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Wildlife Effects of EDCs (Endocrine Disrupting Chemicals)

Invertebrates

Snails and other mollusks living in coastal areas around the world developed male reproductive organs after being exposed to the organometal tributyltin (TBT). TBT is an ingredient in anti-fouling paint used to rid boats and ships of barnacles and other unwanted hitchhikers. Even at very low concentrations (1 part per billion), TBT causes female snails to grow a penis that blocks their egg-releasing duct. The females then produce eggs that cannot be fertilized and released. In the 1980s and 1990s, populations of coastal marine snails in Europe, North America, and Asia dwindled rapidly. In response to this problem, TBT is now restricted to use on ships longer than 25 meters (75 feet).

Fish

Widespread feminization occurs in the United Kingdom (UK). Male fish with feminine characteristics are found near freshwater municipal sewage outlets in England. The fish have intersex organs that produce fewer motile sperm than normal testes, have skewed blood levels of the estrogen hormone estradiol, and have livers that produce vitellogenin, an egg-yolk protein normally found at extremely low levels in males. Studies have showed that these intersex males had very low sperm counts and were less fertile than normal males.

Scientists have found two groups of compounds that are the most likely culprits: the alkylphenols (breakdown products of chemicals found in detergents and plastics) and natural and synthetic [estrogens](#), including 17-beta-estradiol, estrone, and 17-alpha-[ethinylestradiol](#) (Desbrow et al. 1998; Jobling and Sumpter 1993; Routledge et al. 1998).

Masculinized females occur in some rivers in the United States. Female mosquitofish living downstream from paper mill wastewater outfalls in the southeast develop male genital organs and male courtship behavior (Bortone et al. 1989; Howell et al. 1980). This apparent sex change is only superficial, as masculinized females have ovaries and give birth to live babies, just like normal females of this species (Bortone and Davis 1994). How the physical and behavior alterations might affect reproduction and populations is still unclear.

Pulp and paper mill effluents can also suppress or inhibit reproductive capacity in male and female fish. Certain species of wild fish in Canada, Norway, Sweden, and the US have lower sex hormone levels, take longer to reach puberty, and have reduced fertility.

Amphibians

Wild frogs in the US suffer from sexual disruption. Up to 9 percent of cricket frog populations in Illinois are intersex. That is, the frogs have eggs in the testis or have one complete testis and one complete ovary, instead of

the normal two testes or two ovaries (Reeder et al. 2005). Ten - 90 percent of male northern leopard frogs collected in 2001 in the upper Midwest also had eggs in the testis (Hayes et al. 2003).

Reptiles

One of the most well-known examples is from alligators living in Florida's Lake Apopka. The animals were exposed to the estrogenic pollutants dicofol and [DDT](#) and its metabolites, DDD, DDE, and chloro-DDT, after an extensive chemical spill in 1980. The lake's alligator population plummeted during the next 10 years.

Eggs and newborn alligators had higher than normal mortality. The eggs were loaded with high concentrations of p,p'-DDE, p,p'-DDD, and other [organochlorine pesticides](#). Teenaged females had severe ovarian abnormalities and blood estrogen levels two times higher than normal. The male juvenile alligators were feminized. They had smaller than normal penises, abnormal testes, and higher estrogen and lower testosterone levels in their blood than normal males of the same age.

Birds

Since the 1950s, fish-eating and predatory bird populations have suffered a variety of health problems due to organochlorine pollutants, including poor reproductive success, growth retardation, and goiter (an over-sized, over-worked thyroid gland). The birds are burdened with a stew of [organochlorines](#), especially p,p'-DDE (a breakdown chemical of the pesticide DDT) and [PCBs](#).

Reproductive failure in bald eagles, brown pelicans, gulls, and other birds of prey during the 1970s through the early 1990s was mainly due to eggshell thinning caused by p,p'-DDE .

Mammals

In mammals, the best evidence comes from the field studies on Baltic grey and ringed seals and from the semi-field studies on Wadden Sea harbor seals, where both reproduction and immune functions have been impaired by [PCBs](#) in the food chain. Other mammals affected include the polar bear, mink, rabbit, and guinea pig.

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