

cycle on one host (Eggleton and Belshaw 1992. *Phil. Trans. R. Soc. B* 337:1–20).

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**ECNOMIOHYLA MIOTYMPANUM (Small-eared Treefrog) and CHARADRAHYLA TAENIOPUS (Porthole Treefrog). REPRODUCTIVE BEHAVIOR.** *Ennomiohyala miotympanum* and *Charadrahyla taeniopus* are endemic to the Atlantic Versant in the Sierra Madre Oriental of México (Duellman 2001. *The Hylid Frogs of Middle America. Society for the Study of Amphibians and Reptiles*, in cooperation with the Natural History Museum of the University of Kansas. 1170 pp.). Male *E. miotympanum* reach 38.4 mm SVL, and attract females by means of an advertisement call, whereas acoustic communication for mate acquisition in *C. taeniopus* (whose females are 70 mm SVL) does not seem to be important (Duellman 2001, *op. cit.*). Despite these differences in size and presumably in reproductive behavior, here we report an observation of amplexus between these two hylid frogs.

On 30 Oct 2009, we surveyed anurans along the Apulco River (19°57'N, 97°32'W; 1041 m elev.), located in the Sierra Norte of Puebla, México. At 0008 h, one of us (FGVC) found a male *E. miotympanum* in amplexus with a female *C. taeniopus*, on a stone at the river's edge (Fig. 1). Although the couple was manipulated, they remained in amplexus during the observation period which lasted for at least 23 min. We cannot be certain how long the frogs remained in amplexus after our observations. This kind of interspecies interaction may increase the risk of predation, and implies an unsuccessful time investment that otherwise could be utilized for mating with conspecific individuals (Butler 2007. *Herpetol. Rev.* 38:444; Höbel 2005. *Herpetol. Rev.* 36:55–56). Indeed, if gamete release occurred, it would mean a considerable loss of energy, at least for the female.

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FIG 1. Male *Ennomiohyala miotympanum* in amplexus with a female *Charadrahyla taeniopus* found in the Sierra Norte of Puebla, México.

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**ENGYSTOMOPS PUSTULOSUS (Tungara Frog). PREDATION.** On 1 Aug 2010 at 2000 h local time, at Parque Nacional Palo Verde, Provincia Guanacaste, Costa Rica (10.34459°N 85.34080°W), we observed a large belostomatid (giant water bug) predating an adult male *Engystomops pustulosus* (Fig. 1). This took place in a flooded roadside ditch, in close proximity to several calling male *E. pustulosus*. We did not observe the bug seize the frog, but the frog appeared fresh and alive (though not moving), and was presumed to have been recently captured. As we photographed the bug, it swam away with the frog still in its grasp, and we presume that it consumed the frog. Belostomatids are among the most common invertebrate predators of frogs, and the ecologically similar *Physalasmus cuvieri* has been observed to fall prey to these insects (Toledo 2005. *Herpetol. Rev.* 36:395–400). However, this is the first observation of predation of *E. pustulosus* by a belostomatid. Two species of *Lethocerus* are reported from Costa Rica: *L. medius* (Guérin-Ménéville) and *L. collosicus* (Stål) (Perez-Goodwyn 2006. *Stutt. Beiträge zur Natur.* 695:1–71). The belostomatid reported here was large (> 8 cm), and well outside the reported geographic range of *L. medius*. Because of its size and the geographic region, the tentative identification of this insect is *L. collosicus*.



FIG. 1. Belostomatid (likely *Lethocerus collosicus*) predating *Engystomops pustulosus*.

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**HYLA CINEREA (Green Treefrog). WINTER AGGREGATION.** Hibernation site selection is poorly known for adult North American treefrogs, and true winter aggregation has not been reported. Here, I report a winter aggregation of *Hyla cinerea* in southern Louisiana, USA.

At 1230 h on 28 Dec 2009, I discovered 31 adult-sized *H. cinerea* between two 0.5 × 61 × 244 cm plywood boards (air temperature

TABLE 1. Hibernation sites for adult North American treefrogs (*Hyla* and *Pseudacris*). In the “N” column, groups of individuals found together are separated by a comma.

Species	Locality	Month/ season	°C	N	Habitat	Reference
<i>H. andersonii</i>	Georgia	winter	—	1	under bark	Neill 1948. Herpetologica 4:107
<i>H. chrysoscelis</i>	Ohio	Dec	4	1, 1, 1, 1, 1	leaf litter at base of tree	Burkholder 1998. Herpetol. Rev. 29:231
<i>H. chrysoscelis</i>	Tennessee	Oct	15–30	1, 1, 1, 1	treehole	Ritke and Babb 1991. Herpetol. Rev. 22:5
<i>H. cinerea</i>	Louisiana	Dec	5	31	elevated wood pile	This study
<i>H. cinerea</i>	Illinois	Nov Feb Jan	20 — 16	2 1 1–5	cliff face crevices, under talus in holes	Garton and Brandon 1975. Herpetologica 31: 150
<i>H. cinerea</i>	Georgia	winter	—	2–3	decaying tree under bark	Neill 1948, <i>op. cit.</i>
<i>H. femoralis</i>	Georgia	Dec	—	1	decaying log	Neill 1948, <i>op. cit.</i>
<i>H. gratiosa</i>	Florida	Dec	14	1	ground, under bark	Franz 2005. Herpetol. Rev. 36:434
<i>H. squirella</i>	Georgia	winter	—	1	decaying log	Neill 1948, <i>op. cit.</i>
<i>H. versicolor</i>	Louisiana	Jan	16	3, 4	treehole	Fontenot 2003. Herpetol. Rev. 34:358
<i>P. cadaverina</i>	California	fall–winter	4–19	40, each	rock crevices	Harris 1975. Herpetologica 31:236
<i>P. regilla</i>	California	Feb	9	1	under weeds, in water	Brattstrom and Warren 1953. Copeia 1955:181

5.3°C). The boards were among ~20 others in a pile stored ~1 m above the ground, under the west side a house that was elevated 4 m on pilings. Natural ground elevation was ~0.5 m, thus the frogs' refuge was ~1.5 m above sea level, in an area largely surrounded by brackish marsh and open waterways. The pile of boards had been in the weather for at least 6 months, and had warped to form ~1 cm crevices between them. The frogs were initially clustered next to each other in a roughly oval shape between the boards. Within three minutes of removing the board hiding them, all of the frogs had crawled slowly until each fell off the edge onto the ground, and continued to disperse into vegetation. The site was located at 30.303427°N, 90.330054°W, just south of the Joyce Wildlife Management area, ca. 8 air km E of the village of Manchac, Louisiana, USA.

Table 1 summarizes reported hibernation sites, most of which represent only one locality within each species' geographic range. Note that each account includes <5 individuals. Habitat descriptions in the Table 1 references suggest that many species move to different habitat for winter hibernation sites. Some of these sites were at higher elevation and may be above flood level, particularly in canyon habitat that may be prone to seasonal flooding. The present report is of a remote location in brackish marsh that potentially experiences flooding and increased salinity by wind-driven tides through Lake Pontchartrain. Variation in elevation in most of this marsh is less than 1m, such that sustained light east wind for 2–3 days would likely flood most of the area. Historical floods levels in the local area suggest that the frogs would have been above most flooding asso-

ciated with normal weather patterns, but not catastrophic floods like those produced by organized storms (i.e., tropical depressions, tropical storms, hurricanes), which do not normally occur there during winter. Thus, a potential explanation for the unusually large aggregation of frogs reported here is that suitable hibernation sites above flood level are rare in the area. Alternatively, and perhaps in addition, a frog aggregation may reduce evaporative water loss by reducing the amount of exposed body surface area.

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**HYLA CINEREA (Green Treefrog). CANNIBALISM AND DEFENSIVE POSTURE.** Cannibalism among larval amphibians is not unusual (Pfennig et al. 1993. Anim. Behav. 46:87–94; Poelman and Dicke 2007. Evol. Ecol. 21[2]:215–227), and adults of large anuran species like Cane Toads (*Rhinella marina*) are also known to prey on smaller anuran species or smaller conspecifics (Pizzatto and Shine 2008. Behav. Ecol. Sociobiol. 63[1]:123–133). However, reports of adult treefrogs cannibalizing smaller conspecifics are rare (McCallum et al. 2001. Herpetol. Rev. 32[2]:99–100), and to my knowledge there has never been a report of a Green Treefrog consuming a smaller conspecific.

Here I report an incident of cannibalism of a recently metamorphosed *Hyla cinerea* (20.7 mm SVL) by an adult, male *H. cinerea* (41.6 mm SVL) (Fig. 1), which occurred on 23 June 2009 at a pond