Survival of chorus frogs in natural and restored environments

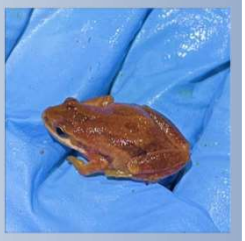
Jeanne Dudemaine[1], Aurore Fayard[1], Emiko Wong[3], Odile Colin[3], Lyne Bouthillier[4], Catherine Doucet[5], Sophie Tessier[6], Vance L. Trudeau[2], Marc J. Mazerolle[1]

Background

- In Quebec, the chorus frog is an emblem of the protection of species at risk. Its population has greatly declined in the last decade due to wetland habitat loss following urban expansion in the Montérégie area in southern Quebec.
- To maintain species at risk, reintroduction in restored environment is a potential strategy to assist population recovery. However, for successful reintroduction, techniques must be tailored to the species of interest.
- Current knowledge on the life span, population size, and survival of the chorus frog in Quebec is fragmentary and required to improve conservation of the species.

Objectives:

(1) to assess the abundance and survival of individuals in reintroduced populations and compare them to natural populations
(2) to determine the impact of larval density in mesocosms on short term and long-term survival
(3) to evaluate the use of environmental DNA to estimate the abundance of individuals



Methods

Estimating adult abundance during breeding season:

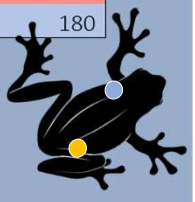
- 2 visits per day during the entire breeding season
- Capture-mark-recapture study in 5 ponds (3 natural, 2 constructed) using PIT tags
- In 2021, 732 metamorphs were released in two constructed ponds in Parc national du Mont-Saint-Bruno

Estimating larval growth and survival in mesocosms:

- 1191 tadpoles in 24 mesocosms (180L per mesocosm) during summer 2022
- Six larval densities:

Densities	Replicates	Tadpole per replicate
0,02	5	4
0,06	5	11
0,1	5	18
0,3	3	54
0,6	3	108
1	3	180

- Metamorphs were marked with Visible Implant Elastomer.
  - 4 colors to code the density (as shown in the table)
  - 2 positions to code the pond of release

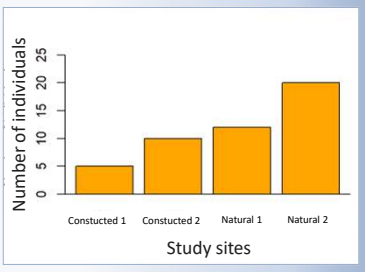


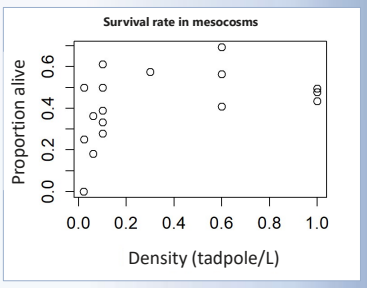
- Release of the individuals in two constructed ponds in Parc national du Mont-Saint-Bruno
- Environmental DNA (eDNA) sampling to estimate the relationship between eDNA concentration and 6 larval densities

Preliminary results

Estimating adult abundance during breeding season:

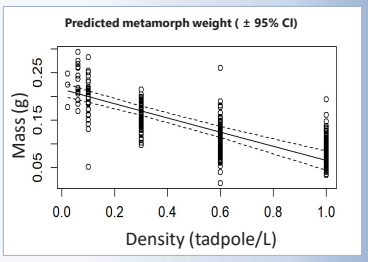
- On 5 ponds studied:
  - Chorus frog occurred in 2 natural sites and the two constructed ponds
  - One natural population went extinct
- 47 individuals were captured, 8 of which were recaptured more than once





Estimating larval growth and survival in mesocosms:

- Metamorphs larger when reared at low densities
- 583 individuals reached metamorphosis
- 571 metamorphs were marked and released in two constructed ponds



Next steps

- Evaluation of carry-over effects of tadpole density on adult survival
- Evaluation of dispersal ability of individuals to colonize other constructed ponds
- Comparison of apparent survival of adults in natural and constructed ponds from three field seasons (2021, 2022, 2023)
- Evaluation of eDNA concentrations to estimate population abundance

M. Sc. Candidate – Forest science. Faculty of Forestery, Geography and Geomatics (2022-2023). Jeanne.dudemaine.1@ulaval.ca

Environment and Climate Change Canada

cef Centre d'étude de la forêt

1 Université Laval

2 uOttawa

3 espace pour la vie biodôme montréal

4 Forêts, Faune et Parcs Québec

5 Sépaq Parc national du Mont-Saint-Bruno