of the mature females (the first and third individuals) were found to be gravid via palpation, but only the third female was captured during the reproductive season.

Lordosis is a concave deformity of the spine in the middle of the carapace with most cases reporting a "saddle" in the carapace; this deformity is considerably rarer in turtles with previous cases observed almost entirely in sea turtles (Rhodin et al. 1984, *op. cit.*). On 15 May 2013, I captured a female Diamond-backed Terrapin on Rockefeller Wildlife Refuge, Vermilion Parish, that exhibited lordosis (17.8 cm MCL, 17.0 cm MPL, 1175 g; Fig. 2). The carapace was greatly deformed with anterior and posterior carapace "humps" and an unpigmented section in the "saddle" portion of the carapace. This unpigmented section appeared similar to a burn scar, and marsh fires do occasionally occur on this portion of the refuge. However, this is not entirely explainable as burn scars are usually on the highest portion of the carapace, and the scar was mostly in the lower "saddle" of the carapace. The central three vertebral scutes appeared fused and five internumerary scutes were present between the pleural and vertebral scutes. The female was also missing her right front foot and missing several toes on the left front foot. Interestingly, the individual was palpated and found to be gravid.

During the six-year study, I captured 865 unique terrapins in southwestern Louisiana, and I found three individuals with kyphosis at all sites (0.35%) and only one individual with lordosis (0.11%). When captures from only the Mud Lake site are considered (i.e., the only site where kyphosis was present), 3 of 404 individuals captured (0.74%) exhibited kyphosis, while no kyphotic individuals were captured at 15 other sites with 461 total captures. The reported rates of kyphosis in natural turtle populations are typically <0.50% (e.g., Trembath 2009. Chelon. Conserv. Biol. 8:94–95; Selman and Jones 2012. Chelon. Conserv. Biol. 11:259–261; Louque et al. 2015. Herpetol. Rev. 46:81; Mitchell et al. 2019. Herpetol. Rev. 50:353–354), with the highest population rate of kyphosis, 2.13%, reported in a population of *Trachemys gaigeae* (Big Bend Slider) by Stuart and Painter (2008. Herpetol. Rev. 39:218–219). Thus, the Mud Lake population of *M. terrapin* appears to have a relatively high incidence of kyphosis compared to other reported populations of freshwater turtles. For lordosis, to date only a single observation has been reported in a turtle species that is not a sea turtle. Mitchell (2014. Herpetol. Rev. 45:311) reported a case of lordosis in the freshwater turtle, *Chrysemys picta picta* (Eastern Painted Turtle). Therefore, my observation of lordosis in *M. terrapin* is only the second confirmed case of lordosis in freshwater turtles.

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***PSEUDEMYS GORZUGI* (Rio Grande Cooter). PREDATION.** *Pseudemys gorzugi* is a large freshwater turtle species found throughout south and west Texas and southeastern New Mexico, USA and northeastern Mexico (Ernst and Lovich 2009. Turtles of the United States and Canada. Second Edition. The John Hopkins University Press, Baltimore, Maryland. xii + 827 pp.; Pierce et al. 2016. *In* Rhodin et al. [eds.], Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN SSC Tortoise and Freshwater Turtle Specialist Group, pp. 100.1–100.12). The conservation status of this species is currently undergoing evaluation by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 2015. Fed. Reg. 80:37568–37579) and is currently listed as Near Threatened by the IUCN (http://www.iuncnredlist.org/species/18459/97425928; 29 Aug 2019), state-threatened in New Mexico, and a Species of Greatest Conservation Need in Texas (Pierce et al. 2016, *op. cit.*). Knowledge on the ecology and natural history of *P. gorzugi* is extremely limited, and most of what is known about *P. gorzugi* is inferred from the closely related species *P. concinna* (Lovich and Ennen 2013. Amphibia-Reptilia 34:11–23), prior to being elevated to a full species by Ernst (1990. Cat. Am. Amph. Rept. 461:1–2). Additionally, a limited range, elusive behavior, and suspected declines further contribute to the paucity of information on the natural history of *P. gorzugi*. Little is known about *P. gorzugi* predation, but suggested predators of hatchlings include mammals, ravens, and large wading birds (Ernst and Lovich 2009, *op. cit.*). Here, we report an additional predator of *P. gorzugi*.

On 16 May 2019, two of us (APB, DRD) observed an adult Yellow-crowned Night Heron (*Nyctanassa violacea*) along San Felipe Creek in Blue Hole Park, Del Rio, Val Verde County, Texas, USA (29.36913°N, 100.88480°W; WGS 84), with a juvenile *P. gorzugi* (ca. 5 cm carapace length) in its beak. We observed the heron manipulate the juvenile *P. gorzugi* in its beak for ca. 3 min before approaching, causing the heron to fly to the opposite shore of San Felipe Creek, still holding the *P. gorzugi*. When we approached a second time, the heron flew out of sight, again still holding the juvenile *P. gorzugi*. It remains unclear if the heron was ultimately able to consume the juvenile *P. gorzugi*, which appeared dead by the time the heron flew off. We used 10× magnification binoculars to view this interaction and confirm the identification of the turtle. Yellow-crowned Night Herons are generalist predators and are known to consume various crustaceans, arachnids, insects, fish, amphibians, and reptiles, including the turtles *Malaclemys terrapin* (Riegner 1982. Colonial Waterbirds 5:173–176) and *Sternotherus odoratus* (Niethammer and Kaiser 1983. Colonial Waterbirds 6:148–153). Wading birds are recognized as important predators of turtles, especially hatchlings (Janzen et al. 2000. J. Evol. Biol. 13:947–954), and to our knowledge, this is the first direct observation of avian predation on juvenile *P. gorzugi*.

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***TERRAPENE CAROLINA TRIUNGUIS* (Three-toed Box Turtle). DIET.** *Terrapene carolina triunguis* is an omnivorous species known to regularly consume fruits, roots, leaves, seeds, fungi, mollusks, annelids, arthropods, small vertebrates, bird and reptile eggs, and carrion (Ernst et al. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington D.C. 577 pp.). Although the literature on box turtle diet is often divided about the degree of carnivory in this species, insects, including many beetles, comprise a significant portion of *T. carolina* diets (Klimstra and Newsome. 1960. Ecology 41:639–647). Here, we report a new invasive prey species for *T. carolina triunguis* from Washington County, Arkansas, USA, *Popillia japonica* (Japanese Beetle).

On 12 August 2019, an adult male turtle (11+ years old, 127 mm max carapace length, 104 mm max carapace width, 126 mm max plastron length, 434.2 g) was collected as part of a demography study. While in captivity, the turtle excreted feces containing arthropod remains of at least one *P. japonica*, identified by large, intact pieces of the exoskeleton. Between 16–22 August 2019, additional *P. japonica* remains were found in three separate fecal

samples from one or more of three adult box turtles, although it was impossible to discern the individual turtle(s) responsible as they were temporarily housed together. This suggests that *P. japonica* may already be a common prey item for this population. *Popillia japonica* is among the most widespread and common invasive insects in the eastern United States (Potter and Held. 2002. Annu. Rev. Entomol. 47:175–205), widely overlapping in geographic range with *T. carolina* and inhabiting many of the same habitat types. While the competitive relationships between *P. japonica* and native arthropods in the United States are poorly understood, *P. japonica* could emerge as an important food source should native species exhibit population declines due to competition or anthropogenic factors. *Popillia japonica* have been documented as a common prey item for some populations of *Glyptemys muhlenbergii* (Bog Turtle) and may already be a regular part of *T. carolina* diets in the eastern USA (Melendez et al. 2017. Herpetol. Conserv. Bio. 12:272–278).

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***TRACHEMYS SCRIPTA* (Red-eared Slider) and *PSEUDEMYS GORZUGI* (Rio Grande Cooter). FISH HOOK INGESTION and SHOOTING.** Recreational fishing has contributed to a decline of turtle populations in both marine and freshwater habitats due to boat collisions (Bennett and Litzgus 2014. J. Herpetol. 48:262–266), entanglement in traps and fishing lines (Grosse et al. 2009. Chelon. Conserv. Biol. 8:98–100), and ingestion of fish hooks (Nemoz et al. 2004. Biologia 59:185–189). Due to opportunistic foraging behavior of some turtles, using baited traps or hooks increases the probability of catching turtles as bycatch (Cartabiano et al. 2015. J. Freshw. Ecol. 30:407–415). Incidents of fish hook ingestion have been reported in many turtle species such as *Macrochelys temminckii* (Alligator Snapping Turtle; Trauth et al. 2017. Herpetol. Rev. 48:836), *Phrynop geoffroanus* (Geoffroy's Side-necked Turtle; Borges Da Rocha et al. 2018. Herpetol. Rev. 49:321–322), *Caretta caretta* (Loggerhead Sea Turtle; Hoarau et al. 2014. Mar. Pollut. Bull. 84:90–96), and *Lissemys punctata* (Flapshell Turtle; Sivanarayanan et al. 2014. Intas Polivet 15:178–179). Steen et al. (2014. PLoS ONE 9:e91368) reported that ca. 5% of 438 freshwater turtles of four different species (*Sternotherus odoratus* [Eastern Musk Turtle], *Chelydra serpentina* [Snapping Turtle], *Trachemys scripta* [Red-eared Slider], *Apalone spinifera* [Spiny Softshell]) in Tennessee and 3.5% of 170 *C. serpentina* in Virginia contained fish hooks. Furthermore, Sack et al. (2017. J. Zoo. Wildl. Med. 48:716–724) reported that 2.3% of all turtles (N = 1847) rescued between 2005–2014 had injuries from ingestion of fish hooks.

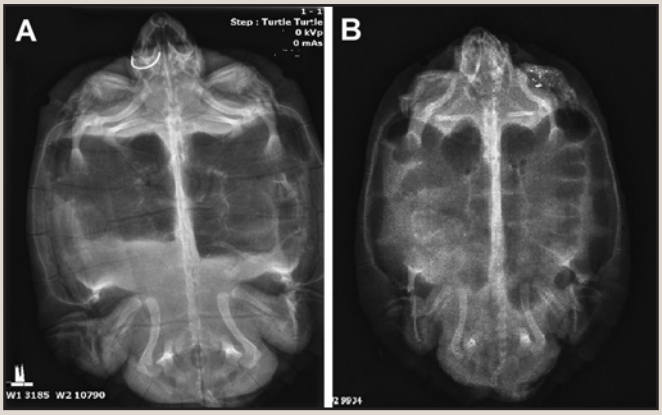

FIG. 1. X-radiograph images taken at Desert Willow Veterinary Service and Rehabilitation Center. A) female *Trachemys scripta* with a J-type fish hook in the mouth and B) a female *Pseudemys gorzugi* with bullet fragments in the left front leg.

In 2017, during a long-term, mark-recapture study of *Pseudemys gorzugi* (Rio Grande Cooter) on the Black River, Eddy County, New Mexico, USA, one female *P. gorzugi* was found with a fishing line protruding from its mouth and a hook embedded in the throat (Waldon et al. 2017. Herpetol. Rev. 48:837). In this case the hook was safely removed, but injuries from fishing gear could pose a risk for a state-threatened species such as *P. gorzugi*. In addition, carcasses of *P. gorzugi* and *T. scripta* have been found in New Mexico with evidence of gunshots, although the frequency is unknown (Pierce et al. 2016. *In* Rhodin et al. [eds.], Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN SSC Tortoise and Freshwater Turtle Specialist Group, pp. 100.1–100.12). In New Mexico, *P. gorzugi* can be found in the Pecos River and its tributaries, including the Black River. The river is used for irrigation, cattle ranching, oil industry, and for public recreation (i.e., swimming and fishing). Due to the conservation sensitivity of the species and the overlap between its habitat and recreational fishing areas, an assessment of the prevalence of fish hook ingestion and gunshot wounds is needed.

From 15 May to 17 August 2018, we captured turtles using traditional hoop net traps baited with canned sardines. We focused on two accessible stretches of the Black River. The first stretch is ca. 1500 m long, located upstream near the Black River headwaters and is managed by the Bureau of Land Management (BLM). The second stretch is ca. 3000 m long and is about 30 km downstream from the first stretch; this stretch is located within natural gas and oil industry sites as well as private properties. Captured turtles were transported to Desert Willow Veterinary Services and Wildlife Rehabilitation Center to assess the presence of ingested fish hooks using x-radiograph.

We radiographed 288 turtles: 152 female *P. gorzugi* (117–278 mm SCL), 120 male *P. gorzugi* (125–238 mm SCL), a male *Chrysemys picta* (Painted Turtle; 158 mm SCL), four female *T. scripta* (153–244 mm SCL), 10 male *T. scripta* (123–195 mm SCL), and one *Chelydra serpentina* (298 mm SCL). Of all x-rayed individuals, six turtles were found with signs of injuries caused by anthropogenic activities. Two female *T. scripta* (205, 244 mm SCL) and one female *P. gorzugi* (278 mm SCL) each had a fish hook in the mouth (Fig. 1A). Hooks appeared to be J-type hooks with the size ranging from 8.9–31 mm long. The hooks were removed safely by hand after examination. Unexpectedly, we also found three female *P. gorzugi* with, respectively, a bullet in the hind leg, bullet fragments in the front leg, and a metal piece in the throat region (251, 173, 240 mm SCL, respectively; Fig. 1B). Individuals shot appeared to be in good condition and only had minor scars on their legs.

Our findings showed a relatively low proportion of turtles with ingested fish hooks on the Black River (1%). However, the ingestion of fish hooks could be species and sex specific. Sack et al. (2017, *op. cit.*) noted that the common species likely found with ingested fish hooks were *T. scripta* and *C. serpentina*. Moreover, in *C. serpentina*, the percentage of females with ingested fish hooks could be as high as 33% (Steen et al. 2014, *op. cit.*). It is worth pointing out that all individuals with gunshot wounds and ingested fish hooks were adult females, two of which were reproductively mature (i.e., contained shelled-eggs or oviductal follicles). Ingestion of fish hooks may lead to severe injuries such as lead poisoning and intestinal perforations (Borkowski 1997. J. Zoo. Wildl. Med. 28:109–113).