

Short notes and reviews

## Bidder's organ in the female of *Bufo ictericus*: morphological characterization

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### Abstract

Bidder's organ has been cited as a structure present only in males of the toad family Bufonidae, and is used as a systematic characteristic. In this study, we examined females of *Bufo ictericus* in order to ascertain whether this structure also occurs in females. Macroscopic observations and light microscopy technique for paraffin embedding were performed. This study reveals that females of *Bufo ictericus* can have a Bidder's organ with typical morphology, and in close spatial relationship with the ovary. This suggests that the Bidder's organ is not an exclusive structure for male toads, but that it may also occur in active females.

### Introduction

Bidder's organ has been described as a rudimentary ovary-like structure (Tanimura and Iwasawa, 1992; Spengel, 1876). The literature refers to Bidder's organ as a structure exclusive for male bufonids and it has been used as a diagnostic character for this family (Duellman and Trueb, 1994). Some authors reported that if the testis is removed the Bidder's organ develops into a functional ovary, and that this event represents a reproductive strategy (Tanimura and Iwasawa, 1986, 1987). Farias et al. (2002) investigated the Bidder's organ of male *Bufo ictericus*, using routine and histochemical techniques in light microscopy and transmission electron microscopy. They concluded that the Bidder's organs are provided with a structural apparatus that is able to produce sexual cells; then, it is not appropriate to designate the Bidder's organ as a rudimentary ovary.

In this study, we used the female of *Bufo ictericus* to ascertain if the Bidder's organ also occurs in female members of the Bufonidae.

### Material and methods

Nine adult females of *Bufo ictericus* Spix, 1824 were collected in accordance with Brazilian law (collecting permit no. 020222.003111/96-14 issued by IBAMA) in Rio de Janeiro State. The animals were killed with ether vapor after anesthesia. Ovarian and Bidder's organ fragments were fixed by immersion in Bouin's liquid for 18h at 4°C. After rinsing in ethanol 70%, the fragments were processed according to the standard histologic technique for paraffin embedding. Five micrometer serial slices were stained with hematoxylin-eosin and Gomori's trichrome (Lillie and Fulmer, 1976).

### Results

Macroscopically, the Bidder's organ is observed in close association with the ovary (Figs. 2 and 3). The Bidder's organs were found in seven females. In two females with fully grown postvitellogenic ovarian follicles, the Bidder's organs could not be seen.

The ovary consists of a thin sheath of connective tissue, enclosing the ovarian follicles and visualized at different stages of development (Fig. 4). The ovarian follicles consist of germ cells surrounded by a follicular cell layer. The germ cells display a large nucleus with several prominent nucleoli. The ovary is a sac-shaped structure without a typical medullar region.

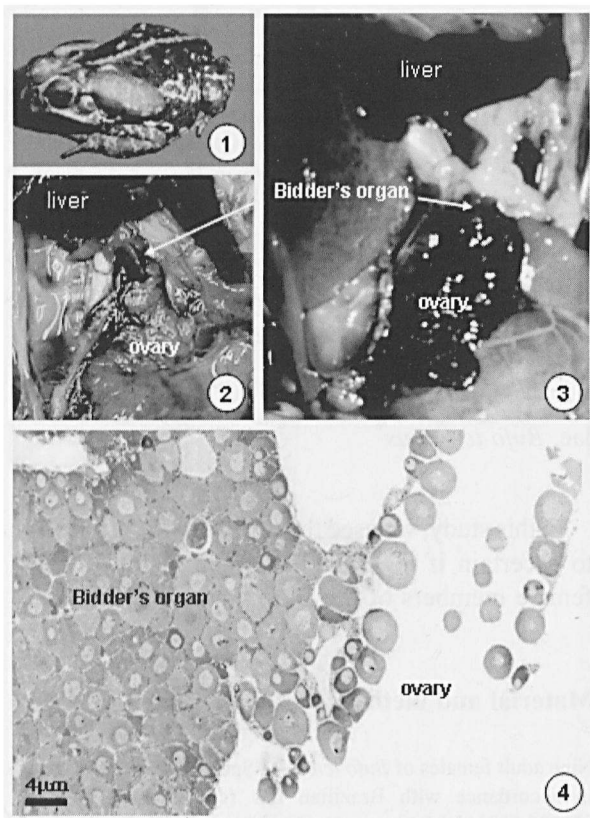


Fig. 1–4. – 1– Photograph of a female of *Bufo ictericus*; 2– Macrograph of an immature female of *Bufo ictericus*. Note the close association of the ovary to the Bidder's organ; 3 – Macrograph of a mature female of *Bufo ictericus*, but the ovarian follicles are not yet totally developed; 4 – Female of *Bufo ictericus*. Light micrograph showing close spatial relationship between the Bidder's organ and the ovary. HE-staining.

Bidderian follicles at different stages of development are shown (Fig. 4). Germ cells display a rounded nucleus, and are enclosed by a layer of follicular cells, varying from flat to cubic. Light microscopy images reveal typical Bidder's organ in close spatial relationship with ovary. In some cases, continuity between both organs is observed (Fig. 4).

## Discussion

Although the Bidder's organ in male bufonids has been reported since the last century (Spengel, 1876), available information about its morphology is still scarce. The Bidder's organ is specific for the Bufonidae and has been cited as a rudimentary ovary-

like structure in males of the specimens (Vitale-Calpe, 1969; Pancak-Roessler and Norris, 1991; Duellman and Trueb, 1994). We previously pointed out that the Bidder's organ of male *Bufo ictericus* has a structural apparatus able to produce sexual cells. The Bidder's organ is made up of a cortex and a medulla. The cortical region shows an ovarian morphology, exhibiting follicles in different stages of development. A small medullar region contains some fairly large blood vessels, notably coiled arteries and convoluted veins. Melanin pigment cells are also detected in the medullar region (Farias et al., 2002).

In this study, female Bidderian follicles are similar to ovarian follicles; they show the basic structure, in which a single continuous layer of follicular cells surrounds the oocyte. Tanimura and Iwasawa (1992), who studied the ovary and male Bidder's organ in young toads of *Bufo japonicus formosus*, showed similarities between ovarian follicles and male bidderian follicles. Female Bidder's organs have the same morphological characteristics as observed in male Bidder's organs described by Farias et al. (2002).

Duellman and Trueb (1994) commented that the Bidder's organ occurs only in male bufonids, and is used as a systematic characteristic. However, in this study, we prove that the female of *Bufo ictericus* may also have a typical Bidder's organ in close spatial relationship with ovary.

In *Bufo ictericus*, the Bidder's organ of females exhibits the usual morphological characteristics as previously described by us for males. This data suggests that the Bidder's organ is not a structure exclusive to male bufonids, but it may also occur in active females. It is still unclear if these females originate from active males or if the Bidder's organ represents an embryonic remnant.

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