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SLE254

The Practical Report

(Sexing chickens - pracs 2-4)



Determining the sex of the domestic chicken (*Gallus gallus*)

WHY?

Many species like chickens are sexually monomorphic and cannot easily be distinguished by phenotype when young.

HOW?

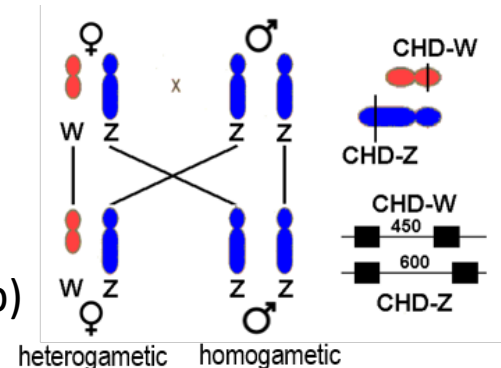
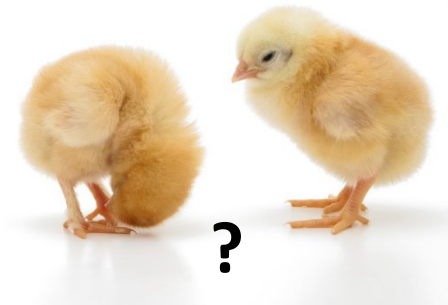
Analysis of the sex-chromosome-specific gene locus CHD (chromo-helicase-DNA binding gene, CHD1), carried on the W & Z chromosomes (CHD-W & CHD-Z).

- males are homogametic (ZZ chromosomes)
- females are heterogametic (ZW chromosomes)

BY WHAT PROCESS?

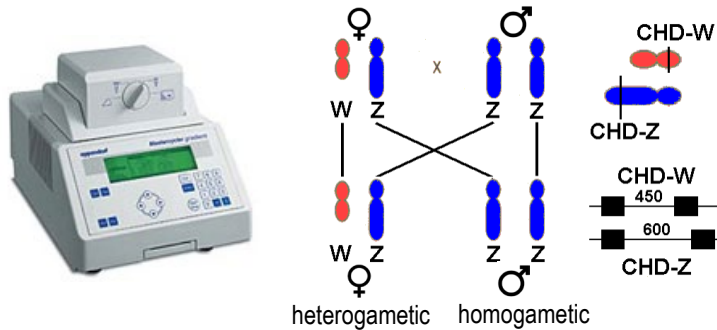
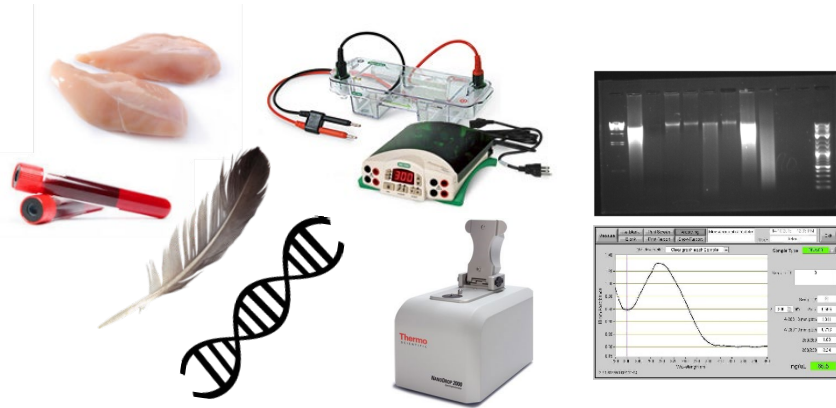
PCR amplification of CHD1 from sample DNA extracts and visualisation by gel electrophoresis.

- males yield 2× CHD1Z (~600 bp)
- females yield 1× CHD1Z (~600 bp) & 1× CHD1W (~450 bp)



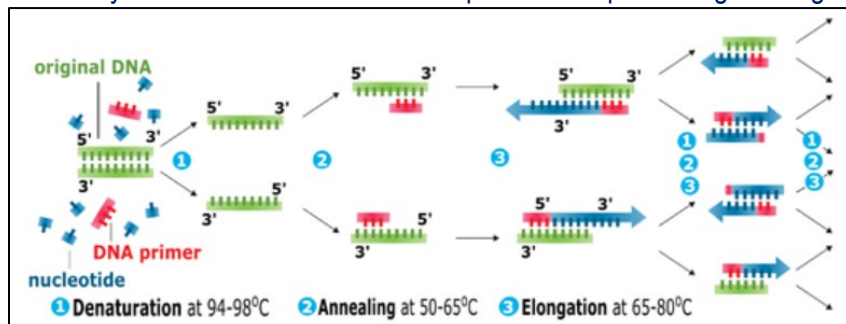
Comprise conserved exons, with introns of different lengths

Pracs 2&3: DNA extraction, assessment & CHD1 gene PCR amplification



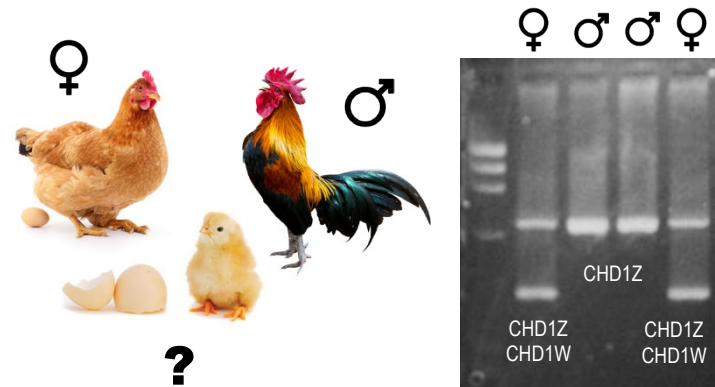
PCR (Polymerase Chain Reaction)

– an enzymatic reaction that creates exponential copies of a gene target.



Prac 4:

PCR product visualisation & interpretation



Source: modified from SM Carr (2008);
mun.ca/biology/scar/Bird_sexing.html

Assessment task – Chicken prac poster

(Worth 32%, Due 8pm Friday 22nd September)

Poster format comprising:

- Introduction & Aims
- Methods
- Results
- Discussion & Conclusions
- References



Which samples are most likely to be successful in PCR?

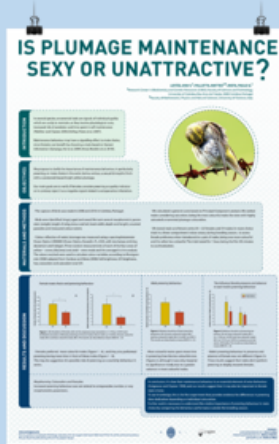
Overview

Assessment task – Chicken prac poster

Worth 32%, Due 8pm Friday 20th September

Poster format comprising:

- Introduction & Aims
- Methods
- Results
- Discussion & Conclusions
- References



Based on the Chicken practical series

Requires you to report on the utility and approach taken in the use of particular molecular techniques for the sexing of animal species - using the domestic chicken (*Gallus gallus*) as an example.

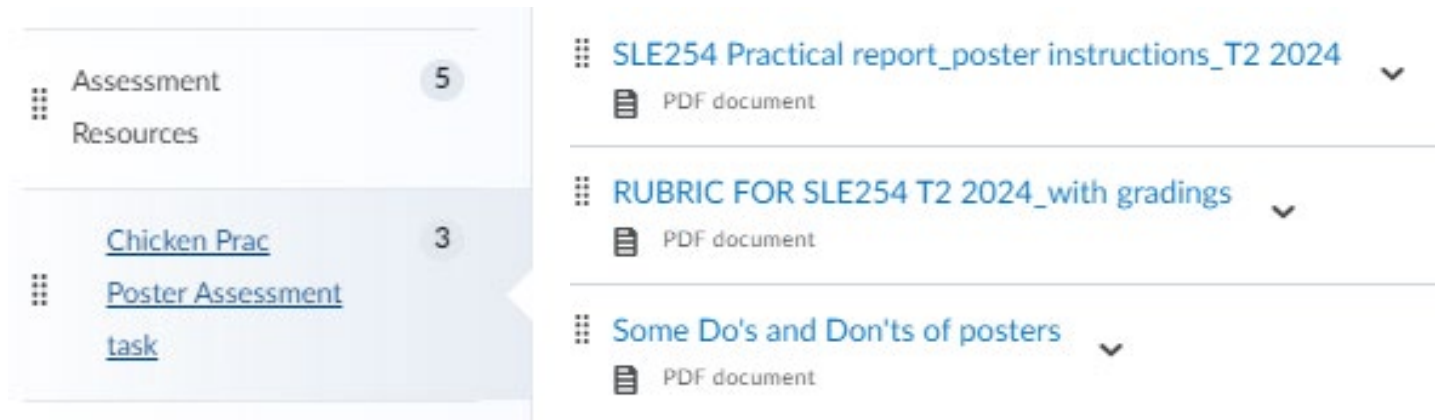
You must prepare and submit your poster as an **individual** assessment task.

Submit to the assignment drop box
(no emailed hard copy assignments will be accepted)

Note: marks will be deducted at a rate of 5% per day. No marks will be given after 7 days.
If you need an extension, please complete the online extension request form.

Instructions for the assessment task (poster)

A detailed set of instructions and a rubric is provided on the unit site (details allocation of marks) – it is essential you consult these!

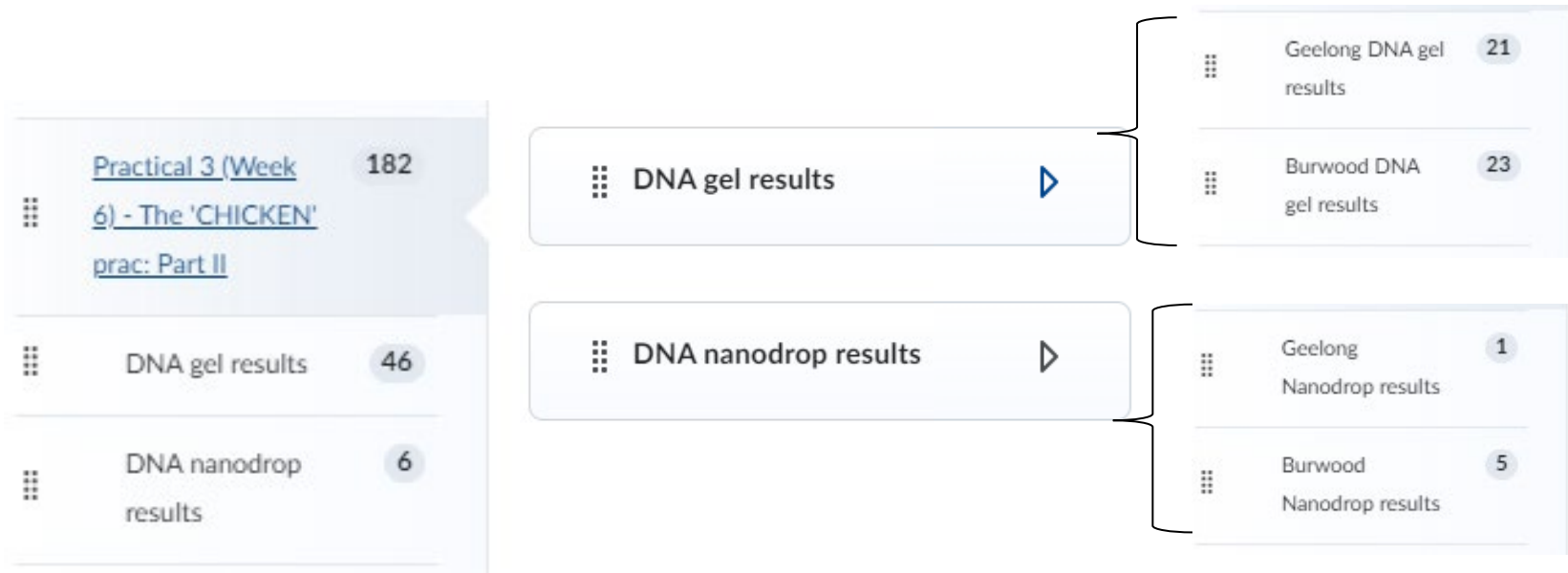


Plagiarism is taken very seriously. Check your work in Turnitin!

Please read the Rules of Plagiarism in Appendix 2 of the poster instructions

Results for the assessment task (poster)

All results generated throughout the pracs are available on the unit site.



Prac 3 – DNA gel images and nanodrop results.

Results for the assessment task (poster)

All results generated throughout the pracs are available on the unit site.



The screenshot displays a user interface for a learning management system. On the left, a sidebar contains two items: 'Practical 4 (Week 8) - The 'CHICKEN' prac: Part III' with a count of 123, and 'PCR gel results' with a count of 46. In the center, a button labeled 'PCR gel results' with a right-pointing triangle icon is visible. On the right, a list of items is shown: 'PCR gel results (Geelong)' with a dropdown arrow, 'PCR gel results (Burwood)' with a dropdown arrow, and '100 bp DNA ladder' with a dropdown arrow and an 'Image' icon below it.

Prac 4 – PCR gel images.

NB: These we be uploaded at the end of Week 8.

What to include

Title, Introduction & Aims

- Your title should be informative and convey an accurate description of what your report is about in context with the outcomes. Be descriptive, yet concise. Good titles are typically less than 15 words.
- The introduction is an account of the current scientific research area, setting the scene for the scientific problem to be addressed. **DO NOT just copy the introduction from the prac manual.**
 - Give context e.g. Some species like chickens are monomorphic and hard to distinguish sex phenotypically.....we can use molecular techniques like PCR to do this.....explain how this is done...
 - Chickens follow a Z-W type sex determination system which means.....difference in males and females are.....
 - State what you aim to determine (i.e. the sex of the chicken) and what you expect.....

Rationale & utility of the approach:

Sampling

➤ *Destructive*



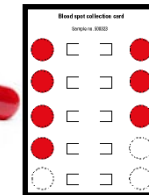
➤ *Non-destructive (invasive)*



➤ *Non-invasive*



Pros and Cons
to each approach



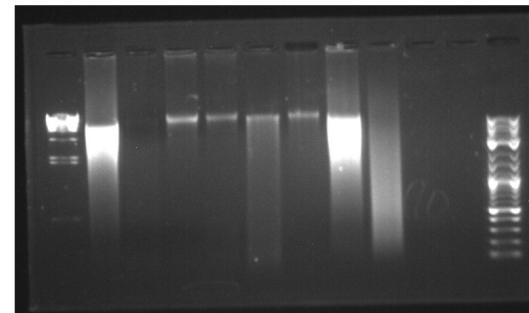
DNA Quality & quantity

➤ *Sample type*

➤ *Preservation method & duration*

➤ *Extraction method*

Agarose gel electrophoresis



Nanodrop



High or low quality (HMW/LMW), sheared/
fragmented, high or low yield, contaminated ?

Can influence PCR success or failure

What to include

Methods

- The methods is a very succinct statement of the procedures used to generate the data. **DO NOT just copy the methods from the prac manual.**
- You should detail key steps, e.g. sample collection, processing, DNA extraction, and PCR analysis and visualisation.
 - Refer to relevant references to avoid re-writing whole slabs of text, e.g. “The method employed to extract DNA from samples followed that of Hogan et al. (2020), which briefly included”
- The methods should comprise concise paragraphs (**not dot points**) like that of a scientific paper:

e.g. “For PCR, 10µl reaction volumes were prepared and comprised 30 ng DNA, 1 x PCR buffer, 1.6 mM MgCl₂, 0.2 mM of each dNTP, 0.4 mM of each forward and reverse primer and 0.05 U of Taq DNA polymerase (Type/company)”. “Reactions were subsequently subjected to 94°C for 3 min + (94°C for 30 sec + 60°C for 30 sec + 72°C for 30 sec) x 25 + 72°C for 10 min + 15°C for ∞”.

What to include

Methods

- Do not provide lists of materials.
- Avoid use of irrelevant steps, e.g. “I put my gloves on before...” or “I then disposed of the tube”.
- Write in past-tense.

What to include

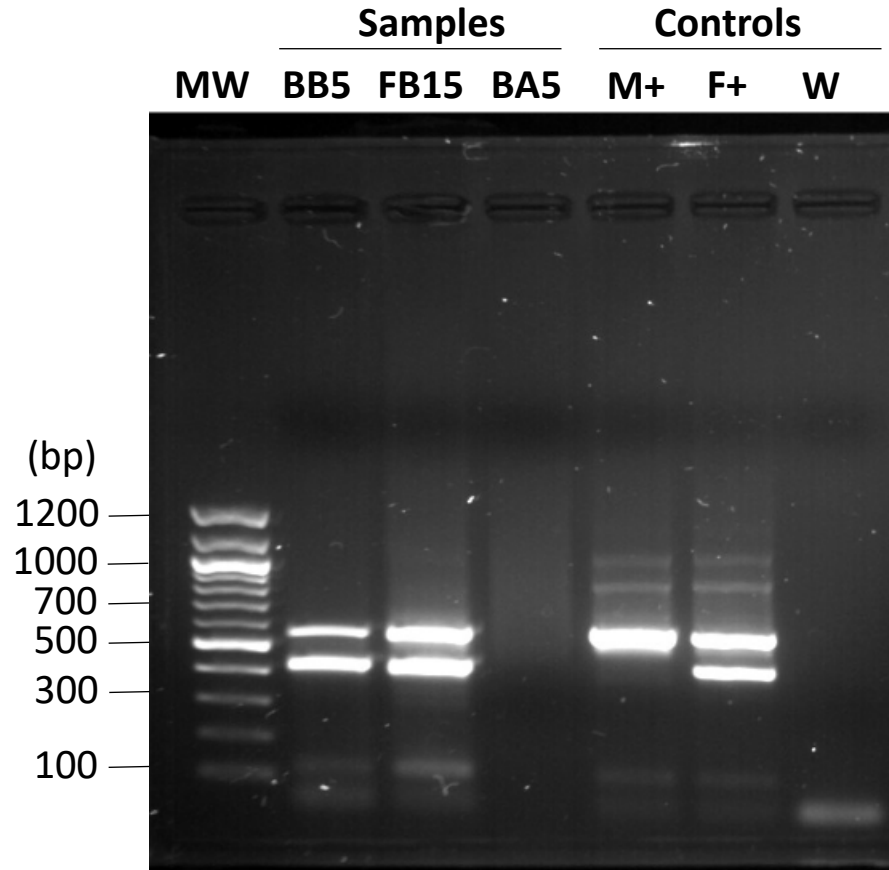
Results

- The results section should visually present the data/results, and state the key findings (**do not discuss them**)
 - e.g. summary data like mean \pm standard deviations of DNA concentrations should be provided in a table with corresponding text stating that “From Table 1, it was observed that the highest concentration of DNA was obtained from blood samples”.
- You may choose to separate it into 2 sections dealing with DNA extraction and PCR separately.
 - Include a copy of the accompanying gel image which should be clearly annotated (i.e. to include sample ids, markers etc), labelled (e.g. “Figure 1”), and have a caption that details what is depicted, e.g. “Figure 1 Agarose gel electrophoresis of PCR products obtained from amplification of the W and Z genes from chicken blood samples”.
- State any other findings, e.g. comparisons between groups, in relation to controls ...etc.

What to include

Results

Figure 1. Agarose gel electrophoresis of PCR products obtained from total DNA extracted from blood (BB5, BA5) and feather (FB15) samples taken from two domestic chickens. Experimental controls include gDNA from a male (M+) and a female (F+) chicken, and water (no template control). MW – 100 bp ladder.



You have access to a reasonable number of gel images as part of the class dataset. As such, alongside your own gel image, you may wish to convert the rest of the data into a table of e.g. % Males/Females per sample type.

What to include

Discussion & Conclusions

- As it suggests, you need to discuss your results. Don't just restate what they were i.e. **state what the results mean and why**.
 - Findings should be discussed in relation to the scientific literature (citing a min. of 5 refs in the text).
 - Should comprise concise paragraphs (**not dot point format**)
- Start with key findings, e.g. were there great differences between sample types? maybe suggest why this might be.....
- Conclusion needs to bring everything back together. Restate aims and if they were reached or not and why, and provide some suggestions for future directions/work.
 - Remember: no new findings or results should be added at this point.

What to include

References

- References should be in Harvard style and should have correct and consistent formatting.
 - Reference section can be smaller font size.
 - Comprise a list of **at least 5 or more** relevant peer-reviewed papers
 - Reference the practical manual if cited in the methods
 - Reference any other sources of information (websites) if cited in the text
- Further instructions for referencing is given at the end of the Poster instruction document in Appendix 1.

What to include

Format

- Use PowerPoint to make your poster
- Make a new presentation with a single slide (portrait or landscape)
 - From slide “layout” (under the home tab) choose a completely blank slide and adjust the slide size to poster dimensions (70 cm × 100 cm)
- Poster should be predominantly visual
- Keep your writing to a minimum by using concise sentences and avoiding irrelevant information.
- Don't use any fonts smaller than 16 point and make sure your images are large enough and clear
- Word count should be about 800 - 1000 words (excluding figure/table captions and references)
- Use headlines to make it easy to read
- Use graphics colour and fonts effectively to achieve a consistent and clean layout

AOPA 2016 Poster title goes here, containing strictly only the essential number of words...

Author's Name(s) goes here¹, Author's Name(s) goes here², Author's Name(s) goes here³

¹Name of institution/workplace goes here

²Name of institution/workplace goes here

³Name of institution/workplace goes here

Poster with a simple layout

- Layout easy to follow
- Text :
 - Maybe a little too small?
 - Maybe a little too much?
- Slightly boring, but does the job

Introduction	Results	Discussion
<p>First...</p> <p>Keep your poster within the following limits:</p> <p>Size: A0</p> <p>Orientation: Portrait (vertical)</p> <p>The page size of this poster template is A0 (841x1190mm), portrait (vertical) format. Do not change this page size. Most printers can scale-to-fit a smaller or larger size, when printing.</p> <p>Introduction – The introduction should present the reasoning behind the project which you are describing/investigating. This means that the reader, having read all the introduction, should feel able to predict what your investigation will be. At the same time your introduction should allow someone who is not an expert to understand why you did this experiment.</p> <p>Simply highlight this text and replace.</p>	<p>Tip for making a successful poster...</p> <ul style="list-style-type: none"> • Re-write your paper into poster format i.e. Simplify everything, avoid data overkill • Headings of more than 8 words should be in upper and lower case, not all capitals. • Never do whole sentences in capitals or underline to stress your point, use bold characters instead. • When laying out your poster leave breathing space around your text. Don't overcrowd your poster. • Try using photographs or coloured graphs. Avoid long numerical tables. <p>Importing / inserting files...</p> <ul style="list-style-type: none"> • The best type of image files to insert are JPEG or TIFF. JPEG is the preferred format. • Reference the source if image captured from web. • Be aware of the quality/resolution of the image to avoid pixelation when the image is printed. • For simple graphs use MS Excel, or do the graph directly in PowerPoint. • Graphs done in a scientific graphing programs (eg. Sigma Plot, Prism, SPSS, Statistica) should be saved as JPEG or TIFF if possible. <p>Results - This section provides the reader with a clear, concise summary of the data you collected and the results of any statistical tests. Clarity is all important, try to resist the temptation to interpret the results as you go along.</p> <p>Simply highlight this text and replace.</p>	<p>Printing and Laminating...</p> <p>Once you have completed your poster, it's a good idea to produce an A3-size draft print to check it yourself and proof read, if possible, show your printed poster to a colleague/friend/family-member for a look with 'fresh eyes'. Once you are happy with the poster, send it via email to events@aopa.org.au by 5:00pm Monday 12th September 2016. The AOPA Office will print the poster for you and take it to the Congress.</p> <p>Discussion - This is the section in which you can interpret the results of the investigation and discuss their meaning. It is important that your discussion relates the results to the issues raised in the introduction. The results may not have led to clear-cut answers to the questions raised initially, so your discussion might have to suggest further investigations/methods which can answer the initial question. You might also discuss any limitations of the investigation. Don't just conclude that further research is required, leaving your reader to guess what the further research could possibly be – be explicit as to what questions and problems your investigation raised, and how you might answer/solve them.</p> <p>Simply highlight this text and replace.</p>
<p>Method</p> <p>How to use this poster template...</p> <p>Simply highlight this text and replace it by typing in your own text, or copy and paste your text from a MS Word document or a PowerPoint slide presentation.</p> <p>The body text / font size should be between 24 and 32 points. Arial, Helvetica, Calibri or equivalent.</p> <p>Keep body text left-aligned, do not justify text.</p> <p>The colour of the text, title and poster background can be changed to the colour of your choice. Section headings can be moved up and down to accommodate the text boxes.</p> <p>Method – The method section describes in detail the operations performed by the investigator. The method must contain enough information for the reader to be able to repeat the experiment, but it should not include any irrelevant details.</p> <p>Simply highlight this text and replace.</p>	<p>Figure, table or picture</p> <p>Figure, table or picture</p> <p>Figure, table or picture</p> <p>Figure, table or picture</p>	<p>Conclusion</p> <p>Conclusion – Review the main findings and results, and express them in general terms.</p> <p>This part is also for busy readers who don't have time to read all of your findings, and for readers who want to read an overview of the findings before deciding whether to read the findings in detail.</p> <p>Simply highlight this text and replace.</p>
		<p>References</p> <p>References – standard referencing: if you have a large number of references, change font size smaller to between 18 and 24. This section should take no more than 1/3 of this column.</p> <p>Simply highlight this text and replace.</p>

Nice poster
with a simple,
yet visual layout

PERSONALITY, SEX DIFFERENCES, AND MATE CHOICE IN THE EUROPEAN SERIN

Ana V. Leitão & Paulo G. Mota

CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade de Coimbra, Departamento Ciências da Vida, Laboratório de Etologia, Coimbra, Portugal
*Corresponding Author: anamleitao@gmail.com

INTRODUCTION

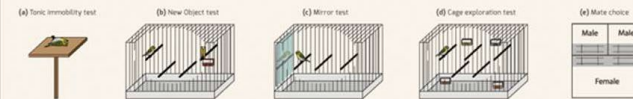
- Animals can demonstrate individual behavioural traits that are consistent over time and in different contexts, also known as personality traits (Réale et al. *Philosophical Transactions B* 2010).
- Personality has increasingly been the focus of ecological studies to understand the evolution and maintenance of these and its consequences.
- While several hypothesis have been considered, sexual selection has been scarcely studied although it is possible that it may play an important role in the origin and maintenance of personality differences (Schuett et al. *Bio Reviews* 2010).

OBJECTIVES

- Study consistent interindividual differences in behaviour in the serin (*Serinus serinus*).
- Understand how sexes differ in their behavioural traits.
- Understand how different behavioural contexts are related and differ between sexes.
- Explore a possible role of personality traits in female mate choice.

METHODS

- Wild serins (30 males and 17 females) were captured, and maintained in an indoor aviary until the end of the experiments.
- Individuals were subjected to four behavioural tests to assess fear (a), neophobia (b), sociability (c), and exploration (d), and tested for repeatable individual differences in two rounds.
- Mate choice tests were performed in an aviary (e) with a random female and a unique combination of two males with similar colouration.



RESULTS

REPEATABILITY

Males and females differ in their consistency

Trait	All	Repeatability
Fear	All	$R=0.303$ $P=0.007$
	Sexes	$R=0.307$ $P=0.007$
Neophobia	All	$R=0.400$ $P=0.002$
	Sexes	$R=0.392$ $P=0.024$
Sociability	All	$R=0.289$ $P=0.003$
	Sexes	$R=0.287$ $P=0.072$
Exploration	All	$R=0.248$ $P=0.049$
	Sexes	$R=0.193$ $P=0.115$

Note: Repeatability calculated from two round components of ANOVA for the repeatability tests. Sample size: Test (n), Males (M), Females (F).

SEX DIFFERENCES

Males are more sociable than females ($t=2.017$, $P=0.050$)

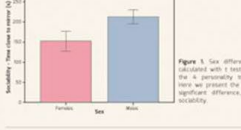


Figure 1. Sex differences calculated with a t test, for the 4 personality traits. There was present the only significant difference, for sociability.

MATE CHOICE

Female number of visits to males was related to their own personality trait (sociability: $X^2=10.455$, $p=0.001$)

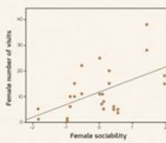


Figure 2. Relationship between female number of visits to males in the mate choice test and female sociability. A GLM repeated measures was performed to test female visits using two PCA's of female personality as covariates. PC2 was significant and negatively female sociability.

CONCLUSIONS

- Individuals showed repeatability in the four behavioural tests.
- Males and females differed in their consistency and behavioural responses across the different tests.
- Behavioural traits were correlated, indicative of a possible behavioural syndrome, but differed between females and males: More neophobic males were also more sociable, and females that were more sociable were less fearful and marginally less explorative.
- In mate choice tests, female personality was related with its own behavioural performance.
- Our results stress the importance of looking for sex differences in personality, and for considering the influence of personality in mate choice context.

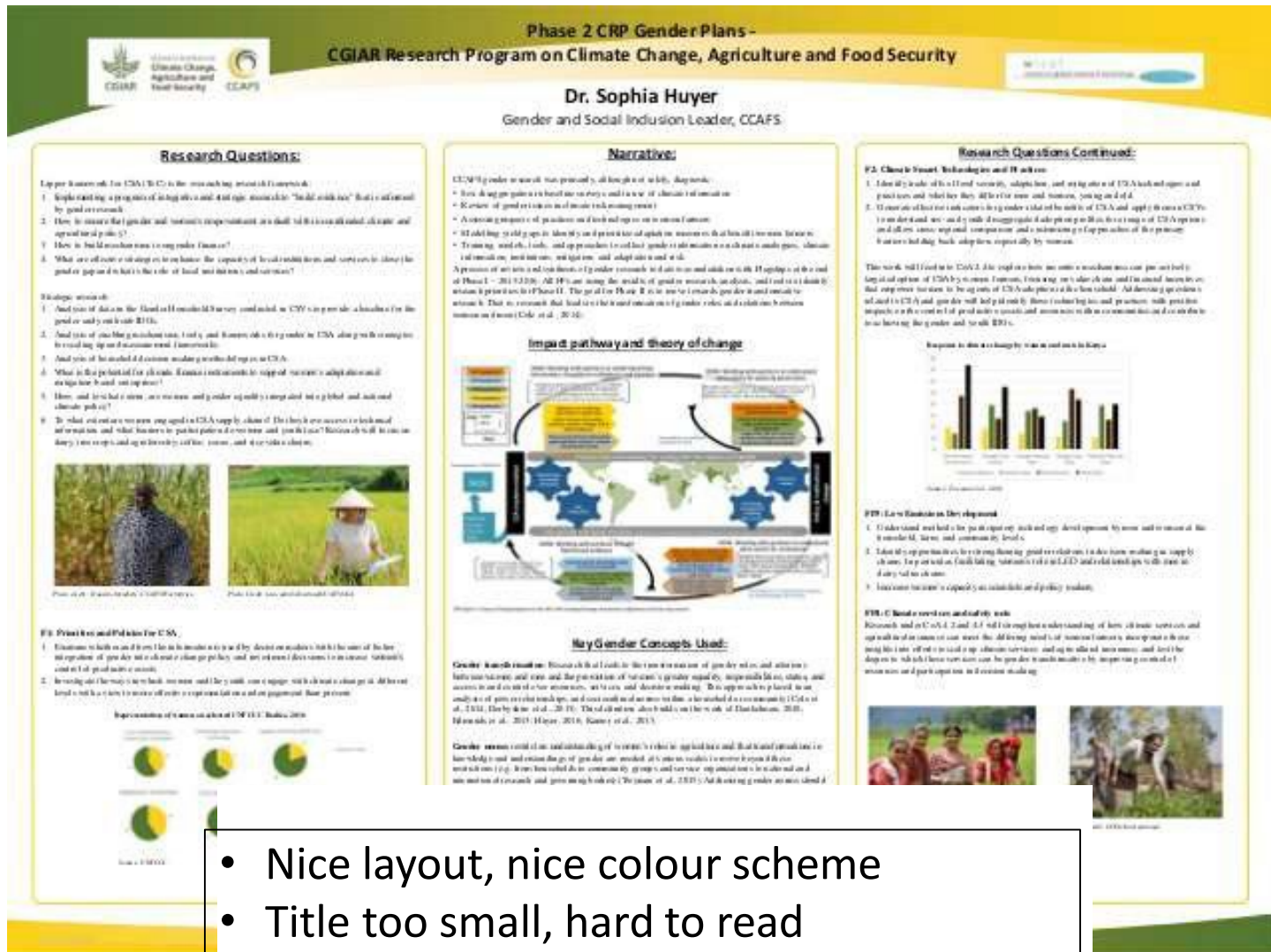
Acknowledgements:
We thank everyone of the Behavioural Ecology Group for the support. This work is funded by FCT, Portugal, Project UIDB/04448/2020. We held the necessary Portuguese licenses for conducting this work.



Replace this
with
References

Replace this with
Discussion and
conclusions

What's wrong with this poster?



- Nice layout, nice colour scheme
- Title too small, hard to read
- No references, no proper figure legends

Transmissible Cancer And the Evolution of Sex



Frédéric THOMAS, Thomas MADSEN, Mathieu GIRAudeau, Dorothée MISSE,
Rodrigo HAMEDE, Orsolya VINCZE, François RENAUD, Benjamin ROCHE & Beata UVARI
PLOS BIOLOGY June 6, 2019



The evolution of sex is the hardest problem in evolutionary biology.

— John Maynard Smith —

Sexual reproduction appears much more efficient and less costly

Sexual reproduction appears much more efficient and less costly

Sexual reproduction appears much more efficient and less costly

Therefore, despite 50 years of research, the selective forces maintaining obligate sex remain not fully understood

Sexual reproduction would prevent invasion by transmissible selfish neoplastic cheater cells. Sexual reproduction permits systematic change of the multicellular organism's genotype and hence an enhanced detection of transmissible cancer cells by immune system.

Given the omnipresence of oncogenic processes in multicellular organisms, together with the fact that transmissible cancer cells can have dramatic effects on their host fitness, our scenario suggests that the benefits of sex and concomitant recombination will be large and permanent, explaining why sexual reproduction is the dominant mode of reproduction in eukaryotes.

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Given the omnipresence of oncogenic processes in multicellular organisms, together with the fact that transmissible cancer cells can have dramatic effects on their host fitness, our scenario suggests that the benefits of sex and concomitant recombination will be large and permanent, explaining why sexual reproduction is the dominant mode of reproduction in eukaryotes.

Empirical testing of theories that explain the evolution of sex is difficult, but several observations seem to support our hypothesis:

Step 1

Step 2

Constant progress in animal cloning could also help to evaluate the risk of cancer cell transmission associated with asexual reproduction. We predict that the likelihood of mother to foetus malignant cell transmission will be higher when the implanted embryos (e.g. in mammals) are genetically identical to their mother, compared to embryos that have originated from another female, or being the

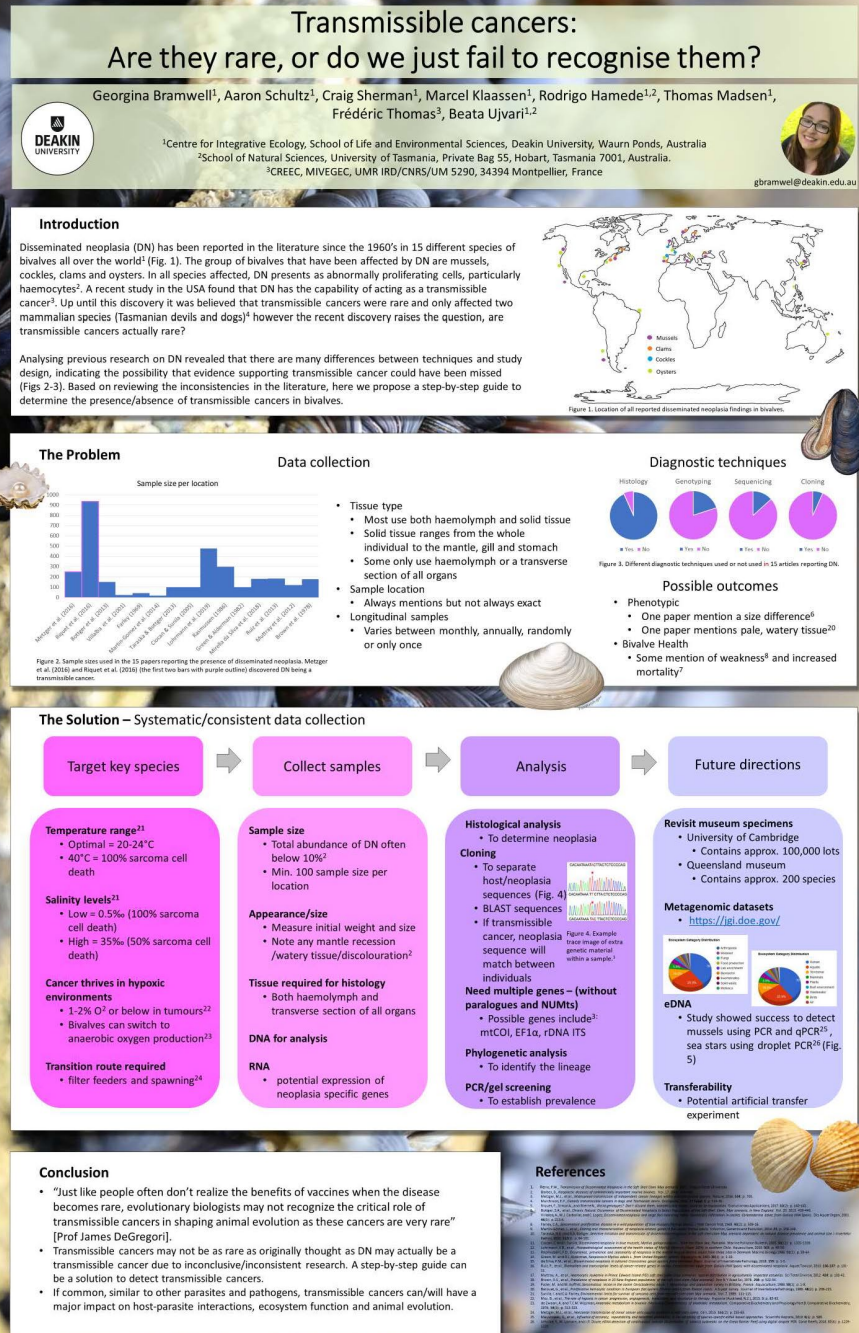


What about this one?

- Confusing layout, hard to follow
- Text hard to see:
 - blue text on blue background
 - font too small
 - white text overlapping images
- Images too small
- No references



Nice poster with a well structured and visual layout



Some useful resources

The following links can provide advice on effective poster design:

<http://guides.nyu.edu/posters>

<http://www.personal.psu.edu/drs18/postershow/>

<https://www.behance.net/gallery/2284120/SCIENTIFIC-POSTER>

https://www.youtube.com/watch?v=AwMFhyH7_5g