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Sexual Dimorphism in the Dentition of Basal Vertebrates

T. Gunn  
*Florida Atlantic University*

E. J. Cave  
*Florida Atlantic University*

Christine N. Bedore  
*Florida Atlantic University*

David W. Kerstetter  
*Nova Southeastern University*, kerstett@nova.edu  

Stephen M. Kajiura  
*Florida Atlantic University*

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amphibian communities throughout Kentucky. In this presentation, we discuss the process we are using to develop the KY-WRAM and Amphibian IBI, which are based upon the methods established by Ohio EPA's Wetland Ecology Group, and some preliminary results. These topics include a description of Coefficients of Conservatism, an Amphibian Quality Assessment Index, other amphibian community metrics, and our approach to developing these for Kentucky.

**Gunn, Theresa** (Florida Atlantic University); Cave, Eloise; Bedore, Christine (Florida Atlantic University, Canada); Kerstetter, David (Nova Southeastern University, Canada); Kajiura, Stephen (Florida Atlantic University, Canada)

**Sexual Dimorphism in the Dentition of Basal Vertebrates**

Elasmobranch fishes are among a small group of vertebrates that use their mouth to bite their mate during courtship and copulation. Because the teeth of males are under selective pressure to facilitate both feeding and grasping of the females, there exists the potential for conflicting selective demands on the tooth morphology, where the tooth shape optimal for one behavior may be suboptimal for the other. Various elasmobranch species have been documented to exhibit sexual dimorphisms in tooth morphology with males typically possessing more cuspidate teeth, presumably to facilitate grasping the female during mating. Male Atlantic stingrays ( *Dasyatis sabina* ) demonstrate seasonally dynamic changes in dentition, from molariform teeth during the non-mating season to cuspidate teeth during the mating season. This seasonal change in tooth shape is documented for only a single species so it remains unknown whether this is a widespread phenomenon. Pelagic stingrays ( *Pteroplatytrygon violacea* ) are in the same family (Dasyatidae) as Atlantic stingrays but feed on teleost and squid prey which present similar demands on the male tooth morphology as the slippery body of their female mates. If the tooth morphology of pelagic stingrays is sexually dynamic and males undergo a seasonal change in tooth shape, it suggests that dynamic teeth are likely widespread throughout the batoids. Pelagic stingray jaws were collected monthly from commercial fisherman for a full year. the number of tooth files and rows did not differ between the sexes and ranged from 20-35 tooth rows and 5-10 tooth files in both upper and lower jaws. Upper jaw symphyseal teeth were extracted for shape analysis. Qualitative differences in tooth shape were observed between males and females throughout the year, and males demonstrated different tooth shapes between mating and non-mating seasons. Male Pelagic stingray teeth were more strongly cuspidate than female teeth especially late in the mating season (April) when the teeth have rotated to the outermost functional position. Male Teeth from the non-mating season (November) showed a more rounded triangular shape. a Procrustes superimposition with relative warp analysis was employed to quantify the differences between the sexes and between mating and non-mating seasons. The observation that male tooth morphology changes seasonally, even in a piscivorous species, indicates that this is a widespread phenomenon.

**Guo, Ce** (Institute of bio-inspired structure and surface engineering, Nanjing University of Aeronautics and Astronautics);

**Biomechanism of adhesion in gecko setae**

The study of the adhesion of millions of setae on the toes of geckos has been advanced in recent years with the emergence of new technology and measurement methods. The theory of the mechanism of adhesion by van der Waals forces is now accepted and broadly understood. However, this paper presents limitations of this theory and gives a new hypothesis of the biomechanism of gecko adhesion.