In recent years, there has been an increasing interest in studies on the bee superfamily (Apoidea), particularly solitary bees, such as the red mason bee (*Osmia rufa*, syn. *O. bicornis*), which is pollinator of agricultural crops and plants in urbanized areas. With the current problem of worldwide pollinator deficits, the knowing as much as possible about biology of the red mason bee, as important element of local biological balance and integrity, is crucial. Yet, information about solitary bees is still rather dispersed and requires to be replenished. It is generally known that *O. rufa* is a polylectic species (pollen generalist without specialization), but with some preferences. Females of red mason bee perform provisioning flights for mud portion to mason brood compartments inside the nests or forage pollen on the scopa to store it inside the nest for offspring, and also to consume an energetic meal of nectar and pollen to survive. Up till recently researchers used various methods to seek for flower preferences of solitary bees, including: observations of behaviour in field conditions, laboratory experiments on preferences, examinations of adult faces, analysis of pollen found on insects abdomens, and analysis of pollen packages. All those results in comparison to floristic composition of the area may indirectly indicate directions and area surface covered by bees' flights, yet they all do not fill all knowledge gaps. Because of that, still little is known about *O. rufa* flight behaviour, except that this solitary bee focus around the emerging place by establishing their nests and can be seen foraging up to 300 meters from that sposts. The observation also indicated that red mason bees show the lowest activity in the morning, returning back to the nest with pollen and/or mud only twice per hour, compared with almost six times per hour at noon and over four times in the evening. Also to determine pollination efficiency, which is a complex issue depending on number of factors, it is important to know flights behaviour, covered distances and circadian activity of insect. So, in order to precisely and accurately research the flight trails of solitary bees and complement knowledge gaps the project employs novel technology of low-cost electronic tagging system for bee monitoring based on radio frequency identification to clarify several *O. rufa* flight performance parameters.

Specially designed nesting constructions will be placed in low-intensity agriculture grassland area along with radio frequency identification system (i.a. antennas network). Nowadays radio frequency identification tags have proven to be valuable as they can be small enough to be glued onto insects, and uniquely encoded which enable precise identification of thousands of animals in a single experiment. So far the radio frequency identification technology has been successfully employed to study the nest-drifting behaviour of a paper wasp species and the decision-making behaviour of ants, whereas in the case of bees radio frequency identification systems have been mainly used to examine the effects of pesticides on honeybees or on bumblebees, as well as in research of their ecology and / or behaviour. Therefore every year next to each nesting construction 200 individuals of both females and males of *O. rufa* – previously artificially emerged and tagged – will be simultaneously released in the same moment at the turn of March and April (depending on the weather conditions). Throughout the 24 hours a day, 7 days a week until the natural death of tagged red mason bees radio frequency identification readings will be received and monitored. Additionally as supplementary data plant inventory pictures and lists, pollen packages species analysis and basis breeding data (such as number of cocoons, presence of parasites, etc.) will be collected. By tracking flights of red mason bees from several neighbouring breedings within mapped area, project results will allow to answer:

• How long in terms of time and distance is a single flight of red mason bee – from leaving the nest to the return? How flight activity changes within the circadian rhythm? How it changes with age? How flights change with blooming period of plants in the covered area?

• What complicated are trajectories of bees flights (do they perform many turns and manoeuvres, changes of direction, etc.)?

• How long is daily route distance of bees? How many single flight do they perform?

• Do females nesting inside one breeding construction fly in the same direction to use the same sources of provision? Do solitary bees from neighbouring breedings show the same preferences and share the same destination of flights?

• Do males keep close to the aggregation created by females? Are they active flyers? How they disperse in the area after the mating period? Do males' flight traces coincides with females'?