



The Newsletter of the Society of Australian Systematic Biologists.

Issue 2 (May 2009)

Editorial

This issue of *Banksia* contains a miscellany of articles including news from the ICZN, a review of an open source vectors graphics program, and details of the SASB conference being held in September. The article by Bob Mesibov on GPS best practise is a good example of the articles I hope to publish - clearly written articles on a subject that many of us are involved with, that contains information that is handy to know but that is difficult to find elsewhere. Please do submit articles that might be of interest. All contributions are considered, regardless of length. I'd also like to see more photos of Australasian organisms to give the newsletter colour and to celebrate the amazing biota of this unique part of the world.

From talking with colleagues, it is becoming apparent to me that communication with other biologists is one of the aspects of taxonomy that has been neglected. While it could be viewed as yet another job that we can't find time for, I believe that increased communication would also increase the value of our endeavours to the wider scientific community and serve to build the support for further taxonomic research. I don't know exactly what forms this communication may take, but an ideal place to start is on the personal level with individuals taking responsibility to discover how they may best use their enthusiasm and expertise to assist others in their research, and in doing so demonstrate the value and importance of taxonomy.

In saying this, I am not relegating taxonomic research to being merely the identification service of biology. However, the fact remains that though taxonomy has a critical function in underpinning all subsequent biological knowledge, it is considered an auxillary work that should be done on someone else's budget. The reasons for this state of affairs are legion, and merely increasing communication with others will not resolve all the issues facing taxonomy as a discipline. However, keeping our contact with the end-users of our research will exclude irrelevance as being one of them.

Of course, any ideas and suggestions as to how *Banksia* might be able to help with the above would be welcomed enthusiastically.

Samuel Brown

In this issue:

Editorial	1
Spatial data tips	2
Darwin 200.....	3
PhD positions	4
ICZN update.....	4
Discussion topic	5
Software	6
Website review.....	7
About the society	8



Spatial data tips

Datums

A recent discussion on TAXACOM suggests that there is still some uncertainty in the taxonomic community about datums.

The key point is this: if you record localities as either latitude/longitude or UTM grid references, you should specify the datum used. For a comprehensive discussion of datums, visit

<http://www.ga.gov.au/geodesy/datums/aboutdatums.jsp>

or for a quick-and-simple explanation, see my spatial data website

<http://www.utas.edu.au/spatial/locations/spadatum.html>

The error in confusing old and new Australian datums is about 200 m. If your locations are only known +/- 1 km, or if your lat/long is only to the nearest minute, then 200 m isn't an issue.

However, in recent years most field workers have determined locations with a GPS unit with an accuracy of 10-20 m. GPS locations should always include the datum used.

In publications, the datum used can be given either in Materials and Methods as something like 'All locations are based on the WGS84 datum', or individual locations can be qualified with the datum in brackets, e.g. 43°05'46"S 146°42'28"E (GDA94).

Good GPS practice

Ordinary handheld GPS units have an accuracy of 10-20 m. By this I mean that their position reading will be within 10-20 m of the correct value under favourable conditions. Nevertheless, they will often declare a better accuracy, e.g. +/- 5 m. You can test the precision of such positions by taking numerous, repeated readings at the same spot over several days or weeks. I did that with my Garmin E-Trex for my mailbox last year, and got an E-W precision of ca. 9 m and a N-S precision of ca. 13 m. Conditions were favourable for readings: nearly a 360° view of unobstructed sky. Accuracy in less open places and in forest/woodland will not be as good, and field workers rarely get the chance to get repeated readings at field sites.

What this means for publications is that GPS readings should not be used unedited. A latitude of 43°05'46.3"S implies an accuracy of about 2 m, which is nonsense. Lat/long readings should be rounded to the nearest second. A UTM easting of 661234 is also nonsense, since it implies an accuracy of 1m. Such readings could either be rounded off to the nearest 10 m, or the reading given with, say, '+/- ca. 10 m'.

Another GPS issue is elevation. The elevation you read on a GPS screen isn't the true 'above sea level' elevation, but instead is based on a theoretical Earth surface called an ellipsoid. Again, Geoscience Australia has a nice online explanation:

<http://www.ga.gov.au/geodesy/ausgeoid/n.jsp>

Looking for a simple workaround, I compared 10m contour elevations on 1:25 000 scale maps with Google Earth elevations. I found that the two elevations typically agree within 10-20 m, which is roughly the vertical error on 1:25 000 scale mapping of steep and/or densely vegetated terrain.

Spatial data conversion software

It's often necessary to convert a batch of locations from datum to datum, or from lat/long to UTM or vice versa. There are two excellent freeware programs for doing this:

LOTE: <http://www.ecostats.com/software/lote/lote.htm>;

GeoCalc: <http://www.geocomp.com.au/geocalc/index.html>

Both are Windows programs. As a Linux user I find that GeoCalc has problems under WINE, while LOTE works perfectly.

Bob Mesibov

DARWIN 200: Evolution and Biodiversity

DARWIN 200: Evolution and Biodiversity

**The Combined Australian Entomological Society's 40th AGM & Scientific Conference /
Society of Australian Systematic Biologists / 9th Invertebrate Biodiversity & Conservation
Conference**

25 – 28 September 2009

Darwin, Northern Territory, Australia

www.evolutionbiodiversity2009.org.

The deadline for the submission of abstracts is 25 July 2009

The biennial conference of the society is being held this September in Darwin, NT. The theme this year surrounds the commemoration of Charles Darwin' 200th birthday, and 150 years since the publication of his seminal work "The Origin of the Species". The conference has been organised to dovetail with the Charles Darwin: Shaping our science, society and future symposium that is being held in the same location (<http://www.cdu.edu.au/cdss2009/index.html>).

Key themes of the conference are evolution, biogeography, biodiversity and conservation, with marine biodiversity, taxonomy in the 21st century and insect/plant interactions being among the proposed symposia topics.

Michael Braby



PhD Positions

In the next issue of the newsletter, expected to be published in October 2009, we hope to advertise the possibilities for postgraduate study and scholarships in systematics and taxonomy in Australia and New Zealand. Please send details of potential projects to the editor.

Lyn Cook

ICZN Update

Electronic publishing

A debate that has been raging among zoological nomenclatural circles is the validity of electronic publishing. Currently the commission considers as available names published on paper and 'hard' digital media such as CD-ROMs. As electronic publishing becomes more prevalent, the suitability of this medium for taxonomic publications is now up for review. This issue has been brought into the limelight very recently by the publication in *PLoS One* of the fossil primate *Darwinius masillae* (<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0005723>)

A draft amendment to the International Code of Zoological Nomenclature was published in *Zootaxa* in October 2008, starting a one-year review period before a revised amendment will be presented for voting by the commission in November 2009.

The draft may be downloaded from <http://www.mapress.com/zootaxa/2008/f/zt01908p067.pdf>

Formal comments should be sent to Dr Ellinor Michel, Executive Secretary of the ICZN (iczn@nhm.ac.uk) or to Dr Gary Rosenberg, chair of the ICZN Editorial Committee (rosenberg@ansp.org).

In summary it suggests that:

Electronic-only publications should be considered valid, with the condition being that there can be reasonable assurance that they will be accessible and readable in the long-term.

A form of registration should accompany electronic publishing of nomenclatural acts.

Physical publications that are not based on paper, such as CD-ROMs or DVDs, should not be considered valid.

Current cases

In the interests of gathering greater input from the taxonomic community, the International Commission on Zoological Nomenclature has made freely available online the lists of Cases submitted for consideration by the Commission (http://www.iczn.org/List_of_open_cases.html). The Commission carefully considers the comments they receive during deliberations.

Samuel Brown

Discussion topic

In a recent paper published in *Molecular Ecology*, the abstract began with the following statement:

"Current taxon assignments at the species level are frequently discordant with DNA-based analyses."

Cardoso A, Serrano A & Vogler AP. (2009). Morphological and molecular variation in tiger beetles of the Cicindela hybrida complex: is an 'integrative taxonomy' possible? Molecular Ecology 18:648-664

This statement struck me as being a little too emphatic, and so wondered what the society thought about the subject. Here's a few of the responses:

An excerpt from: Peucker, A.J., Dann, P., and Burridge, C.P. 2009 Range-wide Phylogeography of the Little Penguin (*Eudyptula minor*): Evidence of Long-distance Dispersal. *The Auk*. 126(2): 397–408.

<http://www.bioone.org/doi/abs/10.1525/auk.2009.08055>

Few studies of genetic variation, and of mitochondrial DNA (mtDNA) phylogeography in particular, have revealed relationships that are concordant with subspecific designations in birds (Ball and Avise 1992, Zink et al. 2000, Zink 2004). According to the most recent review, only 3% of avian subspecies tested were monophyletic and, on average, 1.9 independently evolving groups were inferred from mtDNA variation within species, in contrast to the average 5.5 designated subspecies based on phenotypic characters (Zink 2004). However, the reviewed studies typically assessed only phylogenetic relationships among mtDNA lineages, which are likely to be discordant with subspecific taxonomy if features defining the intraspecific groups have arisen recently, effective population sizes are very large, or there is occasional gene flow between groups (Avise 2000). Regardless, under these conditions one could still expect mtDNA variation to be significantly partitioned according to intraspecific designations, but this is rarely tested, perhaps because of inadequate sample sizes.

Ball, R. M., Jr., and J. C. Avise. 1992. Mitochondrial DNA phylogeographic differentiation among avian populations and the evolutionary significance of subspecies. *Auk* 109:626–636.

Zink, R. M. 2004. The role of subspecies in obscuring avian biological diversity and misleading conservation policy. *Proceedings of the Royal Society of London, Series B* 271:561–564.

Zink, R. M., G. F. Barrowclough, J. L. Atwood, and R. C. Blackwell-Rago. 2000. Genetics, taxonomy, and conservation of the threatened California Gnatcatcher. *Conservation Biology* 14:1394–1405.

Chris Burridge

Yes, it does happen, of course:

1. There may be two or more DNA-diagnosable groups within a single morphological species. In this case, it seems likely that there are cryptic species within what had previously been considered a single species. Actually, it is often the case that more detailed morphological study will turn up slight but distinct differences, which had been missed before.

2. Two or more morphologically-defined species may turn out to belong to a single DNA-diagnosable group. In this case, the morphological evidence should be re-examined, to see whether the species divisions are actually cogent. If they are not (if they actually represent polymorphic variants), then the species should be synonymised. If, after this re-examination, the divisions remain cogent, then it means simply that the species have not (yet?) achieved reciprocal monophyly at that particular locus -- we always have to remember that morphological differences are real, and that, unless we can demonstrate phenotypic plasticity for a particular morphological character, then it is proxy for some other DNA sequence.

3. If a particular DNA type (allele, haplotype) characterises one species, but overlaps into another one, unless it is a case of retained ancestral polymorphism, it seems likely that there has been introgression due to hybridisation.

In the groups of mammals with which I am familiar, all three occur. The first case is turning out to be extremely frequent, and many new species, especially of Madagascar lemurs, have been described over the last few years, based on mtDNA, with morphological study lagging far behind.

Colin Groves

I recently put my head on the chopping block and published the referenced paper. In its latter half we talk a lot about what species and population level phylogeographic data mean for species level systematics, at least in birds. We tried to highlight the exciting nature of the problems.

Leo Joseph

Joseph, J. and Omland, K. E. 2009 Phylogeography: its development and impact in Australo-Papuan ornithology with special reference to paraphyly in Australian birds. *Emu* 109: 1-23.

<http://www.publish.csiro.au/nid/96/paper/MU08024.htm>

Software

Inkscape

Computer images come in two different types. These are raster (bitmap) and vector. Raster graphics are familiar to most people, being the type used in the common formats JPG, BMP, TIFF and GIF. These graphics build their image up using pixels assigned to particular colours. Raster images are very resolution dependant, and so scaling pictures much smaller or (more significantly) much larger than the original creates a noticeable difference in quality. They can however deal with images containing a wide variety of colours and are thus most suitable for photos and the like. Vector graphics on the other hand describe the shapes and objects in the image in a resolution independent way, allowing them to be scaled up or down without any difference in quality. They are most used for line illustrations and technical drawing, and in the commercial arena. In biology, vector graphics would be most useful for diagrams such as trees and networks, as well as line drawings of morphological structures.

Inkscape is an open source vector graphics editor that aims to provide the same capabilities as Adobe Illustrator and CorelDraw. Its native file format is the Scalable Vector Graphics (SVG) format, a non-proprietary format that is becoming the standard vector graphics format, being supported by web browsers and other image-utilising software. While still in a very early stage of development, the range of capabilities appears to be good. The program seems to be relatively intuitive to learn, though there are a lot of functions to experiment with before the program can be used to its best. Documentation appears to be good, with a number of books and tutorials available from the website. Unfortunately, there does not appear to be any good online tutorials aimed at biological illustration.

I have not used any other vector graphics programs, so cannot comment on the strengths and weaknesses of Inkscape compared with commercial products. If you are familiar with vector graphics, it is well worth checking out. If you are dealing with line drawings and diagrams often, and have not experimented with vector graphics, I seriously recommend Inkscape as an initial start point. More information on the project and installation files for the main operating systems can be obtained from the website: <http://www.inkscape.org>.

Samuel Brown

Website review

Taxonomy Research and Information Network

The Taxonomy Research and Information Network (TRIN) (<http://www.taxonomy.org.au>) is an emerging site that has the commendable aim of reinvigorating taxonomic research and provide a service to enhance collaboration among taxonomists. The frontend of the site is very aesthetically pleasing, though a little light on detail. A good number of links to other biodiversity-focussed website is provided by the "Biodiversity Information" and "Useful Links" sections, but unfortunately there are very few "Publications and Products", and slightly ominously, the "Capacity Building" tab doesn't work at all...

Where it is at its most powerful though is the wiki associated with the site. Now, I am not at all familiar with wikis and personally find them somewhat obtuse and difficult to use. With that disclaimer in mind, with a bit of time it is possible to find some really cool things. Overall the site is a bit sparse, with the best content being a bibliography and checklist of the plume moths, and a comprehensive summary of a number of procedures for use in marine biology.

If the purpose of the site is to provide taxonomic information to the general public, this website unfortunately fails. From the point of view of a disinterested visitor to the site, I found it difficult to access and little real content to bring me back to it in the future. As a platform for collaborators to monitor ongoing work though, this site could well be successful. Like all wikis, the concept will stand or fall upon the motivation of contributors to add to the site and make it more useful, and whether or not it achieve its purpose of enhancing the collaboration between taxonomists. The site is open to all interested parties, so the onus is on research groups, and the taxonomic community in general to make it into something that is useful to us.

Samuel Brown

About the Society

SASB Officers:

Lyn Cook (President)
l.cook@uq.edu.au
Andrew Thornhill (Secretary)
andrew.thornhill@anu.edu.au
Samuel Brown (Newsletter Editor)
Sam.Brown@lincolnuni.ac.nz
Steve Cooper (Treasurer)
Chris Lambkin
Michael Braby
Mike Crisp
Bob Mesibov

The Society:

The Society of Australian Systematic Biologists is open to all people who are committed to using the science of biological systematics as a basis for the study and understanding of nature. The Society is a non-profit interdisciplinary organisation whose purposes are to promote the scientific study of biological systematics and to disseminate scientific and educational information related to its fields of interests.

Membership:

Membership is free. Details are available on the society website (<http://www.sasb.org.au/the-society/membership/>) and from the secretary.