**GASTROPHRYNE**

Catalogue of American Amphibians and Reptiles.  

**Gastrophryne Fitzinger**  
Narrow-mouthed toads

**Engystoma:** Holbrook, 1836:38.  
*Gastrophryne* Fitzinger 1843:33. Type species by original designation *Engystoma rugosum* Duméril and Bibron (1841), a synonym of *G. carolinensis* (Holbrook, 1836).  
*Sysyoma:* Cope, 1867:194 (part).  
*Euphemis:* Boulette, 1903:536.  
*Microhyla:* Parker, 1934:123 (part).

- **Content.** The five species are: *Gastrophryne carolinensis* (Holbrook, 1836), *G. olivacea* (Hallowell, 1856), *G. elegans* (Boulette, 1882), *G. pictiventris* (Cope, 1886), and *G. usta* (Cope, 1866).

- **Definition and Diagnosis.** *Gastrophryne* is a typical member of the family Microhylidae as defined by Parker (1934) and Griffiths (1965). It is distinguished from other genera by a combination of external and osteological characters of the adult and external characters of the larvae. The tympanum is concealed. There is a transverse postorbital dermal groove. No digital disks are present. The terminal phalanges are juxtaposed. The tadpole's flap-like upper lip is notched medially and overlaps the simple lower lip; the margins of the tadpole upper lip are usually papillate or scollopated. *G. usta* (Cope, 1866) was the only species known by Parker (1934) to have terminal phalanges. The outer jelly of the egg of *G. elegans* and (?) *G. olivacea* is flat on one side. (The eggs of the other species are not known.) The mating call is a prolonged baa or buzz. The only known karyotype has 22 chromosomes.

- **Descriptions.** The genus is characterized by Carvalho (1954), A. P. Blair (1968) and Nelson (1972c). A. P. Blair's (1968) characterization as "without 2 ridges across palate" is misleading. These ridges occur on most species of *Gastrophryne* but the anterior one is very faint in some specimens (Nelson, 1972c).

Adults are terrestrial, cryptozoic, and largely myrmecophagy (ant eating). Intrageneric differentiation includes adaptations to aridity (2 metatarsal tubercles in *G. usta*, depressed body in *G. olivacea*) and to forest litter (expanded terminal phalanges in *G. elegans* and *G. pictiventris*).

- **Illustrations.** Illustrations of the external features of adults and tadpoles and of sonograms of the mating calls are cited by Nelson (1972c-d). Parker (1981) figures the skull. The other diagnostic features of osteology have not been figured but Parker (1927, 1934) and Carvalho (1954) figure some of them for related genera.

- **Distribution.** The range of *Gastrophryne* includes the lowlands of the Central American lowlands from Costa Rica and El Salvador to Mexico, the northern Mexican Plateau (into southern Arizona), and the southeastern United States from Maryland and Florida west to Nebraska and Texas.

- **Fossil Record.** Fossil records are all within the present range. The earliest record is a fragmental illum from the Florida Miocene assigned to "Microhyla sp." by Aufenberg 1949). The other records are all Pleistocene ilia of *G. olivacea* and *G. carolinensis*.

- **Pertinent Literature.** Nieden (1926) and Parker (1934) include descriptions of most microhylids. Parker (1927), Dunn (1949), and Carvalho (1954) compare New World species of this family. Parker (1927, 1944) and Carvalho (1954) discuss osteology and intergeneric affinities. Nelson (1972c) discusses generic status, anatomy, body size, sexual dimorphism, tadpoles, mating calls, serum proteins, specific distinctions, distribution, habitats, geographic variation, intraspecific taxa, adaptations for myrmecophagy (ant eating), predators, ectoparasites and skin disease, reproductive capacity, premating isolating mechanisms and affinities. Stebbins (1966b) notes that tough skin prevents *Gastrophryne* from ants. Microhylid tadpoles lack keratinized teeth and beaks and are predominantly microphagous (Parker, 1934). Savage (1953, 1955) and Griffiths (1961) suggest Hypopachus tadpoles feed by trapping particles in gill mucus. *Gastrophryne* tadpoles resemble *Hypopachus* and may feed similarly (Nelson and Cuelar, 1968).

- **Nomenclatural History.** Most species and synonyms were described as *Engystoma*. When Fitzinger erected *Engystoma* he stated that it was based on *Rana gibbosa* and that Breviceps was already based on this species, but that he preferred his own genus (Stejneger, 1910). Duméril and Bibron (1841) then described *Engystoma rugosum* (= *E. carolinensis*). Fitzinger then, in a catalogue list and without comment, based *Gastrophryne* on *E. rugosum*. This change was first noted by Stejneger (1910).

Parker (1927) restricted *Gastrophryne* to New World microhylids that lack clavicles. Noble (1931) then stated that no character separated *Gastrophryne* from the Asiatic genus *Microhyla*. Parker subsequently (1934) combined these genera as *Microhyla*. Stejneger and Barbour (1939) proposed using *Gastrophryne* for American microhylids for which there were no characters to separate them from the Asiatic genus.

- **Key to Species.**

1. A single metatarsal tubercle; coloration variable  
2. Two metatarsal tubercles; venter light with pepper­fine dark spots forming a darker reticulum (may be evident only with magnification); Mexico to El Salva­dor  
3. Tips of toes not flattened and not wider than remainder of digit; usually a distinct rudiment of web­bing between toes; venter black or brown with white spots; southern Mexico to Costa Rica

- **Notes.** The five species are:  
1. *G. carolinensis*: adults are terrestrial, cryptozoic, and largely myrmecophagy (ant eating). Intrageneric differentiation includes adaptations to aridity (2 metatarsal tubercles in *G. usta*, depressed body in *G. olivacea*) and to forest litter (expanded terminal phalanges in *G. elegans* and *G. pictiventris*).  
2. *G. elegans*: adults are terrestrial, cryptozoic, and largely myrmecophagy (ant eating). Intrageneric differentiation includes adaptations to aridity (2 metatarsal tubercles in *G. usta*, depressed body in *G. olivacea*) and to forest litter (expanded terminal phalanges in *G. elegans* and *G. pictiventris*).  
3. *G. pictiventris*: adults are terrestrial, cryptozoic, and largely myrmecophagy (ant eating). Intrageneric differentiation includes adaptations to aridity (2 metatarsal tubercles in *G. usta*, depressed body in *G. olivacea*) and to forest litter (expanded terminal phalanges in *G. elegans* and *G. pictiventris*).  
4. *G. usta*: adults are terrestrial, cryptozoic, and largely myrmecophagy (ant eating). Intrageneric differentiation includes adaptations to aridity (2 metatarsal tubercles in *G. usta*, depressed body in *G. olivacea*) and to forest litter (expanded terminal phalanges in *G. elegans* and *G. pictiventris*).  
5. *G. olivacea*: adults are terrestrial, cryptozoic, and largely myrmecophagy (ant eating). Intrageneric differentiation includes adaptations to aridity (2 metatarsal tubercles in *G. usta*, depressed body in *G. olivacea*) and to forest litter (expanded terminal phalanges in *G. elegans* and *G. pictiventris*).
...of digits; no webs; venter faintly mottled or white. United States and northern Mexico.

3. A dark inguinal spot; ventral white spots separated by more than their least diameter; Nicaragua and Costa Rica...

4. Venter mottled; dorsum typically with a dark median wedge (broader posteriorly); dorsum brown or tan. Southeastern United States...

• Eymology. Gastrophryne is from the Greek Gaster (belly) and phryne (touch). It presumably refers to the potbellied habitus. "Narrow-mouthed" is an English rendition of Engystoma.

COMMENT
Alternative arrangements of species are discussed in the species accounts. Dunn's (1949) comment that these species (G. usta excluded) and Glossostoma sequesteriforme "could all be races of a single species" is refuted by Carvalho (1954), W. F. Blair (1955), and Nelson (1972e).

The only character in which Gastrophryne and Microhyla agree and differ from Hypopachus is the absence of a proctodont-like cloaca; this feature has been convergently lost in several lines of microhylid evolution (Parker, 1927, 1931, 1934; Carvalho, 1954) and consequently cannot be considered diagnostic.

Gastrophryne differs from Microhyla, with which it has been confused, in several features (Nelson, 1972e; see also Littlejohn, 1959; W. F. Blair, 1962; Carvalho, 1954; and Nelson and Cuellar, 1968). Microhyla species (compare with Description and Diagnosis) frequently have no postorbital dermal grooves, frequently have t-shaped terminal phalanges and toe discs, some have palatines, and none has the maxillary and quadratojugal in contact (Carvalho, 1954; not independently confirmed); as tadpoles they have the spiracle distinctly separated from the anus, never have a (ventrally-directed) flap-like upper lip, often have expanded lower lips and a terminal flagellum on the tail, and those examined do not have a longitudinal esophageal plica; they have mating calls that are short notes or trills but not prolonged buzzes; and the single karyotyped species has 26 chromosomes. In each of these features Gastrophryne and Hypopachus agree and differ from Microhyla. Plasma protein electrophoresis (Nelson, 1972e) and hybridization (Littlejohn, 1959) also indicate Gastrophryne and Hypopachus are closely allied but a direct comparison with Microhyla is not available. Gastrophryne and Hypopachus are much more closely allied to each other than either is to Microhyla. Hence, Gastrophryne, rather than Microhyla, is the appropriate name for these five New World species.

Note added in proof: Omissions from G. carolinensis account: Guibé (1949). Cat. types amph. Mus. Nat. Hist. Paris. Notes that the type of trugusoma Dumeril and Bibron has data indicating it originated at "Newoude-Orleans" (New Orleans). Although this is compatible with its present placement as a synonym of Gastrophryne carolinensis it conflicts with Schmidt's (1953, Checklist N. Amer. Amphib. Rept. 6th ed.) restriction of the type locality to "vicinity of Charleston."

LITERATURE CITED


Nelson, Craig E. 1972a. Gastrophryne carolinensis. Cat. Amer. Amphib. Rept. 120.1-120.4.


1972e. Systematic studies of the North American microhylid genus Gastrophryne. J. Herpetol. 6(2) :111-137.


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