



STATISTICAL MODELING AND PREDICTION OF HFRS INCIDENCE IN THE UDMURT REPUBLIC, 1973-2009



Table. Model selection (1-order only, since collinearity) for accurate and early prediction for detrended HFRS Incidence in the Udmurt Republic, 1973-2009. Predictors: winter breeding in bank vole and its density in June & August in t year, Linden & Spruce yield (0-5 rank scale, or {0...3}=0, {4-5}=1) in t-1 year

Predictor (Xi) in 1-order model	K	-2LL	L.R.	w_{CAIC}	Prior desirability	PW
1. Winter breeding	2	-26.58	35.47	0.786	0.25	0.197
2. Linden, 0/1, (t-1)	2	-23.96	32.85	0.212	1	0.212
3. Linden, 0-5, (t-1)	2	-13.86	22.75	0.001	1	0.001
4. Density, June	2	-11.98	20.86	0.001	0.125	1.E-04
5. Density, August	2	-3.24	12.12	7.E-06	0.063	4.E-07
6. $[H_0]$	1	8.89	-	2.E-07	-	-
7. Spruce, 0-5, (t-1)	2	6.70	2.18	5.E-08	1	5.E-08

$$CAIC = -2LL + K[1 + \log(n)],$$

$$\Delta CAIC_i = CAIC_i - CAIC_{best},$$

$$w_i = [\exp(-0.5 \Delta CAIC_i)] / [\sum \exp(-0.5 \Delta CAIC_i)],$$



Fig. 1. The bank vole (*Clethrionomys (Myodes) glareolus* Schreb., 1780) is the main reservoir of Puumala (PUUV) Hantavirus, which causes hemorrhagic fever with renal syndrome (HFRS) in humans.

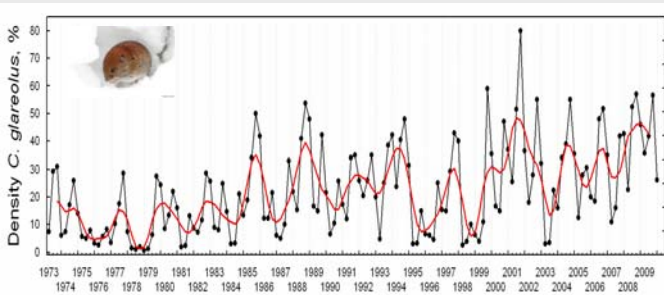


Fig. 3. Dynamics of bank vole in lime-spruce forests UR (1973 – 2009). Red line – 1 year moving average.

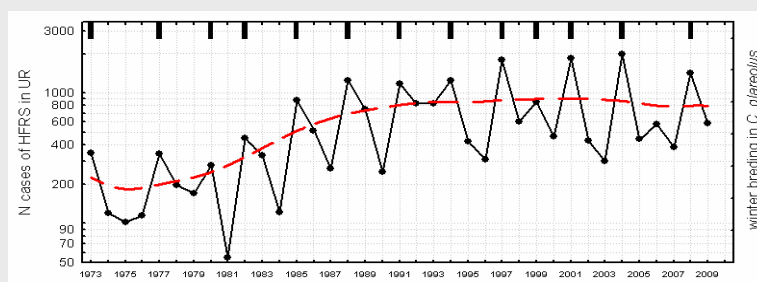


Fig. 2. Time series of HFRS incidence in UR (1973 – 2009). Dashed line – s-shaped trend. Black bars (top) – winter breeding in bank vole.

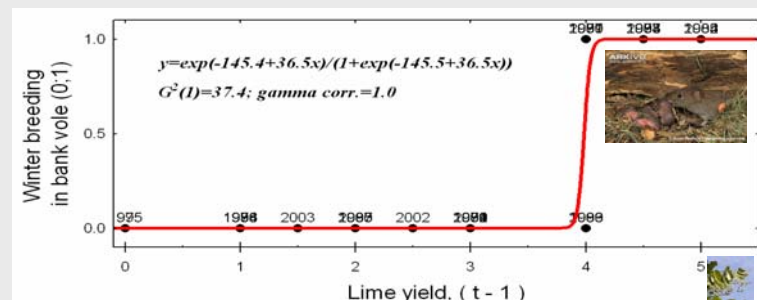


Fig. 4. Dependency of winter breeding in bank vole (logit regression) on linden nuts yield in the preceding year. UR (1973 – 2009).

