

Nesting of European bee-eaters (*Merops apiaster*) in Central Europe depends on the soil characteristics of nest sites

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The European bee-eater (*Merops apiaster*) is the first known species of the order Coraciiformes and the second bird species whose distribution depends on the granulometrical characteristics of soils constituting suitable banks for breeding. The mean particle size of soil samples from bee-eater nest places was $42.76 \pm 13.58 \mu\text{m}$ (max 66.82 μm , min 20.10 μm). Mean particle size differed significantly between samples from bee-eater and sand martin nest places, and unoccupied cliffs respectively. In total 12 different particle sizes were analysed. There were no bee-eater holes in soils containing particles over 10,000 μm . The number of all psephitic particles (above 2,346 μm) was more than 15 times lower in samples from bee-eater colonies than in those from sand martin holes. However, samples from bee-eater colonies contained 20 times more soil grains between 28.0 and 9.2 μm . These highly significant differences may explain why these two species do not usually breed in mixed colonies.

Key words: European bee-eater, microhabitat nest-site selection, soil particle analysis, sand martin, Southern Moravia.

Introduction

Habitat is one of the most important features determining the distribution and settlement of species (PARTRIDGE, 1981). Birds may follow a hierarchical order of habitat selection. For instance, at the macrohabitat level, selection may decrease from the geographical region to the landscape level and further down to the optimal patch (BLOCK & BRENNAN, 1993). Similarly, at the microhabitat level, nest site selection may go from the selected patch to the nest embankments and finally to the level of soil layers in the bank. For a long time it

was assumed that appropriate nesting sites were not limiting (LI & MARTIN, 1991). However, an appropriate nesting site must offer food and shelter from both predators and unfavourable weather conditions (MARTIN & ROPER, 1988, LI & MARTIN, 1991), which may be difficult to obtain. In some cases, the limiting factor is basic and immediate – the location of adequate material or substrate to build the nest.

In the case of bee-eaters it is not the location of special nest material which is limiting, but a very specific site to build the nest, i.e. a sandy cliff soft enough to be excavated but secure enough

to avoid collapse apart from many other factors that influence all species such as food abundance, low predation risk, etc. Some of the most important variables for habitat choice are the physical characteristics of soil in banks used for bee-eater breeding colonies. The only research investigating the soil requirements of bank-nesting birds has been performed on sand martins, *Riparia riparia* (L., 1758). SANDMANN-FUNKE (1972) and SIEBER (1980) gave a general description of the basic soil characteristics of typical sand martin banks. Current research focused on two major physical characteristics – the penetrability of nest banks (JOHN, 1991), and the particle size analysis of soil adjacent to nest holes (HENEBERG, 2001, 2003). This raised the question of whether the physical characteristics of breeding banks are also important in other breeding species.

It is known that other cavity-nesting birds like woodpeckers are limited by the availability of suitable substrates for excavation. The suitability of trees for excavation is also influenced by their physical characteristics, e.g. SCHEPPS et al. (1999) found that the selection of appropriate trees by four species of woodpeckers is influenced by the substrate hardness and excavation strength of the bird. It appears that limitation of hole-nesting species by the physical characteristics of breeding banks or trees may be an important and often overlooked factor.

There has been growing interest in the range expansion of the European bee-eater, *Merops apiaster* (L., 1758), between 1991 and 2000. ŠIMEČEK (1997, 2000) reported that the population of bee-eaters has increased 4–5 times in the Czech Republic. This has provided a unique opportunity to analyse the factors influencing nest site selection in this bird.

We also performed the first soil particle size analysis of burrowing species from the family Meropidae, the European bee-eater. This paper presents the results of soil particle size analysis of European bee-eater breeding sites in Central Europe. The first aim of this work is to investigate the soil requirements of bee-eaters. There is also the convenient opportunity to directly test possible differences between bee-eaters and sand martins, because the study area is one of three main population centres for sand martins in the Czech Republic (JERÁBKOVÁ & HENEBERG, 2001). The second aim is to compare differences in the soil requirements of bee-eaters and sand martins attempting to find ecological factors contributing to the observed habitat segregation of both species.

Material and methods

Soil sampling

Nests of bee-eaters are typically placed in about 1.3 m long holes excavated in a horizontal direction in steep sandy or loamy banks. Breeding colonies of bee-eaters in C Europe are usually small, mainly up to 10 nests, located in sunny warm landscape with scattered greenery, about 120–260 m a.s.l., mainly in sandpits, clay pits, cliffs beside brickyards, and terrace walls in orchards and vineyards. Usually, bee-eaters dig new holes for each breeding attempt (DAROLOVÁ et al., 2001). The abundance of bee-eaters fluctuates considerably due to the destruction of breeding habitats and human excavation of breeding banks and cliffs during the breeding period (KRISTÍN, 1994).

Soil sampling was conducted during July–August 1999–2001. Soil samples from bee-eater holes were collected at nest places in S Moravia (Czech Republic, 48°40′–49°10′ N, 16°00′–17°20′ E), which is a regular breeding region of this bird in the Czech Republic (ŠIMEČEK, 2000). All sites were located up to 400 m a.s.l.

In addition, we collected comparative soil samples from sand martin holes. The study area is also one of three main population centres of sand martins in the Czech Republic (JERÁBKOVÁ & HENEBERG, 2001), and there is also the convenient opportunity to directly test possible differences between bee-eater and sand martin nestplaces.

The third group of soil samples was taken from banks where both species were absent, but which fulfil the known conditions for nesting of these two species (wider than 5 m, at least 1 m high, having a slope 90–100° and a vertical lift at 40 m of less than 1 m) (HJERTAAS, 1984; KRISTÍN, 1994) (sites were not occupied by either of the study species in the years 1995–2001). Samples from soil layers without holes in occupied banks are also included. Nesting banks of sand martins as well as banks unoccupied by bee-eaters or sand martins were found in the same area and altitude range as nesting sites of bee-eaters.

One could argue: How do we know whether or not strata used by the birds exist in the banks without nests? Studying the sand martin nest places, we may sample only in the immediate area around each nest and not in a set of randomly chosen sites in the breeding banks like in this study based on results from bee-eater nest places. The Czech subpopulation of bee-eaters dig their holes in very homogeneous banks that contain layers with almost no granulometrical heterozygosity (HENEBERG & ŠIMEČEK, unpublished data). However, there is granulometrical heterozygosity between different river terraces. This is the reason why we used samples collected at a large number of sites, not only from one breeding bank.

Thus, we measured 23 soil samples from 18 bee-eater breeding colonies. In addition, we collected comparative soil samples from 134 sand martin breeding holes located in 21 banks. The third group of 162 soil samples was composed of soil samples originating from

55 banks unoccupied by both species, and from soil layers without holes in occupied banks. We did not find any cliff shared by both species; only in two cases were bee-eater and sand martin holes found close together, but there were no mixed colonies.

A sample of bank material was defined as a quantity of sand (loam, soil, etc.) excavated at a given site on the surface of the bank weighing more than 150 g (sand was scooped out at least one centimetre deep into the surface of the bank). Two groups of samples designated as "from holes" were collected from the soil strata where the breeding holes were present, mostly from places adjacent to the lateral sides of breeding holes. Strata under and above holes may contain soil with different granulometrical characteristics, and thus are not included in this group of samples "from holes" (SIEBER, 1980).

Soil analysis

The protocol by HENEBERG (2003) for particle size analysis was followed. Briefly, a dry sieve analysis was used to determine the distribution of particle sizes over 0.9 mm in each soil sample (GEE & BANDER, 1986; SCHMIDT et al., 1999). Soil samples were treated with 10% H₂O₂ at room temperature. After gas development ceased, the suspension was boiled and dried at 105 °C. All remaining material was fractionated into particle size ranges over 4.00, 4.00–3.00, 3.00–2.00, 2.00–1.25, 1.25–0.90 and less than 0.90 mm shaking for 2 min. The diameter of particles over 4.00 mm was measured using a slide gauge and these particles were divided in particle sizes > 60.00, 60.00–40.00, 40.00–20.00, 20.00–10.00 and 10.00–4.00 mm. The soil of each size range retained was weighed and percentage by weight in each size category calculated.

Decantation (BOUYOUCOS, 1951) was used to determine the psamitic, aleuritic and pelitic fraction. Samples were air-dried, treated with 10% H₂O₂, aggregates crushed and the soil was passed through a 2.00 mm sieve. A 100 g sample of particle size range less than 2.00 mm was placed in a glass cup, filled with water and boiled to remove any remaining air. Then, 5 ml of 1 N sodium hexametaphosphate was added and the contents of the cup stirred for 10 min to thoroughly mix the soil sample. The contents was transferred to the sedimentation cylinder, topped up to 1,000 ml, shaken for 2 min and then allowed to settle. After insertion of the hydrometer, readings were performed 30, 60 and 120 s after shaking. Additional settling readings were performed 5, 15, 30 and 45 min and 1, 2, 5, 12 and 24 h after shaking. The size of particles settled at these times was calculated separately for the particle density of each sample according to Stokes's law.

Particle size limits refer to equivalent spherical diameter, i.e. the diameter of spherical particles with the same density and settling velocity as the analyzed particle (SCHMIDT et al., 1999). All measurements were made at 24 °C (gravity acceleration of distilled water 980.665 gal). The particle size distribution obtained using this method gives similar results to the ones using other methods (FONTAINE et al., 2000; NAIME et al., 2000).

Rates of standardized particle size fractions were calculated using data obtained by these two methods. Twelve standardized particle size fractions were determined in all three groups of samples – psephitic (over 2.346 mm, divided into particle sizes >60.00, 60.00–40.00, 40.00–20.00, 20.00–10.00 and 10.00–2.346 mm), macropsamitic (2,346–774 μm), mesopsamitic and micropsamitic (774–84 μm), macroaleuritic (84.0–28.0 μm), mesoaleuritic (28.0–9.2 μm), microaleuritic (9.2–3.0 μm), macropelitic (3.0–1.0 μm), mesopelitic and micropelitic soil fraction (less than 1.0 μm) (BLAZEK et al., 1978; HENEBERG, 2003).

Data analyses

Soil analysis data were pooled into three groups from bee-eater nest places, from sand martin nest places and from banks where both species were absent, but which fulfil the known conditions for nesting of these two species (see above). These groups were analysed separately to investigate the differences between the substrate from bee-eater colonies and other locations. Data shown are means ± SD unless stated otherwise.

Crude analysis of mean particle sizes has been performed using one-way ANOVA. Savage's index (SAVAGE, 1931) was used to analyse the degree of selection of sand martins and bee-eaters for each soil category. This index ranges from 0 (maximum negative selection) to infinite, 1 being the central value of no selection. Manly's test (MANLY et al., 1993) has been used to find statistical differences between the degree of selectivity from random values. To obtain a significance level, we used a comparison of Manly's test results with the critical value of a chi-square with one degree of freedom as stated in MANLY et al. (1993).

To verify the results of the analysis described above, we took the fraction containing psamitic (2,346–84 μm) particles as 100% and compared the proportion of psephitic, aleuritic and pelitic particle size fraction with this one. Then we compared the values calculated for each sample between the group of samples from bee-eater holes and both control groups of samples (Fig. 3).

Results

Mean particle size of soil samples from bee-eater nest places was $42.76 \pm 13.58 \mu\text{m}$, (max 66.82 μm, min 20.10 μm). Mean particle size of the control samples from sand martin holes was $192.90 \pm 122.34 \mu\text{m}$ (max 498.96 μm, min 23.45 μm). Mean particle size of samples from unoccupied layers and banks displayed the largest variability, because they contained samples composed of extremely fine clay particles as well as very rough particles. The mean particle size of this group was $356.42 \pm 906.25 \mu\text{m}$ (max 3844.51 μm, min 16.95 μm). Differences between these three groups of samples are highly significant (ANOVA, $P < 0.001$). Mean particle size of soil samples is only a crude criterion, but as shown in Fig. 1, bee-eaters

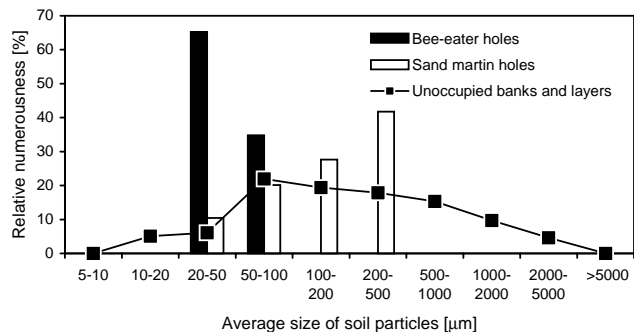


Fig. 1. Mean particle size of soil samples from bee-eater holes (black columns), sand martin holes (white columns) and from unoccupied banks and layers (black dots). Each of these three groups totalled 100%. Bee-eaters as well as sand martins dig their nests in soils with mean particle size 20–500 μm . This fact is not caused by the absence of layers without sediments with other granulometrical characteristics, but probably by the soil requirements of these two species.

Table 1. Mean percentage (\pm SD) of each particle category in soil samples from bee-eater and sand martin holes and from layers without holes. Bee-eater holes were not found in soils containing first four soil particle fractions.

Fraction range [μm]	Bee-eater holes	Sand martin holes	Layers without holes
> 60,000	0.00 \pm 0.00	0.00 \pm 0.00	0.68 \pm 4.16
60,000–40,000	0.00 \pm 0.00	0.00 \pm 0.00	0.84 \pm 3.15
40,000–20,000	0.00 \pm 0.00	0.02 \pm 0.19	1.94 \pm 4.05
20,000–10,000	0.00 \pm 0.00	0.02 \pm 0.25	1.12 \pm 5.49
10,000–2,346	1.46 \pm 1.78	22.74 \pm 20.08	22.32 \pm 20.55
> 2,346 (Σ pseph.)	1.46 \pm 1.78	22.79 \pm 20.10	26.94 \pm 25.46
2,346.0–774.0	9.40 \pm 5.70	18.08 \pm 8.81	19.17 \pm 7.23
774.0–84.0	37.48 \pm 10.51	53.58 \pm 21.63	36.44 \pm 22.56
84.0–28.0	49.67 \pm 19.66	4.88 \pm 9.49	11.18 \pm 4.89
28.0–9.2	10.56 \pm 5.80	0.53 \pm 1.49	4.99 \pm 9.51
9.2–3.0	0.9 \pm 1.27	0.10 \pm 0.20	0.45 \pm 0.42
3.0–1.0	0.09 \pm 0.22	0.20 \pm 0.05	0.18 \pm 0.09
> 1.0	0.11 \pm 0.42	0.03 \pm 0.10	0.64 \pm 0.17
N	23	134	162

show strong selection for soils with mean particle size 20–70 μm . Banks composed from larger or smaller particles were unoccupied or occupied only by sand martins.

Based on the results of this crude analysis, we analysed bee-eater soil requirements using the contents of 12 standard particle fractions in each sample. Average means (\pm SD) for all 12 fractions of three groups of samples are shown in Table 1. Soil samples from bee-eater holes did not contain any grains from the four largest fractions (larger than 10,000 μm), whereas samples from sand martin holes and samples from unoccupied locations did. The quantity of all psephitic particles (above 2,346 μm) was more than 15 times lower in samples from bee-eater colonies than in those from sand martin holes. In comparison, samples from bee-eater colonies contained 20 \times more soil grains between 28.0 and 9.2 μm (Tab. 1).

Savage's index indicating the degree of selection (SAVAGE, 1931) and Manly's test of the degree of selectivity were used to test the significance

of differences between the three groups of samples tested (Tab. 2). The highest values of Manly's index were found for grain size 20,000–40,000 μm , and for grain size 28.0–9.2 μm . Samples from bee-eater breeding localities contained 10.56 \pm 5.80% (max 25.31%, min 0.78%) of the mesoaleuritic particle size fraction (28.0–9.2 μm). Soil from sand martin holes contained 0.53 \pm 1.49% (max 14.31%, min 0.00%) of this fraction, and samples from unoccupied banks were composed of 6.44 \pm 10.21% (max 33.90%, min 0.00%) of this fraction. The distribution of this particle size range is shown in Fig. 2. The distribution of particles 9.2–3.0 μm showed a similar distribution.

To verify the results of this analysis, we took the fraction containing psamitic (2,346–84 μm) particles as 100% and compared the proportion of psephitic, aleuritic and pelitic particle size fraction with this one. Then we compared the values calculated for each sample between the group of samples from bee-eater holes and both control groups of samples (Fig. 3).

Table 2. The degree of selection for the size of soil grains shown as Savage's selection index (SAVAGE, 1931) and Manly's test of the degree of selectivity (MANLY et al., 1993). All soil samples including samples from unoccupied places were pooled and the degree of selection of each bird for each soil category was calculated. Data are shown in the following order: Savage's index; Manly's degree of the selectivity; and the significance.

Fraction range [μm]	Bee-eater holes	Sand martin holes	Layers without holes
> 60,000	0.00; 150.4; $P < 0.01$	0.00; 5104.5; $P < 0.01$	1.97; 7007.1; $P < 0.01$
60,000–40,000	0.00; 294.2; $P < 0.01$	0.00; 9985.4; $P < 0.01$	1.97; 13707.5; $P < 0.01$
40,000–20,000	0.00; $1.1 \cdot 10^7$; $P < 0.01$	0.02; $3.5 \cdot 10^8$; $P < 0.01$	1.95; $4.8 \cdot 10^8$; $P < 0.01$
20,000–10,000	0.00; 1001.8; $P < 0.01$	0.03; 31527.4; $P < 0.01$	1.94; 43768.9; $P < 0.01$
10,000–2,346	0.07; 504.8; $P < 0.01$	1.08; 137.0; $P < 0.01$	1.06; 115.8; $P < 0.01$
> 2,346 (Σ pseph.)	0.06; 507.3; $P < 0.01$	0.97; 11.6; $P < 0.01$	1.15; 672.6; $P < 0.01$
2346.0–774.0	0.52; 135.4; $P < 0.01$	1.00; 0.3; n.s.	1.06; 122.6; $P < 0.01$
774.0–84.0	0.64; 69.4; $P < 0.01$	1.24; 1134.7; $P < 0.01$	0.85; 642.9; $P < 0.01$
84.0–28.0	4.39; 7322.2; $P < 0.01$	0.43; 6985.1; $P < 0.01$	0.99; 4.0; $P < 0.05$
28.0–9.2	3.00; 4146.2; $P < 0.01$	0.15; 25348.5; $P < 0.01$	1.42; 8991.1; $P < 0.01$
9.2–3.0	2.66; 369.2; $P < 0.01$	0.30; 2231.9; $P < 0.01$	1.34; 785.6; $P < 0.01$
3.0–1.0	0.82; 0.2; n.s.	0.18; 173.9; $P < 0.01$	1.70; 187.1; $P < 0.01$
> 1.0	0.33; 66.6; $P < 0.01$	0.08; 4325.6; $P < 0.01$	1.86; 5465.8; $P < 0.01$
N	23	134	162

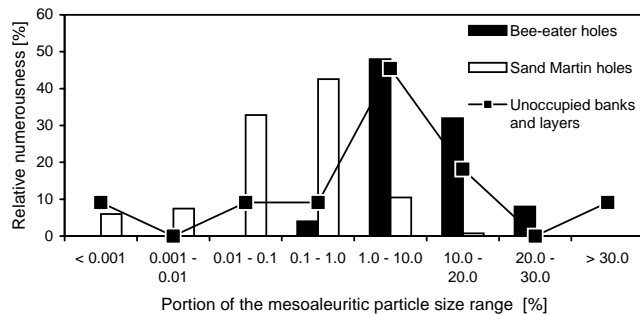


Fig. 2. Highly significant differences between samples from bee-eater nest places and control groups of samples were found in the proportion of mesoaleuritic particle size fraction (28.0–9.2 μm). Distribution of this particle size fraction is shown. Black columns indicate samples from bee-eater holes, white columns are samples from sand martin holes and the black dots represent samples from unoccupied banks and layers.

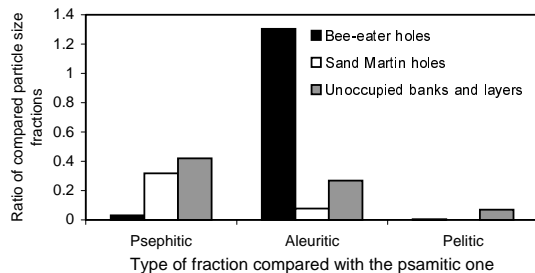


Fig. 3. Relative proportion of the psephitic, aleuritic and pelitic particle size fraction compared with the psamitic one (psamitic particle size fraction is 100%). Values are calculated for samples from bee-eater holes (black columns), sand martin holes (white columns) as well as for control samples from unoccupied banks and layers (grey columns).

which may be affected by the possible independence of single particle size fractions. Using this method, the calculated relative proportion of the aleuritic particle size fraction (84.0–3.0 μm) was more than 169 times higher in samples from bee-eater nest places than in samples from sand martin nest places. This particle size fraction is assumed to be the crucial factor determining the absence of interspecific competition between bee-eaters and sand martins.

On the other hand, the calculated relative proportion of the psephitic (> 2,346 μm) and pelitic (< 3.0 μm) particle size fraction was 13 times (resp. 16 times) lower than in control samples from unoccupied banks and layers as predicted.

Discussion

This analysis confirmed the results obtained by the more simple method presented above,

The soil requirements of European bee-eaters are very important in terms of the proportion of the

mesoaleuritic and microaleuritic fractions (28.0–9.2 μm and 9.2–3.0 μm , respectively). This species is also the first known species of the order Coraciiformes and the second bird species with the distribution depending on granulometrical characteristics of soils constituting suitable banks for their breeding colonies. Using the method first described on sand martins (HENEBERG, 2001, 2003), we determined basic granulometrical characteristics of existing and potential breeding banks of European bee-eaters as described in Tables 1 and 2.

Second, we hypothesized that the soil requirements of bee-eaters and sand martins would not be identical. Nest site preferences of both species differed only in details. Both species nested in near-vertical banks of sandpits, clay-pits or cliffs; we did not find any holes at level ground. The local density of sand martins was governed partly by site-availability, and colony size and inter-nest distances were changed with cliff face dimensions. The presence of this trend was not so prominent in bee-eaters, but it may be caused due to the small size of breeding colonies (KOSENKO & FRY, 1998). The preference of bee-eaters to breed in more warm and sunny areas was compensated, because breeding colonies of both species were situated in the same area, where the differences in average temperature and other climatic characteristics were negligible.

However, these two species did not compete for nest sites. Mixed colonies are very rare; only KRÍŠTÍN (1994) found two mixed colonies out of 18. During the Czech sand martin census over 90 years, there were no mixed colonies. Sand martin holes were sometimes close to bee-eater holes, but always in a different type of soil (HENEBERG, unpublished data). We think that this is not caused by interspecific competition, because both species differ in diet, and breeding phenology. These species may also share the same biotopes but nest site preferences differ markedly and this seems to be due the differences in the type of soil each species can dig out.

We also tested soil samples of both species sampled under the same conditions (for details see Material and Methods) and found highly significant differences between the European bee-eater and sand martin breeding sites. These differences were most significant in aleuritic and pelitic particles (particles under 28 μm), but were also significant in some fractions of rough psephitic particles (40–10 mm). We did not find any bee-eater holes containing particles over 10 mm, which were relatively common in the study area (see control groups of samples). These results also cor-

roborated the hypothesis about the importance of granulometrical characteristics of breeding banks for the nesting of European bee-eaters.

Identifying habitat characteristics, like soil requirements that influence the selection of nest sites, can provide the information necessary for understanding and managing populations (POWELL & STEIDL, 2002) and subsequently leads to the effective conservation of breeding habitats. To date, there have been only vague characteristics of soil requirements of European bee-eaters (CRAMP, 1985). This paper gives the first detailed information about the granulometric characteristics of breeding sites as one of the most important factors influencing the suitability of a bank for nesting of this species.

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First records of *Dendrothrips degeeri* Uzel, 1895 (Thysanoptera, Thripidae) in Slovakia

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Although research on thrips in Slovakia has not been very intensive and detailed yet, there are numerous faunistic data on this matter from various sites and biotopes. Most of them come from the study material of nidicolous fauna from nests of birds and mammals (PELIKÁN et al., 2002). Recently the new checklist of Slovakian thrips has been published (FEDOR et al., 2003) to update the first list from the 70's (PELIKÁN, 1977) taking the whole area of former Czechoslovakia into account. Establishing the new generation of

thysanopterologists resulted to cover new sites and to enrich knowledge on the national entomofauna in several species recorded here for the first time (SIERKA, 2003; FEDOR, 2003).

The first record of *Dendrothrips degeeri* Uzel, 1895 refers to intensive research on thrips in National nature reserve Jurský Šúr. From this point of view the site has been studied for about 40 years, for the first time by HESKOVÁ (1967), determining 56 species from 5 sites. Apart from this there are several more papers

dealing with thrips in Jurský Šúr (PELIKÁN, 1990; PELIKÁN et al., 2002; FEDOR et al., 2001; SIERKA, 2003; SIERKA & HALGÓS, 2003). The other records of *Dendrothrips degeeri* come from several sites in SW Slovakia (FEDOR et al., 2002).

In 2002 we published the first note on its national occurrence as a part of invertebrate fauna occurring in nests of birds and mammals (PELIKÁN et al., 2002). The data were of ecological character rather than faunistic, therefore this paper is aimed to specify faunistic aspects of the firstly recorded mentioned species and to add new information on its occurrence in Slovakia.

All the captured specimens were identified using the keys by SHLIEPHAKE & KLIMT (1979). The thrips were preserved according to the common and standard methods (LEWIS, 1973). The material has been deposited at the author's collection.

Thripidae Stephens, 1829

Dendrothrips degeeri Uzel, 1895

Material examined. SW Slovakia, Podunajská nížina lowland: **National nature reserve Jurský Šúr**, Svätý Jur env. (48°14' N, 17°17' E, 7769c = grid reference number of the Databank of the fauna of Slovakia), 5.XII.1985, 2 ♀♀ in a nest of *Turdus merula* L., 1758; 5.I.1987, 2 ♀♀ in a nest of *Lanius collurio* L., 1758; leg. M. Krumpál et D. Cyprich, det. J. Pelikán; **Čičov** (47°45' N, 17°16' E, 8272b), 18.XI.1985, 1 ♀ in a nest of *Turdus* sp., leg. M. Krumpál et D. Cyprich, det. J. Pelikán; **Galanta** (48°11' N, 17°47' E, 7872a), 16.I.1986, 1 ♀ in a nest of *Fringilla* sp., 1 ♀ in a nest of *Lanius* sp., leg. M. Krumpál et D. Cyprich, det. J. Pelikán; **Vojka pri Dunaji** (47°58' N, 17°35' E, 8070a), 19.I.1986, 2 ♀♀ in a nest of *Turdus* sp., 1 ♀ in a nest of *Sylvia* sp., leg. M. Krumpál et D. Cyprich, det. J. Pelikán; **Pusté Uľany** (48°14' N, 17°16' E, 7771c), 14.III.1986, 2 ♀♀ in a nest of *Turdus* sp., leg. M. Krumpál et D. Cyprich, det. J. Pelikán. Distribution. Europe (SHLIEPHAKE & KLIMT, 1979), Bohemia (PELIKÁN, 1977). Remarks. Holotype in the Czech Republic. Specimens usually occur as foliicolous and arboricolous thrips on *Fraxinus excelsior*, although these were recorded in nests of birds.

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