

## Recent literature from Cambodia

This section summarizes recent scientific publications concerning Cambodian biodiversity and natural resources. The complete abstracts of most articles are freely available online (and can be found using Google Scholar or other internet search engines), but not necessarily the whole article. Lead authors may be willing to provide free reprints or electronic copies on request and their email addresses, where known, are included in the summaries below.

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### New species & taxonomic reviews

Bayarsaikhan, U., Bucsek, K. & Bae, Y-S. (2018) A review of the genus *Eugoa* Walker (Lepidoptera, Erebidae, Arctiinae, Lithosiini) in Cambodia, with the description of a new species. *Zootaxa*. DOI 10.11646/zootaxa.4403.3.3

The authors review the *Eugoa* moth genus in Cambodia which comprises 20 species, including one new species to science that they describe (*E. arguta*) and first records of three species: *E. vasta*, *E. formosicola* and *E. kuznetzovi*. A key to the species in the genus in Cambodia is provided, including illustrations of adults and genitalia. Author: [uug228@yahoo.com](mailto:uug228@yahoo.com)

Kosterin, O.E. & Kompier, T. (2018) *Amphicnemis valentini* sp. nov. from the Cardamom ecoregion in Cambodia and Vietnam (Odonata: Coenagrionidae). *Zootaxa*. DOI 10.11646/zootaxa.4429.2.4

Describes a new species of *Amphicnemis* to science from the Ream Peninsula of Cambodia (Preah Sihanouk Province) and Phú Quốc Island, Vietnam. The new species is similar to *A. gracilis*, which occurs in Peninsular Malaysia and Sumatra, but differs in having a long process on the male prothorax. Author: [kosterin@bionet.nsc.ru](mailto:kosterin@bionet.nsc.ru)

Neang T., Chan S. & Poyarkov, N.A. (2018) A new species of smooth skink (Squamata: Scincidae: Scincella) from Cambodia. *Zoological Research*, **39**, 220–240.

The authors use morphological and genetic data to describe a new species of smooth skink to science from Keo Seima Wildlife Sanctuary, Monduliri Province. Named *Scincella nigrofasciata*, the new species is forest-dwelling and can be distinguished from all other South-east Asian congeners by a combination of morphological characters. Author: [thyneang9@gmail.com](mailto:thyneang9@gmail.com)

Jia Y., Wang S. & Bae, Y-S. (2018) The genus *Promalactis* Meyrick (Lepidoptera: Oecophoridae) in Cambodia, with description of eight new species. *Zootaxa*. DOI 10.11646/zootaxa.4422.1.6

Describes nine species of the *Promalactis* moth genus from Cambodia, including eight species new to science and

one new record for the country. Photographs of adults and genitalia are provided. Author: [uug228@yahoo.com](mailto:uug228@yahoo.com)

### Biodiversity inventories

Averyanov, L.V., Pham V.T., Maisak, T.V., Le T.A., Nguyen V.C., Nguyen H.T., Nguyen P.T., Nguyen K.S., Nguyen V.K., Nguyen T.H. & Rodda, M. (2017) Preliminary checklist of *Hoya* (Asclepiadaceae) in the flora of Cambodia, Laos and Vietnam. *Turczaninowia*, **20**, 103–147.

This study presents new data recorded on 33 new or rare species with the *Hoya* plant genus in eastern Indochina between 2012–2017, including eight species from Cambodia. Including the new data, the flora of eastern Indochina comprises at least 45 species within the genus. Author: [av\\_leonid@mail.ru](mailto:av_leonid@mail.ru)

Bayarsaikhan, U., Lee D-J. & Bae, Y-S. (2018) A review of *Barsine* Walker, 1854 (Lepidoptera: Erebidae, Arctiinae) in Cambodia, with a new record. *Journal of Asia-Pacific Biodiversity*. DOI 10.1016/j.japb.2018.05.003

The authors review the *Barsine* moth genus in Cambodia, documenting the occurrence of 12 species including the first country record for one: *B. sieglindae*. They also provide a key to *Barsine* species in Cambodia with illustrations of adults and genitalia. Author: [uug228@yahoo.com](mailto:uug228@yahoo.com)

Chan B.P.L. & Li F. (2017) Significant records of three bunting species from Cambodia, including a first country record. *BirdingASIA*, **28**, 54–55.

Describes observations of three bird species (little bunting *Emberiza pusilla*, black-headed bunting *E. melanocephala* & yellow-breasted bunting *E. aureola*) in Kratie Province in 2017. The observation of black-headed bunting may be the first unequivocal record of the species in the wild in Cambodia. Author: [boscokf@kfbg.org](mailto:boscokf@kfbg.org)

Kosterin, O.E. (2016) A survey of Odonata of Monduliri, the elevated eastern province of Cambodia, for ten days in June 2014. *International Dragonfly Fund*, **98**, 1–85.

The author presents the results of a dragonfly survey in eastern Mondulkiri in 2014. Of the 106 species encountered, 97 were assigned to previously described taxa, including 15 which represent first records for Cambodia. Remarks on taxonomy and habitats are provided. Author: kosterin@bionet.nsc.ru

Matalin, A.V. (2018) New records of tiger beetles (Coleoptera, Carabidae: Cicindelinae) from Cambodia. *Far Eastern Entomologist*, **356**, 9–16.

Describes four tiger beetle species recorded from Cambodia for the first time: *Naviauxella labiosa*, *Cylindera* (Ifasina) *viridilabris*, *C. (Eugrapha) biprolongata* and *C. (E.) mutata*. New records of three additional species are also reported for the Kampot, Preah Sihanouk and Pursat provinces. Author: andrei-matalin@yandex.ru

Ohtaka A. (2018) Aquatic oligochaete fauna (Annelida, Clitellata) in Lake Tonle Sap and adjacent waters in Cambodia. *Limnology*. DOI 10.1007/s10201-018-0543-5

This study presents the results of surveys of aquatic oligochaetes in and adjacent to the Tonle Sap Lake between 2000 and 2005. Thirty-nine taxa were recorded, which mainly comprised widely distributed species. Author: ohtaka@hirosaki-u.ac.jp

## Species ecology & status

Claassen, A.H., Forester, J.D., Arnold, T.W. & Cuthbert, F.J. (2018) Consequences of multi-scale habitat selection on reproductive success of riverine sandbar-nesting birds in Cambodia. *Avian Biology Research*, **11**, 108–122.

Habitat selection occurs at multiple spatial scales and affects demographic processes such as reproductive success. The authors investigated the consequences of habitat selection on the reproductive success of four riverine sandbar-nesting bird species in Cambodia. All four species generally selected larger habitat patches in territories with higher proportions of bare ground substrates, including gravel and dry mud. Vegetation generally had a negative effect on reproductive success, which was likely due to the reduced ability of incubating birds to detect predators, or increased cover or foraging efficiency of predators. Proximity to the river channel also reduced nest success, as nests near the channel had a higher risk of flooding. Author: claa004@umn.edu

Eam S.U., Chantha N., Hang C., Thuang R. & Frechette, J. (2018) Camera trapping in the Cardamom Mountain Landscape, Cambodia, reveals Asian elephant calves with severe injuries from wire snares. *Oryx*, **52**, 409.

The authors summarize the results of camera trapping efforts which suggest that wire snares could be causing unnaturally high calf mortality among elephant populations in the Cardamom Mountains of southwestern

Cambodia. Although efforts to remove wire snares are ongoing in the region, the practice of snaring appears to be increasing. Author: jackson.frechette@fauna-flora.org

Gray, T.N.E. (2018) Monitoring tropical forest ungulates using camera-trap data. *Journal of Zoology*. DOI 10.1111/jzo.12547

Despite their ecological and conservation importance, tropical forest ungulates are poorly known with few studies on their density and abundance. This study estimated densities of lesser oriental chevrotain *Tragulus kanchil* in the Southern Cardamom National Park using camera-trap encounter rates and a random encounter model (REM) that does not require individual identification of animals. Random deployment of camera-traps, a prerequisite of the REM, did not prevent detection of most of the ground-dwelling large mammal species likely present. The author concludes the REM has potential for monitoring tropical ungulates, particularly in dense evergreen forest where other methods are unsuitable. Author: gray@wildlifealliance.org

Gray, T.N.E., Hughes, A.C., Laurance W.F., Long, B., Lynam, A.J., O'Kelly, H., Ripple, W.J., Seng T., Scotson, L. & Wilkinson N.M. (2018) The wildlife snaring crisis: an insidious and pervasive threat to biodiversity in Southeast Asia. *Biodiversity Conservation*. DOI 10.1007/s10531-017-1450-5

Southeast Asia supports more threatened species than any comparable continental area and is in the midst of a conservation crisis due to hunting. This article reviews the threat posed by the use of wire snare traps which have resulted in many largely intact forest areas losing much of their former vertebrate diversity and abundance. Because snares are easily and cheaply replaced, removal efforts alone will not solve the problem. The authors recommend actions to address the issue including the proactive search, arrest and prosecution of snare-setters, development and enforcement of legislation criminalizing the possession of snares and measures to reduce the demand for wildlife products in Southeast Asia. Author: gray@wildlifealliance.org

Hon N., Behie, A.M., Rothman, J.M. & Ryan, K.G. (2018) Nutritional composition of the diet of the northern yellow-cheeked crested gibbon (*Nomascus annamensis*) in northeastern Cambodia. *Primates*. DOI 10.1007/s10329-018-0663-x

The authors measured the nutritional composition of food items consumed by a group of northern yellow-cheeked crested gibbons for four months during the dry season in northeastern Cambodia. The gibbons spent the most of their time feeding on fruit, followed by young leaves, flowers and mature leaves. Details of the nutritional composition of these items are provided and may contribute to captive feeding programmes, ultimately assisting conservation of the species. Author: navenhon@yahoo.com

Lim T., Cappelle, J., Hoem T. & Furey, N.M. (2018) Insectivorous bat reproduction and human cave visitation in Cambodia: a perfect conservation storm? *PLOS ONE*, **13**, e0196554.

Cave roosting bats represent an important component of Southeast Asian bat diversity and are vulnerable to human disturbance during reproductive periods. Because dramatic growth of cave tourism in the region has raised concerns about impacts on cave bats, the authors assessed the reproductive phenology of two species and patterns of human-cave visitation in southern Cambodia. Their results indicate that major birth peaks for the bats coincide with the time of greatest cave visitation each year (April) and therefore raise a conservation concern. Because growing evidence suggests that insectivorous cave bats exhibit reproductive synchrony across mainland Southeast Asia where countless cave shrines are heavily frequented during April in Theravada Buddhist countries, their findings may have wider applicability in the region. Authors: lim.thona@yahoo.com, neil.m.furey@gmail.com

Moody, J.E. (2018) *Population genetics, biogeography, and conservation of the Indochinese silvered langur, Trachypitecus germaini, in Cambodia: is the Mekong River a taxonomic boundary?* PhD thesis, Fordham University, New York, USA.

Indochinese silvered langurs are traditionally considered a single species whose distribution spans the Mekong River, although recent data suggest the river divides two separate species. This study used genetic data, ecological niche models, acoustic and pelage data to evaluate the Mekong barrier hypothesis. The results provide support for the existence of two silvered langur species in Indochina (*Trachypitecus germaini* and *T. margarita*), which likely diverged as a result of isolation in rainforest refugia during the Pleistocene. The author suggests that future studies of silvered langurs in Indochina should focus on clarifying the limits between the two species and estimating population sizes in certain landscapes.

Rostro-García, S., Kamler, J.F., Crouthers, R., Sopheak K., Prum S., In V., Pin C., Caragiulo, A. & Macdonald, D.W. (2018) An adaptable but threatened big cat: density, diet and prey selection of the Indochinese leopard (*Panthera pardus delacouri*) in eastern Cambodia. *Royal Society Open Science*, **5**, 171187.

The authors studied Indochinese leopards *Panthera pardus delacouri* in Srepok Wildlife Sanctuary to determine their density, diet, prey selection and predation impact. The density revealed was one of the lowest ever reported in Asia and dietary analysis confirmed 13 prey species, although ungulates (banteng *Bos javanicus*, wild pig *Sus scrofa* & muntjac *Muntiacus vaginalis*) represented most of the biomass consumed and important differences existed in diet and prey selection between sexes. Predation impact was low for the three ungulate species. The

authors conclude that leopard is an important apex predator in Srepok Wildlife Sanctuary but will soon be eradicated unless effective protection is provided. Author: rostro.susana@gmail.com

Trisurat, Y. & Bhumpakphan, N. (2018) Effects of land use and climate change on Siamese eld's deer (*Rucervus eldii siamensis*) distribution in the transboundary conservation area in Thailand, Cambodia, and Lao PDR. *Frontiers in Environmental Science*. DOI 10.3389/fenvs.2018.00035

This study used occurrence data to predict the distribution of Siamese eld's deer in the transboundary area of Thailand, Cambodia and Laos and determine potential shifts in suitable habitats due to different land use and climate change scenarios in 2030. Predicted habitats were concentrated in the protected areas of lowland Cambodia and Laos. Land use change alone did not affect the distribution of the species, whereas climate change affected it substantially. The authors provide recommendations for cooperation in conservation efforts among the three countries, habitat protection and ex-situ conservation. Author: fforyyt@ku.ac.th

## Coasts, wetlands and aquatic resources

Althor, G., Mahood, S., Witt, B., Colvin, R.M. & Watson, J.E.M. (2018) Large-scale environmental degradation results in inequitable impacts to already impoverished communities: a case study from the floating villages of Cambodia. *Ambio*. DOI 10.1007/s13280-018-1022-2

Subsistence communities within the Tonle Sap Lake area rely on resource extraction from the lake for their livelihoods and potentially face serious challenges due to climate change and hydrological changes related to dam construction in the Mekong Basin. The authors interviewed subsistence fishers across five floating villages on the lake in 2015 and found that the fishery system is undergoing a rapid ecological decline, with available fish stocks increasingly experiencing reductions. The implications of these losses for the future of floating village communities on the lake are considered. Author: g.althor@uq.edu.au

Heng K., Chevalier, M., Lek S. & Laffaile, P. (2018) Seasonal variations in diet composition, diet breadth and dietary overlap between three commercially important fish species within a flood-pulse system: the Tonle Sap Lake (Cambodia). *PLOS One*, **13**, e0198848.

Tropical lakes and their associated floodplains are dynamic habitats strongly influenced by seasonal variations in hydrological conditions. The authors investigated whether seasonal changes in the water level of the Tonle Sap Lake differentially affect the diet breadth

and dietary overlap of three commercially important fish species (*Anabas testudineus*, *Boesemania microplepis* & *Notopterus notopterus*) with important differences in their life-cycles e.g., seasonal migration. Their results demonstrate seasonal variation occurs in dietary breadth and overlap which suggests considerable plasticity occurs in the feeding behaviour of the three species. Author: mathieu.chevalier38@gmail.com

Oyagi H., Endoh S., Ishiwaka T., Okumura Y. & Tsukawaki S. (2017) Seasonal changes in water quality as affected by water level fluctuations in Lake Tonle Sap, Cambodia. *Geographical Review of Japan Series B*, **90**, 53–65.

The water level of the Tonle Sap Lake varied by 8 m between seasons in 2005, which caused dramatic seasonal changes in its surface area. The authors assessed water quality in the lake during the low and high water periods. They conclude that changes in lake water quality during low water periods are partly caused by the increased influence of discharge from inflowing tributaries as the volume of lake water decreases. Seasonal changes are also caused by contamination from mobile floating villages around the lake's margin. During the wet season, water quality does not appear to be affected by human activity but is significantly affected by reverse inflow from the Mekong River. Author: oyagi.hideo@nihon-u.ac.jp

## Forests and forest resources

Lonn P., Mizoue N., Ota T., Kajisa T. & Yoshida S. (2018) Biophysical factors affecting forest cover changes in community forestry: a country scale analysis in Cambodia. *Forests*, **9**, 273.

Community forestry is increasingly used in developing countries to achieve poverty reduction and ecological outcomes. The authors used a nationwide dataset of 197 community forestry projects established between 1994 and 2005 across Cambodia to identify biophysical factors that affected forest cover changes from 2005 to 2016. Their results indicate that deforestation was likely to increase with increasing size of the community forestry area at lower elevations and on gentler slopes. Deforestation also increased if the community forestry area was located close to villages, markets and community forestry boundaries, but further away from main roads. Author: mizouenn@gmail.com

Sakkhamduang, J., Miwa K. & Mihara M. (2017) Resin trees: a vital source of the Phnong people's livelihood in transition in Cambodia. In *Sustainable Livelihoods in Socio-ecological Production Landscapes and Seascapes* (eds S.M. Subramanian, S. Chakraborty, B. Leimona, Y. Amano & K. Ichikawa), pp. 58–66. United Nations University Institute for the Advanced Study of Sustainability, Tokyo.

The Phnong people account for as much as 80% of the population of Mondulkiri Province and depend on self-sufficient agriculture for their livelihoods. Resin trees provide an important income source during rice shortages but are threatened by illegal logging and changes in land use due to economic land concessions. This study explores the causes and effects of the decrease in resin trees upon the livelihoods of the Phnong and ways in which they cope with the challenge. Solutions are proposed including the involvement of resin tree stands in REDD+ or carbon mitigation programmes and increasing agricultural productivity to enhance food security. Author: j.sakkhamduang@gmail.com

Scheidel, A. & Work, C. (2018) Forest plantations and climate change discourses: new powers of 'green' grabbing in Cambodia. *Land Use Policy*, **77**, 9–18.

Efforts to combat global climate change through forestry plantations intended to sequester carbon and promote sustainable development are increasing. The authors analyze Cambodia's first large-scale reforestation project awarded within the context of climate change mitigation. Through their case study, they conclude that current climate change discourses, forestry agendas and their underlying assumptions require critical revision in global policy discussions to forestall the growing problem of green grabbing in land use. Author: arnim.scheidel@gmail.com

Turreira-García, N., Meilby, H., Brofeldt, S., Argyriou, D. & Theilade, I. (2018) Who wants to save the forest? Characterizing community-led monitoring in Prey Lang, Cambodia. *Environmental Management*, **61**, 1019–1030.

Community monitoring is sometimes thought to succeed only where sustained funding, legislation for communities to enforce rules, clear tenure rights and a state-created enabling environment exist. The authors present a case-study of a grassroots-monitoring network that protected forest where no external incentives or rule enforcement power were provided. Despite this, and a lack of land-ownership rights and enduring threats of violence and conflicts, their results show that autonomous community monitoring can take place when members are sufficiently motivated by the risk of losing their resources. Author: ntg@ifro.ku.dk

## Environmental policy & practice

Beauchamp, E., Woodhouse, E., Clements, T. & Milner-Gulland, E.J. (2018) "Living a good life": conceptualizations of well-being in a conservation context in Cambodia. *Ecology and Society*, **23**, 28. DOI 10.5751/ES-10049-230228

Conservation practice is sometimes criticized for relying on simplistic assumptions about social contexts in natural

resource management. The authors provide one of the first examinations of local conceptualizations of well-being in a conservation context, using mixed methods to examine these at three sites in northern Cambodia. Taken together, their results suggest that conservation incentives that mirror people's aspirations can balance out negative trade-offs linked to compliance and contribute to well-being. Author: emilie.beauchamp@zoo.ox.ac.uk

Flor, R.J. Chhay K., Sorn V., Maat, H. & Hadi, B.A.R. (2018) The technological trajectory of integrated pest management for rice in Cambodia. *Sustainability*, **10**, 1732.

While the efficacy of integrated pest management has been demonstrated in Cambodia, its dissemination and sustained adoption has not met with similar success.

The authors explore technological systems and pest management trends that have influenced this by examining connections between pest management options at the farmer level and conditions in the technological system. Although programs have targeted change by increasing knowledge of integrated pest management, they conclude that many of the systemic conditions in place sustain the current reliance on pesticides. Authors: r.flor@irri.org

*The Recent Literature section was compiled by Neil M. Furey, with contributions from Andrea Claassen, Thomas Gray and Oleg Kosterin.*