A Research Talk
in 12 minutes

Your Name
Division
Institution

Impact

- An interesting <u>idea</u>
- An engaging <u>speaker</u>
- A polished <u>delivery</u>….

- Questions and comments.

A 'story board'

Introduction 1 min	Background 2 min	Aims 1 min	Aim 1 0.5 min
Methods 1 1 min	Results Discussion 1 2 min	Aim 2 0.5 min	Methods 2 1 min
Results Discussion 2 2 min	Summary Outcomes 1 min		

Introduction

- What is the <u>general</u> topic and its background?

  (Why is it interesting? What work has come before?)

- What is the <u>particular</u> topic?

- How are you going to approach it?

Aim 1

Methods

(outline only; no details)

Results

(overview only; figures, not tables; few statistics)

Discussion

(emphasize main points; state the significance)

(All combined for Aim 1)

Aim 2

Methods

(outline only; no details)

Results

(overview only; figures, not tables; few statistics)

Discussion

(emphasize main points; state the significance)

(All combined for Aim 2)

Summary and outcomes

Briefly recap your results.

Outline the implications
for the discipline.

Delivery: 10 top human fears

1. Speaking before a group
2. Heights
3. Insects
4. Financial problems
5. Deep water
6. Sickness
7. Death
8. Flying
9. Loneliness
10. Dogs

Delivery

- Engage the audience (be enthusiastic: ☺)
- An educated but inexpert audience
- Aim to intrigue rather than instruct
- Keep it simple (memorable)
- Share the slides (try not to use notes)
- Make eye contact (don't watch the screen)
- Watch the time: 🕐
- Speak to the cheap seats (big font, big noise)
- Pause…
- Dress for comfort
- Welcome questions (and try to answer them)
- Rehearse (friends, peers, supervisor…)
- Rehearse
- Rehearse

A PowerPoint Tutorial

Include the minimum, essential information.

An investigation into the effect of finfish aquaculture on the demersal macrofauna in Fitzgerald Bay (Spencer Gulf, South Australia) using remote, time lapse underwater video
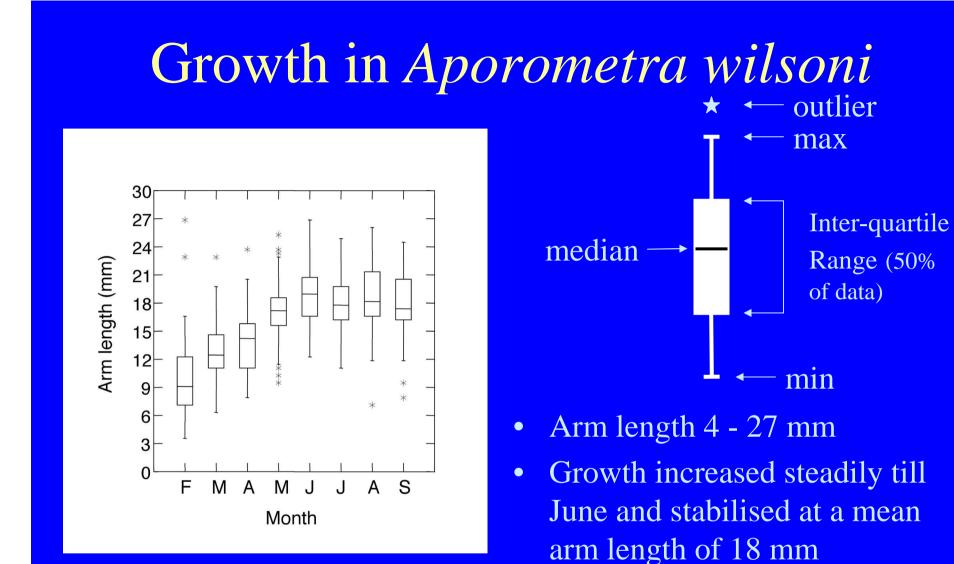
John Howard

Supervisors:
Dr Peter Costello and Dr Brendan Nelson

Importance

- Studies of air-breathing in fishes often stress the importance of aerial respiration in the origin of the tetrapods and the phyletic progression from amphibians to mammals ??

- This conveys the impression that both fish evolution and the importance of air breathing to fishes ended with the appearance of the amphibians

- But air-breathing has persisted!

- Further studies allow us to draw parallels between the ecological and environmental factors affecting extant forms and the factors that likely led to the early origin of air breathing

88 words

Importance

- Air-breathing fishes often represent the evolutionary origin of the tetrapods.
- This conveys the impression that air-breathing was an inferior, transitional state.
- But 756 species of air-breathing fish persist.
- This study helps understand the adaptive value of air-breathing in extant forms and the environmental factors that led to the origin of air breathing.
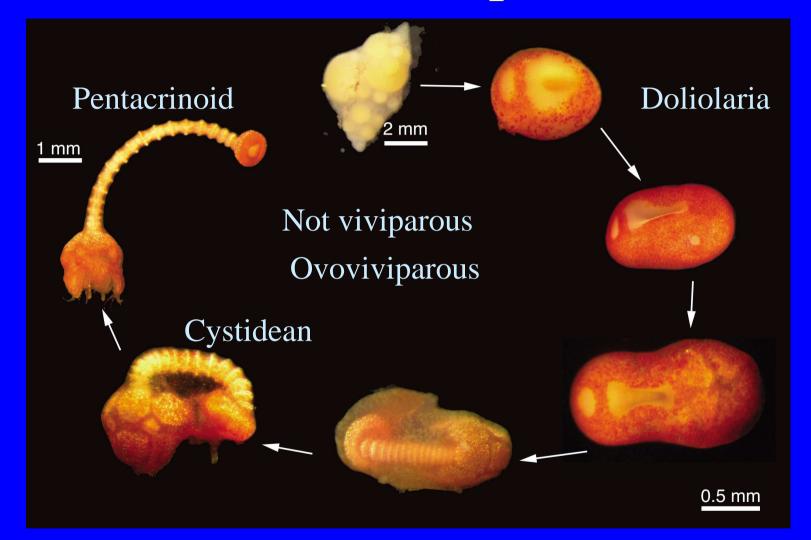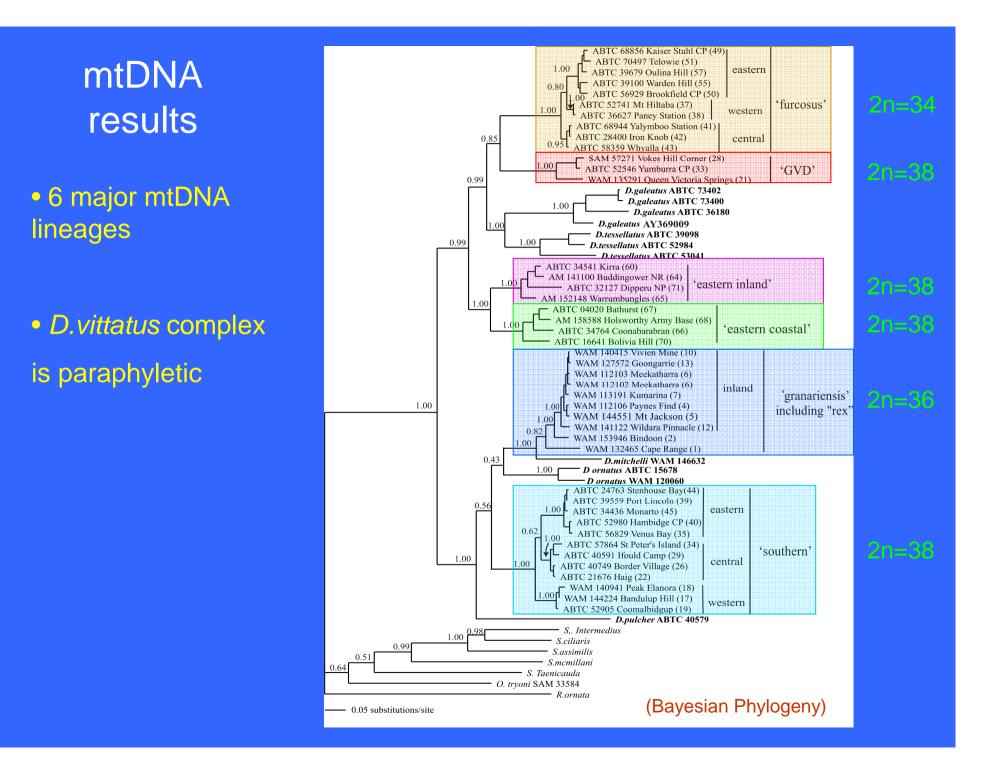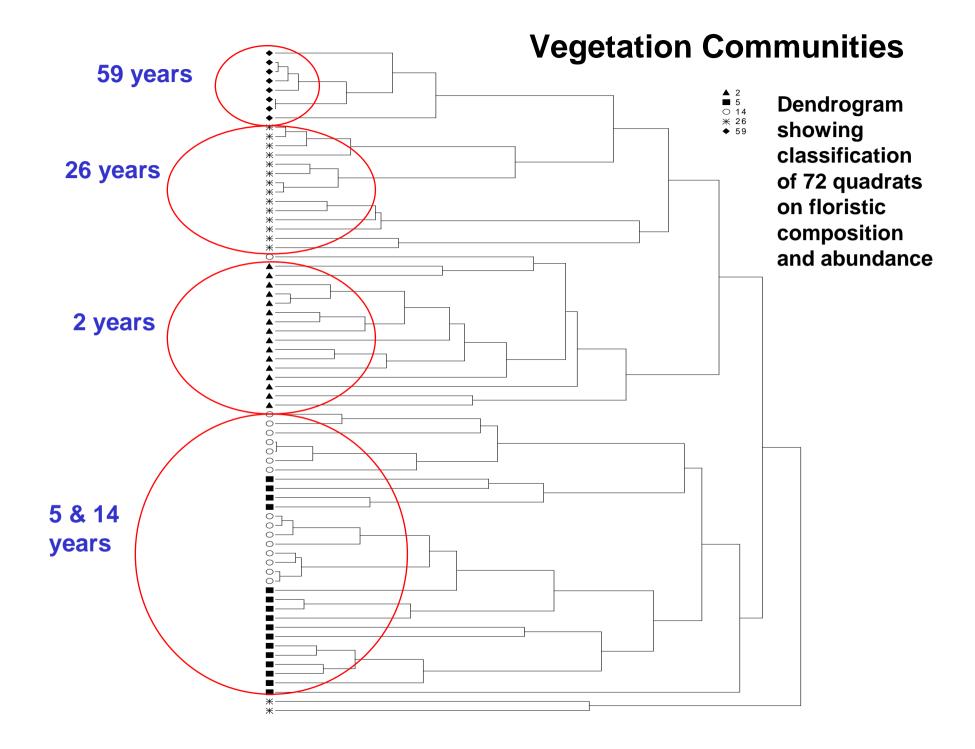
53 words

Growth in *Aporometra wilsoni*

Box plot of *A. wilsoni* arm

length (mm) over time

- Arm length 4 - 27 mm
- Growth increased steadily till June and stabilised at a mean arm length of 18 mm
- Very few adults in early months

Larval development

Pentacrinoid

1 mm

2 mm

Doliolaria

Not viviparous

Ovoviviparous

Cystidean

0.5 mm

Development of *Aporometra wilsoni*, followed in the laboratory

Vegetation Communities

59 years

26 years

2 years

5 & 14 years

Dendrogram showing classification of 72 quadrats on floristic composition and abundance

▲ 2
■ 5
○ 14
✳ 26
◆ 59
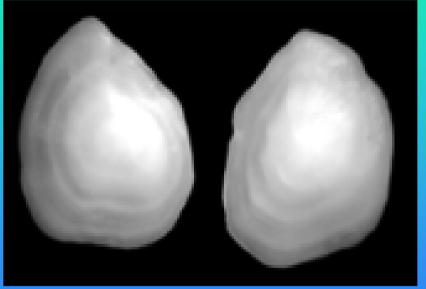
Make text understandable on its own.

Otolith Chemistry

- Promising new method

- $CaCO_3$
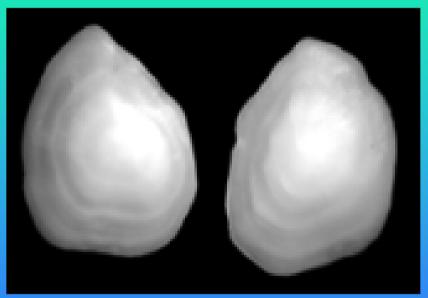
- Daily increment

- Inert

- Relationships

Otolith Chemistry

- Promising method capable of answering questions regarding fish migrations

- Calcium carbonate $CaCO_3$

- Daily growth increments

- Permanent record of life

- Unanswered question: what is the relationship between elemental concentrations in the water and in the otolith?

Air-breathing in fish:

- Evolved independently many times (>67!)

- Is common in warm, eutrophic, brackish or fresh water

- Can be associated with ephemeral pools

- Is primarily an adaptation to hypoxia (supply problem)

Is air-breathing associated with increased metabolic rates during and after activity? (demand problem)
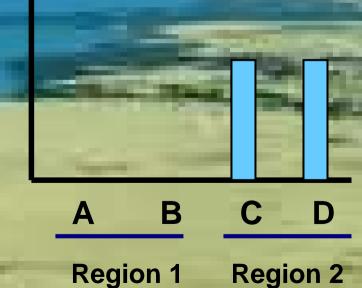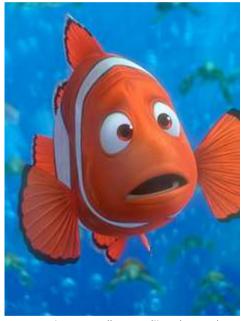
Omit irrelevant material in text and figures.

Importance of Neutral Buoyancy

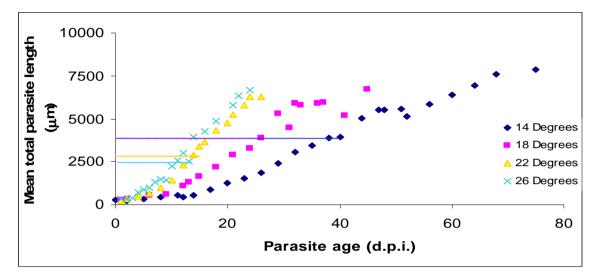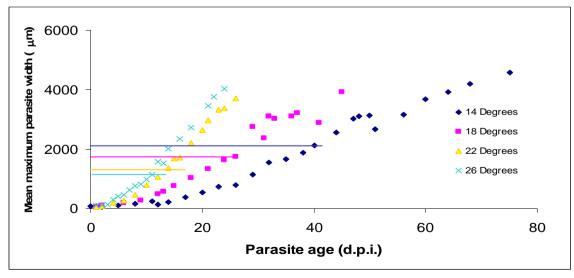

www.pixar.com/featurefilms/nemo/

- Sink or swim… or float
- Neutral buoyancy saves energy
- Allows fish to remain motionless in mid-water

Make all text and figures large enough to see.
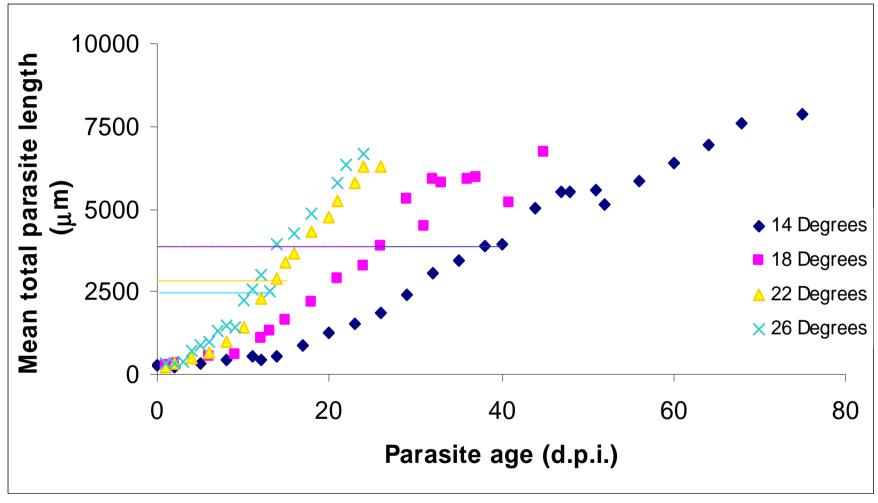
Parasite Growth Rates

Mean total parasite length (μm)

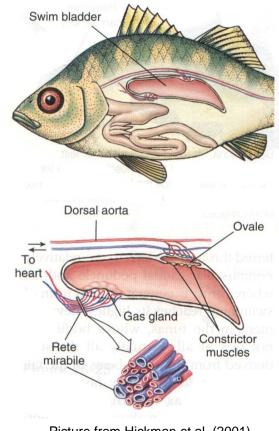**Mean maximum parasite width (μm)**

Parasite Growth Rates

Mean total parasite length (μm)

Mean total parasite length (μm)

Parasite age (d.p.i.)

- ◆ 14 Degrees
- ■ 18 Degrees
- ▲ 22 Degrees
- ✕ 26 Degrees
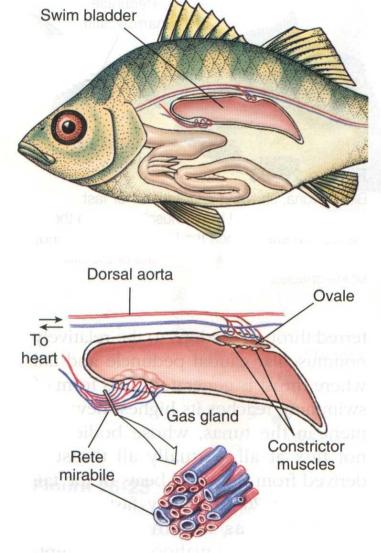
Fill the frames.

Swimbladder

- Storage of gases

- Gases reduce fish density

- Two forms:
  1. Physostomous – open
  2. Physoclistous – closed, gas gland

Picture from Hickman et al. (2001) "Integrated Principles of Zoology"

Swimbladder

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Align and distribute items artistically.

Response of
Amphibolis antarctica and
Posidonia sinuosa
to reduced salinity

Emma O'Toole

Experiment 1

$$P_B = 101 \text{ kPa}$$

| $P_{O2} < 21$ kPa e.g. 5, 10 kPa | $P_{O2} = 21$ kPa Control | $P_{O2} > 21$ kPa e.g. 40, 60 kPa |

Response variable = air breathing frequency
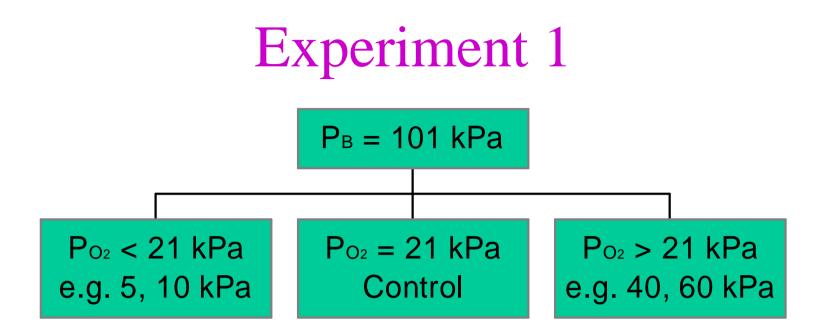
n = 11

Hypotheses:

1. <u>Buoyancy regulation?</u> → No change in air-breathing frequency

2. <u>Respiration?</u> → Air-breathing frequency ↑ for $P_{O2} < 21$ kPa
   → Air-breathing frequency ↓ for $P_{O2} > 21$ kPa

Experiment 1

Response variable = air breathing frequency

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Results

- 6764 trap nights
- 835 animals captured
- 19 species
- Trap success = 12.35%

Amphibians:
- 10% of captures (85)
- 3 species

Reptiles:
- 4% of captures (31)
- 10 species

Mammals:
- 86% of captures (719)
- 6 species

Eastern Banjo Frog

(*Limnodynastes dumerilii*)

Silky Mouse

(*Pseudomys apodemoides*)

Norris's Dragon

(*Amphibolurus norrisi*)

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Diagrams and pictures are often clearer than text.
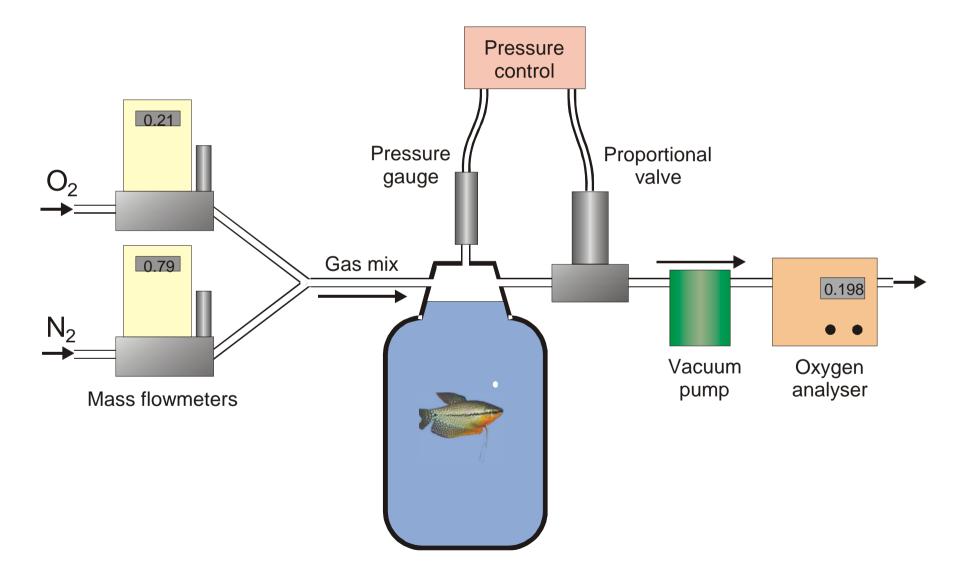
Materials

First experiment to use hyperbaric chamber!

Gas was mixed and flowed into chamber.

Pressure in chamber was controlled by feedback mechanism involving measuring pressure in chamber and actuating solenoid reduction valve on outflow to create appropriate resistance.

Thus both gas concentration and total pressure could be controlled.
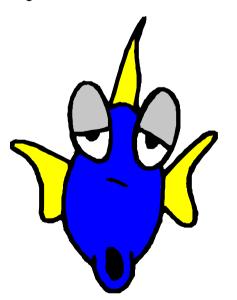
Materials

First experiment to use hyperbaric chamber!

Pictures add interest, but keep them relevant.

Project Aim

- Assess whether buoyancy regulation or respiration is the greater stimulus for air-breathing activity in *T. leeri*

Bimodal or Trimodal Gas Exchangers

Lungs
Gills
Skin
Cloaca
Air-breathing organs, e.g.:
      Swim bladder
      Labyrinth organs
      Mouth
      Intestine

Use animation for sequential text.

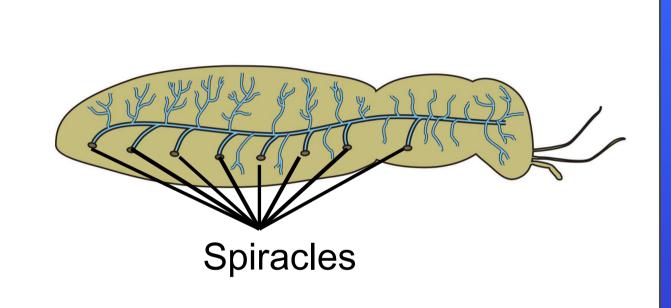Use animation to introduce items as you speak.

Avoid pointless animation.

Air-breathing in fish:

- Evolved independently many times (>67!)

- Is common in warm, eutrophic, brackish or fresh water

- Can be associated with ephemeral pools

- Is primarily an adaptation to hypoxia (supply problem)

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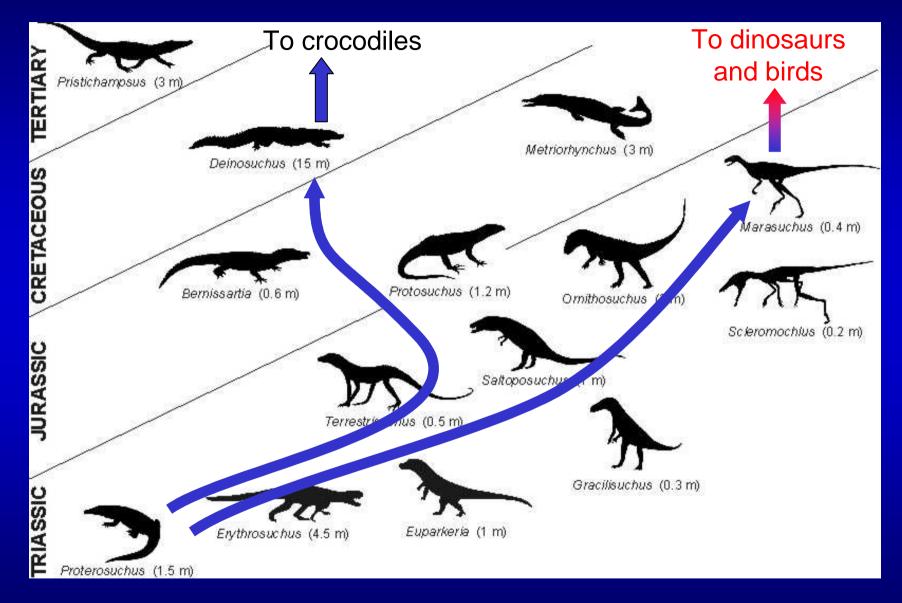
Typical Insect

Spiracles

Diffusion of O_2 in air
250 000 x faster than in water

Physiology of Sauropod Dinosaurs: Cardiovascular Evidence

Roger S. Seymour
Ecology & Evolutionary Biology
University of Adelaide
Australia

Crocodiles and birds have 4-chambered hearts

Avoid distracting backgrounds.

Results

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Morioka
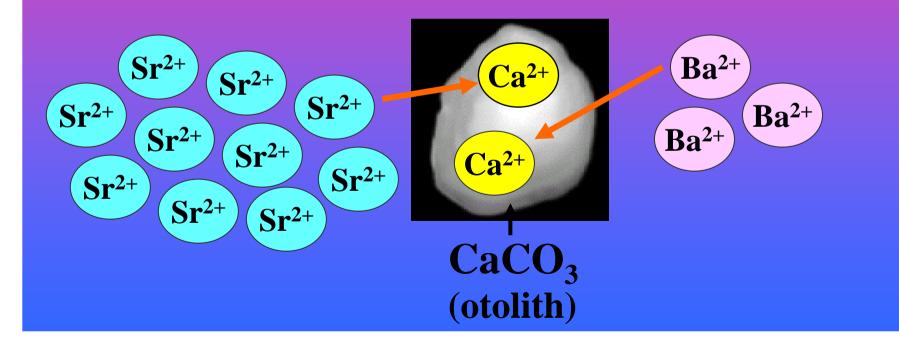
Avoid colour clashes.

Theory of elemental uptake

$$CaCO_3 \; + \; Ba^{2+} \longrightarrow BaCO_3 \; + \; Ca^{2+}$$

(otolith)

or   or

$$Sr^{2+} \qquad\qquad SrCO_3$$

Is there competition for binding sites between elements?

Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+} Sr^{2+}

Ca^{2+} Ca^{2+}

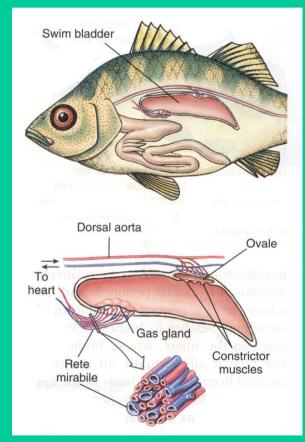Ba^{2+} Ba^{2+} Ba^{2+} Ba^{2+}

$CaCO_3$
(otolith)

Avoid using red and green.

Likely that some in the audience are red/green colour blind.

Swimbladder

- Storage of gases

- Gases reduce fish density

- Two forms:
  1. Physostomous – open
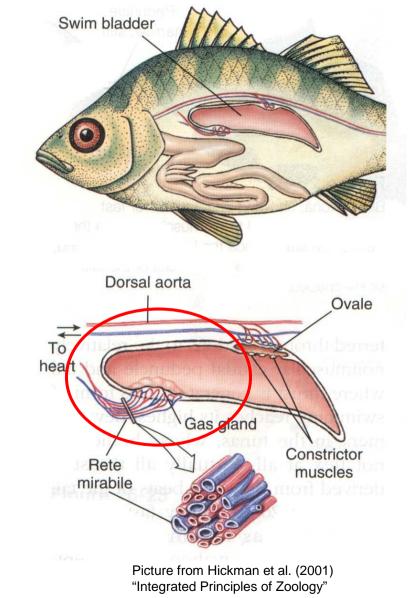 2. Physoclistous – closed, gas gland

Picture from Hickman et al. (2001)
"Integrated Principles of Zoology"

Swimbladder

- Storage of gases
- Gases reduce fish density
- Two forms:
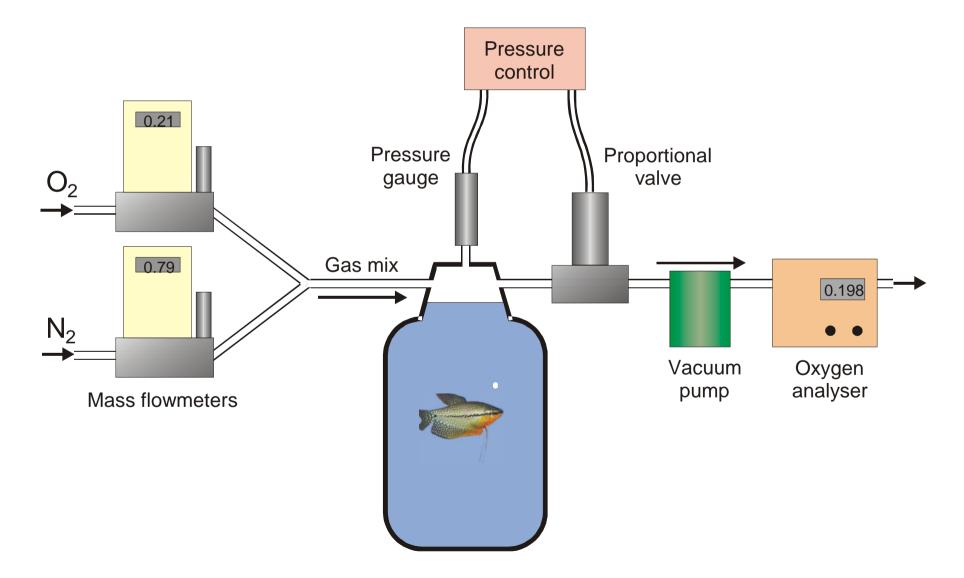 1. Physostomous – open
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Tip: To prevent show through, put a sheet of black paper behind the page that you scan.

Picture from Hickman et al. (2001) "Integrated Principles of Zoology"
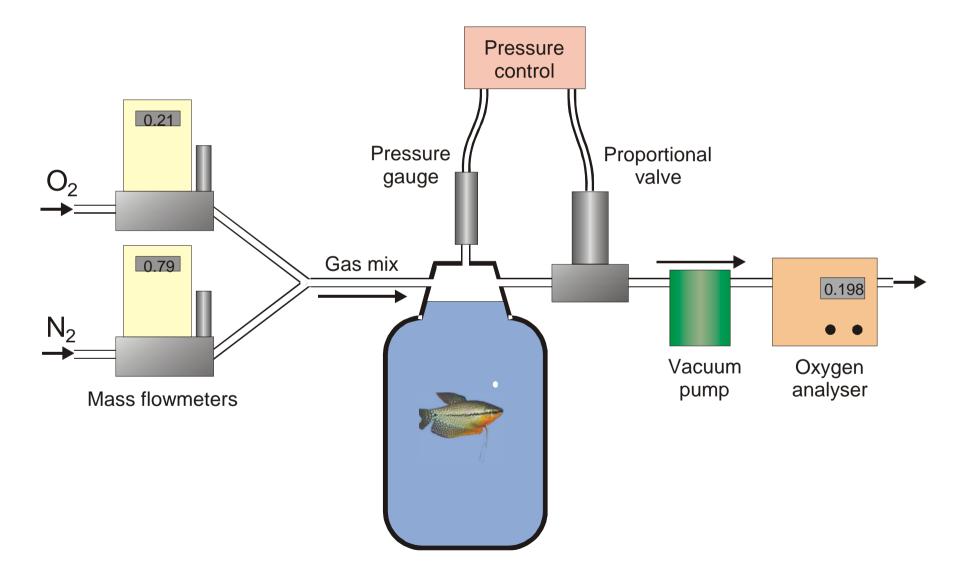
Use consistent and simple fonts.

Materials

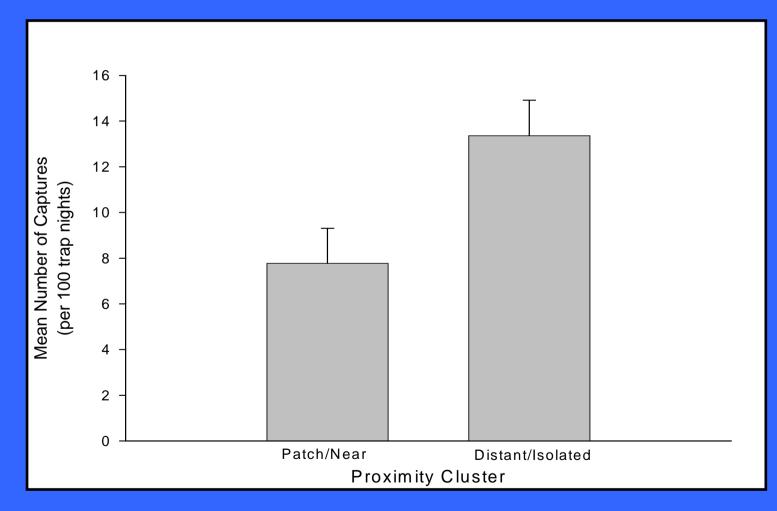## First experiment to use hyperbaric chamber!

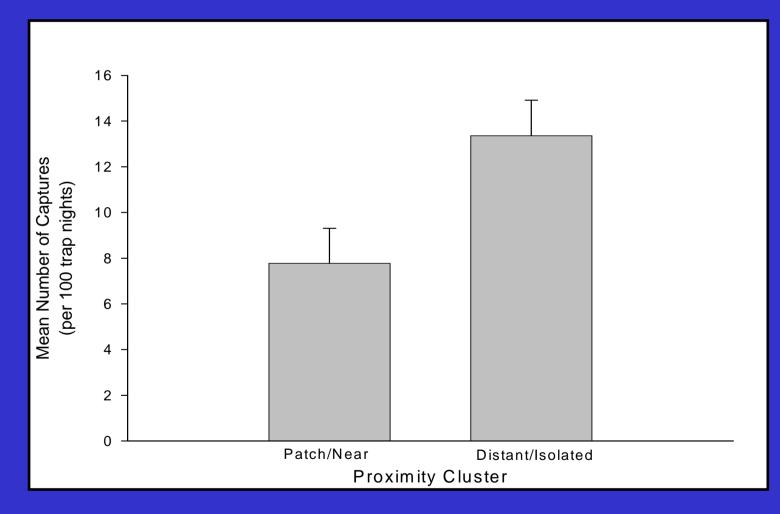# Materials

First experiment to use hyperbaric chamber!

Enhance contrast between text and background.

The mean number (± s.e.) of *Mus musculus* captured (per 100 trap nights) at the proximity clusters of patch and near roadside, and distant and isolated roadsides.

Mann-Whitney U = 32.00, Z = -2.31, *P* = 0.02

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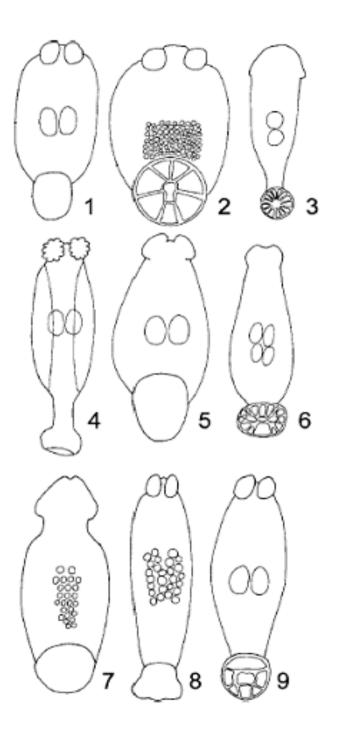
Mann-Whitney U = 32.00, Z = -2.31, *P* = 0.02

Use landscape orientation.

1

2

3

4

5

6

7

8

9

Experimental – Manipulations of Attributes

Remove perches

Remove leaf litter

Cover bear ground litter

Repeat observations

Significant responses?

Avoid final acknowledgements slide.
Acknowledge at beginning or during presentation.

Physiology of Sauropod Dinosaurs: Cardiovascular Evidence

Avoid abbreviations, especially to a heterogeneous audience.

Habitat Model

Results of logistic regression analysis of Mallee Emu-wren presence/absence. Models with significant levels of empirical support ($\Delta_i < 2$) are shown in bold.

Model no		Δ_i	$\Lambda \, (g_i/\chi)$	W_i
8	**TRCOV + ALCOV**	**0.00**	**1.00**	**0.48**
3	**TRCOV**	**1.86**	**0.39**	**0.19**
15	ALCOV+TRCOV+XACOV	2.40	0.30	0.14
9	TRCOV + ALCOV + LECOV + XACOV	2.45	0.29	0.14
Global model	TOTC+AMCOV+ALCOV+BBCOV+BOCOV+ LECOV+TRCOV+ XACOV	5.61	0.06	0.03
16	TRCOV+LECOV+BBCOV	6.24	0.04	0.02
1	BOCOV	15.13	< 0.001	< 0.001
7	LECOV	18.01	< 0.001	< 0.001
6	ALCOV	18.61	< 0.001	< 0.001
4	TOTC	18.91	< 0.001	< 0.001
14	ALCOV+XACOV+LECOV	18.96	< 0.001	< 0.001
11	BOCOV+LECOV+XACOV+ALCOV	18.98	< 0.001	< 0.001
2	BBCOV	19.44	< 0.001	< 0.001
5	AMCOV	19.54	< 0.001	< 0.001
10	XACOV	19.81	< 0.001	< 0.001
13	LECOV+AMCOV+BBCOV	21.28	< 0.001	< 0.001
12	BOCOV+LECOV+XACOV+ALCOV+BBCOV	21.69	< 0.001	< 0.001

Avoid capitals.

THE FATE OF *ADH* MUTANTS IN *DROSOPHILA MELANOGASTER* POPULATION CAGES
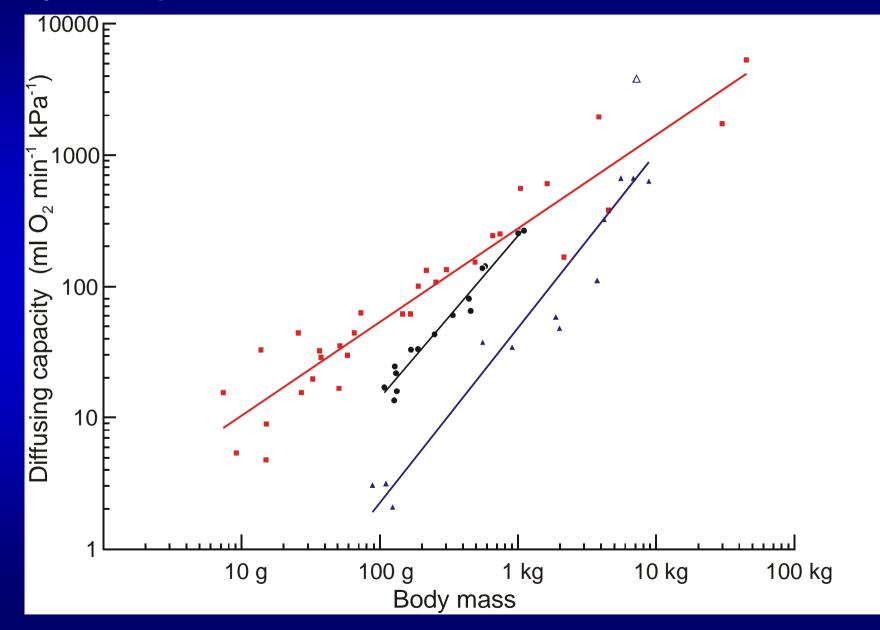
The fate of *Adh* mutants in *Drosophila melanogaster* population cages

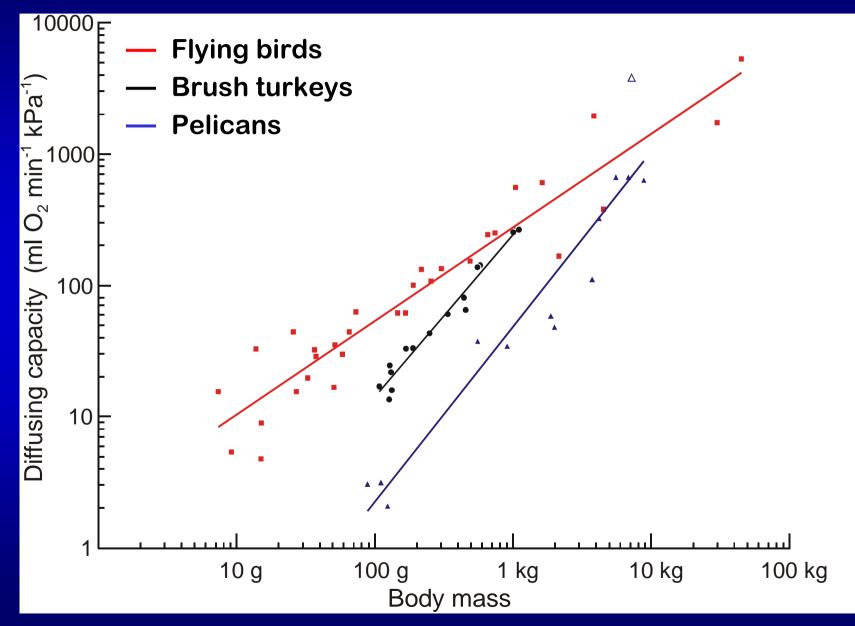Effect of Cheap Malt Beverages on *Adh* Expression in Wild Type and Mutant *E. coli*

Effect of cheap malt beverages on *Adh* expression in wild type and mutant *E. coli*

Avoid graph legends.

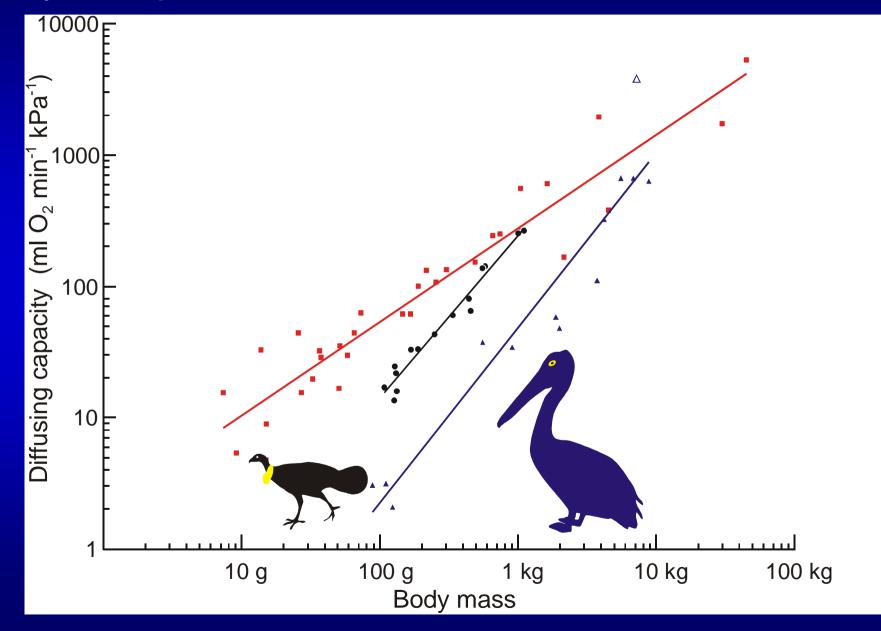Label lines and points.

Use miniature figures.

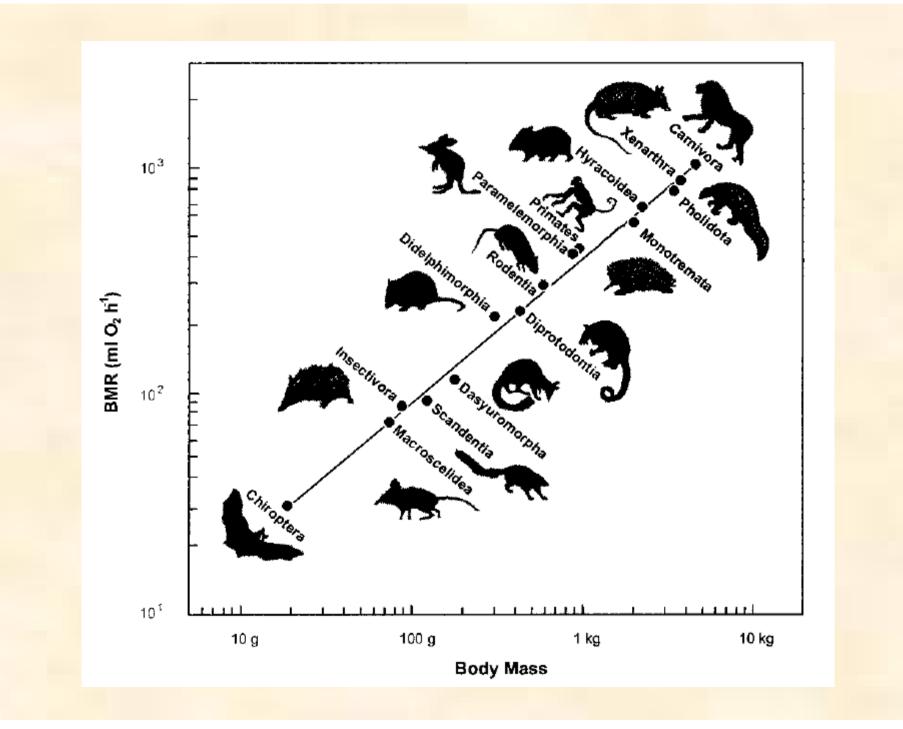Symmorphosis: structure matched to function

Symmorphosis: structure matched to function

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Reduce the file size of imported pictures.

Resolution should be 72 dots/inch

This means a file about 300-600 kB

However, scanned images should be as large as possible.

Recommendations for PowerPoint slides

Include the minimum, essential information.
Make text understandable on its own.
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Fill the frames.
Align and distribute items artistically.
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Pictures add interest, but keep them relevant.
Use animation for sequential text.
Use animation to introduce items as you speak.
Avoid pointless animation.
Avoid distracting backgrounds.
Avoid color clashes.

Recommendations for PowerPoint slides

Use consistent and simple fonts.
Enhance contrast between text and background.
Use landscape orientation.
Avoid final acknowledgements slide.
Avoid abbeviations.
Avoid capitals
Avoid legends to figures. Use symbols.
Reduce the size of imported pictures.