Developmental abnormalities in free-living anurans from agricultural habitats

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Preliminary results

Developmental abnormalities were recorded in wild-caught American toads (*Bufo americanus*), bullfogs (*Rana catesbeiana*), gray treefrogs (*Hyla versicolor*), green frogs (*Rana clamitans*), mink frogs (*Rana septentrionalis*), northern leopard frogs (*Rana pipiens*), spring peepers (*Pseudacris crucifer*), and wood frogs (*Rana sylvatica*) in agricultural habitats of the St. Lawrence River Valley of Québec, Canada, between 1992 and 1996.

Limb deformities were observed in 300 metamorphosing anurans out of 4 286 (7,0 %) examined in 60 sites exposed to pesticides, compared to 16 of 1075 (1,5 %) in 26 control sites. The prevalence of limb deformities among contaminated sites varied from 0 to 67 %, and from 0 to 7,7 % in control sites. Among adults, 19 of 732 (2,6 %) had limb deformities in 54 pesticide-exposed sites, while 11 of 693 (1,6 %) were malformed in 27 controls.

Limb deformities included cases of ectromelia, ectrodactyly, polymely, polydactyly, syndactyly, clinodactyly, cutaneous fusion between the femur and tibiofibula, and five other types of limb abnormalities. Of 3 655 metamorphosing anurans examined in 1996, we observed 126 cases of limb deformities (34,5 ‰), 41 cases of limb and/or digit amputation (11,2 ‰), 14 unilateral anophthalmia (3,8 ‰), 12 black-eyed frogs (3,3 ‰), 12 cases of melanism (3,3 ‰), 10 blue frogs (2,7 ‰), 8 cases of generalized edema (2,2 ‰), 7 cases of eye anomalies (1,9 ‰) including 3 ectropic eyes, 3 deformed jaws (0,8 ‰), and 2 cases of traumatic enucleation (0,5 ‰).

Histopathological examination of limb deformities has not yet revealed any etiologic agents. Preliminary statistical analysis indicates no significant difference in occurrence of limb deformities between pesticide-exposed and control populations. However, the prevalence and diversity of deformities in some of the farmland habitats, their simultaneous occurrence in more than one species at given sites, their overall diversity, and the fact that many agents are potentially harmful to anuran development, emphasize the need for further studies under both field and laboratory conditions.