

Phylogenetic Diversity Workshop

Cape St. Francis, South Africa – 15th to 20th March 2005
(Organizers: Félix Forest, Richard Cowling, Ingrid Nänni)

Participants:

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Edited notes from the discussions on which papers to develop:

PAPERS DECIDED ON:

1. Region wide analysis using QDS and PRECIS data
2. Region wide analysis using Acocks data and endangerment categories
3. Region wide study using Protea Atlas data
4. Gouritz using Vlok vegetation types and Vlok genera lists (a series of three papers)
 - I. PD endemism
 - II. PD versus other biological measures
 - III. Short cuts to predicting PD (environmental variables – e.g. soil types)
5. Explore Phylogeography of a number of genera
6. Sensitivity analysis of PD – conservation implications
7. Hotspot wide (SA) analysis of angiosperm PD
8. Species threat and phylogeny
9. QDS how well does genus richness vs PD fare at representing PD

We discussed:

- important questions
- data bases available
- authors
- time frame for papers
- lines of communication
- data sharing protocols
- how are we going to foster collaboration with the international participants in the future – what are the funding opportunities to bring this group together again

PAPER 1.

Region wide analysis using QDS and PRECIS data – chaired by Dan

A. Does PD based decision give a different answer? – in terms of priorities identified
Vs what?

1. various targets
2. genus level diversity

for 2. accretion curve

Accretion curves

Cost version of accretion curves

Predicting complementarity (that no-one understands)

B. Focus on the tree

Does a single species make a difference

Randomization

Genera sampling

Demo PD endemism

Bad tree

Number of species within genus... the curve

Look at environmental history – in the discussion

Taxa outside – in or out?

Authors:

Leader: Felix

Co-authors: everyone at the workshop who has made a scientific contribution

Timelines:

Data collecting by end of July and first draft Dec 05

Should have a tree in August

DF – might be an issue of PD endemism which might take a bit longer

PAPER 2.

Region wide analysis using Acocks data and endangerment categories – chaired by Mathieu

Assign PD to each vegetation type and compare with endangerment status

Relationship between PD and endangerment status

Scale: vegetation type

Threatened species - only at species level – Protea?

What is the loss of PD if we are losing threatened vegetation types?

PD endemism / veg types

Authors:

Leader : Mathieu, and Serban as the key partner

Authors: Richard, Dan for PD endemism, Félix (has the data set), Vincent, Terry

Timelines:

Acocks – Mathieu and Serban

CB Masters project - start in September 05 – Felix could co-supervise – Mathieu will speak with MSc students

– make it clear that it is a multi-authored input

Plan B – no students want the project – then Serban and Mathieu

Manuscript by March 06

PAPER 3.

Region wide study using Protea Atlas data – chaired by Gail and Mathieu

We should be able to invent an appropriate Q for this incredible data set

These issues were discussed; some were picked up by other papers

- a. PD dissimilarity measure (Simon Ferrier) based on subset – how reliable?
- b. Can environment predict PD? (link to process) – see paper 4.III

c. PD pattern at different scales

What is the link between species endangerment and PD and does it differ between recently evolved veg. types and clades and older ones

Authors:

- a. and b. **Leaders** Terry and Dan
co-authors: Vincent , Gail, Simon, Tony Rebelo, PhD student that Dan knows
- c. **Leader:** Jonathan and Rich Greyner
co-authors: Mathieu and Tony Rebelo

Timelines:

- b. Jonathan – its part of Rich Greyner's post doc which due to finish at the beginning 2006
- a. and b. Terry and Dan – might be some issues of automating - affects the timing – July 06 (Terry has a sabbatical next year)

PAPER 4 (a series of three papers).

Gouritz using Vlok vegetation types and Vlok genera lists - chaired by Andrew
geographic extent 24000kms, planning units will be cadastral units

Pattern

ca. 369 vegetation units nested in 7 levels (biome, structure, drainage basin and floristic composition) – all in Jan's head

- for each one we can get the genera and genus level richness, estimates of species per genus
- PD score at the genus level
- rare and the endemic species of each veg. Type
- ? pollination distribution

Process

- landscape age – 3 levels– Gondwana, African, post African
- spatial surrogates for ecol./evolutionary processes (esp. water)

Services

Service issues that underpin the economic drivers are agriculture and tourism

- Water delivery
- Scenery delivery
- Veg cover/transformation (resilience)
- Soil stability – further down the line (resilience)
- Delivery of pollinator services

Human / threats

- Costs of conservation (land purchase or opportunity costs)
- Land use
- Human population density/ growth
- Livestock numbers (MR – how would we use that)

Problems?

- Different areas of veg types
- Non-endemic veg. types/ genera
- Does PD endemism vary enough between veg. types at genus level?

We will be able to compare PD endemism (which is unique) between the veg types

Questions

Sub-paper

I. PD endemism

priorities versus benefits to society (win wins) and costs to society

Qualitative win/win, win/loose = Eden argument

Quantitative trade offs – costs to society

will be done at the vegetation type level

also interested in using other biological measures (biodiversity – biomass argument) and comparing how well they match

Authors :

Leaders: Mathieu and Richard

Co-authors: Dan, Andrew, Félix, Terry

Sub-paper

II. PD versus other biological measures - Dan

PD versus generic richness , species richness, species richness per genus

Correlations, priority areas, (accretions, map), predicting complementarity

PD versus current best guesses of location of evolutionary process - Terry

Authors:

Leaders: Dan and Terry

Co-authors: as for I.

Sub-paper

III. Short cuts to predicting PD

Environmental variables – e.g. soil type

Authors:

Leader: Vincent

Co-authors: as for I.

Timelines:

Mid 2007

GR If we can get the stuff from Jan Vlok we can start on academic analyses

PD surfaces should be available by Dec 2005

GR – should we be applying for extra funding

TH – list of 5-6 target genera and then maybe he can get his students on to it – can look for funding

III. Short cuts to predicting PD

Vincent

The environmental surface exists – you can get it whenever you want

PD surface will be available by end of this year

Mid 2006

PAPER 5.

Explore Phylogeography of a number of genera – chaired by Terry

Terry showed slide of Distribution of *Elytropappus rhinocerotis* samples bearing different cpDNA haplotypes

Work out to what extent the pattern of *Elytropappus* is general

The areas where you currently get phylogenetic diversity might not conserve the processes

Phylogeography

- Significant geographic structuring of genetic variation
- High genetic diversity in certain High- altitude populations and in the south east consistent with plausible refugia
- Inference of past fragmentation congruent with separate climatic histories of western and eastern parts of the distribution

RC – *Euclea unguolata* within the Little Karoo would be a good one to work on

RC – excited that its that level stuff that is going to help us crack the refugia question

Authors:

Leader: Terry (will be more than one paper out of this)

Co-authors: Richard is happy to provide advice on what species to choose in the Little Karoo

Serban

Timelines:

Mid 2006 (Terry)

PAPER 6.

Sensitivity analysis of PD – conservation implications – chaired by Vincent

PD value affected

Branch lengths

Tree topology

* Time transformed

PD and significance (randomized)

Use taxa versus phylogeny

cf. Kevin Omland, Mike Steel

Effect “on the ground”

Taxa range (eg. Iridiaceae and above family)

Taxonomic delimitation

Taxa concept

Authors:

Leader : Vincent

Co-authors : Terry, Félix (are we going to use the rbcL thing to test this), Dan, Jonathan, Gail?

Timelines:

Dec 2005 (Vincent)

PAPER 7.

Hotspot wide (SA) analysis of angiosperm PD – chaired by Jonathan

Hotspots of PD coincide with hotspots of species endemism?

Families – global

Genera – SA

I.a. Do a randomization for Genera in SA (ca. 2000)

– generic distribution in SA

Tree of genera in SA – get rbcL tree (and pull sequences out of genebank) ca. 1500 (not necessarily SA species – that doesn't matter for this argument)

Endemic PD – do the hotspots contain more or less endemic PD than a random selection

The 3 areas should be treated separately

I.b. gap analysis – what areas would be select next to max PD – ID important

Areas to sample in the future

II. compare PD endemism vs. PD diversity vs. species endemism

Leader: Families globally Serban (Jon has a lot of the maps already)

Authors : Jon, Vincent, Félix

If it has to be a hotspot analysis then someone else has to do the lead because Serban just wants to see the map – Vincent and “Gail successor” – on hold for a year.

Timelines:

Hotspots

global analysis (family level)– Serban

map 2006 (depends on the map)

South African one depends on the tree

End of 2006

PAPER 8.

Species threat and phylogeny – chaired by Jonathan

(been done in birds)

potentially a way to use genera if we have complete threat status info for the genus

We need phylogenies which are complete

- sister clades
- Generic - 6000 rbcL tree (a lot has been published and Vincent has a matrix)

Species level

Comparing PD and the endangerment species

Degree of threat and age of the different clades and endangerment status

Leader: Jonathan,

Co-authors: Félix, Andrew, Vincent, Richard with the biological traits, Terry, Gail with the Protea stuff via Tony Rebelo.

Timelines:

mid 2006 but would be nice to speed this one on -could happen a lot before this (Jonathan)

PAPER 9.

QDS how well does genus richness vs PD fare at representing PD

– part of one of the fundamental Qs (PD versus Genera)

Leader: Jonathan plus Felix

Co-authors: everyone (Jon might have a conflict of interests so might have to bail out)

Timelines:

Trying to do a Rodrigues with some real data

Wait for the August tree

Could do a quicky on the existing tree – “write the paper and wait for the tree”!

Optimising is a bit of a hurdle – Jonathan could probably write some software with Rich Grenyer

December 2005

LINES OF COMMUNICATION

This record will be sent out by Ingrid.

Ingrid prepared to play a facilitating role until the end of 2005 – thereafter maybe unavailable.

2-monthly update from each leader sent to Ingrid to collate and forward to the others

Ingrid to send a reminder a week before-hand, and then collate the reports and forward them to everyone

DATA SHARING PROTOCOLS

Anything RC has he will give out to anyone

MoU for everyone to sign regarding all the data sharing – Ingrid will organise it

FOSTER COLLABORATION

RC - May need to get together again

What are the options for funding

TH – is successful at getting NRF money but then have to participate in a workshop – Terry is sure that if the timing is OK then he could organise the flight expenses

VS – Darwin funding – still some money for a workshop before end of March 2006

GR – would be great to have a course on the Darwin project – looks good for the project

VS – we will ask Darwin to ask us for an extension – they could fund a co-ordinator to facilitate – Gail and Vincent will write this into the Darwin report, because the scientific phase is only taking off now. Darwin extra funding could be between 30 and 50 thousand pounds

Workshop for end of Jan 2006 – **Terry to take this forward**

RC what is planned there, and the participation that you have is quite impressive

Also the systematists and conservationists coming together here is fantastic