

Home range, movements and activity patterns of an exceptionally large male Brown Bear (*Ursus arctos* L.) in the area of the Bulgarian-Greek border (Western Rhodope Mts.)

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Abstract. The movements and activity patterns of an exceptionally large brown bear (*Ursus arctos* L.) were investigated in the area of the Bulgarian-Greek border (Western Rhodope Mts.) after footprints and other signs of its life activities during a field work in the period 2012-2016. Its minimum home range in spring was estimated to at 140-150 km². Different parts of its home range were occupied seasonally.

Key words: *Ursus arctos*, Bulgaria, home range, footprints.

Introduction

The brown bear (*Ursus arctos* L.) is endangered and protected in Bulgaria (Spiridonov, Spassov, 2015). The monitoring of the brown bear in Bulgaria is based on the identification of signs of life activities (especially footprints) (Gunchev 1989, Gubar 1990, Spassov *et al.* 2000, Spassov *et al.* 2015). The data published below represent results from the bear field investigations (2012-2016) in the region of Adjilarska Reka hunting husbandry (Kozhari village) and the adjacent territories on the Bulgarian/Greece border in Western Rhodopes (biotope: 80-100-year old spruce forest). This work was supported by PUDOOS, Contract No 9190/20.05.2013.

Results

During November 2015 (in mild weather) 10 bears were living simultaneously in Adjilarska Reka Hunting husbandry and the adjacent territories on a surface of ca. 70 km² (after the footprints detections and the camera-trap visual information): A mother with three cubs from the same year; another one with two yearlings; a dominant male with a scar on the muzzle (see below); another (young?) bear with white spot on the flank, and a second large male, about 7/8 years old (16 cm width of the fore paw footprint). All these bears come on a game supplementary feeding station (Fig. 1). The very large old male, which had seriously wounded a pack-horse 7 years ago, was recorded for the first time by us at the mentioned feeding station on 17 Mar 2014 (because of its size and scars on the head this bear is easy to recognize): The data from the camera-trap show the presence of an old male with scars from battles with other males on the head and on the muzzle (Fig. 1). It seems very well fed for the season (weight probably much more than 250-260 kg at this moment and at least 300 kg in autumn, after footprint estimate), which is most probably due to its winter feeding on the Greek territory where it had last year oak nuts and grass. On the

feeding stations the bears also forage very well on corn. The registered (two times- in 2014 and in 2015) footprints of its paws in a shallow snow on the boundary of the 189-forest section has been really enormous. Its presence was documented on a mountain ridge, moving towards the feeding station: front paw width – 18 cm (and 19 cm on snow), length of hind one 29/30 cm. In close proximity was detected a fresh mark on a spruce (18.04.2014). Its presence was detected several times along the mountain ridge of the border between Bulgaria and Greece (W of front paw footprint detected on 24.04.2016 was 18 cm on muddy ground). Its marking with nails on century-old spruce (detected just on the border) were established at a height 2.5 m, and hair from rubbing of the head to 210 cm (Fig. 2). Five mark trees were found on its regular route along the border on a distance of about 4-4.5 km, approximately between border pillars No. 158 and No. 164. The trees have a diameter (at chest height) - 30-93 cm (the average diameter of mark trees in northern part of European Russia is 20-30 cm, see: Rukovsky 1984). The marks from nails were from at least two different bears, after the color of remaining stuck hair from the head, reaching from 210 till 250 cm. According our observations the large diameter of the home range of the noted above old dominant male exceeds considerably 20 km (reaching probably till 30 km). Its minimum home-range, calculated after the witness and our observations, is ca. 140-150 km² in spring (core territory?), roughly between Trigrad, Jrebevo, Buinovo, Kojari, Kesten and the border (from Bulgarian side); its part in Greek territory is about 50-60% of the whole one. Its total home range could be much than three times larger (in N. Greece the size of the adult males' home range varied individually in spring from 105 to 181km², the total home range - from 102 km² to 507 km² (n=4) (Kanellopoulos *et al.* 2006). Different parts of the home range of this male (the belt of oak, the belt of beech in Greece and the belt of conifers) are occupied, after our collection of data, seasonally. The availability of 2-3 points for supplementary game-feeding is one of the main factors which determine the individual territory and movements of the bears on the Bulgarian part of the mentioned territory.



Fig.1. Dominant male (supposed age of at least 15 years old) with scars of battles with rivals. Hunting Forestry Adjilarska (photo from a kamera-trap, D. Bukovsky, 17.03.2014 at a game-feeding station).



Fig 2. A century-old bear marking tree just on the Bulgarian/Greek border. The tree is marked also with white paint as a border pillar (photo N. Spassov).

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