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Amphibians in the Yoko Forest Reserve (DRC): Hoplobatrachidae and Hyperoliidae

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Annotated checklist and distribution of amphibians (Amphibia Anura) in the Yoko Forest Reserve, Democratic Republic of the Congo

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ABSTRACT The Yoko Forest Reserve, located in northeastern Democratic Republic of the Congo, remains poorly documented with regard to its amphibian fauna. This study aimed to document the amphibian species occurring in the reserve and to provide information on their habitat occurrence and geographic distribution. Field surveys were conducted over a twelve-month period and included twenty-four nocturnal sampling sessions using visual encounter surveys, systematic habitat excavation, and acoustic detection of calling males. A total of 5,707 specimens were recorded, representing 33 species, 17 genera, and 10 families, all belonging to the order Anura. Species were identified using diagnostic external morphological characteristics. For each species, information on habitat occurrence and geographic distribution is provided. This annotated checklist contributes to the knowledge of amphibian diversity in the Congo Basin and provides valuable baseline data for future ecological studies, biodiversity monitoring, and conservation initiatives in the Yoko Forest Reserve.

KEY WORDS Amphibians, Anura, Species richness, habitat use, biodiversity assessment, tropical rainforest, Congo Basin, Yoko Forest Reserve.

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INTRODUCTION

Amphibians are cosmopolitan vertebrates (Frost, 2025), but their description and distribution remain largely incomplete in Africa (Lawson & Klemens, 2001; Dewynter & Frétey, 2019; Greenbaum et al., 2022; Dehling & Sinsch, 2023), particularly in the Democratic Republic of the Congo (DRC) (Chifundera, 2019, Badjedjea et al., 2022; Musubaho et al., 2024a). They represent essential components of biodiversity (Chifundera, 2019) and play a crucial role in ecosystem processes, which underscores the need for a better understanding of their diversity and distribution. Such knowledge is fundamental for the implementation of effective species conservation strategies (Chifundera & Behangana, 2013; Chifundera, 2019; Koirala et al., 2019; Gidis & Baskale, 2020; Vagmaker et al., 2020; Kabanze et al., 2023).

However, the survival of many amphibian species is increasingly threatened by anthropogenic activities such as commercial logging, mining, industrial agriculture, and poaching, which lead to the degradation and destruction of forest ecosystems (Greenbaum & Chifundera, 2012; Zhuravleva et al., 2013; Chifundera, 2019). These rapidly intensifying threats in sub-Saharan Africa directly affect amphibian populations and distribution patterns, particularly among anurans (Asefa et al., 2020; Estrada et al., 2020; Kabanze et al., 2023). The forest ecosystems of the Kisangani region are not exempt from these pressures (Masimo et al., 2020; Kipute et al., 2023; Balandi et al., 2024; 2025), with significant consequences for the fauna they support. This is particularly the case of the study area, whose forest is threatened with destruction due to its promixity of the city of Kisangani. This situation exerts increasing pressure on its amphibian fauna, which remains poorly studied and insufficiently known (Musubaho et al., 2024a), as is the case for many other forests in the DRC (Badjedjea et al., 2022). It is in this context that this study was carried out.

The aim of this study was to document the amphibian fauna of the Yoko Forest Reserve (YFRE), DRC. Particularly:

(i) establish an annotated checklist of amphibian species occurring in the study area, and

(ii) identify species based on external morphological characteristics, and document their occurrence across surveyed habitats and their geographic distribution.

Thus, we hypothesized:

(i) similar to other lowland forest blocks in the DRC (Penner & Rödel, 2007; Nagy et al., 2013; Masudi et al., 2019; Badjedjea et al., 2022), the YFRE, due to its geographical location, may harbor a species-rich amphibian fauna;

(ii) previous studies have shown that morphological traits (e.g. general body appearance, tympanum size and shape, skin texture, presence or absence of dorsal folds, digital and pedal webbing, the presence/absence of tarsal and metatarsal tubercles) are used to distinguish amphibian species (Frétey et al., 2011; Channing & Rödel, 2019; Badjedjea et al., 2022; Greenbaum et al., 2022; Dehling & Sinsch, 2023; Nečas et al. 2025).

The same traits may also assist in species identification within the study area, many of which exhibit wide distribution across the surveyed habitats and sub-Saharan Africa (Frétey et al., 2011; Dewynter & Frétey, 2019; Dehling & Sinsch, 2023; Frost, 2025).

MATERIAL AND METHODS

The YFRE is located near the Equator, between 0°15' and 0°20'N, and 25°14' and 25°20'E (Musubaho et al., 2024a), along the Kisangani-Ubundu Road axis in Tshopo Province, DRC (Fig. 1).

It is characterized by a mean annual temperature of 25°C, an average annual rainfall of about 1,750 mm, and the absence of a truly dry month (Picard et al., 2015). As in the entire Kisangani region, rainfall occurs throughout the year but is interrupted by two sub-dry seasons. The major rainy season extends from September to December, while the minor rainy season spans from March to June. Conversely, the major sub-dry season occurs during January and February, and the minor one during July and August (Kahindo, 2011; Sabongo, 2015). The hydrographic network is dominated by rivers, the most important being the Yoko and Biaro Rivers. These rivers receive water from numerous small streams before flowing into the Congo River. The Yoko River, from which the reserve takes its name, flows west to east and divides the area into two blocks (northern and southern). The vegetation is dominated by primary forest flora interspersed

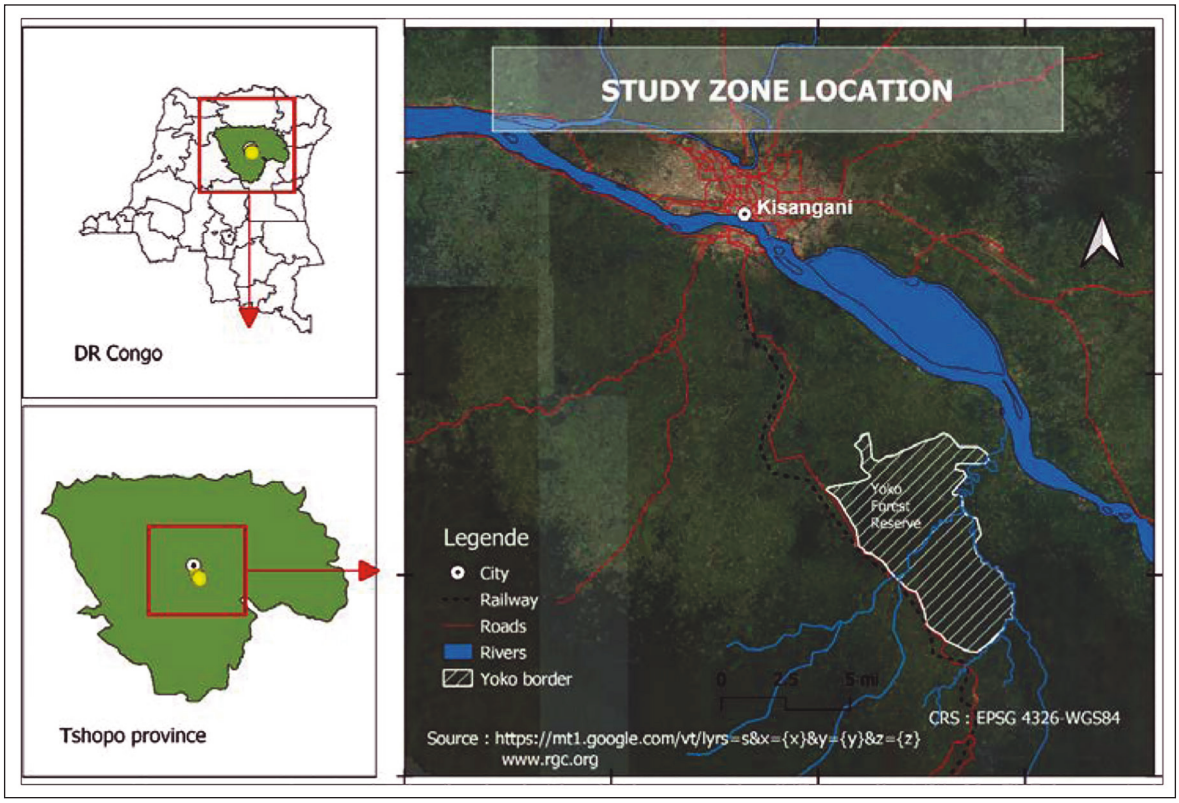


Figure 1. Location map of the Yoko Forest Reserve (YFRE) in the Kisangani region, Tshopo Province, DRC. Data sources: background (https://mt1.google.com/vt/lyrs=s&x={x}&y={y}&z={z}, accessed on 15 February 2023; city, railway, roads, rivers and Yoko border layers (RCG: https://www.rgc.cd, accessed on 15 February 2023).

with patches resulting from anthropogenic disturbances. The physiognomy of this vegetation allowed the identification of six habitat types sampled throughout the study area: primary forest, fallow, field, primary forest-fallow edge, primary forest-field edge, and the river, which was considered as a special habitat in this study.

Amphibians were collected in twenty-four field campaigns, situated over a twelve-month period from December 2020 to November 2021, with two six consecutive day campaigns per month (in the second and fourth weeks of each month) exclusively within the Yoho Forest Reserve, Ubundu district, Tshopo Province, DRC.

The method used for data collection was nocturnal capture. It was supported by three techniques, including visual survey, systematic excavation of habitats using a headlamp, and acoustic survey hearing vocalizations (Musubaho et al., 2024a). According to Veith et al. (2004), the first two techniques are less sensitive to specimen detection and less subject to gender bias, while the third favors male detectability.

Specimens were collected manually, and only doubtful specimens or those belonging to species not yet recorded were collected. Unknown specimens were euthanized, labeled, fixed with 4% formalin and preserved in 70% alcohol. They were identified at the Centre de Surveillance de la Biodiversité and deposited at the Laboratoire d'Ecologie et Gestion des Ressources Animales at the University of Kisangani, located in the city of Kisangani (0°30′34.3″ N, 25°11′31.2″ E), DRC. The remaining specimens were photographed and regularly released after a simple, standard pre-marking procedure involving permanent dyes applied to the head or back of the specimens, in accordance with the capture-mark-recapture method described before (Heyer et al., 1994; Maynou et al., 2017).

They were then identified using coloration patterns, diagnostic external characters and published

regional taxonomic references (Schiøtz, 1999; Channing, 2001; Channing & Howell, 2006; Howell, 2010; Frétey et al., 2011; Mercurio, 2011; Amiet, 2012; Phaka et al., 2017; Channing & Rödel, 2019; Dehling & Sinsch, 2023; Frost, 2025) before being released. During collection, data were transcribed onto specially designed cards and then digitized for further analyses.

RESULTS

A total of 5,707 amphibians in 33 species, 17 genera, 10 families of the order Anura were recorded in the Yoho Forest Reserve, Ubundu district, Tshopo Province, DRC (Table 1). In the following, we present a list of amphibian species encountered during this survey.

For each species, we provide location, the abundance and morphological characteristics of specimens, habitats in which specimens have been recorded in the study zone, and the distribution of the species in Africa.

Familia ARTHROLEPTIDAE Mivart, 1869
Genus *Arthroleptis* Smith, 1849

Arthroleptis tuberosus Anderson, 1905

DESCRIPTION. Specimens exhibit a light ventral surface, with a white or gray throat, and yellow coloration on the inner thighs. The dorsal surface is tuberculate, displaying various shades of gray, brown, and yellow. A dark vertebral stripe, sometimes present, is widened at the level of the eyes and bordered by two pale, whitish, or yellowish stripes (Fig. 2). Channing & Rödel (2019) described the species by a compact or slender body, a rounded snout, and a dorsum partially or densely covered with warts of varying sizes. Dorsal coloration ranges from beige to reddish-brown, adorned with dark, often interrupted patterns.

HABITAT. Thirty-one (31) specimens (22 in primary forest, 6 in fallow and 3 in primary forest-fallow edge); leaf litter or in vegetation along watercourses, height not exceeding 0.5 m.

DISTRIBUTION. *Arthroleptis tuberosus* is known from Cameroon, the Republic of Congo, Gabon, and eastern DRC, with probable occurrence in the Central African Republic and Equatorial Guinea (Badjedjea et al., 2022; Frost, 2025).

Arthroleptis variabilis Matshie, 1893

DESCRIPTION. Specimens exhibit a brown, finely tuberculate dorsal skin, scattered with black spots. A vertebral ridge extends from the tip of the snout to the cloacal region. The flanks are densely covered with round tubercles, while a light gray, triangular-shaped area stretches from the tip of the snout to the midpoint of the upper eyelid. The tympanum is clearly visible, bordered dorsally by a dark brown stripe extending from the eye to the posterior corner of the jaw. The posterior surfaces of the abdomen and thighs are granular, whereas the throat and chest are smooth. The posterior surfaces of the thighs, legs, and forearms display dark brown transverse bands. The palmar and plantar surfaces bear prominent subarticular tubercles. A long internal metatarsal tubercle reaches the base of the first toe, nearly equal in length to it, while no external metatarsal tubercle is present. The toes are slightly expanded at the tips, in contrast to the fingers. The third finger is unusually long and finely denticulated. Webbing is poorly developed between the toes, and it is absent between the fingers (Fig. 3). Noble (1954) characterized the species by black lines extending from the tympanum border to the insertion of the pectoral girdle. Perret (1966) notes that females have a brown throat, whereas males have a mottled, purplish throat with a clear median stripe. Males are generally smaller and slenderer than females.

HABITAT. Twenty (20) specimens (16 in primary forest, 1 in fallow, 1 in primary forest-field edge and 2 in primary forest-fallow edge). Previous studies (Frétey & Blanc, 2001; Blanc & Frétey, 2004; Musubaho et al., 2024b; Frost, 2025) described this species as terrestrial and primary forest indicator species.

DISTRIBUTION. *Arthroleptis variabilis* has been reported from Nigeria, Cameroon (Herrmann et al., 2005a), the Central African Republic, Republic of Congo, Equatorial Guinea, Gabon (Blanc & Frétey, 2004; Burger et al., 2006; Pauwels & Rödel, 2007; Larson & Zimkus, 2018; Dewynter & Frétey, 2019; Frost, 2025) and the DRC (Musubaho et al., 2021; Badjedjea et al., 2022).

Family	Species	Ni
ARTHROLEPTIDAE (8)	*Arthroleptis tuberosus* Anderson, 1905	31
	Arthroleptis variabilis Matschie, 1893	20
	Cardioglossa leucomystax (Boulenger, 1903)	142
	Leptopelis calcaratus (Boulenger, 1906)	41
	Leptopelis christyi (Boulenger, 1912)	313
	Leptopelis millsoni (Boulenger, 1895)	217
	Leptopelis notatus (Buchholz et Peters, 1875)	322
	Leptopelis ocellatus (Mocquard, 1902)	68
BUFONIDAE (4)	*Nectophryne batesii* Boulenger, 1913	4
	Sclerophrys gracilipes (Boulenger, 1899)	30
	Sclerophrys gutturalis (Power, 1927)	13
	Sclerophrys pusilla (Mertens, 1937)	143
DICROGLOSSIDAE (1)	*Hoplobatrachus occipitalis* (Günther, 1858)	12
HYPEROLIIDAE (11)	*Afrixalus equatorialis* (Laurent, 1941)	3
	Afrixalus osorioi (Ferreira, 1906)	60
	Afrixalus quadrivittatus (Werner, 1908)	19
	Cryptothylax greshoffii (Schilthuis, 1889)	6
	Hylambates verrucosus Boulenger, 1912	91
	Hyperolius langi Noble, 1924	26
	Hyperolius ocellatus Günther, 1858	15
	Hyperolius parallelus Günther, 1858	7
	Hyperolius platyceps Boulenger, 1900	175
	Hyperolius sp.	20
	Kassina maculosa (Sternfeld, 1917)	1
PHRYNOBATRACHIDAE (2)	*Phrynobatrachus auritus* Boulenger, 1900	734
	Phrynobatrachus perpalmatus Boulenger, 1898	17
PIPIDAE (1)	*Xenopus pygmaeus* Loumont, 1986	62
PTYCHADENIDAE (3)	*Ptychadena christyi* (Boulenger, 1919)	209
	Ptychadena mascareniensis (Duméril et Bibron, 1841)	357
	Ptychadena perreti Guibé et Lamotte, 1958	135
PYXICEPHALIDAE (1)	*Amietia nutti* (Boulenger, 1896)	82
RANIDAE (1)	*Hylarana albolabris* (Hallowel, 1856)	1995
RHACOPHORIDAE (1)	*Chiromantis rufescens* (Günther, 1869)	337
10 families	**33 species**	**5 707**

Table 1. Anuran amphibian species surveyed between December 2020 and November 2021 in the YFRE, DRC. Ni = number of specimens collected per species; Numbers in parentheses indicate species number per family.

Genus *Cardioglossa* Boulenger, 1900

Cardioglossa leucomystax (Boulenger, 1903)

DESCRIPTION. Specimens exhibit relatively small eyes, an elongated body shape, and a beige dorsal skin marked with small white spots and adorned with a symmetrical hourglass-shaped pattern, darker in color and sometimes finely bordered with pale tones. The flanks are spotted, while the ventral surface is light and finely speckled with brown. The hind limbs display well-contrasted patterns: longitudinal on the thighs and transverse on the shanks. Limbs are slender, with the tibia longer than the foot. A black stripe extends from the snout to over half of the body length, while the ventral side is pale with black spots (Fig. 4). These morphological characteristics are consistent with the description provided by Laurent (1972).

HABITAT. One hundred and forty-two (142) specimens (43 in primary forest leaf litter, 5 in fallow and 94 along rivers and water bodies, as well as in primary forest, fallow, cultivated fields and edges). According to Frétey & Blanc (2001), Blanc & Frétey (2004), the species occupies a variety of habitats, including primary forests, savannas, forest track edges, ponds, swamps, riverbanks, and roadside pools.

DISTRIBUTION. *Cardioglossa leucomystax* is known from Guinea (Largen & Dewesett-Lemaire, 1991), Nigeria (Nneji et al., 2019), Gabon (Blanc & Frétey, 2004; Burger et al., 2006; Pauwels & Rödel, 2007; Larson & Zimkus, 2018; Dewynter & Frétey, 2019), Cameroon (Herrmann et al., 2005a; Portik et al., 2016), Equatorial Guinea, Uganda, the Central African Republic, Angola (Frost, 2025), and the DRC (Musubaho et al., 2021; 2024a; Badjedjea et al., 2022; Frost, 2025).

Genus *Leptopelis* Günther, 1859

Leptopelis calcaratus (Boulenger, 1906)

DESCRIPTION. Specimens exhibit a brownish coloration, with a granulate dorsal skin scattered with small, sparse tubercles. Between the eyes, the skin is grayish, adorned with a dark triangular pattern extending to the eyelids. Two spots delimit three dark transverse bands reaching the lower eyelid. A dark dorsal stripe connects the midpoint of the eyelids to the base of the urostyle. Beneath the eye, a white stripe with orange-brown hues is divided into lateral bars or spots. The ventral skin is uniformly granulated. The tympanum is prominent, eyes are protruding, and the snout is rounded, slightly projecting beyond the lower jaw, these are also distinctive characteristics of this species. Two or three low tubercles are present at the mouth commissure. The external metatarsal tubercle is absent, while well-developed subarticular tubercles are visible on the fingers and toes. Palms and soles are finely granulated. The forearms and tarsi are robust and bear a longitudinal glandular fold on their posterior surfaces. The tibia displays three or four dark transverse bands, and the presence of a heel spur formed by a low skin fold distinguishes this species from other members of the genus (Fig. 5). Amiet (2012) described the species by an angular canthus rostralis outlined by a pale line, long hind limbs, broadly webbed hands and feet, and highly compressed distal subarticular tubercles, particularly on fingers III and IV. The spur is flexible, and the external metatarsal tubercle is small.

HABITAT. Forty-one (41) specimens (28 in primary forest, 2 in fallow and 11 in primary forest-fallow edge); perched on vegetation along watercourses, approximately 3 m above the ground. Amiet (2012) reported that habitats and breeding sites of this species are typically in marshy areas along small streams in dense forest. Males seek locations with dense vegetation and frequently call from liana masses. It also inhabits dense post-cultivation bush but generally remains close to primary forest.

DISTRIBUTION. *Leptopelis calcaratus* is known from Cameroon, Equatorial Guinea, Nigeria (Schiøtz, 1967; Herrmann et al., 2005a; Amiet, 2012; Portik et al., 2016), Uganda, Angola, Republic of Congo (Jackson & Blackburn, 2007; Frost, 2025), Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Dewynter & Frétey, 2019), and the DRC (Laurent, 1973; Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022; Frost, 2025).

Leptopelis christyi (Boulenger, 1912)

DESCRIPTION. Specimens exhibit two distinct morphs: a more common brown morph and a



Figures 2–5. Arthroleptidae from Yoko Forest Reserve (DRC). Fig. 2: *Arthroleptis tuberosus*. Fig. 3: *Arthroleptis variabilis*. Fig. 4: *Cardioglossa leucomystax*. Fig. 5: *Leptopelis calcaratus*.

brown-green morph, characterized by a green dorsal triangle and stripes on the limbs. The ventral surface, including the throat, is granulated. The dorsal surfaces of the fingers are broad, often golden yellow in some specimens and white in others, suggesting pronounced sexual dimorphism within the species. The brown-green morph is rarely entirely green (Fig. 6). Amiet (2012) characterized this species by a robust stature, a broad head, an angular canthus rostralis, a small tympanum, and a relatively long snout with an obliquely truncated tip anterior to the nares. The dorsal skin is finely textured and homogeneous, sometimes appearing shiny rather than matte in certain specimens.

Habitat. Three hundred and thirteen (313) specimens (241 in primary forest, 41 in fallow, 1 in cultivated field, 28 in primary forest-fallow edge and 2 in primary forest-field edge); perched in vegetation along watercourses, approximately 3 m above the ground. According to Amiet (2012), the species lives in forested areas, male calling sites are always located above the understory in disturbed habitats, including road edges with ditches, high-grass lowlands, bushes and vine thickets of old cultivation, and wetlands. Males occupy calling positions at heights of 1–3 m.

Distribution. *Leptopelis christyi* is widely distributed across Central Africa, from Cameroon and Gabon through the Congo Basin forests to Angola (Amiet, 2012; Dewynter & Frétey, 2019), and occurs in Uganda, Tanzania, Cameroon (Frost, 2025), and the DRC (Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022; Frost, 2025).

Leptopelis millsoni (Boulenger, 1895)

Description. Specimens exhibit red eyelids and two dorsal morphs: one entirely brown, and another brown mixed with green, the latter coloration extending to the tibia and forearm, forming transverse bands. The ventral surface is pale, whitish to yellowish, with a rough texture, including the throat. In some specimens, green predominates on the dorsal surface, which becomes densely granulate in adults and entirely green in juveniles (Fig. 7). Schiøtz (1967) described the species by a brown

dorsal skin adorned with small green spots intermixed with a black or brown dorsal pattern, contrasting with a yellowish ventral surface. The tympanum is large, with a snout slightly shorter than the horizontal diameter of the eye, and the upper eyelid bears a white spot. The species also shows well-developed pedal webbing and a small internal metatarsal tubercle. Laurent (1973) reported dark transverse dorsal lines and a similarly dark ventral reticulation, while Badjedjea et al. (2022) described this large Central African *Leptopelis* as having fully webbed feet, a relatively large tympanum, a brown back marked with darker transverse bars, a lightly granulate brown dorsal skin, a rust-red iris, and yellow ventral coloration on the thighs. According to Amiet (2012), although the species lacks particularly prominent morphological traits, it is distinguished by short hind limbs, a well-defined canthus rostralis, large tympani, and a fine-textured dorsal skin giving the dorsum an almost smooth appearance. Dorsal macules are generally conspicuous, while lateral macules appear inconsistent. Posterior to the eye, exists a series of irregular spots, subtle due to low contrast with the background coloration.

HABITAT. Two hundred and seventeen (217) specimens (162 in primary forest, 12 in fallow and 43 in primary forest-fallow edge); perched on branches and lianas at height of 2-3 m. According to previous studies (Perret 1966; Frétey & Blanc, 2001; Blanc & Frétey, 2004), *L. millsoni* inhabits primary and secondary forests, where specimens perch in vegetation along watercourses. Amiet (2012) indicated that during the breeding season, this species is associated with calm rivers flowing under a light canopy in hilly areas and males call from shrubs and trees.

DISTRIBUTION. *Leptopelis millsoni* has been reported from Cameroon (Herrmann et al., 2005a; Amiet, 2012), Nigeria, Angola, Gabon, the Central African Republic (Burger et al., 2006; Pauwels & Rödel, 2007; Dewynter & Frétey, 2019; Frost, 2025), and the DRC (Masudi et al., 2019).

Leptopelis notatus (Buchholz et Peters, 1875)

DESCRIPTION. Specimens are relatively large, comparable in size to some other species within the genus *Leptopelis*. The dorsal skin is entirely green, with paler areas. A light triangle, often visible on the back or head, is a common pattern. The ventral surface is dark brown and slightly tuberculate (Fig. 8). Amiet (2012) described this species by a high polychromatism, a relatively broad head with dorsal macules arranged in a triangle pointing anteriorly, a moderately long snout, a highly rounded (non-angular) canthus rostralis, and a fine, homogeneous dorsal skin texture lacking a white subocular spot.

HABITAT. Three hundred and twenty-two (322) specimens (245 in primary forest, 18 in fallow, 57 in primary forest-fallow edge and 2 in primary forest-field edge); perched in vegetation at height of 2-3 m. Amiet (2012) reported that *L. notatus* occupies a variety of habitats, including primary forest, gallery forest, and secondary formations, particularly in swampy lowlands.

DISTRIBUTION. *Leptopelis notatus* is known from Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Amiet, 2012; Larson & Zimkus, 2018; Dewynter & Frétey, 2019), Republic of Congo (Jackson & Blackburn, 2007), Cameroon, and the DRC (Herrmann et al., 2005a; Amiet, 2012; Masudi et al., 2019; Musubaho et al., 2021; Frost, 2025).

Leptopelis ocellatus (Mocquard, 1902)

DESCRIPTION. Specimens exhibit a brownish or grayish dorsum, adorned with small dark spots and a faint dorsal triangle. A dark canthal stripe extends behind the eye to the forelimbs, then fragments into large, rounded spots outlined with pale coloration along the flanks. Laterally, specimens bear black spots interrupted at mid-body, but continuing to the insertion of the thighs. The ventral surface is pale and granulate, contrasting with the dorsal surfaces of the thighs and shanks, which display black transverse bands; the inner surfaces are bright yellow, marbled with dark spots. In some specimens, a blue throat and smaller body size compared to more robust specimens suggest sexual dimorphism within the species (Fig. 9). Laurent (1973) indicated that specimens are robust, with a relatively short and broad head. Amiet (2012) notes a strongly marked, angular canthus rostralis, and tympani that are well visible but slightly smaller than in related species. The dorsal skin is smooth across the body and limbs, with minimally developed commissural excrescences. Dorsal pigmentation ranges from gray

to brown through beige, without traces of green, while lateral macules are always highly conspicuous.

Habitat. Sixty-eight (68) specimens (53 in primary forest, 7 in fallow, 7 in primary forest-fallow edge and 1 in primary forest-field edge); perched in vegetation approximately 3 m above the ground. According to previous studies, *Leptopelis ocellatus* is a primary forest indicator species like the four other species of the genus *Leptopelis* (Musubaho et al., 2024b), and occupies diverse habitats including primary forests, savannas, pond margins, swampy areas (Blanc & Frétey, 2004; Amiet, 2012), secondary forests and cultivated lands (Perret, 1966), as well as in vegetation bordering forested areas (Frétey & Blanc, 2001).

Distribution. *Leptopelis ocellatus* has been reported from Cameroon, Equatorial Guinea, Republic of Congo, Angola, Central African Republic (Herrmann et al., 2005a; Amiet, 2012; Frost, 2025), Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Larson & Zimkus, 2018; Dewynter & Frétey, 2019), and the DRC (Penner & Rödel, 2007; Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022).

Familia BUFONIDAE Gray, 1825
Genus *Nectophryne* Buchholz et Peters, 1875

Nectophryne batesii Boulenger, 1913

Description. Specimens of this arboreal toad exhibit a short snout, heavily pigmented black webbing, and a dark dorsum with greenish flanks, contrasting with a white chest and belly. Coloration varies depending on the time of day: green at night and black during the day. The green coloration may lead to confusion with certain tree frogs (Fig. 10). According to Laurent (1976a), the toad species is distinguished from other species of the genus by the presence of broad adhesive discs and highly developed webbing on fingers and toes, as well as well-marked submandibular conical tubercles in males.



Figures 6–9. Arthroleptidae from Yoko Forest Reserve (DRC). Fig. 6. *Leptopelis christyi*. Fig. 7: *Leptopelis millsoni*. Fig. 8: *Leptopelis notatus*. Fig. 9: *Leptopelis ocellatus*.

In both sexes, the snout projects clearly anterior to the mouth opening. Perret (1966) also mentioned lingual dimorphism and chromatic variation among specimens, with colors ranging from brown to white.

HABITAT. Four (4) specimens (3 in primary forest and 1 in fallow); perched on tree truncks or in vegetation at approximately 1.5 m above the ground. Their green coloration allows them to remain immobile and cryptic on substrates, providing excellent camouflage within the surrounding vegetation.

DISTRIBUTION. *Nectophryne batesii* is known from Cameroon (Herrmann et al., 2005a), Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Larson & Zimkus, 2018; Dewynter & Frétey, 2019), Republic of Congo, Central African Republic, DRC, Angola, and Equatorial Guinea (Frost, 2025).

Genus *Sclerophrys* Tschudi, 1838

Sclerophrys gracilipes (Boulenger, 1899)

DESCRIPTION. Specimens of this species exhibit a light brown dorsum, finely to densely tuberculate, with or without a pale mid-dorsal line, which may be continuous or broken. The head is broader than long. Some specimens display a darker or grayish coloration, also densely tuberculate on the dorsum, with or without a dorsal line. The dorsal skin is rough, scattered with small conical tubercles located on the flanks, under the tarsus, and on the metatarsus. Tuberculation is irregular and heterogeneous, particularly pronounced on the flanks. The ventral surface is grayish or whitish, sometimes adorned with diffuse black spots, while the throat is gray to dark. The tympanum is well visible. Limbs are slender, fingers thin with rudimentary webbing. A single subarticular tubercle is present, while the metatarsal tubercles are small but prominent. Parotoid glands are very small, often barely visible, and may be blunt or bear slight ridges (Fig. 11). This is a small, common toad (Frétey & Blanc, 2001) which Perret (1966) described by the absence of a tarsal skin fold, lateral tubercles are more pronounced than dorsal ones, fingers I and II are subequal, and sexual dimorphism is pronounced.

HABITAT. Thirty (30) specimens (7 in primary forest, 8 in fallow, 2 in cultivated field, 7 in primary forest-fallow edge and 6 in primary forest-field edge). According to previous studies (Frétey & Blanc, 2001; Blanc & Frétey, 2004), *S. gracilipes* primarily inhabits the ground layer in primary forests, savannas, pond or swamp margins, roadside ponds, and open areas.

DISTRIBUTION. The species has been reported from Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Larson & Zimkus, 2018; Dewynter & Frétey, 2019), Cameroon, Equatorial Guinea, Angola, Republic of Congo (Jackson & Blackburn, 2007; Frost, 2025), and the DRC (Penner & Rödel, 2007; Masudi et al., 2019; Nagy et al., 2013; Musubaho et al., 2021).

Sclerophrys gutturalis (Power, 1927)

DESCRIPTION. Specimens of this species exhibit rough skin adorned with large, blunt warts, smaller on the flanks. Dorsal coloration ranges from clay to brown, punctuated with pairs of brown or dark spots extending from the interorbital region. The parotoid glands are large and prominent, longer than wide, globular, and positioned close to the eyelid. A prominent, soft gland is also present behind the rictus. Finger I is longer than finger II. Two well-developed metatarsal tubercles and a distinct tarsal fold are observed. The throat is brown in some specimens and white in others (Fig. 12). Mercurio (2011) reported similar traits, noting a single subarticular tubercle on the fingers, poorly developed webbing restricted to basal fringes of the toes, and two red patches on the dorsal surfaces of the thighs. According to Inger (1968), this large, common species lacks cranial crests but possesses prominent, oval parotoid glands nearly contiguous with the eye margin. Phaka et al. (2017) noted that the tympanum is well visible, fingers lack webbing or terminal discs, and males exhibit a darker throat with dark nuptial pads on the outer fingers. Spawls et al. (2019) described the species' call as a slow, pulsating snore, reminiscent of a machine gun. Dehling & Sinsch (2023) report a dark olive-brown dorsum with dark brown spots, a cream to whitish belly, and a characteristic pale cross between four well-marked dark brown head spots. The lateral surfaces of the thighs often bear red marks, more conspicuous in juveniles.

Habitat. Three (3) specimens (6 in fallow, 3 in cultivated field, 3 in primary forest-fallow edge and 1 in primary forest-field edge). Authors (Blanc & Frétey, 2004; Dehling & Sinsch, 2023) reported that specimens of this species inhabit cultivated wetlands, artificial ponds, and tolerate anthropogenic disturbances.

Distribution. *Sclerophrys gutturalis* is known from Uganda, Tanzania, and Kenya across much of East and Southern Africa, except the southwestern regions (Mercurio, 2011; Phaka et al., 2017; Channing & Rödel, 2019; Spawls et al., 2019; Kabanze et al., 2023; Dehling & Dehling, 2023; Frost, 2025).

Sclerophrys pusilla (Mertens, 1937)

Description. Specimens of this species are relatively large and exhibit a dorsum with low tuberculation, a white and granular ventral surface, and a yellow throat. A distinct pale mid-dorsal line is clearly visible. Toes show rudimentary webbing, while tubercles are numerous and well-developed on the feet. The parotoid glands are visible, well-defined, smooth, and not distinct from the upper eyelid (Fig. 13). Spawls et al. (2019) reported that this species was formerly designated as *Sclerophrys (Bufo) maculatus* in earlier taxonomies. Perret (1966) describes it as possessing narrow parotoid



Figures 10–13. Bufonidae from Yoko Forest Reserve (DRC). Fig. 10: *Nectophryne batesii*. Fig. 11: *Sclerophrys gracilipes*. Fig. 12: *Sclerophrys gutturalis*. Fig. 13: *Sclerophrys pusilla*.

glands, conical and pointed warts on the flanks, a smooth dorsal skin, and a tarsal skin fold. According to Phaka et al. (2017), the spacing between pairs of dark spots on the snout and behind the eyes forms a pale cross on the head, a feature also observed in *Sclerophrys gracilipes* and *S. gutturalis*. Spawls et al. (2019) described the species' call as a rough "quork-quork".

HABITAT. One hundred and forty-three (143) specimens (5 in primary forest, 48 in fallow, 25 in cultivated field, 18 in primary forest-fallow edge and 47 in primary forest-field edge). For Frost (2025), the species typically inhabits humid savannas and forest edges.

DISTRIBUTION. *Sclerophrys pusilla* occurs across much of sub-Saharan Africa, including Gabon (Larson & Zimkus, 2018; Dewynter & Frétey, 2019), Kenya (Spawls et al., 2019), Cameroon, Republic of Congo, Central African Republic, South Sudan, Ethiopia, Botswana, Uganda, Mozambique, Zambia, Zimbabwe, Angola, Namibia (Frost, 2025), South Africa (Phaka et al., 2017), and the DRC (Nagy et al., 2013; Masudi et al., 2019; Musubaho et al., 2021).

Familia DICROGLOSSIDAE Anderson, 1871
Genus *Hoplobatrachus* Peters, 1863

Hoplobatrachus occipitalis (Günther, 1858)

DESCRIPTION. Specimens examined are characterized by the presence of an occipital groove and a dorsoventrally flattened head forming a triangle with a sharp canthus rostralis. The dorsal skin exhibits short glandular folds or tubercles of variable size and density, becoming more conical on the flanks and sacral region. The dorsum is sometimes scattered with dark spots, less distinct in juveniles, and the general coloration ranges from green to olive gray. The dorsal surfaces of the tibia and arms bear large brown spots reminiscent of leopard skin. The ventral region is white, with or without black spots. The tympanum is well distinct. The chin and chest show gray spots, which merge into marbling under the thighs and tibiae. The toes are fully webbed; the inner metatarsal tubercle is narrow, long, and slightly prominent, whereas the outer metatarsal tubercle is absent. Fingers are free, with the first finger being more robust and longer than the others (Fig. 14). Poynton & Broadley (1985a) described this species by strongly webbed toes and an external metatarsal tubercle separated from the rest of the foot by a membrane. Recently, Dehling & Sinsch (2023) indicated that the skin has numerous enlarged tubercles and short dermal ridges, some forming interrupted dorsolateral glandular folds, slippery due to the presence of many glands. They also report an olive, dull brown, or gray dorsum with darker markings, a pale occipital band behind the eyes, a white ventrum with large irregular dark spots, fully webbed feet, and a large tympanum bordered by a strongly curved and conspicuous supratympanic fold.

HABITAT. Twelve (12) specimens (6 in primary forest, 1 in fallow, 1 in primary forest-fallow edge, 1 in primary forest-field edge and 3 in streams); along roads traversing these habitats. Dehling & Sinsch (2023) noted that the species is semi aquatic, and remains closely associated with water bodies in savannas, agricultural lands, disturbed forest edges, riverbanks, ponds, and pools.

DISTRIBUTION. *Hoplobatrachus occipitalis* is known from Sub-Saharan Africa, including Mauritania, Senegal, and southern Mali through West Africa to Ethiopia, Niger, Zambia, and Angola (Poynton & Broadley, 1985a; Dehling & Sinsch, 2023; Frost, 2025). It has also been recorded in Nigeria (Nneji et al., 2019), Republic of Congo (Jackson et al., 2007, Jackson & Blackburn, 2007), Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Dewynter & Frétey, 2019), Rwanda (Dehling & Sinsch, 2023), Kenya (Kabanze et al., 2023), and the DRC (Inger, 1968; Penner & Rödel, 2007; Nagy et al., 2013; Masudi et al., 2019; Musubaho et al., 2021).

Familia HYPEROLIIDAE Laurent, 1943
Genus *Afrixalus* Laurent, 1944

Afrixalus equatorialis (Laurent, 1941)

DESCRIPTION. Specimens exhibit consistent coloration, characterized by a nearly square dark dorsal blotch, which is a distinctive feature of this species. The dorsal region is brownish or whitish, contrasting with a uniformly white ventral surface. This is the only large-sized species of the genus present in the study area (Fig. 15). Amiet (2012) reported the

presence of a single dorsal spot and several lateral spots, while the lumbar spot is absent. In addition to the main dorsal blotch, the back is sprinkled with irregular dark speckles, which are more noticeable at night. According to Badjedjea et al. (2022), this little-known frog shows a brownish dorsal coloration at night, turning gray or whitish during the day.

Habitat. Three (3) specimens in primary forest, exclusively along streams. *Afrixalus equatorialis* is restricted to humid forests in the northwestern and central Congo Basin (Badjedjea et al., 2022).

Distribution. *Afrixalus equatorialis* has been reported from Cameroon (Amiet, 2012; Frost, 2025) and the DRC during sampling campaigns in several forest blocks (Penner & Rödel, 2007; Musubaho et al., 2021; Badjedjea et al., 2022).

Afrixalus osorioi (Ferreira, 1906)

Description. The examined specimens are characterized by a finely tuberculate dorsal skin, a granulate ventral surface, smooth throat and thoracic regions, a short and strongly truncated snout, and prominent eyes. The dorsum exhibits a grayish-brown coloration with two parallel dorsolateral stripes that converge in a light brown sacral region and extend to the cloaca. A rectangular scapular blotch extends from the interorbital region to the lumbar area. The flanks are dark brown, while the thighs, tibias, and tarsi show a grayish-brown hue. The hind limbs are slender, and both fingers and toes bear adhesive discs. Well-developed internal and external metatarsal tubercles are present (Fig. 16). According to Laurent (1982), lumbar protuberances and distinct lateral dark bands delimit a narrow fusiform postero-dorsal light area, sometimes connected to the elongated or split anterior dorsomedial blotch. Spawls et al. (2019) described specimens as having coloration ranging from white to pink or brown, with a broad median dorsal stripe, and males producing a call consisting of a series of rapid clicks. Badjedjea et al. (2022) noted that some specimens exhibit a dark brown hue with a barely discernible dorsal pattern.

Habitat. 60 specimens (29 in primary forest, 10 in fallow, 19 in primary forest-fallow edge and 2 in primary forest-field edge), along streams.

Distribution. *Afrixalus osorioi* has been reported from Angola, much of the Congo Basin, as well as Uganda and Kenya (Schiøtz, 1975; Dewynter & Frétey, 2019; Masudi et al., 2019; Spawls et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022; Isingoma et al., 2023; Frost, 2025).

Afrixalus quadrivittatus (Werner, 1908)

Description. The captured specimens exhibit three light dorsal stripes separated by two dark stripes. A pale stripe is present on the tibia, extending from the heel to the knee, while light spots mark the arm, forearm, and flanks. A dark stripe runs from the posterior region of the eye to the thigh insertion (Fig. 17). Dehling & Sinsch (2023) described this species by an elongated body, relatively short limbs, large eyes, a smooth, spineless belly, and a brown dorsum with three pale longitudinal stripes converging toward the head. The ventral surface is creamy white. Spawls et al. (2019) describe the male call as a short buzz followed by a series of clicks.

Habitat. Nineteen (19) specimens (11 in primary forest, 4 in fallow and 4 in primary forest-field edge); in clearings, and herbaceous vegetation around swamps or along streams, without entering primary forest understory. According to Dehling & Sinsch (2023), this arboreal species occurs in both humid and dry savannas, agricultural areas, and secondary forests.

Distribution. *Afrixalus quadrivittatus* is widely distributed across East and Central Africa, with confirmed records in Ethiopia, Kenya, South Sudan, Uganda, Zambia, and several Central African countries, though its western range remains uncertain (Frétey et al., 2011; Channing & Rödel, 2019). It has also been reported in Rwanda (Mindje et al., 2020; Dehling & Sinsch, 2023) and the DRC (Musubaho et al., 2021; Badjedjea et al., 2022; Dehling & Sinsch, 2023).

Genus *Cryptothylax* Laurent et Combaz, 1950

Cryptothylax greshoffii (Schilthius, 1889)

Description. The collected specimens exhibit a uniform, slightly granular dorsal skin, reddish in some specimens, suggesting sexual dimorphism.



Figures 14–17. Hoplobatrachidae and Hyperoliidae from Yoko Forest Reserve (DRC). Fig. 14: *Hoplobatrachus occipitalis*. Fig. 15: *Afrixalus equatorialis*. Fig. 16: *Afrixalus osorioi*. Fig. 17: *Afrixalus quadrivittatus*.

The ventral skin is yellow to orange and granulo-tuberculate. The thighs are smooth, while the hands and feet are orange red. The flanks are smooth or very slightly granular, with dark stripes extending from the nares beyond the scapular insertion. The inner thighs, throat, and chest are also smooth. The robust thighs, often tinged with pink or red, are slightly shorter than the tibia, and their coloration extends to the adhesive discs. Digital webbing is nearly absent, whereas plantar webbing is well developed. The ovate muzzle is slightly flattened; the tympanum is visible, and the pupil is diamond shaped. Digit I is the shortest, digit III the longest, while digits II and IV are of comparable length. An external metatarsal tubercle is present, but the internal tubercle is absent (Fig. 18). Laurent (1976b) described this species by two vomerine tooth series between the choanae, a relatively large head slightly wider than long, an oval and slightly protruding muzzle, and simple, low subarticular tubercles. The femur is slightly shorter than the tibia. According to Amiet (2012), this is a large, massive looking treefrog with thick hind limbs, a long, ogival head, a nearly square pupil, and a circular tympanum. Badjedjea et al. (2022) report pronounced sexual color dimorphism: males are yellowish to brown, while females are whitish to pinkish with orange digital discs.

HABITAT. Six (6) specimens (5 in primary forest and 1 in fallow); around swamps or along streams, rarely entering primary forest. Amiet (2012) reported that *C. greshoffii* occupies amphibious grass formations along stream banks.

DISTRIBUTION. *Cryptothylax greshoffii* is known from the Republic of Congo (Jackson et al., 2007; Jackson & Blackburn, 2007), Gabon (Pauwels & Rödel, 2007; Dewynter & Frétey, 2019), Cameroon (Amiet, 2012), Equatorial Guinea, the Central African Republic, Angola (Frost, 2025), and the DRC (Penner & Rödel, 2007; Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022). Amiet (2012) also reported its presence in several localities of the Congolese Basin.

Genus *Hylambates* Duméril, 1852

Hylambates verrucosus Boulenger, 1912

Description. Specimens are characterized by a warty dorsal skin, uniformly black or dark gray, sometimes marked with indistinct, darker spots. The ventral skin is granular on the abdomen, throat, chest, and inner thighs. The muzzle, somewhat pointed, slightly protrudes beyond the mouth, and the jaw commissures bear prominent tubercles. An internal metatarsal tubercle is present, slender and slightly raised, whereas the external tubercle is small and indistinct. The flanks exhibit irregularly shaped or elliptical dark spots, while the axillary and anal regions are bright yellow, a distinctive feature of the species. Spinules are mixed with the warts on the tibiae, tarsi, metatarsi, and arms. The fingers and toes bear large adhesive discs; digital webbing is absent, while partial webbing connects toes II, III, IV, and V. The femur usually has two brown-yellow bands, the tibia two or three yellow bands, and the tarsus two or three pale bands. The palms and soles are finely granular (Fig. 19). Schiøtz (1975) described this species by a broad, flat body, a visible tympanum, densely warty dorsal skin, and well-developed, large digital and pedal discs. The belly is mottled brown or gray. Dehling & Sinsch (2023) recently noted that this frog, recognizable by its striped and warty limbs, displays thighs and posterior flanks barred with black and yellow or orange.

Habitat. Ninety-one (91) specimens (46 in primary forest, 9 in fallow and 36: primary forest-fallow edge); along forest roads, on vegetation surrounding water bodies, perching at heights ranging from 2 to 2.5 m. Dehling & Sinsch (2023) reported that *H. verrucosus* is arboreal, inhabits lowland and montane forests, generally associated with forest edges, open areas, and it tolerates anthropogenic disturbance and breeds in temporary ponds.

Distribution. The species is distributed from Uganda, Rwanda, and the DRC (Schiøtz, 1975; Laurent, 1976b; Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022; Dehling & Sinsch, 2023; Isingoma et al., 2023; Frost, 2025).

Genus *Hyperolius* Rapp, 1842

Hyperolius langi Noble, 1924

Description. Specimens exhibit a dorsal coloration marked by darker sand-colored bands, with the dorsolateral bands being lighter. The ventral side is whitish-yellow or greenish, including the underside of the femur, tibia, and foot (Fig. 20). Two color morphs were observed: one displays a camouflage pattern (Laurent, 1950), while the other shows clear canthal and dorsolateral bands extending to approximately half the body, consistent with the description done by Badjedjea et al. (2022).

Habitat. Twenty-six (26) specimens (10 in primary forest, 2 in fallow and 14 in primary forest-fallow edge), along marshes and other water bodies.

Distribution. *Hyperolius langi* has been reported from Uganda (Isingoma et al., 2023) and the forests of the DRC (Masudi et al., 2019; Badjedjea et al., 2022; Frost, 2025).

Hyperolius ocellatus Günther, 1858

Description. The specimens with small size, exhibit a reddish-brown dorsal skin speckled with black or purple spots, while the ventral surface is yellow orange. Some specimens display a light green triangle on the snout, a light green lateral stripe on each side, and a dorsolateral line (Fig. 21). This description aligns with previous authors, who noted that the species is sexually dichromatic, with females morphologically distinct from males (Frétey & Blanc, 2001; Portik et al., 2019; Badjedjea et al., 2022), although some males in Cameroon exhibit the ocellated pattern typical of females (Amiet, 2012).

Habitat. Fifteen (15) specimens (11 in primary forest, 1 in fallow and 3 in primary forest-fallow edge); perched on herbaceous vegetation along water bodies. Blanc & Frétey (2004) reported that *H. ocellatus* occupies primary forest, savannas, ponds and marshes. According to Frétey & Blanc (2001), this species is also found in secondary forests, where breeding specimens perch at low heights on vegetation near stagnant water or slow-moving streams.

Distribution. *Hyperolius ocellatus* is widely distributed across tropical Africa, from Nigeria and Equatorial Guinea to Uganda and Angola (Frétey & Blanc, 2001; Frost, 2025), including Cameroon (Herrmann et al., 2005a; Amiet, 2012; Portik et al.,

2016), Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Frétey et al., 2011; Larson & Zimkus, 2018; Dewynter & Frétey, 2019), and the DRC (Masudi et al., 2019; Badjedjea et al., 2022).

Hyperolius parallelus Günther, 1858

DESCRIPTION. Specimens exhibit coloration that can be easily confused with other species of the same genera. The dorsum is warty and displays an hourglass pattern, while some specimens often show a pale, uniform coloration. The upper surface of the thighs and the underside of the tibias are orange, a color that extends to the toes and ventral surface (Fig. 22). According to Dehling & Sinsch (2023), the dorsum is generally black, dark brown, or brown, with broad bands or large pale spots (white to light brown) bordered by darker shades, present in the center of the back and on the flanks. The limbs are of a lighter hue.

HABITAT. Seven (7) specimens in primary forest. According to Dehling & Sinsch (2023), *H. parallelus* is an arboreal species that inhabits savannas and cultivated wetlands, and it tolerates anthropogenic disturbances.

DISTRIBUTION. This species has been reported from Namibia, Angola, Burundi, Rwanda (Dehling & Sinsch, 2023), as well as in Uganda, Tanzania, Malawi, Zambia, Botswana, Zimbabwe, and the Republic of Congo (Frost, 2025) and in the DRC (Nagy et al., 2013).

Hyperolius platyceps Boulenger, 1900

DESCRIPTION. The recorded specimens exhibit a greenish dorsal skin of the MD type (dorsal macule morphs in which the cephalic, scapular, and dorsal macules are always fused into an hourglass pattern), covered with scattered small protuberances, and granular ventral skin. The snout is short, and the nostrils are prominent. Two pale bands extend from the snout to the insertion of the thighs; the ventral side bears a red spot, while the upper surfaces of the tibias are dotted with macules. The dig-



Figures 18–21. Hyperoliidae from Yoko Forest Reserve (DRC). Fig. 18: *Cryptothylax greshoffii*. Fig. 19: *Hylambates verrucosus*. Fig. 20: *Hyperolius langi*. Fig. 21: *Hyperolius ocellatus*.

ital webbing is rudimentary, and the internal metatarsal tubercle is present. In contrast, the pedal webbing reaches at least the last subarticular tubercle on the external side of toes I, II, and III (Fig. 23). These characteristics confirm observations made by Amiet (1978b) who highlighted the historical difficulties in distinguishing this species from its congeners. Amiet (2012) also noted a relatively narrow head, large, flattened granules on the palms and soles, and uniformly colored macules. The dorsal surface, including the limbs, bears small apple-green protuberances, particularly visible during the day.

Habitat. One hundred and seventy-five (175) specimens (133 in primary forest, 14 in fallow and 28 in primary forest-fallow edge), along marshes and other water bodies. According to the literature, *H. platyceps* is a parasylvicolous species, rarely venturing beyond primary forest and disturbed habitats, preferring wide forest galleries and edge areas where males call with single or repeated, slightly squeaky "clack" sounds, perched on twigs or most often on leaves (Amiet, 2012). It also frequents forest pond and swamp margins as well as savannas (Frétey & Blanc, 2001; Blanc & Frétey, 2004).

Distribution. *Hyperolius platyceps* is known from Zambia, Angola, the Republic of Congo, Cameroon, the Central African Republic, Equatorial Guinea (Poynton & Broadley, 1985a; Largen & Dowsett-Lemaire, 1991; Frost, 2025), Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Dewynter & Frétey, 2019), and the DRC (Laurent, 1972; Masudi et al., 2019; Badjedjea et al., 2022).

Hyperolius sp.

Description. Specimens are distinguished from other congeners by a slender, elongated body and a pointed snout that projects noticeably forward in profile. The ventral skin is yellowish, while the dorsal skin is greenish, adorned with small black dots interspersed with fine, sparse granulations across the entire dorsal region. These dots are also present on the dorsal surfaces of the legs, forearms, and throat. In some specimens, two pale bands extend from the snout to the lumbar region, crossing the eye area. The tips of the fingers and toes are expanded (Fig. 24), forming probably small adhesive discs.

Habitat. Twenty (20) specimens (7 in primary forest, 1 in fallow, 12 in primary forest-fallow edge).

Genus *Kassina* Girard, 1853

Kassina maculosa (Sternfeld, 1917)

Description. The single specimen is distinguished by a highly elevated (convex), oval, short snout that does not extend beyond the lower jaw. The dorsal skin is smooth, light gray, marked with black or dark spots of irregular and roughly elliptical shape, particularly dense on the flanks and sacral region. The tympanum is clearly visible and relatively close to the eye. The thighs, tibias, tarsometatarsal region, and arms are adorned with irregular beige transverse bands. The forearms are long, fingers slender, and without webbing. Fingers III and IV are connected at the base (finger III) and at the distal end (finger IV) by prominent articular tubercles. The palmar tubercles on the hands are distinct. Toes I and II are free, while rudimentary webbing is present between toes III, IV, and V. The internal metatarsal tubercle is oval and well visible, whereas the external one is absent (Fig. 25). Amiet (2012) described this species by a slightly stocky body, smooth dorsal skin on the head and mid-dorsal region, elongated limbs, and granulations on the rear dorsum and flanks often stretched longitudinally. The sides of the head and body are nearly smooth, becoming finely granulated toward the belly. The ventral surface is strongly reticulated-granular, with granulation contours forming polygons generally longer than wide. In females, the throat and pectoral region are smooth, while the inner thighs are granulated.

Habitat. One (1) specimen in the primary forest. According to Amiet (2012), *K. maculosa* frequents heavily disturbed forest areas.

Distribution. The species has been reported from Cameroon, Gabon, the Central African Republic, Sudan, Angola, and the DRC (Dewynter & Frétey, 2019; Frost, 2025).

Familia PHRYNOBATRACHIDAE Laurent, 1941
Genus *Phrynobatrachus* Günther, 1862

Phrynobatrachus auritus Boulenger, 1900

Description. The recorded specimens exhibit

notable polymorphism. The tympanum is moderately distinct or sometimes concealed, topped by a well-visible oblique glandular fold. The snout is rounded or sub-truncated, and the hind limbs are long and robust. The vocal sac is well-defined and accompanied by longitudinal glandular folds arranged in series along both sides of the lower jaw. The dorsal skin is finely granular, whereas the ventral skin remains smooth. The throat is dark, with small whitish spots in some specimens and yellow marbling in others. The mandibular edges are also marbled. The dorsal surfaces of the thighs and tibias are marked with transverse brown bands, while the inner and posterior faces are marbled or darkly pigmented. A dark occipital interorbital band delineates the parietal region, forming a triangle lighter than the rest of the back. In some specimens, a clear dorsal stripe extends from the tip of the snout to the cloaca. The tips of the fingers and toes are expanded into sub-oval terminal discs. Pedal webbing is reduced on toe IV. Specimens are also distinguished by a slightly prominent internal tarsal tubercle, a well-marked external metatarsal tubercle, a weakly developed internal metatarsal tubercle, and prominent sub-articular tubercles (Fig. 26). Lamotte & Xavier (1966b) described this species by a pronounced sexual dimorphism: the head is massive, the snout obtuse, and the canthus rostralis angular. The dorsal skin is finely textured, pigmented, and crossed by two longitudinal glandular cords. The belly is generally pigmented on a white background, while the inner surfaces of the tibias, throat, and chest are dark. Badjedjea et al. (2022) reported generally lighter coloration with a pale to whitish ventral skin, while Frétey & Blanc (2001) noted two small, characteristic, round, asymmetrical, and very dark tubercles in the lumbar region. According to Dehling & Sinsch (2023), the back of this "golden puddle frog" is smooth, adorned with a large X-shaped cutaneous ridge extending from behind the eyes to the middle of the trunk. The canthus rostralis and the supratympanic fold are well-developed, the limbs long, and the digital and pedal tips are not enlarged.

HABITAT. Seven hundred and thirty-four (734) specimens (657 in primary forest, 37 in fallow, 34 in primary forest-fallow edge, 3 in primary forest-field edge and 3 in primary forest, along streams). According to previous studies, *P. auritus* is terrestrial, and frequents primary and secondary tropical forests, particularly along tracks, riverbanks, and near ponds or lakes (Blanc & Frétey, 2004; Dehling & Sinsch, 2023).

DISTRIBUTION. *Phrynobatrachus auritus* has been reported from Nigeria, Gabon, Cameroon (Herrmann et al., 2005a; Burger et al., 2006; Pauwels & Rödel, 2007; Portik et al., 2016; Larson & Zimkus, 2018; Dewynter & Frétey, 2019; Frost, 2025), the Republic of Congo (Jackson et al., 2007), Rwanda, Uganda (Dehling & Sinsch, 2023; Isingoma et al., 2023) and the DRC (Nagy et al., 2013; Masudi et al., 2019; Badjedjea et al., 2022; Dehling & Sinsch, 2023; Musubaho et al., 2021).

Phrynobatrachus perpalmatus Boulenger, 1898

DESCRIPTION. The collected specimens exhibit a dorsally densely warty skin, particularly on the flanks and sacral region. The tympanum is visible, and a loreal fold extends from the posterior angle of the eye to the base of the arm. The snout is pointed, and the top of the head lacks a brown interorbital occipital band, which continues to the anal region. The general skin coloration is dark. A light longitudinal strip runs along the flanks and is also visible on the inner surfaces of the thighs. The dorsal surface of the tibias displays transverse brown bands. The ventral skin is generally light, while the throat is lightly dark gray in females and densely pigmented in males, which also exhibit a brown or green mid-dorsal stripe. The toes are slightly expanded into discs, whereas the fingertips are slender. Pedal webbing is highly developed, extending beyond the last sub-articular tubercles. The tibia bears epidermal granulations, and a prominent tarsal tubercle is present at mid-length of the tarsus, with a second, less distinct tubercle at the base of the tibio-tarsal joint. Both external and internal metatarsal tubercles are present (Fig. 27). Inger (1968) described this species by non-expanded digital tips and toes with small discs often accompanied by slight posterior projections. The gular skin of males is grayish, and femoral glands are absent. The belly is yellow, with the thorax of females and juveniles often spotted with brown, while a narrow light stripe extends from the eyes to the groin.

HABITAT. Seventeen (17) specimens (16 in pri-



Figures 22–25. Hyperoliidae from Yoko Forest Reserve (DRC). Fig. 22: *Hyperolius parallelus*. Fig. 23: *Hyperolius platyceps*. Fig. 24: *Hyperolius* sp. Fig. 25: *Kassina maculosa*.

mary forest and 1 in primary forest-fallow edge); leaf litter or near water points.

Distribution. The species is reported from South Sudan, Mozambique, Malawi, Zambia, Burundi, and the DRC (Frost, 2025).

Familia PIPIDAE Gray, 1825
Genus *Xenopus* Wagler, 1827

Xenopus pygmaeus Loumont, 1986

Description. Specimens of this species observed in the study area have a small, dorsoventrally flattened head, wider than long, with small eyes whose upper eyelids are rudimentary or absent. The dorsal surface, dark brown spotted with yellow, bears two rows of small lateral dorsal spines that meet at the rump. The toes are webbed and equipped with black keratinous claws. The skin is smooth, and the pupil is round. The ventral sides of the forelimbs and hindlimbs are yellow, while the dorsal side matches the coloration of the back (Fig. 28). According to Loumont (1986), this species is characterized by its small size, pronounced sexual dimorphism between males and females, and a dorsal pattern composed of two parallel or curved bands located behind the eyes, which are small with black irises.

Habitat. Sixty-two (62) specimens (41 in primary forest, 6 in primary forest-fallow edge and 15 in ponds and stagnant waters in primary forest or along forest tracks).

Distribution. *Xenopus pygmaeus* is known from Gabon, the Central African Republic, Zambia, and the DRC (Dewynter & Frétey, 2019; Masudi et al., 2019; Musubaho et al., 2021; Frost, 2025).

Familia PTYCHADENIDAE Dubois, 1987
Genus *Ptychadena* Boulenger, 1917

Ptychadena christyi (Boulenger, 1919)

Description. Specimens have a strongly promi-

nent snout and a light brown dorsal skin, marked by a glandular fold on each side extending from behind the eye to the cloacal region. No middorsal stripe or clear line from the snout to the cloaca was observed, but a black stripe runs from the snout past the tympanum. The sacral region shows two faint internal glandular folds. External metatarsal tubercles are weakly developed, while the terminal phalanges of toes II and III bear small black claws that slightly pierce the skin. The posterior thighs are marbled, and the dorsal surface shows transverse brown bands (Fig. 29). Boulenger (1919) described this species as having a strongly depressed head, a distinct tympanum, a pointed snout clearly projecting beyond the lower jaw, and a black temporal region bordered below by white, with a dark bar between the eyes. The subarticular tubercles are very prominent, the internal metatarsal tubercle is oval and protruding, and no fold is present along the tarsus. The coccygeal region bears a pair of glandular folds, and the inner thighs near the cloaca are also glandular. According to Badjedjea et al. (2022), this little-documented species is distinguished by well-marked dorsolateral glandular folds and a generally smooth back (unlike most species in the genus *Ptychadena*, which have numerous longitudinal dorsal folds). Some specimens show additional short, irregular dorsal and lateral folds, but these are less visible than the two main dorsolateral folds.

HABITAT. Two hundred and nine (209) specimens (96 in primary forest, 30 in fallow, 11 in cultivated field, 80 in primary forest-fallow edge, 1 in primary forest-field edge and 2 in temporary water bodies, along streams). Previous studies reported *P. christyi* in lowland forests (Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022; Frost, 2025).

DISTRIBUTION. This species is known from Uganda and the lowland forests of the DRC (Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022; Frost, 2025).

Ptychadena mascareniensis (Duméril et Bibron, 1841)

DESCRIPTION. Specimens have a long and wide head, a slightly marbled lower jaw, and a dorsal skin coloration ranging from light to dark, characterized by six glandular folds, with the outer lateral folds being lighter. A clear green middorsal stripe extends from the snout to the cloaca. In its center, a fine light line continues along the tibia to the tibio-tarsal joint. The snout, not prominent, overlies a frontal region marked by a triangular brownish area. The posterior surface of the thighs bears transverse brownish bands (Fig. 30). According to Perret (1966), the general body shape is robust, the pedal webbing is moderately developed; external and supernumerary metatarsal tubercles are absent, and the terminal phalanges of toes II and III are slightly curved with rounded tips.

HABITAT. Three hundred and fifty-seven (357) specimens (92 in primary forest, 42 in fallow, 144 in primary forest-fallow edge, 60 in primary forest-field edge and 8 in temporary water bodies or along streams). Specimens rarely penetrate deep into primary forests.

DISTRIBUTION. *Ptychadena mascareniensis* is widely distributed across sub-Saharan Africa (Perret, 1966; Lamotte, 1967; Rödel, 2000a; Frost, 2025), including Cameroon (Herrmann et al., 2005a), Gabon (Pauwels & Rödel, 2007; Larson & Zimkus, 2018), Kenya (Kabanze et al., 2023), and the DRC (Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022).

Ptychadena perreti Guibé et Lamotte, 1958

DESCRIPTION. The recorded specimens are characterized by a brownish dorsal skin adorned with dark spots and six glandular folds, with the two innermost folds restricted to the sacral region. A typical middorsal stripe, crossed centrally by a fine light line, extends from the snout to the cloacal region. The lower jaw is dark, while the throat, chest, and knees are finely speckled with dark spots. The slightly prominent snout overlies a vocal sac whose opening is located above the forearm insertion. The internal and external metatarsal tubercles are poorly developed, and the terminal phalanges of toes II and III bear claws that slightly pierce the skin. The dorsal surfaces of the thighs and tibias bear four to five brown transverse bands, while their posterior surfaces show marbling like that of the lower jaw (Fig. 31). Guibé & Lamotte (1958) described this species by a rounded canthus rostralis, a concave loreal region, and a long, acumi-

nate snout that extends well beyond the mouth. Females are larger than males, and the tibio-tarsal joint extends past the tip of the snout in both sexes. Internal and external metatarsal tubercles are present; supernumerary tubercles under metatarsals III and IV are distinct and sometimes replaced by small black spots. Males possess an inferior-type vocal sac.



Figures 26–31. Phrynobatrachidae, Pipidae and Ptychadenidae from Yoko Forest Reserve (DRC). Fig. 26: *Phrynobatrachus auritus*. Fig. 27: *Phrynobatrachus perpalmatus*. Fig. 28: *Xenopus pygmaeus*. Fig. 29: *Ptychadena christyi*. Fig. 30: *Ptychadena mascareniensis*. Fig. 31: *Ptychadena perreti*.

HABITAT. One hundred and thirty-five (135) specimens (70 in primary forest, 15 in fallow, 45 in primary forest-fallow edge, 3 in primary forest-field edge and 1 in temporary water bodies). Blanc & Frétey (2004) indicated that *P. perreti* is anthropophilic, and inhabits disturbed areas, forest track and river edges, as well as sunny ponds, pools, and puddles.

DISTRIBUTION. The species is reported from the Central African Republic (Joger, 1990), the Republic of Congo (Largen & Dowsett-Lemaire, 1991; Jackson & Blackburn, 2007), Cameroon, Gabon, South Sudan, and various regions of the DRC (Guibé & Lamotte, 1958; Perret, 1966; Herrmann et al., 2005a; Burger et al., 2006; Pauwels & Rödel, 2007; Larson & Zimkus, 2018; Dewynter & Frétey, 2019; Frost, 2025; Musubaho et al., 2021; 2024a; Badjedjea et al., 2022). The distribution of this species is restricted to western Central Africa and north of the Congo River, extending to northeastern DRC (Channing & Rödel, 2019).

Familia PYXICEPHALIDAE Bonaparte, 1850
Genus *Amietia* Dubois, 1987

Amietia nutti (Boulenger, 1856)

DESCRIPTION. Specimens exhibit a dorsal skin marked with black and brown spots, a coloration extending over the femur, tibia, and foot. The ventral surface is white to cream, while the throat is marbled with dark and light spots (Fig. 32). According to Spawls et al. (2019), this is the large river frog, generally brown or olive in color, sometimes more or less spotted. Its call is biphasic, consisting of harsh croaks reminiscent of the whine of a small mammal. Dehling & Sinsch (2023) described this Nutt's frog as having a smooth dorsum with fine longitudinal dorsolateral skin ridges extending from behind the eyelids to the sacrum, parallel to one to four more discreet lateral ridges or rows of tubercles. There is no transverse dorsal ridge. The legs are long, the feet broad, and the toes widely webbed. The dorsal coloration ranges from light to dark brown, sometimes marked by a yellowish vertebral stripe, while the ventral surface is immaculate, with diffuse darker markings on the throat and chest.

HABITAT. Eighty-two (82) specimens (26 in primary forest and 56 in along streams). Dehling & Sinsch (2023) reported that *A. nutti* is terrestrial, occupies intact forests, grasslands, cultivated wetlands, tolerating a certain degree of anthropogenic disturbance and reproduces in slow-flowing streams, ditches, irrigation channels, ponds.

DISTRIBUTION. *Amietia nutti* is widely distributed across central, eastern, and southern Africa (Larson et al., 2016), notably in Kenya (Spawls et al., 2019; Kabanze et al., 2023), Ethiopia, Burundi, the DRC, Tanzania, Rwanda, and Uganda (Mindje et al., 2020; Dehling & Sinsch, 2023; Frost, 2025).

Familia RANIDAE Rafinesque, 1814
Genus *Hylarana* Tschudi, 1838

Hylarana albolabris (Hallowel, 1856)

DESCRIPTION. The captured specimens exhibit a prominent dorsal fold extending from the posterior corner of the eyes to the cloacal region. The snout is slightly obtuse and barely surpasses the lower jaw. The jaws are silvery, the lips shiny, ranging from white to golden yellow, and the rectal glands, like the lips, are silver white. Tympanum is well visible and relatively large. The flanks bear light-colored cords forming a broken series running from the corner of the mouth to the groin. The dorsal skin is granular, chocolate-brown, and densely spotted with brown in the lumbar region, while the ventral skin is smooth, grayish, and variably dark among specimens. The posterior surface of the thighs is marbled; the dorsal side of the tibiae bears transverse bands, and their inner surfaces are generally granular. The fingers are free, long, and slender, while the toes are webbed (Fig. 33). Perret (1977) described the species as having a head longer than wide, a prominent snout, a rounded canthus rostralis, and pronounced dorsolateral glandular ridges of the same color as the back. The skin is rougher in males than in females, and the vocal sacs are underdeveloped. A longitudinal, interrupted white cord runs along the flanks. The rectal glands have an isolated post-rectal button, while the labial glands are elongated. The foot webbing is moderately developed, and the fingertips are strongly dilated into pyriform discs. Dehling & Sinsch (2023) reported that the dorsum ranges from olive to dark brown, often marked with black spots, and the ventral surface is whitish, sometimes

with dark patterns. They also report dorsolateral cutaneous ridges extending from the eye to the sacrum.

Habitat. Nineteen hundred and ninety-five (1995) specimens (1778 in primary forest, 79 in fallow, 118 in primary forest-fallow edge, 11 in primary forest-field edge and 9 in along streams); perched on shrubs about 1 m above ground. According to the literature (Frétey & Blanc, 2001; Blanc & Frétey, 2004; Dehling & Sinsch, 2023), *H. albolabris* is terrestrial, and occupies a wide range of habitats: savannas, lentic sections of streams, intact or degraded forests, gallery forests, disturbed areas, forest edges, pond margins, marshes, and roadsides. Dehling & Sinsch (2023) reported that the species is tolerant of anthropogenic disturbances, and reproduces in ponds, marshes, and streams.

Distribution. *Hylarana albilabris* is widely distributed across sub-Saharan Africa (Jongsma et al., 2018), including Nigeria, Cameroon, Equatorial Guinea, the Central African Republic (Herrmann et al., 2005a; Frost 2025), the Republic of Congo (Jackson et al., 2007), Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Larson & Zimkus, 2018; Dewynter & Frétey, 2019), Kenya (Spawls et al., 2019; Kabanze et al., 2023), Uganda, Tanzania, Rwanda (Channing & Rödel, 2019; Dehling & Sinsch, 2023), and the DRC (Masudi et al., 2019; Nagy et al., 2013; Musubaho et al., 2021; 2024a; Badjedjea et al., 2022; Dehling & Sinsch, 2023).

Familia RHACOPHORIDAE Hoffman, 1932
Genus *Chiromantis* Peters, 1854

Chiromantis rufescens (Günther, 1869)

Description. Specimens exhibit a uniform dorsal skin, slightly warty, with scattered grayish or green-gray areas. The ventral skin is light, densely granular on the throat and the inner surfaces of the thighs, while the thoracic region remains smooth. The tympanum is visible and closely adjacent to the posterior edge of the orbit. The dorsal surfaces of the thighs, tibiae, tarsi, and metatarsi are marked with dark brown transverse bands, and the forearms are strongly wrinkled on their posterior surfaces. The eyes are prominent with horizontal pupils. The snout is short and blunt, and the lower jaw shows slight marbling. Webbing between fingers I and II is less extensive than between fingers III and IV, and the palm is finely granular. An external metatarsal tubercle is present, and the foot webbing, strongly wrinkled, reaches the distal edges on the outer side of the first four toes (Fig. 34). Schiøtz (1967) described this large arboreal frog as slender, with wide and protruding eyes, a heavily spinulose dorsal and lateral skin on the head, back, and legs, and a wrinkled ventral surface. Other features include a rounded canthus rostralis, widely spaced large choanae, strongly webbed toes (except for the distal phalanx of toe IV, which is free of webbing), a small distinct metatarsal tubercle, and pronounced sexual dimorphism (males smaller than females).

Habitat. Three hundred and thirty-seven (337) specimens (88 in primary forest, 41 in fallow, 203 in primary forest-fallow edge and 5 in primary forest-field edge), perched on shrubs about 1-2,5 m above ground, always in association with *Hylambates verrucosus*. The species is rarely venturing far from ponds and forest clearings (Frétey & Blanc, 2001); it occupies forest edges, riverbanks, lakes, pond margins near roads (Blanc & Frétey, 2004).

Distribution. *Chiromantis rufescens* is known from sub-Saharan Africa (Kielgast & Lötters, 2009; Leaché et al., 2019), including Gabon (Burger et al., 2006; Pauwels & Rödel, 2007; Dewynter & Frétey, 2019), Cameroon (Herrmann et al., 2005a; Portik et al., 2016), and the DRC (Masudi et al., 2019; Musubaho et al., 2021; Badjedjea et al., 2022; Frost, 2025).

DISCUSSION

This study provides the first information on amphibian species present in the study area, but it has certain limitations. The absence of voucher specimens and detailed measurements restricts future taxonomic verification of some records and the comparison of the specimens body size with specimens of the same species from other regions of Africa. In addition, seasonal variability was not considered, even though amphibian presence and activity vary significantly according to season and species phenology. Furthermore, the lack of sex determination for specimens limited the assessment

of secondary sexual character variation between males and females. These shortcomings highlight the need for future studies to incorporate genetic analyses to confirm the identification of amphibians in the area. Despite these limitations, the results of this study should be regarded in their current state, as they represent an important preliminary contribution to the knowledge of the region's amphibian species.

The lowland forests of the DRC are among the least studied terrestrial ecosystems (Burgess et al., 2004; Badjedjea et al., 2022). This is particularly true for the Kisangani region, and more specifically for the study area, whose amphibian fauna has never been the subject of in-depth studies, unlike other vertebrate groups present (Musubaho et al., 2024a). The lack of data on amphibians, both within the study area and in other forests of the Congo Basin, may be explained by recent sociopolitical instability, the remoteness of the sites, and limited access to habitats (Anthony et al., 2015; Greenbaum, 2017; Badjedjea et al., 2022). These constraints are further compounded by a lack of financial resources and appropriate equipment to conduct research on this taxonomic group.

Based on morphological characterization, several traits have been identified in amphibians across different countries in sub-Saharan Africa. These traits include the general habitus or overall appearance and size of specimens, variation in diurnal and nocturnal coloration, skin texture and the presence or absence of dorsal folds, tympanum visibility, pupil shape, head and gular gland width, the length of the thigh, leg, and foot, as well as the morphology of fingers and toes and their webbing, the size and shape of tarsal and metatarsal tubercles, and secondary sexual characteristics, notably the formation and distribution of glands on the chest and forelimbs (Amiet, 1978b; Channing, 2001; Frétey & Blanc, 2001; Channing & Howell, 2006; Frétey et al., 2011; Mercurio, 2011; Amiet, 2012; Phaka et al., 2017; Spawls et al., 2019; Badjedjea et al., 2022; Dehling & Sinsch, 2023; Frost, 2025). The taxonomy of African amphibians remains highly complex, particularly for certain frogs whose morphological differentiation is still challenging (Spawls et al., 2019). It has evolved considerably under the influence of phylogenetics, yet numerous classification issues remain unresolved, requiring stable approaches that reflect species evolution (Frétey et al., 2011) and rely on the cumulative efforts of researchers. Among anurans, particularly tree frogs, the terminal ends of fingers and toes have adapted to an arboreal lifestyle through the development of adhesive terminal expansions, in contrast to terrestrial forms (Amiet, 2012).

From a faunal distribution perspective, studies have shown that the presence of anuran species in various regions of the world is strongly influenced by habitat structure, ecological and environmental characteristics (Da Silva et al., 2012; Jongsma et al., 2014; Onadeko, 2016; Vagmaker et al., 2020), their productivity related to precipitations (Blanc & Frétey, 2004; Kabanze et al., 2023), as well as by ecological barriers (Gascon et al., 2000; Flügel et al., 2015; Badjedjea et al., 2022; Musubaho et al., 2024a). These factors may also explain the presence of the species recorded in the study area.

Although caecilians are known only from tropical and equatorial regions (Grassé, 1996; Nussbaum & Pfrender, 1998; Rödel & Ernst, 2004; Lecointre & Le Guyader, 2006; Frétey et al., 2011), the results of this study indicate their absence in the YFRE. Similar research also reported the absence of this taxonomic group in other forest blocks in the DRC, notably in Lokutu (Penner & Rödel, 2007), as well as in the Okapi Wildlife Reserve (Masudi et al., 2019) and the Kokolopori Reserve (Badjedjea et al., 2022).

CONCLUSIONS

This study provides the first comprehensive annotated checklist of amphibians from the YFR and contributes valuable information on their occurrence across different habitat types and their geographic distribution. The relatively high species richness recorded highlights the ecological importance of the reserve and confirms its role as a significant refuge for amphibian diversity in the central Congo Basin.

The distribution of species across habitats suggests that habitat characteristics and environmental conditions influence the composition of amphibian assemblages within the reserve. The occurrence of several forest-associated species further empha-







Figures 32–34. Pyxicephalidae, Ranidae and Rhacophoridae from Yoko Forest Reserve (DRC). Fig. 32: *Amietia nutti*. Fig. 33: *Hylarana albolabris*. Fig. 34: *Chiromantis rufescens*.

sizes the conservation value of this forest ecosystem. These findings provide important baseline data for future ecological, biogeographic, and conservation research in the region. Given the increasing anthropogenic pressures affecting tropical forests, the conservation of the YFR and its surrounding landscapes remains essential for maintaining amphibian diversity and the ecological functions these species perform. Additional long-term surveys, including the collection of voucher specimens and detailed morphological and molecular data, would improve species documentation and strengthen future assessments of amphibian diversity in the region.

Overall, this study contributes to a better understanding of amphibian diversity and distribution in Central Africa and highlights the importance of continued biodiversity inventories for informing conservation planning and sustainable management of forest ecosystems.

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