



## Parental care in amphibians

Todd Pierson  
21 February 2017

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## Stereotypical amphibian reproduction



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## Forms of parental care

 <p>Nest guarding</p>	 <p>Food provision</p>	 <p>Transport</p>
 <p>Lactation</p>	 <p>Education</p>	

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### Forms of parental care

 Nest guarding	 Food provision	 Transport
 Lactation	 Education	

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### Why bother?

...why not bother?

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### Why bother?

- Protection against predators
  - Conspecific and heterospecific
- Protection against desiccation
- Protection against microbial pathogens
  - Antimicrobial secretions
  - Selective eating of infected eggs
- Aeration of eggs

...why not bother?

- Reproductive costs
- Survival costs

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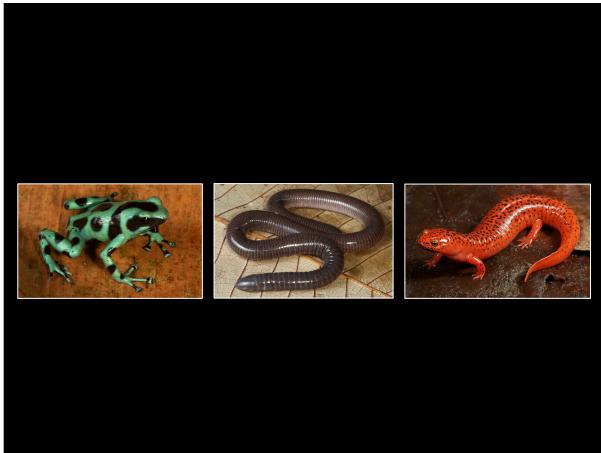
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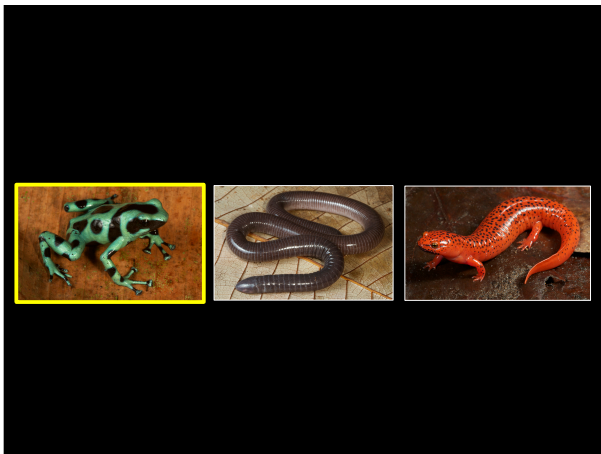
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### Anuran Parental Care



- ① Attendance of eggs and young.
- ② Transport of eggs.
- ③ Transport of young.
- ④ Feeding of young.

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### Anuran Parental Care



- ① Attendance of eggs and young.
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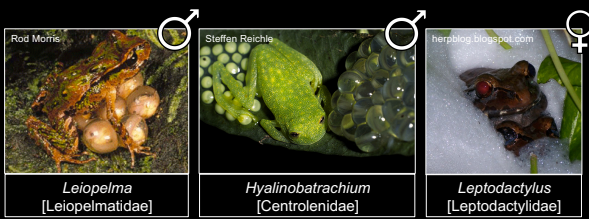
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### ① Attendance of eggs and young.

- Most common form of parental care
- 13-15 anuran families
- Mostly terrestrial




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## ② Transport of eggs

- Independent evolution in four families of frogs.
  - Very different strategies
    - Morphological adaptations to match
  - Male vs. female transport

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## ② Transport of eggs

[Surinam toad \(\*Pipa pipa\*\)  
video on ARKive](#)

*Pipa*  
[Pipidae]



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## ② Transport of eggs

**Hemiphractidae**



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② Transport of eggs

*Rheobatrachus*  
[Myobatrachidae]



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② Transport of eggs

*Rheobatrachus*  
[Myobatrachidae]



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② Transport of eggs

*Alytes obstetricans*  
[Alytidae]



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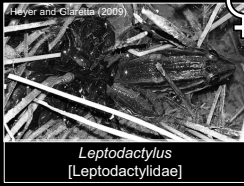
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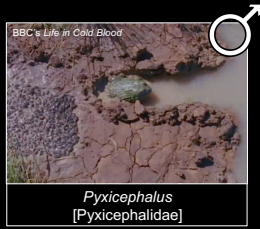
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③ Transport of larvae or young



*Leptodactylus*  
[Leptodactylidae]



*Pyxicephalus*  
[Pyxicephalidae]

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③ Transport of larvae or young



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③ Transport of larvae or young

**Rhinoderma**  
[Rhinodermatidae]



Dante Fynolo

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③ Transport of larvae or young

***Assa darlingtoni***  
**[Myobatrachidae]**

H. Ehmman



♂

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③ Transport of larvae or young

BBC's *Life in Cold Blood*



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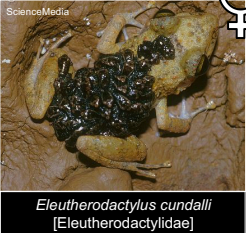
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③ Transport of larvae or young

**Transport of terrestrial young**


ScienceMedia



♀

*Eleutherodactylus cundalli*  
[Eleutherodactylidae]

Sphenophryne  
[Microhylidae]



♂

S. Richards

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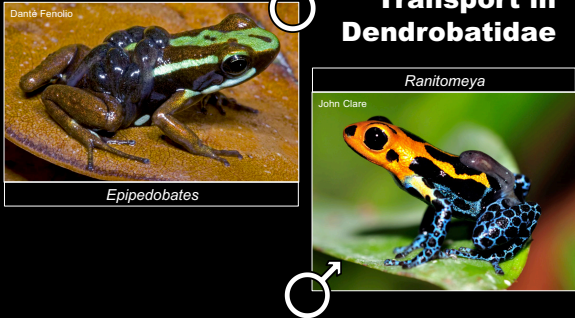
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③ Transport of larvae or young

**Transport in Dendrobatidae**



*Epipedobates*

*Ranitomeya*

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③ Transport of larvae or young

**Transport in Dendrobatidae**



*Oophaga*

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④ Feeding of young

Repeated evolution of egg-feeding:

- Dendrobatidae [+++]
- Two genera in Hylidae [2]
- Rhacophoridae [1]
- Leptodactylidae [1]

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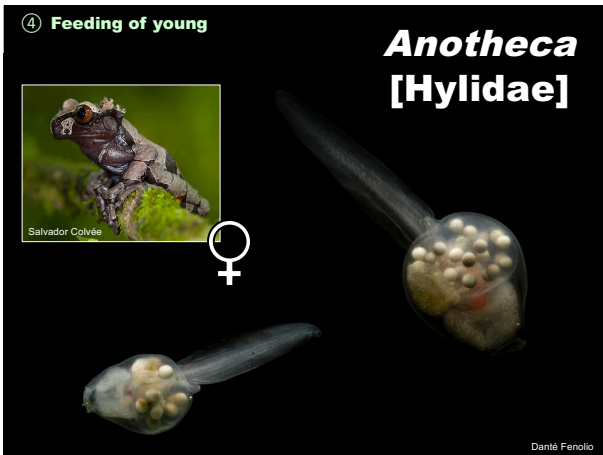
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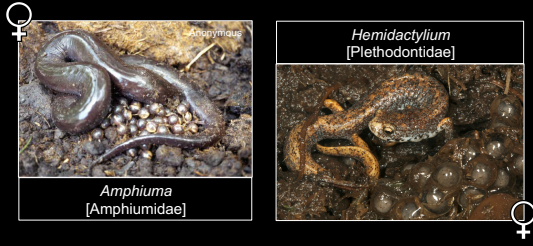
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① Attendance of eggs or young

- Most common form of parental care.
- Found in most (if not all) families of salamanders.



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① Attendance of eggs or young

BBC's *Life in Cold Blood*



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① Attendance of eggs or young

What's this one?



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① Attendance of eggs or young

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**Marbled salamander**  
*(Ambystoma opacum)*



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① Attendance of eggs or young

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① Attendance of eggs or young

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### Ma or Pa?



- Often larger
- Internal fertilization
- Egg-feeding



- External fertilization
- Present when eggs are laid

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① Attendance of eggs or young

#### Two-lined salamanders (*Eurycea bislineata* complex)





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### Male dimorphism

“cirriferous male”



“big-headed male”



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### Caecilian Parental Care



① Attendance of eggs or young.

④ Feeding of young.

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① Attendance of eggs or young



RG Kamal

*Ichthyophis*  
[Ichthyophiidae]




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① Attendance of eggs or young



Gymnopsis  
[Dermophiidae]

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④ Feeding of young



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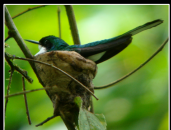
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Forms of parental care



Nest guarding



Food provision



Transport



Lactation



Education

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