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### The amphibian fauna of The Gambia, West Africa

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THE amphibians of The Gambia, the smallest country in West Africa, have received little attention from herpetologists, with only a few surveys carried out at a limited number of sites within the last few decades. Between March 1999 and July 2005 the authors have surveyed the amphibians and reptiles of The Gambia on a casual basis, with three periods of more concentrated effort during 2000, 2002 and 2004/2005, using drift fences. In this paper we have collated the data from the existing literature including unpublished material and from our own surveys to form an up-to-date checklist for The Gambia.

#### THE GAMBIA

The Gambia is the smallest country in continental Africa, covering just 11,300km<sup>2</sup>. It is surrounded by the much larger country of Senegal to the north, east and south, and borders the Atlantic Ocean to the west. The shape of the country is defined by the River Gambia, which flows from its eastern border for 480 km to its juncture with the Atlantic Ocean. However, in spite of its small size, The Gambia is considered to be the fourth most densely populated country in Africa with approximately 1.5 million people in 2003. The climate consists of a short rainy season (from mid-June through to early October) and a longer dry season (from mid-October through to early June). Average rainfall per year is around 1,020 mm, but it is normally much higher in the western parts of the country (up to 1,700 mm) and drier in the

eastern parts of the country (as low as 800 mm); Baldeh *et al.* (1997).

#### PREVIOUS AMPHIBIAN RESEARCH

The biodiversity of The Gambia as a whole has been poorly studied, with the possible exception of its plants and birds. An inventory of known species has recently been compiled by Emms & Barnett (2005), which lists only 3,335 species (including all plants and animals) so far recorded for The Gambia. Only a handful of recent studies have been undertaken on the amphibians (e.g. Barnett *et al.* (2001), Gruschwitz *et al.* (1991), Miles *et al.* (1978), Pauwels & Meirte (1996), Wanger (2005) and many of these have been carried out in very limited areas with most of them concentrating on Abuko Nature Reserve in the western part of the country. There is very little information known about the status and distribution of Gambian amphibians, especially on the north bank of the River Gambia and in the eastern half of the country.

#### METHODOLOGY

In order to add to our knowledge of the amphibian species present in The Gambia, and their status and distribution, several drift fences have been erected and monitored for short periods throughout the western half of the country, on both the north and south banks of the River Gambia. Casual records have been kept for all amphibians located in the country between March 1999 and July 2005.

### Drift fence location and recording details

From June to September 2000, two drift fences were monitored on a daily basis, one in gallery forest and one in Guinea savannah, in Abuko Nature Reserve (Fig. 2a). These results have been published in Barnett *et al.* (2001). During June 2002 seven drift fences were monitored in western Gambia, one each in Niimi National Park, Sittanunka and Bao Bolon Wetland Reserve in the North Bank Division, Tanji River Bird Reserve, Abuko Nature Reserve, and Makasutu Culture Forest in the Western Division and Kiang West National Park in the Lower River Division. These were monitored on a daily basis by the staff of Makasutu Wildlife Trust, the Department of Parks and Wildlife Management, Makasutu Culture Forest and the Gambian Reptile Farm. Between May 2004 and July 2005 two drift fences, again one in gallery forest and one in Guinea savannah, have been monitored on a daily basis (excluding weekends when lids were placed over the pitfalls to prevent captures) in Abuko Nature Reserve by the staff of Makasutu Wildlife Trust as part of the capacity building and research undertaken on the Darwin Initiative project. The aim of the Darwin Initiative project in The Gambia is to increase the number of personnel in The Gambia able to assess and monitor its biodiversity. It is focused on the Darwin Field Station (DFS) in Abuko Nature Reserve. This facility provides training courses about biodiversity and related issues, educational material on biodiversity and facilitates and stimulates biodiversity research. It is run by a local NGO Makasutu Wildlife Trust.

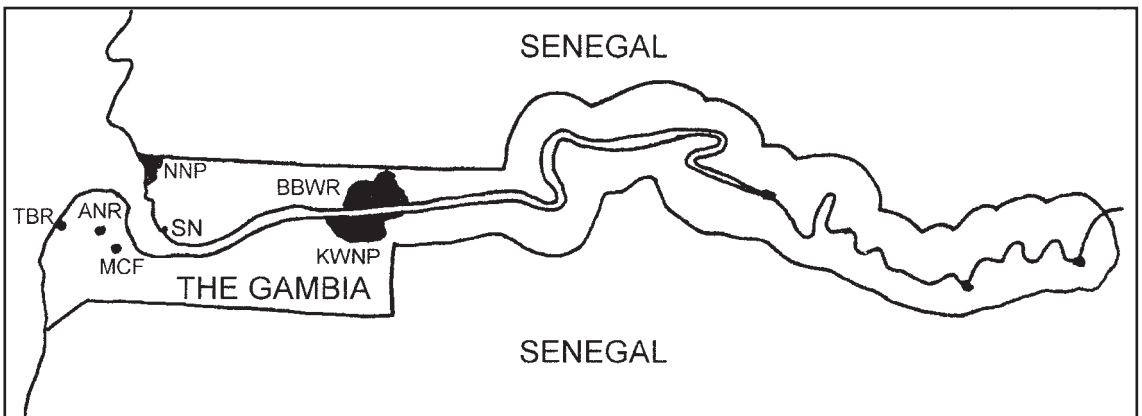
Some specimens were collected for identification purposes and as vouchers (they are stored at the Zoology Museum of the University of Michigan, and the Darwin Field Station, Abuko Nature Reserve) in ethanol (70%). All other captures were released unharmed 50–100m from the drift fences. The specimens have been identified by G. Schnieder of the Zoological Museum of the University of Michigan and by M.-O. Rödel. During August and September 2003, T. Wanger installed and monitored three drift fences in the south-eastern part of Kiang West National Park. The drift fence catches were identified by T. Wanger and M. Solé-Kienle, with their determinations checked by photographs sent to M.-O. Rödel; Wanger (2005).

All of the drift fences were approximately 30m in length with pitfalls placed every 3m. They were made of local materials to reduce costs (rice bags sewn together for the fence, and oil containers or plastic buckets for the pitfalls). The location of the sampling sites is shown in Figure 1 and recording details of the drift fence fieldwork are presented in Table 1.

### RESULTS

In the following systematic account we have included all known locations, with references, for the individual species in The Gambia.

**Figure 1.** Map of The Gambia showing locations of sampling sites. Key: ANR = Abuko Nature Reserve; BBWR = Bao Bolon Wetland Reserve; MCF = Makasutu Culture Forest; NNP = Niimi National Park; SN = Sittanunku; TBR = Tanji River Bird Reserve.



Name	Recording period	Latitude/ Longitude	Capture Effort (= days x number of buckets)	Description of habitat around drift fences
Abuko Nature Reserve	June-September 2000	16°39'W 13° 24'N	61 x 10 = 610	Gallery forest adjacent to large permanent freshwater pools.
Abuko Nature Reserve	June-September 2000	16°39'W 13° 24'N	61 x 10 = 610	Southern Guinea savannah in an area prone to flooding during the rainy season.
Abuko Nature Reserve	June 2002	16°39'W 13° 24'N	30 x 10 = 300	Gallery forest between small concrete-lined pools.
Abuko Nature Reserve	July 2004 – June 2005	16°39'W 13° 24'N	156 x 12 = 1872	Southern Guinea savannah in grassy area. No freshwater features close by.
Abuko Nature Reserve	July 2004 – June 2005	16°39'W 13° 24'N	156 x 12 = 1872	Gallery forest adjacent to large permanent freshwater pools.
Tanji River (Karinti) Bird Reserve	June 2002	16°47'W 13°23'N	30 x 10 = 300	Moist coastal forest along a little-used footpath. No freshwater features close by.
Makasutu Culture Forest	June 2002	13°19'N 16°39'W	30 x 10 = 300	Heavily wooded southern Guinea savannah, along a little-used footpath located above a freshwater flush vegetated with sedges.
Kiang West National Park	June 2002	15°50'W 13°08'N	30 x 10 = 300	Degraded Sudan savannah, adjacent to a small 'stream' formed by a leaking freshwater tank.
Kiang West National Park	August-September 2003	15°50'W 13°08'N	31 x 21 = 651	Guinea savannah beside stream and small pool, Guinea savannah and rice fields
Niumi National Park	June 2002	16°30'W 13°30'N	30 x 10 = 300	Interface between moist southern Guinea savannah and coastal scrub dominated by <i>Tamarix</i> . Adjacent to an area that is temporarily flooded during the rainy season.
Sittanunka	June 2002	13°23'N 16°28'W	30 x 10 = 300	Sparsely-wooded southern Guinea savannah adjacent to farm building. No freshwater features close by.
Bao Bolon Wetland Reserve	June 2002	13°34'N 15°50'W	30 x 10 = 300	In cultivated bush land adjacent to rice fields close to the village of No-Kunda.

**Table 1.** Location and recording period of drift fences during the study period.

## FAMILY PIPIDAE

*Silurana tropicalis*

The Tropical platanna has so far been recorded in a very limited area of Western Division: Abuko Nature Reserve in drift fences; Barnett *et al.* (2001); Barnett & Emms (2002) and the 2004–5 survey; Gruschwitz *et al.* (1991) as *Xenopus tropicalis*; Jones *et al.* (1991); Lamin as *X. tropicalis*; Gruschwitz *et al.* (1991); Pauwels & Meirte (1996); Makumbaya as *X. tropicalis*; Pauwels & Meirte (1996) and as *Dactylethra calcaratus* with no location mentioned by de Rochebrune (1884). 7 specimens are stored at the Zoology Museum, University of Michigan and 4 specimens are stored at the Darwin Field Station.

## FAMILY BUFONIDAE

*Bufo maculatus* (Figure 2b)

The Flat-backed toad appears to be well distributed, at least in the west of The Gambia, having been recorded in the North Bank, Western and Lower River Divisions. It was recorded by Barnett *et al.* (2001) in Abuko Nature Reserve in drift fences and the 2004–5 survey; in Kiang West National Park in drift fences by Barnett & Emms (2002) and Wanger (2005); Towtoo and Jinack Island in Niimi National Park by Barnett & Emms (pers. obs.) One specimen of this species is stored at the Zoology Museum, University of Michigan.

*Bufo pentoni*

Penton's toad also appears to be well distributed, having been recorded in the same three divisions as the Flat-backed toad; at Abuko Nature Reserve by Barnett *et al.* (2001) in drift fences and the 2004–5 survey; at Bao Bolon Wetland Reserve by Barnett & Emms (2002); Kiang West National Park in drift fences by Barnett & Emms (2002) and Wanger (2005). Four specimens are stored at the Zoology Museum, University of Michigan.

*Bufo regularis*

The Common African toad appears to be the commonest and most widespread of the *Bufo* species in The Gambia. Several records include information on the predators of this toad, which include Nile monitor (*Varanus niloticus*), Black cobra (*Naja melanoleuca*) and the Herald snake

(*Crotaphopeltis hotamboeia*): It has been recorded near Bakoteh and Lamin by Pauwels & Meirte (1996); at Sintet in a village compound by Miles *et al.* (1978); with no location mentioned in hotel grounds, savannah and gallery forest by Gruschwitz *et al.* (1991); at Abuko Nature Reserve in drift fences by Håkansson (1974), Barnett *et al.* (2001), Barnett and Emms (2002) and the 20045 survey; in Kiang West National Park in drift fences by Barnett *et al.* (2001), Barnett & Emms (2002) and Wanger (2005) and Bao Bolon Wetland Reserve in drift fences by Barnett *et al.* (2001) and Barnett & Emms (2002); at Tanbi Wetland Complex by Barnett *et al.* (2000); and Makasutu Culture Forest (Barnett & Emms, pers. obs.). 16 specimens are stored at the Zoology Museum, University of Michigan.

*Bufo xeros*

The Savannah toad appears to have a wide distribution in The Gambia, having been recorded in the Western, North Bank and Lower River Divisions: at Abuko Nature Reserve in drift fences by Barnett *et al.* (2001); Niimi National Park by Barnett *et al.* (2000); Kiang West National Park by Wanger (2005); and with no location mentioned by Jones *et al.* (1990). Three specimens are stored at the Zoology Museum, University of Michigan.

## FAMILY HEMISOTIDAE

*Hemisis marmoratus*

The Shovel-nosed frog appears to be widespread, at least in the western part of The Gambia, having been recorded in Western Division and the western part of North Bank Division: It was recorded at Abuko Nature Reserve in drift fences by Barnett *et al.* (2001), Barnett & Emms (2002) and in the 2004–5 survey; Niimi National Park and Sittanunka in drift fences by Barnett & Emms (2002); and with no location mentioned by Jones *et al.* (1991). Four specimens are stored at the Zoology Museum, University of Michigan.

## FAMILY RANIDAE

*Hildebrandtia ornata*

There has been no mention of the locations in which Budget's burrowing frog has been reported from The Gambia, as *H. budgetti* (Jones, 1991) and as *H. ornata* (Rödel, 2000).



Figure 2a. Gallery forest drift fence at Abuko Nature Reserve 2004–2005.



Figure 2b. Flat-backed toad, *Bufo maculatus*.



Figure 2c. Accra puddle frog, *Phrynobatrachus accraensis*



Figure 2d. Edible frog, *Pyxicephalus edulis*.



Figure 2e. *Hyperolius spatzi* (dorsal colour).



Figure 2f. *Hyperolius spatzi* (ventral colour).



Figure 2g. Red rubber frog, *Phrynomantis microps*.



Figure 2h. Ground tree frog, *Leptopelis bufonides*.

*Hoplobatrachus occipitalis*

The Groove-crowned bullfrog appears to be a common and widespread species in The Gambia, with the distinction of being one of the few species that appears to be able to breed throughout the dry season if suitable habitat is available: It has been recorded at Bakoteh, Mandinaba, Lamin and Makumbaya (one mile from Mandinari), as *Dicroglossus occipitalis* by Pauwels & Meirte (1996); Serrekunda, Lamin and Abuko Nature Reserve, as *D. occipitalis* by Gruschwitz *et al.* (1991); Abuko Nature Reserve as *H. occipitalis* in drift fences by Barnett *et al.* (2001) and in the 2004–5 survey; with no location mentioned as *D. occipitalis* by Jones *et al.* (1990); Kiang West National Park in drift fences by Wanger (2005); and Pirang Forest Park – in wells by the forest by Emms & Barnett (2004) and Makasutu Culture Forest – in a freshwater pool by Barnett & Emms (pers. obs.).

*Amnirana galamensis*

This species was formerly known as *Hylarana galamensis*, but is now placed in the genus *Amnirana* (Dubois, 1992). The Yellow-striped frog appears to be widespread but uncommon: it has been recorded near Fajara by Gruschwitz *et al.* (1991); MacCarthy Island by Andersson (1937); with no location mentioned by Jones *et al.* (1990); and Kartong – in a well by Barnett & Emms (pers. obs.).

*Ptychadena bibroni*

The Broad-banded grass frog appears to have a wide distribution in The Gambia, having been recorded in the Western Division and Central River Division: at a hotel near Serrekunda, Abuko Nature Reserve and MacCarthy Island, as *P. macCarthyensis* by Gruschwitz *et al.* (1991); Abuko Nature Reserve in drift fences by Barnett *et al.* (2001); and with no location mentioned as *P. macCarthyensis* by Jones *et al.* (1990) and *P. bibroni* by Rödel (2000). Four specimens are stored at the Zoology Museum, University of Michigan.

*Ptychadena longirostris*

The Snouted grassland frog has only been recorded in one location in The Gambia: at Kalagi,

on the bank of riverside rice field by Miles *et al.* (1978); and with no location mentioned as *P. longirostris* and *P. aequiplicata* by Jones *et al.* (1990). It is not easy to distinguish this and the following species. However, as both are recorded from Senegal their occurrence in The Gambia is likely.

*Ptychadena tellini*

This species was formerly known as *P. schubotzi* [compare Rödel (2000), Largen (2001)]. It has so far not been recorded from The Gambia. However, the records from the Senegal makes it very likely that it occurs in The Gambia as well (Joger & Lambert, 2002).

*Ptychadena oxyrhynchus*

The Sharp-nosed grass frog has so far only been recorded definitely from Abuko Nature Reserve in The Gambia by Gruschwitz *et al.* (1991) and in drift fences by Barnett *et al.* (2001). It has also been reported with no location mentioned by Jones *et al.* (1990). One specimen is stored at the Zoology Museum, University of Michigan.

*Ptychadena pumilio*

Jones *et al.* (1990) reports the Little rocket frog from The Gambia, but without mentioning locations.

*Ptychadena tournieri*

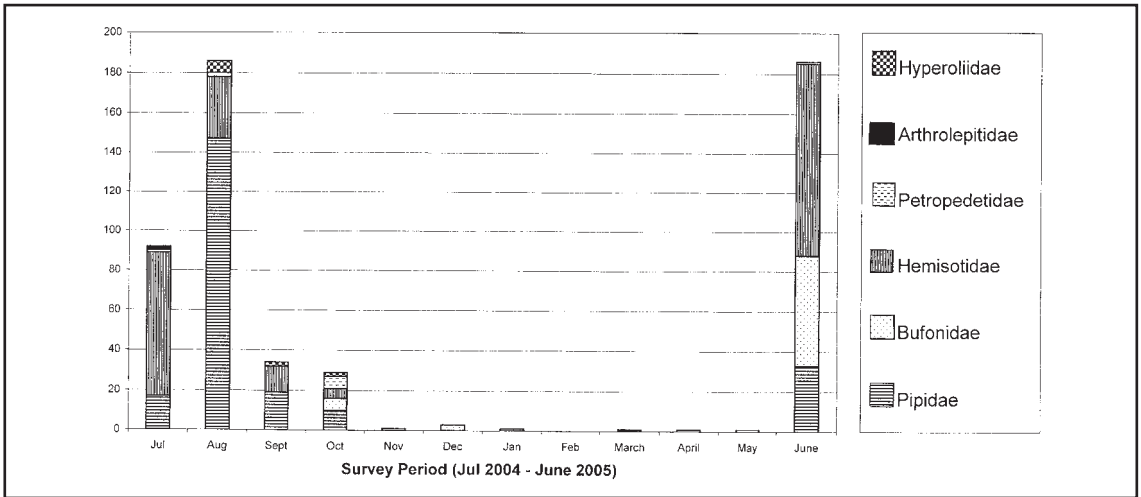
Tournier's rocket frog has been reported from The Gambia by Jones *et al.* (1990) and Rödel (2000) but without details of the locations.

*Ptychadena trinodis*

The Dakar grassland frog has so far been recorded only from the Western Division and Lower River Division: Mandinaba by Pauwels & Meirte (1996); Abuko Nature Reserve in drift fences by Barnett *et al.* (2001); and Kiang West National Park in drift fences by Wanger (2005).

*Pyxicephalus edulis* (Figure 2d)

The Edible frog has been recorded only once at a single location in The Gambia: Bao Bolon Wetland Reserve in a drift fence by Barnett & Emms (2002). This record is an important first step to close the enormous distribution gap



**Figure 3.** Number of individuals per family recorded in Abuko Nature Reserve gallery forest drift fences.

between Mauritania in the west; Böhme *et al.* (2001) and Benin; Nago, Grell & Rödel (unpubl. data) and Nigeria in the east; Walker (1966). The specimen caught in The Gambia is stored at the Zoology Museum, University of Michigan.

#### FAMILY PETROPEDETIDAE

##### *Phrynobatrachus cf. calcaratus*

This species of Puddle frog has been recorded only once (two individuals) in Abuko Nature Reserve in drift fences during the 2004–2005 survey. The specimens are stored at the Darwin Field Station, Abuko Nature Reserve.

##### *Phrynobatrachus francisci*

This species of Puddle frog appears to be the commonest and most widespread species of its genus in The Gambia: It has been recorded near Bakoteh and Mandinaba by Pauwels & Meirte (1996); at Abuko Nature Reserve and near Serrekunda by Gruschwitz *et al.* (1991); at Abuko Nature Reserve in drift fences by Barnett *et al.* (2001), Barnett & Emms (2002) and in the 2004–5 survey; with no location mentioned by Jones *et al.* (1990); at Kiang West National Park in drift fences by Barnett & Emms (2002) and Wanger (2004); and with no location mentioned as *P. cf. francisci* by Rödel (2000). Thirteen specimens are stored at the Zoology Museum, University of Michigan.

##### *Phrynobatrachus accraensis* (Figure 2c)

The Accra puddle frog has been recorded in The Gambia only in Abuko Nature Reserve: in drift fences in the 2004–2005 survey, and with no location mentioned as *P. latifrons* by Jones *et al.* (1990). The two specimens are stored at the Darwin Field Station, Abuko Nature Reserve.

##### *Phrynobatrachus natalensis*

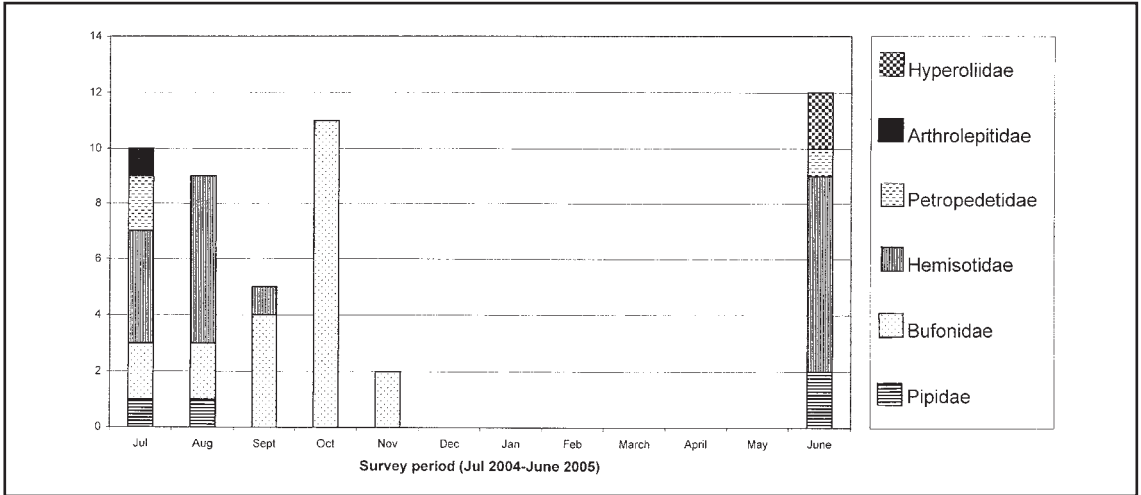
There has been no mention of the locations in which the Cape puddle frog has been recorded in The Gambia: Jones *et al.* (1990), and as *P. cf. natalensis*: Rödel (2000).

#### FAMILY ARTHROLEPTIDAE

##### *Arthroleptis cf. poecilnotus*

The West African screeching frog has been recorded several times in a single location in The Gambia: Abuko Nature Reserve in drift fences by Barnett & Emms (2002) and the 2004–5 survey. The taxonomy of West African Screeching Frogs is so far unsettled – compare Rödel & Bangoura (2004), and thus a reliable determination of these frogs at the species level is impossible. However, this record is a range extension for the genus and shows the potential of The Gambia to harbour not only savannah, but forest associated taxa as well. Two specimens are stored at the Zoology Museum, University of Michigan, and one specimen at the Darwin Field Station, Abuko Nature Reserve.





**Figure 4.** Number of individuals per family recorded in Abuko Nature Reserve Guinea savannah drift fence.

#### FAMILY HYPEROLIIDAE

##### *Afrixalus fulvovittatus*

The Striped spiny reed frog has been recorded in The Gambia only in Abuko Nature Reserve, in drift fences by Barnett *et al.* (2001). It was also recorded by Jones *et al.* (1990) as *A. f. fulvovittatus* with no location mentioned. This frog is more closely associated with forest than *A. vittiger*, that is a pure savannah species. The taxonomy of this and the following species is debated [see Schiøtz (1999), Rödel (2000)]. Schiøtz is naming this taxon as *A. fulvovittatus* type B and the following one as type A. We are thus unsure as to the exact identity of the four specimens stored at the Zoology Museum, University of Michigan, although they may be type A.

##### *Afrixalus vittiger*

The Spiny reed frog has only been recorded in Abuko Nature Reserve and Kiang West National Park in drift fences by Wanger (2005) and in the 2004–5 survey. Rödel (2000) also reports this species from The Gambia with no location mentioned. One specimen is stored at the Darwin Field Station.

##### *Afrixalus weidholzi*

Weidholz's Banana frog has been recorded only once in a single location in The Gambia: Kiang West National Park in drift fences by Wanger (2005). It is also quoted from Frost (1985).

##### *Hyperolius concolor*

This species of reed frog has been recorded only once in The Gambia by Barnett *et al.* (2001) from the Abuko Nature Reserve and is most probably a misidentification as preserved individuals in alcohol of this species and of *H. occidentalis* are not really distinguishable. According to Schiøtz (1999), *H. concolor* does not range as far west as The Gambia, but is replaced there by *H. occidentalis*. As long as no confirmed record of *H. concolor* from The Gambia is available, it should be deleted from the country's species list.

##### *Hyperolius nitidulus*

There has been no mention of the locations in which the West African reed frog has been recorded in The Gambia as *H. nitidus*; Jones *et al.* (1990) and as *H. nitidulus*; Rödel (2000). However, the latter author included *H. spatzi* within the synonymy of *H. nitidulus*. After studying *H. spatzi* vouchers from westernmost Guinea and photos from the Gambia we agree with Böhme (1978) that *H. spatzi* most likely is a taxon distinct from *H. nitidulus*. As long as no confirmed records of *H. nitidulus* from The Gambia are available, this species should be deleted from the country's species list.

*Hyperolius occidentalis*

The Western reed frog has only been recorded in Abuko Nature Reserve in The Gambia: Gruschwitz *et al.* (1990); Barnett *et al.* (2001); Joger (1981).

*Hyperolius spatzi* (Figures 2e and f)

This species from the *H. viridiflavus*-group Schiøtz (1999) was considered a synonym of *H. nitidulus*; Rödel (2000); Frost (2004). It has the same body shape as *H. nitidulus*, but a chalk white dorsal surface, covered with tiny black spots, instead of a brownish or yellowish back. It also lacks the black lateral line and spots of *H. nitidulus*. The ventral surfaces are yellow, not white as in *H. nitidulus*. The only known locality of *H. spatzi* in The Gambia is Abuko Nature Reserve. Two specimens are stored at the Darwin Field Station, where they were found in 2005.

*Kassina cassinoides*

The Large running frog has only been recorded in The Gambia in the Lower River Division: at Kiang West National Park in drift fences by Wanger (2005); and with no location mentioned by Jones *et al.* (1991).

*Kassina fusca*

The Pale running frog has been recorded in The Gambia in the Western Division and Lower River Division: at Abuko Nature Reserve in drift fences by Barnett *et al.* (2001) and Kiang West National Park in drift fences by Wanger (2005); and with no location mentioned by Jones *et al.* (1990). Five specimens are stored at the Zoology Museum, University of Michigan.

*Kassina senegalensis*

The Senegal running frog has been recorded in The Gambia in the Western Division and Lower River Division: at Abuko Nature Reserve in drift fences by Barnett *et al.* (2001) and the 2004–5 survey; Kiang West National Park as juveniles in drift fences by Wanger (2005); and with no location mentioned by Jones *et al.* (1990). Five specimens are stored at the Zoology Museum, University of Michigan and two specimens at the Darwin Field Station.

*Leptopelis bufonides* (Figure 2h)

The Ground tree frog has been recorded in The Gambia in the Western Division and Lower River Division: at Abuko Nature Reserve in drift fences by Barnett *et al.* (2001) and the 2004–5 survey; Kiang West National Park in drift fences by Barnett & Emms (2002) and in maize, cous-cous and rice fields by Wanger (2005). Seven specimens are stored at the Zoology Museum, University of Michigan.

*Leptopelis viridis*

The Savannah tree frog has been recorded in The Gambia in the Western Division and Lower River Division: Abuko Nature Reserve in drift fences by Barnett *et al.* (2001), Barnett & Emms (2002) and the 2004–5 survey; Kiang West National Park in drift fences by Barnett & Emms (2002); and with no location mentioned Jones *et al.* (1990). 13 specimens are stored at the Zoology Museum, University of Michigan.

FAMILY MICROHYLIDAE

*Phrynomantis microps* (Figure 2g)

The Red rubber frog has been recorded in The Gambia in the Western Division and Lower River Division: Kiang West National Park in drift fences by Barnett & Emms (2002) and Wanger (2005); at Towtoo, a few kilometres from Banjul International Airport by Barnett & Emms, (pers. obs.); and with no location mentioned by Jones *et al.* (1990). The former genus name *Phrynomenus* is no longer valid for African species – compare Dubois (1988), Rödel (2000).

**Drift Fence Catches in Abuko Nature Reserve**

Monthly numbers of individuals recorded in the drift fences located in the gallery forest and Guinea savannah habitats of Abuko Nature Reserve during the 2004–5 survey are shown in Figures 3 and 4 respectively. The greatest variety and numbers of amphibians coincided with the beginning of the rainy season (July and August in 2004 and June in 2005).

The drift fence catches peaked in the gallery forest in August 2004, and fell away sharply to almost nothing (apart from the occasional *Bufo* species) during the dry season. A large proportion

of the catch during August was made up of *Silurana tropicalis* (80%) and *Hemismus marmoratus* (17%). Drift fence catches in the Guinea savannah were much lower both in diversity and numbers of amphibians. 545 amphibians were caught in the gallery forest drift fence and 49 amphibians were caught in the Guinea savannah fence. A large proportion of the catch throughout the year in the savannah habitat was made up of *Bufo* species, but particularly during the period September–November (80–100%). It appears from the results that amphibian surveys in The Gambia should be carried out in the first few months after the rains start and that drift fences should be sited near to water, (even if it is seasonal) and preferably near forest habitats to obtain the maximum amount of species.

### DISCUSSION

The information presented in this paper was collected through reviewing past records and papers and carrying out field work, including gathering casual records and establishing drift fences at various times and in various locations in the country during the period 1999–2005. Despite the fact that the seven fences erected in June 2002 coincided with a drought year resulting in small catches, during this time we have added six new species of amphibians to The Gambian checklist; *Bufo maculatus*, *Bufo pentoni*, *Phrynobatrachus* cf. *calcaratus*, *Pyxicephalus edulis*, *Arthroleptis* cf. *poecilnotus* and *Leptopelis bufonides*, and extended the known range of several species within the country.

The intensive fieldwork at Abuko Nature Reserve, especially in the last two years has provided good baseline information on the abundance and diversity of the amphibian fauna throughout the year in this area and afforded an ideal opportunity to train local researchers in identification and survey skills. This will allow ongoing monitoring of the amphibian populations in future years. The results have also allowed us to produce an easy to use field guide on the *Common Amphibians of The Gambia*; Barnett & Emms (2005), with the aim of stimulating interest in this

area. We have donated 400 copies of the book to the lower basic schools in The Gambia as part of the Darwin Initiative project towards this endeavour.

Abuko Nature Reserve is probably the most studied area with respect to its biodiversity in The Gambia. Yet during the present study new species have been recorded for the country from this reserve. This is due in part to the paucity of past research and a lack of in-country expertise. A large part of The Gambia (east of Bao Bolon Wetland Reserve on the North Bank and Kiang West National Park on the South Bank) remains unsurveyed for its amphibians. The variety of species in Abuko Nature Reserve gives an indication of what may be discovered in the rest of The Gambia, a task now made a little easier with a country field guide on the common species and trained field workers.

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