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Contents

8 Archaeobotanical Database of the Czech Republic

Dagmar Dreslerová – Adéla Pokorná

The Archaeobotanical Database of the Czech Republic (CZAD) is a tool for recording, archiving, disseminating and researching data on plant macro-remains from archaeological sites in the Czech Republic. Technically and conceptually, it is based on the ArboDatMulti database programme, a product of co-operation between the Landesamt für Denkmalpflege, Hessen, Germany, and the Institute of Archaeology CAS in Prague. By sharing unique and persistent identifiers of fieldwork events and archival documents this database will become part of the complex archaeological e-infrastructure (AMCR) in the Czech Republic.

The CZAD is available on the web, both in Czech and English versions. Unpublished data may be requested from the administrator; however, permission of the author is required. URL: http://www.arup.cas.cz/czad/ (CS); http://www.arup.cas.cz/czad/?l=en (EN).

8.1 INTRODUCTION

Archaeobotany is mainly concerned with plant remains preserved within, or in association with, archaeological contexts. Macro-remain analysis, a branch of archaeobotany, deals with plant fragments visible to the naked eye (their average size is more than 0.1-0.2 mm), such as seeds, fruits, parts of infructescences (like cereal chaff) and wood. The preservation of plant remains depends on different taphonomic processes, with charring being the most common.[1] Macro-remains from archaeological contexts represent an important source of information for targeting research topics such as past subsistence strategies, crop husbandry regimes, human diet, vegetation and climate changes and the effects of human activities on the landscape. Furthermore, the use of wild plants for medicinal and/or technical purposes and long-distance trade in exotic crops may also be studied.

[1] Charring preserves plant material after it was subjected to burning. Another type of preservation – mineralization, usually occurs when minerals carried in solution (mostly calcium phosphates) are deposited around plant cell surfaces. Mineralized remains are commonly found in middens, cesspits and latrines. Finally, water-logged plant remains can be recovered from underwater sites (lake sites) or archaeological features that contained water such as wells, cesspits and ditches.

Archaeobotany has a long tradition in the Czech Republic (CR; cf. Kočár – Dreslerová 2010). However, it has been the intensive co-operation of botany with rescue archaeology in the last two decades that has produced a vast increase in the body of archaeobotanical data (Fig. 8.1). This development has brought an urgent need for uniform data treatment and the secure storage of information in electronic form. Therefore, the Institute of Archaeology CAS in Prague (IAP) initiated the *Archaeobotanical Database of the Czech Republic* (CZAD; Pokorná et al. 2011) project, planned as a part of the complex research e-infrastructure of the IAP.

The electronic CZAD database offers the efficient treatment of data collected from various sources, and significantly broadens the range of research topics that can be studied by archaeobotany. It also adds relevance and value to all included data: within this context even seemingly marginal or less numerous findings can gain significance and contribute to a better understanding of various research topics.

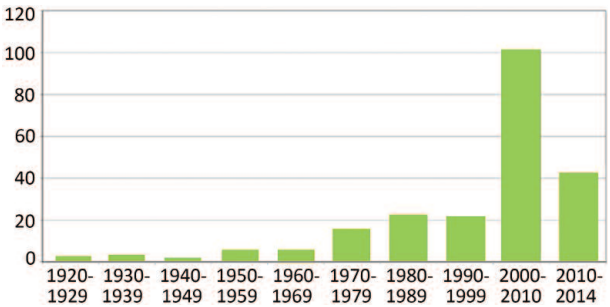

Fig. 8.1 *Number of fieldwork events with archaeobotanical samples from prehistoric contexts, according to decades (the last column covers only five years).*

8.2 TECHNICAL BACKGROUND AND DATA MODEL

Technically, CZAD is based on the ***ArboDatMulti*** specialized multilingual database program (Pokorná et al. 2011) built on the general principles, structure and thesauri of the German program ***ArboDat*** developed for the processing and evaluation of archaeobotanical data (Kreuz – Schäfer 2002, 2010). *ArboDatMulti* was created within the scope of the bilateral *ArboDat* project, financially supported by the Czech Academy of Sciences in 2009-2011. It is basically a MS Access application, primarily designed for data processing by individual researchers. A uniform database structure and coding system for plant taxa is, however, fundamental and makes effective data exchange both between individuals and groups of specialists on the national and/or international level possible.

ArboDatMulti has four language versions (English, French, German and Czech). Although some adaptations have been made to suit local requirements, the data in all versions are fully compatible with the original *ArboDat* programme. *ArboDatMulti* consists of three interrelated segments (Kreuz et al. 2011):

[1] **ArchBotProgramm** contains utility programmes including all definitions, calculations, join-properties and operational controls, forms and reports and pre-programmed queries. Additional user-defined tables, queries and other objects can be stored here.

[2] **ArchBotStrukDat** contains special terms and their definitions (glossaries) ordered thematically in tables. They are usually given by abbreviations with corresponding explanations and related data. The database's key element, plant coding, is based on a system being currently used by many archaeobotanical departments in Europe (created by S. Jacomet in Basel; cf. Paulsen 1995). Additionally, environmental characteristics of each plant species are included in the database structure.

[3] **ArchBotDaten** contains data itself, i.e. information on archaeological sites (projects), features, samples and identified plant remains. The information is ordered hierarchically in four tables (data classes): Projects (location, details on the fieldwork), Features (details on the find contexts), Samples (description of individual soil samples) and Results. The Results table contains descriptions of the identified macro-remains according to their taxa, type of macro-remains (seed/fruit, wood, chaff, etc.) and state of preservation (charred, mineralized or water-logged). Thus, each record corresponds to an intersection of one sample with a taxon, type of material and type of preservation; the quantity of finds in such units is recorded. In other words, if macro-remains of the same plant species in the same sample are preserved in two different ways (e.g. both charred and water-logged), they are input as two separate entries; the same rule is applied when there are finds of both seeds and vegetative parts of the plant (Fig. 8.2).

The technical tripartition of the programme has practical advantages for the combination and separation of data pools, as well as for programme updates. Under normal working conditions, of course, *ArboDatMulti* behaves as a coherent computer application.

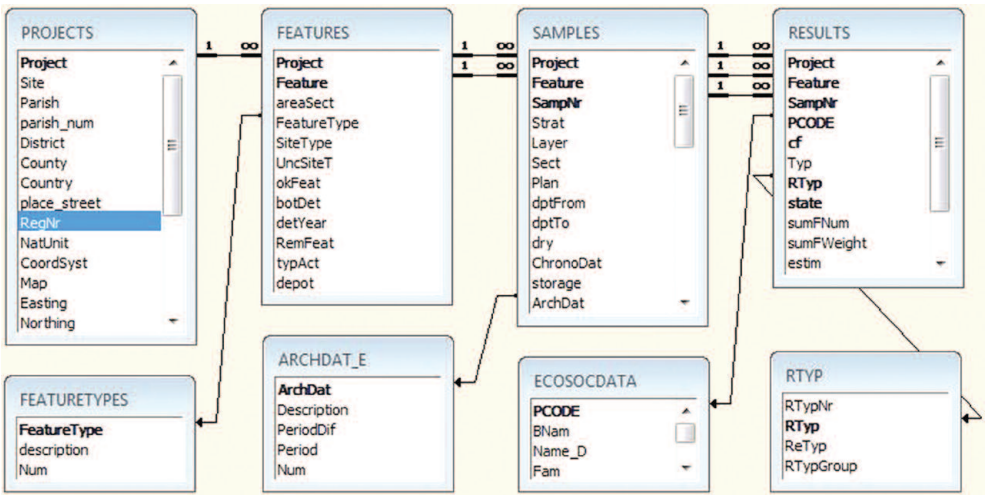

Fig. 8.2 *The CZAD data model. The field "RegNr" corresponds to the fieldwork event identifier, which may serve as a link to the AMCR data.*

8.3 CZAD DATA SET AND ITS ADMINISTRATION

CZAD data is collected and stored in the IAP by an *ArboDatMulti* desktop application. This (the only complete one) data set currently incorporates both published and unpublished data. The former part of the data set comes from publications and earlier expert reports kept in the IAP Archive; it is transferred to the database by the IAP staff. The latter component is created by individual inputs by the experts – archaeobotanists, possessing and using the *ArboDatMulti* programme for their own research. This data is included exclusively on a consensual basis, provided by individual contributors to the IAP and incorporated into the CZAD by the administrator.

A part of the data set – the already published data – is presented to the public through an internet client. The internet version runs on the IAP web server and includes information in a simplified form. It presents basic information on the archaeological fieldwork event (location, director of the excavation, dating, etc.) and major information on the archaeobotanical analysis (author, context and amounts of samples, taxa and macro-remains). The site location is displayed on an interactive map.

Regarding the remaining data, IAP as the database administrator guarantees full respect of the copyright. Queries focusing on unpublished data issued by individual database users are regularly met by the administrator, but the source data are passed to any third party only with the permission of the author.

Most of the CZAD data concern seeds/fruits (i.e. carpological data), whereas wood and charcoal finds enter the database less frequently; the database is also not designed for recording pollen data. By the end of 2014, carpological data from 370 archaeological sites were recorded (Fig. 8.3), representing altogether some 7,700 samples and more than two and a half million individual macro-remains.

Future plans call for the CZAD to be linked to the AMCR e-infrastructure as one of its peripheries. Individual projects will be linked to AMCR fieldwork events by sharing their unique and persistent identifiers. In this way, archaeobotanical data will be unambiguously geo-referenced and provided with a full research context (fieldwork characteristics, date of data collection, methods of excavation, organisation, name of the project's director, etc.). In addition, source information will be available by linking CZAD records to individual documents (such as excavation reports, expert reports, etc.) and publications whose databases are also part of the AMCR system.

8.4 RESEARCH APPLICATIONS

ArboDatMulti has been designed as a research tool. Besides the possibility to create queries according to individual research interests, it also contains many pre-programmed queries intended for data evaluation (Kreuz et al. 2011). It is especially this particular element of the programme that makes the applications powerful research tools on a high qualitative level. An overview of trends in prehistoric cereal

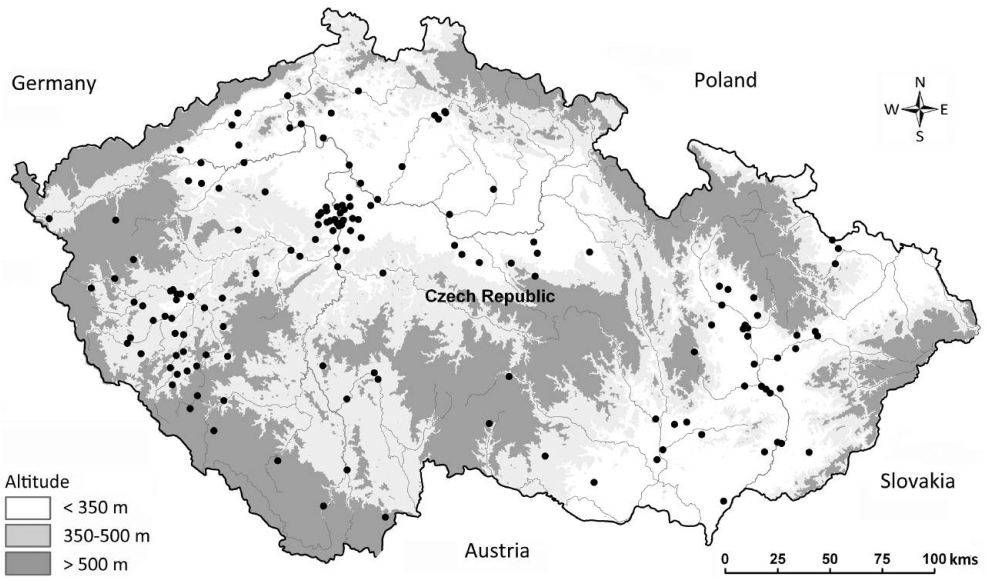

Fig. 8.3 *Map of sites with prehistoric archaeobotanical finds in the Czech Republic. Map prepared by Č. Čišecký.*

cultivation in the CR may be mentioned here as an example of research activities anchored within the CZAD data (Dreslerová – Kočár 2013). Another research project focuses on wild-growing herbaceous plants from 220 prehistoric archaeological sites in the CR (Kočár et al., in prep.).

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