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Is Citizen Science an Effective Tool for Lyme Borreliosis Surveillance ?

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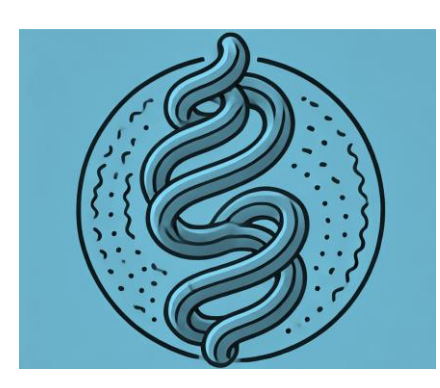
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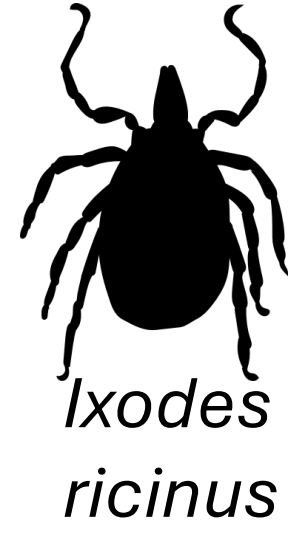
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Context

Lyme borreliosis (Lb) is the most prevalent vector borne disease in France

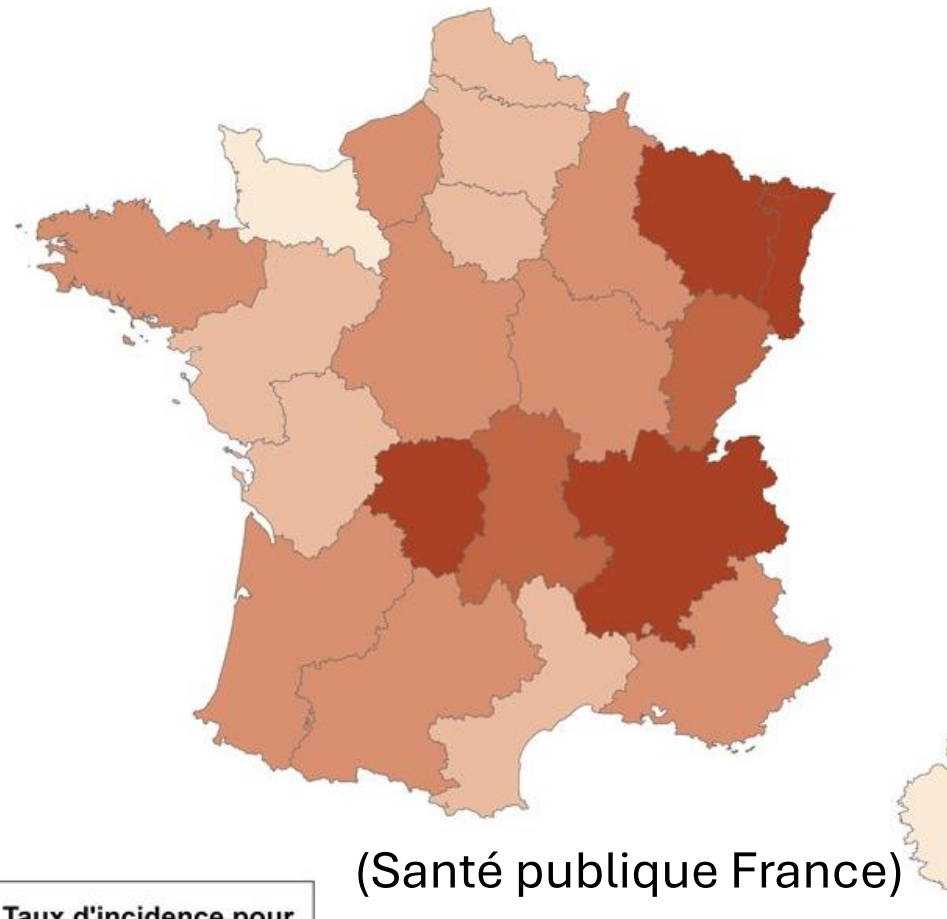


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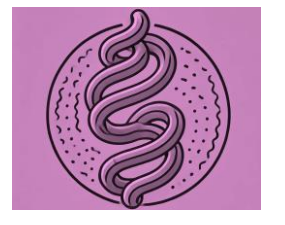
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47 000 cases in 2021



(Santé publique France)

Most frequent species in Europe

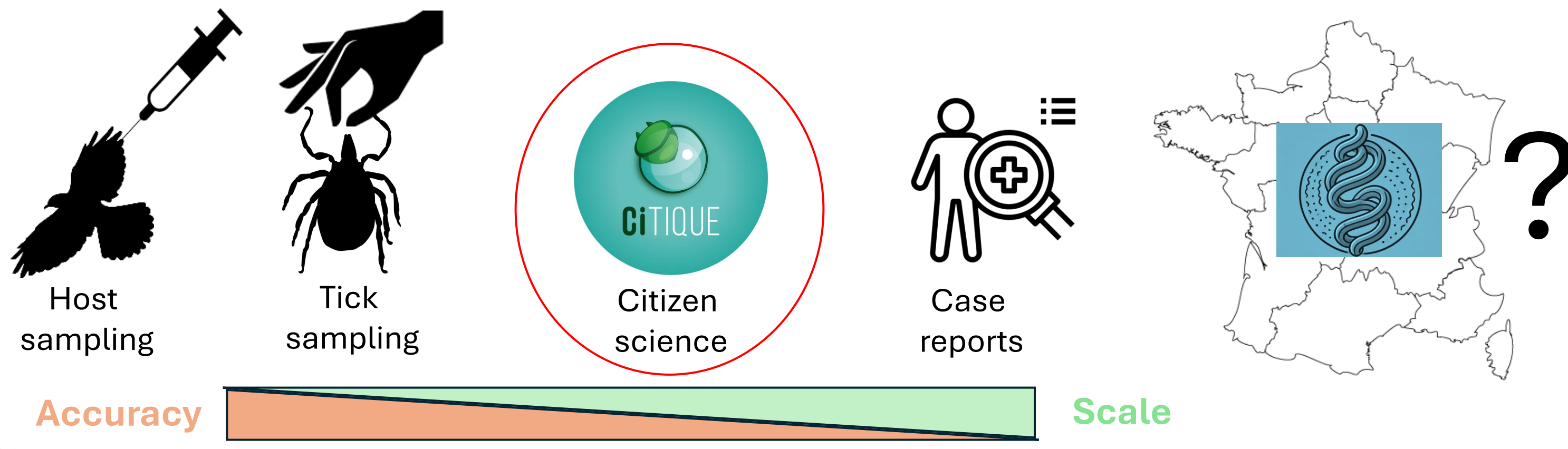


Borrelia afzelii

Borrelia garinii

Monitoring Bbsl distribution is important for risk prevention

Different methods to monitor Bbsl distribution



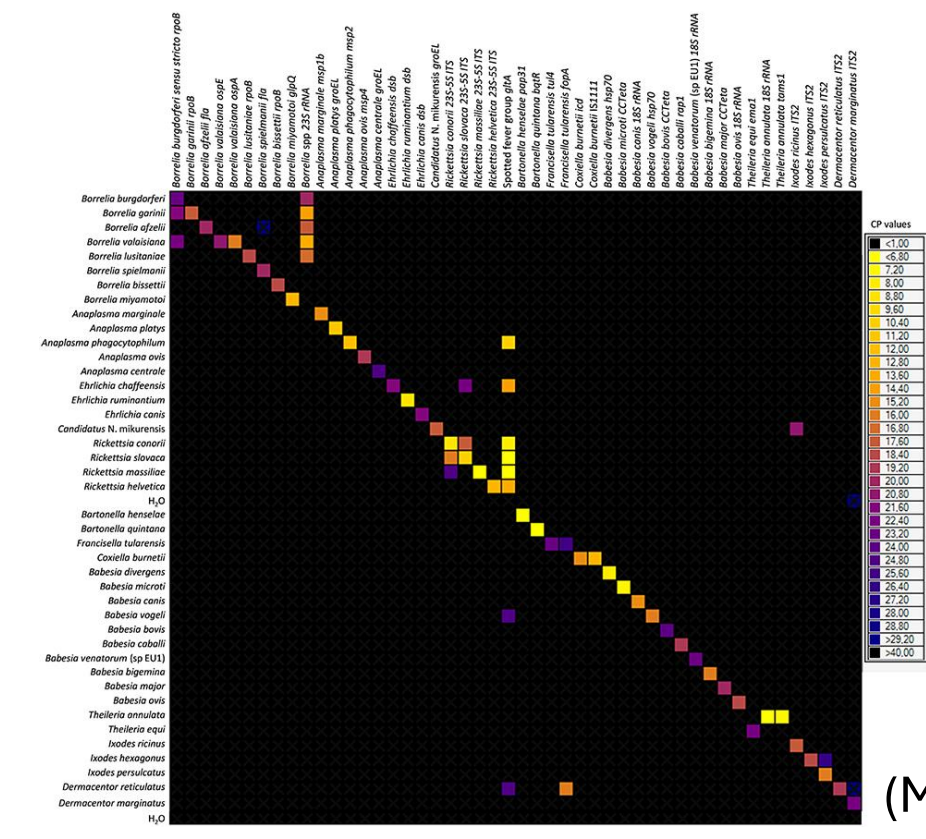
Aim : Identify factors associated with the distribution of Bbsl genospecies in Continental France

Methods

Ticks screening for *Borrelia sensu lato*



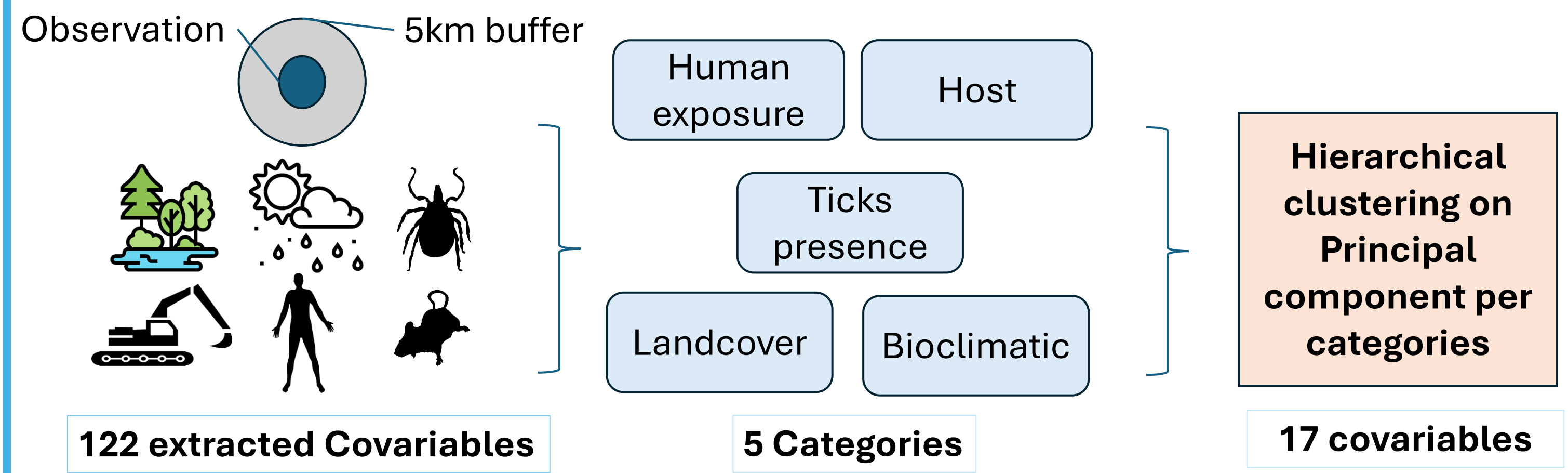
1887 biting *I. ricinus*



BioMark dynamics Systems

(Michelet et al., 2014)

Covariable extraction / selection

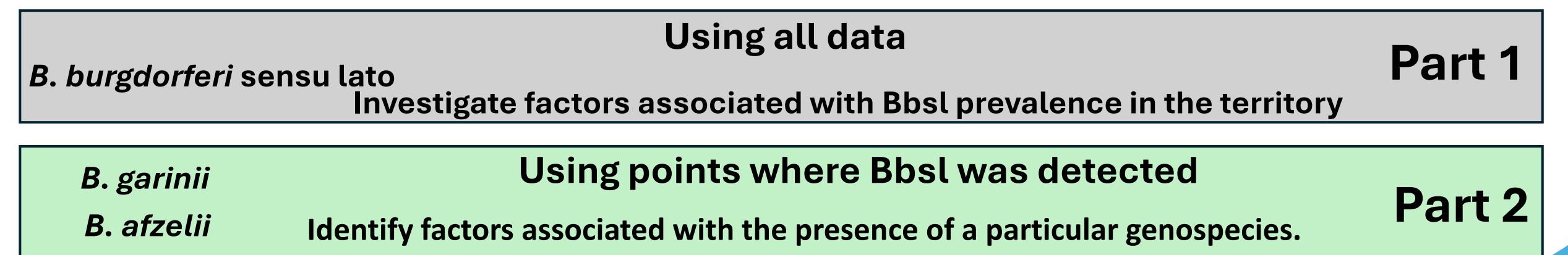


GAM models

Formula

Borrelia ~ Selected covariables + constrained gaussian process on coordinates

Two part modeling



Bbsl Distribution

Most sampling done in the Northern part of the country

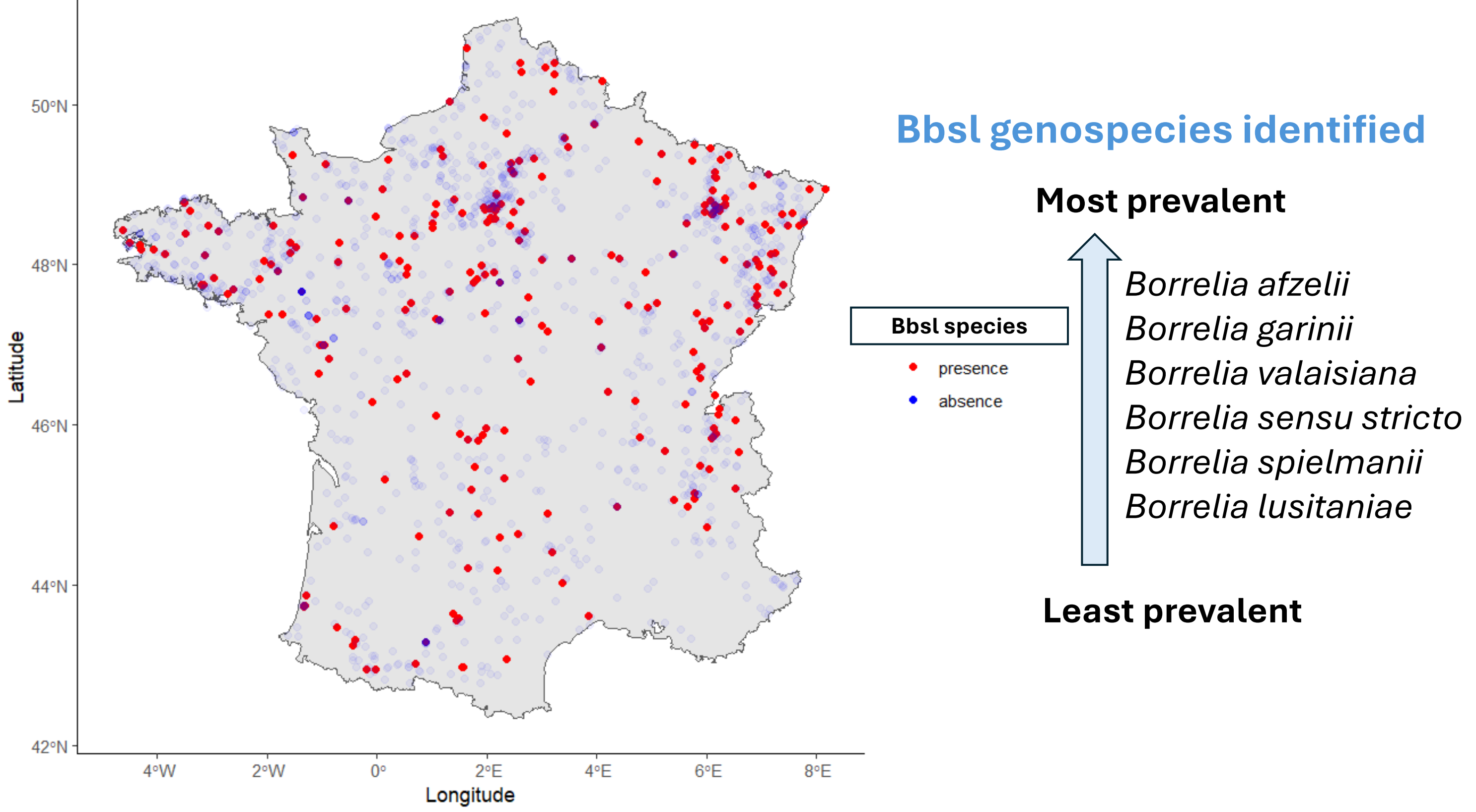


Figure 1 Original location of the ticks sent for pathogens identifications across the French territory.

B. afzelii and *B. garinii* prevalence and associated factors

Borrelia afzelii

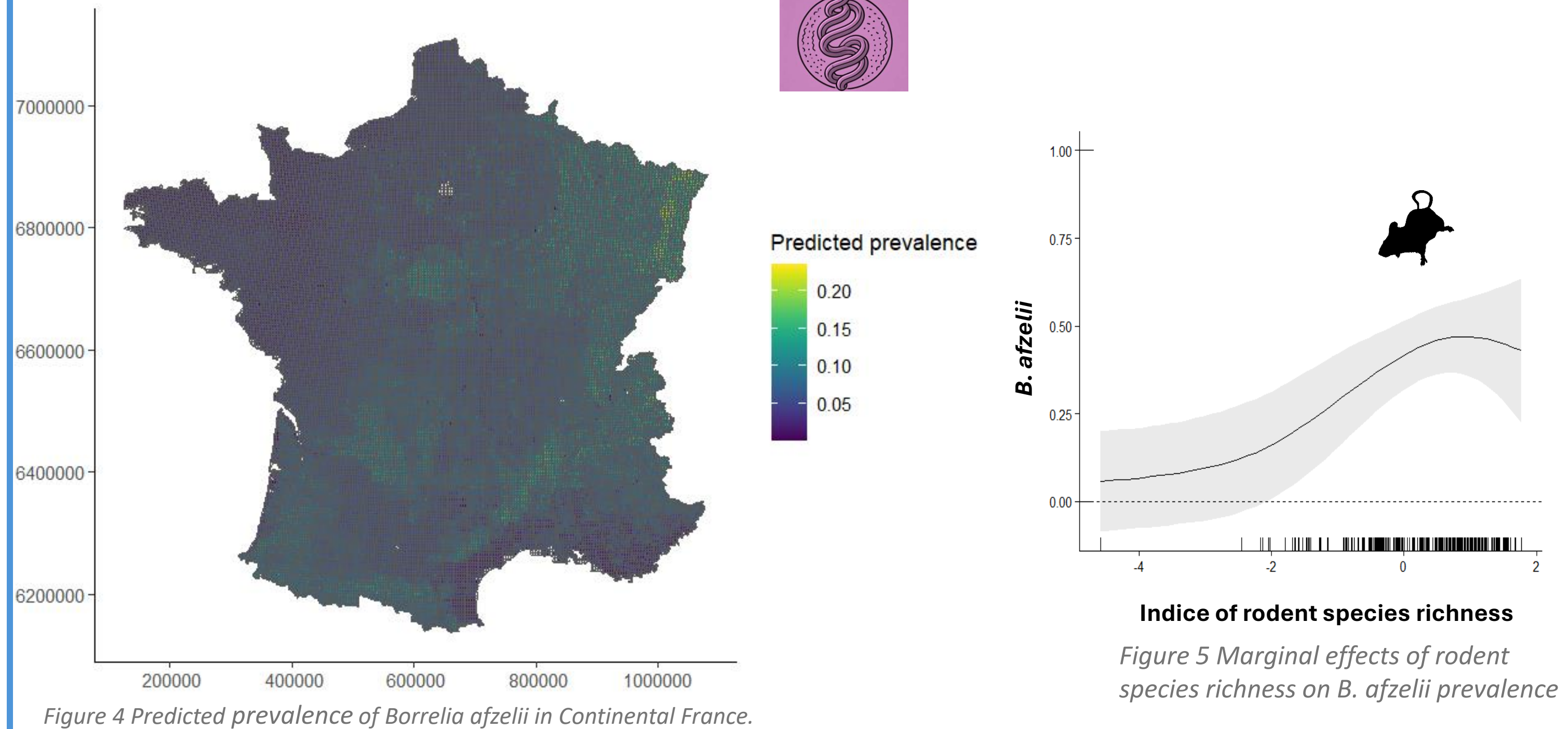


Figure 4 Predicted prevalence of *Borrelia afzelii* in Continental France.

Borrelia garinii

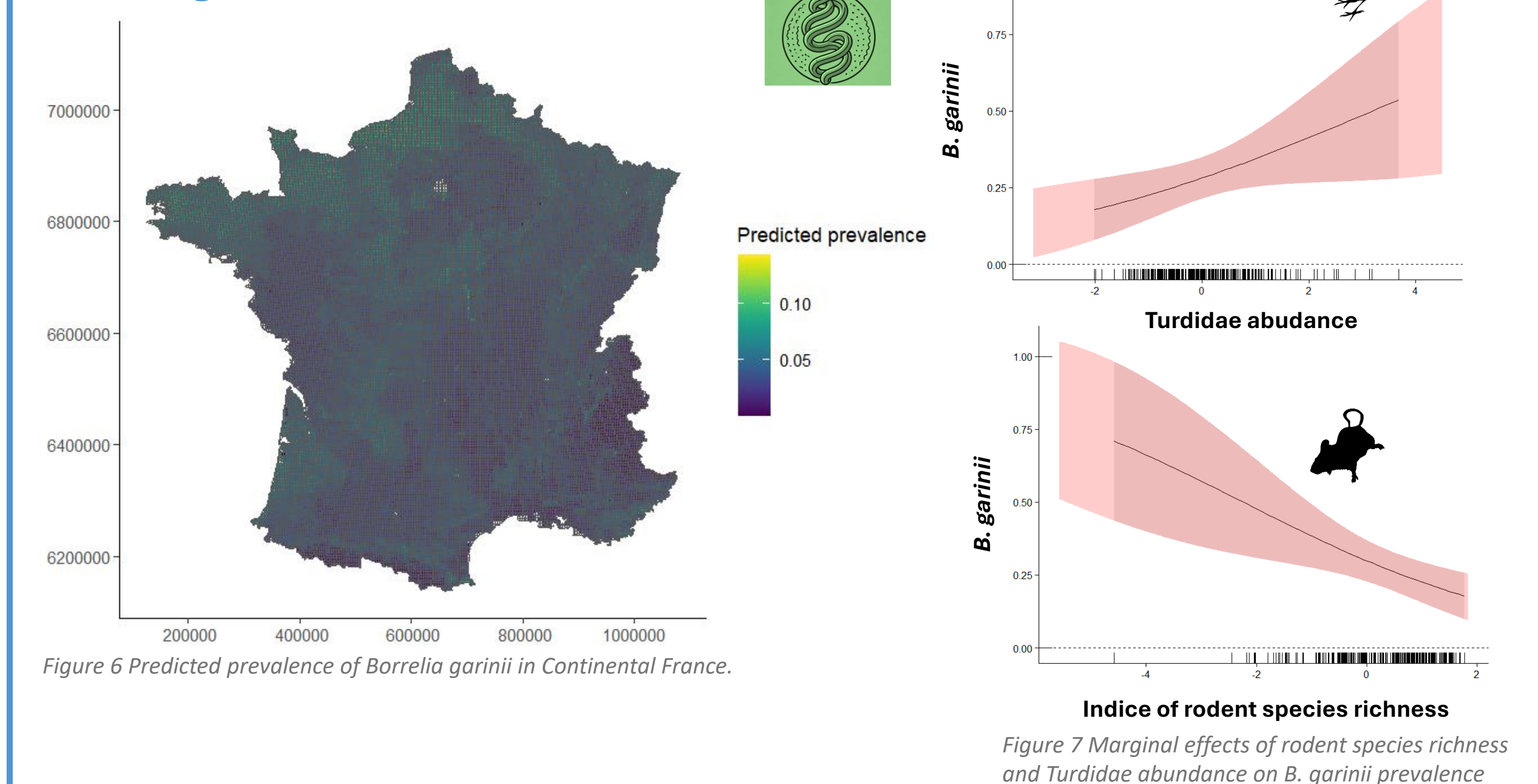


Figure 6 Predicted prevalence of *Borrelia garinii* in Continental France.

Predicted Bbsl prevalence

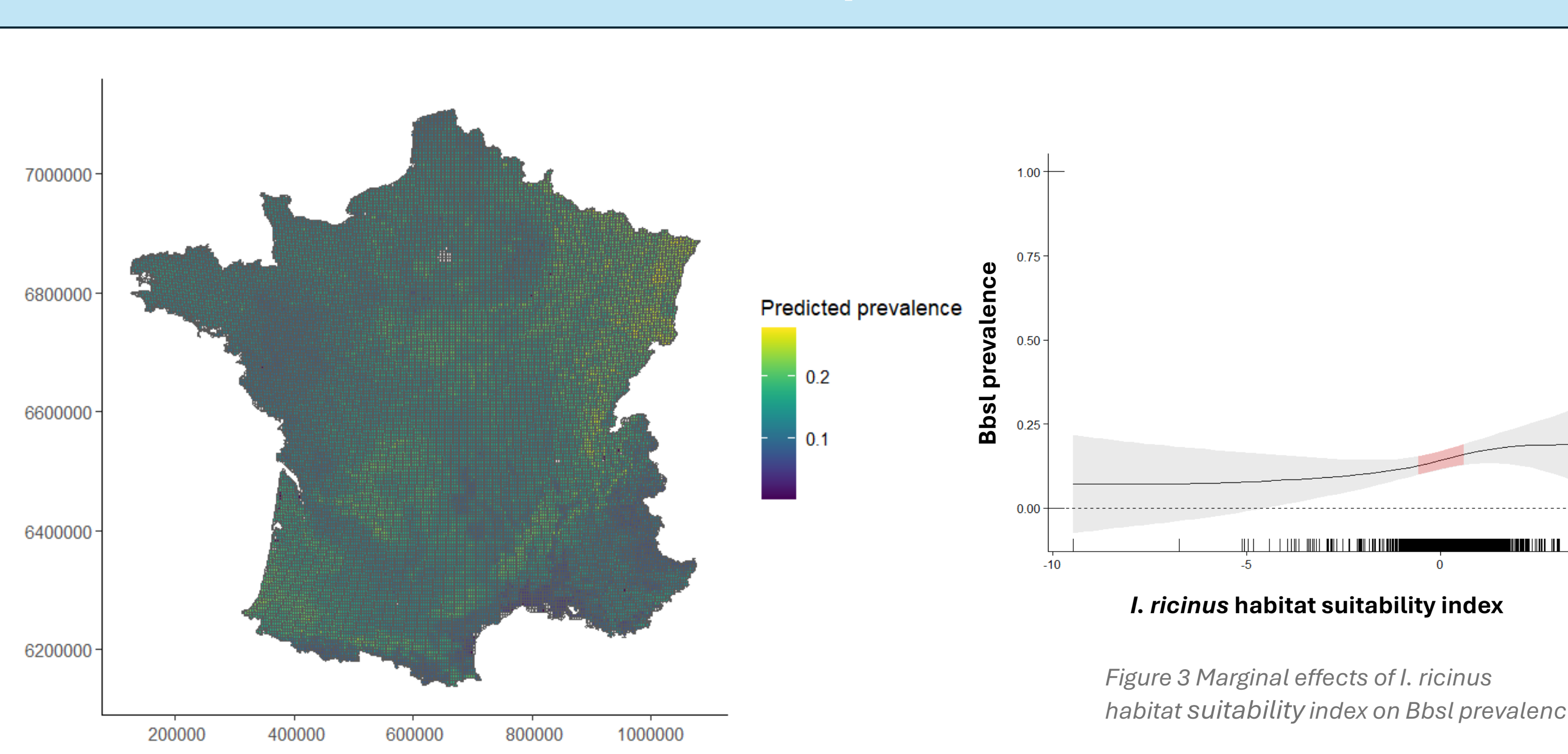


Figure 2 Predicted prevalence of *Borrelia burgdorferi sensu lato* in Continental France.

Figure 3 Marginal effects of *I. ricinus* habitat suitability index on Bbsl prevalence

No common factor between Bbsl genospecies except for tick presence

Take home messages

- ✓ Heterogeneous spatial distribution between Bbsl genospecies
- ✓ Citique (citizen science) is an effective tool to capture broad trends
- ✓ Host differences are a key factor in explaining variations in distribution.

Perspectives

- Reinforce sampling in low sampling areas to investigate local patterns
- Investigate bite reports to identify specific areas and time periods of human exposure.

