

[Purchase](#)[Export](#)[Search ScienceDirect](#)[Advanced search](#)

Article outline

 Show full outline

Abstract

Keywords

1. Introduction

2. Materials and methods

3. Results

4. Discussion

Acknowledgements

References

Figures and tables



Table 1

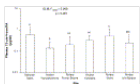
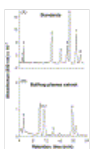


Table 2

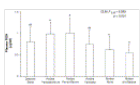
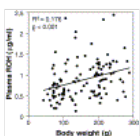


Table 3

ADVERTISEMENT

Aquatic Toxicology

Volume 71, Issue 2, 26 January 2005, Pages 109–120



Plasma retinoid profile in bullfrogs, *Rana catesbeiana*, in relation to agricultural intensity of sub-watersheds in the Yamaska River drainage basin, Québec, Canada

Virginie E. Bérubé^{a, c}, Monique H. Boily^{a, c}, Chistian DeBlois^{b, c}, Nathalie Dassylva^b, Philip A. Spear^{a, c}

[Show more](#)

Choose an option to locate/access this article:

Check if you have access through your login credentials or your institution

[Check access](#)[Purchase \\$35.95](#)[Get Full Text Elsewhere](#)<http://dx.doi.org/10.1016/j.aquatox.2004.10.018>[Get rights and content](#)

Abstract

Amphibian populations are decreasing globally and the causes are presently unclear. Retinoids have been extensively studied in other vertebrate classes where they are associated with pleiotropic effects such as susceptibility to disease (including cancer and parasitic infections), deformities and reproduction. To investigate the hypothesis that retinoid homeostasis is influenced by agricultural activities, blood samples were collected from adult bullfrogs, *Rana catesbeiana*, at each of six sub-watersheds chosen to represent a gradient of agricultural intensity within the Yamaska River drainage basin. Samples of surface water were collected at each of the study sites approximately 1 month after spraying and analyzed for 53 pesticides. Male body weight was significantly different ($p < 0.001$) between study sites with the smallest bullfrogs captured from the Rivière à la Barbe sub-watershed associated with high agricultural intensity. A significant linear regression ($p < 0.001$; $R^2 = 0.176$) was obtained between plasma retinol and body weight. Plasma retinol concentrations were significantly different between study sites ($p < 0.001$) being lowest at both Rivière Noire and Rivière à la Barbe. More than 60% of the land area in these sub-watersheds is under intensive corn–soya cultivation and surface water contained the highest concentrations of the herbicides atrazine, deethyl-atrazine, simazine, metolachlor, dimethenamide, chlopyralide, dicamba and bentazone. Plasma 13-*cis*-4-oxo-retinoic acid was significantly different ($p < 0.001$) between sub-watersheds, however this effect was apparently unrelated to agricultural intensity. Plasma retinol was negatively correlated ($p = 0.026$; $r = -0.237$) with plasma 13-*cis*-4-oxo-retinoic acid. These results suggest that retinoid homeostasis in bullfrogs may be influenced by agricultural practices.

Keywords

Amphibians; All-*trans*-retinol; 13-*cis*-4-Oxo-retinoic acid; Pesticides