Poster Session 1 – Population Dynamics

50 Drivers of *Microtus arvalis* population dynamics : lessons from a 17 year time series

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Common vole population dynamics appear to be strongly correlated to landscape configuration. In comparing time series of vole populations in various regions of France, Delattre et al. (1992) reported a variety of patterns, ranging from low density populations prone to local extinction in intensively tilled homogeneous agricultural landscapes, to multi-annual large-amplitude variations of population densities in permanent grassland landscapes. These observations support the Trophic ROMPA (Ratio of optimal to marginal patch habitat) Integrated Model (TRIM) outlined by Lidicker (2000), which combines the exploitation ecosystems hypothesis (Oksanen and Oksanen 2000) with the effect of spatial arrangements of habitats on vole dispersal and predator communities. In landscape of high productivity and large proportion of optimal habitat Lidicker (2000) TRIM and Delattre et al. (1992) conceptual models predict that (1) vole population dynamics will be driven mostly by extrinsic rather than by intrinsic factors. In practice, population dynamic features, except for seasonality (reproduction stop in winter) should not be driven by reproduction variation; (2) population peaks will last longer and at the extreme tend to produce larger amplitude fluctuations with only seasonal variation and no cyclicity. In this presentation, we consider a 17 year (1979-1996) time series of *Microtus arvalis* population fluctuation in eastern France, in a landscape where the ratio of permanent grassland in farmland is near 100%. We show that: (1) large multiannual population variation (> 5 years) and long (multi-annual) high density peaks (hundreds ind./ha) can be observed with no delayed density dependence (thus no cyclicity); (2) meteorological conditions have a delayed and direct impact on reproduction parameters but not on population dynamics and (3) population declines in spring and summer are not explained by reproduction variation, hence explained by mortality increase. This corroborates Lidicker and Delattre's models and indicates that the drivers of population dynamics might be a combination of predation/disease/social stress. To isolate or weigh each of these factors is however virtually impossible yet for methodological reasons.

459
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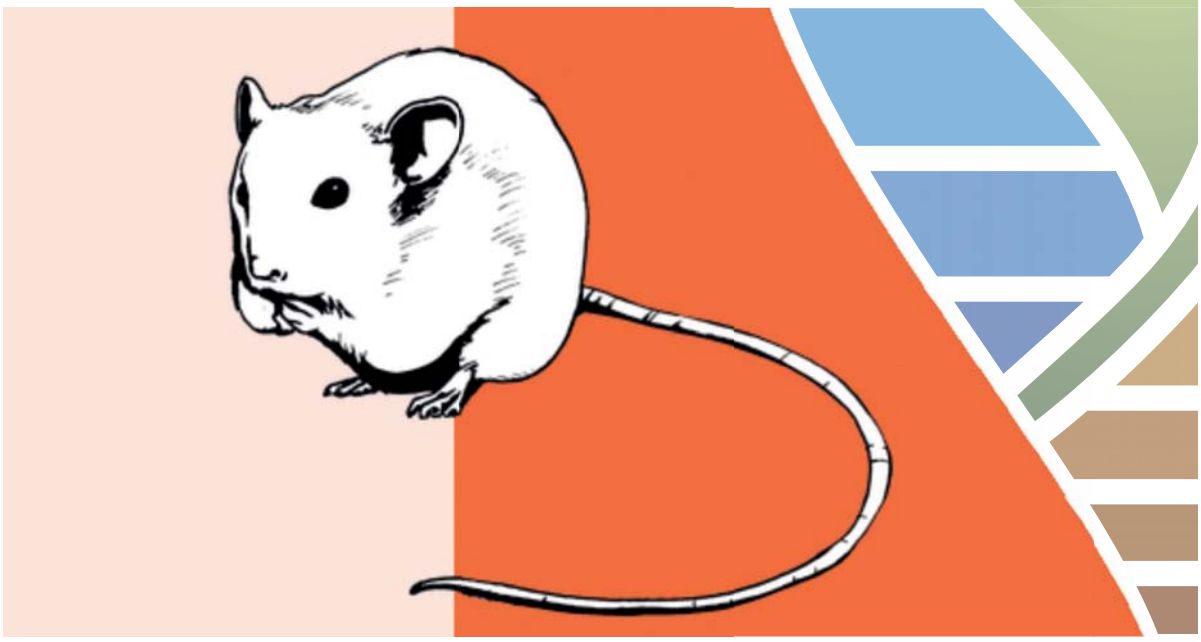

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459
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