"Fruiting gaps" and mechanisms behind long-distance seed dispersal events in interactions between oaks *Quercus* spp. and Eurasian Jays *Garrulus glandarius* L.: the role of seed crop size, recaching, and satiation

There is a simple reason why animals carry seeds from the source: the risk of loss of scattered seeds decreases inversely with the distance from the cache to the source area, where the predators forage more intensively. That reason results in complicated relationships between the Eurasian Jay (hereafter Jay) and oaks by some authors recognized as a symbiosis because acorns allow Jays to survive winter food scarcity and Jays enhance the reproductive success of oaks. In Europe, Jay is considered to be a typical acorn eater and disperser and thus a key species in the dispersal and expansion of the genus *Quercus*. But is there something important that we do not know about Jay and oaks? My former initial research showed that Jays still have many secrets! One of them is the fate of collected acorns by Jays when resources are changing, i.e. when acorns availability decrease in non-mast years. It arises some new questions – how far they are dispersed, how many acorns are eaten and recached? And what about secrets of oaks? They are really unpredictable because no Jays know when they will have mast year… The aim of this study is to get to know the secrets of Jays-oak interactions.

Currently the best way to recognize all the secrets of Jay-oak interactions is to apply radio-tracking transmitters that are put longitudinally into the drilled acorns and then closed and sealed with gel glue. Tagged acorns exhibited on feeders are carried by Jays and stored singly in a variety of scattered caches (Fig. 1). The tracking of tagged acorns will allow me to investigate changes in dispersal distance between- and during seasons in relation to different acorns availability – which will be estimated from seed traps. Stores localization will be helpful to track their fate and to estimate recaching and its relevance for dispersal distance. Data concerning changes in availability of seeds during season and between seasons will be helpful to verify the satiation hypothesis straight on jays and oaks. This research will also deliver new data to answer the questions – how often long-distance dispersal occurs in Jays, how seed crop affect the probability of long-distance dispersal events, what is the reason and frequency of recaching, and what is the rate of pre-dispersal acorns consumption in Jays?

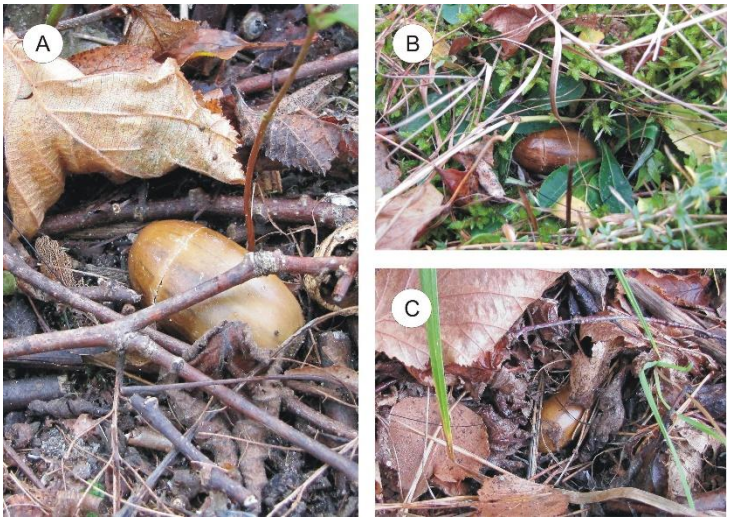

Fig. 1. Different types of Jays' caches of tagged acorns (see sealed place on seed coat). A – acorn cached between stalks and leaves not concealed with litter, B – acorn cached in moss cushion, C – acorn cached in tree litter (photo by P. Kurek).

There are two aspects of pioneering nature of this project that may be recognized as present reasons for choosing the research topic – technical and purely cognitive that will affect the development of the research field. The real novel is the estimation of the fate of acorns stored by jays expressed in three aims that concern not well recognized aspects of jays' behavior (long-distance dispersal, recaching, and satiation hypothesis). Those problems were rarely or none the objects of research or they were tested and analyzed in rodents as a case study and thus need to be further focused on birds as completely different guilds of granivores. Connecting issues of plant-animal interactions and forest ecology makes my project more multidisciplinary and thus has relevant impact on research field.