

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

Barták, M., Khrokalo, L. & Vervesc, Y. (2018) New records, synonyms and combinations for oriental Sarcophagidae (Diptera), with updated checklists for Cambodia, India, Taiwan, Thailand and Vietnam. *Journal of Asia-Pacific Entomology*, **22**, 44–55.

This study presents faunistic records for 29 flesh fly species, including 12 species that are new records for Cambodia. Based on critical review of published records and study data, an updated checklist including 16 species of flesh fly is provided for Cambodia, together with lists for India, Taiwan, Thailand and Vietnam. Author: bartak@af.czu.cz

Bayarsaikhan, U., Lee D-J. & Bae Y-S. (2018) New record of *Hergovitsia* Bucsek from Cambodia (Lepidoptera, Erebidae, Arctiinae, Lithosiini), with description of a new species. *Zootaxa*. DOI 10.11646/zootaxa.4531.4.9

The authors describe a new species to science (*Hergovitsia longivirga* n. sp.) from Cambodia which also represents the first country record for the genus. They compare their new species with *H. magnifica* Bucsek, 2012 and provide a key to the *Hergovitsia* genus on the basis of external morphology and male genitalia.

Bayarsaikhan, U., Lee D-J. & Bae Y-S. (2018) Three new species of *Diduga* Moore, [1887] (Lepidoptera, Erebidae, Arctiinae) from Cambodia. *Zootaxa*. DOI 10.11646/zootaxa.4514.3.6

This study describes three new species in the *Diduga* genus from Cambodia (*D. dubatolovi* n. sp., *D. kohkongensis* n. sp. and *D. bispinosa* n. sp.) along with five recorded species: *D. albicosta* Hampson, 1891, *D. barlowi* Holloway, 2001, *D. amoenusa* Bucsek, 2012, *D. annulata* Hampson, 1900 and *D. alternota* Bucsek, 2014. A key to Cambodian species in the genus is provided, including illustrations of adults and genitalia.

Bresseel, J. & Constant, J. (2018) The stick insect genus *Medauroidea* Zompro, 2000: taxonomic note and extension to Laos and Cambodia with one new species, *M. romantica* sp. nov. (Phasmida: Phasmatidae: Clitumninae). *Belgian Journal of Entomology*, **73**, 1–19.

The authors describe a new species of *Medauroidea* Zompro, 2000 (*M. romantica* sp. nov.) from Phnom Tnout mountain, Preah Vihear Province. The new species is the first record for this genus in Cambodia. They also propose taxonomic revisions for several species and bring the total number of stick insect taxa formally recorded from Cambodia to three genera and three species. Author: joachimbresseel@gmail.com

Kosterin, O.E. (2018) Rediscovery of *Lestes nigriceps* Fraser, 1924 (Odonata: Lestidae) in eastern Cambodia. *Zootaxa*. DOI 10.11646/zootaxa.4526.4.8

Lestes nigriceps Fraser, 1924 was described from India in 1922 and has not been reported since. In June 2018, a population was found in eastern Cambodia, Monduliri Province. This paper describes the Cambodian males, their variation and for the first time, the true female of *L. nigriceps*. Author: kosterin@bionet.nsc.ru

Kosterin, O.E. (2018) *Macromidia genialis buusraensis* subspecies nova (Odonata, Synthemisidae s.l.) from eastern Cambodia. *Journal of the International Dragonfly Fund*, **121**, 1–26.

This study describes a new subspecies of dragonfly (*Macromidia genialis buusraensis*) from 10 males and two females collected at three localities in Monduliri Province and provides a brief overview of the *Macromidia* genus. Author: kosterin@bionet.nsc.ru

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

The authors describe a new species of damselfly (*Amphicnemis valentini* sp. nov.) from Ream Peninsula in Cambodia and Phú Quốc Island, Vietnam. The new species is similar to *A. gracilis* Krüger, 1898 which occurs in Peninsular Malaysia and Sumatra, but differs in possessing a long process on the male prothorax. Author: kosterin@bionet.nsc.ru

Lin Y., Li S. & Jäger, P. (2018) Tetrablemmidae, a spider family newly recorded from Cambodia (Arachnida, Araneae).

ZooKeys, 777, 43–55.

The authors report Tetrablemmidae O. Pickard-Cambridge, 1873 from Cambodia for the first time and describe two new species to science from Kep Province and Battambang Province: *Tetrablemma kepense* sp. n. and *Tetrablemma sokense* sp. n. (respectively). Author: lisq@ioz.ac.cn

Vuong T.T., Hassanin, A., Furey, N.M., Nguyen T.S. & Csorba, G. (2018) Four species in one: multigene analyses reveal phylogenetic patterns within Hardwicke's woolly bat, *Kerivoula hardwickii*-complex (Chiroptera, Vespertilionidae) in Asia. *Hystrix, the Italian Journal of Mammalogy*. DOI 10.4404/hystrix-00017-2017

The authors present a comparative phylogeographic study which used molecular, morphological and morpho-metric methods to address systematic issues in the *Kerivoula hardwickii* complex in Asia. They also describe one new bat species to science (*K. dongduongana* sp. n) based on specimens from Vietnam and Cambodia. The new species is currently known only from the Annamite Mountains of Vietnam, Laos and Cambodia. Author: vttu@iebr.ac.vn

Biodiversity inventories

Kosterin, O.E. (2018) More Odonata found at the Cardamonean foothills in Koh Kong Province of Cambodia in 2014–2018. *Journal of the International Dragonfly Fund*, 123, 1–21.

This paper presents data on Odonata collected in 2014–2018 from the coastal foothills of the Cardamom Mountains in Koh Kong Province. These data include the first record of *Tetrathemis flavescens* Kirby, 1889 nationally and the first record of *Risioiphlebia guentheri* Kosterin, 2015 from southwestern Cambodia. Author: kosterin@bionet.nsc.ru

McCann, G.E. (2018) Douc langurs camera trapped in Virachey National Park, Ratanakiri, Cambodia. *Southeast Asia Vertebrate Records*, 2018, 84–86.

This note provides details of 12 camera trap photographs obtained in late 2014 and early 2015 of animals identified as red-shanked douc *Pygathrix nemaeus* in Virachey National Park. Author: greg.mccann1@gmail.com

Storozhenko, S.Y. (2018) To the knowledge of pygmy grasshoppers (Orthoptera: Tetrigidae) from Cambodia. *Far Eastern Entomologist*, 362, 17–20.

The author provides an annotated list of 11 species of Tetrigidae for Cambodia, including seven species recorded from the country for the first time. Author: storozhenko@biosoil.ru

Thaung R., Munoz, V.H., Holden, J., Willcox, D. & Souter, N.J. (2017) The Vulnerable fishing cat *Prionailurus viverrinus* and

other globally threatened species in Cambodia's coastal mangroves. *Oryx*. DOI 10.1017/S0030605317001491

The Vulnerable fishing cat faces a perilous future in Southeast Asia and was last sighted in Cambodia in 2003. The authors deployed camera traps at four sites in southern Cambodia in January–May 2015 to determine if it was still present. Eight records of the fishing cat were obtained from mangroves in Peam Krasop Wildlife Sanctuary and one from Ream National Park, but none were obtained from Botum Sakor National Park or Prey Nup. Several other globally threatened species were also photographed in Peam Krasop Wildlife Sanctuary. Author: nicholas.souter@alumni.adelaide.edu.au

Try Y., Konga V. & Rossi, W. (2017) First records of Laboulbeniales (Ascomycota) from Cambodia. *Webbia: Journal of Plant Taxonomy and Geography*. DOI 10.1080/00837792.2017.1359476

The authors report 16 species of the fungi for the first time from Cambodia. One of these, *Tetigomyces indeterminatus* Thaxt., represents the first record since its description. Author: alter.rossi@univaq.it

Yefremova, Z., Yegorenkova, E. & Dekoninck, W. (2018) First records of Eulophidae from Cambodia (Hymenoptera: Chalcidoidea). *Belgian Journal of Entomology*, 75, 1–13.

The authors present a checklist of Eulophidae in Cambodia, which includes 26 species in 15 genera and nine additional species identified to genus. These include the first records for Southeast Asia of 18 species. Author: zefremova@post.tau.ac.il

Species ecology & status

Furey, N.M., Racey, P.A., Ith S., Touch V. & Cappelle, J. (2018) Reproductive ecology of wrinkle-lipped free-tailed bats *Chaerephon plicatus* (Buchanan, 1800) in relation to guano production in Cambodia. *Diversity*. DOI 10.3390/d10030091

Cave-roosting bats in Southeast Asia are vulnerable to increasing pressure from climate change, habitat loss and human disturbance in the region. To guide their conservation management, the authors evaluated the reproductive phenology and body condition of *Chaerephon plicatus* for 14 months in 2015–2016 and quantified guano harvesting at the largest colony in Cambodia in 2011–2016. Two annual breeding cycles were documented and body condition declined significantly between the late wet season and late dry season, suggesting that the bats experience increasing energetic stress as the latter progresses. Annual guano harvests increased over the study period but could not be used as a proxy for monitoring population size. Author: neil.m.furey@gmail.com

Loveridge, R., Ryan, G.E., Sum P., Grey-Read, O., Mahood, S.P., Mould, A., Harrison, S., Crouthers, R., Ko S., Clements, T., Eames, J.C. & Pruvot, M. (2018) Poisoning causing the decline

in South-East Asia's largest vulture population. *Bird Conservation International*. DOI 10.1017/S0959270918000126

Cambodia supports populations of three Critically Endangered vulture species. These are believed to be isolated from other populations globally and remained stable until recently. This study presents a population analysis which shows that populations of two species (white-rumped vulture *Gyps bengalensis* and red-headed vulture *Sarcogyps calvus*) have declined since 2010, while another (slender-billed vulture *Gyps tenuirostris*) may have begun to decline in 2013. These trends are supported by evidence of reduced nesting success. The authors suggest there is an urgent need to tackle use of carbamate pesticides in hunting and propose conservation actions. Author: robin.loveridge@gmail.com

Pin C., Ngoprasert, D., Gray, T.N.E., Savini, T., Crouthers, R. & Gale, G.A. (2018) Utilization of waterholes by globally threatened species in deciduous dipterocarp forest of the Eastern Plains Landscape of Cambodia. *Oryx*. DOI 10.1017/S0030605318000455

Deciduous dipterocarp forests provide crucial habitat for globally threatened species in Southeast Asia and water availability in these forests is limited to perennial rivers and waterholes during the dry season. This study investigated waterhole use by six globally threatened species through camera-trapping at 54 waterholes in Srepok Wildlife Sanctuary during the 2015–2016 dry season and measuring waterhole and landscape characteristics. Water depth and the area of water at the start of the dry season were the main factors influencing waterhole use, although waterholes further from villages were also used more frequently. The authors suggest that enlarging and deepening waterholes could enhance habitat for a range of species, although patrols would also be needed to ensure these are not targets for hunting. Author: chanratana.pin@gmail.com

Coasts, wetlands and aquatic resources

Chandara P., Sopath S. & Claassen A.H. (2018) Using the contingent valuation method to assess communities' willingness to accept compensation for waterbird nest protection in the 3S rivers, Cambodia. In *Water and Power* (eds M. Stewart & P. Coclanis), pp. 187–198. Springer, Cham, Switzerland.

Payment for ecosystem services may enable local participation in conservation if these are acceptable to communities. This study used contingent valuation methods to determine an appropriate level of incentives for local communities to take part in an ongoing nest protection scheme for six water bird species in the Sekong, Sesan and Srepok river basin of Cambodia.

Neang M., Méral, P. Aznar, O. & Déprés, C. (2018) Trade-offs between ecosystem services and opportunity costs in maintaining the Tonle Sap Lake agro-ecosystem (Cambodia). In *Water and Power* (eds M. Stewart & P. Coclanis), pp. 89–114. Springer, Cham, Switzerland.

The usefulness of the ecosystem services framework to emphasize relationships between agriculture and ecosystems has received little attention. This study combines an ecosystem services and dis-services approach with agrarian system analysis and diagnosis methodology to identify ecosystem services and and dis-services provided by rice production systems on the Tonle Sap Lake floodplain. Its findings suggest show that organic rice systems do not perform well economically or ecologically in ecosystem service provisions, whereas wet-season rice and floating rice in particular provide the most ecosystem services. Author: nmalyne@rua.edu.kh

Ngor P.B., Sor R., Prak L.H., So N., Hogan, Z.S. & Lek S. (2018) Mollusc fisheries and length–weight relationship in Tonle Sap flood pulse system, Cambodia. *International Journal of Limnology*, 54, 34.

Molluscs are important for ecological function, livelihoods and fisheries, but are often forgotten in research and management. The authors report intra-annual variation in the landing and growth patterns of three mollusc species (*Corbicula moreletiana*, *Pila virescens* and *P. ampullacea*) in Kampong Chhnang Province of Tonle Sap Lake. Their results suggest that molluscs in the lake i) are important resources for people's livelihoods, ii) respond differently to intra-annual variation in temperature, precipitation and hydrology, and iii) are being intensively exploited with significant reductions in growth rate. Author: pengbun.ngor@gmail.com

Seak S., Chandara P. & Claassen, A.H. (2018) Assessment of local community perceptions of biodiversity conservation in the 3S rivers of Cambodia: using a knowledge, attitudes, and practices (KAP) approach. In *Water and Power* (eds M. Stewart & P. Coclanis), pp. 199–216. Springer, Cham, Switzerland.

The Sekong, Sesan and Srepok (3S) rivers support many threatened species and provide diverse natural resources and ecosystem services that support millions of people. The authors conducted a knowledge, attitudes and practices survey of selected communities along the 3S rivers to understand perceptions about an ongoing nest protection scheme for waterbirds there. According to local communities, waterbird populations increased and threats decreased as a result of the programme. They also had positive impressions of the programme and believed it provided them with significant livelihood benefits. Author: seak.sopath@rupp.edu.kh

Sok K., Méral, P., Pillot, D. & Defosse, S. (2018) Ecosystem services from Tonle Sap flood pulse: spatial and economic

analysis in Aek Phnom and Sangkae Districts of Battambang Province, Cambodia. In *Water and Power* (eds M. Stewart & P. Coclanis), pp. 123–151. Springer, Cham, Switzerland.

Livelihoods of people in the Tonle Sap Lake area of Cambodia are complex combinations of rice-based cropping, fishery systems, mixed cash crops/home gardens, natural pond culture/aquaculture, cattle and livestock, collection of flooded forest products, and non-farm and off-farm activities. This paper provides an overview of these through economic and mapping analysis of two districts of Battambang Province. It also identifies types of household activities and their economic performance, changes in farming systems, agro-ecological zones, levels of poverty and resilience, and the country's related gain and loss in gross domestic production. Author: sokkimchhin@gmail.com

Srean P. (2018) Factors influencing marine and coastal area situation in Cambodia. *Asian Journal of Agricultural and Environmental Safety*, 2018, 12–16.

Marine and coastal areas in Cambodia cover 17,237 km² and provide important resources for human well-being. Rapid expansion of fisheries in these areas have caused economic and environmental concerns about their management. This study used secondary data to explore trends in marine and coastal activities and associations with socioeconomic variables over the last two decades. It concludes that marine and coastal areas face stresses from increases in a variety of human activity, rapid expansion of fisheries to meet demands for food consumption and declining mangrove forests. This is reflected in a decreased catch per unit effort which is associated with the rise in fishing activity. Author: pao.srean@gmail.com

Forests and forest resources

Brofeldt, S., Argyriou, D., Turreira-García, N., Meilby, H., Danielsen, F. & Theilade, I. (2018) Community-based monitoring of tropical forest crimes and forest resources using information and communication technology – experiences from Prey Lang, Cambodia. *Citizen Science: Theory and Practice*. DOI 10.5334/cstp.129

The use of smartphones for data collection has opened up new opportunities for communities wishing to engage in monitoring. While information and communication technology (ICT) can systematize data collection, it can also present challenges for community members. The authors investigated the effectiveness of having local forest monitors use ICT to collect data on forest crimes in Prey Lang, Cambodia. Their findings suggest that communities with little formal education are able to monitor forest crimes and forest resources cost-effectively using ICT, although maintenance of software and hardware and data valida-

tion will continue to require external support. Author: idat@ifro.ku.dk

Chou P. (2018) The role of non-timber forest products in creating incentives for forest conservation: a case study of Phnom Prich Wildlife Sanctuary, Cambodia. *Resources*. DOI 10.3390/resources7030041

This study used a variety of social research methods to examine whether extraction of non-timber forest products (NTFPs) would encourage pro-conservation behaviour among people in Phnom Prich Wildlife Sanctuary. Its findings suggest that extraction of NTFPs does encourage local participation in forest conservation and that the annual value of NTFPs extracted in the wildlife sanctuary is approximately US\$ 0.95 /ha or US\$ 95 /km². Author: chou.phanith@d.mbox.nagoya-u.ac.jp

Kiyono Y., Ito E., Monda Y., Toriyama J. & Sum T. (2018) Effects of large aboveground biomass loss events on the deadwood and litter mass dynamics of seasonal tropical forests in Cambodia. *Tropics*, 27, 33–48.

Dead organic matter (DOM) plays an important role in forest ecosystem functions, although little data exists for the seasonal forests of Indochina. The authors monitored deadwood and litter masses at 1–2 years intervals over 10 years in 22 permanent plots in evergreen and deciduous forest across Cambodia. They found that large loss events of aboveground biomass, which were probably caused by logging, increased deadwood mass and DOM carbon stock, but did not necessarily affect litter masses. As a whole, the forests were characterized by a relatively small deadwood mass, possibly due to anthropogenic removal of deadwood and dying trees. Author: kiono@ffpri.affrc.go.jp

Singh, M., Evans, D., Chevance, J-B., Tan B.S., Wiggins, N., Kong L. & Sakhoen, S. (2018) Evaluating the ability of community-protected forests in Cambodia to prevent deforestation and degradation using temporal remote sensing data. *Ecology and Evolution*. DOI 10.1002/ece3.4492

Community forests play an important role in preserving forests in Cambodia, which has experienced rapid deforestation in recent decades. This study used remote sensing data to compare temporal variation in forest structure between six community forests in Phnom Kulen National Park and a wider study area. Their findings suggest that while community-protected forests can improve conservation outcomes to some extent, more actions are needed to curb illegal selective logging of valuable timber trees. Author: minerva_singh@yahoo.co.in

The Recent Literature section was compiled by Neil Furey, with contributions from Tom Gray, Oleg Kosterin and Valter Rossi.