Mountain Chicken, *Leptodactylus fallax*

Fig. 1. Mountain chicken. (R. Gibson)

General Description

Local Name
Mountain chicken or crapaud.

The mountain chicken, so-called for its love of mountainous forests and similarity in taste to that of chicken, is a large Caribbean frog of the family Leptodactylinae. Adults reach, on average, 135 mm in body length (Brooks, 1982) but large specimens, often female, regularly exceed 170mm (pers.obs.).

Both sexes are largely chocolate-brown on the head, legs and dorsum, each with a unique pattern of darker markings particularly on the sides of the head (loosely forming a post-ocular stripe) and flanks. The groin region of the flank is often rusty-brown or red in colour. Depending upon temperature, physiology, and the substrate on which they are kept, ground colour can darken or lighten considerably. When lighter a series of "chevrons" become visible on the dorsum of some individuals. The hind limbs are banded on both thighs and lowers legs with darker brown cross bars. The inner surfaces of the hind limbs and the venter are near white and unmarked. The eyes have a large horizontal elliptical pupil and striking golden iris. Two lateral rows of smooth "tubercules" run along the posterior half of the upper flank on each side, parallel to the spine. Toes are not webbed.

Conservation Status
IUCN 2000: Vulnerable.
Threatened through loss and disturbance of habitat, introduced predators and competitors and exploitation by humans for food. Distribution has markedly decreased in recent history.

Conservation Measures Taken
Dominica has implemented restrictions on the hunting of this species. Unfortunately, this legislation is poorly implemented. Captive breeding efforts were initiated in the AZA in the late 1980's but no reproduction has yet been achieved in this programme.

A captive breeding and research programme initiated at Jersey Zoo in 1999 has reproduced the first mountain chickens in captivity and discovered and described the complex and previously unknown breeding behaviour and biology of the species. This information is used in the design of appropriate conservation strategies for the frog in Montserrat.

FFI and Durrell Wildlife assist the Montserratian authorities in monitoring the status of this species and studying its habits in the wild.

Studbook Holders
National: None
International: None
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Distribution and Habitat

Formerly recorded from Martinique, St Lucia, St Kitts and Guadeloupe, it is now confined to Dominica and Montserrat in the Lesser Antilles, Eastern Caribbean. Its distribution is severely restricted within each island according to habitat availability.

Mountain chickens are found in montane forests, generally above an altitude of about 300 m but sometimes lower. Preferred habitat is steep slopes bordering ghauts (streams) holding water year-round.

Captive Management

Introduction
13 (7.6) adult mountain chickens were collected by Durrell Wildlife during 1999 and brought to Jersey Zoo for an experimental captive breeding and research programme. At this time knowledge of this species' reproductive behaviour and biology were crucial for conservation planning and captive breeding techniques were sorely lacking. Zoos in the USA and Canada have maintained this species without successful reproduction since the late 1980's and the Paris Museum kept Dominican origin frogs in the 1970's, again without successful reproduction.

I.D. System Employed
Photographs of the unique patterns on the side of the head are adequate for small numbers of frogs. Large numbers require micro-chipping with Passive Implantable Transponders (PIT tags) which can be inserted in the lymph sacs beneath the skin.

Housing

Early attempts at quarantining and holding this species in small enclosures met with serious problems (see *Health, Main Problems*). A minimum floor area of 2 x 2m is recommended for a trio of this species. At Jersey Zoo an adult pair or trio are maintained on display in a 2 x 2 x 2.5m (l x w x h) naturalistic enclosure furnished with a large, shallow pond (~1/3 m^2), caves, hollow logs, multiple levels, live plants and a substrate providing security and humidity (see below).

A further 9-10 adult frogs are maintained in a large group off-show in a similarly furnished, but accordingly complex, enclosure measuring approx. 3.5 x 4.5 m. Newly metamorphosed juveniles have been maintained in plastic boxes measuring 0.35 x 0.5 m in groups of 6-12 until 3-4 months of age and then moved to children's paddling-pools measuring 1.4 x 2.4 m in groups of 30 or more.

Environmental Enrichment
Naturalistic climatic and physical environmental characteristics (see ***Housing*** and below).

Temperature, Lighting and Humidity
Temperatures are relatively consistent throughout the year with daytime ambient temperatures being 24-28°C and nighttime 19-13°C. An increase of 1-2°C occurs from approx. late April through to late October. Humidity is maintained in excess of 60% throughout the year. Light rainfall is simulated by hand with a hosepipe in May and more heavily in September and October. Illumination is provided either by metal-halide floodlights or broad-spectrum fluorescent strip lights. Photoperiod is maintained with little seasonal variation reaching minimum day length in early January (11:13) and maximum day length in late June (13:11). Ambient light through external windows increases the day length in the summer but with only a subdued level of light.

Substrates
Adults and juveniles can be maintained on a mixture of soil, bark-chippings and leaf litter. This substrate provides security for the frogs and maintains adequate humidity.

Health

Maximum Life Span
Unknown in the wild or captivity. Likely to live in excess of a decade in the wild and longer in captivity.

Main Problems
Abrasions to rostrum and supra-orbital ridges can result from escape attempts by individuals in confined spaces. These will deteriorate quickly, treated or untreated, if the behavioural/housing problem is not corrected. Some substrates, and/or excessively wet or dry substrates, can irritate the ventral surface of the feet causing ulcer-like abrasions. Modifications of the substrate should correct this.
Groups kept in too high a density (too small a cage or inadequate visual barriers) will develop "dominant" and "subordinate" individuals. The latter tend to be inhibited from feeding and may become reclusive and lose weight.

Routine Veterinary Procedures
Faecal samples are submitted for regular parasitological screening. Blood samples have been taken from the central vein running longitudinally along the centre of the belly. Specimens have been immobilised for x-ray examination by confinement in a small plastic box and pinned with a piece of foam-rubber cut to exactly fit inside the box with the lid on.

Anaesthesia
Not carried out. Recommend bathing in dilute MS222 solution.

Contraindications
None known.

Nutrition

Natural Diet
Studies of diet in Dominica recorded predominantly orthopteran insects, but also other insects, arachnids, myriapods, crustacea (land crabs), small frogs, lizards, and very occasional small birds and mammals (Brooks, 1982).

Nutritional Requirements in Captivity
Diet at Jersey Zoo has been almost exclusively invertebrate - crickets (*Gryllus bimaculatus* and *Acheta domestica*) and locusts (*Locusta locusta* and *Schistocera migratoria*) - with the occasional (one per month) addition of small mice (*Mus musculus*) or defrosted mussels.

Delivery
Frogs are fed 3-5 times per week, *ad libitum*, by releasing live insects into the enclosure in the late afternoon - shortly before the frogs' activity period.

Water
Water is permanently available in large pools and rainfall is periodically simulated (see under **Captive Management**).

Supplements
All insects are gut-loaded for 48 hrs prior to being offered as food, with a 50:50 mix of Nutrobal® (Vetark Animal Health) multi-vitamin and mineral powder and ProGrub (Live foods Direct) insect diet. Crickets are then dusted with Nutrobal® immediately prior to distribution to frogs.

Contraindications
Juvenile frogs grow exceedingly fast, though become over-weight. Insufficient calcium supplementation will lead to poor mineralisation of the skeleton and result in multiple fractures of the limb bones.

Reproduction

Sexing Techniques
Frogs of approximately 1 yr and older can be sexed by the presence of a small spur (nuptial excresence) on the inner edge of each forefoot in males. Mature males develop a black horny sheath on this spur in late spring which remains for the duration of breeding activity - approximately 4-5 months. Additionally, mature males demonstrate enlarged (hyper-trophied) forearms, are smaller and of slighter stature than mature females.

Breeding Seasonality
Breeding activity probably occurs year-round on a small scale but appears to be concentrated in the months of May through July (unpubl.). This coincides with observed increases in advertisement calling and development of the male secondary sexual characters described above.

Inter-birth interval
Mature females are capable of breeding on an annual basis if adequate nutrition is available. In captivity it is quite plausible that well-fed females could produce more than one clutch per year.

Environmental Changes
No additional climatic changes are implemented for initiation of courtship and breeding - only maintenance of annual seasonal patterns (see **Captive Management**). A suitable underground nest site (burrow consisting of tunnel with nest-chamber) is provided in the form of a 20 x 30 x 15 cm plastic box with a length of 10 cm diameter drainpipe attached to one long side.

Social Management
"Pairing" of two males in an enclosure with an appropriate nesting burrow, during May-July, provokes wrestling bouts. The dominant animal takes ownership of the nest burrow and calls to advertise his presence and occupation of a suitable breeding site.

Courtship and Amplexus
Introduction of a female to a male in ownership of a nest burrow results in a change of call. Receptive females enter the nest burrow and are "courted" for up to 10 hours prior to amplexus. Amplexus is axillary and lasts for a further 3-5 hours. A foam nest is produced during mating, measuring approximately 10-12 cm in diameter and about 1-2 cm in depth. Up to 50 small eggs (1.4-1.6 mm diam.) are deposited in the nest. The male leaves the burrow after mating but the female remains within the burrow or tunnel.

Parental care
Both parents demonstrate guarding of the nest to some degree. Males remain in the vicinity of the nest, but never enter the burrow, and will attack intruders. Females remain predominantly within the burrow and attack intruders entering the tunnel. Females also provide all sources of larval nutrition throughout the developmental period (see below).

Egg and Larval Development
Eggs hatch after 7-10 days depending upon temperature. The largest successful hatch of five nests in captivity at Jersey Zoo is 45. Tadpoles at hatching measure approx. 4.0-4.5 mm body length. Female frogs remain within the tunnel or nest-chamber throughout the 6-8 week duration of larval development. During this time they provision the nest at 2-3 day intervals (a total of 10-13 times) with, at first hundreds, but latterly thousands, of small infertile eggs. Larva reach up to 150 mm total length before developing limbs, absorbing the tail, and leaving the burrow approx. 23-29 mm in length.

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