NEW OCCURRENCE OF RARE PROTECTED MOSS SPECIES *BUXBAUMIA VIRIDIS* (BRYOPSIDA, BUXBAUMIACEAE) IN THE BIAŁOWIEŻA FOREST

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ABSTRACT. The Green Shield-moss *Buxbaumia viridis* (Bryopsida, Buxbaumiaceae) is an endangered, legally protected bryophyte considered as an ancient forest species both in Poland and elsewhere in Europe. This paper presents new localities for NE Poland, specifically in the Białowieża Forest. As an epixylous species, it is threatened by logging and intensive forest management. It is of utmost importance to protect this species' habitat, particularly at the present time when increased logging is proposed.

KEY WORDS: *Buxbaumia viridis*, Białowieża Forest, rare species, primeval forest relics

INTRODUCTION

Buxbaumia viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl. is an endangered (category E) moss species (ŻARNOWIEC et al. 2004), protected by law in Poland (ROZPORZĄDZENIE... 2014), by the Bern Convention (KONWENCJA... 1979) and Habitat Directive 92/43/EEC (DYREKTYWA... 1992) and also considered to be endangered (category E) in Europe (SCHUMACKER & MARTINY 1995).

Buxbaumia viridis is characterised by minute gametophytes (1 mm) resembling protonema, without typical leaves, which makes this species difficult to detect during the haploid phase. The shoots can be observed only when the sporophytes develop, from autumn until late spring. The seta (5–7 mm) bears a prominent capsule (5–8 mm), firstly green, later (when mature) it becomes brown (STEBEL 2004, VONČINA 2012). *Buxbaumia viridis* is defined as an epixylous species, growing on logs of dead trees bereft of bark in advanced state of decay, mainly on fir and spruce, rarely on beech (STEBEL 2004, HAJEK 2008, 2010, KOZIK & VONČINA 2012, VONČINA 2012, VONČINA & CHACHUŁA 2012, KUCHARZYK et al. 2016 unpubl.). The species is also rarely observed on soil

humus and on layers of soil covering stones (HAJEK 2010, KUCHARZYK 2016 unpubl.).

In Poland, *Buxbaumia viridis* is documented mainly from the south-eastern part of the country, from different forest communities, e.g.: *Dentario glandulosae-Fagetum abietetosum*, *Carici albae-Fagetum abietetosum*, *Carici albae-Fagetum typicum*, *Abieteti-Piceetum montanum* and *Tilio-Carpinetum* (SZMAJDA et al. 1991, PHILLIPPE & OCHYRA 2004, STEBEL 2004, CYKOWSKA 2008, VONČINA 2008, 2012, CHACHUŁA & VONČINA 2010, CYKOWSKA & VONČINA 2011, VONČINA et al. 2011, KOZIK & VONČINA 2012, ZARZECKI 2012, TOPOLSKA & KUCHARZYK 2014–2016 unpubl., FUDALI et al. 2015, KUCHARZYK & TOPOLSKA 2015). It was also reported in the northern part of Poland – in the vicinity of Elbląg and Gdańsk, in *Luzulo pilosale-Fagetum* and *Stellario-Carpinetum* communities (HAJEK 2008, 2010, 2012). South-western localities are known from Sudetes (SZMAJDA et al. 1991, SMOCYK & WIERZCHOLSKA 2008, CYKOWSKA & VONČINA 2011).

Currently, the nearest localities to the Podlasie region are known from Roztocze Upland – Świerszcz river valley (FUDALI et al. 2015). The species has not been recorded so far neither from the Belarusian part of Białowieża Forest nor the country of Belarus (RYKOVSKY & MASLOVSKY 2004).

MATERIAL AND METHODS

All the information given on current localities derives from our own studies, surveyed during the spring of 2016. The localities listed below are presented according to the Atmos grid square system (OCHYRA & SZMAJDA 1981). The bryological nomenclature follows OCHYRA et al. (2003) and SZWEYKOWSKI (2006), categories of threat are given after ŻARNOWIEC et al. (2004), geographical names follow KONDRACKI (2001).

RESULTS

A detailed description of *Buxbaumia viridis* occurrence on the newly discovered localities in Białowieża Forest is given below.

ATMOS Cg-55: NE Poland, Podlasie Lowland, Bielska Plain, NE part of the Białowieża forest division (department 250D), 52.765°N, 23.757°E.

A total of 66 sporogones were observed on the extent of ca. 300 cm of the rotten log of *Quercus robur*, without a bark, in a *Tilio-Carpinetum* community. The accompanying species were: *Herzogiella seligeri*, *Eurhynchium angustirete*, *Orthodicranum montanum*, *Lophocolea heterophylla*, *Rhizomnium punctatum*, *Lepidozia reptans*, *Plagiothecium laetum*, *Dicranum scoparium*, *Hypnum cupressiforme*, *Nowellia curvifolia* and *Jamesoniella autumnalis*, det. A. Szczepaniuk, 3.05.2016.

A total of 12 sporogones were observed on the extent of ca. 70 cm of the rotten log of *Quercus robur*, without a bark, in a *Tilio-Carpinetum* community. The accompanying species were: *Hypnum cupressiforme*, *Herzogiella seligeri*, *Jamesoniella autumnalis* and *Lophocolea heterophylla*, det. J. Kucharzyk, 3.05.2016.

DISCUSSION

The records of *Buxbaumia viridis* we provided are first occurrences of the species in the Białowieża Forest. Previously unknown type of substrate inhabited by the species in Poland – decaying wood of *Quercus robur* – have been revealed. Typically this moss is confined to rotten wood of spruce and fir, often in stream valleys (SMOCZYK & WIERZCHOLSKA 2008, VONČINA 2008, 2012, CHACHUŁA & VONČINA 2010, CYKOWSKA & VONČINA 2011, ZARZECKI 2012, TOPOLSKA & KUCHARZYK 2014–2016 unpubl., KUCHARZYK & TOPOLSKA 2015).

Buxbaumia viridis is considered to be an ancient forest species (CIEŚLIŃSKI et al. 1996, STEBEL & ŻARNOWIEC 2014).

Our discovery confirms that the Białowieża Forest is an important refugium for an array of ancient forest species. *Buxbaumia viridis* is mainly known from isolated localities in extensive forest areas, where the forest management is not intensive (or is abandoned), largely from the national parks or nature reserves. The most significant threats for the species are: an increase of insolation, a decrease of moisture

and forest logging. It seems to be a very important issue in light of the new logging plan for the Białowieża Forest, resulting in increased timber harvesting (ANEKS... 2016). The forests with newly discovered localities of *B. viridis* should be entirely excluded from logging (see STEBEL 2004).

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