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Quadrangular enclosures in the upper regions of the Bohemian and Bavarian Forests: Preliminary report

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Abstract
The upper regions of the Bohemian and Bavarian Forests are home to what appear to be some of the best-preserved natural ecosystems in Europe. Airborne laser scanning (LIDAR) methods have nonetheless revealed numerous surface relics of past human activity. Among the most recent discoveries is a series of quadrangular enclosures with various types of stone walls or stone earth banks that range from 20 m to 40 m wide. At altitudes of around 1100 m a.s.l., there are some 600 of these barely detectable and little-known features that have largely fallen out of the historical consciousness, partly as a result of the displacement of the German population after the Second World War, and partly because they are hardly recognizable in the terrain. Radiocarbon dating, an analysis of historical administrative, topographical and forestry maps, and observations regarding the present-day vegetation enable us to estimate the origin of the enclosures between the second half of the 17th century and the second half of the 19th century. Preliminary results suggest that some of them could have been forest nurseries and seedbeds, some of which could have been founded before the great forest disturbances of the 1860s and 1870s. They therefore represent a missing piece in the history of forest management in the Šumava region.

Key words: Bohemian/Bavarian forests, quadrangular enclosures, historical forest nurseries and seedbeds, stone architecture

Introduction

The mountain landscapes of Europe appear to be particularly appealing to researchers. In marginal areas beyond the traditional agricultural lowlands, the interaction between people and their natural environment is currently a popular subject of interdisciplinary studies. It has been repeatedly shown that human beings have been attracted to the mountains, including the treeless high mountain ranges, since prehistoric times. The most common forms of exploitation of these regions include mining, logging, hunting, gathering, and seasonal pastoralism. Although it is traditionally believed that the mountains were first inhabited in the Middle Ages, there is increasing evidence of human presence as early as the Mesolithic (i.e., the time

of the hunters and gatherers) and throughout prehistory and the early Middle Ages up to the present day. Recent archaeological research has convincingly demonstrated that not only in the Alps but also in the Bohemian Forest (Šumava), there are traces of local human occupation from the Mesolithic and from the Bronze and Iron Ages, although such traces are difficult to find in the heavily forested and barely accessible terrain (DRESLEROVÁ et al. 2020a, DRESLEROVÁ et al. 2020b).

Archaeological research in such terrain requires prospection using techniques that differ from the typical archaeological methods of field walking and aerial photography. High resolution LIDAR, kindly provided by the Šumava and Bayerischer Wald National Parks, proved to be an excellent tool in this regard. Study of the datasets revealed hitherto unknown anthropogenic structures in the form of qudrangular walled enclosures with sides that range in length from 20 m to 40 m. Their remains have escaped the attention not only of the public but also of forestry specialists. As part of a small project focused on the relics of past human activity on the Bohemian-Bavarian border (a joint project of the Prague Institute of Archaeology and the Šumava National Park), an attempt has been made to shed light on the age and purpose of these enclosures. Our research questions included whether the occurrence of these enclosures is limited to the upper regions of the Bohemian Forest, or if they can be also found in other mountain areas.

MATERIALS AND METHODS

Area of interest

The area of Bohemian and Bavarian forests was formed by a tectonically elevated Paleogene plain and is among the most extensive mid-mountain ranges in Europe. The upper regions, above 1000 m a.s.l., cover an area of 384 km^2 and represent around 41% of the total area of the two national parks, which is 927 km^2 (Fig. 1). The prevalent land cover type is forest. The upper elevations (>1150 m a.s.l.) are naturally dominated by mountain spruce forest (*Picea abies* (L.) Karst.), with a minor share of the common rowan *Sorbus aucuparia* L. (NEUHÄUSLOVÁ et al. 1998). Lower elevations are covered mainly by mixed *Fagus sylvatica–Abies alba* forests as a result of extensive logging and subsequent planting of *Picea abies* (CHYTRÝ 2012). The timberline is reached at the highest summits of Plechý (1378 m a.s.l.) on the Czech side of the border and the Grosser Arber (1456 m a.s.l.) on the German side. The area is also one of the most important peatlands in Central Europe as more than 15% of the area is covered by bog habitats (SOUKUPOVÁ 1996). Annual mean temperatures at the higher altitudes are around 5 °C; average precipitation varies from 730 mm to 1300 mm (TOLASZ et al. 2007).

LIDAR scanning and map sources

A key tool for the identification and morphological description of the enclosures was the terrain model based on LIDAR airborne laser scanning (DMR_NPS). This model was initially developed for large-scale mapping of tree species and dead trees in Šumava National Park and Bavarian Forest. With 55 point density on 1 square m, the TerraSolid automatic filtration was used to process the original point clouds into DEM, which figures deviated from real values between 2.0–15.0 cm in position and 5.0–7.0 cm in height. DEM was with its 0.5 m

resolution thus precise enough for identification of man-made features in the forested landscape (KRZYSTEK et al. 2020). For further enhancement of the enclosures on the LIDAR imagery, the original DEM was further processed by David Novák into a local relief model (LRM – NOVÁK 2014).

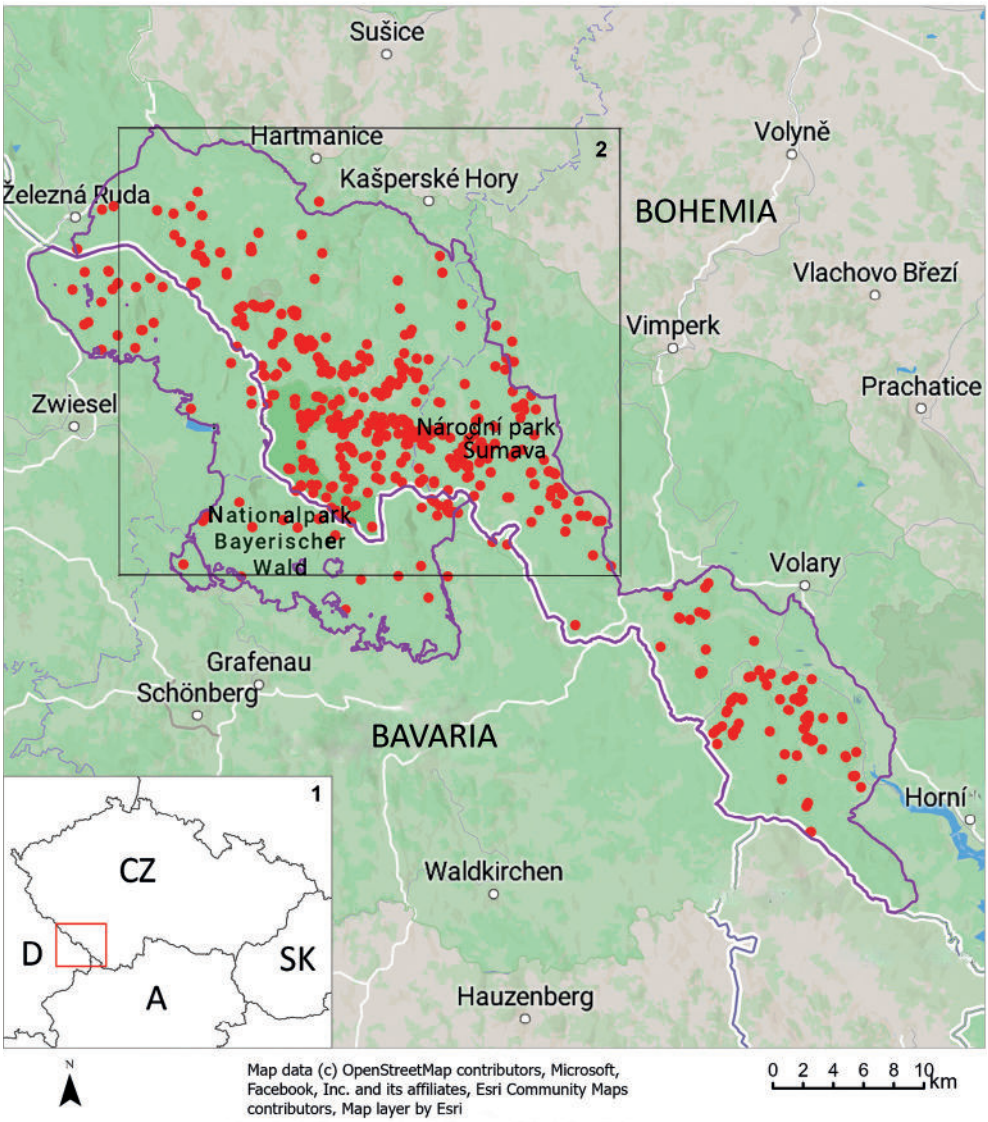

Fig. 1. Areas of the Šumava National Park (Národní park Šumava) and the Bavarian Forest National Park (National Park Bayerischer Wald). Red dots – quadrangular enclosures; 1 – position of the area of interest in Central Europe; 2 – detail depicted in Fig. 4.

This visualization of local changes in elevation enabled us to identify and describe almost 600 enclosures in the area of interest. For this study we selected a sample group of 238 specimens; the sample was generated randomly as a result of the first unsystematic survey of images covering the northern part of the national park. This set served as the basis for dividing the enclosures into morphological types, for categorizing them according to shape, internal subdivision, the placement of entrances their location on slopes, and for analysing their relationship to other man-made features in the mountains. A sub-set of 60 from the total amount of so far known enclosures was further visually prospected and sampled for pollen and pedological samples. The criteria for their selection were their location in different parts of the park and mainly their current availability due to the state of the terrain and local access constraints. This sample can therefore also be considered random.

Having identified the enclosures by LIDAR, our first aim was to identify the date and purpose of these structures by a study of the extensive available mapping materials. Walls or other features of ca. 100 of the enclosures from the sample group are still recognizable on WMS-ORTOFOTO-P (version 2023-02-20), while a further 100 were found on an historical Orto photo map from the 1950s (Historická ortofotomapa ©CENIA 2010 a ©GEODIS BRNO, spol. s r.o. 2010, version 2022-12-15). With a few exceptions (fewer than 10 from the sample group), none of the enclosures seems to have been used recently or up to the middle of the last century: aerial photographs from the early 1950s already show them in various stages of decay.

To identify the nature of the enclosures, we used maps from the 18th and 19th century, including the first, second and third Military Surveys (© 1st Military Survey, Sections No. 228-9, 237-9, 246-8, 254-6, 261-3, 267-6 Austrian State Archive/Military Archive, Vienna; © 2nd Military Survey, Sections No. W_15_III-IV, W_16_II-IV, W_17_I-III, W_18_I-II Austrian State Archive/Military Archive, Vienna; © 3rd Military Survey, Section No. 4350_2-4, 4351_1-4, 4451_1-4, Austrian State Archive/Military Archive, Vienna) and various charts from the Stable Cadastre of Bohemia (Imperial Obligatory Imprints of the Stable Cadastre 1:2880 – Bohemia, sections: 2161-1, 2176-1, 2191-1, 2442-1, 3214-1, 3250-2, 3755-1, 6088-1, 6481-1, 6522-1, 7207-1, 7644-1, 8557-1, 9081-2, 9228-1, 9266-1, 9395-2 accessible via https://geoportal.cuzk.cz/). Only 5 of the enclosures (2% of the sample group) were identified as having been fields or pastures during some period of their existence. The remainder could not be related to previously mapped features.

Archival sources

To assist in identifying the date and purpose of the enclosures, we used the archival sources of historical forest maps (Bestandeskarte) and forest management plans (Wirtschaftplan). The main source was the "Schwarzenberská lesní zařizovací kancelář" at the state regional archive in Třeboň (Český Krumlov department). Data were available for three main forest districts: 1. Prášily: Březník–Pürstling area 1863–1921; Filipova Huť– Phlipshütte area 1863–1921; Modrava–Mader area 1863–1912; Nová Studnice–Neubrunn area 1862–1921; Prášily –Stubenbach area 1862–1921; Rokytská Slať–Weitfäller area 1882–1921; Schätzův les –Schätzenwald area 1862–1921; 2. Vimperk: Borová Lada–Ferchenhaid area 1858–1925; Knížecí Pláně–Fürstenhut area 1858–1935; Strážný–Kushwarda 1858–1915; 3. Český Krumlov: Bližší Lhota–Vorderstift area 1857–1947; České Žleby–Böhmish Röhren area 1903–1943;

Hučice–Hutchenbach area 1874–1891; Jelení Vrchy–Hirchbergen area 1903–1933; Nové Údolí–Neuthal area 1882–1943; Plešný–Plockenstein area 1874–1948; Stožec–Tusset area 1853–1932; Želnava–Solnau area 1857–1947.

The materials, published in 1963 by J. MINISTR and in 1973 by R. STOLAŘÍK, provided our main source (so far) of information on past forest management. The second source was the digital and physical archive of the Šumava National Park Administration. We used forest maps and forest management plans from the 1930s for the forest districts of Vimperk and Prášily, and data from the Military Forests of Czechoslovak State Forests from the 1950s to the 1990s.

RESULTS

Types of enclosure

The enclosures are largely quadrangular: the most prevalent shape is a rectangle or near-rectangle, followed by a group of squares or near-squares (Fig. 2). Other shapes are far less common: rhombuses and rhomboids are present but in negligible numbers (Fig. 3A). In terms of size, the median value of the area encompassed by the walls/banks of the enclosure is 525 m^2; the vast majority of the enclosures encompass an area of less than 1000 m^2 (Fig. 3B).

Regarding altitude, the highest enclosure is located 1337 m a.s.l.; the lowest at only 828 m a.s.l. Most are located at 1130 m a.s.l. ± 50 m; the median elevation of the sampling set is 1134 m a.s.l. (Fig. 3C). Although located near the summits of the mountains, the enclosures are situated on relatively gentle slopes: the difference between the highest and lowest points

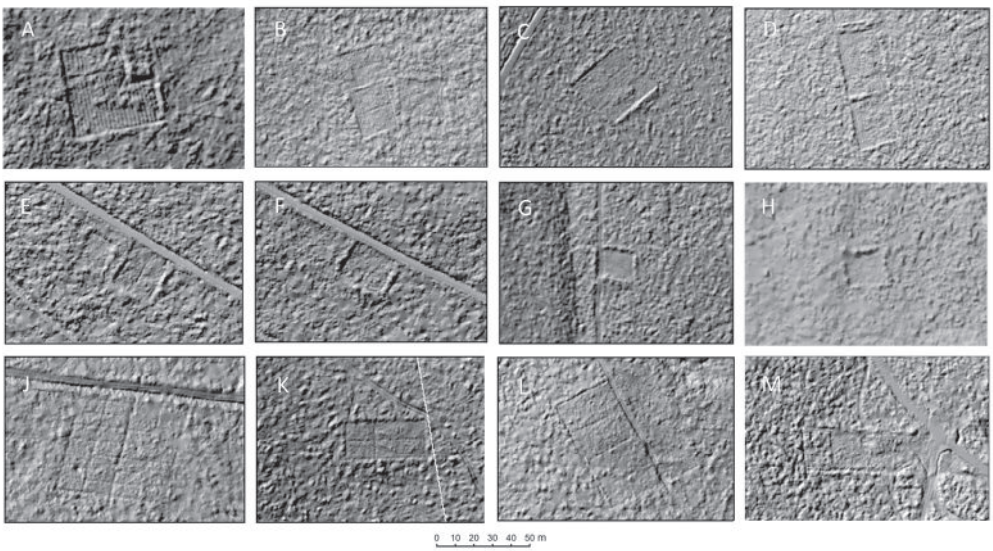

Fig. 2. Selection of LIDAR – derived images of enclosures mentioned in the text. A: EN_33; B: EN_63; C: EN_123; D: EN_129; E: EN_135; F: EN_137; G: EN_196; H: EN_250; J: EN_298; K: EN_311; L: EN_322; M: EN_172.

of enclosures in the sample group is most commonly around 2.5 m. The median length of the longer side of the enclosure is around 31.0 m and of the shorter side around 25.0 m.

LRM visualization of LIDAR data allowed us to study the internal features of the enclosures, even those that are barely visible on orthophotography or in the field to the naked eye. It appears that only 24 of the 238 enclosures from the sub-sample had any internal division in the form of partition walls (Fig. 3D). The internal space of 80 enclosures was, however, divided by shallow ditches (Fig. 3E). The internal space was mostly divided in half, but also into 6 parts (EN_311; Fig. 2) or 8 parts (EN_322; Fig. 2), and in one case into 24 parts (EN_295; Fig. 2). The ditches run both down the slope and along the contour.

The final morphological feature examined was the relation of individual enclosures to the hillside contour lines. Almost two-thirds of the enclosures appeared to ignore the contour lines of the hills (Fig. 3G) and were thus positioned somewhat askew to the slope. No obvious relationship was observed between slope orientation, insolation or cardinal directions. Average

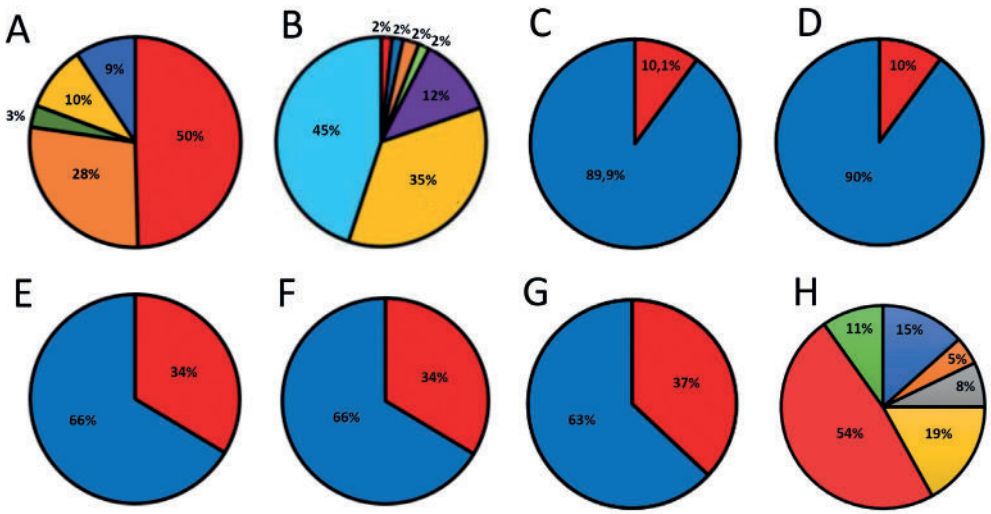

Fig. 3. Graphs illustrating the characteristics of the enclosures. A: Enclosures divided into categories according to shape. 50%: rectangle (118 items); 28%: square (66); 10%: rhomboid (24); 9%: polygons and other irregular shapes (22); 3%: rhombus (8). B: categories according to size of the encompassed area. 45%: 0.0091–0.05 ha (107 items); 35%: 0.05–0.10 ha (84); 12%: 0.10–0.20 ha (29); 2%: 0.20–0.30 ha (4); 2,5%: 0.30–0.50 ha (6); 2%: 0.50–1.00 ha (4); 2%: 1.00–3.50 ha (4). C: categories according to elevation of their central point above sea level (a.s.l.). 10.1%: >1300 m (1 item) and 900–1000 m (10); 89.9%: 1000–1100 m (61), 1100–1200 m (133), 1200–1300 m (28). D: categories according to existence/absence of internal division walls. 90%: without internal division (214 items); 10%: with internal division (24). E: categories according to the presence/absence of ditches in their interiors. 66%: without ditches (158 items); 34%: with ditches (66). F: categories according to the presence/absence of entrances visible on LIDAR. 66 %: without entrances (173 items); 34%: with entrances (65). G: categories according to their respect/disrespect to the general contour lines. 63%: respecting the contours (150 items); 37%: ignoring contours (88). H: categories according to the relationship to the road systems on 2nd and 3rd military surveys. 54 determining, 19 – respecting, 15 – ignoring, 11 – alongside the mapped roads, 8 – preceding, 5 – negative relationship to the features mapped on the historical maps.

difference between highest and lowest point inside the enclosure in the sample group was 4.73 m. No sensible pattern was recorded here since the enclosures often appeared to be grouped somewhat randomly in clusters. Although not intersecting each other, they were only rarely aligned to each other in any way. Their alignment to the road system is described further below.

Types of wall/bank construction

The construction of the walls/banks varied in ways that cannot be deciphered by LIDAR scanning. Our analysis is therefore based on a sample of approximately 60 visually prospected enclosures. Those we mention below are shown in Fig. 4; they can be divided into the following groups:

(a) dry stone wall with a facing on both sides (e.g., EN_33)
(b) dry stone wall with a facing on the inner side (e.g., EN_250)
(c) stone bank, often using large stones or rocks in situ (e.g., EN_135)
(d) stone-earthen banks of various sub-types:
    (i) stone base, soil bank on the top (e.g., EN_196)
    (ii) stone base, soil bank on the inner side (e.g., EN_123)
    (iii) stone base, soil bank on the outer side (e.g., EN_137)
    (iv) alternating stone and soil banks, usually irregular (e.g., EN_129)
    (iv) mixture of stones, soil, and the remains of tree stumps of various sizes (e.g., EN_63)

Some walls/banks are lined on the inside with ditches; these are sometimes filled with stones (for drainage?) (e.g., EN_397).

Entrances

Without physical field observation it is difficult to determine whether the present-day breaks in the banks were originally entrances or are the result of more recent activity, such as forest management. According to our interpretation of the LIDAR data, entrances were identified in 65 enclosures (27% of the sample set; Fig. 3F), but wall-breaks narrower than 0.5 m cannot be detected this way.

All of the physically visited enclosures had at least one, but usually more, wall/bank breaks. Some of these were "true" entrances, usually to enclosures with well-preserved stone walls, and in these cases, the ends of the walls terminate with quite recognizable faces (Figs. 5J, 7).

The interior of the enclosures

The vegetation present within the enclosures varies considerably but can be divided roughly into three groups:

(a) a treeless area with undergrowth, consisting mostly of moss
(b) young trees
(c) mature trees of different ages

In the latter two types, the surface is covered mainly by blueberries, grass, and moss in various combinations.

The "ridge and furrow" system, that is, ridges and troughs created by some sort of ploughing or tillage, can be considered a separate category. Some 53% of the enclosures in the sample

group (Fig. 3G) exhibit this kind of arrangement in the interior. The ridges are approximately 1.0–1.2 m wide and 0.2 m high; the troughs are approximately 0.4 m wide. They are easily recognizable on LRM visualization of the LIDAR imagery (Figs. 2, 6).

Discussion

Almost 600 enclosures of uncertain age and purpose form a distinctive but largely forgotten phenomenon in the upper regions of the Šumava and Bayerischer Wald National Parks. The enclosures demonstrate the extent and intensity of human activity in the recent past but also its ephemeral nature. Each enclosure is original in its own way, whether in terms of the type of boundary used, the overall construction, the relation to the terrain, and the internal structure. It can be only assumed that they were built at different times and for different purposes.

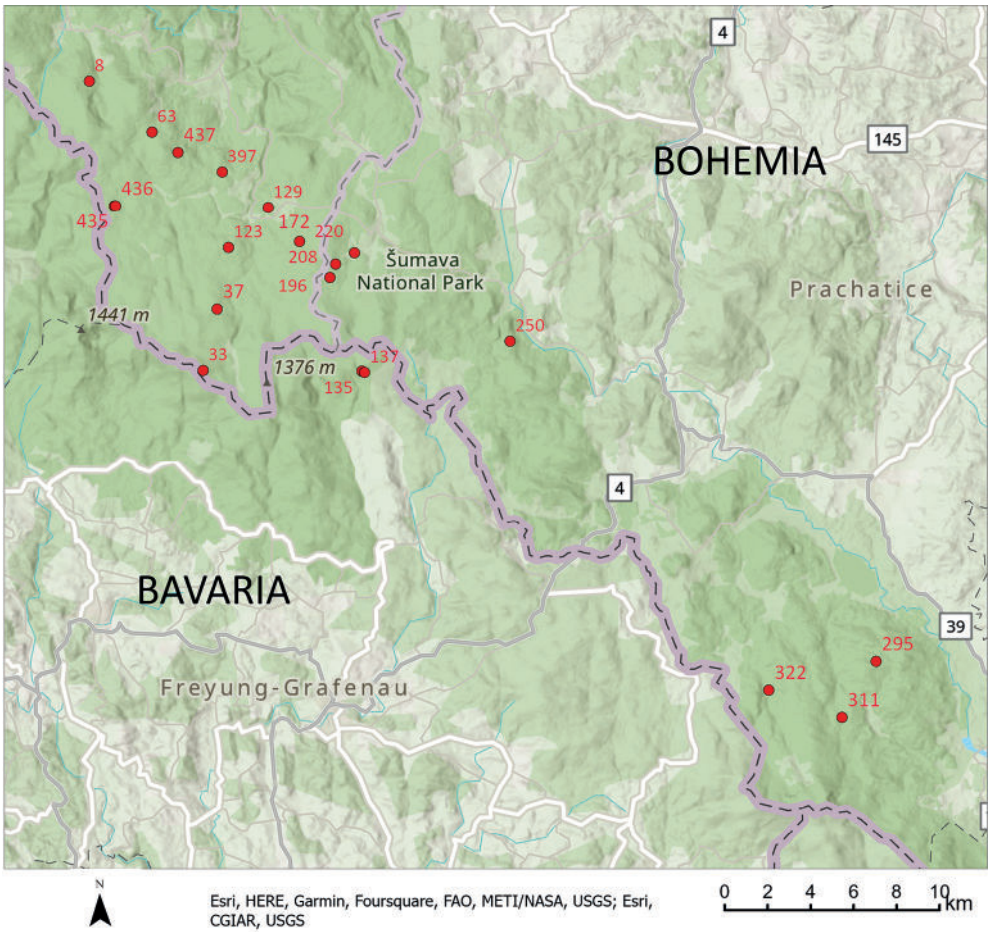

Fig. 4. Detailed map with numbered enclosures.

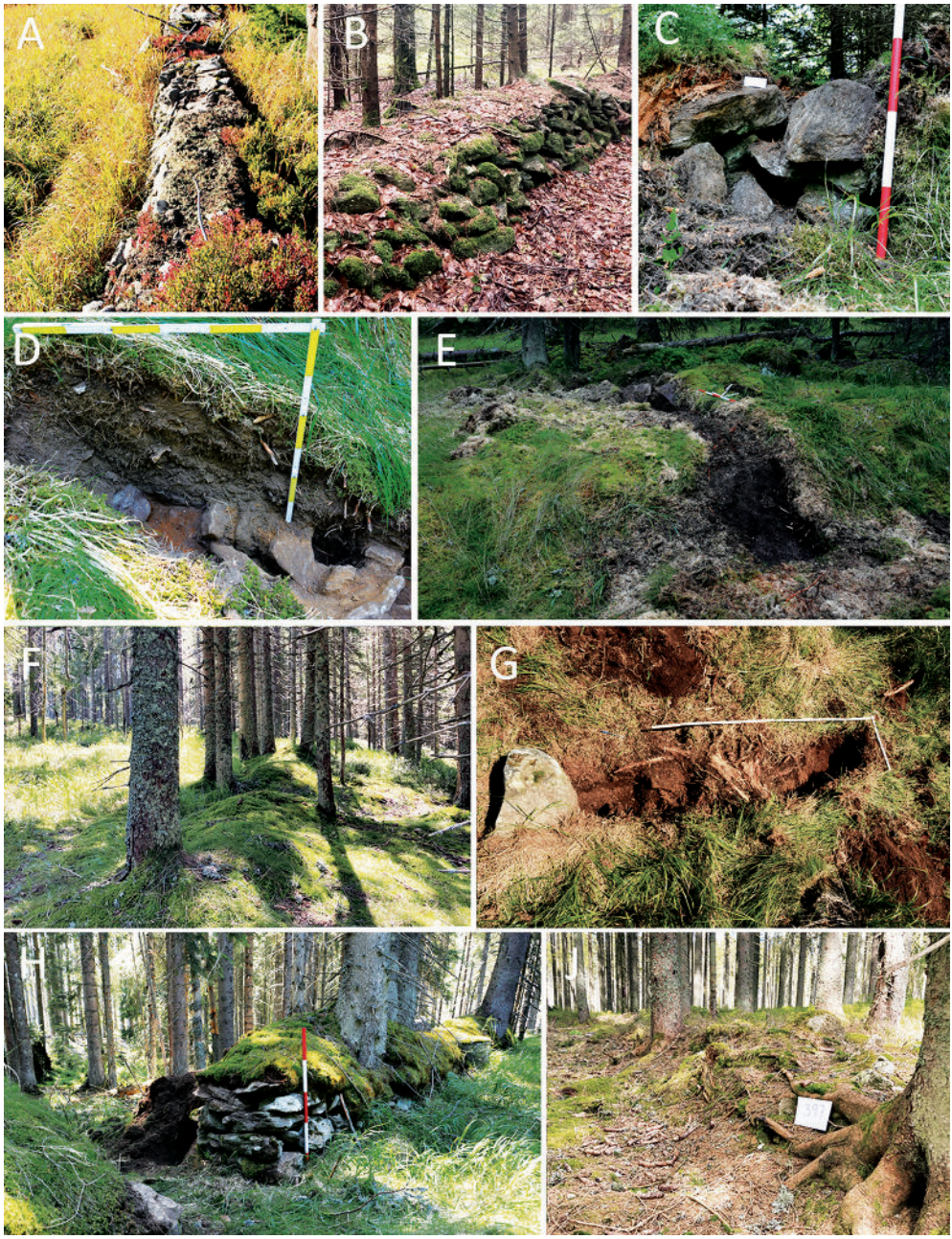

Fig. 5. Examples of types of wall/bank construction. For letters and numbers of enclosures see text (photo: A: P. Čížková; B-J: D. Dreslerová).

Although our consideration of the function of the enclosures is still preliminary, we assume that most of them were originally forest nurseries or seedbeds. Several factors lead us to this assumption. First, the enclosures are all situated on land previously (and still) categorized as forest ground. Secondly, the ridge/bed system identified in more than half of the enclosures is typically associated with seedbeds. The bed system and the precise shape of the enclosures, with walls which usually measure round multiples of ten metres in length (20, 30, 40), would allow a more precise estimation of the seed or seedlings required for a given area and enable simple economic control over the achieved result. For completeness, it should also be noted that the ridge and furrow was used in medieval and post medieval agriculture in many parts of Europe. The most famous examples of the system come from Britain, probably due to their visibility to the present day (e.g. FOWLER 2002, DOHNAL 2011).

The date of construction of these enclosures remains uncertain. Their existence is not recorded in the forestry maps or archival forest management plans mentioned above, and precious little information is to be found in the older archival materials so far processed (MINISTR 1963, STOLAŘÍK 1973). This is somewhat strange considering the labour involved in their construction. Also, some other information in the archives is slightly confusing to us, such as the statement that fences were not used to any great extent, probably because game numbers were low, and that building nurseries at higher altitudes, especially in the Antýgl district, was not recommended, even though numerous enclosures do in fact appear at elevations above 1100 m a.s.l. (see Fig. 1).

Other explanations regarding the function of the enclosures

Our rational minds, however, resist believing that the stone enclosures, often built with great effort and lined with metre-high walls and entrances are ‘merely’ short-term forest nurseries. Furthermore, the variability in the design of the enclosures indicates that some of them could have been used for other purposes. T. BLAŽKOVÁ (2019, p. 143) suggests that the remains of a stone enclosure (EN_37 in our list and divided into two by a ditch) near the deserted village of Josefstadt between present-day Modrava and Březník could be a cattle pen. She suggests that two other enclosures (Špičník EN_33, and one of the three near Javoří slať, EN_434,

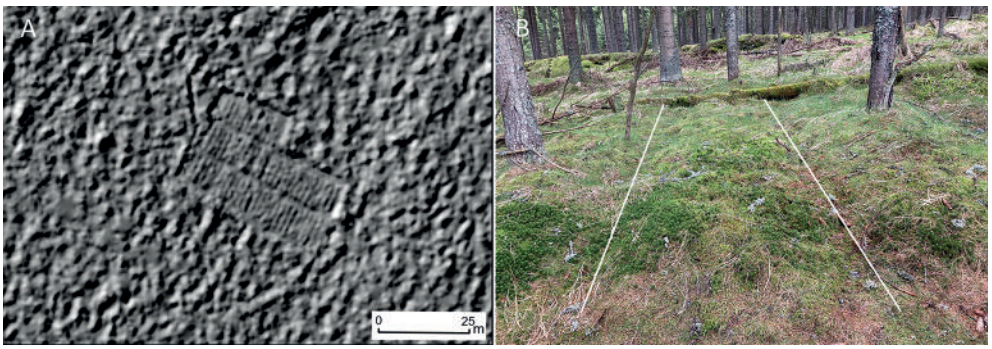

Fig. 6. Example of ‘ridge and farrow’ system. Enclosure EN_208: A – LIDAR-derived image; B – ridge and furrow (photo: D. Dreslerová).

EN_435 (with ridge and furrows) or EN_436) could also have been cattle pens (BLAŽKOVÁ 2019, p. 64). The enclosure at Josefstadt could conceivably have been a small pen for animals that came seasonally with the loggers, but Špičník with its ridge and furrow system, is clearly a forest seedbed. The Javoří slať enclosure appears to be remote from any settlement and would therefore have to be used as part of a seasonal pasturing system (transhumance). The available historical sources (e.g., ZEITHAMMER 1901) do not mention such animal housing. Without settling on a final decision about their function, we here provide three examples of unique structures that differ significantly from the rest of our dataset.

1. Dry-stone wall enclosure with two possible drain holes (EN_8)

This enclosure, the most prominent dry-stone structure in our dataset, lies in difficult terrain near the Prášily Lake at 1090 m a.s.l. The wall is faced on both sides and is composed of large stones and slabs. The preserved width and height of the wall is at least 1.0 m above the current surface. An entrance is provided in the middle of the eastern wall, narrowing from 0.9 m at the exterior to 0.6 m at the interior. A ditch or gutter runs through the entrance, effectively cutting the enclosure in half from top to bottom. In both corners of the eastern wall there are further 1.0 m wide "drain" holes at ground level, bridged by substantial slabs (Fig. 7). The original purpose of this structure remains uncertain, but its construction and the care taken to construct details such as the drains is unparalleled.

2. Diamond-shaped enclosure (EN_120)

The northernmost known enclosure is particularly enigmatic. It is a perfect rhombus: a diamond-shaped enclosure with sides of 42 m. The walls are a mixture of larger stones and clay in various proportions. The average surviving thickness of the rampart is 4 m (Fig. 8). The structure is situated on a northeastern slope between 1030 and 1021 m a.s.l. some 50.0 m from the nearest road (Armádní). The interior appears to be flat and must have been levelled at some time. Entrances might have been located at acute angles, but these were destroyed by the harvester only recently. We made cuts in the enclosure walls at the obtuse angles. The SW bank is made of pure stone, only slightly recessed into a ditch. The northeastern bank has an earthen base with a double layer of stones stacked on top of each other, bringing the crown of the bank up to the height of the rest of the enclosure walls. A fragment of 16th–19th century pottery was found while trenching inside the enclosure. The radiocarbon date of charcoal taken from the base of the SW bank dates the structure to AD 1645–1796 (CRL 22_1486; Fig. 9); the two dates from the base of the NE crossing are of a similar or later time (CRL 20_144, CRL_20_145; Fig. 9). This structure is special because of its perfect geometry and the care dedicated to levelling its interior. Unless the diamond shape is simply a matter of happenstance, surveying the site must have been a laborious task.

3. Water reservoir (?) (EN_220)

The distinctive walls of this enclosure are 2.5–3.0 m thick (Fig. 10). They are each 17 m long (measured externally) and describe a square. In some places, the height of the banks from the inner side reach almost 1.5 m; outside, the height varies between 1.0 m and 1.2 m. The enclosure is thus effectively a basin. On the northern side a combination of stone wall and

stone-clay bank was identified, with no apparent trace of masonry. The bottom of the enclosure is flat and has been levelled to some extent. An entrance for a watercourse was found in the southwestern corner (Fig. 10). No buildings or other structures were detected in the vicinity. As a tank, the enclosure could have held some 1200 hl of water.

Further considerations of the function of these enclosures will be made when the results of the pedological and palynological analyses become available.

Dating the enclosures by LIDAR, map analysis, and archival materials

Some of the enclosures certainly served relatively recently as forest nurseries or seedbeds, particularly those plotted on the maps from the 1930s (Fig.11) and listed in the forest management plans from the same period. Several enclosures identified by LIDAR also

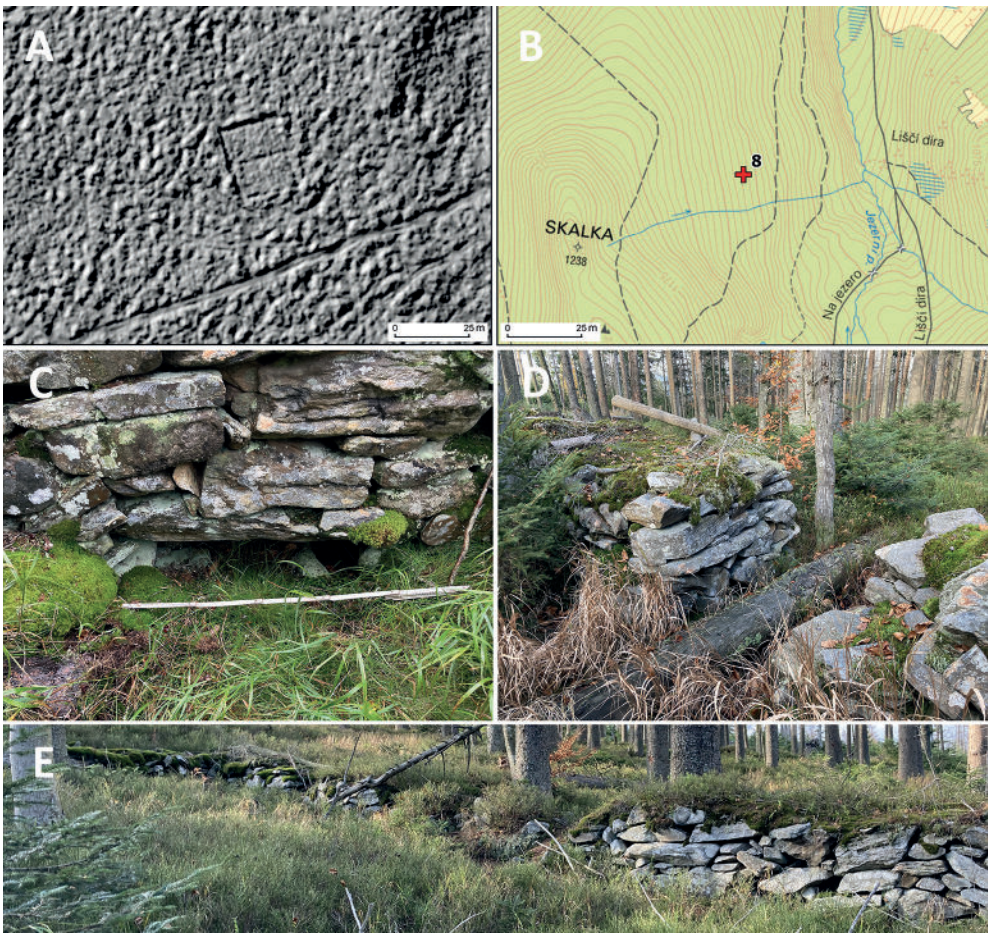

Fig. 7. Enclosure EN_8: A – LIDAR-derived image; B – location of the enclosure on the map; C – drain hole; D – entrance; E – north wall (photo: D. Dreslerová).

coincide with the outline of forest nurseries on forest maps. Dating the enclosures established before the 1930s is more difficult, however, as the older forestry maps and forest management plans yielded little information. Further research will seek information regarding forest nurseries and seed stands from the period 1850–1922, and – if possible – earlier, based on documents held at the State regional archive in Třeboň (Český Krumlov department); given the (dis)organization of the archival materials and the state of their processing, we consider this task to be rather demanding. The information obtained will be supplemented using historical maps and then compared with the identified enclosures.

So far, 112 enclosures have been studied using historical mapping in an attempt to unravel the relationship between the enclosures and the road systems that emerged during the 18th and 19th centuries in the Bohemian Forest. This subgroup had no "ridge and furrow" organization in the enclosure interiors (Fig. 3H). The enclosures were categorized according to whether they preceded, respected, or ignored the road systems mapped on the 2nd and 3rd military surveys. Separate categories were also reserved for those enclosures clearly built alongside the mapped roads (and therefore being younger than the previous mappings without these roads: the 2nd military survey was finished in 1853; the 3rd military survey was

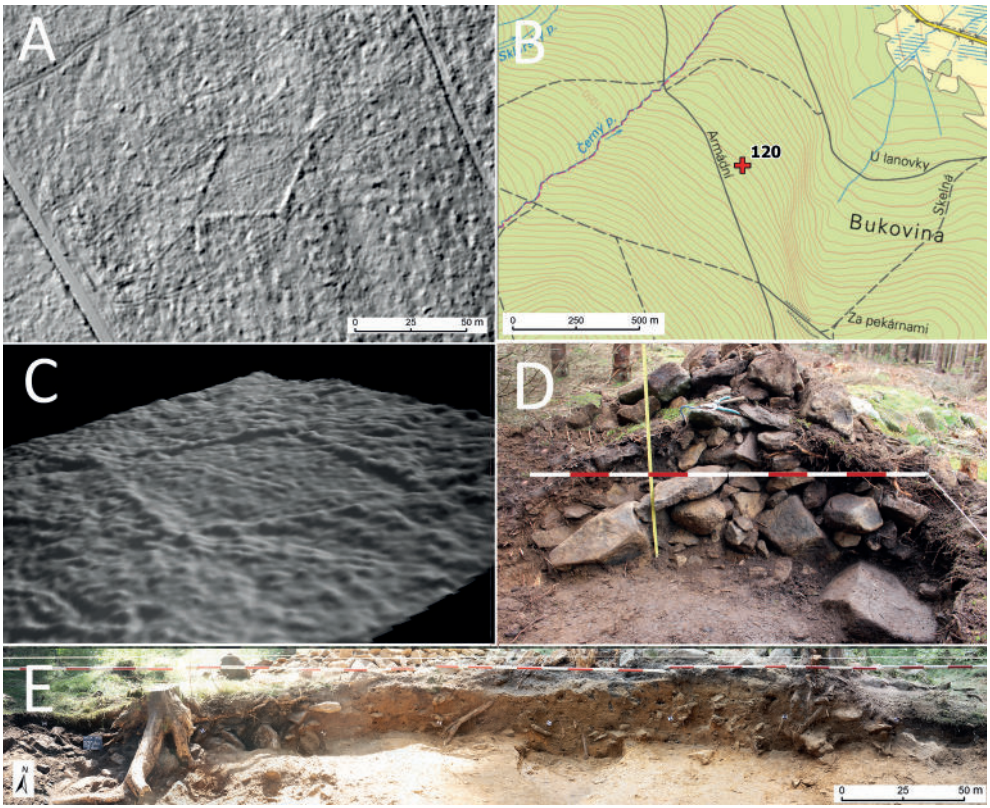

Fig. 8. Enclosure EN_120: A – LIDAR-derived image; B – location of the enclosure on the map; C – 3D image of the enclosure; D – cut through the SW bank; E – cut the NE bank (photo: D: D. Dreslerová, E: T. Chlup).

published in 1883) or associated with some features visible on the maps, such as the edge of the forest. The last group of enclosures can be described as those with a negative relationship to the features mapped on the historical maps: they are some distance away from the known road systems and not aligned to any of the local paths or other features (Fig. 3J).

Vital for our further research are the enclosures that intersect or are already somehow plotted on the 2nd military survey (and therefore built before 1853) and those that ignore or have a negative relationship to the road systems before ca 1900. Some 21 examples (9% of the sample group) fit these requirements. They are potentially the oldest examples of quadrangular enclosures in the upper areas of the Bohemian and Bavarian Forests and will therefore be the subject of further study.

A short note on our final research question: Do these structures occur in other (mountain) areas?

We do not yet know whether similar enclosures occur in other mountain or indeed lowland regions. Because of their poor visibility in the terrain, they can only be readily identified on high-resolution LIDAR imagery. Enclosures similar to those discovered in the Bohemian Forest were found in the Bavarian parts of the mountain range, although not in such quantity (only around 50 of them). The Bavarian enclosures appear to differ little from their Bohemian counterparts. They are less well preserved, however, because of the predominance of deciduous trees, which form conditions less favourable for the preservation of linear features such as heaped-stone banks.

We are currently at the beginning of our search for similar features outside the Bohemian and Bavarian Forests. The search is limited to areas where LIDAR imagery of sufficient quality is available for research purposes. Dr. Tibor Lieskovský from the Slovak Technical University in Bratislava (STU) has kindly informed us that similar features can be identified on the New Digital Terrain Map of Slovakia (DTM 5.0). The features that most resemble our enclosures are two square enclosures in the cadastre of the village of Očová, Poľana region, central Slovakia, located at ca. 800 m a.s.l. (Fig. 12). They also have clearly visible internal articulation. One of them is marked as a forest nursery on the current map, but visual inspection is yet to be carried out.

Further corroborative evidence will be the subject of a later and more detailed report.

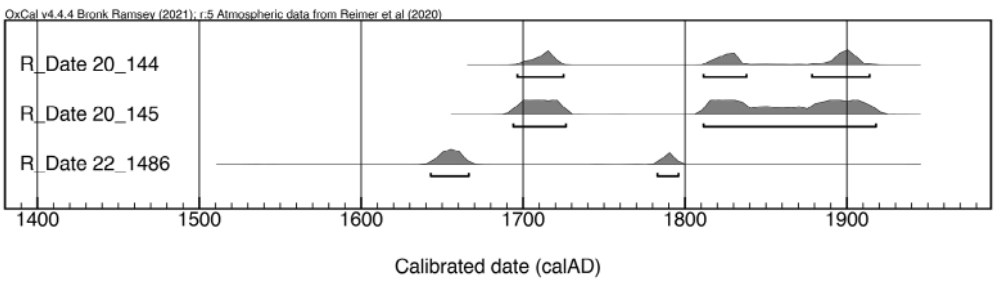

Fig. 9. Radiocarbon dating of samples from EN_120. CRL 20_144, 74 ±15, 95,4% probability; CRL 20_145, 105 ±15, 95,4% probability; CRL 22_1486, 245 ± 15, 95,4% probability.

Conclusions

The main reason for studying the nature and purpose of the quadrangular enclosures in the upper regions of the Bohemian and Bavarian Forests is the region's history – or rather its lack of history. Although the general historical, political, and economic narrative of the area over recent centuries is well known, beneath this general layer of knowledge existed an even finer stratum of local traditions, customs, procedures, and approaches to subsistence in the harsh climatic conditions of the sparsely populated mountains. These practices tended to be highly localized and were not always regulated or documented by local or other authorities. Valuable

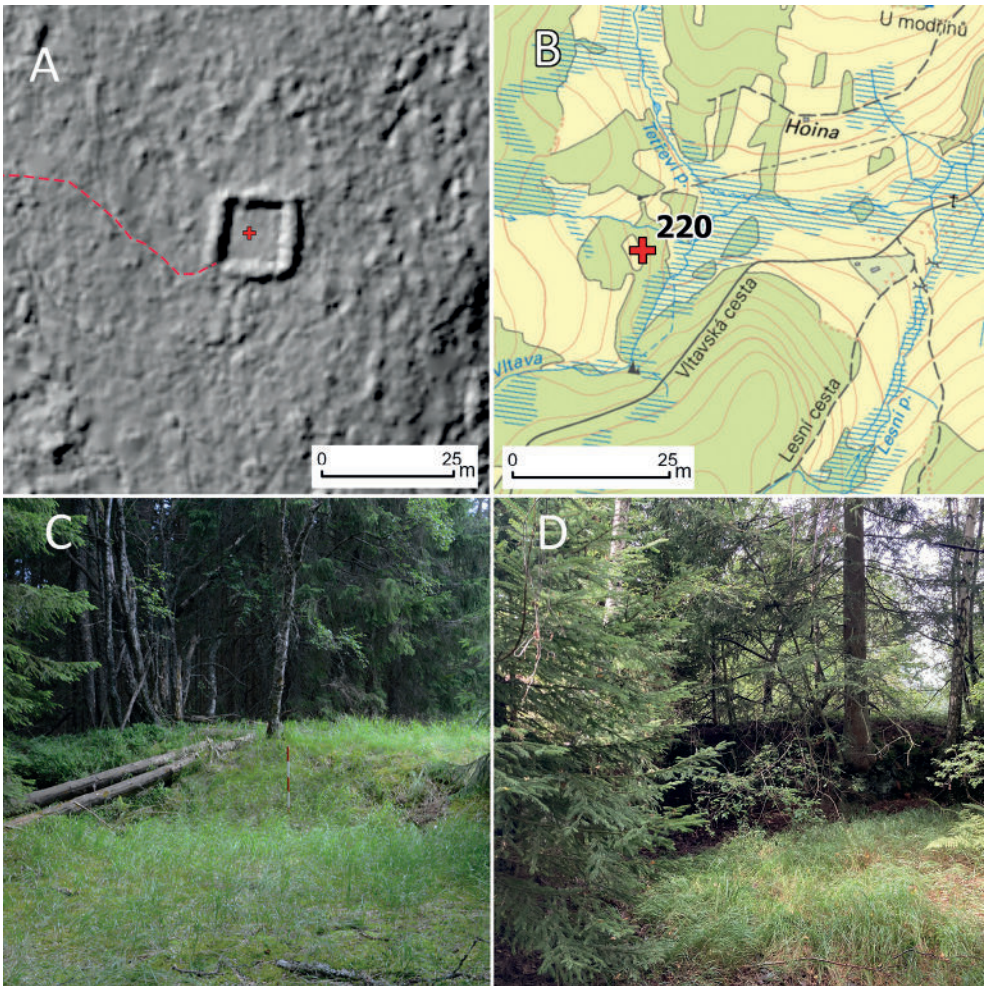

Fig. 10. Enclosure EN_220: A – LIDAR-derived image, red – inflow of water into reservoir; B – location of enclosure on the map; C – interior, south wall; D – interior of the defunct water reservoir for the glass grindery in Josefův Důl, Jizerské Hory, from 1890 (photo: D. Dreslerová).

sources for learning about such local specifics are usually regional chronicles or oral tradition but in this area these sources are largely incomplete because of the post-war displacement of the German population and the subsequent abandonment of most of their settlements. This process was reinforced by the subsequent partial colonization by people from elsewhere in Czechoslovakia and the creation of the Iron Curtain with its buffer zones and restrictions to movement on the Czech side of the border.

Fig. 12. LIDAR-derived image of two square enclosures in the cadastre of the village of Očová, Poľana region, central Slovakia (image by Tibor Lieskovský).

The possibilities for research into the age and meaning of the enclosures are far from exhausted. Archaeological and archival research, and pedological and palynological analyses all offer suitable approaches to fill the gaps in our historical knowledge.

Here we present the preliminary findings concerning these walled structures:

(1) They are a phenomenon that pre-dates the forest disturbances of the 1860s and 1870s (that is, at least some of the enclosures predate this period).
(2) Despite looking similar to each other on LIDAR and according to visual prospection, the enclosures were built using a variety materials and techniques.
(3) The enclosures did not all serve the same purpose. The variability in morphology and landscape setting all but precludes the likelihood that they were all forest nurseries or seedbeds.

So far, we have no access to high-resolution DTMs for other mountain ranges. This preliminary report is also, therefore, an appeal to readers to share knowledge concerning the appearance and use of similar enclosures in other mountain areas (and lowlands).

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