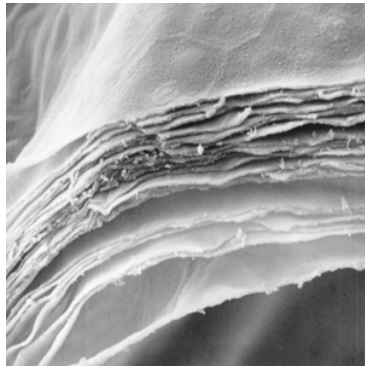


Living underground:
what does it take?

The water-holding frog (*Cyclorana platycephala*) shows there is more to burrowing than just digging a hole.



photo by Stewart Ford, used by permission



adaptation 1
super skin

image: scanning electron
micrograph of cocoon skin layers

A frog's skin is highly permeable and requires protection from the external environment. The skin is comprised of two layers: a thick external layer called the epidermis that prevents moisture loss; and a thinner layer called the dermis that is important in gas exchange. The epidermis is shed regularly in a process called sloughing and then eaten by the frog.

During aestivation the epidermis is allowed to build up to form a thick, protective cocoon that helps prevent evaporative water loss. The cocoon covers the entire frog except for the nostrils.

- 1. Name another type of cocooning animal. What is the function of its cocoon?

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adaptation 2
storage space

When you are heading underground to aestivate, water storage is essential. The water-holding frog has a super-sized bladder capable of holding enough water for up to three years underground. The bladder is extremely important as it provides the only source of water once the cocoon is formed.

- 2. Suggest another structural adaptation that allows an organism to conserve or store water.

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adaptation 3:
tools for the trade

The water-holding frog burrows backwards: its hind feet have a small ridge on the underside, called a metatarsal tubercle, that it uses as a spade to work its way down into soil, up to 30 cm below ground.

3. Name other structures used for digging in a terrestrial and an aquatic animal.

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adaptation 4:
powering along

Unlike most frogs, the water-holding frog is capable of catching food underwater. Webbing between the toes increases the surface area of the frog's feet. This, together with muscular legs, gives the water-holding frog greater propulsive power when swimming and hunting.

4. What other structures do animals possess to aid propulsion in the water?

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adaptation 5:
maximising vision

The water-holding frog has eyes positioned on top of its head, providing maximum vision whilst in water. Eye position is important if this hunter is to catch its prey and avoid predation.

5. Suggest another animal with specialised eye position. How does this structure improve its function?

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adaptation 6:
taking cover

Water-holding frogs range in colour from grey to dark brown, with a whitish belly. This colouring provides them with effective camouflage against snakes, monitor lizards and birds while they wallow in ponds, streams and clay pans.

6. Give an example of other skin colouration in amphibians. Is it used for camouflage? If not, what is its function?

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