

The Bornean Frog Race: Raising Conservation Awareness on Amphibians of Sarawak and Malaysia

The second largest (743,380 km²) tropical island (after New Guinea), Borneo straddles the equator between coordinates 04°S–07°N and 10–119°E (Fig. 1). Croizat (1958) described Borneo as a geological composite, and the island sits on the eastern margin of the Sunda Shelf, a Laurasian continental plate. Until three decades ago, the island comprised vast swaths of tropical forest, and a diversity of forest types and contrasting habitats, ranging from extensive lowland dipterocarp forests, significant areas of blackwater swamps, and high mountains. The seas around Borneo are generally shallow (< 200 m), contributing to faunal similarities with the faunas of Sumatra (to the west), Java (to the south), and Peninsular Malaysia (in the north), all areas lying on the Sunda Shelf. Exceptionally deep waters (> 2000 m) of the Makassar Strait, to the east of Borneo, separate that island from Sulawesi, which lies on the Sahul Shelf. Wallace's Line, demarcating the Oriental fauna from that of Australasia, is positioned across these deep-water straits

Apart from contemporary habitat conditions, past climates and land connections are linked to present diversity. During the glaciation events of the Pleistocene, sea levels in the northeast approached 140 m below present level in the Sulu Sea (Linsley 1996), while to the north, the north Sunda Shelf was -116 to -114 m (Hanebuth et al. 2000) when the Sundaland formed a gigantic landmass (Molengraaff 1921; Morley and Flenley 1987). Generalized reconstructions of the Southeast Asian archipelago during the Pleistocene have been shown by Voris (2000). Climate change coinciding with this last glacial maxima, ca. 23,000–18,000 years before present, brought in more dry, cool, as well as seasonal environments (Flenley 1997; Earl of Cranbrook 2000), and presumably permitted the movement of biota to and from Borneo (Ashton 1972; Sartono 1973).

The current climate of Borneo is characterized by high, equitable temperatures and heavy rainfall spread throughout the year. The relatively wetter periods are during the Northeast Monsoons (November to April), although the Southwest Monsoons (April to August) bring some rainfall. Daytime temperatures in most low-lying areas are 30–32°C, and humidity is typically above 70%; while in the highlands, such as the 4095 m Gunung Kinabalu, temperatures can reach freezing point at the summit. Annual precipitation is 4,000–5,000 mm. However, localized effects of geomorphological features, including mountain massifs and bays, have significant effects on weather conditions and on the local biotas within the island.

Three independent countries are situated on Borneo, their boundaries demarcated by either high mountains or large river basins, the largest being Indonesia (539,460 km², divided into

INDRANEIL DAS*,
ANDREW ALEK TUEN,
PUI YONG MIN,
ONG JIA JET

*Institute of Biodiversity and Environmental Conservation,
 Universiti Malaysia Sarawak 94300 Kota Samarahan, Sarawak, Malaysia*

*Corresponding author; e-mail: idas@ibec.unimas.my

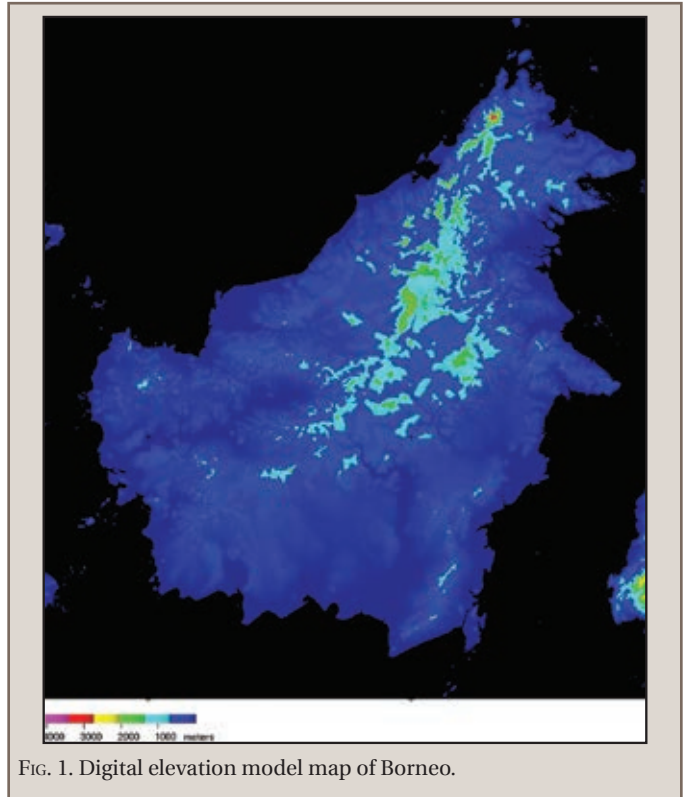


FIG. 1. Digital elevation model map of Borneo.

four provinces of Kalimantan), with other significant portions being Malaysia (divided into the states of Sabah, 73,710 km² and Sarawak, 124,450 km²), and the smallest entity is the Sultanate of Brunei Darussalam (5,760 km²). Forestry practices differ within these political units, influencing the extent and quality of their natural vegetation.

Borneo's size, location, and geological history have contributed to the high amphibian species diversity (see Table 1). New species continue to be described annually with every significant collecting effort even in well-sampled sites, or when larger species complexes are systematically revisited, particularly using tools of molecular analyses. Amphibians, for their dual requirement of both clean water and forest cover, are surrogates of tropical biodiversity.

Studies of Borneo's amphibian fauna commenced with early European visitors, primarily the British (in northern and western Borneo) and the Dutch (in the southern parts of the island), who were often explorers and natural historians (Das 2004). The frog fauna of the island is currently accessible to a lay audience via the field guide of Inger and Stuebing (2005), now in its second edition. It draws upon the substantial research of these authors, spanning over half a century, that earlier resulted in the monographic revisionary work of Inger (1966).

Of the 178 amphibian species now known from Borneo, 130 (or 73%) are endemic to the island. An additional 43 species are distributed across Sundaland (including the Malay Peninsula, Sumatra, Java, and Bali), but not beyond, these being referred

to as Indo-Malayan elements in the fauna of the island. Among them are several whose extra-Bornean distribution is only peripheral (*Limnonectes palavanensis* and *Microhyla petrigena*). Autochthonous genera on Borneo include *Borneophrys*, *Leptobranchella*, *Meristogenys*, and *Sabahphrynus*. Other more widespread Sundan lineages show major radiations here, include *Ansonia* (12 species), *Kalophrynus* (10 species), *Leptobranchium* (six species), *Leptolalax* (seven species), *Pelophryne* (eight species), *Philautus* (19 species), and *Rhacophorus* (15 species). Several essentially Indo-Chinese elements identified on Borneo, possibly relictual from the time of land connection with the Asian mainland, include *Feihyla*, *Ingerana*, and *Odorrana*. Adding to the frog fauna are several species that are human commensals, and suspected to have arrived in the past century, mostly inadvertently with plants and other agricultural products (including *Duttaphrynus melanostictus* and *Kaloula pulchra*), and one is an escapee from frog farms (*Hoplobatrachus rugulosus*).

The most recent assessment of the world's amphibians paints a bleak picture for the Bornean amphibian fauna (see Table 2; IUCN 2013; <http://www.iucnredlist.org/>). A total of 27 species are classified as NE (Not Evaluated). Of those whose conservation status has been assessed, 15 are DD (Data Deficient), 54 LC (Least Concern), 40 are NT (Near Threatened), 30 are VU (Vulnerable), nine EN (Endangered), and three CR (Critically Endangered). Belonging to the most threatened categories are three species with rather restricted ranges, two of which were described only in the last decade—*Pelophryne linanitensis* and *P. murudensis* (from Sarawak) and *Leptobranchella palmata* (from Sabah). No active conservation measures have been directed thus far to assure their continued survival. Excluding those in the NE, DD, and LC categories, there are 82 threatened species, representing 46%, or nearly half the known amphibian fauna of the island. These figures are, of course, conservative estimates, as species complexes (or biological species nested within morphologically similar species complexes) exist within a number of species that are currently categorized as Least Concern (including, among others, *Limnonectes palavanensis*, *Occidozyga sumatrana*, *Leptobranchium abbotti*, *L. montanum*, *Megophrys nasuta*, *Chaperina fusca*, *Kalophrynus heterochirus*, *K. pleurostigma*, *Odorrana hosii*, *Kurixalus appendiculatus*, *Philautus petersi*, *Polypedates macrotis*, *Rhacophorus cyanopunctatus*, and *R. pardalis*). These indicate insufficiency in current knowledge of Bornean frogs, and a need for further research on a diverse series of disciplines, from taxonomy and systematics, to ecology, ethology, and distribution.

Rates of deforestation are high in Borneo (Primack and Hall 1992; Bryan et al. 2013); the major driver of deforestation is logging for hardwoods and clearing of land for oil-palm plantations and urbanization. Such landscape change has been instrumental in population fragmentation and extinctions. One recent study reported the persistence of many amphibian species, including Bornean endemics, in secondary forests, but not in plantation forests (Gillespie et al. 2012). On the Indonesian portion of Borneo, an ambitious project of settling people from densely populated islands of Java and Madura into Kalimantan (Fearnside 1997) implies clearing of more forest land for agriculture and settlement. During the dry season, many forests are prone to fire, accidentally started, or used by settlers to clear vegetation to prepare the land for agriculture (swidden cultivation). Other factors that threaten local amphibians are harvest for food and introduction of exotic species from the food or pet trade, which may, on one hand, compete with local amphibians, and on the

other, introduce deadly diseases. At least one species (*Hoplobatrachus rugulosus*) is introduced on Borneo, presumably having escaped from frog farms. In the Malay Peninsula, two additional exotic species of frogs can claim residency—the American *Lithobates catesbeianus* and the Chinese *Hylarana guentheri*. The large number of exotic amphibian species offered for sale in local petshops in towns of Sarawak and Sabah (including North American, European, and African frog and salamander species) is a further cause for concern, as several (including *Ceratophrys* spp. and *Xenopus laevis*) have been linked to the deadly fungal pathogen, *Batrachochytrium dendrobatidis* (Phylum Chytridiomycota), often abbreviated as *Bd*.

The Bornean Frog Race is celebrated on the last weekend of April. Since 2012, two editions have been held. The event coincides with the annual "Save the Frogs Day" (www.savethefrogs.com/day), a global action celebrated via 270 events in over 30 countries, to highlight conservation issues facing the world's amphibians. The Race is organized by the students and staff of the Institute of Biodiversity and Environmental Conservation (IBEC) of the Universiti Malaysia Sarawak (UNIMAS). UNIMAS is a federal body within the autonomous Malaysian state of Sarawak, with one of its research areas being tropical biodiversity. This area of research is appropriate given the university's strategic location in the heart of a Southeast Asian biodiversity hotspot. The first Bornean Frog Race was held to coincide with UNIMAS's 20th anniversary, at the Permai Rainforest Resort, on the evening of 28 April 2012. The event comprised exhibitions, talks, and a race to document amphibians in Gunung Santubong National Park. No inventories of this mountain have been published before, although the massif has a long history of zoological explorations, starting with Alfred Russel Wallace (1823–1913), who collected on Santubong in 1855, and during his stay at the village in the foothills, wrote his most famous paper, entitled "On the Law Which has Regulated the Introduction of New Species." The Race was publicized through IBEC's website (<http://www.ibec.unimas.my/save-the-frogs-day-2012.html>), the Raffles Museum website (<http://rafflesmuseum.wordpress.com/2012/04/23/the-bornean-frog-race-2012/>), and through Facebook (<http://www.facebook.com/TheBorneanFrogRace2012>). An exhibit pertaining to amphibian diversity, comprising photographs of frogs, an exhibition of books on frogs, and a display of amphibians depicted in postage stamps of the world. A special philatelic sheet was brought out on the date, in association with Pos Malaysia, under the SetemKu program, featuring the Bornean Rainbow Toad (*Ansonia latidisca*), the subject of a natural history talk given by UNIMAS graduate student, Ong Jia Jet. This is one of the 10 "Lost Frogs" in the list by Conservation International, and considerable media publicity was received upon its rediscovery (Pui et al. 2011). A computer displayed images and played calls of frogs of the world. The Race was attended by 41 participants (many of whom were students from UNIMAS, in addition to members of the Malaysian Nature Society, and staff of the Sarawak Forest Department and Sarawak Forestry Corporation). Participants had about 120 minutes to go up a trail on Gunung Santubong and photographically document amphibians.

Three prizes were awarded for each of the following categories: a) the three best amphibian photos taken; b) the rarest amphibian found; and c) the most species found. Two extra prizes for the Judge's Special Award were given to: a) the youngest participant, and b) the most enthusiastic participant. The main prizes included natural history books, donated by Datuk Chan Chew Lun, proprietor, Natural History Publications (Borneo)

TABLE 1. Checklist of the amphibians of Borneo, current as of 21 October 2013, annotated with the current IUCN Red List status (IUCN 2013). Abbreviations include: NE = Not Evaluated; DD = Data Deficient; LC = Least Concern; NT = Near Threatened; VU = Vulnerable; EN = Endangered; and CR = Critically Endangered. One introduced species has been indicated with an asterisk.

ORDER ANURA

Family Bombinatoridae

Barbourula kalimantanensis Iskandar, 1978 EN

Family Bufonidae

Ansonia albomaculata Inger, 1960 NT
Ansonia echinata Inger and Stuebing, 2009 NE
Ansonia fuliginea (Mocquard, 1890) VU
Ansonia guibei Inger, 1966 EN
Ansonia hanitschi Inger, 1960 NT
Ansonia latidisca Inger, 1966 EN
Ansonia leptopus (Günther, 1872) NE
Ansonia longidigita Inger, 1960 NT
Ansonia minuta Inger, 1960 NT
Ansonia platysoma Inger, 1960 EN
Ansonia spinulifer (Mocquard, 1890) NT
Ansonia torrentis Dring, 1984 VU
Duttaphrynus melanostictus (Schneider, 1799) LC
Ingerophrynus divergens (Peters, 1871) LC
Ingerophrynus quadriporcatus (Boulenger, 1887) LC
Leptophryne borbonica (Tschudi, 1838) LC
Pedostibes everetti (Boulenger, 1896) DD
Pedostibes hosii (Boulenger, 1892) LC
Pedostibes rugosus Inger, 1958 NT
Pelophryne api Dring, 1984 EN
Pelophryne guentheri (Boulenger, 1882) VU
Pelophryne linanitensis Das, 2008 CR
Pelophryne misera (Mocquard, 1890) VU
Pelophryne murudensis Das, 2008 CR
Pelophryne rhophophilia Inger and Stuebing, 1996 VU
Pelophryne saravacensis Inger and Stuebing, 2009 NE
Pelophryne signata (Boulenger, 1895) NT
Phrynoidis aspera (Gravenhorst, 1829) LC
Phrynoidis juxtaspera (Inger, 1964) LC
Pseudobufo subasper Tschudi, 1838 LC
Sabaphrynus maculatus (Mocquard, 1890) NE

Family Ceratobatrachidae

"*Ingerana*" *baluensis* (Boulenger, 1896) LC

Family Dicroglossidae

Fejervarya cancrivora (Gravenhorst, 1829) LC
Fejervarya limnocharis (Gravenhorst, 1829) LC
 **Hoplobatrachus rugulosus* (Wiegmann, 1834) LC
Ingerana rajae Iskandar, Bickford and Arifin, 2011 NE
Ingerana sariba (Shelford, 1905) NE
Limnonectes asperatus (Inger, Boeadi and Taufik, 1996) NT
Limnonectes finchi (Inger, 1966) LC
Limnonectes ibanorum (Inger, 1964) NT
Limnonectes ingeri (Kiew, 1978) NT
Limnonectes kenepaiensis (Inger, 1966) DD
Limnonectes kuhlii (Tschudi, 1838) LC
Limnonectes leporinus Andersson, 1923 LC
Limnonectes malesianus (Kiew, 1984) NT
Limnonectes palawanensis (Boulenger, 1894) LC
Limnonectes paramacrodon (Inger, 1966) NT
Limnonectes rhacodus (Inger, Boeadi and Taufik, 1996) NT

TABLE 1. Continued.

ORDER ANURA

Occidozyga baluensis (Boulenger, 1896) NT

Occidozyga sumatrana (Peters, 1877) LC

Family Megophryidae

Borneophrys edwardinae (Inger, 1989) VU
Leptobranchella baluensis Smith, 1931 VU
Leptobranchella brevicrus Dring, 1984 VU
Leptobranchella mjobergi Smith, 1925 LC
Leptobranchella palmata Inger and Stuebing, 1992 CR
Leptobranchella parva Dring, 1984 VU
Leptobranchella serasanae Dring, 1984 VU
Leptobranchium abbotti (Cochran, 1926) LC
Leptobranchium gunungense Malkmus, 1996 VU
Leptobranchium hendricksoni Taylor, 1962 LC
Leptobranchium ingeri Hamidy, Matsui, Nishikawa, and Belabut, 2012 NE
Leptobranchium kanowitense Hamidy, Matsui, Nishikawa, and Belabut, 2012 NE
Leptobranchium montanum Fischer, 1885 LC
Leptolalax arayai Matsui, 1997 VU
Leptolalax dringi Dubois, 1987 NT
Leptolalax gracilis (Günther, 1872) NT
Leptolalax hamidi Matsui, 1997 VU
Leptolalax maurus Inger, Lakim, Biun and Yambun, 1997 NT
Leptolalax pictus Malkmus, 1992 VU
Leptolalax platycephalus Dehling, 2012 NE
Megophrys kobayashii Malkmus and Matsui, 1997 NT
Megophrys nasuta (Schlegel, 1858) LC
Xenophrys baluensis (Boulenger, 1899) NT
Xenophrys dringi (Inger, Stuebing and Tan, 1995) NT

Family Microhylidae

Calluella brooksii (Boulenger, 1904) DD
Calluella flava Kiew, 1984 DD
Calluella smithi (Barbour and Noble, 1916) DD
Chaperina fusca Mocquard, 1892 LC
Gastrophrynoides borneensis (Boulenger, 1897) VU
Kalophrynus baluensis Kiew, 1984 NT
Kalophrynus barioensis Matsui and Nishikawa, 2011 NE
Kalophrynus calciphilus Dehling, 2011 NE
Kalophrynus eok Das and Haas, 2003 DD
Kalophrynus heterochirus Boulenger, 1900 LC
Kalophrynus intermedius Inger, 1966 VU
Kalophrynus nubicola Dring, 1984 NT
Kalophrynus pleurostigma (Tschudi, 1838) LC
Kalophrynus punctatus Peters, 1871 VU
Kalophrynus subterrestris Inger, 1966 NT
Kaloula baleata (Müller in Van Oort and Müller, 1833) LC
Kaloula pulchra Gray, 1831 LC
Metaphrynella sundana (Peters, 1867) LC
Microhyla bermorei (Blyth, 1856) LC
Microhyla borneensis Parker, 1928 LC
Microhyla maculifera Inger, 1989 VU
Microhyla malang Matsui, 2011 NE
Microhyla nepenthicola Das and Haas, 2010 NE
Microhyla perparva Inger and Frogner, 1979 NT
Microhyla petrigena Inger and Frogner, 1979 NT
Huia cavitympanum (Boulenger, 1893) LC
Hylarana baramica (Boettger, 1900) LC
Hylarana erythraea (Schlegel, 1837) LC
Hylarana glandulosa (Boulenger, 1882) LC

TABLE 1. Continued.

ORDER ANURA

Family Ranidae

- Hylarana laterimaculata* (Barbour and Noble, 1916) LC
- Hylarana luctuosa* (Peters, 1871) LC
- Hylarana megalonesa* (Inger, Stuart and Iskandar, 2009) NE
- Hylarana nicobariensis* (Stoliczka, 1870) LC
- Hylarana picturata* (Boulenger, 1920) LC
- Hylarana raniceps* (Peters, 1871) LC
- Hylarana signata* (Günther, 1872) LC
- Meristogenys amoropalamus* (Matsui, 1986) VU
- Meristogenys dyscritus* Shimada, Matsui, Yambun and Sudin, 2011 NE
- Meristogenys jerboa* (Günther, 1872) VU
- Meristogenys kinabaluensis* (Inger, 1966) NT
- Meristogenys macrophthalmus* (Matsui, 1986) DD
- Meristogenys maryatiae* Matsui, Shimada and Sudin, 2010 NE
- Meristogenys orphnocnemis* (Matsui, 1986) LC
- Meristogenys phaeomerus* (Inger and Gritis, 1983) NT
- Meristogenys poecilus* (Inger and Gritis, 1983) NT
- Meristogenys stenocephalus* Shimada, Matsui, Yambun and Sudin, 2011 NE
- Meristogenys stigmachilus* Shimada, Matsui, Yambun and Sudin, 2011 NE
- Meristogenys whiteheadi* (Boulenger, 1887) NT
- Odorrana hosii* (Boulenger, 1891) LC
- Staurois guttatus* Günther, 1858 NE
- Staurois latopalmarum* (Boulenger, 1887) LC
- Staurois parvus* Inger and Haile, 1959 DD
- Staurois tuberilinguis* Boulenger, 1918 NT

Family Rhacophoridae

- Feihyla kajau* (Dring, 1984) NT
- Kurixalus appendiculatus* (Günther, 1858) LC
- Nyctixalus pictus* (Peters, 1871) NT
- Philautus acutus* Dring, 1987 VU
- Philautus amoenus* Smith, 1931 VU
- Philautus aurantium* Inger, 1989 EN
- Philautus bunitus* Inger, Stuebing and Tan, 1995 VU
- Philautus davidlabangi* Matsui, 2009 DD
- Philautus disgregus* Inger, 1989 EN
- Philautus erythrophthalmus* Stuebing and Wong, 2000 VU
- Philautus gunungensis* Malkmus and Riede, 1996 VU
- Philautus hosii* (Boulenger, 1895) NT
- Philautus ingeri* Dring, 1987 VU
- Philautus juliandringi* Dehling, 2010 NE
- Philautus kakipanjang* Dehling & Dehling, 2013: NE
- Philautus kerangae* Dring, 1987 EN
- Philautus macroscelis* (Boulenger, 1896) NE
- Philautus mjobergi* Smith, 1925 NT
- Philautus petersi* (Boulenger, 1900) LC
- Philautus refugii* Inger and Stuebing, 1996 VU
- Philautus saueri* Malkmus and Riede, 1996 VU
- Philautus tectus* Dring, 1987 VU
- Philautus umbra* Dring, 1987 VU
- Polypedates chlorophthalmus* Das, 2005 DD
- Polypedates colletti* (Boulenger, 1890) LC
- Polypedates leucomystax* (Gravenhorst, 1829) LC
- Polypedates macrotis* (Boulenger, 1891) LC
- Polypedates otilophus* (Boulenger, 1893) LC
- Rhacophorus angulirostris* Ahl, 1927 EN
- Rhacophorus baluensis* Inger, 1954 NT
- Rhacophorus belalongensis* Dehling and Grafe, 2008 NE

TABLE 1. Continued.

ORDER ANURA

- Rhacophorus borneensis* Matsui, Shimada & Sudin, 2013 NE
- Rhacophorus cyanopunctatus* Manthey and Steiof, 1998 LC
- Rhacophorus dulitensis* Boulenger, 1892 NT
- Rhacophorus fasciatus* Boulenger, 1895 VU
- Rhacophorus gadingensis* Das and Haas, 2005 DD
- Rhacophorus gauni* (Inger, 1966) NT
- Rhacophorus harrissoni* Inger and Haile, 1959 NT
- Rhacophorus nigropalmatus* Boulenger, 1895 NT
- Rhacophorus pardalis* Günther, 1858 LC
- Rhacophorus penanorum* Dehling, 2008 NE
- Rhacophorus rufipes* Inger, 1966 NT
- Theloderma asperum* (Boulenger, 1886) LC
- Theloderma horridum* (Boulenger, 1903) LC
- Theloderma licin* McLeod and Ahmad, 2007 LC

ORDER GYMNOPIHIONA

Family Ichthyophiidae

- Ichthyophis biangularis* Taylor, 1965 DD
- Ichthyophis dulitensis* Taylor, 1960 DD
- Ichthyophis lakimi* Nishikawa, Matsui, and Yambun, 2012 NE
- Ichthyophis monochrous* (Bleeker, 1858) DD
- Ichthyophis nigroflavus* (Taylor, 1960) DD
- Ichthyophis pauli* Nishikawa, Matsui, Sudin & Wong, 2013 NE

TABLE 2. Conservation status of the amphibians of Borneo, according to the IUCN Red List (IUCN 2013). Abbreviations as in Table 1.

Sl.	Category	Number	Percentage
1	NE	27	15.17
2	DD	15	8.43
3	LC	54	30.34
4	NT	40	22.47
5	VU	30	16.85
6	EN	9	5.06
7	CR	3	1.69

Sdn Bhd., based in Kota Kinabalu. Other prizes were donated by UNIMAS and organizers of the Race, including book vouchers from a leading book shop in Kuching. The event was covered by the local news media (*The Star, Kuching, Borneo Post, and Utusan Malaysia*), as well as magazines specializing in tourism and travel.

The second Bornean Frog Race was held on 27 April 2013, and was a larger event (Fig. 2). The venue was Kubah National Park, a part of the Matang Range, close to the city of Kuching. The range is home to nearly 60 species of amphibians (Das et al. 2007), with several undescribed. This version of the Race was organized in collaboration with the Sarawak Forestry Corporation (SFC), towards the end of the Kubah Week celebrations (a week-long education and fun event which included guided tours covering flora, fauna, and heritage walks, to collection sites of Victorian naturalists—Odoardo Beccari [1843–1920] and Wallace). The Race was attended by over a hundred participants and accompanying persons, which was the limit set by the organizers, and comprised a day-long series of events, starting with a parallel junior education program (led by Ramlah Zainuddin,



FIG. 2. Poster of the Bornean Frog Race 2013.



FIG. 4. Frogs on stamps of the world postcard.



FIG. 3. Exhibits and Frog Race 2013 volunteers.

Senior Lecturer at the Department of Zoology, UNIMAS) at the Matang Wildlife Centre, where school children from Kuching learned about frogs, tadpoles, and their respective habitats within a wider context of conservation. Talks on amphibians and an amphibian photography workshop were organized at Kubah National Park for participants. The workshop was led by natural history and outdoors photographers, Hans Hazebroek and Ch'ien Lee. An exhibit room with items related to frogs was set up (Fig. 3). These included amphibian books and scientific papers, including an extensive section on works for children, amphibian toys, stamps, coins, postcards, stickers, stationery, fridge magnets, terrarium of live frogs, etc. Special posters were prepared for the Race, one showing frogs on stamps of the world (also reproduced as a postcard; see Fig. 4), another on all the amphibians recorded from Kubah National Park and the Matang Range,



FIG. 5. British artist Paul McNamee with a watercolor of Wallace's Flying Frog, the first prize for the participant with the greatest number of frog records.

the latter reproduced in an A4 format for participants to use as a field guide during the Race. A Saint John's Ambulance, along with four paramedics, were on standby for any medical emergency that might occur during such events (fortunately, their services were not required).

The main prizes—books and frog sculptures—were donated by Datuk Chan Chew Lun of Natural History Publications (Borneo), Sdn Bhd. Additional prizes were donated by Paul McNamee (a watercolor of Wallace's Flying Frog; Fig. 5) and Samuel

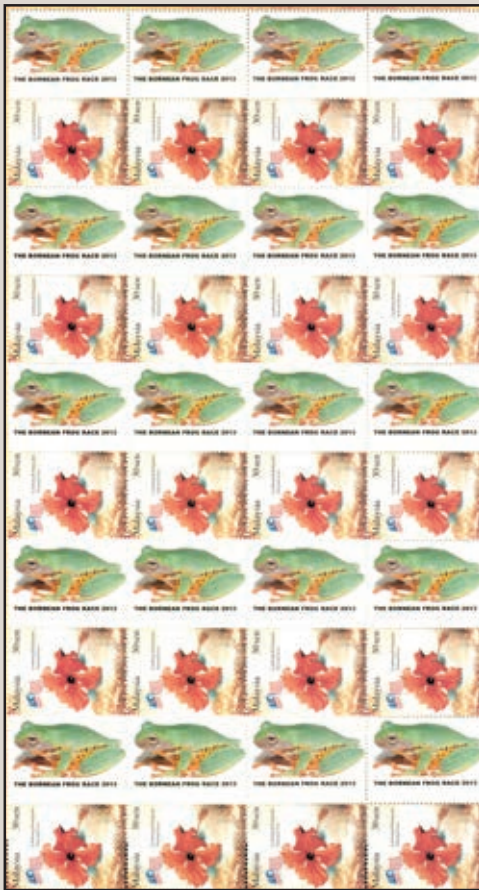


FIG. 6. A sheet of SetemKu personalized stamps for the Bornean Frog Race 2013, issued by Pos Malaysia.



FIG. 7. Participants prepare for the Race (April 2013).

Shonleben (a BBC DVD). Stephen Antang, Wildlife Warden of Kubah National Park, gave a welcoming speech to participants, and also described the Park and its trail systems. Andrew Alek Tuen, Director, IBEC, gave the keynote address, and Indraneil Das gave a brief talk on the beauty and diversity of amphibians, followed by the release of two batrachological items: the official Borneo Frog Race 2013 stamps, released under the Pos Malaysia SetemKu program (Fig. 6) and a demo version of an app for smartphones entitled “Frogs of Kubah.” A perspective speech “Why I love frogs” was given by Datuk Chan Chew Lun, followed by the screening of BBC documentary from “Land Invaders” from the “Life in Cold Blood” series (with permission from Sir David Attenborough). The final briefing before dinner was on safety issues by Hans Breuer, friend of IBEC.

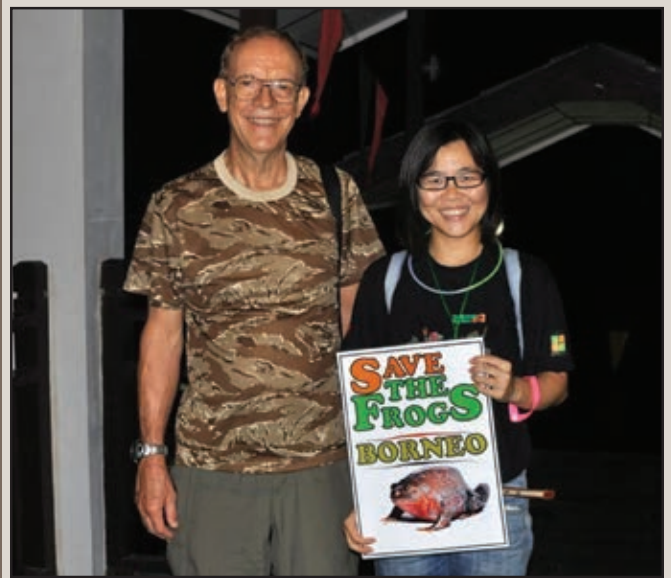


FIG. 8. Hans Hazebroek returning to the registration desk after completing the Race.



FIG. 9. Participants and volunteers of the Frog Race 2013 showing “Save the Frogs” poster.

Following an early dinner, served at the cafeteria of the newly opened Interpretation Centre of Kubah National Park, the rules of the Race were laid out by IBEC graduate students, Pui Yong Min and Ong Jia Jet (including time limit, safety issues, and ways to reduce impact on the native fauna and vegetation). Flag-off to the Bornean Frog Race was at 1830 h (Fig. 7), at the head of the Summit Trail. Headlamps and flashlights, as well as the occasional camera light, were seen bobbing up the trail for the next few minutes, until all participants disappeared up the trail in the direction of the Frog Pond, a 45-minute brisk walk along the Trail. Before 2100 h, when the long whistle went out to announce the end of the Race, the participants started drifting back to the registration desk (Figs. 8–9), recording their return and proceeding to one of 10 desks equipped with laptops to download their photographic entries. Thereafter, participants drifted into the lecture theatre, supper in hand, to hear the special talk of the day by Ulmar Grafe, of Universiti Brunei Darussalam (advisor to Stephen Spielberg for the film *Jurassic Park*), “Behaviour and Ecology of Amphibians on Borneo: Foot-flagging, Ultrasound Communication and Species Diversity,” the subjects of his life-long research on the ecology and behavior of tropical frogs.



FIG. 10–11. Certificates for the Bornean Frog Race 2013.

Judging of photographic entries and other categories followed, and at 2330 h, the winners were announced in the three categories, as in the previous year. The certificates were in several attractive designs, created by Pui Yong Min (Figs. 10–11). Participation certificates were distributed and after concluding speeches by Andrew Alek Tuen and Oswald Braken Tissen of SFC, the Race came to an end just after midnight.

Several participants overnighted at one of the several chalets of the Park, while others returned the next morning, by 1000 h, before the arrival of Datuk Amar Abg Hj Abdul Rahman Zohari Bin Tun Datuk Abg Hj Openg, Minister of Housing and Minister of Tourism. After the welcoming address by Datu Hj Ali Yusop, Managing Director/CEO of Sarawak Forestry, Abdul Rahman Zohari presented some of the prizes, while others were distributed by the Conference Organizers (Figs. 12–13).

The Bornean Frog Race brings to the fore the great beauty and diversity of amphibians and their larval stages to the general public of Sarawak and Malaysia, as perhaps never before. At the same time, it emphasizes the need for their conservation, via the take home messages, given through talks, exhibits, films, as well as signage, such as 'The Dip', where participants were encouraged to dip their shoes into a tub of potassium permanganate, a solution for removing the deadly *Bd* chytrid fungus that is now linked to amphibian declines worldwide. Exposing the general public, particularly the urbanites of Kuching to the sights and sounds of a rainforest by night, and showcasing the diversity of amphibians and other life at one of Sarawak's less well-known

national parks, in a convivial atmosphere, and providing educational material made the event appreciated by the participants. Many came with their entire families. The interest shown by participants (one of whom came all the way from India, another from the eastern Sarawak town of Miri, to take part in this half-day event) and the media is gratifying, and we hope to have a more eventful program in 2014, within Sarawak Government's Ministry of Tourism's Calendar of Events.

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FIG. 12. The winning image for the first prize for the Bornean Frog Race 2013 by Philip Chen Zhao Ching.



FIG. 13. Some of the winners of the Bornean Frog Race 2013.

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