Gábor Csorba

Abstract: The Great evening bat (la io) was hitherto found in eleven localities in the Indomalayan Region. In the recent years the species was collected from two more localities by the expedition of the Hungarian Natural History Museum. Based on the descriptions of the former localities and the new records it can be proved that the great evening bat is an obligate cave-dwelling species of the subtropical limestone areas of Southeast Asia.

Key words: Indomalayan region, la io, distribution, ecology.

Introduction

The Great evening bat la io Thomas, 1902 is one of the biggest and rarest vespertilionids of the world. The description of the species was based on a single specimen, and for a long time only singly collected specimens, all of them came from China (Sowerby 1932; Sanborn 1933; Allen 1938). The first colony was discovered by Pen et al. (1962) in Sichuan, China; he described it as a new species of the genus under the name la longimana, separated from la io on the basis of the bigger size of individuals and an unicuspid I1. This taxon and also Parascotomanes beaulieui (Bourret 1942) from Laos were referred to the synonymy of la io by Topál (1970). In the same paper, based on the characteristics of the skull and especially the os penis, Topál raised back the genus la, formerly treated as a subgenus of Pipistrellus by several authors (Simpson 1945; Ellermann & Morrison-Scott 1951) to the genus status again. However, Menu (1987) based on dental characteristics referred la to the synonymy of Eptesicus, the generic distinctness of la is generally accepted (Corbet & Hill 1992; Koopman 1994).

Due to the scattered records, the ecology of the Great evening bat is only very insufficiently known. According to the literature, almost all the specimens were captured in caves, but Topál (1970) noted that the individuals observed in India "spend the daytime obviously not in the cave and use it only for their nocturnal quarters."

During the recent expeditions of the Hungarian Natural History Museum (HNHM) two more locations of the species were found, and the new findings yield more information on the distribution and ecology of la io.

Materials and methods

A first specimen of la io was deposited in the Hungarian Natural History Museum (HNHM) collected by Topál (1970) in India. During further zoological expeditions by
the staff of the Museum in Southeast Asia, the species was collected from the following localities:


2. Nepal, Gandaki Prov., Bimalnager, Sidda Gupha (Monk Cave), 750 m, 12.10.1994 and 12.4.1995. Altogether four males and two females were collected by G. Csorba, Gy. László, G. Ronkay and L. Ronkay. All specimens are stored in the HNHM except the one Nepalese which is placed in the Harrison Zoological Museum, Sevenoaks, Kent.

In addition to these specimens, two (including the holotype) deposited in the Natural History Museum, London were studied.

The measurements were taken by dial calipers, those of short distances and teeth under a stereomicroscope (tab.1). Abbreviations of the measurements used in this paper are as follows: FA - length of forearm; TAIL - length of tail; EAR - length of conch; SBASL - basilar length of skull from frontal edge of palate to the foremost part of ventral incision between condyles; STOTL - total length of skull, from front of canines to occiput; UCM3L - crown length of upper toothrow; ZYGW - width of skull between zygomata; MASTW - mastoid width of skull; MAND - length of mandible, between hindermost portion of articular process and anteriormost edge of II alveolus; LCM3L - crown length of lower toothrow.

<table>
<thead>
<tr>
<th>Locality</th>
<th>FA</th>
<th>TAIL</th>
<th>EAR</th>
<th>SBASL</th>
<th>STOTL</th>
<th>UCM3L</th>
<th>ZYGW</th>
<th>MASTW</th>
<th>MAND</th>
<th>LCM3L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>80.41</td>
<td>71.13</td>
<td>26.92</td>
<td>20.85</td>
<td>26.68</td>
<td>10.80</td>
<td>17.65</td>
<td>14.21</td>
<td>21.03</td>
<td>11.87</td>
</tr>
<tr>
<td>Nepal</td>
<td>78.44</td>
<td>69.21</td>
<td>26.21</td>
<td>20.44</td>
<td>26.76</td>
<td>10.78</td>
<td>17.41</td>
<td>14.01</td>
<td>20.88</td>
<td>11.69</td>
</tr>
<tr>
<td>Nepal</td>
<td>77.45</td>
<td>67.20</td>
<td>25.10</td>
<td>21.33</td>
<td>28.10</td>
<td>11.05</td>
<td>18.01</td>
<td>14.35</td>
<td>21.35</td>
<td>12.05</td>
</tr>
<tr>
<td>Nepal</td>
<td>75.91</td>
<td>67.15</td>
<td>26.32</td>
<td>20.26</td>
<td>26.43</td>
<td>10.85</td>
<td>17.02</td>
<td>13.89</td>
<td>20.36</td>
<td>11.70</td>
</tr>
<tr>
<td>Nepal</td>
<td>78.24</td>
<td>70.64</td>
<td>26.44</td>
<td>20.61</td>
<td>26.82</td>
<td>10.86</td>
<td>17.69</td>
<td>14.01</td>
<td>21.26</td>
<td>11.90</td>
</tr>
<tr>
<td>Nepal</td>
<td>77.19</td>
<td>70.48</td>
<td>26.88</td>
<td>21.36</td>
<td>27.51</td>
<td>10.83</td>
<td>17.82</td>
<td>14.35</td>
<td>21.58</td>
<td>11.80</td>
</tr>
<tr>
<td>Nepal</td>
<td>74.38</td>
<td>63.94</td>
<td>26.32</td>
<td>19.67</td>
<td>26.49</td>
<td>10.51</td>
<td>17.17</td>
<td>13.62</td>
<td>20.32</td>
<td>11.43</td>
</tr>
</tbody>
</table>

Tab.1: Measurements (in mm) of Vietnamese and Nepalese specimens of /a io/
The names of the Chinese localities are given according to Sivin et al. (1988) and Zhao & Adler (1993).

Results

In Vietnam the presence of the species was proved by a single mandible (Topál 1970). The new specimen in Vietnam was collected by mist-net erected in front of a cave, when the bat left the cave at the beginning of dusk. /a io/ was captured together with the following species: Rhinolophus pearsoni, Rh. sinicus, Hipposideros armiger, Miniopterus schreibersi. This locality is situated in an extensive limestone area with several caves, surrounded by agricultural areas and disturbed secondary forest. The survival of the species is endangered by the collection of bats by hill tribes for consuming.

The Nepalese datum is the westernmost known locality of this species. The first individuals were caught at twilight with a mist-net erected in the spacious entrance of
the cave during the collection at autumn. From the estimated 20-30 specimens 3 males were taken. In spring, at the same cave, the bats started to leave the cave before sunset. In this case the majority of the captured individuals were females. Of the three specimens taken, one was a pregnant female with one embryo. At both occasions the following species were captured together with *la io*: *Rhinolophus pearsoni, Rh. pusillus, Rh. affinis, Hipposideros armiger, Miniopterus schreibersi*. The area is one of the few limestone landscapes of Nepal; in the surroundings there are only small forest fragments among the cultivated fields. The survival of this population seems to be safe, since the cave is guarded by the local people as a sacred place.

The series of Nepalese specimens gives the opportunity to supervise the diagnostic characters given by *Pen* (1970) in the description of *la longimana*. The specimens stored in the HNHM regarding their forearm measures (tab.1) are completely within the range given by *Pen*, and the shape of the first upper incisor varies even within the same population being either bicuspid or unicuspud.

<table>
<thead>
<tr>
<th>Locality (country, province, settlement)</th>
<th>Reference/voucher specimens</th>
<th>collected specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. China, Hubei, Changyang</td>
<td>Thomas 1902</td>
<td>1 male</td>
</tr>
<tr>
<td>2. China, Jiangsu, Nanjing</td>
<td>Sowerby 1932</td>
<td>1 (sex?)</td>
</tr>
<tr>
<td>3. China, Guizhou, 40 mls SW of Wenshu</td>
<td>Sanborn 1933</td>
<td>1 male</td>
</tr>
<tr>
<td>4. China, Sichuan, Yanjunggou</td>
<td>Allen 1938</td>
<td>2 (sex?)</td>
</tr>
<tr>
<td>5. China, Yunnan, Kunming</td>
<td>SDM</td>
<td>4 (sex?)</td>
</tr>
<tr>
<td>6. China, Sichuan, Huidong</td>
<td>Pen et al. 1962</td>
<td>2 male, 53 female</td>
</tr>
<tr>
<td>7. China, Jiangxi, ?</td>
<td>NHM</td>
<td>1 female</td>
</tr>
<tr>
<td>8. Laos, Tran-ninh, ?</td>
<td>Bourret 1942</td>
<td>1 male</td>
</tr>
<tr>
<td>9. Thailand, Chiangmai, Chiang Dao</td>
<td>Allen &amp; Coolidge 1940</td>
<td>1 male</td>
</tr>
<tr>
<td>10. Vietnam, Ha Nam Ninh, Cuc Phuong</td>
<td>Topál 1970</td>
<td>1 mandible</td>
</tr>
<tr>
<td>11. India, Assam, Maustrai</td>
<td>Topál 1970</td>
<td>1 male</td>
</tr>
<tr>
<td>13. Nepal, Gandaki, Bimalnager</td>
<td>HNHM, NZM</td>
<td>4 male, 2 female</td>
</tr>
</tbody>
</table>

Tab.2: Records of *la io*

SDM = State Darwin Museum, Moscow; NHM = The Natural History Museum, London; HNHM = Hungarian Natural History Museum, Budapest; HZM = Harrison Zoological Museum, Sevenoaks

Unfortunately, the published distribution maps of the species (*Corbet & Hill* 1992; *Lekagul & McNeely* 1977) are incomplete and unreliable due to the difficulties to locate the Chinese geographical names. Therefore, based on the published records and museum specimens (tab.2) the distribution map of *la io*, depicting all of the known localities, is presented (fig.1). All non-Chinese specimens come from limestone areas; in the case of the Chinese specimens the information is often uncomplete. Therefore all the Chinese limestone areas are plotted on the distribution map, as possible sites where *la io* may occur.
Fig.1: Distribution of *la io*. For the numbers of localities see tab.2. The black areas indicate limestone ranges in China. In the case of locality 7, only the province is known; therefore the limits of the province are indicated on the map.

**Discussion**

Based on the study of specimens from the same Nepalese population I conclude in agreement with the findings of Topál (1970) that the species or even the subspecies status of *la longimana* is not approved neither by the measurements of the forearm nor by the shape of the upper incisor. By the comparison of distribution data and geological maps it can be proved that the Great Evening Bat is a year-round cave-dwelling species of the subtropical limestone areas. In the studied Nepalese population the individuals form a mixed colony at least during spring when gravid females are in majority. This observation is in high agreement with the findings of Pen et al. (1962). The bats can leave very early the cave where they roost, sometimes well before dusk/twilight and during the night might turn up at other caves for resting, as it is known in the case of several insectivorous bat species (Kunz 1982).

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