heard quick trills indicative of *P. crucifer* territoriality calls. After ca. 5 min of searching, we located two males in close proximity (< 0.2 m). They began exchanging territoriality calls in rapid succession. When one male approached male two, the intensity of calling from both males increased. The males oriented toward each other and continued to rapidly call. Male two approached male one and the frogs locked their forearms. At this time, the calling had nearly ceased. Both frogs began pushing each other and in some instances rose slightly up on their hind legs. Wrestling continued for a minute, then male one broke free and turned away. Male two hopped onto his back and they began to jostle for the top position. The jostling continued for ca. 2 min until male one retreated ca. 0.5 m away and held a low posture in the water. Male two returned to the original perch and commenced advertisement calling. After another two to three minutes, male one moved within ca. 0.2 m of male two but remained postured low in the water. Male one remained in this position for about three minutes then swam away.

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**Pseudacris triseriata** (Western Chorus Frog). Reproduction. *Pseudacris triseriata* is widespread throughout the upper Yampa River Valley (ca. 2100 m) in northwestern Colorado (Hammerson 1999. Amphibians and Reptiles in Colorado. 2nd Edition. Univ. Press of Colorado and Colorado Division of Wildlife. 484 pp.). After most natural temporary breeding habitats (snowmelt ponds and wet meadows) dry, *P. triseriata* often reproduces in available irrigated meadows. Irrigated meadows have variable and unpredictable hydroperiods, so they may represent risky reproductive sites. Although *P. triseriata* can lay eggs in areas that dry before metamorphosis (Hammerson, op. cit.), their success in irrigated meadows is undetermined. Here, I provide preliminary data on *P. triseriata* survivorship in irrigated meadows.

In mid-June 1999, I located nine irrigated meadows that *P. triseriata* were using by following their breeding calls. I monitored sites only if they were currently irrigated or had been within the past week, determined by asking local ranchers. Meadows irrigated by the same ditch were considered independent only if a barrier, such as a flowing irrigation ditch separated them. I searched each site until 2–5 *P. triseriata* egg clusters were found. I flagged each cluster to enable relocation and measured water depth and water temperature at subsequent visits. Sites were visited during early morning, mid-afternoon, or early evening to encompass daytime temperature variation. Dating the initiation of hatching in each egg cluster allowed me to estimate the minimum period from oviposition by counting back 2 days (i.e., the minimum period from oviposition to hatching [Pettus and Angleton 1967. Evolution 21:500–507]). I revisited the meadows every 3–5 days until they dried.

In five (56%) meadows, the water level dropped steadily over the monitoring period and the pools within dried completely. In the remaining four meadows, water depth fluctuated as irrigation water was increased or cut off. Maximum pool temperature ranged from 24–35°C; less than the critical thermal maxima for both piedmont and montane *P. triseriata* tadpoles (Hoppe 1978. Herpetologica 34:318–321). Although all monitored egg clusters hatched tadpoles, the longest hydroperiod for any of the meadows was 51 days.

As a minimum hydroperiod of ca. 65 days is required from oviposition to metamorphosis (Smith 1983. Ecology 64:501–510), 100% mortality is implied. Because *P. triseriata* began calling at least 30 days prior to initiation of my study (Anne Davis, pers. comm.), substantial breeding had likely already taken place. Therefore, irrigated meadows may have acted as mortality sinks only to late-season breeders. Because *P. triseriata* may lay two clutches per season (Degenhardt et al. 1996. Amphibians and Reptiles of New Mexico. Univ. New Mexico Press, Albuquerque. 431 pp.), it is possible that the unsuccessful eggs could have been second attempts or that many of the clusters within individual pools were from a single female. These alternatives notwithstanding, these data imply that further investigation of irrigated pastures as mortality sinks is warranted.

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**Rana palustris** (Pickerel Frog) and **Ambystoma maculatum** (Spotted Salamander). Reproductive Behavior. Pickerel Frogs and Spotted Salamanders are early spring breeders (Johnson 1997. The Amphibians and Reptiles of Missouri. Missouri Department of Conservation). Although both species may breed in the same pond, the potential for interspecific interference seems small, as both species have widely different reproductive behavior. The salamander mating system is based on olfactory communication, whereas the frog attracts mates via acoustic/vibrational communication. Nevertheless, here I report several instances of inter-species amplexus.

On the night of 7 March 2004, I visited a pond at Three Creeks CA (Boone Co., Missouri, USA). While there were many salamanders in the pond, I found very few *Rana palustris* and did not observe any signs of reproduction (e.g., calling activity or pairs). However, I encountered two different cases in which a male *R. palustris*...

Fig. 1. A male *Rana palustris* in amplexus with an *Ambystoma maculatum* of unknown sex, found in central Missouri on 7 March 2004.
Acanthocephalus bufonis in *R. rugosa* is a new host record.

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Palest r had amplexed an *Ambystoma maculatum*. Both pairs were found on the bottom of the pond, in 0.3–0.6 m of water. Although I caught the pairs to examine them and take photographs, the frog maintained the amplexus. Between-species amplexus may incur several costs for both participants. Besides lost feeding opportunity and increased risk for predation there is also the cost of lost mating opportunity.

Two weeks later I visited the site again. This time I found several dozen *R. palustris*, heard males call, and found many egg clutches. I also observed another between-species interaction: as a salamander swam by a male *R. palustris*, the frog turned and amplexed the salamander. The frog quickly released the salamander, however. Further observations are needed to verify whether males are less prone to mating mistakes than conspecific mating opportunities are available.

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**RANA RUGOSA** (Wrinkled Frog). **ENDOPARASITES.** *Rana rugosa* is endemic to Japan, Korea, and northeastern China (Frost ed.). 1985. Amphibian Species of the World: A Taxonomic and Geographical Reference. Allen Press, Inc. and The Association of Systematics Collections, Lawrence, Kansas. 732 pp.). It was introduced to Hawaii from Japan in 1895 or 1896 (Bryan 1931. Mid-Pacific Magazine 43:61–64; Oliver and Shaw 1953. Zoologica 38:65–95). The purpose of this note is to report the acanthocephalan *Acanthocephalus bufonis* in *R. rugosa* from Oahu, Hawaii.

One *R. rugosa* (52 mm SVL) was collected May 2000 at Honolulu, Hawaii. It was deposited in the herpetology collection of the University of Michigan, Ann Arbor, Michigan as UMMZ 227582. The esophagus, stomach, small intestine, large intestine, lungs, and urinary bladder were opened and examined separately for helminths under a dissecting microscope. The body cavity was also searched. Two adult acanthocephalans were found in the small intestines. They were each cleared in a drop of concentrated glycerol, identified as *Acanthocephalus bufonis* and subsequently deposited in the United States Parasite Collection, USNPC, Beltsville, Maryland as USNPC 94316.


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**ACTINEMYS MARMORATA** (Pacific Pond Turtle). **DIET.** The diet of *Actinemys marmorata* is known to include a wide variety of items from benthic invertebrates, to plant materials, to carrion (Bury 1986. J. Herpetol. 20:515–521). An opportunistic forager, they often eat the most abundant food resource available (Holland 1985. Herpetol. Rev. 16:112–113). In this note, we provide the first observation of a Pacific Pond Turtle consuming fish eggs.

On 14 May 1997 while conducting a herpetological survey of the Cache Creek drainage in Wolf Creek at the mouth of Quartz Canyon in Lake County, California (USA), one of us (MRJ) observed a spawning aggregation of ca. 100 California Roach (*Lavinia symmetrica*). The fish had schooled into a tight ball ca. 40 cm diam and were spawning over a cobbly substrate in 50 cm of water. Closer examination revealed the presence of a Pacific Pond Turtle under this spawning aggregation. The turtle was resting on the cobbly substrate and remained motionless except for occasionally retracting its head to avoid being hit by swimming and darting fish. I carefully watched the turtle between 1550–1615 h and soon observed that it was foraging for fish eggs being deposited in the cracks of the substrate. There was no attempt to catch swimming fish as they moved by the turtle’s head or bounced off the turtle’s head, neck, and front legs. After my observations were completed, I removed the turtle from the spawning aggregation and found that it was an adult female, 145 mm straight-line carapace length.

This record provides another observation of an opportunistic feeding event by a Pacific Pond Turtle; the consumption of fish eggs may also benefit female turtle fitness by providing a rich source of nutrients for their own egg development.

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**CHELONIIDAE** (Marine Turtle). **NEST PREDATION BY BOBCATS.** A variety of mammal species are known as primary predators (initial excavators) of marine turtle nests in Florida (e.g., Stancyk 1982, *In Bjornald* (ed), Biology and Conservation of Sea Turtles, pp. 139–152. Smithsonian Institution Press, Washington, D.C.). Raccoons (*Procyon lotor*) are probably the most widespread and destructive nest predator (Stancyk, *op. cit.*), depredating up to 95% of nests in some areas, unless control measures are implemented (Bain et al. 1997. Sea turtle nesting and reproductive success at the Hobe Sound National Wildlife Refuge (Florida), 1972-1995. Report to U.S. Fish and Wildlife Service, ARM Loxahatchee NWR). Spotted Skunks (*Spilogale putorius*), Gray Foxes (*Urocyon cinereoraeugentes*), Opossums (*Didelphis virginiana*), and Red Wolves (*Canis rufus*) are other native species that depredate nests, while Nine-banded Armadillos (*Dasypus novemcinctus*), Coyotes (*Canis latrans*), feral swine (*Sus scrofa*), and Red Foxes (*Vulpes vulpes*) are destructive exotic mammal species (Atencio 1994. Proc. Sea Turtle Symp. 13:201–204; Bain et al., *op. cit.*; Drennen et al.

TESTUDINES