

DISCUSSION – DISKUZE

The environmental perspective of the relationship between Great Moravian centres and their hinterland: A response to Jiří Macháček's polemic

Environmentální perspektiva vztahu velkomoravských center
a jejich zázemí: Reakce na polemiku Jiřího Macháčka

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The paper presents a critical review of the interpretative model of the relationship between Great Moravian centres and their hinterland formulated by Jiří Macháček (in press), from an environmental and empirically based perspective. Based primarily on archaeobotanical analyses of the Mikulčice-Valy site, supplemented by archaeozoological data and new findings from settlements in the broader hinterland of the centre, the work endeavours to refine the methodological foundations of archaeobotanical interpretation and critically evaluate reductionist approaches that lead to a dichotomous understanding of the 'centre-hinterland' relationship. Using taphonomic models, the ecological evaluation of habitat requirements of wild species and spatial distribution of archaeobotanical assemblages, it is documented that Mikulčice-Valy cannot be interpreted either as an exclusively consumption centre dependent on redistribution from the hinterland, or as a unit that is fully self-sufficient in terms of the food supply. Empirical data, on the contrary, point to a complexly organised economic system in which the centre had its own production and processing capacities, combined with functionally differentiated and ecologically adapted links to the wider settlement hinterland. The study emphasises the need to abandon the schematic dichotomy of centre and hinterland in favour of an empirically testable model of the economic organisation of Great Moravian centres.

archaeobotany – Mikulčice-Valy – Great Moravia – hinterland – subsistence

Příspěvek představuje kritickou revizi interpretačního modelu vztahu velkomoravských center a jejich zázemí formulovaného Jiřím Macháčkem (in press), a to z environmentální a empiricky založené perspektivy. Studie vychází především z archeobotanických analýz lokality Mikulčice-Valy, doplněných archeozoologickými daty a novými poznatky ze sídel v širším zázemí centra. Cílem je zpřesnit metodická východiska archeobotanické interpretace a kriticky zhodnotit redukční přístupy, které vedou k dichotomickému chápání vztahu „centrum–zázemí“. Na základě aplikace tafonomických modelů, ekologického vyhodnocení stanovištních nároků planě rostoucích druhů a prostorové distribuce archeobotanických souborů je doloženo, že Mikulčice-Valy nelze interpretovat ani jako výlučně konzumní centrum závislé na redistribuci ze zázemí, ani jako plně potravinově autarkickou jednotku. Empirická data naopak poukazují na komplexně organizovaný hospodářský systém, v němž centrum disponovalo vlastními produkčními a zpracovatelskými kapacitami, kombinovanými s funkčně diferencovanými a ekologicky adaptovanými vazbami na širší sídelní zázemí. Studie zdůrazňuje nutnost opustit schematickou dichotomii centra a zázemí ve prospěch empiricky testovatelného modelu hospodářské organizace velkomoravských center.

archeobotanika – Mikulčice-Valy – Velká Morava – zázemí – subsistence

Introduction

The discussion of the relationship between strongholds and their economic hinterland belongs to broader topics of early medieval archaeology concerning the functioning of political centres, the organisation of production, and methods of food distribution in more complex settlement structures. Similar issues are also discussed within environmental archaeology and historical economics when studying early medieval centres in various regions (*Klanica 1987; Dresler – Macháček 2008; Galuška 2008; Poláček 2008; Mařík 2009; Danielisová – Mařík 2012; Hladík 2014; Dresler 2016; Látková 2017; Dresler – Beran 2019; Látková – Hajnalová 2019; Hladík et al. 2022*). Archaeobotanical data also play a crucial role in this debate (*Látková 2017; Látková – Hajnalová 2019; Hladík et al. 2022*), as they allow the reconstruction of subsistence strategies and agricultural production. The body of empirical findings presented in the monograph *The Archaeobotany of Mikulčice. Food Supply to the Early Medieval Stronghold* (*Látková 2017*) focuses on the systematic analysis of archaeobotanical finds from various parts of the Mikulčice agglomeration. The aim of this work was to critically review assumptions about the food subsistence of the Mikulčice-Valy Great Moravian stronghold based on taphonomic models, the ecological requirements of wild plants and spatial distribution of archaeobotanical assemblages.

Macháček responds critically in his discussion paper (*in press*), in which he attempts to systematise and compare three models of the relationship between centres and hinterlands in Great Moravia: hierarchically organised economic space with the systematic redistribution of products from the hinterlands to the centres (model 1); food self-sufficiency of centres, which assumes their own production activities within the agglomeration (model 2); and existence of local markets, where product exchange took place through semi-formal mechanisms (model 3). *Macháček* places the interpretation based on archaeobotanical data in the second category (model 2).

Although *Macháček* (*in press*, 5–9) presents centres as systems of redistributive domination with almost no production activity, archaeobotanical research offers an alternative view (*Látková 2017*, 71–129). However, it is necessary to note that *Macháček* interprets the conclusions of my study inaccurately in some points. The archaeobotanical study does not argue in favour of the full food self-sufficiency of the Mikulčice-Valy site in the sense of an isolated agrarian system, but points to a high level of economic organisation, which also included some of the production activities taking place directly within the central settlement. Archaeobotanical data interpreted using two taphonomic models provide support for the interpretation of the Mikulčice-Valy site, which appears to have been not only a passive consumer of external surplus products from the hinterland, but also had the capabilities and sufficient labour force for partial production and processing of crops (*Látková 2017*, 103).

The aim of this response is to systematically present the methodological foundations of archaeobotanical analysis, to supplement empirical findings that have not been considered in the discussion thus far, and to critically evaluate the consequences of reductive and schematic approaches in interpreting the relationship between the centre and its surroundings. The presented arguments are intended to contribute to a deeper understanding of the observed phenomena and to the formulation of an interpretative framework that will allow us to capture their internal complexity and regional conditionality without *a priori* assumptions.

Between consumption and production: Towards a methodological interpretation of archaeobotanical evidence from Mikulčice-Valy¹

The following chapter summarises the empirical archaeobotanical data from Mikulčice-Valy and explains the methodological framework for their interpretation. These assemblages represent one of the most extensive archaeobotanical datasets for the Great Moravian period, allowing for a more detailed assessment of the nature of agricultural production, crop processing, and the organisation of the food economy within the central agglomeration. Interpretation of my work (*Látková 2017*) as presented by *Macháček (in press)*, there is rather a distortion of the original argumentative framework. My study does not present the model of local agricultural production as free speculation, but as an analytical alternative based on the ecological demands of cultivated species, soil conditions, taphonomic analyses, and structural differences in archaeobotanical assemblages. For this reason, I consider it necessary to comprehensively present both taphonomic models, including their methodological foundations, interpretative limits, and the potential they offer for the reconstruction of the agricultural organisation of archaeological sites.

The organisation of agricultural production, processing, and consumption of crops was analysed using the taphonomic models (specifically crop processing models) of *Hillman (1981; 1984)*, *Jones (1984)*, and *Fuller and Stevens (2009)*. In the context of archaeobotany, these taphonomic models define the filters through which plant remains pass from harvest to burial. They are utilised here strictly as a site-formation methodology to identify the nature of agricultural waste, which must be conceptually distinguished from the broader socio-economic or spatial models of centre–hinterland relationships. These interpretative frameworks provide a basis for a deeper understanding of the functioning of agricultural infrastructure within the agglomeration (*Látková 2017*, 101–104; *Látková – Hajnalová 2019*, 411–412).

The taphonomic model according to *Jones (1984)* is based on the ecological classification of weed seeds (weed seed categories model). It distinguishes six groups of weed species linked to various phases of post-harvest crop processing – from winnowing waste to clean stocks (*Jones 1984*, 60; *Látková 2017*, 90). This approach aims to determine the phase of post-harvest crop processing in which individual archaeobotanical assemblages formed. The results of the analysis showed that most samples from different parts of the Mikulčice agglomeration were dominated by species typical of the late stages of cleaning before storage, especially waste from fine sieving and manual cleaning before storage or consumption. In contrast, weeds characteristic of the initial stages of processing (e.g. winnowing, coarse sieving) were not identified in any of the parts of the agglomeration (*Látková 2017*, 92–93).

These findings suggest that the central parts of Mikulčice, as well as the peripheral zones of the agglomeration (Kopčany-Kačenáreň and Mikulčice-Trápíkov), were not a place

¹ The results are presented only in abbreviated form. A more detailed description of the methodology, its practical application and an interpretation of the findings is published in the work *The Archaeobotany of Mikulčice. Food Supply to the Early Medieval Stronghold* (*Látková 2017*, 87–94).

of primary crop processing, but rather an area for final cleaning, storage, and consumption (Látková 2017, 92–94). According to the interpretation of Hillman (1981; 1984) and Jones (1984), these late phases are characteristic of consumer settlements. However, Hajnalová (2012, 112) points out that waste from fine screening may also be present at production sites.

Based on the concept of Fuller and Stevens (2009), the second taphonomic model assumes the ability of a community to mobilise labour during one of the most stressful periods of the agricultural year, at harvest. According to this approach, it is possible to distinguish in the archaeobotanical material settlements whose inhabitants produced crops at the household level and settlements where production took place at a higher level of social organisation (community and/or centrally controlled). Food-producing communities at a higher level of social organisation should indeed be able to mobilise a sufficient amount of labour during the harvest so that crops can be processed as quickly and efficiently as possible.

The results of applying this model to the assemblages from Mikulčice showed that in all parts of the agglomeration, including the acropolis, the outer bailey, the extramural area, and the peripheral parts, samples with a clear dominance of cleaned grain and traces of late processing phases, especially cleaning before storage, prevail (Látková 2017, 103). At the same time, there is an almost complete absence of waste typical for the initial stages of processing, such as threshing or winnowing. These data support the hypothesis that Mikulčice-Valy, as a power centre, had its own well-organised economic system and was able to mobilise a sufficient amount of labour (Látková 2017, 103–104).

Unlike the previous model based on Hillman and Jones, which evaluates the function of archaeological contexts based on the presence of ecologically specific weed species, the model by Fuller and Stevens allows for a broader interpretation linked to social organisation and mechanisms of agricultural labour. In the context of Mikulčice, this model supports the hypothesis of the agrarian autonomy of the centre and its ability to process significant quantities of agricultural products directly on site, while also calling into question the necessity of systematically importing cleaned grain from the rural hinterland (Látková 2017, 104–105).

The archaeobotanical data thus reveal a partly paradoxical image: on the one hand, all the analysed areas of Mikulčice show signs of a consumer character, but on the other hand, the data indicate that the harvest for this agglomeration was provided by a highly organised community that went beyond the framework of a typical early medieval rural household. Only under these conditions was it possible to effectively mobilise a sufficient amount of labour to process crops during key periods. This suggests a high probability that some residents of Mikulčice were directly involved in the production of plant-based foods.

The model of seasonal involvement is neither historically nor ethnographically unique. On the contrary, ethnographic studies from different regions of the world show that the combination of specialised and agrarian activities within a single community is a common phenomenon. Evans-Prichard (1940) describes a society whose main livelihood is raising cattle, but during the harvest season, all members of the community, regardless of their primary occupation, participate in the millet harvest. A similar case is also documented among the Kalinga of the Philippines, where women devote most of the year to pottery production, while during the agricultural season the entire community regroups for planting and harvesting (Longacre – Skibo 1994). These ethnographic parallels point to possible

scenarios in which seasonal participation in agriculture, even within an otherwise specialised community, represents a long-term sustainable model (*Hodder 1982; Fratzkin 1991; Lane 2004*).

In the spirit of Hodder's approach (*Hodder 1982*), the involvement of different social groups in the harvest and agricultural work cannot be understood solely as an ecological or economic necessity; participation has symbolic and social significance, as it builds ties between different segments of society, strengthens collective identity and internal solidarity, and alleviates tensions between groups with different social roles. The collective work of diverse social groups on the harvest thus becomes a ritual that expresses mutual dependence and shared responsibility. These practices also reflect control over resources and the environment and function as a tool of social power and symbolic communication. Therefore, agricultural activities cannot be interpreted solely as a response to environmental conditions; it is also necessary to take into account that people consciously shape and maintain them. Harvesting and crop management thus become not only a means of subsistence, but also a tool for social relations, cultural self-presentation, and the formation of social identity (*Hodder 1982, 15; 1990, 72*).

In the case of the Great Moravian site of Mikulčice-Valy, it can therefore be assumed that in times of greatest need many residents could also lend a hand in agricultural production, although they were employed in craft, religious or administrative activities for most of the year. Taphonomic models, archaeobotanical data, and ethnographic parallels together support the hypothesis that the Mikulčice-Valy site was not only a consumer-oriented centre, but also had its own production capacities, which were in some cases activated seasonally.

Localisation of the agricultural hinterland²

In addition to the actual processing of crops, it is crucial to ask where these plants, especially cereals, could have been grown, i.e. where the closest economic hinterland of Mikulčice-Valy, was located. It has traditionally been assumed that the Great Moravian centres were dependent on the broader economic hinterland for food and that the nearest arable land, in the case of the Mikulčice stronghold, was located on the river terraces, several kilometres from the centre (*Klanica 1987; Macháček 2007; Poláček 2008; Hladík 2014, 166*). This assumption was based on the logical reasoning that floodplain areas were unsuitable for agriculture, which, however, is challenged by the latest analyses and empirical evidence (*Petřík et al. 2019; Adameková et al. 2025; Janovský et al. 2025*).

From the perspective of archaeobotanics, the key to revising this theory is the analysis of the habitat requirements of the identified plant species, especially their relationship to soil reaction (pH). Soil reaction does not change as significantly over time as other soil properties (*Hájková et al. 2023, 137*), and therefore it can provide important information about the character of agricultural habitats in the Early Middle Ages.

² Summarising argumentation on this issue is published in the work *The Archaeobotany of Mikulčice. Food Supply to the Early Medieval Stronghold* (*Látková 2017, 122–125*).

An analysis of archaeobotanical assemblages from Mikulčice showed a surprisingly high share of species indifferent by soil pH, along with a significant representation of acidophilic species, which does not correlate with the character of soils on chernozem terraces, but instead corresponds to the acidic subsoil of sandy sediments of the Morava River floodplain (Látková 2017, 119–121). This result indicates that in the 9th century, arable land was located within the floodplain, i.e. in the immediate vicinity of the stronghold and not outside the basin, as assumed previously (Látková 2017, 125).

This hypothesis is also supported by a comparison of archaeobotanical data with the ecological characteristics of species from selected sites of the current vegetation of the Lower Moravian Valley. Particularly significant is the high ecological correspondence between the archaeobotanical assemblage and the present-day flora of the Mikulčice-Valy archaeological site (Brzicová 2014), where, similar to the medieval material, pH-indifferent and acidophilic species are dominant. Species preferring neutral and alkaline soils are only weakly represented (Látková 2017, 122–125). This pattern differs from the data from terraces, where neutral and basic soil types dominate, confirming the difference in ecological conditions.

From an agricultural and strategic point of view, situating the fields in the immediate vicinity of the stronghold made sense, primarily due to intensive and time-differentiated land management throughout the year (Hillman 1984), and also from the perspective of protection and control over resources. As for the extent of the economic hinterland, with an estimate of the population of Mikulčice in the range of 1,000–2,000 people (Stloukal – Vyhnánek 1976, 40–42), it is possible to assume a need for 60–400 ha of arable land, which, with standard productivity, corresponds to a distance of a maximum of 1–2 km from the settlement (Klanica 1987; Poláček 2008; Hajnalová 2012).

Today, the floodplain area contains extensive grain and other agricultural areas, extending to the new archaeological base at the Mikulčice-Trapíkov site. Moreover, the very core of the agglomeration—the acropolis and the outer bailey—was intensively used as arable land before the start of archaeological research in the 1950s.

In addition to archaeobotanical evidence, new geoarchaeological research has also shown that the floodplain area around the Great Moravian centres was relatively stable and intensively used in the 9th–10th century. Sediments from the Břeclav-Pohansko site do not show significant flood deposits during the entire Great Moravian period, though the continuity of sedimentation is documented from the 3rd century BC until the end of the 10th century (Petřík *et al.* 2019).

Analyses of soil, sediments and plant macroremains demonstrate intensive agricultural use of the alluvial environment during peak Great Moravian activity associated with deforestation, an increase in nitrogen-loving species, and the anthropogenic enrichment of soils, which points to systematic cultivation of fields and fertilisation of crops and meadow vegetation (Petřík *et al.* 2019, 13–14). Archaeobotanical and palynological data from the Uherské Hradiště – Sady site confirm long-term and stable agricultural production in the floodplain environment since the 8th century, despite repeated flooding dynamics (Adameková *et al.* 2025, 18). Preferential modelling of landscape use also shows that the floodplain was purposefully used as the main production area for arable land, with a disproportionately large representation of agricultural areas and a direct link to settlements (Chrástek 2013, 88).

Economic hinterland of Great Moravian Mikulčice-Valy

For a long time, the interpretation of the economic functioning of Great Moravian centres such as Mikulčice-Valy was limited by the availability of archaeobotanical data from surrounding rural settlements (*Klanica 1987; Poláček 2008; Hladík 2014*).

The absence of larger collections from sites in the hinterland of the centre does not stem from the selective approach of archaeobotany, but a long-term archaeological research strategy, in which samples for archaeobotanical analysis were not systematically collected from these sites from the beginning of research on Great Moravian centres. Archaeobotany cannot replace missing field data and its interpretative potential is directly dependent on the methodology, scope, and structure of the collected samples.

The first archaeobotanical collections from settlements in the hinterland of the Mikulčice stronghold were only obtained in recent years as part of rescue archaeological excavations. These assemblages were immediately analysed and, at the time this text is being prepared, they are already processed and ready for publication, thus creating, for the first time, a substantial empirical basis for comparing the central area of the Mikulčice-Valy stronghold and its broader rural hinterland (*Látková et al. in press*).

At the same time, it should be emphasised that the taphonomic and palaeoeconomic models presented in previous works (*Látková 2017; Látková – Hajnalová 2019*) do not assume the necessity of archaeobotanical material from all parts of the agglomeration. Archaeobotanical samples from settlements in the hinterland did not represent a necessary condition for testing the hypothesis on the degree of economic self-sufficiency of the centre (*Jones 1984, 60; Fuller – Stevens 2009, 230; Hajnalová 2012, 102–103, 105–106; Látková 2017, 87, 93*).

New archaeobotanical and archaeozoological data from settlements in the hinterland of the Mikulčice stronghold (Prušánky-Podsedky, Mikulčice-Podbřežníky, and Hrušky – Tvrdonické podsedky) demonstrate that the differences between the centre and hinterland sites cannot be reduced to a simple model of unilateral agrarian dependence. On the contrary, the data point to a functionally differentiated, ecologically adapted and largely autonomous economic system in the Great Moravian period (*Látková et al. in press*).

Archaeobotanical analyses document the cultivation of various cereals, legumes and, to a lesser extent, fruits and oil or fibre plants in the broader hinterland. The central area of the stronghold was dominated by millet, which is characterised by a short growing season, minimal soil requirements, and easy processing. This crop made it possible to satisfy food requirements in more densely populated areas, where high concentration of people demanded rapid consumption (*Kuna et al. 2013, 134–135*).

In the rural hinterland, there was a predominance of wheat and barley, crops with a longer growing season, more demanding in terms of field maintenance, and suitable for more stable and long-term agricultural use. The difference in the share of cereals between the centre and the hinterland cannot be explained exclusively by selective harvesting by the centre, e.g. millet, because archaeobotanical data show that the fields were located directly in the floodplain environment near the stronghold, and the hinterland could have supplied the centre mainly with wheat from the chernozem terraces with higher fertility and a strategic advantage. Differences in the representation of cereals thus probably reflect natural variations in the production and use of fields and functional specialisation between the centre and settlements in the hinterland. Taphonomic analyses support this

differentiation of economic functions: crop processing at the stronghold took place in a comprehensive and organised manner at the level of a larger community, while at sites in the hinterland, the crop was processed gradually or stored unthreshed and processed on an ongoing basis according to current needs, which suggests farming at the level of a family or a smaller community.

An analysis of the ecological requirements of wild-growing species tested the hypothesis that when comparing identical segetal species, in the case of a uniform origin of field crops from the hinterland, weed assemblages from the centre and the hinterland would show comparable requirements for habitat conditions. The assessment of ecological requirements was carried out based on the presence of identical taxa documented in both types of environments.

However, the results show that this was not the case. Based on the requirements of field weeds for soil pH and nitrogen content, it is clear that the fields in the hinterland had a different structure and quality than the fields in the central part of the agglomeration. Finds of seeds of herbaceous species from the hinterland show higher requirements for soil pH and a higher trophic level, which indicates more naturally fertile soils. As such, the observed differences cannot be explained solely by the varied composition of weed communities, but reflect the different ecological conditions of the cultivated fields. These results support the idea of a mosaic agrarian system in which production was carried out within a broader settlement structure, suggesting a flexible and adaptive network of local producers rather than centralised redistribution (*Látková et al. in press*).

Archaeozoological data complement the palaeoeconomic picture. The raising of livestock was a stable activity at all types of settlements, but the species composition of osteological material varied according to the function and importance of the site. The stronghold was dominated by species providing quickly processed food (pigs) and allowing flexible use, while the hinterland was dominated by species associated with more stable and long-term farming, especially cattle.

The acquired data clearly indicate that central settlements had their own production capacities and relative self-sufficiency, while the hinterland locations functioned as complementary units involved in a network of interconnected activities and exchange. The long-term continuity of economic processes and the synchronisation of activities between the centre and its hinterland underscore the functional integration and complementarity of both types of sites.

Interpreting the obtained data from the broader economic hinterland leads to a model of a decentralised, ecologically adapted economy. Centres are not merely redistribution nodes, as traditionally assumed, but autonomous units combining their own production and consumption with exchange ties to the hinterland. Each location, be it a centre or a peripheral settlement, was to some extent self-sufficient and simultaneously integrated into a functionally interconnected system.

This model takes into account ecological conditions, resource availability, production variability, and population needs, while allowing for adaptive cooperation and flexible redistribution of surplus production. The overall palaeoeconomic image shows that the centre had the capacities to ensure its own consumption and processing, while the hinterland fulfilled a supplementary and complementary role. Mutual ties between the centre and the hinterland ensured adaptive cooperation, efficient use of the landscape, and a stable food

supply. Differences in ecological characteristics, the type of cultivated crops, and the structure of livestock production indicate a sophisticated system in which individual localities combined autonomy and mutual interaction (*Látková et al. in press*).

The political-economic character of Mikulčice in a comparative perspective

The interpretation of the economic organisation of Great Moravian centres, especially Mikulčice-Valy, inevitably touches upon broader theoretical questions of the political economy of early medieval societies. The key problem is not the existence of agricultural production itself, but the way it is organised, controlled, and linked to political power. In this sense, Mikulčice-Valy represents a suitable test case for the application and critical evaluation of two influential conceptual frameworks: the cyclical chiefdoms model of *Hodges (1982; 2012)* and the *staple finance* model formulated by *Earle (1977; 1997)*.

The model of the economic relationship between Great Moravian centres and their hinterland according to *Macháček (in press)* is in many respects carefully considered and supported by archaeological and historical arguments, but certain methodological issues emerge during a critical evaluation. As a basic starting point for interpreting the Great Moravian centres, Macháček uses the model of cyclical chiefdom (*Macháček 2005*, 100–103), which is based on the temporary consolidation of power and redistributive mechanisms.

Hodges' concept of cyclical chiefdoms is based on observations of early medieval centres whose political and economic stability was limited by the absence of systematic control over basic agricultural production (*Hodges 1982; 2012*). In this model, centres are primarily places of consumption and redistribution, whose food base is dependent on the hinterland and personal ties among elites. Food production takes place outside the centres and is not organisationally integrated into their political structure. The consequence is cyclicity—alternating periods of accumulation, expansion, and subsequent decline, when redistribution networks are disrupted or exhausted.

At first glance, some aspects of Mikulčice might appear compatible with this model, especially the absence of significant grain pits directly inside the area of the stronghold. However, this interpretation runs counter to a growing body of archaeological, archaeobotanical, and other environmental data suggesting a more complex picture. The location of Mikulčice in an intensively used river floodplain, the long-term continuity of settlement, and the size of the area point to the existence of a stable economic base that goes beyond the framework of a purely consumer centre (*Látková 2017; Látková – Hajnalová 2019; Kovačiková et al. 2020; Hladík et al. 2022; Janovský et al. 2025; Látková et al. in press*).

In this context, the concept of staple finance, as developed by *Earle (1977; 1997)*, appears to be more analytically productive. This model assumes that political power is anchored in the ability to control the flow of basic subsistence commodities, especially food, through a combination of local production, regional accumulation, and redistribution. The key point is that staple finance does not require centralised storage right in the heart of the centre or its complete agrarian self-sufficiency. Production can be spatially dispersed in the hinterland, but organisationally and politically integrated into the centre as a control node.

Earle rejects the notion that the political centres of chieftaincy societies were exclusively dependent on the redistribution of food from subordinate communities, and instead assumes that elites often had their own production base of key foods. In his theory of the political economy of chieftaincy, the key is control of the most productive lands, on which, through labour or dependent peasants, staples were produced and served to finance power.

The model is illustrated in detail using the example of Hawaiian chiefdoms, where farmers cultivated not only their own plots but also fields directly belonging to the chief, with the revenues from them supporting the chief's court, warriors, priests, and ceremonial activities (Earle 2011, 39–40). Earle also emphasises that the view of the chief as a central redistributor of everyday production is misleading, because the chief's intervention in local production was selective and focused primarily on securing his own political strategies (Earle 2011, 31–32). Earle rejects the older functionalist model of the chief as a universal redistributor and stresses that elite interventions in local production were strategic, oriented towards financing power, not regulating everyday subsistence (Earle 2011, 31–32).

Storage of agricultural stocks

The issue of storing agricultural products, especially grain, is one of the fundamental issues in interpreting the economic functioning of Great Moravian centres (Pleinerová 1995, 62–63; Klanica 2008; Mazuch 2008; Hladík 2014). In the case of Mikulčice, the discussion has long focused on the absence of typical underground storage pits within the fortified agglomeration, which has been repeatedly interpreted as evidence of the non-agrarian character of the centre and its complete dependence on an external hinterland (Dresler – Macháček 2008; Hladík 2014, 173; Macháček *in press*, 8). However, this conclusion is based on a narrowly reduced understanding of storage strategies and does not reflect the variability of crop preservation forms or the ecological and taphonomic conditions of the site.

Grain pits are primarily evidence of storage practices (Beranová 1965; Kunz 2004; Jevtić 2011), not a direct indicator of agricultural production. Their presence is testimony to the method and organisation of crop storage, not about the place of its cultivation or the extent of farming activity of a particular community. Grain production took place in fields that leave only very limited traces in the archaeological record, whereas storage represents a subsequent, technical-organisational phase of the economic cycle. The automatic identification of grain storage pits with local agrarian production represents a logical short-cut that leads to incorrect economic conclusions. The centre could produce grain but store it in a different form, elsewhere, or consume it continuously; on the other hand, it could also store grain without the crop being directly grown in its immediate vicinity. Storage pits, therefore, reflect decisions concerning the technical method of storing agricultural products, not the existence or absence of agricultural production itself.

Moreover, it is also problematic that the term 'storage pit' is used very loosely in archaeological literature, where this type of feature is often identified as a grain pit *sensu stricto* without critical reflection. Many authors are unaware of the functional difference between a storage pit *sensu lato* and a grain pit *sensu stricto*. These are features with distinct purposes. While a grain pit (*s. s.*) is a specialised feature primarily intended for long-term storage of grain, a storage pit (*s. l.*), often of smaller dimensions, was used to store other

types of food (e.g. meat, dairy products, vegetables, feed) or various commodities (*Beranová 1965; Kunz 2004; Jevtić 2011*). Disregarding these differences and uncritically combining different types of pits under one terminological framework leads to systematic distortion of interpretations of the economic organisation of settlements, to overestimation of storage capacities, and to erroneous conclusions about the level of agrarian production and subsistence strategies of the studied communities.

Archaeology and ethnography clearly show (*Kudrnáč 1958; Kunz 2004; Jevtić 2011; Hajnalová 2012*, 30–32, 119–120) that underground grain pits represent only one of the specialised forms of long-term grain storage.³ Their function was not to ensure daily consumption, but rather to create strategic reserves that were quickly consumed once opened (*Kunz 2004*, 31–133). Grain stored in pits was intended primarily for consumption, not for sowing, as anaerobic conditions could partially degrade germination (*Fenton 1983*, 586; *Sigaut 1988*, 22). Ethnographic and experimental research shows that most storage pits could be reused over a long period of time, with one pit being able to serve for several years to decades if well maintained, though only if it was always hygienically cleaned and burned after the contents were removed (*Bevan et al. 2024*, 500–501).

In his text, *Macháček (in press)*, 8) also refers to the claims of M. Hajnalová and interprets them as a rejection of the traditional idea of grain pits as grain stores. But this interpretation is misleading; Hajnalová's study does not question the storage function of grain pits themselves, but critically reassesses their specific purpose and method of use. Her hypothesis shows that the traditional idea of grain pits as universal seed storage is untenable, as the pits could have served various forms of long-term storage of grain intended for, for example, consumption, exchange, or as an emergency reserve (*Hajnalová 2012*, 119–120). Hajnalová's scepticism therefore does not concern the existence of storage in grain pits as such, but the reduction of their function to a single, normative model—seed storage.

Hajnalová (2012, 120) argues that it is necessary to take into account the basic agroeconomic connections between winter and spring crops, which directly affect the need and length of storage. Winter crops are sown in autumn and harvested in the first half of the following year. If some of the harvest is to be used as seed for the next growing cycle, it is necessary to preserve it only until autumn sowing, i.e. for a relatively short period. In contrast, spring crops are not sown until the following spring, and the seeds must be stored for significantly longer and in worse climatic conditions. Archaeobotanical research shows that in Central Europe, winter cereals were dominant in prehistoric times and the Early Middle Ages (*Bogaard 2004; Hajnalová – Varsík 2010*).

The interpretation by Macháček, who uses Hajnalová's conclusions as an argument against local storage or the agrarian engagement of centres, is therefore methodologically

³ Grain could also be stored in a wide variety of above-ground and other structures that allowed for its long-term preservation. Wooden storage containers were typically used, e.g. hollowed logs or chests, to protect the grains from rodents and moisture. Another option was woven baskets made of straw or other plant materials, which ensured good air circulation. Above-ground granaries could be built on stilts at strongholds and in central settlements to protect supplies from flooding and pests. These forms of storage allowed for flexibility, combining smaller underground pits with various types of above-ground structures, depending on available space and community needs (*Kunz 2004; Jevtić 2011*).

flawed because it confuses criticism of functional uniformity with the denial of storage strategies as a whole while simultaneously overlooking the basic agronomic logic of cereal production, which itself presupposes the existence of long-term storage mechanisms.

A comparison of Mikulčice with other Great Moravian centres, even if they are centres of lesser importance or of a different character than Mikulčice-Valy, supports this conclusion. At Great Moravian strongholds such as Nitra-Hrad (*Bednár 2007*, 210), Zalavár-Vársziget (*Szőke 2007*, 414; *Ritoók 2015*, 104), Bojná I-Valy (*Pieta 2015*, 17; *Boržová et al. 2020*, 12), Devín-Hrad (*Plachá – Hlavicová 2011*, 75), Svätý Jur – Neštich (*Vavák 2019*, 72), and Gars-Thunau (*Herold 2014*, 237–238), storage pits were documented directly in their central areas, in some cases even with preserved cereal grains (*Bednár 2007*, 210). And yet, even in these cases, their presence is not interpreted as evidence of local agrarian production, but as part of the consumption and redistribution mechanisms of the power centre from its hinterland (*Bednár 2007*, 210; *Pieta et al. 2007*, 15, 39–40; *Boržová 2020*, 56).

In the case of Mikulčice, on the contrary, the absence of pits is used to confirm the same conclusion, i.e. the non-agrarian nature of the centre (*Hladík 2014*, 173; *Macháček 2001; in press*, 8), which leads to a double interpretational standard, where the presence and absence of the same phenomenon supports an identical hypothesis. From a methodological point of view, this is a problem because the model formulated in this way is not falsifiable in the spirit of the Popperian principle.

Ecological anthropology emphasises that agricultural production in pre-industrial conditions represents primarily a risk management strategy, not yield maximisation. Climatic instability, crop fluctuations, soil limits, and biological losses mean that production is oriented towards securing the household in ‘bad years’, rather than towards systematically creating long-term surpluses (*Halstead – O’Shea 1989*, 2–3). From this perspective, potential surplus is unstable, time-limited, and often unpredictable.

At the same time, short-term surplus product is rapidly absorbed in many societies through social practices such as feasting, reciprocity, or exchange. These forms of consumption do not lead to permanent accumulation, but serve to strengthen social ties and reduce future risk. The surplus product thus becomes a social instrument rather than an economic basis for hierarchisation (*Halstead – O’Shea 1989*, 4–5).

This approach also has important implications for the interpretation of archaeological evidence of storage. Storing grain is technologically demanding and risky, and households have a strong incentive to maintain control over their own production. The presence of grain pits cannot, therefore, be automatically interpreted as evidence of central accumulation of surplus product, and their absence cannot be understood as proof of the absence of production (*Halstead – O’Shea 1989*, 5–6).

An alternative explanation for the absence of grain pits at the Mikulčice-Valy stronghold is offered by the concept of dynamic consumption, in which the harvest was distributed and consumed continuously, without the need to build extensive long-term stores. The high concentration of residents in the centre, short distances between production locations and the settlement, and the possibility of rapid redistribution reduced the need to build large storage spaces. Such a model is well documented ethnographically and historically (*Halstead – O’Shea 1989*, 5–6) and best corresponds to the ecological and archaeological data from Mikulčice-Valy.

Production evidence

In the last decade, thanks to archaeological (Hladík *et al.* 2022), archaeobotanical (Látková 2017; Látková – Hajnalová 2019; Látková *et al.* *in press*), and archaeozoological (Kovačiková *et al.* 2020) analyses, new evidence has emerged that significantly challenges the traditional model of the complete food dependence of centres on the hinterland. The relationship between the central location of Mikulčice-Valy and its economic hinterland can be characterised as closely functionally interconnected, based on the cooperation of individual components of the settlement structure. The economy of the Mikulčice agglomeration is interpreted as a complex, functionally differentiated, and regionally interconnected system (Hladík *et al.* 2022; Látková *et al.* *in press*). The central fortified settlement served as a supra-community power and administrative hub, while Great Moravian society in the 9th century was socially stratified and individual strata participated in various tasks in the subsistence system—from primary production to resource management. The centre was not merely a recipient of products from the surrounding area but was actively involved in the organisation and control of economic processes (Hladík *et al.* 2022, 137).

Mikulčice can thus be understood as a centre that concentrated power and resources but was also part of an effectively functioning economic and social network based on reciprocal exchange between variously specialised segments of the population. Settlements on the periphery of the centre, such as Mikulčice-Trapřkov, functioned as distribution and processing points for food and craft products and at the same time as nodes through which power and administration moved (Hladík *et al.* 2022, 113). However, not all settlements fulfilled the same role; some specialised in crop production, others raised livestock, processed raw materials, or stored products, which points to horizontal differentiation and ecological adaptation framed by social relations and institutional control (Hladík *et al.* 2022, 125–128).

Archaeozoological evidence has special informative value (Kovačiková *et al.* 2020). Analyses of the settlement components of Mikulčice clearly demonstrate that active pig husbandry, including reproduction, took place directly in the acropolis and the outer bailey. The osteological material clearly demonstrates the presence of all age categories—from young to adult females older than three years, which rules out an interpretation as an exclusively consumer site (Kovačiková *et al.* 2020, 11–13). The authors state that ‘*pork consumption demand was partially met by pigs raised at the acropolis as well as at the bailey*’ (Kovačiková *et al.* 2020, 13), thus confirming that part of the food requirements, especially meat, was provided directly in the centre. This type of farming required not only space, but also planning, organisation, and knowledge of breeding processes, from securing feed to controlling the reproductive cycle.

Analogous conclusions also allow archaeozoological, archaeobotanical, and isotopic data from Břeclav-Pohansko. Cereal pollen grain finds were made to varying degrees in almost all samples from Pohansko, and in one case, their occurrence was recorded in larger quantities, specifically at the Great Moravian well in the northeast bailey (Doláková *et al.* 2020, 544). The fact that pollen grains were found in clusters in the well is key evidence of the local manner of handling agricultural products. This phenomenon indicates a low degree of natural transport, meaning that the pollen was not brought to the site by wind from afar, but remained attached directly to the grain stalks after harvest. The presence of such

clusters at archaeological sites clearly demonstrates the handling of cereals in the initial stages of their processing; for example, during threshing, pollen grains may be gradually released and deposited in archaeological features (Doláková *et al.* 2020, 544). This data confirms that the residents of Pohansko processed their own crops directly within the area of the stronghold. According to Doláková *et al.* (2020, 530), the inhabitants of the centre ‘to a certain extent participated in the provision and processing of agricultural products themselves’, including the cultivation of cereals and the raising of cattle. Isotopic analyses have shown that the cattle were fed on local vegetation, thus suggesting the animals were raised locally. Therefore, similar to the case of Mikulčice-Valy, the economy of the Great Moravian Břeclav-Pohansko stronghold was based on a combination of local production and specialised supply from the hinterland (Doláková *et al.* 2020, 552).

Archaeological analysis of agricultural tools from Břeclav-Pohansko (Dresler – Beran 2019) supports this picture. Agricultural tools represent a significant part of the metal inventory (Dresler – Beran 2019, 237). While opinions have appeared in the past questioning the centre’s own agricultural production due to the unsuitable inundation terrain of the Thaya River and it was assumed that supplies were provided in the form of mandatory contributions from surrounding settlements (Dresler – Beran 2019, 239–240), an analysis of the collection of finds from 1959 to 2015 does not confirm this model. Tools such as ploughshares and coulter exhibiting traces of intensive wear and subsequent blacksmith repairs are clear evidence of their actual use directly by the inhabitants of the centre (Dresler – Beran 2019, 294). Metallographic analyses reveal a high technological level of local production (Dresler – Beran 2019, 291). These findings indicate that the economy was not based solely on the passive receipt of commodities, but on advanced artisanal production and active land management, which ensured the viability of this important centre (Dresler – Beran 2019, 294).

Similar indicators of local agrarian production can be observed in other early medieval fortified settlements in Central Europe. The hillfort of Gars–Thunau in Lower Austria provides an interesting comparative case study in this regard (Herold 2014). Archaeobotanical results point to the close connection of the hillfort with local agricultural production in its immediate hinterland. The hillfort is situated on an elevated position, which, in terms of the availability of agricultural land, does not represent ideal conditions for larger-scale agricultural production. Nevertheless, archaeobotanical data indicate that the grain was brought to the hillfort unthreshed and that the subsequent stages of its processing, especially threshing and cleaning, took place directly in the hillfort or in its immediate vicinity. This method of crop handling assumes the existence of fields in the relative vicinity (Popovtschak – Zwiauer 2003, 241). The spectrum of weeds accompanying field crops shows that the fields were probably located both on the plateau west of the hillfort and in lower positions on the eastern side, with the archaeobotanical material representing weeds typical for both ecologically distinct areas (Popovtschak – Zwiauer 2003, 240–243; Herold 2014, 237). At the same time, species typical for forest clearing vegetation were identified, indicating that the inhabitants actively deforested the surrounding landscape to create agricultural land (Popovtschak – Zwiauer 2003, 240–243; Herold 2014, 237–238).

Archaeobotanical finds also document a relatively diverse spectrum of cultivated plants. Grapevines, plum trees, and cucumbers suggest the existence of certain garden areas next to the fields, although their exact location within the hillfort area or its immediate surroundings is unknown (Popovtschak – Zwiauer 2003; Herold 2014, 237–238).

Furthermore, imprints of plants in daub indicate that the processing of the harvested crop took place directly on the site. Likewise significant is the discovery of an iron hoard containing tools interpreted as those used in tilling the soil, which indicates that at least some of the inhabitants of the stronghold were directly involved in agricultural production (*Popovtschak – Zwiauer 2003*, 231, 240–243; *Herold 2014*, 237–238). Archaeozoological data create a similar image of the economic functioning of Gars–Thunau. Of the analysed assemblage of bones, approximately 88% of the finds come from domesticated animals, mainly cattle, pigs, and sheep. Analysis of age representation and anatomical parts suggests that these animals were raised directly on the site or in its immediate surroundings and served the needs of the local population, with no evidence of any extensive import or export of animal products (*Kanelutti 1990*; *Herold 2014*, 238).

These data indicate that even a relatively small hillfort lacking optimal conditions for agriculture from a geomorphological perspective had its own agrarian hinterland in the immediate vicinity and inhabitants likely participated in growing crops (*Herold 2014*, 237). In this context, it seems unrealistic to assume that even other centres situated in environments with significantly more favourable conditions for agriculture were completely dependent on external supplies. The economy of the stronghold was thus based not only on local crop production, but also on the local raising of livestock (*Herold 2014*, 237–238).

As the presented evidence shows, intensive and well-conducted archaeobotanical and archaeozoological research is of fundamental importance for the critical reassessment of long-accepted interpretive models. Systematic analysis of plant and animal remains allows us to confront traditional ideas about the functioning of early medieval centres with direct empirical data, in many cases leading to a revision of established interpretative ideas. Results from sites such as Mikulčice-Valy, Břeclav-Pohansko, and Gars–Thunau show that where such research has been carried out with sufficient intensity, evidence of local agrarian production and the raising of livestock repeatedly appears directly in their areas or immediate vicinity. These findings suggest that the economic reality of early medieval centres was more complex than the model of purely consumer sites that relied on supplies from the hinterland.

Conclusion

The results of interdisciplinary research (also presented in this text) apply exclusively to the Mikulčice-Valy and its immediate surroundings. Although some of the observed phenomena, such as differences in the processing stages of crops between the central agglomeration and the hinterland, indications of agricultural microspaces directly in the settlement structure, or the presence of selected crops in central areas, may find parallels at other Great Moravian sites, it is not appropriate to mechanically transfer these results to the entire territory of Great Moravia. Each power and settlement centre must be assessed regarding its specific natural background, settlement dynamics, archaeological preservation, and available source material.

At the same time, it should be emphasised that there is currently no other Great Moravian site in Central Europe that would have such an extensive and well-evaluated archaeobotanical data set as Mikulčice-Valy. It is the scope and systematicity of the research that has been performed, as well as its temporal and spatial depth, that makes this site a unique case.

However, this uniqueness also presents a methodological challenge: we do not have comparable data from other settlements of the same importance, and the model archaeobotanically documented for Mikulčice cannot be automatically applied to other contemporary centres. Any attempt at generalisation would ignore the specific ecological and settlement configuration of this site, as well as the qualitatively exceptional state of preservation and documentation.

The aim of the archaeobotanical analyses was not to formulate a universal model valid for the entire Great Moravian territory, but to open up space for alternative interpretations based on a combination of environmental, archaeobotanical and settlement data. The archaeology of economic relations in the Early Middle Ages requires not only an interdisciplinary perspective, but also consistent methodological reflection, critical evaluation of sources, and explicit formulation of interpretative assumptions.

The difference between the model of subsistence organisation that I present in my studies and Macháček's interpretation does not lie in the fundamental question of the existence of an economic hinterland of Great Moravian centres, but in the way in which this relationship is understood, modelled, and empirically supported. The traditional interpretation (*Dresler – Macháček 2008; Macháček 2013*) is based on an archaeological framework according to which the centres functioned as dominant consumer nodes, supplied by the surrounding area through a redistribution network.

In contrast, the archaeobotanical data indicate the possibility of a more complex organisation of agricultural production, which did not have to be exclusively tied to settlements in the broader hinterland, but could also include selected locations directly within the central agglomeration. This is not about denying the existence of the hinterland or returning to the idea of self-sufficient centres, but about refining and opening up the interpretative framework based on data that show a higher degree of diversity of subsistence strategies than the classical redistribution model assumes.

While the traditional interpretation is built on structural certainty, which is supported by synthetic works and generalised archaeological schemes, my approach emphasises an analytical, environmentally-anchored perspective that is not universal but instead based on specific evaluated material. In this sense, it represents a contribution to the discussion that can improve our understanding of the complexity of the economic functioning of early medieval centres.

The complete food dependence of Great Moravian centres on supplies from the hinterland appears to be a model that would have been extremely vulnerable in the real conditions of the early medieval environment. Given the uncertainty of transportation, the impermanency of production at hinterland sites, and frequent fluctuations in political or climatic stability, such a unilateral strategy would threaten the daily functioning of the centre. It seems more realistic to imagine that centres like Mikulčice-Valy took a varied approach to securing food and diversifying resources to buffer their economic resilience. Strategically, it is logical that the centres could not remain completely passive and dependent strictly on supplies from the hinterland. To a certain extent, self-production represented an adaptive solution. Raising animals and growing crops directly on site, as evidenced by research from Mikulčice, allowed continuous access to food and independence from supplies from the hinterland. This type of strategy is not a sign of isolated, independent management, but represents a well-planned model of redundancy—the deliberate use of multiple parallel resources that together increased the stability and operational security of the seat of power.

At the same time, however, it should be noted that the centres' hinterlands themselves were probably not a homogeneous and uniformly functioning unit. Each site could have had a specific relationship to the centre, derived from its size, origin, function, ecological situation, or the social status of its inhabitants. Some of these settlements may have provided grain, others raised livestock, still others produced specialised crafts or performed service functions. Likewise, the degree of their involvement in the supply system could vary: while some could fulfil the role of permanent suppliers, others could pay contributions irregularly or only in certain seasons.

This variability once again confirms that the stability of the centre required diversified means for securing subsistence, in which its own production was supplemented by a diverse and flexibly organised supply system. Archaeobotanical and archaeozoological data from Mikulčice-Valy, supported by comparable evidence from surrounding lower-level sites and partly also from other contemporary centres, consistently support the interpretation of the site not only as a political, ceremonial, and craft centre, but also as an agricultural and economic hub with locally organised food production adapted to specific environmental conditions. From the point of view of Popper's critical rationalism (*Popper* 1997, 10–11, 264), this is a relevant falsification, i.e. a situation where the hypothesis about the exclusively consumerist character of Great Moravian centres should either be abandoned or fundamentally reformulated.

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