poles. The small frogs were dark brown with small blue dots. When disturbed, the small frogs would remain on the back of the parent. This suggests the tadpoles were normal, non-feeding larvae and they likely remained on the back of the male through metamorphosis. This area was very humid with normal temperatures around 30ºC this time of year, at the end of the rainy season.

This observation represents a new mode of reproduction not previously reported (Duellman and Trueb 1985. Biology of Amphibians. Johns Hopkins Univ. Press, Baltimore and London).

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LEPTODACTYLUS MYSTACINUS (Mustached Frog). **DEIMATIC BEHAVIOR**. Deimatic behavior is a mechanism of secondary defense, which has the function of increasing the possibility of survival of an animal after it has been detected by the predator (Robinson 1969. Evol. Biol. 3:225–259). This behavior has been described in Leptodactylidae, especially *Pleurodema* and *Physalaemus* (Martins 1989. J. Herpetol. 23:305–307 and references therein). However, little is known about its occurrence in the genus *Leptodactylus*. *Leptodactylus mystacinus* is broadly distributed in eastern Brazil (Frost 2002. Amphibians Species of the World: an online inference 2:21). Herein, I report deimatic behavior of *L. mystacinus* collected in Nanuque City, Minas Gerais State, southeastern Brazil, on 4 Nov 2001, during faunal rescue activities for Hidroeletric Usine of Santa Clara (UHE Santa Clara - 17°53'S, 40°11'W). This locality is an extension of the geographic distribution of this species and the first occurrence in the Mucuri River Basin. When collected, the specimen exhibited a defensive position similar to that of *Physalaemus nattereri*. The first stage consisted of inflating the lungs, followed by lowering of the back and suspending the posterior region of the body. During this display, the forelegs remained close to the body. This posture makes it difficult for capture by predators and allows the individual to use its head or legs for defense (Sazima and Caramaschi 1986, *op cit.*). The individual remained in this position for only a few seconds. When again threatened, the individual abandoned the deimatic behavior and fled, seeking shelter. This species lacks well-developed and conspicuous inguinal glands. Glandular secretions were not observed. This behavior has also been observed in *Physalaemus fuscomaculatus* and *P. deimaticus*, although its functional significance is not well understood. A voucher specimen is deposited in the Reference Herpetologics Collection of the Pontifícia Universidade Católica de Minas Gerais (MCNAM 2636).

I thank the Companhia Energética Santa Clara for financial support, the Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis for collecting permits, Msc. Conrado A. B. Galdino for help, and Dr. Renato N. Feio for suggestions and comments on this manuscript.

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MERTENSIELLA LUSCHANI (Luschan's Salamander). **ENDOPARASITES.** *Mertensiella luschani* is a salamandrid that is known from the mountains of southeastern Anatolia, Turkey, and the Aegean islands of Karpathos, Saria, and Kasos (Frost [ed.] 1985. Amphibian Species of the World: A Taxonomic and Geographical Reference. Published as a joint Venture of Allen Press, Inc. and The Association of Systematics Collections, Lawrence, Kansas. 732 pp.). To our knowledge, there are no reports of helminths from *M. luschani.* The purpose of this note is to report two species of Nematoda from *M. luschani.*

Fifty *M. luschani* (mean SVL 141 mm ± 22 SD, range: 85–175 mm) were collected August 1997 and April 2001 in Antalya, Turkey (36°52'N, 30°45'E, elev. 150 m). Salamanders were preserved in 10% formalin and stored in 70% ethanol. The esophagus, stomach, and small and large intestines were opened and separately examined for helminths under a dissecting microscope. Nematodes were cleared in a drop of concentrated glycerol and studied as a temporary wet-mount under a compound microscope. Two species of Nematoda were identified: *Angiostoma aspersae* (from the small intestine) and *Cosmocerca longicauda* (from the large intestine). Prevalence (number of infected salamanders/salamander sample x 100) and mean intensity (mean number helminths per infected salamander ± 1 SD and range) were: *A. aspersae* (34%, 1.3 ± 0.77 SD, range: 1–4); *C. longicauda* (3.0 ± 2.0 SD, range: 1–7). Selected nematodes were deposited in the United States National Parasite Collection, Beltsville, Maryland as *A. asperase* (USNM 94459) and *C. longicauda* (USNM 94460). Voucher salamander specimens were deposited at Uludag University, Department of Biology, Bursa, Turkey.

Angiostoma aspersae was originally described from specimens taken from the snail *Helix aspersa* collected in France (Morand 1986. Bull. Mus. Nat. Hist. Nat, Paris, 4e sér., A 11:111–115). *Mertensiella luschani* is the first salamander species reported to harbor *A. aspersae*; but more work is necessary to determine if this nematode directly infects salamanders or is only a byproduct of diet. *Cosmocerca longicauda* has previously been reported from other European salamandrids: *Triturus alpestris, T. cristatus, T. helveticus, T. montandoni, T. vulgaris* (Baker 1987. Mem. Univ. Newfoundland, Occas. Pap. Biol. 11:1–325). It is apparently palearctic in distribution. *Angiostoma aspersae* and *Cosmocerca longicauda* in *M. luschari* are new host records; Turkey is a new locality record.

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PHYSALAEMUS BILIGONIGERUS (False-eyed Frog). **ENDOPORASITES.** Here we present data on helminths infecting *Physalaemus biligonigerus*. The study was carried out in a soybean cropland of the middle region of Argentina (31°14'46"S, 63°33'8"W, Córdoba Province) during December 2002 to March

2003. We collected 19 adult *P. biligonigerus* (7 males and 12 females; SVL 35–36 mm ± 1.96 mm).

All frogs were infected by helminths. The number of helminth species per individual host varied from 1–3 (most frequently three) and was not related to frog size (SVL, r = 0.22; p = 0.85). Three helminth species were recovered: one acanthocephalan, *Acantocephalus lutzi*, and two nematodes, *Rhabdias* sp., and *Physaloptera* sp. (found only as larvae cysts). Voucher specimens were deposited at the Faculty of Biochemistry and Biological Sciences Parasite Collection (FBCBPC 1000-3). Data on prevalence and infection intensities (*sensu* Bush et al. 1997. J. Parasitol. 83:575–583) for each helminth species and their respective sites of infection are given in Table 1. *Physalaemus biligonigerus* represents a new host record for *Acanthocephalus lutzi* and for the genera *Physaloptera* and *Rhabdias*.

Although the sample size is small, our data suggest that the population of *P. biligonigerus* that inhabited soybean cropland has a relatively high frequency of helminth infection, with the nematode *Physaloptera* being most prevalent. Stress, in the form of pesticide exposure, may decrease the host amphibians' ability to resist infection, resulting in higher parasite loads (Kiesecker 2002. Proc. Natl. Acad. Sci. 99:9901–9904). Despite the risk, anuran populations in the midwestern Córdoba Province coexist with soybean crops that are the dominant land use in this region. In addition, these anurans are exposed to pesticides used to protect these crops. Further studies are necessary to confirm the relationship between pesticide exposure and parasite infection.

We thank Graciela Navore and Mónika Hamann for suggestions.

TABLE 1. Prevalence (in percentage and absolute values) and intensity of infection (mean ± standard deviation, with range in parentheses) of helminths found in *Physalaemus biligonigerus* (N = 19).

	Helminth Prevalence	Mean intensity (range)	Site of infection
Acanthocephala			
Acanthocephalus lutzi	26.32% (5)	5 ± 3.5 (2–10)	Intestines
Nematoda			
Rhabdias sp	36.84% (7)	5 ± 3.8 (2–13)	Lungs
Physaloptera sp. (larvae)	84.21% (16)	28.7 ± 17.6 (3–50)	Stomach, cysts

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RANA BOYLII **(Foothill Yellow-legged Frog). PREDATION.** Introduced aquatic predators are known to negatively effect amphibian populations both directly and indirectly (Kats and Ferrer. 2003. Diversity and Distributions 9:99–110). The Signal Crayfish (*Pacifastacus leniusculus*) is native to the Pacific Northwest and has been introduced into numerous Sierra Nevada drainages which are currently populated by *R. boylii* including the Pit, Stanislaus, South Fork Trinity (Jamie Bettaso, pers. comm.), and the North Fork Feather rivers. Failed recruitment at several *R. boylii* breeding sites on the Pit River led to speculation about possible negative impacts of the signal crayfish on *Rana boylii* populations (Pacific Gas and Electric Company, unpubl. data).

In conjunction with visual encounter surveys on the regulated Cresta Reach of the North Fork Feather River (Butte Co., California), we installed an Aqua Vu® underwater video camera system to monitor *R. boylii* egg masses and tadpole groups.

Analysis of over 92 hours of videotape revealed several predation events upon a *R. boylii* egg mass. On 23 June 2003 at 1819 h an adult *P. leniusculus* was observed feeding on a *R. boylii* egg mass (depth 21 cm; water temp 16°C; distance from shore 80 cm; 0636000 N, 4410200 E; NAD 27, Zone 10; 427 m elev.). During this observation the crayfish exhibited defensive behavior when another adult crayfish approached and appeared to initiate feeding, and was successfully driven off. Periodic feeding continued by the defending crayfish (entire event lasted 19.2 minutes; video verified by L. Kats), and recently hatched larvae were observed fleeing the egg mass during feeding. *Pacifasticus leniusculus* was commonly observed near egg masses and tadpole groups during video monitoring in both diurnal and nocturnal conditions.

During visual encounter surveys, we noted at least three observations of larvae with tail injuries suggestive of predation attempts by crayfish (injuries resembled clean, scissors-like cuts). Larval tail injuries have also been noted by other biologists working on the Poe Reach of the North Fork Feather River (A. Pool, pers. comm.). These observations are consistent with studies showing that Signal Crayfish are adept at consuming anuran larvae using their claws and walking legs, with unsuccessful prey handling resulting in tail loss (Axelsson et al. 1997. Amphibia-Reptilia 18:217–228). Our observations of Signal Crayfish depredating and molesting *R. boylii* egg masses suggest that they might also contribute to the dislodging of egg masses, leaving them vulnerable to further losses associated with river flow fluctuations.

We also observed a predation attempt upon a *R. boylii* larva. On 27 June 2003 at 2059 h an undetermined species of young-of-the-year fish (ca. cyprinid) attempted to consume a recently-hatched *R. boylii* larva (depth 18 cm; water temp. ca. 14°C; distance from shore 160 cm; 0636281 N, 4411255 E; NAD 27, Zone 10; 427 m elev.). The outcome of this observation remains uncertain because of low light conditions and unclear movements of the larva after the fish captured it in its mouth. During this observation other young-of-the-year fish were observed pecking the substrate in the area where several hundred recently-hatched *R. boylii* larvae were located.

Studies conducted in Europe showed that the presence of exotic *P. leniusculus* caused tail injuries, decreased metamporph size and survivorship of *Rana temporaria* (Nyström et al. 2001. Ecology 82:1023–1039). Recent work conducted in the Sierra Nevada has demonstrated that *P. leniusculus* is more likely to be found in close