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EURODEER: a tool for integrating roe deer data at the biogeographic scale

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GPS collars represent a powerful tool for roe deer monitoring in terms of quantity and precision of locations, independence of fixes from operator bias, survey schedule flexibility and continuity. Location data can be joined to environmental or climatic information, thus stimulating advanced analyses at the ecosystem level. This perspective is particularly intriguing when datasets from different regions are put together to investigate variation in roe deer behavioural ecology along environmental gradients or population responses to specific conditions, such as habitat changes, impact of human activities, different hunting regimes etc. However, there is one drawback, since GPS tracking routinely generates larger data sets than data-management tools commonly used by biologists can presently handle. Similar considerations apply also to other large datasets than GPS data, e.g. long time series of VHF data or activity data. Spatial data, such as animal locations, were traditionally stored in flat local files, accessible by a single user at a time and analysed by a number of independent applications without any common standards for interoperability. The availability of appropriate software would provide researchers and decision makers with opportunities to take full advantage of the richness of GPS data or long time series of VHF and activity data, allowing to work in a multi-user environment. EURODEER (EUropean ROe DEER Information System) is an information system with a spatial database at its core and several client applications to help storing, managing, accessing and analysing GPS data from several research groups throughout Europe. In this paper, we exemplify its structure and underline its utility and potentiality to address general questions on biology and ecology of European roe deer at biogeographic scale. In particular, roe deer GPS data from six research groups are being stored in it, obtaining a dataset of several hundred thousand locations from more than hundred individuals, both females and males, monitored for at least one year. As a pilot study, we analysed seasonal and circadian movement patterns of individuals throughout the study areas, to assess how universal some aspects of spatial behaviour are, including increased activity at twilight or female excursions during the rut.