



Funded Bursary Report

ALPINE GARDEN SOCIETY STUDY TOUR TO THE PICOS DE
EUROPA, 24TH MAY – 2ND JUNE 2013

Beth Marshall | Merlin Trust and RHS Funded Placement

Contents

Acknowledgements	2
List of Figures.....	3
Introduction.....	5
Overview of the Project: Aims and Objectives.....	7
Details of the Study Tour.....	8
Budget.....	26
Bibliography.....	27
ANNEX I: Plant list.....	28

Acknowledgements

I would like to express my sincere gratitude to Dr Kit Grey-Wilson for leading such an interesting and informative study tour and to all the other participants who were so willing to share their knowledge. I would also like to express thanks to the Merlin Trust and the RHS Bursary Committee who were so kind as to fund this trip.

List of Figures

Figure 1: Group Photo	6
Figure 2: <i>Ophrys holosericea</i>	8
Figure 3: <i>Rhinanthus alectorolophus</i>	9
Figure 4: Wildflower rich meadow with <i>Rhinanthus alectorolophus</i>	9
Figure 5: <i>Anacamptis papilionacea</i>	10
Figure 6: <i>Orchis ustulata</i>	10
Figure 7: <i>Orchis morio</i>	10
Figure 8: <i>Tragopogon pratensis</i>	10
Figure 9: Avidly searching for orchids.....	11
Figure 10: <i>Genista hispanica</i>	11
Figure 11: <i>Dactylorhiza markusii</i>	11
Figure 12: <i>Narcissus triandrus</i>	12
Figure 13: <i>N. asturiensis</i>	12
Figure 14: An unusual mutated form of <i>N. nobilis</i>	12
Figure 15: Meadow of <i>N. nobilis</i>	12
Figure 16: <i>Gentiana verna</i>	13
Figure 17: Chris intrepidly traversing the snowy pass at Puerto de San Glorio!.....	13
Figure 18: A view from Mogrovejo	14
Figure 19: <i>Ajuga pyramidalis</i>	14
Figure 20: <i>Aceras anthropophorum</i>	15
Figure 21: <i>Himantoglossum hircinum</i>	15
Figure 22: <i>Allium roseum</i>	15
Figure 23: <i>Thymelaea dioica</i>	16
Figure 24: <i>Daphne laureola</i> subsp. <i>phillipi</i>	16
Figure 25: Amy and Svenja out in the snow.....	16
Figure 26: Really high! View from the top of the Fuente De cable car	17
Figure 27: <i>Gentiana occidentalis</i>	17
Figure 28: <i>Globularia cordifolia</i>	17
Figure 29: <i>Scilla verna</i>	17
Figure 30: <i>Linaria alpina</i>	17
Figure 31: <i>Androsace villosa</i>	18

Figure 32: <i>Dactylorhiza insularis</i>	18
Figure 33: <i>Tulipa australis</i>	18
Figure 34: <i>Orchis pallens</i>	19
Figure 35: Grouping of <i>Chaenorhinum orangifolium</i> , <i>Erinus alpinus</i> and <i>Acinos arvensis</i>	19
Figure 36: <i>Asphodelus albus</i>	19
Figure 37: <i>Serapias lingua</i>	19
Figure 38: <i>Cephalanthera damasonium x longifolia</i>	21
Figure 39: <i>Jasione perennis</i>	21
Figure 40: <i>Orchis langei</i>	21
Figure 41: <i>Cardamine raphanifolium</i>	21
Figure 42: <i>Lilium pyrenaicum</i>	22
Figure 43: <i>Orchis morio x Anacamptis papilionacea</i>	22
Figure 44: <i>Plantago media</i>	22
Figure 45: <i>Echium plantagineum</i> (albino form).....	22
Figure 46: Large grouping of <i>Orchis mascula</i>	22
Figure 47: <i>Globularia repens</i>	23
Figure 48: <i>Petrocopis pyrenaica</i>	23
Figure 49: <i>Himantoglossum hircinum</i>	23
Figure 50: Wildflower meadow with many <i>Anacamptis papilionacea</i>	24
Figure 51: <i>Anacamptis papilionacea</i> (albino form)	24
Figure 52: <i>Echium vulgare</i>	24
Figure 53: <i>Lavendula stoechas</i>	24
Figure 54: <i>Polygala nicaeensis</i> 1.....	25
Figure 55: <i>Polygala nicaeensis</i> 2	25

Introduction

This trip report is a summary of the hugely beneficial study tour undertaken to the Picos de Europa, 24th May to 2nd June, 2013, under the guidance of alpine expert, Dr Kit Grey-Wilson.

Part of the Cordillera Cantábrica, the Picos de Europa are situated in Northern Spain, west of the Pyrenees, and just west of the city of Santander. The landscape of the Picos de Europa is characterized by the impact of the cool, moist Atlantic climate system, ensuring a lush and green environment. The rock formation of the Picos de Europa is largely Carboniferous porous limestone, supporting a very diverse variety of flora. There are a number of different habitats within the Picos region at differing altitudes which provide an ecosystem for diverse flora. Drawing from Teresa Farino's description in her 'Flora and Fauna of the Picos de Europa', these can be categorized as follows:

Below the tree-line (below approximately 1,300 metres):

1. **Haymeadows.** The haymeadows are astoundingly floriferous, rich in orchids and a wide variety of wild flowers which will be detailed throughout this report. The high levels of biodiversity in the haymeadows is in large part owed to the traditional methods of hay meadow management still practiced in the region.
2. **Grazing land.** Grazing land extends above the slopes of the haymeadows, inhibiting the growth of many wildflowers, but home to large communities of genistas, brooms and heathers.
3. **Lower altitude deciduous woodland.** In wet valleys there are oak woodlands, also including *Ulnus glabra*, *Tilia cordata* and *Fraxinus excelsior*.
4. **Mediterranean plant communities.** *Quercus ilex*, *Arbutus unedo* and *Quercus suber* provide a canopy in Mediterranean plant communities which also include a wide range of Mediterranean plants which tolerate dry, arid conditions.
5. **Higher altitude oak and beech woodlands** on the high northern slopes.

Above the tree-line (above 1,300 metres approximately):

6. **Cushion or mat-forming alpine plants.** These include plants endemic to the Picos such as *Saxifraga felineri* and many plants endemic to the Cordillera Cantábrica such as *Sempervivum vicentei*, *Androsace cantabrica* and *Saxifraga canaliculata*.

Due to unseasonably adverse weather conditions during the course of our study tour we mainly focused on the lower altitude habitats as the mountain peaks were still snow covered. Although it was a shame to miss the opportunity to see the high altitude alpine plants we were rewarded by the opportunity to see other plants which had been held back by the cold weather, notably a range of *Narcissus* such as *N. asturiensis*, *N. nobilis* and *N. triandrus* which were still visible in large swathes.

This report is written as a chronological day to day account of the tour. I have highlighted in the account of each day plants of particular interest and a full plant list has been annexed to the report.



Figure 1: Group Photo

Overview of the Project: Aims and Objectives

1. By June 2013, to advance my horticultural knowledge of alpine plants

Participation in this tour has greatly increased my knowledge of alpine plants and wildflowers. It has provided me with a foundation for enabling me to identify alpine plants and wildflowers with greater confidence. This trip report provides a summary of the plant knowledge I have gained.

2. By June 2013, to develop a greater understanding of the threats to alpine plants in the Picos de Europa region.

Output: Report written outlining the threats to alpine plants in the Picos de Europa region, including climate change impacts. I would gladly share this report with other horticulturalists if it would be of interest. This report will also be submitted within three months of the end of the trip to the Merlin Trust.

I have integrated information on the threats to alpine plants into this report, where relevant.

3. By September 2013, to disseminate information about the study tour

Output: If it would be of interest I will write a short report of the study tour and how I have benefited from the Merlin Trust grant for the Merlin Trust website

Details of the Study Tour

Friday 24th May

After a slight delay at the airport at Stansted we arrived in good time to Santander at approximately 5.30 pm local time. Four of us shared a hire car from the airport. Our botanising began shortly after leaving the plane: we discovered a *Serapia cordigera* and an *Ophrys holosericea* (bee orchid, Figure 1) on the grass verge next to the hire car bay. The landscape travelling up to our accommodation, through the Asturias Province into Cantabria is stunning. Most impressively, we drove through the dramatic the La Hermida Gorge. Swathes of orchids could be seen from the car, although unfortunately the roads were just too windy to stop to take photographs. After a minor detour to a supermarket we arrived at our accommodation, La Casa de las Chimeneas at 9.30pm. At 10 pm we convened for a group briefing which was our opportunity to meet each other and discuss the proceedings for the week.

Our tour leader, Christopher (Kit) Grey-Wilson briefly explained the format for each day. We will meet at 9 am each morning to leave for our trips and convene at 9 pm each evening for plant sessions to discuss what has been identified throughout the day. He explained we would be taking a flexible approach to the itinerary, as fair weather will be required for some of the trips into the high regions. For example on Tuesday we will be travelling to Fuente De, home to the longest cable car stretch in Europe and it would be a shame to undertake the journey in cloud.

Kit also gave a brief overview of the geology of the Picos de Europa. The area is a limestone outcrop, but is also typically ericaceous in places, home to many plants from the *Ericaceae* family. We can expect to see a host of alpinines, including *Narcissus*, *Fritallaria*, *Saxifraga* and *Gentiana*. There is also the only cork oak wood in Northern Spain, something I am very much looking forward to seeing.



Figure 2: *Ophrys holosericea*

Saturday 25th May: Around Tudes

Today we enjoyed a day of two parts botanizing. We spent the first part of the morning in Potes, visiting the local supermarket to purchase some supplies. Potes is a very picturesque small Spanish town. Having purchased our supplies and had a brief wander around the town we drove back up to the apartments in Tudes, making regular stops to botanize en route in the grass verges on the road and on the edge of meadows. We were extremely fortunate that the verges had not as yet been strimmed, therefore there were many plants still to be seen. There was a wide array of beautiful wildflowers to be seen, in wonderful combinations, such as the delicate colours of the light mauve *Linum usitatissimum*, with pale cream *Trifolium ochroleucon*, against the vibrant colours of the many

hued *Lotus corniculatus*; *Hippocrepis comosa*, *Anthyllis vulneraria* and the substantial swathes of bluish purple *Echium plantaginimum*, much loved by bees.

We also had a wonderful opportunity this morning to witness the benefits of the European Yellow Rattle, *Rhinanthus alectorolophus* (Figure 3), in the wild. Plants of the genus *Rhinanthus* are root hemiparasitic annuals, although able to photosynthesize, they derive additional carbohydrates and minerals from the roots of host plants such as grasses and legumes. In the UK Greater Yellow Rattle (*Rhinanthus angustifolius*) is a native plant but has drastically declined due to modern agricultural methods. *Rhinanthus minor* is however commonly utilized as an essential component of perennial wildflower mixes to reduce the vigour of grasses, opening the sward to allow wildflowers to thrive with reduced competition. In Figure 4 the species rich diversity as a result of the presence of *Rhinanthus alectorolophus* is clearly evident.



Figure 3: *Rhinanthus alectorolophus*

Figure 4: Wildflower rich meadow with *Rhinanthus alectorolophus*

This morning we also saw some very interesting orchids, including *Anacamptis papilionacea* (the butterfly orchid), *Orchis morio* (the green-winged orchid, also known as *Anacamptis morio*), *Serapis lingua* (the tongue orchid) and *Orchis ustulata* (the burnt orchid).



Figure 5: *Anacamptis papilionacea*

Figure 6: *Orchis ustulata*

Figure 7: *Orchis morio*



Figure 8: *Tragopogon pratensis*

Other highlights of the morning included our first sighting of the beautiful and understated *Polygala nicaensis*, which was to become a set feature throughout our trip. Similarly we were able to see our first *Leopoldia comosa*. This photogenic plant is also known as *Muscari comosum*, but became known to us throughout the trip as the ‘Punk Hyacinth’ thanks to Karen, one linguistically creative member of our trip! Meadow wildflowers such as *Silene italica*, a reflexed catchfly, and *Tragopogon pratensis* (Goat’s-beard) also impressed.

Afternoon session: Walk from Tudes to meadows surrounding the abandoned village of Santiago de Porceida

After a leisurely lunch we wandered into the meadows around the apartments for a few hours. The landscape we encountered this afternoon en route to the meadows had a much stronger Mediterranean feel to it, typified by limestone shale with patches of ericaceous plants such as *Erica arborea* and *Daboecia cantabrica*. Mediterranean plants included *Quercus ilex*, *Arbutus unedo*, *Cistus psilosepalus* (endemic), *Cistus salviifolius* (larger flowered than the *C. psilosepalus*), *Lavendula stoechas*, *Saponaria ocymoides* and *Erysimum duriaei* amongst others.

Having wandered past the intriguing abandoned village of Santiago de Porceida, apparently left to crumble due to local property rights disputes, we were able to climb steeply into some fabulous meadows, rich with more wildflowers to discover. As the meadows climbed the slopes, increasing numbers of sizeable mounds of *Genista hispanica* became visible. In amongst the long grass of the meadows we found various orchids such as *Orchis ustulata*, *Orchis morio*, *Orchis mascula* (the early purple orchid) and the wonderful creamy



Figure 9: Avidly searching for orchids

Dactylorhiza markusii. Also present were plants such as *Conopodium majus* (pignut), *Bellis sylvestris* (similar to the common *Bellis perennis* but with larger flowers and a long stem), *Colchicum spp.*, *Polygala nicaensis* in various colours ranging from blue to purple and pink, and many others.



Figure 10: *Genista hispanica*



Figure 11: *Dactylorhiza markusii*

Kit gave us some useful tips on orchid identification, including how to distinguish between *Orchis mascula* and *Orchis morio*, which at first glance can seem very similar. The *Orchis morio* has a pair of green striped lateral sepals at top of the flower which appear like a hood. The lateral petals on the *Orchis mascula* are not striped green and are slightly reflexed.

Sunday 26th May: Tudes to Puerto de San Glorio (with several roadside stops)

Today we ventured to Puerto de San Glorio, a mountain pass reaching an altitude of 1,609m. Due to the cold conditions this year, the types of flora in flower were different to those one would normally expect to find. The peak would normally be full of gentians in late May for example but this year they were only starting to emerge. What we may have lost in *Gentiana* however we gained in abundance in *Narcissus*. They were absolutely the highlight of the day. At each stop we made towards the summit we saw a different type of *Narcissus* in profusion. These included *Narcissus triandrus*, for me the most beautiful, with creamy reflexed petals; *N. nobilis*, with a classic large trumpet flower; and finally, *N. asturiensis*, a tiny delicate *Narcissus* found just at the snow melt line at the peak.



Figure 12: *Narcissus triandrus*

Figure 13: *N. asturiensis*

Figure 14: An unusual mutated form of *N. nobilis*



Figure 15: Meadow of *N. nobilis*

Having seen *Narcissus* in their natural habitat I now have a greater understanding of the growing conditions they require in cultivation. As is evident in the photograph below, showing *N. nobilis* concentrated along a watercourse, they appear to prefer moist growing conditions during their growing and flowering period, although the bulbs may dry out during the summer period. At Windsor Castle, where I currently work, there are thousands of daffodils planted on the mound next to the Round Tower which have come up 'blind' in recent years,

which I now suspect is due to the dry springs we have been experiencing (this year being of course an exception).



Figure 16: *Gentiana verna*

There were many other highlights today. These included *Gentiana verna* (in dark and pale blue), *Gentiana lutea* (not as yet in flower), *Ornithogallum umbellatum*, *Scilla verna* and *S. liliohyacinthus*, the latter of which we saw en masse in beech woodland high up the slopes, much as we would see bluebell woods in the UK.

Amongst many other beautiful flowers we saw *Erythronium des canis* near the snow line, *Fritillaria pyrenaica subsp. boisioii*, *Pedicularis foliosa* (*Pedicularis* are root hemi-parasites), *P. verticillata*, and many different coloured *Anemone nemorosa*. Other plants which tolerate moist conditions included *Trollius europeus* (in bud, not as yet in flower), and *Caltha palustris* along the banks of streams. Orchids were again present at lower altitude, including *Orchis masculata*, *Dactylorhiza sambucina* (in purple form), and *Dactylorhiza majalis*. There was also an abundance of attractive small alpine species such as *Lithospermum diffusum* in striking blue, *Saxifraga granulata*, *Biscutella laevigata*, *Helianthemum croceum subsp. cantabrica* and *Thlaspi brachypetalum*.

At high altitude we also found *Daphne laureola subsp. philippi*, the endemic *Ranunculus amplexicaulis*, *Betula celtiberica* (closely related to the British *B. pendula*) and *Helleborus viridus subsp. viridus*. One of the most intriguing plants of the day was however the *Pinguicula grandiflora* (the large flowered Butterwort). This is an insectivorous carnivorous plant which traps small insects on their sticky leaves in order to derive additional minerals and nutrients.



Figure 17: Chris intrepidly traversing the snowy pass at Puerto de San Glorio!

Monday 27th May: Mogrovejo

This morning we spent a leisurely few hours at the market. I purchased an excessive amount of local cheese.

In the afternoon we headed out for a botanical stroll in the woodlands around the historic town of Mogrovejo which is notable for its mediaeval tower and picturesque setting. Clearly an important village for tourism, the houses were all very well kept, complete with colourful pot plants outside each door and bright banks of *Calendula officinalis*. *Sedum anglicum* was growing in the nooks of roofs and walls of buildings, displaying many more hues of white and pink than could be expected in the UK. A couple of very architectural *Silybum marianum* plants were also growing in the earth next to the houses.

The woodland stroll was stunning, every now and then the woodland opening out to reveal a panoramic view of the Picos mountains with limestone ridges. The woodland edge gave way to some grazed pastures and abundant wildflower meadows. Evidence again of some ericaceous plants was an indicator that we were walking at fairly low altitude.



Figure 18: A view from Mogrovejo



Figure 19: *Ajuga pyramidalis*

The wildflower meadows revealed swathes of *Asphodelus albus*, *Rhinanthus alectorolophus*, *Polygala nicaeensis*, *Ajuga pyramidalis*, *Serapias lingua* and *Centaurea nigra* amongst others. The hedgerows were full of plants such as *Doronicum columnae*, *Lamium maculatum*, *Papaver rhoeas*, *Veronica chamaedrys*, *Geranium sanguineum*, *Linum usitatissimum* and *Stellaria holostea*. In the more densely wooded areas we discovered several groups of flowering *Aquilegia vulgaris*, *Astrantia major* and *Hyacinthus non-scriptus*. The canopy layer of trees included *Quercus pubescens* and *Robinia psuedoacacia*. The *Q. pubescens* had more open foliage than we had seen previously. The foliage changes from a grey to an attractive pinky colour as it opens. Towards the end of our walk we found an orchid we hadn't previously seen, *Dactylorhiza fuchsii*, the Common Spotted orchid and another root hemi-parasite, *Melampyrum pretense*.

On the journey back to the apartments we were lucky enough to find a couple more new orchids, *Himantoglossum hircinum* (the Lizard orchid, 'hircinum' meaning in latin 'goat-like' or 'smelling of goat'), *Aceras anthropophorum* (the Man orchid), and some beautiful clumps of *Allium roseum* on the roadside just off the turning to Tudes.



Figure 20: *Aceras anthropophorum*

Figure 21: *Himantoglossum hircinum*



Figure 22: *Allium roseum*

Tomorrow a trip to Fuente De if weather's fine. Unfortunately we will be unable to complete the walk due to snow drifts. Cucayo or Anieao will be alternatives as they are drier.

Tuesday 28th May: Fuente De

Today we travelled to Fuente De, where a cable car took us 753 m up to 1,847m altitude (753m from the starting platform) to the Puertos de Aliva. This limestone mountain range is usually abundant with alpine flora at this time of year. Unfortunately at the time of our visit the summit was clad in a layer of snow, making passage and the search for any more than a very limited amount of alpine flora impossible. Svenja, Amy and myself did however hugely enjoy finding the few plants that were visible at the snowline, which included *Narcissus asturiensis* looking rather pitiful, *Thymelaea dioica*, *Gentiana verna*, *Daphne laureola* subsp. *phillipi*, *Draba aizoides* and *Genista legionensis*. The latter seemed to be draped all over most visible rock faces. According to Kit this creates a mass of yellow flowers when in bloom, which must look spectacular.



Figure 23: *Thymelaea dioica*

Figure 24: *Daphne laureola* subsp. *phillipi*



Figure 25: Amy and Svenja out in the snow

Figure 26: Really high! View from the top of the Fuente De cable car



Figure 27: *Gentiana occidentalis*

We spent the rest of the day enjoying the diversity of flora in the lower meadows and rocky slopes. In the lower meadows we found many buttercups, including *Ranunculus bulbosus* (identifiable by its reflexed sepals), *R. ficaria* and *R. gramineus*. There were also *Helleborus foetidus* and *H. viridus* (distinguishable as the latter has basal leaves), *Hepatica nobilis*, and *Cardamine raphenifolia* amongst others. Orchids included *Orchis mascula*, *O. ustulata*, and *Aceras anthropophorum*. Probably the most striking, with its luminescent blue, was the *Gentiana occidentalis* which Kit fortunately discovered for us towards the end of the day.

On the rocky slopes there was also a wealth of plants of interest, in the areas where the plants had been able to find stable ground in amongst the scree. Delicate *Scilla verna*, *Polygala nicaeensis*, *Globularia cordifolia*, *Lithospermum diffusum* and *Iberis spathulata* were evident, as were *Euphorbia polygalifolia*, *Linaria alpine subsp. filicaulis* and *Erinus alpinus*. There were numerous mounds of *Androsace villosa*, Kit interestingly pointed out the eye of the flower turns pink on pollination, as is clear in the *Figure* below.



Figure 28: *Globularia cordifolia*

Figure 29: *Scilla verna*

Figure 30: *Linaria alpine*



Figure 31: *Androsace villosa*

Wednesday 29th May 2013: An aborted trip to Puerto de Pandetrave

Today our planned trip to Puerto de Pandetrave had to be aborted due to snow blizzards! As an alternative we visited a number of different sites on our return to Tudes. These were composed of three quite different habitats: rocky outcrops, alpine woodlands and wildflower rich hay meadows.

We encountered a number of new plants. These included the opulent red and orange *Tulipa australis*, *Fritillaria lustranica*, *F. pyrenaica*, *Iris latifolia*, *Orchis pallens* found on an unofficial roadside stop, and *Dactylorhiza insularis* (this had been spotted the evening before just above Tudes but was not such a good example).



Figure 32: *Dactylorhiza insularis*

Figure 33: *Tulipa australis*

Figure 34: *Orchis pallens*



In the rocky outcrops there were some lovely natural rock gardens including plants such as *Acinos arvensis*, *Minuartia verna*, *Erinus alpinus*, *Hippocrepis comosa* and *Chaenorhinum orangifolium*. At our last stop we visited some beautiful wildflower meadows, made all the more special as the sun came out for one of the few occasions of the day. The rich meadows were full of flowers such as *Echium plantagineum*, *Euphrasia spp*, *Anthyllis vulneraria subsp. alpestris*, *Serapias lingua* and *Asphodelus albus*.

Figure 35: Grouping of *Chaenorhinum orangifolium*, *Erinus alpinus* and *Acinos arvensis*



Figure 36: *Asphodelus albus*

Figure 37: *Serapias lingua*

The irregular snow blizzards we have experienced on this trip may be symptomatic of the volatile weather patterns currently being experienced globally associated with climate change. The reasons behind why we have been experiencing these unusual weather patterns is however unclear. Scientists are currently trying to determine whether they are due to a range of causes such as changes to the path of the Gulf Jet Stream; reduction in Arctic sea ice, and changes to ocean cycles such as the Atlantic Meridional Overturning Circulation which transports heat around the world. According to scientists global ocean cycles have been in unusual patterns for the last 10 years, potentially due to an increase in global temperatures, giving rise to unusual weather patterns.

The impact of highly fluctuating weather on alpine plants is also currently being evaluated by groups of scientists worldwide. Scientists have recently published an article in *Nature* evaluating data from 867 vegetation samples above the treeline from 60 summit sites in all major European mountain systems. This study showed that in view of projected climate change there would be a progressive decline of cold mountain habitats and their vegetation¹.

In practice what is likely to occur as temperatures increase is that cold adapted plants will either try to shift northward in latitude, which may be problematic if there is not suitable habitat for them to shift across; or that they will attempt to migrate upwards in altitude on the mountains they inhabit. Plant migration is likely to be limited where they literally run out of mountain on which to migrate. Alpine plants which demonstrate better ability to adapt to warmer conditions will naturally be better able to survive long term². Given climate change projections for Spain are that there is likely to be a temperature increase of 4 degrees 'C, at current emission levels by 2100³, considerable negative impacts on alpine flora seems inevitable.

Thursday 30th May

This morning we wandered down to Potes on footpaths and tracks from the apartments at Tudes. Before we set off a kind lady from the village shared some local walnuts with us, delicious! It was a wonderful sunny day so we all greatly enjoyed the warmth. As the route was similar to that we walked last Saturday we saw many of the same plants, however there were several interesting different features.

Memorably we came across some managed *Quercus suber* (Cork oak) woodlands. These trees are harvested approximately once a decade. We were fortunate enough to find some trees where the cork had been very recently harvested, revealing the deep red ochre of the previously concealed trunk underneath. These cork oak habitats provide important socio-economic as well as environmental services. The cork provides a sustainable income for local communities. Although plastic corks are now being increasingly used by the wine industry, natural cork is utilized by the high quality section of the market, ensuring the product derives good value in economic terms. Environmentally the cork oak habitat helps regulate the water cycle and assists with soil conservation, helping to combat desertification.



¹ Gottfreid et al, January 2012, "Continent-Wide response of mountain vegetation to climate change", *Nature Climate Change*

² John E. G. Good and David Millward, 2007, "Alpine Plants: Ecology for Gardeners", Batsford, pp. 157-159

³ UK Met Office Hadley Centre, 2011, "Climate: Observations, Projections and Impacts: Spain", p. 53



Figure 38: *Cephalanthera damasonium x longifolia*

A couple of new orchids were found today, *Cephalanthera damasonium x longifolia* and *Orchis langei*, in the dappled shade of the woodland. There were also a plethora of beautiful small flowers such as *Petrorhagia velutina*, *Acinos arvensis*, *Hepatica nobilis* and *Jasione perennis*.



Figure 39: *Jasione perennis*

In the afternoon we took a short trip to the villages of Aniezo and Vinziano, where we found many plants of interest, including *Cardamine raphanifolia* and *Geranium lucidum* which were growing on the moist banks of watercourses. We again saw more *Anacamptis papilionacea* and *Orchis langei*. On leaving the villages we also spotted a fabulous *Lilium pyrenaicum* in full flower in the local vegetable plot.



Figure 40: *Orchis langei*

Figure 41: *Cardamine raphanifolium*

Figure 42: *Lilium pyrenaicum*

Friday 31st May: The haymeadows of Tudes and Cucayo

Today we spent the morning exploring the meadows around Tudes and the afternoon in the lovely village of Cucayo. The sun was shining again this morning, providing a wonderful light for photography. We found some unusual plants, including an interesting orchid hybrid, *Orchis morio* x *Anacamptis papilionacea*, showing how easily orchids hybridize in the wild. We also discovered an albino form of *Echium plantagineum* and an odd *Plantago*, known as *Plantago maritima* subsp. *serpentina*. Generally there was an overwhelming amount of plant species to relish, including the architectural *Galactites tormentosa*; *Antirrhinum angustifolium*, *Misopates orontium* (Weasel's snout), *Polygala nicaeensis*, soft pink *Malva moschata*, *Plantago media*, vibrant yellow *Tuberaria guttata*, and many more of the previously seen orchids to name but a few.



Figure 43: *Orchis morio* x *Anacamptis papilionacea*

Figure 44: *Plantago media*

Figure 45: *Echium plantagineum* (albino form)



Figure 46: Large grouping of *Orchis mascula*

This afternoon we visited Cucayo, a village perched on the edge of the mountain slopes. Behind the village are conglomerates of rock, a mix of river stone and sediment thrown up by a volcanic eruption. This provides an ideal growing environment for the rare endemic *Petrocopis pyrenaica*. Also of interest were two different *Globularia*, *G. cordifolia* and *G. repens*, nestled in the nooks of rocky outcrops. A colossal grouping of *Orchis mascula* was to be found having scrambled up a bank, and an albino specimen of the same. Examples of the silvery leaved *Eryngium bourgatti* about to flower were also observed, and the delicate *Linaria alpinus*.



Figure 47: *Globularia repens*



Figure 48: *Petrocopis pyrenaica*

Saturday 1st June: Barreda to Obargo

Our final day in the Picos. Accompanied by glorious sunshine we walked from the village of Barreda to Obargo, bypassing wildflower meadows, rich with wild orchids and a wide variety of other flora. The villages themselves seemed very well provided for with small orchards, vegetable plots and a walnut grove. Some peach leaf curl was evident on some of the nectarine trees. The contrast in diversity of flora between the grazed and ungrazed meadows was stark. Although grazing clearly limits the growth of wild flora, anthropogenic land use change in terms of clearing woodland has provided opportunities for the otherwise rare wildflower meadow species, providing space and enough sunlight for them to thrive.



Figure 49: *Himantoglossum hircinum*

Today we saw the most prolific numbers of orchids en masse to date. In fact Kit said he had never seen so many of some orchids, such as the *Anacamptis papilionacea* in one spot. Other orchids seen included *Serapis lingua*, and *Himantoglossum hircinum*. We even saw an albino form of *Anacamptis papilionacea*. Other interesting plants included the annual *Echium vulgare*, *Antirrhinum angustifolium*, *Leopoldia comosa*, *Allium roseum*, and *Lupinus spp.*, the latter of which was not wild but had probably been planted as a green manure at some point by the local farmers.

Thanks to all the rain, common meadow flowers such as *Linum usitatissimum*, *Lotus corniculatus*, *Geranium pyrenaicum*, *Rhinanthus alectorolophus*, *Thymus masticiana* and *Salvia verticillata* all glistened in the sunlight, against a stunning backdrop of the Picos mountains.



Figure 50: Wildflower meadow with many *Anacamptis papilionacea*



Figure 51: *Anacamptis papilionacea* (albino form)

Figure 52: *Echium vulgare*

Figure 53: *Lavendula stoechas*

Sunday 2nd June: Return to the UK

Today we finally returned to the UK after an enjoyable drive along the Spain coast. To conclude this report I shall include a couple of pictures of the underrated *Polygala nicaeensis*, in homage to this beautiful plant!



Figure 54: Polygala nicaeensis 1

Figure 55: Polygala nicaeensis 2

Budget

Summary of costs	Expenditure
Travel Costs:	<i>£245.11</i>
Cost of flights (Stansted to Santander)	<i>£167.00</i>
Cost of hire car	<i>£30</i>
Cost of fuel	<i>£50.10</i>
Cost of train travel to / from airport	<i>£11.70</i>
Cost of train travel to Kew Gardens	<i>£9.50</i>
Car travel to RHS Wisley (@ 25p per mile)	<i>£513.41</i>
Total Travel Costs	
Administration:	<i>£14.89</i>
Insurance	<i>£14.89</i>
Total Administration Costs	
Equipment:	<i>£150</i>
Equipment and clothing (personal contribution)	<i>£150</i>
Total Equipment Costs	
Other Costs:	<i>£625</i>
Cost of organised tour	<i>£14.50</i>
Entry ticket to Kew	<i>£117.20</i>
Subsistence (@ £20 per day)	<i>£639.50</i>
Total Other Costs	
Total Expenditure	<i>£1167.80</i>

Total grant received from RHS Bursary Committee *£275*

Total Grant received from Merlin Trust *£1,100*

A sum of £90 surplus grant will be returned to the Merlin Trust.

Name:

Signature:

Date:

Bibliography

“Climate: Observations, Projections and Impacts: Spain”, UK Met Office Hadley Centre, 2011

Christopher Grey-Wilson and Marjorie Blamey, “The Alpine Flowers of Britain and Europe”, Collins, 1986

Gottfreid et al, “Continent-Wide response of mountain vegetation to climate change”, *Nature Climate Change*, January 2012

João Santos Pereira, “From the Cork Oak to Cork: A Sustainable System”, APCOR – Portuguese Cork Association

John E G Good and David Millward, “Alpine Plants: Ecology for Gardeners”, Batsford, 2007

Oleg Polunin and B. E. Smythies, “Flowers of South-West Europe: A Field Guide”, Oxford University Press, 1988

Oleg Polunin, “Flowers of Europe”, Oxford University Press, 1969

Richard Wilford, “Alpines from Mountain to Garden”, Royal Botanic Gardens, Kew, 2010

Teresa Farino, “Flora and Fauna of the Picos de Europa”, 2013

V.H. Heywood et al, “Flowering Plant Families of the World”, Firefly Books, 2007

ANNEX I: Plant list

Saturday 25th May

Morning Session:

Anacamptis papilionacea
Anthyllis vulneraria
Briza media
Dipsacus fullonum
Echium plantaginenum
Fumaria spp
Galactites tomentosus
Geranium molle
Geranium pyrenaicum
Himantoglossum hircinum
Hippocrepis comosa
Lathyrus pratensis
Leopoldia comosa (previously *Muscari comosum*)
Leucanthemum vulgare
Linaria supina
Linum usitatissimum
Lotus corniculatus
Malva moschata
Mentha spp
Orchis morio
Orchis ustulata
Polygala nicaensis
Quercus ilex
Ranunculus acris
Ranunculus bulbosus
Rhinanthus alectorolophus
Rumex acetosella
Sanguisorba major
Serapias lingua
Silene italica
Silene nutans
Thymus mastichina
Tragopogon pratensis
Trifolium ochroleucon
Valeriana officinalis
Arbutus unedo

Afternoon walk:

Alyssum diffusum
Arenaria boissieri
Bellis sylvestris
Bryonia alba
Cistus psilosepalus
Cistus salvifolius
Colchicum spp.
Conium maculatum

Conopodium majus
Daboecia cantabrica
Dactylorhiza markusii
Erica arborea
Erysimum duriaei
Fragaria vesca
Genista hispanica
Helianthemum croceum
Helichrysum spp.
Helleborus foetidus
Hepatica nobilis
Juglans regia
Juniperus communis
Lavendula stoechas
Lithospermum diffusum
Orchis mascula
Orchis morio
Orchis ustulata
Primula vulgaris
Quercus ilex
Quercus pubescens
Saponaria ocymoides
Saxifraga granulata
Sedum album
Sedum reflexum
Tamus communis
Thesium spp.
Valerianella discoidia

Sunday 26th May

First stop:

Ajuga pyramidalis
Anemone nemorosa
Asphodelus albus
Biscutella laevigata
Dactylorhiza majalis
Dactylorhiza sambucina (in purple form)
Euphorbia hyberna
Euphorbia polygonifolia
Genista hispanica
Globularia cordifolia
Helianthemum croceum subsp. cantabricus
Lithospermum diffusum
Meum athamanticum
Narcissus nobilis
Narcissus triandrus
Orchis mascula
Polygala nicaeensis
Ranunculus amplexicaulis
Ranunculus bulbosus

Ranunculus nigrescens
Saxifraga granulata
Scilla liliohyacinthus
Scilla verna
Sorbus aucuparia
Thlaspi brachypetalum
Vaccinium myrtillus
Viola riviniana

Second stop:

Anthemis triumfetti
Caltha palustris
Campanula patula
Dactylorhiza maculata
Echium plantagineum
Fritillaria pyrenaica subsp boissieri
Gentiana lutea (not as yet in flower)
Gentiana verna
Lithospermum diffusum
Meum athamanticum
Narcissus nobilis
Orchis maculata
Papaver rhoeas
Pedicularis foliosa
Pedicularis verticillata
Pinguicula grandiflora
Primula elatia
Primula elatior
Primula veris subsp. columnae
Scilla liliohyacinthus
Scilla verna
Stellaria holostea
Symphytum tuberosum
Trollius europeus
Vicia pyrenaica

Third stop:

Alchemilla spp
Betula celtiberica
Daphne laureola subsp. phillipi
Erythronium dens canis
Gagea lutea
Helleborus viridus subsp occidentalis
Juniperus communis
Narcissus asturiensis
Ornithogalum umbellatum
Prunella grandiflora
Ranunculus amplexicaulis
Sedum acres

Fourth stop:

Anthemis spp.
Cerastium spp.
Fagus sylvatica
Oxalis acetosella
Primula elatior
Romulea columnae
Saxifraga granulata
Vicia pyrenaica
Viola cornuta

By the roadside:

Antirrhinum angustifolium
Aquilegia vulgaris
Cardamine raphenifolia
Erica vagans
Globularia cordifolia
Trifolium incarnatum
Vicia pyrenaica
Viola cornuta

Monday 27th May

Aceras anthropophorum
Ajuga pyramidalis
Anthemis triumfetti
Aquilegia vulgaris
Asphodelus albus
Astrantia major
Castanea sativa
Centaurea nigra
Cistus salvifolius
Daboecia cantabrica
Dactylorhiza fuchsii
Dactylorhiza markusii
Doronicum columnae
Echium plantagineum
Geranium sanguineum
Helianthemum croceum
Himantoglossum hircinum
Hyacinthus non-scriptus
Lamium maculatum
Lilium pyrenaicum
Linum usitatissimum
Melampyrum pratense
Papaver rhoeas
Polygala nicaeensis
Potentilla pyreneica
Prunus spp
Psoralea bituminosa
Quercus pubescens
Quercus pyreneica

Ranunculus ficaria
Rhinanthus alectorolophus
Robinia pseudoacacia
Rosa alpestris
Rosa pendulina
Salvia verticillata
Saxifraga granulata
Scabiosa knautia
Sedum anglicum
Serapias lingua
Silybum marianum
Stellaria holostea
Symphytum spp
Veronica chamaedrys

Tuesday 28th May

At higher altitude:

Daphne laureola subsp. philipi
Draba aizoides
Genista legionensis
Gentiana verna
Helianthemum croceum
Lithospermum diffusum
Narcissus asturiensis
Potentilla crantzii
Ranunculus amplexicaulis
Thymelaea dioica

In the lower meadow:

Aceras anthropophorum
Androsace villosa
Aphodelus albus
Aquilegia spp (probably vulgaris)
Asperula pyrenaica
Biscutella laevigata
Cardamine raphenifolia
Coryllus avellana
Erinus alpinus
Erodium cicutarium
Eryngium bourgatii
Euphorbia polygalifolia
Genista hispanica
Genista legionensis
Genista sagetallis
Gentiana occidentalis
Globularia cordifolia
Helleborus foetidus
Helleborus viridus
Hepatica nobilis
Iberis spathulata

Linaria alpina
Linaria alpina subsp *filicaulis*
Lithospermum diffusum
Ophris fusca
Orchis mascula
Orchis ustulata
Primula elatior
Pritzelago alpina subsp *auerswaldii*
Ranunculus bulbosus
Ranunculus ficaria
Ranunculus gramineus
Saxifraga granulata
Scilla verna
Teucrium pyrenaicum
Thymelaea dioica
Vicia pyrenaica

On the turning to Tudes:

Aceras anthropophorum
Himantoglossum hircinum
Orobanche alba

On the hillside above Tudes:

Cynoglossum officinale
Dactylorhiza insularis
Nepeta spp
Orchis moreo
Polygala nicaeensis
Potentilla rupestris

Wednesday 29th May 2013

Site beyond Puerto de san Glorio:

Armeria alliacea
Erinus alpinus
Eryngium bourgatii
Genista occidentalis
Helianthemum croceum
Helleborus foetidus
Iris latifolia
Lithospermum diffusum
Minuartia verna
Narcissus triandrus
Orchis mascula
Pentaglottis sempervirens
Ribes spp.
Saxifraga continentalis
Saxifraga granulata
Saxifraga pentadactylis
Scilla verna
Trollius europeus

Tulipa australis
Verbascum spp.

Second site:

Amelanchier ovalis
Anemone nemorosa
Aquilegia vulgaris
Arabis alpina
Asphodelus albus
Betula celtiberica
Cardamine resedifolia
Cistus psilosepalus
Corylus avellana
Dactylorhiza inularis
Erythronium dens canis
Euphorbia hyberna
Fritallaria lusitanica subsp. *hispanica*
Fritallaria pyrenaica
Myrrhis odorata
Narcissus nobilis
Plantago media
Polygala nicaeensis
Prunus padus
Ranunculus bulbocus
Ranunculus gramineus
Saxifraga continentalis
Scilla liliohyacinthus
Stellaria holostea
Thlaspi brachypetalum
Trollius europaeus

On the roadside:

Orchis pallens

Third site:

Acinos arvensis
Asplenium trichomanes
Chaenorhinum orangifolium
Doronicum columnae
Erinus alpinus
Geranium rotundifolium
Geum montanum
Geum rivale
Hippocrepis comosa
Minuartia verna
Papaver dubium
Saxifraga continentalis
Silene itallica
Viola cornuta
Viola tricolor

Fourth site:

Achillea millefolium
Aconitum spp
Alchemilla spp
Cardamine pratensis
Cistus salvifolius
Daphne laureola subsp philippi
Erica arborea
Erodium cicutarium
Filipendula ulmaria
Fritallaria lusitanica
Gagea lutea
Mercurialis perennis
Vaccinium myrtillus

Fifth site:

Allium victorialis
Anthyllis vulneraria subsp. alpestris (pink form)
Asphodelus albus
Centaurea nigra
Cynoglossum officinale
Daboeica cantabrica
Echium plantagineum
Erica vagans
Helianthemum croceum
Lithospermum diffusum
Melampyrum spp.
Orchis ustulata
Ornithogallum umbellatum
Plantago media
Polygala nicaeensis
Rhinanthemum minor
Scabiosa cinaria
Serapias lingua
Stellaria holostea
Teucrium pyrenaicum
Thesium pyrenaicum
Viola cornuta

Thursday 30th May

Acer campestre
Acinos arvensis
Anthyllis vulneraria subsp. alpestris
Arbutus unedo
Arenaria spp.
Bellis sylvestris
Bryonia dioica
Campanula linifolia
Cephalanthera damasonium x longifolia
Chamaespartium sagittale

Cistus salvifolius
Clematis vitalba
Conium maculatum
Cornus sanguinea
Cytisus cantabricus
Cytisus scoparius
Daboeca cantabrica
Dorycnium hirsutum
Echium plantagineum
Erica arborea
Eryngium bourgatii
Euphorbia spp.
Fragaria vesca
Genista hispanica
Geranium pyrenaicum
Geranium rotundifolium
Hepatica nobilis
Hippocrepis comosa
Jasione perennis
Lathyrus aphaca
Lathyrus setifolius
Lavendula stoechas
Leopoldia comosa
Linum usitatissimum
Lithospermum diffusum
Lonicera periclymenum
Malva moschata
Malva sylvestris
Orchis langei
Papaver somniferum
Petrorhagia velutina
Phillyrea latifolia
Pistachia terebinthus
Primula vulgaris
Psoralea bituminosa
Quercus ilex
Quercus pubescens
Quercus suber
Ranunculus auricomus
Rhinanthus alectorolophus
Ruscus aculeatus
Saponaria ocymoides
Sedum album
Sedum anglican
Sedum reflexum
Serapis lingua
Sinapis arvensis
Thesium spp.
Thymus mastichina
Trifolium ochroleucon
Umbilicus rupestris

Afternoon trip:

Acinos arvensis
Allium vineale
Anacamptis papilionacea
Anacamptis papilionacea
Campanula spp.
Cardamine raphanifolia
Carex pendula
Centaurea nigra
Doronicum columnae
Erica arborea
Erica vagans
Erigeron spp.
Galactites tormentosa
Geranium lucidum
Iberis spp.
Lathyrus latifolius
Lathyrus pratensis
Lilium pyrenaicum
Orchis langei
Pruimula vulgaris
Ranunculus
Sedum anglican
Sedum reflexum
Silene itallicus
Stachys recta
Thymus mastichina
Valerianella discoidia
Veronica beccabunga
Vinca major

Friday 31st May

Morning walk around Tudes:

Anacamptis papilionacea
Antirrhinum angustifolium
Armeria alliacea
Bellis sylvestris
Cistus psilogula
Cistus salvifolia
Dactylorhiza insularis
Dactylorhiza markusii
Daucus carota
Echium plantaginacea
Echium plantagineum (including an albino form)
Erica arborea
Eryngium bourgatii
Erysimum duriaei
Euphrasia officinalis
Fumatoria officinale

Galactites tomentosa
Helleborus foetidus
Juniperus communis
Lavendula stoechas
Leopoldia comosa
Lithospermum diffusum
Malva moschata
Medicago spp.
Minuartia arvensis
Misopates orontium
Orchid hybrid – between *Orchis mareo* and *Anacamptis papilionacea*
Orchis moreo
Orchis ustulata
Plantago maritima subsp. *serpentina*
Plantago media
Polygala nicaeensis
Rhinanthus alectorolophus
Salvia verticillata
Sanguisorba officinalis
Sedum reflexum
Serapis lingua
Stellaria holostea
Stellaria italicum
Thymus spp
Tragopogon porrifolius
Trifolium ochroleucum
Tuberaria guttata
Veronica chamaedrys

Afternoon in Cucayo:

Roadside stop:

Anthyllis spp.
Aquilegia vulgaris
Geranium pyrenaicum
Lilium martagon
Potentilla alchemilloides
Rhinanthum minor
Saxifraga aizoon
Saxifraga gramineus
Saxifraga pentadactylus subsp. *willkomiana*
Scrophularia canina

Cucayo:

Acinos arvensis
Amelanchier spp.
Asphodelus albus
Asplenium septentrionale
Chaenorhinum origanifolium
Chamaespartium sagittale
Cruciata spp.

Eryngium bourgatii
Genista occidentalis
Geranium lucidum
Globularia cordifolia
Globularia repens
Lamium garganicum
Linaria supina
Lotus corniculatus
Lychnis flos-cuculi
Narcissus nobilis
Narcissus triandrus
Orchis mascula (including an albino specimen)
Orchis ustulata
Pentaglottis sempervirens
Petrocopis pyrenaica
Potentilla alchemilloides
Potentilla croceum
Primula elatior
Ranunculus nigrescens
Sagina apetala
Saxifraga aizoon
Saxifraga granulata
Silene dioica
Silene itallicum
Silene itallicus
Silene vulgaris
Viola odorata
Viola riviniana

Saturday 1st June

Allium roseum
Anacamptis papilionacea (including an albino specimen)
Antirrhinum angustifolium
Asphodelus albus
Cistus salvifolius
Dipsacus fullonum
Echium plantaginacea
Echium vulgare
Fumaria schleicheri
Geranium lucidum
Geranium pyrenaicum
Helianthemum croceum
Helleborus foetidus
Himantoglossum hircinum
Lavendula stoechas
Leopoldia comosa
Leucanthemum vulgare
Linaria triornithophora
Linum usitatissimum
Lotus corniculatus
Lupinus spp

Papaver rhoeas
Parentucellia latifolia
Quercus ilex
Quercus pubescens
Ranunculus pratensis
Rhinanthus alectorolophus
Rhinanthus minor
Ruscus aculeatus
Salvia verticillata
Serapis lingua
Silene itallicum
Thymus masticians
Trifolium ochroleucon
Valeriana officinalis
Valerianella discoidia
Velezia rigida
Verbascum thelapis