. It is native to southern England, shade tolerant, and resistant to cold and frost. There may be scope to plant Hornbeam under Oak, as it could be coppiced to provide a good firewood crop and help to keep the Oak stems shaded and free of epicormics.

Lime is another species which is already present in a British context, but hindered by the lack of a marketable end product. Unfortunately, the situation is similar in Poland, and it is seen as a difficult species to sell, although some is used for turnery, sounding boards, and piano keys. Silviculturally, it is shade tolerant and well suited to lowland mixed broadleaved stands. However, for commercially managed sites it may be worth considering other species as well, perhaps Sycamore, Whitebeam, and Wild Service.

And so in summary, my three main learning points are:

- *Keep a long-term view.*
- *Think of CCF as a spectrum.*
- *Consider other species, and be open-minded to their silvicultural niches.*

My thanks go to Maciej Pach for so ably hosting us in Poland, and to Bill Mason, Donal O'Hare, and Mandy Clinch for organising the tour. I am also very grateful to Woodland Heritage for their support and assistance.

Alan Hunt's thoughts:

The 2015 joint CCFG/Pro Silva project was hosted by the Polish State Forests Experimental Forestry Unit (EFU) based in Krynica Zdrój in the southern Carpathian Mountains. The EFU was established in 1968 and is part of the University of Agriculture in Krakow. The Experimental Forestry Unit is responsible for education and research, maintaining a number of research plots and experimental trials, and is also responsible for the management of 6,427 hectares of forest. Much of the management area is hilly and mountainous, with elevation ranging from 500 to more than 1,100 metres above sea level. The forest is predominantly composed of a mix of European Silver Fir and Beech on relatively good upland brown earths.

In common with other state forests in Europe, the forest management is based on a ten year forest management plan that sets out the management objectives for the site. For example much of the forest managed by the Experimental Forestry Unit is designated as protected forests that fulfil various environmental or social functions, as well as economic functions, such as water protection.

Poland was the first country in Europe to undertake certification of state forests, currently 85% of state forests are Forest Stewardship Council certified, with significant areas of forest also PEFC (Programme for the Endorsement of Forest Certification) certified.

One of the key management objectives being undertaken by the Experimental Forestry Unit over an area of 1,800 hectares, is the conversion of existing stands from nurse crops, and less well adapted species that are not of local provenance, to targeted mixed species forests of primarily European Silver Fir and Beech. Forest management is supported by a series of longstanding research plots and experimental trials, including a natural reserve at *Łabowiec reserve of 54 ha of natural (primeval) forest* that is composed of predominantly European Silver Fir and



Fagus sylvatica in the Łabowiec reserve.

Standing and fallen deadwood in the Łabowiec reserve.

Beech. The reserve was created in 1905 to preserve and study lower montane Beech and Beech-Fir forests that are remnants of the Carpathian Forest. The reserve has expanded in the last hundred years, beginning as a modest three hectares, however the whole site is now protected and has no active management. One of the most striking aspects of the site, other than the prolific mixture of regeneration, was the size and volume of standing and fallen deadwood.

Much of the forest managed by the Experimental Forestry Unit is managed under a mixture of irregular shelterwood systems and selection systems, with clearfelling all but banned. However perhaps one of the most fascinating sites visited was Obrożyska reserve, another remnant site of the Carpathian Forest, though dominated by *Tilia cordata* (small-leaved Lime) that has been managed for a significant period as coppice with standards. This area is protected and studied as a remnant of Larch-Lime primeval forest. Quite aside from the academic value of the reserve, the enormous Lime stands make for a particularly enchanting woodland.

On the final field day of the study tour we visited a number of stands where a selection system had already been established in stands of European Silver Fir and mixed stands. However of particular interest was a stand of Scots Pine that had been established as a nurse crop in 1952 on primarily open land that had been abandoned by agriculture. The objective for the site even then was to establish a native forest of European Silver Fir and Beech. In 2008 small groups of target species were underplanted as part of a group shelterwood system. The local forester was more than happy to allow regeneration of other species such as *Picea abies* (Norway Spruce) and *Acer pseudoplatanus* (Sycamore) as well adapted local species, but he was particularly scornful of a sickly stand of *Picea sitchensis* (Sitka Spruce) on the other side of the valley.

The clarity of objectives on the site, even 63 years ago, and the adoption of a more 'natural' process where light demanding nurse crops are established first, before shade tolerant target species are introduced was very interesting. The foresters were clear that the process would carry on long after their careers and the whole approach was particularly thought provoking when contrasted with the much shorter term vision applied by some foresters.

Much of the management in the stands visited also encouraged large diameter trees to be retained where they had good form and vigour, in order to obtain desirable growing stock from seed trees. A target diameter of more than 90 cm dbh was applied to many of the European Silver Fir stands, yet even at this size refreshingly a premium was paid for timber. These large trees are also seen as crucial in achieving

the wider cultural and environmental objectives as well as being crucial for seed production. Research plots have also shown in stands with these larger trees that there can be economic benefits in retaining them since control sites have shown an increase in increment in trees in the upper story, even when more than 90cm dbh.



Tilia cordata coppice with standards.

One of the most significant issues with the establishment of planted and the naturally regenerating European Silver Fir and Beech was browsing damage, a familiar issue to many of the visiting foresters. The trees planted in groups were all treated with a chemical deterrent applied to the leader each year, at significant expense due to the long establishment period of European Silver Fir. However, the natural regeneration was largely untreated and suffered considerable predation. Perhaps significantly however, the local foresters reported much lower levels of predation in stands with a more diverse age structure where regeneration was more sporadic and dispersed, despite significant deer population across the forests visited.



Bill Mason and Maciej Pach discussing underplanting site.



Underplanting of target species.

Jonathan Burke's thoughts:

On a whim and a suggestion from James Walmsley, the new Head of Forestry at Bangor University, I applied to be one of the Continuous Cover Forestry Group members on a trip to Southern Poland for a week in June 2015. The aim of the trip was to have a look at forest management options in the forest covered natural reserves of the Beskid Sadecki region of the Carpathian mountain range.

I thought this trip may be a bit out of my league as a 1st year Bsc Forestry student but although the other members were a range of particularly adept practitioners in their own fields, ranging from Forestry commission managers (Wales, Scotland and England), ecologists, independent foresters, land owners and high level researchers, I did nonetheless feel welcome and part of the group. I was encouraged to ask questions and voice opinions as the general atmosphere was one of collective study and seeking of the seemingly endless right answers to timeless problems – all of which are of course dependent on your objectives!

The group was quite large numbering 30 and was organised by CCFG chairman Bill Mason with support

from Donal O'Hare of Pro Silva Ireland and hosted by Maciej Pach of the University of Krakow. After a three hour coach ride from our pickup point at Krakow airport we arrived at our base, the experimental forestry unit, which is one of four state run operations to support the management of the majority of 8.7 million hectares of forest of which seven million hectares are state owned. We were then fed, watered and distributed to our comfortable ground floor individual accommodation.

Over the next couple of days we went to see several plots looking at natural primary forests that are managed as reserves and also sites managed for timber production. I would like to tell you about the practical exercise we did at a site which was mainly in conversion from pioneer (nurse) species to mixed stands of mostly Beech and Fir.

My first thinning exercise

Normally done by one person, it would take a day to mark up the thinning of a 2–3 hectare site. On this occasion we were split into groups of three or four and it took 25 minutes to cover approximately $\frac{1}{4}$ acre. The site was natural regeneration of the native European Silver Fir on a steep slope. The job was to



Mixed stand showing the general approach.

choose the best crop trees for a first thinning and mark the nearest one or two competitors for extraction. Consideration was taken for crown classification, vigour and stem condition. The chosen crop tree would be marked at chest height with chalk and any close competitors, especially the ones with bad form, would also be marked. Then swiftly moving to the next five metre area and repeating the process. The chosen crop tree was not always the biggest and the small trees were mainly left for the future. Extraction would be by horse and then skidded out along the rides. The next thinning will be in another 15 years and the same rides will be used again. The target structure is an uneven aged continuous cover forest.

This was a rollercoaster experience for me. I was a little apprehensive, not only because at heart I really appreciate trees and have generally focussed on the planting of more trees rather than harvesting them, but also because I was on a very experienced team from FC Scotland, the Duchy of Cornwall and FC England – they all knew how to do this! So we set off and the guys, as I expected, started choosing and marking trees with confidence. It all happens remarkably quickly. I thought there would be deliberations and ruminations about the best choice but instead there is a steady sure rhythm to the process. Then Charlie turned to me and said “your turn...” and threw me the chalk. Beyond all my expectations I followed their lead and went up to my first crop tree, took a moment to confirm my decision, marked it and then instantly the two nearest competitors were obvious, they were marked, and I was on to my next crop tree. I really enjoyed it and after a discussion with the team it came apparent that there was an element of artistry within this process, not just technical knowledge but an awareness of the management of light. Because the greatest effect of the thinnings, apart from the substantial timber harvest, is to open up new areas of the canopy and encourage growth under adjusted light conditions. Succession will happen right here. What an amazing experience!

A Polish cultural point: If it was known that a large area of forest was being cut down then it would be assumed that the owner was in desperate need for money because this act would be seen as being similar to selling the family jewels.

The perspective of being a student forester means I can have ideas and concepts revealed to me whilst I am looking at a stand of trees. It is the most wonderful feeling to gain an insight just through some patiently measured words and this happened to me several times on the CCFG Poland 2015 trip. Here are some examples:

- *Deer management by wild animals does not necessarily solve the problem but the presence of a predator or the possibility of its presence can keep deer on the move which means minimal time to cause too much damage.*
- *Poland has trees above 600 metres which means there are not many romantic 19th century landscape views but lots and lots of tree covered mountains.*
- *One of the main reasons why Poland operates on a variety of shelterwood and continuous cover systems is because it is illegal to clear fell woodland in these huge reserves.*
- *Deadwood, standing or fallen, is a very important part of continuous cover forestry, not just for the increase in biodiversity but also to provide a source of nutrients and maybe also as a development aid for mycorrhizal relationships that can happen only in old age forests.*

The trip ended with a fire, good food and chat discussing subjects as wide as what is the best concise definition of social forestry to whether broad management objectives in business plans can be translated into more sustainable forests on the ground or just cause more confusion.

There were no right answers that night, just a palette of right answers dependent on your objectives.

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