Mgr. Jaroslav Červinka
Project title: **Distribution and habitat preferences, of the golden jackal (*Canis aureus*) in European range: comparison of different landscape types**

2. Objectives, methods

Project aims The main goals of this project are to assess the distribution and habitat use of the Golden Jackal species (*Canis aureus*), an omnivorous and opportunistic mammal, which is showing recently, an increasing resettlement of the center and southeastern parts of Central Europe. The Project's activities will be performed in eight study areas across its distribution range in Europe. In particular our research interest will be focused to determinate (i) the main habitat characteristics that influence the distribution and numbers of Golden Jackals, (ii) impact of two different landscape managements: intensively vs. extensively (abandoned) used pastoral landscape on Golden Jackal distribution. Our results will bring first detailed information about Golden Jackal distribution and habitat association, applicable for local landscape planning and for its conservation management.

Study areas We will study different stable and scattered populations of Golden Jackal distributed in the European range (Italy, Slovenia, Croatia, Serbia, Hungary, Romania, Bulgaria and Greece). The study areas differ by level of habitat fragmentation, land use and farming management.

Project design The Golden Jackal distribution will be examined based on linear transects using acoustic monitoring (see below) in the two different landscape types. The study transects will be divided into 4 by 4 km quadrates with one calling station within each quadrate to achieve independence of replicate sites. We selected the quadrate size followed Giannatos et al. 2005, who determined the maximum human hearing distance on windless nights from vantage point in an open terrain with no background noise to the two kilometers (see also Krofel 2008). Each transect will be consists of five calling stations (total length = 20 km/transect). Prior to the field work, the study transect will be chosen along roads based on digitized aerial orthophotograph maps (1:5000) using a geographical information system (GIS, ArcView 3.2a - Environmental Systems Research Institute, Inc. 2000). Moreover position of the calling stations will be adjusted according to topographical characteristics in the field in order to optimize sound transmission. In total, we will establish 70 linear transects (350 calling stations).

Special research focus will be concentrated on monitoring of the Golden Jackals in the Bulgaria. In this area we will examine the impact of agricultural abandonment of pastoral landscape of Golden Jackal distribution and population density. To achieve this objective we will establish 20 linear transect in the agriculturally abandoned pastoral landscape and compare it with 20 transect in intensively used pastoral landscape.

Golden jackal monitoring Golden Jackal sampling will be based on acoustic (play-back) monitoring which is widely and commonly used method to determine distribution patterns and habitat preferences of social and vocal territorial carnivores (Gese 2001, Giannatos et al. 2005, Krofel 2007, 2008, 2009, Szabó et al. 2007). Similarly this method was recently successfully used for Golden jackals monitoring in European conditions (Giannatos et al. 2005, Krofel 2007, 2008, 2009, Szabó et al. 2007). Monitoring will be conducted during the highest Golden Jackal vocal activity (one hour after sunset till the midnight, Giannatos et al. 2005, Krofel 2008, 2009), with favorable meteorological conditions (no rain or strong wind). The localities will be visited

at least once during early breeding period (April – May) when jackal activity is mainly concentrated to the core territory around their dens (Jhala and Moehlman 2004).

The acoustic monitoring is based on broadcasting of jackal howling from the *calling station*, which stimulate the Golden jackals to respond and thus identification of the accurate position of individual/group is possible. At calling station the recorded yip-howl by three to four Golden Jackals will be broadcasted for 30 seconds and followed by 3 minutes pause. This set of broadcast and pause is repeated 4 times at each calling station giving a total time ca. 15-20 minutes per each station, with a total of five acoustic stimulations per station. At each calling station we will note the time needed for jackals to respond and the number of howling jackals (single or a group). It is assumed that each response-direction coincided with a territorial group (Giannatos et al. 2005, Krofel 2008).

In addition, this method will be supplemented by direct observation of the Golden Jackals in the surrounding of the calling station using spotlights when animals are detected usually by eye shine (Gese 2001, Giannatos et al. 2005, Krofel 2009).

GIS analysis To investigate the factors which affect Golden Jackal distribution we will investigate landscape characteristics in each study quadrate (4 x 4 km). Landscape characteristics describe land use in broader surrounding of study quadrates and these variables are known to be important in carnivore habitat use and population density (Virgós et al. 2002, Gehring and Swihart 2003, Pita et al. 2009) and is also derived from average home range size of the Golden Jackal during the breeding season (Nowak 1999, Giannatos 2004, Sillero-Zubiri et al. 2004). Proportion of each habitat (forest, agricultural and water area, human settlements) in selected area will be determined by digitized aerial ortho-photo-maps (1:5000) using geographical information system (GIS; ArcView 3.2a - Environmental Systems Research Institute, Inc. 2000). Similarly we will measure commonly used configuration metrics (e.g. including mean patch size, edge density, Shannon's Diversity Index etc.) and monitor agricultural exploitation of study areas (grazed or abandoned).