

# Spatial spread of the brown rat resistance to rodenticides in Flanders

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**Abstract:** Between 2003 and 2010 two 3-year screening periods (I and II) were conducted to monitor the brown rat resistance to rodenticides in Flanders. Resistance was assessed by means of genetic mutations. The aim of the study was to estimate the degree of resistance in Flanders, to test whether there are differences between the 12 river basins, and whether the resistance is increasing over time. Multiple rats per location were caught.

Several statistical analyses were performed on these data. On the one hand, aggregated results per location (presence/absence of resistance, defined in several ways) were analysed using logistic regression (glm), while on the other hand, mixed model logistic regression (glmm) was used on the rat-level to incorporate correlations between rats from a single location.

The level of resistance differed strongly between river basins, some being almost completely resistant, while in others resistance was nearly zero. Correlation was strongest between rats within a location, but variograms also showed a strong correlation between nearby locations (<6km).

The number of locations (resp. rats) per river basin ranged from 2 to 54 (resp. 2 to 151) for screening I, and from 4 to 65 (resp. 11 to 110) for screening II. Due to these small numbers, the estimate of resistance was inaccurate for some river basins. Also, evolution of resistance over time was not analysed, since data collection in both screening periods was not comparable. A more balanced follow-up monitoring program, with enough rats and locations per river basin, has been designed to answer all questions more accurately in the future.