

Short Communication

PREDATION OF THE ORIENTAL NARROW-MOUTHED FROG (*Microhyla orientalis* Matsui, Hamidy, and Eto, 2013) BY THE FRESHWATER CRAB (*Parathelphusa convexa* De Man, 1879) IN JAVA, INDONESIA

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ABSTRACT

We report the first documented observation of predation by the freshwater crab *Parathelphusa convexa* on the Oriental narrow-mouthed frog *Microhyla orientalis* in Indonesia. The event occurred in a rice field in Sleman, Daerah Istimewa Yogyakarta, at night, providing direct evidence that *P. convexa* can act as an opportunistic predator of small anurans inhabiting agricultural wetlands.

Key words: agro-wetlands, mesopredator, opportunistic behavior, Southeast Asia, trophic interactions

Observation

On May 9th, 2025, after heavy rain from 21:48 to 21:53 UTC+07 with an air temperature of 23°C and humidity of 91%, we observed an adult *Microhyla orientalis* (Fig. 1) being captured by an adult freshwater crab (*Parathelphusa convexa*) during a routine herpetofauna survey. The event took place in a rice field at Ngampon, Margodadi Village, Seyegan District, Sleman Regency, Daerah Istimewa Yogyakarta Province, Indonesia (7°44'05.7"S; 110°17'55.0"E). The microhabitat is a muddy rice field with shallow water (approximately 3–5 cm in depth), featuring rice plants (*Oryza sativa*) in the late vegetative stage approaching the generative phase. Most rice plants had not yet produced grains, although a few had begun development. Rice plants height averaged 60–100 cm. Scattered leaf litter was present along the bunds.



Figure 1. An individual of *Microhyla orientalis* from sampling location.

As observers walked along the embankment, a frog appeared disturbed and jumped into the rice paddy. Suddenly, the frog was seized by a crab that was near where the frog landed (Fig. 2). The crab clasped the frog tightly using its right chelae and did not release it despite movements from the prey. The predation lasted for several minutes until the frog ceased struggling. The behavior suggests active ambush predation rather than scavenging, as the frog was alive and mobile before being captured. Unfortunately, the final consumption event could not be observed because the crab sank into the mud with the frog still within its chelae.



Figure 2. The moment after the crab ambushed the frog (A), the crab walked while carrying the frog, which was still moving (B and C), and the crab started to go into the mud holding the frog, which appeared to be no longer moving (D).

Discussion

Members of the genus *Parathelphusa* are common inhabitants of rice fields and irrigation canals in Java and Sumatra (Klaus et al., 2013; Susilo et al., 2020; Akmal et al., 2024). They are primarily detritivorous or omnivorous but can exhibit opportunistic carnivory, feeding on aquatic invertebrates, small fish, and amphibians (Yeo et al., 2008). However, reports of direct predation on frogs by *Parathelphusa* species remain extremely scarce. We believe that this finding is the first documented case of *Parathelphusa* preying on frogs in Indonesia.

Microhyla orientalis, a small-bodied microhylid formerly thought to be endemic to Java and Bali (Matsui et al., 2013) and recently known to be distributed on Sulawesi and Lesser Sunda (Reilly et al., 2020; Eprilurahman et al., 2021), typically occupies open, moist habitats such as rice paddies, irrigation ditches, and wet grasslands. These environments often experience seasonal flooding and provide shallow aquatic microhabitats that are also favored by freshwater crabs, such as *Parathelphusa convexa* (Akmal et al., 2024). The species is mainly terrestrial and secretive, remaining close to the ground surface or hiding among leaf litter and low vegetation to avoid desiccation and predators. Both species are nocturnal. *Parathelphusa convexa* exhibits nocturnal activity patterns typical of many freshwater decapods, foraging predominantly after dusk, though individuals may occasionally be encountered during the day when predation pressure is low (Eprilurahman et al., 2015). In the absence of direct behavioral studies on *Microhyla orientalis*, members of the genus *Microhyla* are generally considered nocturnal, with activity (calling and foraging) concentrated at night in moist habitats (Inger et al., 2017). Adults of *M. orientalis* are small, with a snout–vent length ranging from 16–19 mm, and possess limited jumping and swimming abilities compared to larger anurans (Matsui et al., 2013). During the breeding season, they frequently aggregate in temporary pools or along the edges of flooded rice plots, where they call and forage at night (Wiantoro et al., 2019). This ecological and behavioral overlap with *P. convexa*—an opportunistic omnivore that patrols the same muddy substrates—likely increases the encounter rate between the two species. Consequently, the small size, slow movement, and ground-dwelling habit of *M. orientalis* make it particularly susceptible to ambush predation by freshwater crabs and other small aquatic predators within the paddy-field ecosystem.

This observation also underscores broader trophic implications for paddy-field food webs, which fuse aquatic and terrestrial energy pathways. Freshwater crabs, though often considered detritivores or scavengers, can act as mesopredators. They may directly consume vertebrates, including frogs. Such predatory behavior has been documented in multiple systems and taxa.

For example, *Ptychophallus uncinatus* preyed on a frog and a lizard, while *Potamon* spp. targeted waterfrogs, highlighting their underappreciated role in wetland trophic dynamics (Wehrtmann et al., 2019; Di Nicola et al., 2025). In intensively managed rice landscapes where amphibians also confront pesticide exposure and habitat fluctuation, such predation may additively shape local amphibian populations and community structure (Katayama et al., 2014; Koshida & Katayama, 2018; Nizam et al., 2023). Recognizing freshwater crabs' dual roles—as detrital processors and active predators—will improve biodiversity assessments and management strategies for Southeast Asian agro-wetlands.

Several previous studies have documented comparable cases of amphibian predation by freshwater crabs across different regions of the world. In Europe, *Potamon fluviatile* has been observed preying upon *Pelophylax* species in natural streams of Sicily, Italy, demonstrating active predatory behavior toward adult frogs (Di Nicola et al., 2025). Predation on leptodactylid and hyloid frogs by the freshwater crab *Dilocarcinus pagei* in the Brazilian Pantanal was also reported by Sichieri et al. (2021). In Guinea, the crab *Liberonautes latidactylus* was reported to prey on the frog *Conraua alleni* (Schäfer et al., 2019). On the other part of Africa, Tanzania, predation of the puddlefrog *Phrynobatrachus krefftii* by an unidentified crab species was noted (Hirschmann & Hödl, 2006). Similarly, in East Asia, *Candidiopotamon rathbuni* was recorded preying on *Limnonectes kuhlii* in Taiwan, confirming that freshwater crabs can act as opportunistic predators of small vertebrates in diverse aquatic environments (Tsuji, 2005). In the Philippines, predation on the Mindanao Fanged Frog, *Limnonectes magnus*, by an endemic freshwater crab (*Isolapotamon mindanaoense*) at Mt. Magdiwata, eastern Mindanao Island, is also evidence of frog predation by freshwater crab (Magdua et al., 2022).

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REFERENCES

- Akmal, S., Yonvitner, Y., Yulianda, F., Jerikho, R., Rustiadi, E., Slavík, O., Bláha, M., Kouba, A. & Patoka, J. 2024. The farmer's enemy: pest freshwater crab *Parathelphusa convexa* De Man, 1879 (Decapoda: Gecarcinucidae) established in West Sumatra, Indonesia. *BioInvasions Records*, 13: 483–496. 10.3391/bir.2024.13.2.14.
- Di Nicola, M.R., Marrone, F. & Faraone, F.P. 2025. Predation of a waterfrog (genus *Pelophylax*) by the freshwater crab *Potamon fluviatile* in Sicily, Italy. *Herpetology Notes*, 18: 347–350.

- Eprilurahman, R., Baskoro, W. & Trijoko, T. 2015. Keanekaragaman jenis kepiting (Decapoda: Brachyura) di Sungai Opak, Daerah Istimewa Yogyakarta. *Biogenesis: Jurnal Ilmiah Biologi*, 3(2): 100–108.
- Eprilurahman, R., Atmaja, V.Y., Munir, M., Hamidy, A., Arisuryanti, T. & Ubaidillah, R. 2021. The oriental tiny frog of the genus *Microhyla* Tschudi, 1839 (Amphibia: Anura: Microhylidae) revealed across geographical barriers of the Wallace line. *Journal of Tropical Biodiversity and Biotechnology*, 06 (02): 1–11. <https://doi.org/10.22146/jtbb.64342>
- Hirschmann, W. & Hödl, W. 2006. Visual signaling in *Phrynobatrachus krefftii* Boulenger, 1909 (Anura: Ranidae). *Herpetologica*, 62(1): 18–27.
- Inger, R.F., Stuebing, R.B., Grafe, T.U. & Dehling, J.M. 2017. *A Field Guide to the Frogs of Borneo*. Third Edition. Natural History Publications (Borneo).
- Katayama, N., Baba, Y., Kusumoto, Y. & Tanaka, K. 2014. A review of post-war changes in rice farming and biodiversity in Japan. *Agricultural Systems*, 132. 10.1016/j.agry.2014.09.001.
- Klaus, S., Selvandran, S., Goh, J.W., Wowor, D., Brandis, D., Koller, P., Schubart, C.D., Streit, B., Meier, R., Ng, P.K.L. & Yeo, D.C.J. 2013. Out of Borneo: neogene diversification of Sundaic freshwater crabs (Crustacea: Brachyura: Gecarcinucidae: Parathelphusa). *Journal of Biogeography*, 40: 63–74. <https://doi.org/10.1111/j.1365-2699.2012.02771.x>
- Koshida, C. & Katayama, N. 2018. Meta-analysis of the effects of rice-field abandonment on biodiversity in Japan. *Conservation biology: the journal of the Society for Conservation Biology*, 32(6): 1392–1402. <https://doi.org/10.1111/cobi.13156>
- Magdua, A., Sanguila, M., Manuel-Santos, M. & Fernandez, J. 2022. Predation on the Mindanao Fanged Frog, *Limnonectes magnus* (Stejneger, 1910), by an endemic freshwater crab at Mt. Magdiwata, eastern Mindanao Island, Philippines. *Herpetology Notes*, 15: 559–563.
- Matsui, M., Hamidy, A. & Eto, K. 2013. Description of a new species of *Microhyla* from Bali, Indonesia (Amphibia, Anura). *Zootaxa*, 3670: 579–590.
- Nizam, S.N.M., Baharudin, N.S.H. & Ahmad, H. 2023. Application of pesticide in paddy fields: a Southeast Asia case study review. *Environmental geochemistry and health*, 45(8): 5557–5577. <https://doi.org/10.1007/s10653-023-01668-8>
- Reilly, S., Stubbs, A., Arida, E., Arifin, U., Bloch, L., Hamidy, A., Harmon, K., Hykin, S., Karin, B., Ramadhan, G., Iskandar, D.T. & McGuire, J. 2020. New island records for anurans and squamates from the Lesser Sunda Archipelago. *Herpetological Review*, 51(4): 785–789.
- Schäfer, M., Doumbia, J. & Rödel, M.-O. 2019. The freshwater crab *Liberonautes latidactylus* (de Man, 1903) preys on adult Allen's Giant Frog, *Conraua alleni* (Barbour and Loveridge, 1927). *Herpetology Notes*, 12: 1073–1076.
- Sichieri, G., Lopes, B., Moura, P., Costa, F. & Nunes, I. 2021. Predation on leptodactylid and hylid frogs by the freshwater crab *Dilocarcinus pagei* Stimpson, 1861 (Decapoda, Trichodactylidae) in the Brazilian Pantanal. *Herpetology Notes*, 14: 1133–1136.
- Susilo, V.E., Suratno, Wowor, D., Abror, M.N. 2020. Diversity of freshwater crab (Decapoda) in Meru Betiri National Park. *Journal of Physics: Conference Series*, 1465: 012008, <https://doi.org/10.1088/1742-6596/1465/1/012008>
- Tsuji, H. 2005. Predation on a fanged frog (*Limnonectes kuhlii*) by a freshwater crab (*Candidiopotamon rathbuni*). *Herpetological Review*, 36:125–126.
- Wehrtmann, I., Hernández-Díaz, D. & Cumberlidge, N. 2019. Freshwater crabs as predators and prey: The case of *Ptychophallus uncinatus* from Costa Rica. *Latin American Journal of Aquatic Research*, 47(1): 18–26.
- Wiantoro, S., Narakusumo, R.P., Sulistyadi, E., Hamidy, A. & Fahri, F. 2019. Effects of the total solar eclipse of March 9, 2016 on the animal behaviour. *Journal of Tropical Biology & Conservation (JTBC)*, 137–149. 10.51200/jtbc.v16i0.2035.

Yeo, D.C.J., Ng, P. K. L., Cumberlidge, N., Magalhaes, C., Daniels, S. R. & Campos, M. 2008. A global assessment of freshwater crab diversity (Crustacea: Decapoda: Brachyura). In: Freshwater Animal Diversity Assessment (eds. Balian, E.V., L  vequ  , C., Segers, H., Martens, M.). *Hydrobiologia*, 595: 275–286.