

Abstract for 1st North American Society for Comparative Endocrinology (NASCE)

July 13-16, 2011

Ann Arbor, MI

Presentation Type: Platform

ZWY SEX DETERMINATION IN XENOPUS TROPICALIS

Allen Olmstead and Sigmund Degitz

US EPA, NHEERL, Mid-Continent Ecology Division, Duluth, MN.

Most vertebrate species with described genetic sex determination are either male (XY) or female (ZW) heterogametic. To date, studies with *Xenopus* species indicate that members of this genus operate under a ZW sex determination system. We used two different approaches and demonstrated a ZW sex determination system in lab raised spawns of *X. tropicalis*. Sex-reversed males were generated by larval exposure to the synthetic estrogen, ethynylestradiol and when mated to control females resulted in all-male offspring. Larval exposure to the aromatase inhibitor, fadrozole, resulted in sex-reversed females that when mated to control males produced offspring with a 1:3 male:female sex ratio. One out of three of these female offspring possessed a WW genotype that produced all female offspring when mated with normal males. These results were corroborated using sex-linked genetic markers that showed that the sex-determining factor was inherited maternally in these frogs. Most breeding pairs of this species outside of this study group, however, did not corroborate these results. Breeding trials and inheritance analysis of sex-linked markers show that this species uses a polyfactorial sex determination system with three possible alleles at the same locus. Males of this species can possess one of three genotypes; ZZ, ZY, or WY. Females possess either ZW or WW genotypes. While most spawns results in 1:1 sex ratios, there are occasionally male- or female-biased spawns. These results have implications for this species' usage in endocrine disruptor toxicity testing and provides a unique opportunity to study the evolution of sex determining systems especially with the molecular tools available for this species.