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Feminine Suburbia

Suburbanization, estrogen contamination, and sex ratio in wild amphibian populations



by Richard Melton

Anyone who has seen Jurassic Park knows that, given certain conditions, some species of frogs can change from male to female. This process is known as the feminization of a population. This happens in nature when a frog population has a low number of females. In response, certain male individuals change sexes. Past studies have shown that agricultural areas where certain pesticides, such as atrazine, are used cause an increase in the frequency of the feminization process. This is due to the pesticides releasing endocrine disrupting chemicals (EDC) in the environment. These are chemicals that disrupt the reproductive system of organisms by changing the hormone pathways that determine the sex of an individual. A study published in *Proceedings of the National Academy of Sciences*, suggests that factors present in suburban areas also cause an increase in EDCs and thus increasing the rate of feminization in Green Frogs (*Rana clamitans*) populations. Though the specific causes are unknown the data shows and clear increase in feminization along the suburban gradient.

“...data shows that there is an increase in feminization rate among suburban populations...”

The first step taken by the research team was to determine if there was in fact a difference in the feminization rates between suburban and underdeveloped ponds; their data show that there is an increase in feminization rate among suburban populations, a rather ubiquitous one at that. These data coupled with previous tests show that frog sex ratios change with the introduction of estrogen in a controlled environment and that sex determination in these frog species is not entirely genetic. This suggests that there is something in the environment causing an increase in the rate of feminization process. The researchers also took



chemical samples from the ponds and the land surrounding them to determine what correlations could be found. As expected, the suburban lands had high levels of EDCs and the ponds had especially high amounts of estrogen present than the underdeveloped ponds.

Jurassic park gave us a fictional example of how this process could present a problem, but this is anything but a fictional problem. Further study is needed to determine the long-term effects of increases feminization as well as potential implications of human populations, but the first step to solving a problem is discovering the issue, so this is an important step in finding a solution. 🐾