

## TESTUDINES

**APALONE SPINIFERA** (Spiny Softshell). **PREDATION.** On 2 March 2007, we observed an Eastern Screech Owl (*Otus asio*) in a Wood Duck nest box on the bank of Tippo Bayou on Tallahatchie National Wildlife Refuge, ca. 5 km E Philipp, Tallahatchie County, Mississippi, USA (90°8'35.23"W, 33°45'44.94"N) that had partially eaten a juvenile *Apalone spinifera spinifera* × *A. s. hartwegi* ca. 49 mm in shell diameter. Most hunting by Screech Owls is nocturnal but can be crepuscular, as well as occasionally diurnal (Spendlow 1979. N. Am. Bird Bander 1979:111). They are sit-and-wait hunters that usually make straight-line perch-to-prey strikes (Gehlbach 1994. The Eastern Screech-Owl: Life History, Ecology, and Behavior in Suburbia and the Countryside. Texas A&M Univ. Press, College Station, Texas. 302 pp.). The owl had apparently caught the turtle and brought it back to the Wood Duck box to consume it. When first observed, the owl had eaten the head, three of the legs, and the tail. The remaining leg had been consumed and the shell was desiccated when the box was inspected again on 17 March.

Turtles have not heretofore been reported in the diet of Screech Owls (Gehlbach 1995. In A. Poole and F. Gill [eds.], The Birds of North America, No. 165, Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.; [http://bna.birds.cornell.edu/BNA/account/Eastern\\_Screech-Owl/FOOD\\_HABITS.html](http://bna.birds.cornell.edu/BNA/account/Eastern_Screech-Owl/FOOD_HABITS.html), accessed 23 March 2007). Likewise, Screech Owls have not been reported previously as predators of *A. spinifera* (Carr 1952. Handbook of Turtles. Cornell Univ. Press, Ithaca, New York. 542 pp.; Ernst et al. 1994. Turtles of the United States and Canada. Smithsonian Inst. Press, Washington, DC. 548 pp.; Moler 2007. In P. A. Meylan [ed.], Biology and Conservation of Florida Turtles, pp. 173–177. Chelonian Res. Monogr. 3, Chelonian Res. Found., Lunenburg, Massachusetts). This is the first report of *A. spinifera* predation by an Eastern Screech Owl, and this owl as a predator of a freshwater turtle.

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**EMYS ORBICULARIS** (European Pond Turtle). **NEST PREDATION.** On 18 September 2006 a predated nest of *Emys orbicularis* was found on a track near the Arnoia River, Ourense province, northwestern Spain. Fragments of eggshells were visible within one meter of the hole. A hatchling turtle remained inside the hole, and a small stick was used to get the hatchling out of the nest. Because the nest was positioned between stones, the predator had apparently not been able to reach the bottom of the nest.

Several feces, found near the nest hole and on the track, contained grapes and insects, and presumably were those of a Red Fox (*Vulpes vulpes*). *V. vulpes* is a suspected predator on nests and hatchlings of *E. orbicularis* in Spain (Andreu and Lopez-Jurado 1998. In Fauna Iberica. Museo Nacional de Ciencias Naturales, Madrid.; Salvador and Pleguezuelos 2002. Reptiles Españoles. Canseco Eds.). Wild Boars (*Sus scrofa*) and Badgers (*Meles meles*) are also

potential predators of nesting female turtles, eggs, and hatchlings, but in this case it seems likely that *V. vulpes* was the nest predator.

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**GLYPTEMYS INSCULPTA** (Wood Turtle). **CARRION-FEEDING.** *Glyptemys insculpta* has been referred to as an opportunistic omnivore (Harding and Bloomer 1979. Bull. New York Herpetol. Soc. 15:9–26). Although carrion is sometimes listed among dietary items for the this species (DeGraaf and Rudis 1983. Amphibians and Reptiles of New England. University of Massachusetts Press, Amherst), observations of carrion-feeding seem to be limited. Surface (1908. Zool. Bull. Div. Zool. Pennsylvania Dept. Agri. 6:105–196) found bird remains in two *G. insculpta* stomachs in Pennsylvania and attributed these to scavenging on dead material. Harding and Bloomer (1979, *ibid.*) and Farrell and Graham (1991. J. Herpetol. 25:1–9) both report the species consuming dead fish. Waide et al. (Can. Field-Nat. 117:377–388) observed Wood Turtles fighting over and eating carrion, including mice, toads (*Bufo americanus*) and fish. On several occasions turtles were observed with feathers in their mouths. Here we report an observation of a *G. insculpta* feeding on the remains of a fresh, road-killed, White-tailed Deer (*Odocoileus virginiana*).

On 30 May 2007, a White-tailed Deer, road-killed the previous day, was field-dressed and disposed of by wildlife technicians off a woods road at North Branch, New Brunswick, Canada (46°10'22"N, 65°15'51"W). The disposal site was about 10 m from the Canaan River, with two small brooks nearby. Approximately 2 h following disposal, two of us (DB and KE) returned to the site and observed an adult female *G. insculpta* (estimated carapace length ca. 180 cm) feeding on the carcass. When first encountered, the turtle had a piece of muscle tissue in its mouth. It continued feeding for about 1 minute while under observation, during which time it was photographed. The turtle was then picked up and briefly examined; when returned to the ground the turtle moved quickly towards the nearest water.

This observation provides additional evidence of the carrion-feeding proclivity of *G. insculpta*. It also suggests that road-killed vertebrates should not be overlooked as a potential source of mortality, where the presence of such might encourage turtles to linger on highways.

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**GOPHERUS AGASSIZII** (Desert Tortoise). **FOOD/MECHANICAL INJURY.** During a long-term growth study on *Gopherus agassizii* growth rates, tortoises have been captured annually since 1964 in Rock Valley, Nevada Test Site, Nye County, Nevada, USA (Medica et al. 1975. Copeia 1975:630–643; Turner et al. 1987.

Copeia 1987:974–979). On two occasions we noted mechanical injury caused by grass seeds, a phenomenon apparently not previously documented. Two tortoises captured 24–25 June 1998 (one subadult and one adult male) exhibited swelling below the eye and posterior to the junction of the upper and lower jaw on both sides of the head. Two additional tortoises (a subadult and an adult female) were observed with the identical condition on 16–17 September 1999. We determined that this was caused by a bolus of plant material (seeds of Red Brome Grass, *Bromus madritensis* ssp. *rubens*) lodged in the junction of the upper and lower jaw on both sides of the head, resulting in an oval distention of the facial integument (Fig. 1). The high precipitation that occurred in Rock Valley during the fall and winter of 1997–1998 (September–March total 304 mm) resulted in the germination and luxuriant growth of this exotic annual grass. Desert Tortoises find Red Brome Grass a palatable food item especially when green (Turner et al. 1984. Copeia 1984:811–820; Nagy and Medica 1986. Herpetologica 42:73–92; Esque 1994. MS thesis, Colorado State University, Ft. Collins, Colorado), and will also consume it when it when dry if the tortoise is well hydrated (Nagy and Medica 1986, *op. cit.*)

Between 1998 and 1999, 4 of the 18 (22%) tortoises recaptured in Rock Valley exhibited this condition. The damage inflicted to the jaw by the seeds has persisted for a number of years. In the two adult animals, any sign of mechanical damage (distended flesh in the region impacted by the seeds) disappeared after 3 yr in the female and after 4 yr in the male. After the red brome seeds were removed in two subadult animals, the distended cheek condition continued for 4 yr, and additional seed material was removed each year. Whether the condition is permanent in subadults or might reappear in adult Desert Tortoises is unknown. Three of the tortoises were consumed by predators in 2003, but one subadult tortoise survived through 2004. Its distended mandibular region was still impacted and additional red brome seed material was removed 5 yr after it was first observed with the condition. This bolus of wedged seed material was moist and appeared to be starting to decompose when removed (Fig. 1).

When Red Brome Grass and the related Cheatgrass (*Bromus tectorum*) senesce, the mature seeds have sharp pointed florets that can injure livestock and wildlife species (Crampton 1974. Grasses in California. University of California Press, Berkeley, 178 pp.; Currie et al. 1987. J. Range Manag. 40:547–550; McCrary and Bloom 1984. J. Wildl. Manag. 48:1005–1008; Upadhyaya et al. 1986. Can. J. Plant Sci. 66:689–709; Bossard et al. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley, 360 pp.). We have also observed a Red Brome seed imbedded its full length within the nostril and in another instance impaled in the corner of the eye of Desert Tortoises. These latter two injuries were observed in Piute Valley, Clark County, Nevada, also during 1998 (the year that Red Brome production was extremely good in Nevada).

We do not know how common injury to Desert Tortoises from Red Brome seeds might be. However, both species of *Bromus* have become widespread throughout the Mojave Desert since the 1960s (Shields et al. 1963. Ecology 44:697–707; Beatley 1966. Ecology 47:548–554; Hunter 1991. Great Basin Nat. 51:176–182) and have increased dramatically in vast areas that have burned in recent years (Brooks and Esque 2002. Chelon. Cons. Biol. 4:330–340). Once invasive annual plants dominate Mojave and Sonoran Desert

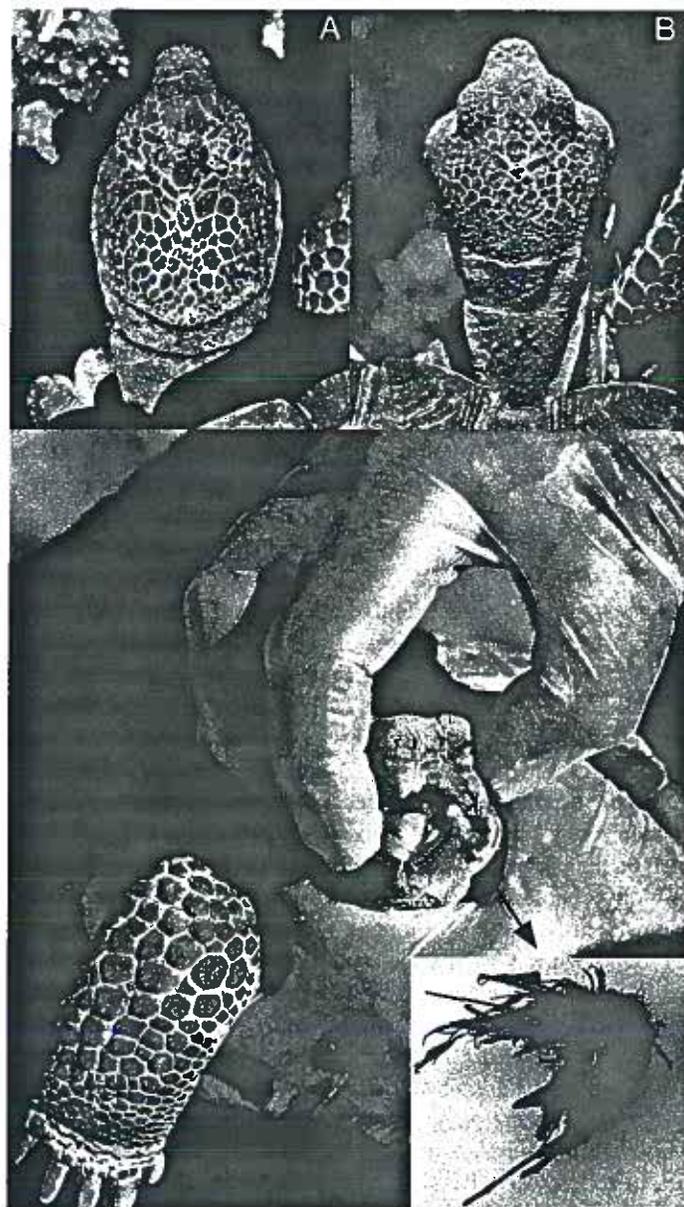


FIG. 1. Upper: Normal head (A) and abnormal head with impacted maxillary region (B). Lower: Impacted maxillary region with inset of the bolus of Red Brome seeds *Bromus madritensis* ssp. *rubens*.

habitat, an invasive plant-fire regime cycle can be established (Esque et al. 2002. In T. R. Van Devender [ed.], The Sonoran Desert Tortoise: Natural History, Biology and Conservation, pp. 312–333. University of Arizona Press and Arizona-Sonora Desert Museum, Tucson, Arizona; Brooks et al. 2004. BioScience 54:677–688). In 2005, over one million acres of Mojave Desert habitat burned in southern Nevada (Young and Clements 2006. Rangelands 28:10–15). Of that burned area ca. 400,000 acres were considered potential *G. agassizii* habitat of which 32,000 acres were within Desert Tortoise critical habitat (Prentice 2006. Desert Tortoise Council Symposium, Tucson, Arizona). The consequent increase in Red Brome Grass might pose both a habitat degradation issue as well as a health risk if tortoises are affected at rates similar to what we observed in Rock Valley.

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#### **NATATOR DEPRESSUS** (Flatback Sea Turtle). **HABITAT.**

*Natator depressus* are presently believed to occupy habitats with soft substrata during all phases of their lives, almost exclusively in turbid shallow inshore waters (Limpus et al. 1983. Aust. Wildl. Res. 10:557–561; Walker 1990. J. Herpetol. 25:246–248), and to our knowledge have not previously been documented inhabiting hard substrata such as coral reefs, rocky reefs, or mangroves. Here we report a potentially extended range of habitat use that may include rocky reefs and/or mangroves, as surmised by the presence on the carapace of turtles of two species of hard substratum epibionts characteristic of rocky reefs and mangrove forests.

We identified the epibionts attached to the carapace of *N. depressus* while they were ashore nesting on a 2 km long sandy beach near Cape Domett, northern Western Australia (14°48.1'S, 128°24.5'E). Epibionts were present on 28.9% of turtles (N = 142). They consisted of three species of barnacle (Crustracea: Cirrepedia), *Chelonibia testudinaria* (Linnaeus, 1758) (19.0%), *Tubicinella* cf. *cheloniae* Monroe & Limpus, 1979 (4.2%) and *Amphibalanus amphitrite* (Darwin, 1854) (1.4%), and one species of rock oyster (Bivalvia: Ostreidae), *Booneostrea cucullina* (Deshayes, 1836) (7.0%). Thick mud was present on the carapace of 11.3% of turtles, with light mud present on a further 3.5% of turtles.

The barnacle *A. amphitrite* and the oyster are generalists, the former inhabiting the intertidal and shallow subtidal zones, where it lives on many types of natural hard substrata (Stafford and Willan 2007. Is it a Pest? Introduced and Naturalised Marine Animal Species of Torres Strait Northern Australia. Queensland Government Department of Primary Industries and Fisheries, Cairns. 33 pp.) and mangrove pneumatophores (Bayliss 1993. Mar. Biol. 116:251–256), as well as piers and vessel hulls (Stafford and Willan 2007, *op. cit.*). The oyster *B. cucullina* has a similar range of depths and habitat types, including intertidal and shallow subtidal rocky reefs, estuaries and mangrove forests (including mangrove trunks and pneumatophores) (pers. obs). The mud present on the carapaces of the turtles is consistent with such low energy environments.

Both *A. amphitrite* and *B. cucullina* are opportunistic and fast-growing. Therefore, they are easily capable of achieving their observed shell sizes of 16.0 and 17.8 mm maximum diameter, respectively, within the expected 45 days that *N. depressus* are within

the nesting area (based on 2.84 nests/season at 16.0 day intervals, Limpus et al. 1984. Aust. Wildl. Res. 11:579–587). The barnacles were sexually mature, but the oysters were not. The presence of these two epibionts on *N. depressus* indicates that the turtles were resident within these habitats for sufficient time for the planktonic larvae of the barnacles and oysters to settle on them, and probably much longer during which time the barnacles had grown to maturity.

These epibionts provide no information as to whether rocky reefs or mangrove forests are utilized only during the inter-nesting period or whether these habitats are used throughout the juvenile and adult phases of the turtles' life cycle. This suggestion of hard substratum residence by *N. depressus* highlights the paucity of information on natural habitats for these turtles in tropical northern Australia and underlines the need for further research.

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#### **LACERTILIA**

**AMEIVA AMEIVA** (Giant Ameiva). **PREDATION.** *Ameiva ameiva* is broadly distributed throughout South America, ranging from Venezuela and Colombia to Argentina (Vitt and Colli 1994. Can. J. Zool. 72:1986–2008). In the Cerrado Region, it occupies a broad range of habitats but is more abundant in areas with some forest cover (Nogueira 2006. Diversidade e Padrões de Distribuição da Fauna de Lagartos do Cerrado. PhD dissertation, Universidade de São Paulo. São Paulo, Brazil. 295 pp.).

During a diurnal raptor road census at 0950 h on 16 October 2006, we observed predation on *A. ameiva* by the White-tailed Hawk, *Buteo albicaudatus*. It took place at the edge of a small forest fragment, 4 m from an unpaved road on a private farm (22°12'38"S, 47°55'39"W, datum: Corrego Alegre; elev. 760 m) located in the municipality of Brotas, Estado do São Paulo, southeastern Brazil. When first seen, the *B. albicaudatus* was perched on the branch at a height of 2.5 m in a small tree pecking at a lizard held in its claws. Our approaching car caused the hawk to fly away without its prey and perch about 10 m away. The lizard, an adult *A. ameiva* (170 mm SVL, 362 mm tail, 144 g), was dead and had extensive damage right below the head, which was nearly separated from the body.

*Buteo albicaudatus* is a large (865–1100 g) raptor found in open areas, hill slopes and other open or sparsely wooded country from Texas to Argentinean Patagonia (Ferguson-Lees and Christie 2001. Raptors of the World. Houghton Mifflin Company, New York. 992 pp.). According to Granzinoli and Motta-Junior (Emu, *in press*) lizards represented 0.94% (N = 3296) of all prey consumed and 7.19% (N = 7.2 kg) of biomass ingested by *B. albicaudatus* in Juiz de Fora, southeastern Brazil. However, all *B. albicaudatus* prey lizards found in Juiz de Fora were anguids. Apart from Granzinoli and Motta-Junior (Emu, *in press*), no studies addressing White-

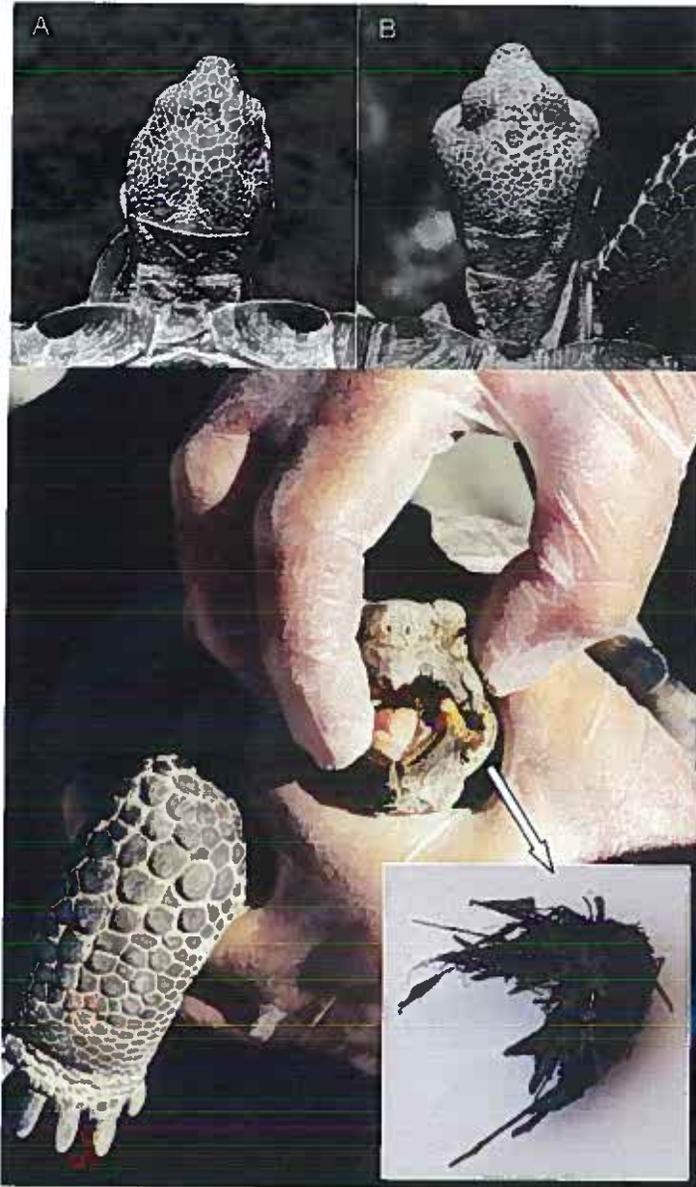


Figure 1. Upper: Normal head (A) and abnormal head with impacted maxillary region (B). Lower: Impacted maxillary region with inset of the bolus of Red brome seeds *Bromus madritensis* ssp. *rubens*.