*Euryce*Alliance Summer Conference 2012

Texas State University-San Marcos

Sponsored by Department of Biology

Date: Friday May 25, 2012

Time: 10am – dinner

Place: Freeman Aquatic Building - Room 136

ABSTRACTS

*Euryce*Alliance Summer 2012 Meeting

May 25, 2012 | Texas State University – San Marcos

Status of the Salado Salamander, *Eurycea chisholmensis*

Andy Gluesenkamp, Texas Parks & Wildlife Department

The Salado salamander (*Eurycea chisholmensis*) is known from six sites in the Salado Creek Watershed in Bell County, Texas. Although the first specimen was collected over half a century ago, the species was not formally described until 2000. Very little is known about this species and extremely small surface population sizes make it difficult to study. Two years of survey efforts yielded three new sites in addition to three historic localities. Unfortunately, anthropogenic threats at some localities and overall development in and around the Salado Creek Watershed are increasing. As a result, this species has been proposed for federal listing.

Notes:

Reproductive timing of *Eurycea naufragia* at two spring sites

Kira McEntire, Southwestern University

The Georgetown salamander, *Eurycea naufragia*, is an endemic, spring dwelling, neotenic salamander found only at 15 sites in Williamson County, Texas. Little is currently known about the life history of this species. We conducted monthly visual encounter surveys at two sites, Swinbank Spring (starting in 2007) and Twin Springs Preserve (starting in 2008). During the visual encounter surveys, each salamander observed was assigned to one of three size classes; 1(less than 2.5 cm), 2 (2.5 - 5.1 cm), or 3 (greater than 5.1 cm). Starting in June 2010 we captured salamanders and examined them for the presence of eggs to determine the timing of reproduction. A significantly greater proportion of gravid females was observed from November to April than May to October at both Swinbank Spring ($X^2 = 48.786$, df = 1, $P < 0.0001$) and Twin Springs ($X^2 = 14.541$, df = 1, $P < 0.0001$). Very few salamanders in the smallest size class were observed throughout the study, and therefore analysis of size classes was restricted to size classes 2 and 3. A higher proportion of size class 2 salamanders was observed from May through October, as compared to November through April, at Twin Springs ($P < 0.001$), but this trend was not observed at Swinbank Spring ($P = 0.7223$). These results support a winter reproductive season for the species, although other environmental factors (e.g.. water flow) may also influence reproduction. An understanding of reproductive timing is important for conservation efforts. Continued research and observations may help to better delineate the timing of reproduction and the potential importance of environmental factors in reproductive events.

Notes:

Update on Ecological Studies of the Georgetown Salamander, Eurycea naufragia

Ben Pierce, Southwestern University

The Georgetown salamander (*Eurycea naufragia*) is an endemic, neotenic salamander known from only 15 sites in the San Gabriel River drainage. The species is currently being considered for the listing as an endangered species. We have conducted monthly visual encounter surveys of salamanders at Swinbank Spring for the past 5 years and Twin Springs for the past 3.5 years. The number of salamanders observed in visual encounter surveys varied from month to month, but more salamanders were observed during spring/summer than during fall/winter. Recaptures of marked salamanders over an 18 month period demonstrated that the salamanders exhibit limited movement within the spring run at both sites. Ongoing studies of this species include surveys of invertebrates at salamander sites, locating additional salamander populations, developing better sampling techniques for salamanders, and studies of urbanization surrounding known salamander locations.

Notes:

Photo-based identification for Central Texas Eurycea: a viable substitute for VIEs?

Nate Bendik, City of Austin

I will be discussing the utility of photographic identification for central Texas *Eurycea* salamanders using computer assisted matching with the program Wild-ID. This includes an overview of the program and how it works and an assessment of its accuracy using a range of quality photographs from *E. sosorum* and *E. tonkawae*. I will also briefly discuss how the output from Wild-ID can be manipulated in program R to automate photo matching and generate a capture history file suitable for import into MARK.

Notes:

Differential use of visual, olfactory and bioelectric predatory cues by *Eurycea sosorum*

Hayley Gillespie & Camille Parmesan, University of Texas at Austin

Predators affect prey populations both directly (through consumption) and indirectly, by inducing costly changes in prey characteristics. This includes changes in prey behavior such as reduced time spent foraging or seeking mates. These indirect predator effects are often stronger in aquatic habitats, as some cues used by prey to detect and avoid predators are more effectively, or only, transmitted in water. To date, the role of olfactory cues in anti-predator behavior by aquatic prey has received much more research attention than either visual or bioelectric cues (weak electric potentials generated by movement of aquatic predators). In addition, few studies have compared the relative use of these predatory cues to anti-predator behavior within a single species. We tested whether the permanently aquatic endangered species – the Barton Springs Salamander (*Eurycea sosorum*) – reacts to visual, bioelectric or olfactory cues from two potential predators: largemouth bass (*Micropterus salmoides*) and red crayfish (*Procambarus clarkii*). *Eurycea sosorum* reduced activity in response to visual and bioelectric cues from potential predators, but did not reduce activity in response to olfactory cues. This response is consistent with the expectation that visual cues should be most effective in shallow, clear water aquatic habitats. This is the first study to demonstrate an anti-predator response by an amphibian mediated only by bioelectric cues, and one of very few to observe this phenomenon among aquatic vertebrates.

Notes:

Chemically Mediated Predator Avoidance in the Barton Springs Salamander, *Eurycea sosorum*

Dominic DeSantis, Texas State University – San Marcos

In many systems, predation is a dominant and influential factor. Little is known about how the federally endangered Barton Springs Salamander, *Eurycea sosorum*, responds to predators. Using captive hatched (predator-naïve) salamanders, we examined the antipredator response of E. sosorum to chemical cues from: (1) a blank water control, (2) a native mosquitofish (*Gambusia affinis*), (3) an introduced sunfish (*Lepomis auritus*), and (4) a native bass (*Micropterus salmoides*). Salamanders decreased activity (antipredator behavior) in response to all fish treatments but not to the blank water control. There was no difference between the response to the native mosquitofish and the introduced sunfish, but both were significantly less than the response to the native bass. These results indicate that *E. sosorum* has innate recognition of predatory fish as has previously been found for a congener, *E. nana*. Additionally, the differing responses to native and introduced predators suggest that risk assessment may be important. *Gambusia affinis* has been found to consume amphibian larvae and eggs, and therefore, the antipredator response may be an ontogenetic hold over. The antipredator response to *G. affinis* has major management implications, as currently, *G. affinis* is sympatric with the largest population of *E. sosorum*, and may be consuming both eggs and larvae of these salamanders.

Notes:

Eurycea data and the Texas Natural Diversity Database

Cullen Hanks, Texas Parks & Wildlife Department

The Texas Natural Diversity Database (TXNDD) is a clearinghouse for information on rare species in Texas. The TXNDD is a member program of the Natureserve Network, and is maintained by Texas Parks & Wildlife Dept. In the past year the TXNDD had added approximately 6,000 specimen records for *Eurycea* collected in Central Texas. This data was received directly from herpnet and from individual Museum collections. Each of the records was mapped according to Natural Heritage Methodology. In addition we have completed a comprehensive update to four species: *E. waterlooensis*, *E. chisholmensis*, *E. naufragia*, and *E. tonkawae*. Currently we are working to improve how we compile information by seeking feedback on the criteria we use to consolidate and rank discreet populations.

Notes:

Texas Natural Diversity Database – Affecting Conservation Decisions

Bob Gottfried, Texas Parks & Wildlife Department

The Texas Natural Diversity Database (TXNDD) is the most complete source of information on Texas rare, threatened, and endangered species. By compiling all available species information in one location the TXNDD is a valuable tool for the conservation of Texas natural resources. Information in the TXNDD is used for a myriad of conservation actions including evaluating and mitigating the impact of development, evaluating the conservation status of species, and prioritizing conservation action. Only by contributing data to the TXNDD can you be assured that the best available information is considered when conservation decisions are made.

Notes:

Eurycea culture orts

Joe Fries, US Fish & Wildlife Service, San Marcos National Fish Hatchery & Technology Center

A variety of culture-related information will be presented, primarily for *Eurycea nana*. Growth, oviposition seasonality, hatch success versus number of days post-oviposit before egg transfer, size at hatch, and clutch size will be presented. Additionally, attempted triggers of reproduction will be discussed.

Notes:

A non-invasive stress assay shows that diseased tadpole populations have elevated corticosterone levels

Caitlin Gabor, Texas State University

Batrachochytrium dendrobatidis (Bd) is a fungus that causes the disease chytridiomycosis and is associated with widespread amphibian declines. Populations vary in their susceptibility to Bd infections as well as the virulence of the infecting lineage, and this may manifest as a differential physiological stress response. Chronic stress yields a costly conflict between the allocation of resources for metamorphosis and immunity that could explain the variation in amphibian susceptibility to emerging diseases. Here, we present the first study to use non-invasive water-borne hormone technique to assess stress hormone levels (corticosterone) of tadpole populations in response to Bd infection. We found that corticosterone levels were higher in infected populations of two species of *Alytes* tadpoles (*Alytes obstetricans* and *A. muletensis*) than in an uninfected population for both species. The relationship between corticosterone and the intensity of infection differed between species, with only the infected *A. obstetricans* population showing a significant positive correlation. Corticosterone levels were also significantly higher in *A. obstetricans* than in *A. muletensis*. The higher corticosterone levels in *A. obstetricans* may be in response to infection by the most virulent Bd lineage whereas *A. muletensis* is infected with the least virulent Bd lineage. The use of water-borne hormone assays will aid in providing a better understanding of the interactions between the neuroendocrine and immune systems in response to climate change, emerging diseases and environmental disturbances, thus aiding in the conservation of amphibians, including Texas *Eurycea*.

Notes:

Stress response of the San Marcos salamander, Eurycea nana, to native and introduced predators

Drew Davis, Texas State University – San Marcos

Exposure to predatory stimuli can result in the elevation of circulating glucocorticoid levels in many species. While associated with immediate survival, chronic increases in glucocorticoids may negatively affect individuals. Corticosterone (CORT) is the main glucocorticoid in amphibians. The San Marcos salamander, *Eurycea nana*, decreases activity in response to native and introduced predatory fish, however, experience may further influence these interactions. To better understand the effects of introduced fish predators, we examined the behavioral and water-borne CORT response to a: 1) native predator (*Micropterus salmoides*), 2) introduced predator (*Lepomis auritus*), and 3) blank control. Salamanders reduced activity (antipredator response) in response to both predator treatments, but not to the blank control, and the response to the native predator was significantly stronger that to the introduced predator. The CORT response to both the blank control and the introduced predator did not differ, and both were lower than the response to the native predator. These results suggest weaker responses towards introduced predators when compared to native predators. Highly abundant introduced predators may attribute to a greater allostatic load on these salamanders, and therefore, selection has favored individuals that have decreased stress responses.

Notes:

Summer 2012 *Euryce*Alliance Meeting - Registered Participants

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Notes/Other Participants:

Time	Speaker	Title
9:15-10:00		Coffee, Breakfast & Check-In
10:00	Hayley Gillespie	Welcome, Tour of *EuryceA*lliance website, listserv + projects
10:15	Andy Gluesenkamp	Status of the Salado Salamander, *Eurycea chisholmensis*
10:30	Kira McEntire	Reproductive timing of *Eurycea naufragia* at two spring sites
10:45	Ben Pierce	Update on Ecological Studies of the Georgetown Salamander, *Eurycea naufragia*
11:00		Coffee Break
11:15	Nate Bendik	Photo-based identification for Central Texas *Eurycea*: a viable substitute for VIEs?
11:30	Hayley Gillespie	Differential use of visual, olfactory and bioelectric predator cues by *Eurycea sosorum*
11:45	Dominic DeSantis	Chemically Mediated Predator Avoidance in the Barton Springs Salamander, *Eurycea sosorum*
12:00		Lunch (provided)
1:00	Cullen Hanks	*Eurycea* data and the Texas Natural Diversity Database
1:15	Bob Gottfried	Texas Natural Diversity Database – Affecting Conservation Decisions
1:30	Group Discussion	Comments/Questions/Suggestions about *Eurycea* data and the TNDD
1:45		Coffee Break
2:00	Joe Fries	*Eurycea* culture orts
2:15	Caitlin Gabor	A non-invasive stress assay shows that diseased tadpole populations have elevated corticosterone levels
2:30	Drew Davis	Stress response of the San Marcos salamander, *Eurycea nana*, to native and introduced predators
2:45	Group Discussion	Review *Eurycea* bibliography – make additions, submit documents
3:00		Suggestions for new features for *EuryceA*lliance site
3:15		
3:30		Social at Saltgrass Steakhouse