Habitat preference of a new invasive species in Wallonia: the bullfrog (Lithobates catesbeianus)

Youri Martin, Etienne Branquart, Arnaud Laudelout, Hans Van Dyck

Department of ecology and biogeography, University Catholic of Louvain, Louvain-La-Neuve, 2009

Introduction

The Bullfrog (Lithobates catesbeianus) has been recorded in Wallonia (S-Belgium) since 1992 (de Wavrin, 2007). We report on the first study in this region designed to characterize its distribution and habitat use. IUCN considers L. catesbeianus as one of the 100 worst invasive species in the world (IUCN, 2000). It negatively affects native amphibians through competition and predation. Moreover, this frog is known to be frequent carrier of a fungus (B. perezi) that causes the amphibian disease fungal encephalitis (Amphibian chytridiomycosis). This disease significantly contributes to the global amphibian decline throughout the world.

Our study focused on bullfrog habitat use in Wallonia to better understand environmental factors that influence the presence and the invasiveness of the species in this region. It provides basic information that may help us to prevent, predict and choose management options to respond against settlement and spread. Distribution and habitat preference were studied in Wallonia during the summer of 2008. We focused on the surroundings of the two known populations at Ransart (Charleroi) and in the Dyle valley (Brabant Wallon).

Results

L. catesbeianus was observed in a very limited number of water bodies (422) close to introduction sites, reproduction only occurred in 3 ponds (Fig. 2). Logistic regression with backward elimination and AIC models both showed the same results for the landscape and pond variables model.

Bullfrog presence was significantly explained by the distance from the known source population (source zone etude) and the percentage of vegetalized water (vegetalized water + vegetalized water + pourc_eau_veg) (Table 1). Bullfrog use a broad range of habitat types. Habitat preference of a new invasive species in Wallonia: distribution, habitat and régime alimentaire. Synthèse bibliographique - suivi 2000-2001 - Résultats. Bullfrog source in Dyle valley: Grootbroek nature reserve. Bullfrog source in Ransart city: “Les étangs de la Roche Ransartoise”. Bullfrog presence was significantly explained by the distance from the known source population (source zone etude). Bullfrog presence was significantly explained by the distance from the known source population (source zone etude) and the percentage of vegetalized water (vegetalized water + vegetalized water + pourc_eau_veg) (Table 1). Bullfrog use a broad range of habitat types. Habitat preference of a new invasive species in Wallonia: distribution, habitat and régime alimentaire. Synthèse bibliographique - suivi 2000-2001 - Résultats. Bullfrog source in Dyle valley: Grootbroek nature reserve. Bullfrog source in Ransart city: “Les étangs de la Roche Ransartoise”. Bullfrog presence was significantly explained by the distance from the known source population (source zone etude) and the percentage of vegetalized water (vegetalized water + vegetalized water + pourc_eau_veg) (Table 1).

Conclusions

We are only at the early stage of the bullfrog invasion in Wallonia. Even if the bullfrog is present in Ransart since more than 15 years, the species remains highly localized. Probably, this can be attributed to the urban context of Ransart. However, there is spreading in the urban context of Ransart. However, there is spreading in the rural wet landscape of the along the Dyle valley: 22.6 km², Ransart 8.5 km²) were visited at least 10 times. Habitat of the 22 potential sites closest to the corrs populations of Ransart and Dyle valley were characterized using 19 habitat variables (14 pond variables and 5 landscape variables). The significant relationships between habitat variables and adult presence were analyzed by logistic regression. We built 2 models, for the pond and for the landscape variables, and we compute each by logistic regression with backward elimination and AIC test. PCA and Pearson correlation were used to study the structure among variables.

Materials and methods

Adult presence was determined by call surveys during the night (June-July). Tadpole presence was studied by visual inspection and setting during the day (July-August). Sites within both zones (Dyle valley: 22.6 km², Ransart 8.5 km²) were visited at least 10 times.

For further information

For further information on this and related projects can be view in the thesis report: Martin, Y. (2009) Habitat catesbeianus, une nouvelle espèce invasive en Wallonie: distribution, habitat et régime alimentaire. Mémoire de l’Université Catholique de Louvain, pp. 81.