Butterflies are suitable group of insects for environmental monitoring purposes only because they are currently the only insect taxon that it is practical to monitor with precision in many parts of the world, moreover, they are well-studied and well-documented in terms of faunistics, ecology and Red Book status. Butterflies are significantly related to several conditions in ecosystems at different spatial and temporal levels (Lang and Bühler, 2011). They are frequently used in environmental monitoring across Europe to assess biodiversity change. According Pollard and Yates (1993), the best way to provide information on the fluctuations of butterfly numbers, so that underlying trends can be assessed, is a long-term monitoring. It helps detect changes from the overall trend at a study site, that are caused by local factors, such as management. The fluctuations of the regional or “all sites” trends, can be used as a baseline for comparison with specific sites to assess the effects of local management. Similarly, the monitoring of animal populations can be central to the conservation of threatened and endangered species. Certainly, the value of such data cannot be overstated in this era of great and rapid environmental change which is accompanied with a retreat of a wide range of organisms (Murphy and Weis, 1988). Decreasing of insects, namely butterflies is not just an aesthetic loss. Such losses may affect the basic functions of ecosystems in terms of reducing food for other organisms, the impoverishment of decomposer communities, or threat to the pollination of plants (Hunter and Price, 1992).

Thomas et al. (2004) argue that many species will not be able to adapt fast enough to new environmental conditions, possibly leading to 15—37% of species going extinct. Even if a certain species did not disappear from a scale of a network map, it does not mean that it does not reduce the number of its populations and locations (Zapletal, 2011). The new Red List of European butterflies (Van Swaay et al., 2010) states that in Europe have not perished any butterfly species, on the other side lists dozens of butterfly loss cases from certain countries. According Kulfan J. and Kulfan M. (2001), there are 6 species of butterflies extinct in Slovakia, 21 are considered as critically endangered, 15 endangered and 41 vulnerable.

It is known that the extent of biodiversity changes, including its decline, depends on the size of scale at which are these changes observed and measured (Thomas and Aber, 1995; Keil et al., 2011). Extinction is performed firstly by local population loss or declining density of individuals in these populations (Leon-Cortes et al., 2000). Similarly, conservation measures are implemented locally, at the level of protected areas or administrative units (states, counties, districts), rather than globally throughout the species areas (Zimmermann et al., 2010).

Different degrees of extinction of butterflies in various countries, depending on their size, socioeconomic and physical conditions described Konvička et al. (2006). This study revealed, that larger areas contain more resources, including more types of biotopes, and hence allow more species to form viable populations. Hence, loss of biotopes, changing land use, etc. may affect more species in small states than in large ones. However, Slovakia can not be considered as a large country, it is characterized by land heterogeneity. It is known that heterogeneous areas harbour more types of biotopes and provide more refuges that may
buffer against species losses. Hence, richness increase and extinctions decrease with biotope heterogeneity which was a feature of the monitored area in its early stage.

Butterfly diversity varies due to local habitat quality and management and also due to the amount, diversity, and spatial organization of habitats at the landscape scale (Aviron et al., 2011). In Europe, natural and semi-natural grasslands have faced significant reduction in area as a consequence of the abandonment of historic land use practices, such as extensive grazing, within the last century. Due to habitat loss and fragmentation, many species have suffered serious declines (Bruckann et al., 2010). Abandonment of formerly extensively grazed grasslands is deleterious for butterfly species having early successional grassland and meadows as primary habitat, e.g. many satyrines and lycaenids (Clausen et al., 2001). Clausen et al. (1998) noted that permanent meadows may support a high number of butterfly species and individuals.

Due to the abandonment of grazing, spontaneous ingrowth of open non-forest areas occurs. The most common scenario for such areas is firstly increase of the dominance of competitive grasses, followed by bushes and trees. Former meadows, hillsides and „steppe“ enclaves change in impervious scrub and then in the forest. In the middle of the 20th century was the impact of extensive grazing everywhere in the open land. Grazing by small mixed herds of cattle, horses, goats and sheep affected practically every piece of non-forest lands. Mown meadows (usually in the fall), rocky or steppe sites and most of the so-called primary forest-free area were regrazed as well. The paradox is that shortly after leaving the pasture, variety of herbal level grows optically—plants are not grazed and blossom. Grazing forbiddance is therefore generally accompanied with the establishment of reservations on non-forest land. Consecutive blooming of former pastureland was seen as a success. The problem is that in the next few decades impoverishment of biodiversity was recorded: firstly, species directly dependent on pasture disappeared, followed by species of next stages of succession (Beneš et al., 2002).

Many butterfly species are threatened or are declining rapidly due to incorrect management or no management at all. Therefore, we analyzed species numbers and abundances of butterflies recorded during the original butterfly monitoring by water pan traps method in trial of colour preference in Lepidoptera (Papilionoidea, Hesperioidea) (Kočíková et al., 2012).

Water pan trap method is a simple and efficient way of providing a large quantitative data set on assemblages of diurnal or nocturnal Lepidoptera. It is an efficient labour-saving tool for butterfly community study, which e.g. Beneš et al. (2000) availed for surveys aimed on diurnal Lepidoptera. Using this method relatively large numbers of butterflies were captured and provide information on changes in the abundance of butterflies on a gradually overgrowing site. Such information is important for conservation and contributes to an understanding of the population ecology of central European butterflies.

**MATERIAL AND METHODS**

The study site is located in the Košice basin (Eastern Slovakia, Western Carpathians), near the village of Beniakovec, 4 km northeast of Košice (48°46' N, 21°18' E; altitude: 300 m) on a northeast-oriented gentle slope on an abandoned pasture adjoining a forest. The herbaceous vegetation is partly ruderalised. The observed site is a former pasture, no longer maintained, in the process of overgrowing with shrub vegetation, mainly with *Prunus spinosa* and *Rosa canina*.

In an area of approximately 20 ha, 10 groups of Moericke water pan traps (Moericke, 1951) for capturing insects were installed. The traps were made of plastic pans (upper diameter: 12 cm, depth 6 cm), painted in one of 5 colours (DUPLI–COLOR—colour spray): white, yellow, blue, violet or red inside and green outside. Water with detergent (1 mL per 1 L of water) was poured into the traps until the depth of water was about 2 cm. Odourless detergent was used to reduce the surface tension of the water. The traps were placed on a 30 cm long wire holder, at the same level as the surrounding vegetation. The traps were exposed for ten days each month from May to September, and this was repeated for 6 years (2001–2003, 2010–2012). They were distributed with the aim of having traps in all the habitats at the study site: xero-mesophilous grassland, edge of an oak-hornbeam forest and extensive shrubwood. In each habitat, five traps of different colours were placed in an area of 2 m² in the form of a square, with the fifth trap at the intersection of the squares diagonals. The groups of traps were placed at the same place throughout the long-term research, but the distribution of traps within the groups varied. The trapped material was checked and collected at 2 day intervals, and the water with detergent in the traps top-upped. During the checks, the contents of traps were sieved, individual Lepidoptera separated and recorded. In two last years of the research, observation of butterflies was done by using a hand-net as well. By using water pan traps authors wanted to minimize the subjective influence and with the concomitant use of hand-nets to compare results of the capture.

The caught butterflies were divided in several groups: according to trophic link, a habitat affiliation and mobility classes (Table 1). The effects of larval host plant, habitat affiliation and butterflies mobility on species composition of butterflies were tested, using Principal Component Analyses (PCA). All analyses were done with using Origin Pro 8.6. Software program (Microral Software Inc., Northampton, USA). An identity matrix was matrix in which all of the diagonal elements are 1 and all off diagonal