



# ABUNDANCE AND DIVERSITY OF SMALL MAMMALS UNDER INDUSTRIAL POLLUTION



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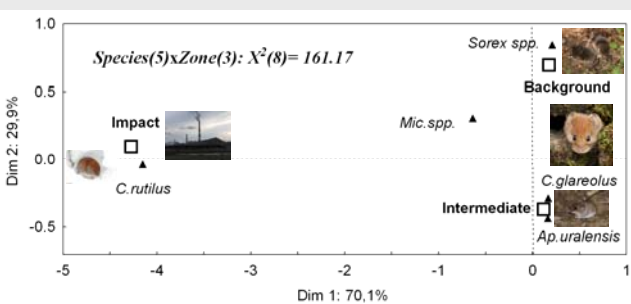
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**Table.** Model selection for density of small mammals [ $\arcsin(2p-1) = b_0 + \Delta \text{Smelter}_j + \lg(x)b_1$ ] near four copper/nickel smelters, 2008-2010. Predictors: 4 smelters : 3 years (7 levels), Lg(distance).

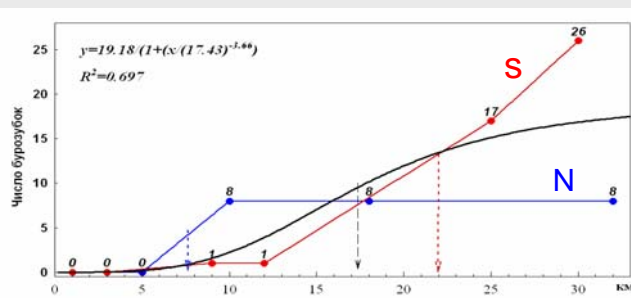
Model	K	-2LL	CAIC	$\Delta$	w
1. Lg(x) + Revda, 2010	3	-52.58	-39.83	0	0.999
2. Lg(x) + Smelter-year	8	-60.88	-26.89	12.94	0.002
3. Lg(x)xSmelter-year	14	-63.14	-3.66	36.17	1E-08
4. Lg(x)	2	-4.89	3.61	43.44	4E-10
5. Smelter-year	7	-5.82	23.92	63.75	1E-14
6. H <sub>0</sub>	1	21.38	25.63	65.46	6E-15

$$CAIC = -2LL + K[1 + \log(n)], \quad \Delta CAIC_i = CAIC_i - CAIC_{best},$$

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

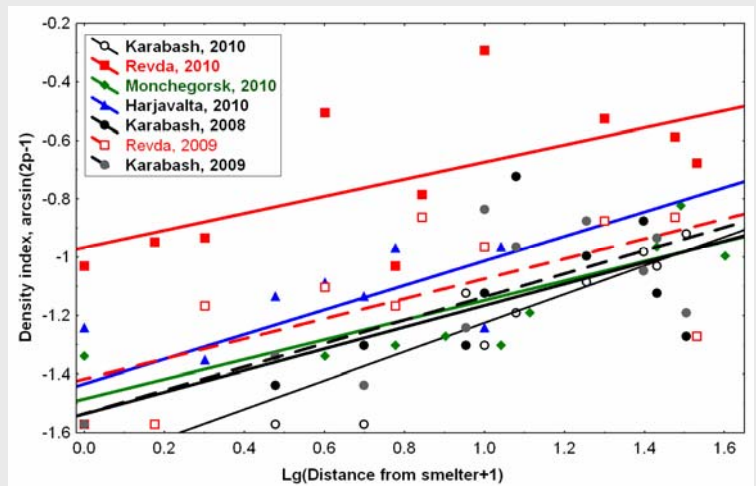


**Fig. 2.** Ordination of the small mammals community (species x zone of pollution), near Karabash copper smelter, 2008-2009.



**Fig. 3.** Density of the shrews near Karabash copper smelter, North & South directions, 2008-2009.

We studied abundance and diversity of small mammals (SM) – rodents and shrews near copper/nickel smelters in Russia (Revda, Karabash, Monchegorsk) and in Finland (Harjavalta). Ten sampling plot were established along 1-30 km distance from each smelter, consisting of 3 lines with 25 snap-traps per line and exposed during three nights each, in total 879 SM were caught. As the distance from the pollution source we observed (Table, Fig. 1) significant increase (min-max): density (from 0.7-1.3 to 4.6-10.0 ind./100 trap-nights) and biomass (from 11-35 to 76-211 g/100 trap-nights) of SM populations; species richness of SM community (from 0.2–1.7 to 3.2–3.4 species/plot). Distinct trophic/taxonomic groups demonstrated a different response on industrial pollution (Fig. 2). The most vulnerable to heavy metal pollution and/or habitat disturbance are insectivorous mammals (Fig. 3).



**Fig. 1.** Density of the small mammals along the distance from the pollution source, near four copper/nickel smelters, 2008-2010. Note, there was simply the Peak phase at Revda in 2010!

