

**BRISC**

BIOLOGICAL RECORDING IN SCOTLAND

Issue No 62 July 2006

ISSN 0966-1964

Recorder News

The spread of Knopper Gall wasps into the Clyde area – Norman & Pearl Tait **p1****Chair's columns** – Patrick Milne Home **p2****Editorial** – **p2****BRISC contact details** **p2****Deadline for next issue** **p2****New passwords for 'private' webpages** **p2****What is special about the Eden Estuary** – Les Hatton **p4****Conference Report:** **p6**▪ **Mud snails (*Omphiscola glabra*) in Scotland** - Craig Macadam **p6**▪ **Teaching Anglers to Identify River Invertebrates : The Tweed Trout & Grayling Initiative** - Kenny Galt **p8**▪ **Minutes of AGM 2006** **p8****Members Forum** **p10****Book Reviews** **p11**▪ **Hill, D., Fasham, M., Tucker, G., Shewry, M. & Shaw, P. (eds) (2005). *Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring*** (Craig Macadam)▪ **Benton, Ted. (2006) *Bumblebees*. New Naturalist Series** (Murdo Macdonald)**ID courses and events** **p12**

Quercus cerris, (L) and an a-sexual or agamic generation in autumn on pedunculate oak *Q. robur*, (L). The random distribution of Turkey oaks in Scotland will limit further northward expansion. This article describes the knopper gall wasp's advance into suitable sites in west and central Scotland.

Knopper Galls. The wasp *Andricus quercuscalicis* in insert

Lifecycle

In spring a-sexual females oviposit into the male flowers of the Turkey oak. The hatching larvae induce tiny, thin-walled, flask-shaped galls to develop on the catkins in April and May, giving rise to a sexual generation. Males and females of the sexual generation emerge in late May to early June of the same year. The sexual females then oviposit into the female flowers of the native pedunculate oak where an agamic generation develops, producing galls on the acorns in the summer and autumn. These large, 2cm galls are very conspicuous and consist of a mass of pyramidal-shaped, ridged tissue that breaks out between the cup and the acorn with two or more growths on an individual acorn.

Continued on p.3

The spread of Knopper Gall Wasps into the Clyde area

By Norman & Pearl Tait

Introduction

The knopper gall wasp *Andricus quercuscalicis* (Burgsdorf 1783) (Hymenoptera: Cynipidae) has invaded western and northern Europe from southern and eastern Europe over the last 400 years. In the late 1950s the insect arrived in the south of England, presumably having crossed the English Channel on high altitude air currents, and has slowly spread northwards reaching southern Scotland in 1995. This species of gall wasp has an obligate sexual generation in springtime on Turkey oak



Notes from the Chair

Why did I need to worry about the Annual Conference and AGM? Jon Mercer had done a superb job organising it all and our thanks to him, his helpers on site, the speakers and the financial contributions made by Scottish Borders Council and SNH. All this help and the setting and facilities of Tweed Horizons Business Centre combined with the sunny weather for our visit to

Whitlaw Mosses NNR made for an excellent day, and I hope the fifty-one paying attendees thought so too. I was very relieved you did not give me a hard time at the AGM – the timing, just before lunch, I think assured that peoples’ minds remained focused on getting through the business element!

The most important aspect at the AGM, from my point of view, was the approval given for the adoption of the Business Plan. This now gives BRISC a clear line to follow for the next ten years and we will start to implement it with immediate effect. The first matter to be addressed being the raising of finance for a senior administration officer; this will necessitate the approach to a number of grant aiding organisations as, without such help, BRISC will be unable to fund any post on their own.

At the beginning of May I attended the Conference and AGM of National Federation for Biological Recording (NFBR) in Birmingham. This was also an excellent conference with a range of speakers over two days and provided a great opportunity to meet a number of people involved in similar work down south. I am due to go south again in June to attend a meeting of the NBN Local Records Centre Steering Group. There does seem to be an inordinate number of meetings and, as ever, are they meetings for meetings sake or do they actually achieve something? I suppose the art is picking ones where you can get them to have an influence on an issue, and if they do influence an outcome then they are almost certainly worth putting some effort into.

During June is another AGM; this time it is the turn of LINK, which is then followed on the same day by a series of workshops to discuss their policy, media, campaigns and parliamentary work. BRISC is an associate member of LINK and therefore we have the opportunity to influence all of their work. I see the main thrust of our input being to ensure that Recording is taken into account when talking about environmental issues, and that we do not get sucked into active lobbying over specific issues. I do try and attend these events to ensure that our role is correctly presented.

It is not always easy for BRISC Committee Members to attend our meetings, albeit there are only four meetings a year, and, to try and ensure that we have both a good spread of Members from throughout the country and that we have adequate numbers at the meetings, we have co-opted two additional members onto the Committee. They are Murdo Macdonald from Inverness and Sara Hawkswell from West Lothian.

We have recently assisted North East Scotland Biological Records Centre in a grant application to the Cairngorms National Park. This was to enable NESBReC to run a series of training courses in biological recording, which were aimed at both experienced recorders and those who had no previous experience. This is very similar to our Wildlife Counts Project, run by Claire McSorley, and I am very pleased that BRISC can be of assistance. It seems that there is a genuine interest in recording, as I understand that the courses run to date have been well subscribed. I hope that this bodes well for the future, that the number of recorders continues to increase and, perhaps more importantly, their records are put onto appropriate databases and become available on a much wider basis than has been possible in the past.

Claire McSorley is another Member who has recently been co-opted onto the Committee. In this instance to take on the role of Secretary, and we are most grateful to her for having agreed to take this on.
Patrick Milne Home



Editorial

Following on from the success of this year’s annual conference, planning has already started on next year’s event. This will take place at the Birnam Centre, Perthshire, on Saturday 24 March 2007 with the suggested theme “Biological recording – why bother?” Please ink this date into your new diaries.

Summaries of two of this year’s talks have been included in the present issue, but it is hoped to publish some if not all the others in the October issue.

Also in the present issue, Les Hatton has come up trumps with a splendid piece of ‘What is special about the Eden Estuary’. This is certainly a place to explore if you are not already familiar with it. Looking ahead I have offers of articles for this series for the next two issues, but if any reader would like to offer me their own article on ‘What is special about ...’ a particular area, please get in touch. It can focus on a geographical area, such as a county, or just a special site like the Eden estuary.

Please note that user name and password for the “Members only” webpages have changed. See below for details.

I have two corrections to make to the printed version of the last issue (No 61), both relating to the illustrations for the article *Watch your Flies*, and both my errors. On p.1 in the caption to the illustration the vernacular name should be *Conopid* fly, and on p.3 in the caption to the photo of the large handsome hoverfly the Latin should be *Helophilus pendulus*. Sincere apologies to Gordon Corbet.

Anne-Marie Smout

BRISC Contacts:

Chairman

Patrick Milne Home, Craigow, Milnathort, Kinross-shire, KY13 0RP, Tel 01577 863758 Email Patrick@milnehome.org

Wildlife Counts Project Officer and BRISC Secretary

Claire McSorley, c/o BTCV, Balallan House, Allan Park, Stirling FK8 2QG, Tel 01786 474061 Email brisc-wcp@btcv.org.uk

Treasurer and Membership Secretary

Duncan Davidson at 140 Pitcorthie Drive, Dunfermline KY11 8BJ Email Duncan@dwwd.freereserve.co.uk

Publications Secretary

Anne-Marie Smout, Chesterhill, Shore Road, Anstruther, Fife KY10 3DZ Tel. 01333 310330 Email amsmout@aol.com

Website Manager

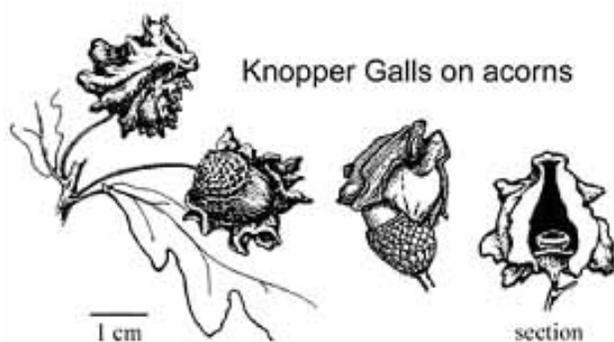
Andy Wakelin, 32 Tailyour Cresc. Montrose, Angus DD10 9BL Email andy.wakelin@which.net

WEBSITE - For the Members Only web pages use

Username **crex**
Password **corncrake**

Knopper Galls - Continued from page 1

The distinctive shape of these galls gave rise to the common name of 'knopper' from the German word *knoppe* meaning a kind of felt cap or helmet worn during the seventeenth century, which the galls are said to resemble. Russet-green, glabrous and sticky at first, the structures later become reddish coloured. After hardening the galls turn brown and drop to the ground in late autumn. Inside the gall is a single, large chamber with a small, hard, thin-walled, spherical inner structure at the base containing one larva. The a-sexual generation overwinters in the hard knopper galls. At the beginning of February the adult a-sexual female gall wasp emerges through a vent at the top of the gall. These newly emerged insects later disperse to Turkey oak where the cycle is repeated.



Distribution of Turkey Oak and the spread of the Knopper gall wasp

Over many centuries, Turkey oak has been planted extensively outside its native range of south-eastern Europe and Turkey and was first introduced to the British Isles in 1735. This tree was planted in parks, gardens and country estates as an ornamental tree thus creating 'islands' of Turkey oak. The knopper gall wasp was now able to successfully invade areas far from its own native range. The English Channel seems to have temporarily held up the knopper gall wasp's invasion of mainland Britain, first noted in Devonshire in the late 1950s. These arrivals were probably unassisted by human agency and would appear to have been air-borne. This species of gall wasp has since spread steadily throughout England, Wales and parts of Ireland. The invasion front extended slowly northwards and by 1994 it was present at Alnwick, Northumberland, on the east side of England, and at north Lancashire to the west.

Scottish Records

The first Scottish knopper galls were collected in 1995 at Canonbie (35/396717) and later at Threave Gardens (25/684517) in Dumfries & Galloway region. In early 2001 knopper galls were reported in the west of Scotland from Lanfine Estate, Newmilns in Ayrshire in 2001 and in Gosford near Aberlady to the east.

The following table lists personal knopper gall observations made during September/October 2002, 2003 and 2004:-

Lanarkshire (VC77)

Location	grid ref.	galls found	Turkey oak
Chatelherault C. Park	NS 539737	4	present at Low Parks
Strathclyde C. Park	NS 735583	3	present at Low Parks

Renfrewshire (VC76)

Location	grid ref.	galls found	Turkey oak
Mar Hall Hotel parkland *	NS 725455	250+	16 trees present in parkland
Gleniffer Braes C. Park	NS 608480	3	probably
Paisley, Renfrew Road	NS 489650	4	none known
Renfrew, Clyde Walkway	NS 500689	50+	2 trees at Renfrew Golf Course
Renfrew, North Deanpark	NS 514672	5	present as above

* formerly Erskine Disabled Servicemen Hospital

Dunbartonshire (VC99)

Location	grid ref.	galls found	Turkey oak
Ardmore Point	NS 785317	4	probably
Gartocharn	NS 425860	25+	2 trees present
Strathleven Park	NS 399779	2	none found
Balloch Country Park	NS 388835	1	4 trees present
Ross Priory	NS 415875	3	probably
Canniesburn Care Home	NS 545712	2	probably (near Garscube Estate)
Erskine Bridge (north)	NS465725	100+	across river at Mar Hall
Drymen	NS 481888	1	not known
Cameron House	NS 375832	10+	probably (near Balloch Park)
Dunbarton Castle	NS403746	1	not known

Perthshire (VC 88)

Location	grid ref.	galls found	Turkey oak
Battleby	NO 085291	2	probably

Acknowledgements

The authors are grateful to Geof Hancock for confirming our identification of the insects that emerged from the galls. Many thanks to Graham Stone for sending various papers relating to the life history of the knopper gall wasp, and thanks also to John Mitchell, Dr Keith Futter and Dr Patricia Walker for sending details of their unpublished records of recent discoveries of knopper galls.

References

- Hancock, E.G. (2001) 'Alien insects in Scotland', *Glasgow Naturalist Supplement* 23,57-65
- Stone, G.N. *et. al.* (1995). 'Geographic and between-generation variation in the parasitoid communities associated with an invading gallwasp', *Andricus quercuscalicis* *Oecologia* (1995) 104: 207-217

Norman & Pearl Tait
11 Rosshall Place,
Renfrew, PA4 0BA.

What is Special about the Eden Estuary?

By Les Hatton



Eden Estuary from Balmullo – photo Les Hatton

More than a Wilderness

Located on the north-east corner of the Fife peninsula the Eden Estuary is dwarfed by the larger firths of Tay and Forth that lie above and below it, its 891 hectares of largely intertidal habitat, tightly hemmed in by a major paper mill, agriculture, forestry, golf courses and along most of its northern shore by a busy military airbase. With 62% of the shoreline behind various forms of sea defenses of varying aesthetic value the Eden is anything but a wilderness, indeed it is far more interesting than that. Despite, or in some cases perhaps because of, this intensive use, it remains of such high wildlife value that it is a Natura 2000 site with SSSI, SPA, and SAC designations that reflect the importance of its biological communities and habitats.



Guardbridge Paper mill – photo Les Hatton

Site History

Whilst the Eden had long been subject to such pressures as commercial mussel collection and salmon fishing and the dumping of material, it was uncontrolled shooting that was the catalyst to introducing some management to the area. Wildfowling was at the forefront of the drive for Local Nature Reserve status, alarmed as they were at the poor quality of sportsmanship and the need to have a mechanism to manage shooting pressures. After ten years of negotiation and consensus building the reserve was formally declared a Local Nature Reserve by local authority in 1978, with byelaws and the first Ranger introduced in 1983. The Eden had been declared an SSSI in 1971 (re-notified in 1981) primarily for winter wildfowl and waders. SPA designation followed in 2000, followed by SAC designation (2005) for intertidal habitats and common (harbour) seal *Phoca vitulina*, these latter two European designations as part of the Tay-Eden complex.

Ecological Value

The Eden is part of an exciting and diverse area that takes in the Earls Muir and Tayport Heath SSSIs, Tentsmuir Forest, Tentsmuir Point and Morton Loch NNR, around into the Tay Estuary itself. Set within this broader ecological context the Eden supports a much wider range of biodiversity as part of this complex, whilst also adding some particular elements to it.

Plant communities are remarkably rich, with a range of various saltmarsh types, many of regional importance, extending around its shores. In this respect the rapidly evolving plant community that exists between the accreting Earls Muir SSSI and the LNR's high water mark boundary on the north shore is of particular interest. The pace of change and diversity is exceptionally high here and it is not surprising that a number of nationally rare plants such as oak-leaved goosefoot *Chenopodium glaucum* may be found. This area also holds rich and poorly documented areas of bryophyte communities. Even the well-worn dune at Outhead, an area of exceptionally high visitor pressure, can throw up some surprises such as the re-emergence of blue fleabane *Erigeron acer* in the 21st century.

Eel grass communities are well represented with extensive albeit sparse areas of *Zostera angustifolia* in the outer part of the estuary, whilst there are patchy and dense stands of *Z. notlii* in the inner bay. *Z. marina* is also thought present, although efforts are underway to confirm this.

Denizens of the Mudflats

The extensive tidal flats are well studied by Professor David Paterson's SERG (Sediment Ecology Research Group) based at St. Andrews University, and are used for a range of other university projects. It is apparent from SERG and others work that the reserve supports dense populations of invertebrate fauna, which in turn attract large numbers of birds. Indeed metre for metre the Eden supports some of the highest bird densities in Britain, even though the overall size of such populations is limited by the 'pocket' nature of the estuary.

Most of the bird interest (and reasons for notification) derives from wintering wildfowl and waders, some of these from the large seaduck concentrations in the adjacent St. Andrews bay. Species of note include shelduck *Tadorna tadorna*, common scoter *Melanitta nigra*, velvet scoter *M. fusca*, grey plover *Pluvialis squatarola* and both species of godwit *Limosa spp.* Indeed the Eden is the best site in Scotland to see black-tailed godwit *Limosa limosa* almost all year round, with a record Scottish count of 811 on 10 April 2005. It is one of the few mainland Scotland sites where this species has been recorded breeding, though sadly not since the late 1970s.



Black-tailed Godwit - photo Les Hatton

Nationally important numbers of greylag *Anser anser* regularly winter and up to 2000+ pink-footed geese *Anser brachyrhynchus* can share the estuary with them, particularly during freezing weather. The Eden is unusual in carrying a regular wintering flock of the hrota (light-bellied) race of brent goose *Branta bernicla*, although numbers rarely exceed 20 except on passage.

A small group of waders (primarily lapwing *Vanellus vanellus*, ringed plover *Charadrius hiaticula*, and snipe *Gallinago gallinago*) and terns attempt to breed most years, and the adjacent ground continues to support healthy populations of species such as skylark *Alauda arvensis* and reed bunting *Emberiza citrinella*. Water rail *Rallus aquaticus* breeds regularly in small numbers, particularly in the reedswamp area developing on the north shore. Sadly the population of corn bunting *Miliaria calandra* appears to have retracted significantly in the last decade, and this species is now only a sporadic breeder.

The reserve has been blessed by various unusual visitors over the year and has a good track record of regularly turning up less common birds such as ruff *Philomachus pugnax* and osprey



Little Egret - photo A-M Smout

Pandion haliaetus on passage, as well as genuine rarities. In recent years this has included little egret *Egretta garzetta* (first recorded on the Eden in 2002 but now regularly encountered in Scotland), American golden plover *Pluvialis dominica* (2003), Temminck's stint *Calidris temminckii* (2003), and crane *Grus grus* (2005).

Mammals and other Taxa

Otters *Lutra lutra* breed on the reserve and have been recorded in most of the recording compartments but are remarkably hard to see. Occasionally one or two animals become more obvious for a while, and there was an enjoyable but short-lived period when patient observers with a telescope could watch an otter regularly working the mussel beds from the comfort of the reserve centre at Guardbridge on an almost daily basis. Common seal *Phoca vitulina* breed on the reserve, and are present all year round, with over 200+ being recorded at peak. Grey seals *Halichoerus grypus* are also commonly encountered, particularly in the summer months. Intriguingly there have been a couple of dead water shrews *Neomys fodiens* found, although live specimens have not been encountered.

The Overlooked and Under Observed

One important and overlooked component of the estuarine environment is its fish populations, and whilst there have been long documented runs of salmon *Salmo salar* and sea trout *Salmo trutta* our knowledge of what is under the water when the tide comes in is remarkably poor. This has implications for our understanding of the ecology of the estuary, for example the remarkable growth in the summer flock of moulting goosander *Mergus merganser* on the Eden (and other small Scottish east coast estuaries) that began in the late 1980s may have coincided with the recovery of sprat *Sprattus sprattus* and herring *Clupea harengus* populations. We only discovered that there were good populations of these species in the estuary during the June-September period through the bye catch of a research project on sea trout during the 1990s.

Whilst the invertebrate fauna of the intertidal areas is well documented with extensive lists of bivalves, crustaceans and other marine based groups, terrestrial invertebrates are more poorly known. We are fortunate in that the reserve is well served by volunteers who have an interest in Lepidoptera and Odonata, and for this part of Scotland the reserve has a respectable selection of both, including both darters *Sympetrum striolatum* and *S. danae* and elegant butterflies such as the dark-green fritillary *Argynnis aglaja*, whilst the nearby Earlshall Muir and edges of Tentsmuir support small pearl-bordered fritillary *Boloria selene*. In the late spring / early summer of 2006 a small colony of green hairstreak *Callophrys rubi* was discovered at the northern end of the reserve (Mike

Ramage, *pers. com*). Moths are much less well known, although unsurprisingly both cinnabar *Tyria jacobaeae* and six-spot *Zygaena filipendulae* are abundant.



Guardbridge hide for birdwatchers – photo Les Hatton

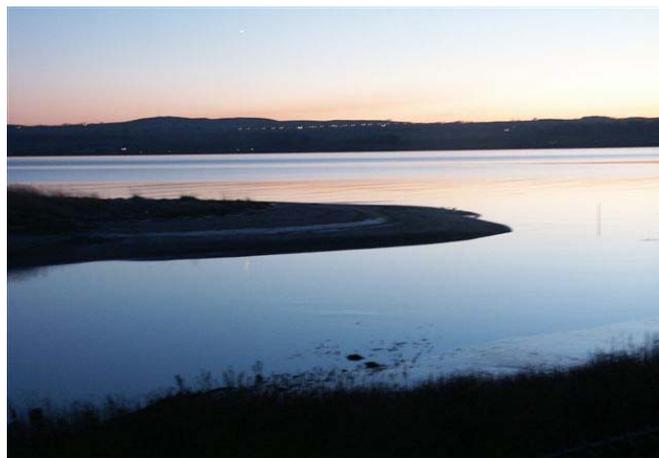
Reserve Facilities

Whilst much of the reserve is intertidal there is good access to most of it with car parks at the top of the West Sands and Guardbridge, giving access to the south side, and Kinshaldy giving access from the Tentsmuir end. For birdwatchers there is a small visitor centre open daily 9am-5pm with toilets and heating at Guardbridge (follow signs for the Eden Estuary Centre), and a wooden hide at Balgove bay (requires key-available from Ranger Service) accessed from the golf course. The site is open to people wishing to examine any of its botanical or other interests, although the site is covered by bylaws that prevent removal of specimens without a permit. Anyone wanting to carry out any serious study would be encouraged to contact the Ranger Service to organise a permit and to discover what other work is being carried out in this busy research environment. The Ranger Service would be keen to receive records of any taxa, particularly those under-recorded ones, and to encourage both amateur and professional research. Current contact details for the Ranger Service are;

Les Hatton (Ranger),
Craigtoun Country Park,
St. Andrews, Fife KY16 8NX.
Tel; 01334 473047/ 07985 707593.
Email: nefrs@craigtoun.freeserve.co.uk

Afterword

So what makes the Eden so special? Primarily it is the fact that such a range of biology can be met with in such a relatively compact area, and which is subject to such rapid and dynamic change (indeed there are dune systems younger than many of the children who visit the reserve). Despite its close proximity to major settlements and workplaces this constantly evolving and changing environment can often be explored in remarkable peace and solitude, and again, despite being well visited, a massive amount remains to be learnt about the habitats and wildlife of the site, particularly under-recorded groups such as lower plants and invertebrates. Happy recording.



Shelly spit – photo Les Hatton

CONFERENCE REPORT

[It is hoped to publish summaries of the remaining talks in the October issue ed]

Mud snails (*Omphiscola glabra*) in Scotland Craig Macadam

Omphiscola glabra (Müller, 1774) (formerly *Lymnaea glabra*) is listed as vulnerable (RDB2) in the Red Data Book (Bratton, 1991). In addition, it is listed as a species of conservation concern in the UK Biodiversity Action Plan and has been proposed as a priority species in the recent BAP review and listed on the Scottish Biodiversity List. It has been included in the biodiversity action plans for Falkirk, East Dunbartonshire, Scottish Borders, Clackmannanshire and, most recently, West Lothian.

Funding from Scottish Natural Heritage, Falkirk Council and West Lothian allowed a Scottish Action Plan for this species to be published in 2005. The Mud Snail Study Group was formed shortly afterwards to promote the conservation of the mud snail in Scotland and to support the conservation work of Local Biodiversity Partnerships and other conservation organisations. The study group successfully applied to the Biodiversity Action Grants Scheme (BAGS) for funds to facilitate the implementation of the action plan.

Distribution

Omphiscola glabra is found south of 61°N in Scandinavia and throughout central parts of Western Europe, including France, Germany, Spain, the Netherlands and Belgium. It is however declining throughout its range, and is now localised wherever it occurs. In Eire, it has always been rare - the only population found in the last 50 years (Shelmaliere Commons, Co. Wexford) was destroyed by farm drainage in 1980 (Hurley, 1981).

Historically, this species was widespread throughout acidic lowland areas of England and Wales. Although possibly under-recorded, it is thought that this species has undergone a marked decline and is now nationally scarce. It remains fairly common on a localised basis in southern Yorkshire and parts of

south-western England, with colonies recorded on eight scattered Sites of Special Scientific Interest (SSSI).

There are Scottish records from 14 ten-kilometre squares, however the majority of these records date from the late 19th/early 20th century. Modern records (post 1970) have been reported from East Dunbartonshire (2002 and 2005), North Lanarkshire (1995) and the Scottish Borders (1973 and 1988). Additional sites have recently been reported from Falkirk (1993), West Lothian (2000) and Clackmannanshire (2004). The mud snail study group has investigated 11 of these 10km records and has identified only five extant populations.



udsnaills *Omphiscola glabra*

Ecology

Adults of *Omphiscola glabra* are typically 12-20mm in length and can be identified using Macan (1977) or Glöer (2002). Adult snails have distinctive shells, although inexperienced workers may confuse juvenile specimens of *Lymnaea palustris* and *Galba truncatula* with this species.

O. glabra is typically found in soft, nutrient-poor waters with few other aquatic animals or plants. These include freshwater marshes, small ditches, temporary pools or seepages that dry up or significantly diminish in summer. These water-bodies are challenging habitats, which in the past were regarded as inferior wildlife habitats and were typically converted into productive agricultural land or improved visually for landscape reasons. Occasionally this species is found in larger water bodies such as swampy drainage ditches and even permanent ponds. It is expected that the number of individuals present at each site will fluctuate from year to year, possibly quite dramatically. This means that any estimate of the population size is likely to be unrealistic.

When pools recede or dry out in summer the snails may be difficult to locate as they burrow into the exposed soft mud and become dormant or aestivate at a depth of 1-6cm.

Most populations are found on uncultivated land with acidic, sandy or gravelly soils, such as heaths and commons, or other unimproved grasslands. In southern Yorkshire, the habitat tends to be either swampy surface ditches or temporary pools (see Boycott 1936 for detailed habitat requirements).

O. glabra is usually the only species of snail present, but sometimes it is found where a few other species that can cope with occasional drying out of the habitat also occur, typically the moss bladder snail *Aplexa hypnorum* and occasionally the button ramshorn snail *Anisus leucostoma*. Other molluscs that have been found in habitat suitable for *O. glabra* include the

red-cruled pea mussel *Pisidium personatum*, *Pisidium casertanum* and the dwarf pond snail *Galba truncatula*. *Omphiscola glabra* is never found where there is a high diversity of snails.

The main threats to mud snail populations are the loss of small ponds and wetlands through development or drainage schemes, inappropriate management such as deepening of seasonal pools, agricultural practices leading to enrichment and run-off into wetlands, isolation of populations and an incomplete knowledge of the distribution and needs of the snails. One of the main aims of the mud snail study group is to determine what makes a good mud snail pond. Unfortunately, there appears to be a lack of funding for habitat management or the creation of new ponds and wetlands.

Captive Breeding

Omphiscola glabra are particularly easy to breed in captivity. Pat Wisniewski of the Wildfowl and Wetland Trust at Martin Mere pioneered captive breeding and the mud snail study group has successfully bred three generations from a single sample of snails. The basic set-up is a plastic aquarium or shoebox filled with local mineral water to a depth of 25mm. Organic lettuce is introduced as food and is supplemented with flaked fish food to ensure the growing snails receive other minerals. It is important that the lettuce is organic so that the snails are not exposed to pesticide residues. Egg masses are laid approximately 3-4 weeks after introduction to the captive environment. In the wild, egg laying begins in mid-February. Egg masses contain 10-30 eggs, typically 12-15 eggs. Eggs develop quickly and once they hatch the small snails feed readily. The key to development and survival seems to be temperature. If the temperature is too low there is little activity, conversely if the temperature is too high the snails die. This is one aspect that the mud snail study group will investigate this year. There are currently around 650 snails in captivity, and by the end of 2006 this figure should rise to around 2000 snails. At present, the study group is negotiating a release policy for these captive bred snails with Scottish Natural Heritage.

Education

Education and raising the public knowledge and understanding of mud snails is one of the primary aims of the mud snail study group. Mugdock Country Park near Milngavie has a mud snail display in their visitor centre and there are plans for other displays at country parks in the area. Eight schools across Falkirk, North Lanarkshire and East Dunbartonshire are currently participating in the captive breeding project, with some of the pupils using the project as part of their John Muir Award. Each school is given a tank and 20 snails that they feed and care for, taking note of the appearance of eggs, the number of eggs per egg mass and development rates. On average, a school with 20 snails is producing around 170 snails at the end of the project.

In March 2006 the mud snail study group was featured in *Whatever!* magazine – a free magazine distributed to 420,000 primary school children and 12,000 primary teachers in Central Scotland, Tayside and Fife. This was an excellent way to raise awareness of the mud snail throughout its geographic distribution in Scotland.

Future Work

The mud snail study group will continue its work to promote the conservation of mud snails in Scotland. In particular, it will continue to search for other populations, especially in areas around historical sites where snails are not present, but also around extant populations.

A detailed investigation of the ecology of the Scottish populations in relation to other parts of the United Kingdom will be undertaken in an attempt to define what makes a 'good' mud snail habitat.

Finally, the study group will continue the captive breeding project and agree a suitable policy on release with Scottish Natural Heritage.

Craig Macadam –
Bradán Aquasurveys Ltd.

References

- Boycott, A.E.(1936). 'The habitats of fresh-water mollusca in Britain'. *Journal of Animal Ecology*. 5:116-186.
- Bratton, J.H. (ed.) (1991). *British Red Data Books*. 3. *Invertebrates other than Insects*. Joint Nature Conservation Committee, Peterborough.
- Glöer, P. (2002). *Die Süßwassergastropoden Nord- und Mitteleuropas*. Conch Books, Hackenheim, Germany.
- Hurley, J. (1981). 'A history of the occurrence of *Lymnaea glabra* (Gastropoda: Pulmonata) in Ireland'. *Irish Naturalist's Journal*. 20:284-287.
- Macadam, C.R. (2002). 'Information note on *Lymnaea glabra* for the Falkirk Local Biodiversity Action Plan'. Unpublished.
- Macadam, C.R. (2005). 'An action plan for the Mud Snail – *Omphiscola glabra* (Müller, 1774)'. www.mudsnailstudygroup.co.uk
- Macan, T.T. (1977). *A Key to the British Fresh and Brackish-Water Gastropods*. FBA Scientific Publication 14 fourth ed.:21-23
- Wisniewski, P. (1999). 'Maintaining a culture of the Mud Snail *Lymnaea glabra* (Müller, 1774)'. *The Conchologists' Newsletter*. No. 151:254-256

Teaching Anglers to Identify River Invertebrates The Tweed Trout & Grayling Initiative Kenny Galt

Launched in June 2005 the Tweed Trout and Grayling Initiative was devised by the Federation of Border Angling Associations (FBAA), the Tweed Foundation, local communities and natural historians. It aims to develop self-sustaining management of the wild trout and grayling of the river Tweed and its tributaries.

One of the first tasks undertaken by the Initiative was to develop a scheme that would allow anglers to monitor the river invertebrates that make up a substantial part of the diet of resident Tweed fish. This was as a direct response to concerns expressed by Tweed anglers over a perceived decline in Tweed invertebrate life.

The Initiative developed the monitoring scheme in the summer of 2005 with help from John Clayton (SEPA Senior Ecologist) and Craig Macadam (National Ephemeroptera Recording Scheme, Riverfly Workshops and Bradán Aquasurveys). The monitoring scheme was also heavily influenced by the Riverfly

Workshops being run up and down the UK by English Nature; the Natural History Museum; the John Spedan Lewis Trust for the Advancement of the Natural Sciences and the national mayfly, stonefly and caddis fly recording schemes. The main aim was to look at long term trends in invertebrate numbers.

The two main challenges when developing the monitoring scheme were what sampling method to use and to what level would the anglers be able to identify the invertebrates? The sampling method that was agreed upon was the method used by the Riverfly Workshops (three minutes "kick sampling", followed by one minute "stone washing"). The Riverfly Workshops have tried to make this a standard sampling method and we saw no need to be different. It was decided that for the identification we would get the anglers to concentrate on mayflies, stoneflies and caddis flies (as these are the invertebrates that are of most importance to anglers). Mayflies and stoneflies would mainly be identified down to family level (with a few uncommon families omitted) however for the caddis flies, which have far more families, only a few common families would be identified.

In late September and early October 2005, twenty-eight anglers attended the first training course, run at the Tweed Foundation. These anglers now go out and take twice-yearly fly life samples (in spring and autumn) from a convenient site within their angling association waters. After collection the anglers bring the samples back to the Tweed Foundation and use low powered microscopes to identify the invertebrates. The results are collected by the Initiative and provide the information needed for the monitoring scheme. All equipment is provided by the Initiative.

As the monitoring scheme is in its infancy, each angler only takes invertebrate samples from one sampling site and identifies only some of the invertebrates to family levels. However it is hoped that as the monitoring scheme progresses so will the skill of the anglers and in the future we hope that there will be more sampling sites and more precise levels of identification.

Kenny Galt
Trout & Grayling Biologist, The Tweed Foundation
Drygrange Steading, Melrose, TD6 9DJ
tel. 01896 84 82 71 fax. 01896 84 82 77
e-mail. kgalt@tweedfoundation.org.uk

Minutes of BRISC 2006 Annual General Meeting held on Saturday 8 April 2006 at The Tweed Horizons Centre, Newtown St Boswells, Scottish Borders 12.40 13.20

Apologies for absence

Andy Wakelin, Jonathan Willet, Gill Calder, Elizabeth Roberts.

Minutes of the Annual General Meeting held on 9 April 2005 at the Bute Building, St Andrews

The minutes had been circulated earlier via *BRISC Recorder News* (July 2005 issue). Copies were also included in the

delegates' pack. The minutes were approved without any changes.

Chairman's Report for 2005

Patrick Milne Home (PHM) indicated that the annual report had been circulated prior to the meeting and also that a further copy was included in the delegates' pack. He hoped people had read it and did not propose to go into it in here any great detail. The main items were that the Development Officer's project had ended and that a new project had commenced with the Wildlife Counts project. Claire McSorley had been appointed as project officer. PMH asked if there were any questions. There were none.

Wildlife Counts Project Officer's Report

Claire McSorley said she had started in mid-October 2005 with the project, which was about recruiting new recorders. The project focussed on three local authority areas: Falkirk, North Lanarkshire and Stirling, and offered free workshops and field outings, aimed primarily at beginners, although existing recorders could be involved as 'mentors'. The workshops were starting this month (April) and leaflets had been circulated with the full programme for people to sign up to. Copies of this were available by the display she had brought with her.

From the floor Thomas Huxley (TH) queried the involvement of existing experts, indicating that there was a need to call upon their expertise, especially with difficult taxa, though any expert involvement also brought with it some difficulties, such as having critical reference collections to hand. These constraints were readily acknowledged by others present. Alan Cameron, who had developed the project while Development Officer for BRISC, welcomed TH's comments and explained that only certain objectives would obtain grants, in particular from the Heritage Lottery Fund (HLF), whose remit had long been to favour involvement of new audiences. Helping existing recorders to extend their expertise had only recently been achieved though a new Natural Talent HLF Bursary. BTCV and the Bat Conservation Trust were taking up this opportunity.

Another comment from the floor raised the need to monitor the progress of the new recorders periodically to ensure they were not lost. Paul Kirkland responded that Butterfly Conservation had run a number of introductory courses, involving lots of new inexperienced people, some of whom had certainly dropped out, but others had become real enthusiasts. It was important to note that these events offered an opportunity to get involved and even if only a few of those attending actually went on to become committed recorders, this was only to be expected. Without such events they might never have had the opportunity or realised what fun recording could be.

Anne-Marie Smout (AMS) pointed out that in the budget for the project BRISC was down to provide a substantial sum 'in kind'. Volunteer help counted as 'in kind' and any assistance from Thomas Huxley and anyone else at the programmed events would be very much welcomed.

Jim Munford welcomed the Natural Talent Bursary funding and congratulated HLF on a real change of direction. It was so much easier for HLF to fund the acquisition of a building or a plot; but assisting people to acquire skills was much less

measurable. However, this new direction would have substantial support from DEFRA, following a report – soon to be published - on the lack of success of the BAP process. The findings of the report were that the monitoring required for the UK BAP felt far short of expectations, especially as regards species. The report laid the blame on government for not having enacted what was required for the success of the BAP process.

Annual Accounts

Duncan Davidson presented the accounts. The figures were included in the annual report and were hopefully self-explanatory. The financial situation was in a fairly healthy state: this was due to the increase in the annual subscription agreed at last year's AGM and also to the fact that a full year's grant money had been received from HLF for the Wildlife Counts project, whereas BRISC was only paying BTCV monthly for managing the project. The accounts had been duly examined and approved by Douglas Turner, solicitor, of Drummond Cook and Macintosh, Anstruther. There were no questions and the accounts were approved.

Membership

Duncan Davidson told the meeting that membership was fairly static:

- Individual membership stood at 92 (lost 5 and gained 4)
- Corporate membership stood at 27 (lost 1 and gained 1)

AMS suggested that Douglas Turner should be made an honorary member of BRISC as this was the third year he examined our accounts for free. The meeting agreed this.

Constitution

PMH said there were no reasons to make any changes to the constitution at the present moment. This was agreed.

Annual subscriptions

PHM said that these had been raised last year and there would be no change this year.

Forward planning: BRISC Business Plan

PHM said that a lot of the committee's time and effort had gone into drafting this. Copies the plan had already been circulated to members and another copy was included in the delegates' packs. He hoped that members had taken the opportunity to study the document in detail. It was very ambitious, but the committee felt that if BRISC were to make a real impact the plan would need to go for an influential post and for someone who could spend a lot of time on high level inputs. PHM as Chair did not have the time to devote to this amount of representation, but of course money to fund such a post would have to be found. All comments on the plan would be very much welcomed, even if just to say that it had been read. Unless there were substantial comments to the contrary, BRISC committee would now go ahead and take the plan forward. No decision had been made on what to call the officer.

From the floor, TH congratulated BRISC on the plan, agreeing that it was very ambitious but that this was the right approach and hoped that the plan would gain the support it deserved.

The Meeting was happy to endorse the plan.

Election of Honorary Officers and Council for 2006/7

PHM told the meeting of the committee changes which had taken place during the year: Allan W Brown had stood down as treasurer, due to a change of job and new commitments, but happily Duncan Davidson had joined the committee, taking on the post of treasurer as well as that of membership secretary.

Jennifer Davidson had moved job within SNH so was no longer involved, but he hoped that her replacement within SNH would join the committee. From the floor, Claire Seymour introduced herself and said she would be pleased to join the committee. This was warmly welcomed. PMH asked for more members to volunteer to serve on the committee and share the responsibilities of running BRISC. No one from the floor offered. All existing officers were re-elected on mass.

There was no other business and the Meeting closed at 13.20



Delegates enjoying the fine lunch spread at the Tweed Horizons Centre. Claire Seymour (SNH) and Nick Littlewood (NESBReC) in the foreground.



The conference outing to Whitlaw Mosses, NNR – photos A-M Smout

MEMBERS FORUM

Further thoughts about learning identification

Supplementary to my comments about learning identification at our spring conference at the Tweed Horizons Centre, here are

two stories, the first about a common mammal. A few months ago, the agricultural column of *The Scotsman* newspaper had an article about badgers and tuberculosis quoting a Professor of Zoology. The article was accompanied by a photograph intended to illustrate a European badger. It looked odd to me but when I 'phoned the Professor, he thought not, that it was indeed *Meles meles*. I then asked a member of the British Association of Shooting and Conservation and he said definitely not (or words to that effect!). Eventually I sent the picture to Edinburgh Zoo, by which time I had looked in Google and seen that the animal was clearly an American badger, *Taxidea taxus*, which the Zoo confirmed was correct. The other story is about water bugs about which I am thought to be fairly expert. Recently, after a break from recording of several years, I visited Tresco, one of the Isles of Scilly where I made a small species list, much reduced in comparison with earlier records. I concluded that the freshwater on Tresco was now mostly brackish. As was my usual habit, I collected and killed in preservative as many specimens of apparently different species as seemed adequate. Under the microscope I was confident about the identification of all but one specimen which did not look quite right for the name I had focused on; but of eight specimens there was just one male, crucial for identification. I sent it and the females to Sheila Brooke who has replaced me as the national organiser of the water bug recording scheme and she e-mailed back that it was a different species, one that I knew well in Scotland but had not expected to find in a brackish habitat. The mistake on my part was embarrassingly stupid and a false record would have gone into the data had I not retained the specimen and sent it to Sheila.

There are two lessons here: (i) even so-called experts may quickly get out of practice at spotting fine differences and (ii) for some groups, it is crucial to kill specimens and preserve them for future reference or for a second opinion. Molluscs are another group for which one's own reference collection (initially confirmed by an expert) can be helpful. However, in today's conservation culture the need to kill specimens may be shunned as not just unnecessary but also morally wrong. Thus birds can be identified by song and bumble bees, dragonflies and macro-moths by sight. Difficult specimens may be kept in a fridge overnight and released the next day. Importantly, it should be and indeed is possible to do good and accurate recording, often without capture, and always without killing.

When, at the conference, I suggested that there is a need for reality in learning identification, I had in mind the considerable differences between identification to family or species level; to identification in the field and identification following capture and preservation for detailed examination, with all that this may later entail in the way of keeping dry specimens in boxes and wet specimens in jars. These differences are not easily learnt and much may depend on space at home for holding specimens and specialist equipment, cultural attitudes to killing and dissection, individual resolve and constant practice, and 'thinking through' the implications of focusing on selected groups.

Thomas Huxley,
The Old Manse, Pitcairngreen, Perth PH1 3LR

BOOK REVIEWS

Hill, D., Fasham, M., Tucker, G., Shewry, M. & Shaw, P. (eds) (2005). *Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring*. Cambridge University Press. ISBN-13: 9780521823685 | ISBN-10: 0521823684. Hbk £85. Also available as eBook.

You would be excused for thinking that the last thing that is needed is another book to tell you how to look at biodiversity, however this is a reference book with a difference. When I opened it and started to flick through it I found that I was drawn into reading section after section. A five-minute quick look turned into an hour and a half of reading! The book is well written and covers each separate subject concisely without the text becoming too dry.

The book, which runs to 571 pages, is split into three parts covering planning, habitats and species. The first part explains how to produce a robust and comprehensive sampling programme. Topics covered include method selection, sampling strategies and data analysis and ask questions such as “is the method likely to damage the environment?” and “should sample locations be permanent or not”. The statistics behind developing a robust sampling programme are discussed in detail. Statistics is a difficult subject for many, with textbooks often getting bogged down in the theory. The use of a series of well-worked, relevant examples in this handbook means that the statistical approaches described can be attempted by almost anyone.

The second part covers habitats in a clear and concise fashion. Habitat requirements and issues are discussed under two headings: “Survey and monitoring requirements and methods” and “Specific issues affecting the monitoring of the habitat”. These discussions focus on assessing habitat condition and management requirements. Each habitat type is complimented with a table that summarises the attributes and recommended monitoring techniques. These specialised monitoring techniques are discussed in detail along with more general techniques for each habitat. The discussion of specialised techniques includes their recommend uses, time efficiency, the expertise and equipment required, field methods, data storage and analysis issues, and a summary of the principal advantages and disadvantages of the technique. This part is concluded with a short discussion of habitat conservation evaluation criteria including details of protection status in the UK and EU and conservation status in the UK.

The final part of this handbook covers species in a similar fashion to the preceding part on habitats. General principles and methods for investigating species biodiversity are explained through a combination of clearly written text and easy to follow figures.

The remainder of this part is taken up by discussions of specific monitoring methods for major taxonomic groups: lower plants, fungi, vascular plants, invertebrates, fish, amphibians, reptiles, birds and mammals. Specific attributes for assessing the condition of each taxonomic group are given, together with general methods for surveying and monitoring the group. The conservation status of each group discussed and criteria for

evaluating the conservation value of assemblages and for site designations are given in most cases.

The handbook is also complimented by a series of useful appendices, covering topics such as the relocation of permanent survey plots, the relationship between BAP and Habitats Directive categories and an annotated list of key references for plant identification.

One of the most useful appendices details the equipment required to undertake different types of surveys. Unfortunately this appendix is not particularly easy to use as all the data is contained in a single table that spans 21 pages!

The handbook is concluded with an extensive list of references and sources of further information.

It is difficult to find fault with this publication: however, if there is one thing to detract from the comprehensive nature of this book it is the relatively poor coverage of brackish and marine habitats. There are sections on maritime boulders, rocks, cliffs and slopes, shingle above high tide, sand dunes and strandline vegetation and salt marsh, however there is no consideration of habitats such as intertidal mudflats, maerl beds and saline lagoons. Similarly, the coverage of brackish and marine species is limited to seabird surveys. There are no methods recommended for monitoring intertidal invertebrates, marine plankton or fish. Considering the emphasis on marine habitats in the Scottish Biodiversity Strategy, this is an unfortunate oversight in what is otherwise a thorough treatise on biodiversity surveys, evaluation and monitoring.

In summary, this handbook provides standard procedures and methods, not only for surveying species and habitats, but also for planning the surveys and for analysing the data to determine the significance of the results. I am sure that in time this handbook will become the standard text for biodiversity monitoring and will grace the shelves of consultants, wildlife professionals and conservation workers alike. However at £85 it may prove too expensive for most biological recorders.

Craig Macadam

Benton, Ted. (2006) *Bumblebees*. New Naturalist Series, Collins. HarperCollins Publishers. Hbk ISBN 0-00-717450-0 £40 Pbk ISBN0-00-717451-9 £25

Almost 50 years ago, in 1959, Collins published the first New Naturalist *Bumblebees* by John Free & Colin Butler. To all of us who have become interested in one way or another in this fascinating group of insects, that volume joined the 1912 work by Frederick Sladen (irresistible extracts from which are used to good effect in the early chapters) as required reading.

Inevitably, with the passage of time, some of the content of these books was superseded by new research, and Ted Benton’s successor to the Free & Butler volume brings the whole subject of ‘bombology’ up to date in an easily readable but nonetheless rigorously scientific and technical manner. As one has come to expect from Ted, the book is copiously illustrated with his own magnificent photographs. The whole

succeeds in that very difficult task for an author - reaching the very different readerships of the interested layman, the specialist naturalist, and the hard-core scientist, and satisfying all of them.

Interest in bumblebees is experiencing something of a boom time in Britain just now, something, sadly, which cannot be said of the insects themselves, many of which are under serious threat and showing declines in range or abundance in many parts of the country. In that context, the book is timely, and it is appropriate if unfortunate that 100 pages, nearly 20% of the text, is dedicated to decline and to conservation activities. The accounts of the intriguing social interactions and complex ecology which precede these sections should go a long way towards raising awareness and fascination among the public, a necessary first step in achieving effective national conservation action.

The book divides neatly into 4 sections: introduction and biology; bumblebees and flowers; identification; and conservation. The chapter unexpectedly called 'Bumblebee psychology' invited early attention, and did not disappoint. Examining the world from the point of view of the insect, it describes the sensory experiences, memory and communication of bumblebees. Aside from the wealth of facts there, it is a useful reminder of the amazing power of biological systems that such vast sensory and processing power sits in such a tiny volume of tissue, and even more humbling when one realises that bumblebees are among the larger insects. It puts our own achievements in digital technology into perspective!

It has long been a puzzle to me why many naturalists, even those experienced in other insect groups, find identification of bumblebees so difficult. Here the reader is taken through a series of stages that will allow even a total beginner to engage easily with the group, while also providing technical keys and diagrams that will prove invaluable to the expert. The comprehensive species accounts, almost all with colour plates, provide a splendid summary for each species. Two messages contained therein are worth pointing out. First, the distribution maps show too many large gaps in our knowledge of current range for even the common species. In Scotland, certainly, the picture is grossly distorted by the recent mapping work in Highland. Second, the accounts reveal the huge differences in individual ecology that must be recognised if targeted and productive conservation management is to be achieved.

It is unfortunate that the persuasive research by Andreas Bertsch and his colleagues into the *Bombus lucorum* complex was published while the book was in preparation, with the result that no separate accounts of *B. magnus* and *B. cryptarum* were included. By happy coincidence, however, plates of all three forms are included, with *lucorum* in Figure 32 (the label *pascuorum* is an error), *cryptarum* in Fig. 30, and *magnus* in Fig. G on page 317, all showing the key differences in the collar. These plates have already proved to be of (inadvertent) assistance as recorders all over the country re-assess the status of their local 'white-tailed bumblebees'.

The decline and future prospects of bumblebee populations discussed in the last two chapters emphasizes that it is not only

through the obvious route of agri-environment measures and changes in agricultural practice that we can help reverse the declines of the past. The importance of waste ground, gardens, and (clouds and silver linings come to mind!) even military zones like Salisbury Plain and Castlemartin for current conservation is made clear. But perhaps the whole message is summed up in the final sentence: '... the conservation of bumblebees - all our fauna, and not just those currently singled out as at risk - will happen only as a by-product of deeper and broader changes to the way we as a society respect and value the rest of nature'. That statement should be displayed in large font in every office in the country where that dreadful word 'biodiversity' is found prominently in policy documents, only to be ignored when the crucial development decisions are made.

Murdo Macdonald

DATES for the DIARY July 2006 onwards

For those who are looking to extend their ID skills, there are a number of events and courses designed to help, both for beginners and more experienced recorders.

BRISC's Wildlife Counts Project offers **FREE** courses and events throughout the summer on a variety of taxa: **birds, bugs and beasts, bats, lichen and fungi, mammals, trees and wild flowers.** All the events take place with North Lanarkshire, Stirling or Falkirk. For more information and to reserve a place, please contact
Claire McSorley, 24 Allan Park, Stirling FK8 2QG,
phone -01786 474061 email brisc-wcp@btvc.org.uk

A series of courses are offered at Kindrogan, the Field Studies Council centre in Perthshire, situated in idyllic surrounding. 1st cost residential, 2nd non-residential.

- 30/6-7/7 – **Mountain and moorland vegetation (flowers).** A 7 day course. Leader Bob Callow. Cost £364 £270
- 12/7-17/7 - **Butterflies and moths.** 5-day course. Leader David Brown. Cost £291 - £229
- 21/7-24/7 – **Fern identification** (3 days). Leader Heather McHaffie. Cost £172 - £120
- 24/7-31/7- **Freshwater Algae** (7 days). Leaders Elliot Shubert and Eileen Cox. Cost £410 - £307
- 12/8-17/8 - **Identifying sedges and rushes.** (5 days). Leader Fred Rumsey. Cost £315 - £235
- 18/8-23/8 - **Fungi for beginners.** (5 days). Leader Liz Holden. Cost £291 - £229
- 18/8-25/8 - **Identifying water plants.** (7 days). Leader Nick Stewart. Cost £365 - £270
- 25/8 – 28/8 - **Scottish mammals.** (3 days). Leader Martin Jamieson. Cost £172 - £120
- 1/9 -4/9 - **National Vegetation Classification: Heathlands.** (3 days). Leader Ben Averis. Cost £172 - £120
- 13/10 – 16/10 - **Birds for beginners.** (3 days) Leader Nick Mutch. Cost £172 - £120
- 16/10 – 23/10 - **Autumn birds.** (7 days). Leader Russell Nisbett. Cost £364 - £270
- 23/10 – 25/10 - **How do birds weather the weather.** (2 days) Norman Elkins. Cost £140 - £110
- 23/10 – 30/10 **Mosses and liverworts.** (7 days). Leader Martha Newton. Cost £364 - £270

More details on the City and Guild 'Time to learn' website at http://www.timetolearn.org.uk/pls/ttl/ttl_learner_course.show_crs_list?p_loc_id=2810