Archiv für Naturschutz und Landschaftsforschung

Band 43
Heft 4
Dezember 2004

Inhalt

www.ArchivNatur.de

The pollen diagram „Repten CRep 89/2“ (Niederlausitz, S Brandenburg, E Germany) from the legacy of Klaus Kloss

Pim de Klerk

Institute of Botany and Landscape Ecology, Ernst-Moritz-Arndt-University, Grimmer Straße 88, D-17487 Greifswald, pimdeklerk@web.de

Keywords:

Brandenburg, Early Holocene, E Germany, Niederlausitz, Palynology, Weichselian Lateglacial

Abstract

A pollen diagram from the surroundings of a Slavic fortification near Repten in the Niederlausitz (S Brandenburg, E Germany) provides a first insight in the vegetation development of the Weichselian Lateglacial and Early Holocene of the Repten area. In the early Lateglacial, a phase with prominent presence of *Hippophaë, Helianthemum,* Polygonaceae, and *Artemisia* is registered. The “Allerød” is only minory recorded, whereas the “Younger Dryas” shows a renewed expansion of *Artemisia*. The Early Holocene sequence of the pollen diagram shows an overrepresentation of PINUS pollen, due to which general changes in vegetation history are not inferable. In the local wetland vegetation during the Early Holocene ferns were markedly present.

Schlüsselwörter:

Brandenburg, frühes Holozän, Niederlausitz, Ostdeutschland, Palynologie, Weichsel-Spätglazial

Zusammenfassung: Das Pollendiagramm „Repten CRep 89/2“ (Niederlausitz, Südbrandenburg, Ostdeutschland) aus dem Nachlaß von Klaus Kloss

Ein Pollendiagramm aus der Umgebung eines slawischen Burgwalls nahe Repten in der Niederlausitz (Südbrandenburg, Ostdeutschland) gibt einen ersten Einblick in die weichselspätglaziale und frühholozäne Vegetationsentwicklung dieses Gebietes. Eine früh-spätglaziale Phase mit prominenter Anwesenheit von *Hippophaë, Helianthemum,* Polygonaceae und *Artemisia* ist registriert. Das „Allerød” ist nur ansatzweise registriert, während die „Jüngere Dryas“ eine erneute Ausbreitung von *Artemisia* zeigt. Der frühholozäne Abschnitt des Pollendiagramms zeigt eine Überrepräsentierung von PINUS Pollen, wodurch allgemeine Änderungen der Vegetationsgeschichte nicht ableitbar sind. Farne waren deutlich präsent in der lokalen „wetland“ Vegetation des frühen Holozäns.

1 Introduction

The late Klaus Kloss worked for many years as a palynologist at the “Brandenburgisches Landesmuseum für Ur- und Frühgeschichte” and performed researches mainly in an archaeological context. Much of his research was never published. It was recently decided to digitalise and interpret a part of his material in order to prevent it from sinking into oblivion (DE KLERK 2004a, in prep.-a, -b, -c; JAHNS in prep.-a, -b).

Several sections near Repten in southern Brandenburg (E Germany, cf. Fig. 1) were palynologically analysed in the framework of archaeological research of a Slavic fortification (cf. REIMER 1992). The analysed sections “CRep 89/1” and “CRep 89/3” represent mainly the Late Holocene and may provide an interesting picture of anthropogenic activities in the area. The core “CRep 89/2” covers the Weichselian Lateglacial and Early Holocene and, thus, characterises a totally different time-frame.

The present paper presents and interprets the pollen diagram from the latter section. Though many pollen diagrams are available from the Niederlausitz (e.g. MÜLLER 1971; LANGE 1973a, 1973b, 1986; LANGE & LIEBTRAU 1973; LANGE ET AL. 1978; KLOSS 1991a; ILLIG & LANGE 1992; BITTMANN & PASDA 1999; JAHNS 1999, 2004), only few of them cover (part of) the Weichselian Lateglacial and/or the early Holocene (cf. Fig. 1). The diagram presented in this paper provides the first data on the vegetation history of the Weichselian Lateglacial and Early Holocene in the Repten area.

2 Description of the study area

The village Repten (51°44´N; 14°03´E) is located in the Niederlausitz in S Brandenburg (Fig. 1). Geomorphologically, the area belongs to a periglacial-fluviatile valley that is bordered by Saalian till plains (cf. STACKEBRANDT et al. 1997).

Unfortunately, there were no notes preserved among the field books of Kloss that describe the local geomorphological background or the lithological composition of the investigated core. It is, however, known that the Slavic fortification borders on a marshy meadow (REIMER 1992). This meadow was probably the subject of the palynological investigations.

3 Methods

The core was derived with a Dachnowsky corer. Preparation of pollen samples included treatment with KOH, gravity separation with $ZnCl_2$, and acetolysis (S. JAHNS, pers. comm. July 2004). KLOSS (1989) provides information on his palynological methods.

For revision of the data, the original pollen counting lists of Kloss were used. In these lists incidentally a + was noted for pollen types observed after the count was finished. For graphical reasons this use was omitted in the present study. Pollen types that were only observed after finishing counting were incorporated with value 1 in the revised dataset, whereas a + was ignored for pollen types of which also counted data were available.

In order to differentiate clearly pollen types from plant taxa, the former are displayed in the text in SMALL CAPITALS (cf. JOOSTEN & DE KLERK 2002). In the revised pollen diagrams and in this paper, pollen type nomenclature does not follow the rather outdated pollen type names of the original counting lists (using names like CYPERALES and AMMIACEAE). Instead, it was attempted to use the nomenclature as generally followed by Kloss in his publications (e.g. KLOSS 1991b, 1993, 1994), but with GETREIDE translated into CEREALIA. As the publications do not reflect consistent pollen type nomenclature (e.g. using different kind of abbreviations), the pollen type names used in this paper should be considered as a practical attempt to present pollen data without the pretension to present morphologically unambiguously defined morphotypes. The counted values of URTICA(LES) were additionally marked U to indicate URTICA (S. JAHNS pers. comm., June 2004).

For calculation and presentation of the data the computer programs TILIA 1.12, TILIA GRAPH 1.18, and TGView 1.6.2 were used (GRIMM 1992, 2004). Pollen frequencies were calculated relative to a pollen sum including pollen types attributable to trees and shrubs (AP) and upland herbs (NAP). The NAP values are an indication for the relative openness of the upland vegetation. Pollen types that might originate from both upland and wetland herbs (e.g. POACEAE and CYPERACEAE) were excluded from the sum since (extra)local effects (sensu JANSSEN 1973) might erroneously indicate an opening of the upland vegetation when in reality a change in the wetland vegetation occurred (cf. JANSSEN & IJZERMANS-LUTGERSHORST 1973; DE KLERK 2004b).

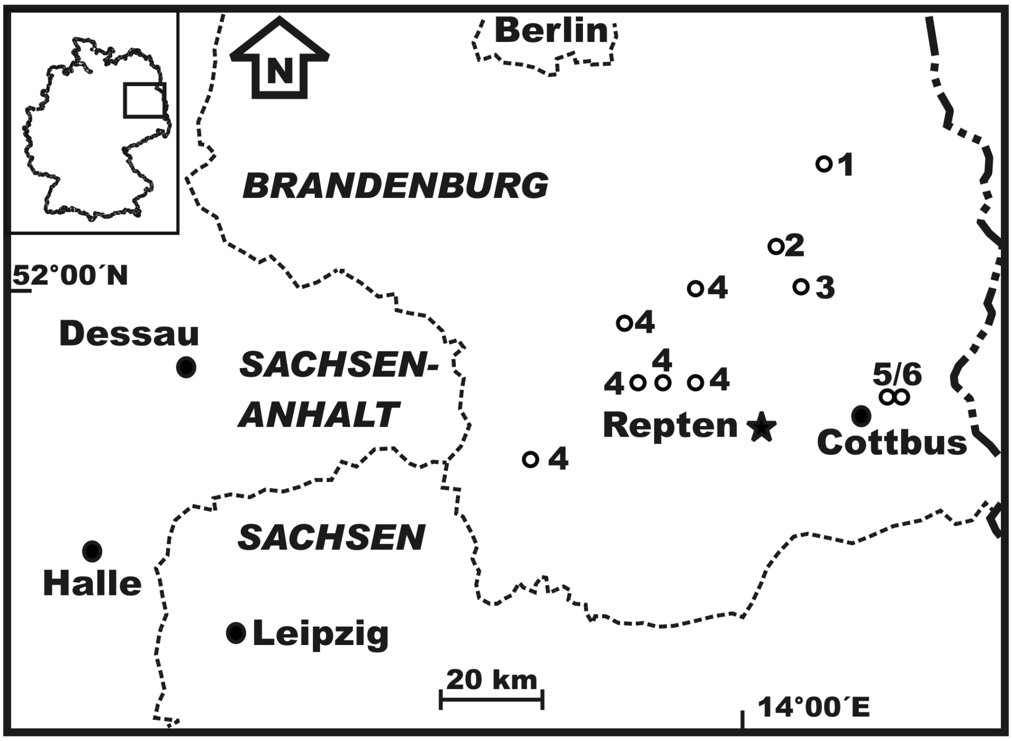
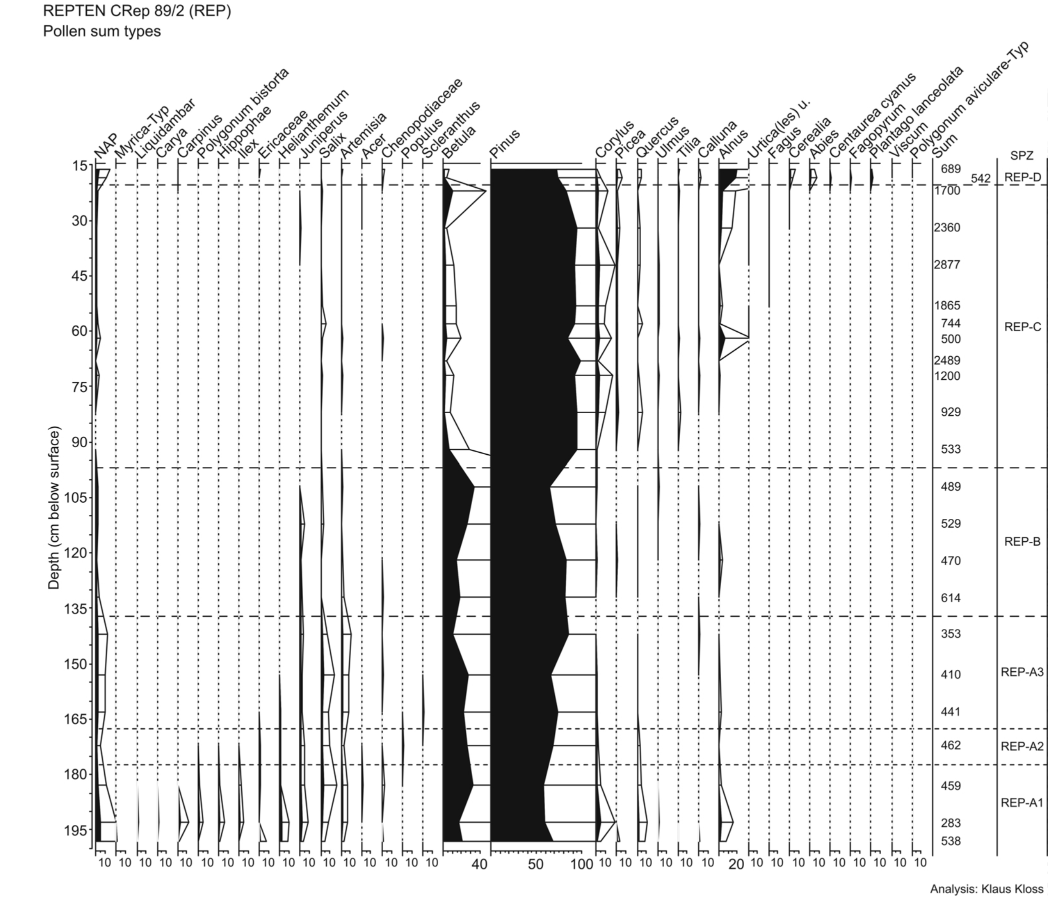


Fig. 1 Location of Repten in southern Brandenburg. Also indicated are the positions of other pollen diagrams from the Niederlausitz covering (part of) the Weichselian Lateglacial and/or early Holocene (sources: 1: LANGE & LIEBTRAU 1973; 2: ILLIG & LANGE 1992; 3: JAHNS 1999; 4: LANGE ET AL. 1978; 5: BITTMANN & PASDA 1999; 6: JAHNS 2004).

Abb. 1 Lage von Repten im südlichen Brandenburg. Ebenfalls angegeben ist die Lage anderer Pollendiagramme aus der Niederlausitz, welche (Teil des) Weichselspätglazial und/oder das frühe Holozän umfassen (Quellen: 1: LANGE & LIEBTRAU 1973; 2: ILLIG & LANGE 1992; 3: JAHNS 1999; 4: LANGE ET AL. 1978; 5: BITTMANN & PASDA 1999; 6: JAHNS 2004).



Pollen percentages in the diagram (Fig. 2) are presented with actual values (closed curves) and a 5-time exaggeration (open curves with depth bars). Pollen types are ordered stratigraphically in order to facilitate a successional interpretation. The diagram is divided into Site Pollen Zones (SPZ's) that are a combination of informal acme zones and informal interval zones sensu HEDBERG (1976) (cf. DE KLERK 2002).

The geochronologic interpretation of the Lateglacial and Early Holocene part of the pollen diagram is in the "traditional" terminology. As the stratigraphic and geochronologic terminology of the Weicheslian Lateglacial is very confusing (cf. e.g. BJÖRCK et al. 1998; USINGER 1998; LITT & STEBICH 1999; ERIKSEN 2002; DE KLERK 2004b) this terminology is used with great care, because no alternative regional geochronologic scheme exists for the area of southern Brandenburg and the distance is too large to assume the vegetation phases defined for Vorpommern (DE KLERK 2002) to be valid.

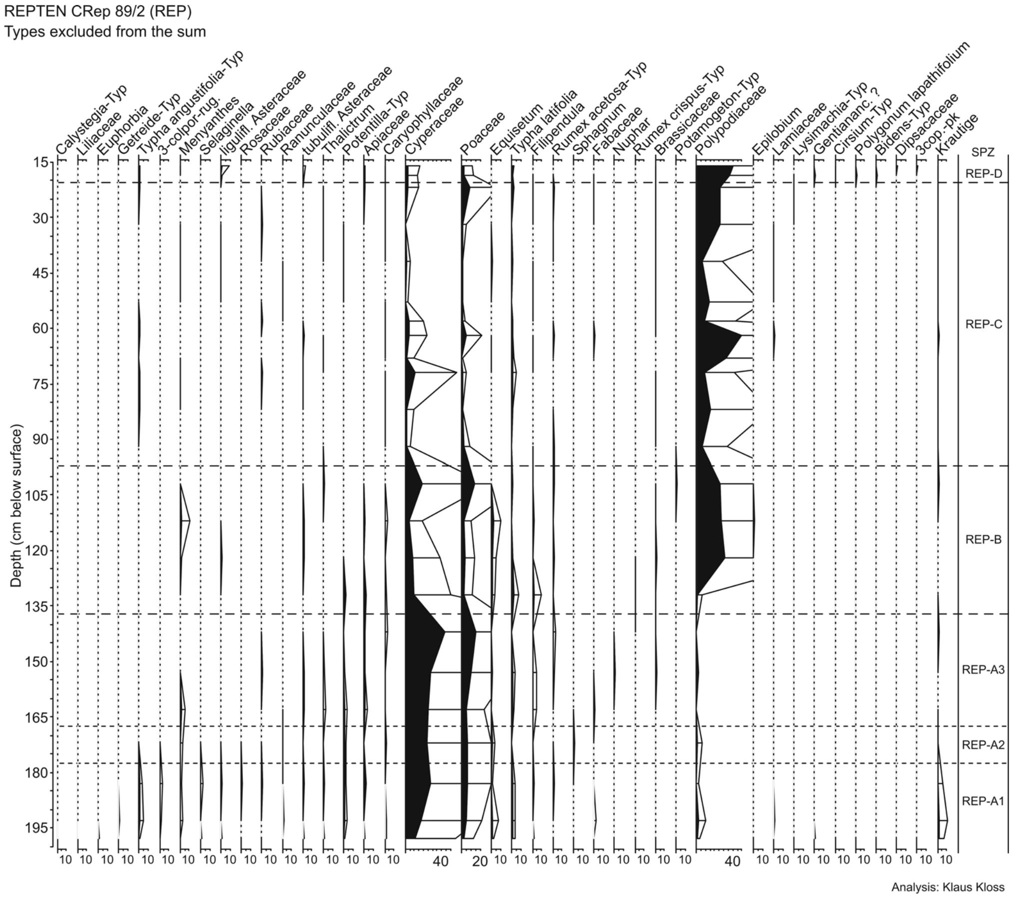


Fig. 2(a/b) Pollen diagram “Repten CRep 89/2”, calculated relative to an upland pollen sum. Pollen frequencies are displayed as actual values (closed curves) and a 5-time exaggeration (open curves with depth bars).

Abb. 2(a/b) Pollendiagramm “Repten CRep 89/2” berechnet mit einer “upland” Pollensumme. Prozentwerte sind als tatsächliche Werte (geschlossene Kurven) und mit 5-facher Überhöhung dargestellt (offene Kurven mit Probelinien).

4 Discussion: interpretation of the pollen diagram

4.1 SPZ REP-A1/A2/A3: Weichselian Lateglacial

SPZ REP-A is distinguished on the basis of relatively high values of SALIX and ARTEMSIA pollen, that indicate that it represents periods with relatively open upland vegetation types. This zone is therefore correlated with the Weichselian Lateglacial. The continuous occurrence of JUNIPERUS pollen shows that also juniper was present on the upland. High values of BETULA and PINUS pollen show that birch and pine were the most important upland pollen producers.

Due to the low temporal resolution of the pollen diagram, a further division of the Weichselian Lateglacial is only possible on the subzone level.

Subzone REP-A1 contains peaks of POLYGONUM BISTORTA, HIPPOPHAE, and HELIANTHEMUM pollen. This indicates that this subzone represents the Lateglacial phases prior to the forested phase generally known as “Allerød” or “Alleröd”. The taxa producing these types must have been prominently present on the upland. High values of LIQUIDAMBAR, CARYA, CARPINUS, ILEX, CORYLUS, QUERCUS, ULMUS, and TILIA pollen are probably due to erosional redeposition (cf. IVERSEN 1936). This might also apply for ALNUS pollen, though it cannot be ruled out that *Alnus viridis* and/or *A. incana* were present in the Lateglacial landscape (cf. DE KLERK 2002).

The decreased NAP-values in subzone REP-A2 suggest that this zone represents the forested phase of the Allerød.

Higher values of NAP in subzone REP-A3, which are mainly due to an increase in the values of ARTEMISIA pollen, indicate that this subzone can be correlated with the cold period generally known as the Younger Dryas.

Little can be said about the local wetland vegetation in the investigated basin, since the pollen types excluded from the sum occur with too low values to infer whether they originate from local or from regional pollen sources (sensu JANSSEN 1973). Only CYPERACEAE pollen occurs with sufficiently high values to assume that Cyperaceae taxa were growing within the investigated basin. Possibly a fringe of sedges bordered the basin margins.

4.2 SPZ REP-B: Preboreal

Lower values of ARTEMISIA pollen indicate that this zone represents a period of renewed expansion of forest. It is, therefore, correlated with the Preboreal. High values of BETULA and PINUS pollen show that birch and pine were the most important upland trees; occurrences of CORYLUS, QUERCUS, and ULMUS pollen indicate that incidental specimens of hazel, oak, and elm were present.

The types excluded from the sum show peaks of TYPHA LATIFOLIA and FILIPENDULA pollen at the base of this zone, followed by an increase in the values of POLYPODIACEAE. This indicates that an initial wetland vegetation including *Typha latifolia* and *Filipendula* (probably *F. ulmaria*) was succeeded by a vegetation of ferns. The somewhat higher values of EQUISETUM spores up to the third sample of this zone indicate that also *Equisetum* grew in the basin.

4.3 SPZ REP-C: Boreal/Atlantic?

SPZ REP-C starts with higher PINUS pollen and lower BETULA pollen values than SPZ REP-B. Prominent is the almost continuous presence with low values of CORYLUS, PICEA, QUERCUS, ULMUS, TILIA, and ALNUS pollen. This shows that this zone can be correlated with the Boreal and possibly reaches into the Atlantic. The extremely high values of PINUS pollen, however, suppress the relative values of other pollen types. Consequently, fluctuations that might indicate the position of this diagram section within the general vegetation development are invisible. This proves that pine was present prominently around the investigated locality. Similar high values of PINUS pollen are visible in the Early Holocene trajectory of the diagram from Luchsee (LANGE et al. 1978).

High values of POLYPODIACEAE show that ferns remained important in the local wetland vegetation.

4.4 SPZ REP-D: Late Holocene

The upper SPZ of the pollen diagram shows lower values of PINUS and higher values of ALNUS pollen than in SPZ REP-C. This indicates that alder became regionally or extralocally more important. High values of CEREALIA, CENTAUREA CYANUS, and FAGOPYRUM pollen date this zone in the late Holocene that is characterised by prominent anthropogenic influence. A hiatus probably separates this zone from the preceding zone.

Locally, ferns remained important, as the high values of POLYPODIACEAE spores show.

5 Concluding remarks

The pollen diagram "Repten CRep 89/2" shows a sequence from the Lateglacial and Early Holocene. The diagram does not provide much insight in vegetation history and landscape development due to a low resolution and the absence of geomorphological and lithological data of the study area. It provides, however, a first picture of the Lateglacial and Early Holocene vegetation history in the Repten area and, thus, deserves a place among the scientific knowledge of southern Brandenburg.

Acknowledgements

The "Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum" gave access to the original data of K. Kloss and permitted publication; S. Jahns is kindly acknowledged for intermediation. H. Joosten gave valuable comments on the text. A. Barthelmes is thanked for the correction of the German text passages.

References

BITTMANN, F. & PASDA, C. (1999): Die Entwicklung einer Düne während der letzten 12000 Jahre: Untersuchungsergebnisse von Groß Lieskow (Stadt Cottbus) in der Niederlausitz. – Quartär **49/50**: 39-54.

BJÖRCK, S., WALKER, M.J.C., CWYNAR, L.C., JOHNSEN, S., KNUDSEN, K.-L., LOWE, J.J., WOHLFARTH, B. & INTIMATE MEMBERS (1998): An event stratigraphy for the Last Termination in the North Atlantic region based on the Greenland ice-core record: a proposal by the INTIMATE group. – Journal of Quaternary Science **13**: 283-292.

DE KLERK, P. (2002): Changing vegetation patterns in the Endinger Bruch area (Vorpommern, NE Germany) during the Weichselian Lateglacial and Early Holocene. – Review of Palaeobotany and Palynology **119**: 275-309.

DE KLERK, P. (2004a): A pollen diagram from a kettle-hole mire near the Kalksee (N Brandenburg, NE Germany) from the legacy of Klaus Kloss. – Archiv für Naturschutz und Landschaftsforschung, this issue.

DE KLERK, P. (2004b): Confusing concepts in Lateglacial stratigraphy and geochronology: origin, consequences, conclusions (with special emphasis on the type locality Bøllingsø). – Review of Palaeobotany and Palynology **129**: 265-298.

DE KLERK, P. (in prep.-a): Repeated terrestrialisation and inundation in the Bornstedter See (Potsdam, NE Germany) as shown in a pollen diagram from the legacy of Klaus Kloss.

DE KLERK, P. (in prep.-b): New insights in the Lateglacial and Early Holocene vegetation history of central Brandenburg (NE Germany) derived from 6 pollen diagrams from the legacy of Klaus Kloss.

DE KLERK, P. (in prep.-c): Vegetation history and landscape development of the Lateglacial, Early Holocene and Late Holocene of a former dune area near Uhyst (Oberlausitz, Sachsen, E Germany): a new interpretation of a pollen diagram of Klaus Kloss.

ERIKSEN, B.V. (2002): Reconsidering the geochronological framework of Lateglacial hunter-gatherer colonization of southern Scandinavia. – Jutland Archaeological Society Publications **39**: 25-41.

GRIMM EC. 1992. TILIA 1.12 and TILIAGRAPH 1.18 (software). – Illinois State Museum: Springfield, Illinois.

GRIMM EC. 2004. TGView 1.6.2 (software). – Illinois State Museum: Springfield, Illinois.

HEDBERG, H.D. (ed.) (1976). International stratigraphic guide: a guide to stratigraphic classification, terminology, and procedure. – New York (John Wiley and sons).

ILLIG, H. & LANGE, E. (1992): Vegetationsgeschichtliche und vegetationskundliche Untersuchungen im Rinnental bei Schuhlem-Wiese (Lausitz). – Verhandlungen des Botanischen Vereins von Berlin und Brandenburg **125**: 5-18.

IVERSEN, J. (1936): Sekundäres Pollen als Fehlerquelle. Eine Korrektionsmethode zur Pollenanalyse minerogener Sedimente. – Danmarks Geologiske Undersøgelse IV. Række **2**: 3-24.

JAHNS, S. (1999): Ein holozänes Pollendiagramm vom Kleinen Mochowsee, nördliche Niederlausitz. – Gleditschia **27**: 45-56.

JAHNS, S. (2004): Ein frühholozänes Pollendiagramm aus dem Tagebau Cottbus-Nord. – Verhandlungen des Botanischen Vereins von Berlin und Brandenburg **137**: 79-87.

JAHNS, S. (in prep.-a): Nacheiszeitliche pollenanalytische Untersuchungen aus Brandenburg, aus dem Nachlass von Klaus Kloss. – Veröffentlichungen des Brandenburgischen Landesamt für Ur- und Frühgeschichte Wünsdorf.

JAHNS, S. (in prep.-b): Pollenanalytische Untersuchungen aus dem Tollensetal, Mecklenburg, aus dem Nachlass von Klaus Kloss. – Veröffentlichungen des Brandenburgischen Landesamt für Ur- und Frühgeschichte Wünsdorf.

JANSSEN, C.R. (1973): Local and regional pollen deposition. – In: BIRKS, H.J.B. & WEST, R.G. (eds.): Quaternary plant ecology. 14th Symposium of the British Ecological Society: 31-42.

JANSSEN, C.R. & IJZERMANS-LUTGERHORST, W. (1973): A “local” Late-Glacial pollen diagram from Limburg, Netherlands. – Acta Botanica Neerlandica **22**: 213-220.

JOOSTEN, H. & DE KLERK, P. (2002): What’s in a name? Some thoughts on pollen classification, identification, and nomenclature in Quaternary palynology. – Review of Palaeobotany and Palynology **122**: 29-45.

KLOSS, K. (1989): Methodische Erfahrungen mit der Pollenanalyse auf archäologische Ausgrabungen. – Veröffentlichungen des Museums für Ur- und Frühgeschichte Potsdam **23**: 13-22.

KLOSS, K. (1991a): Pollenanlytische Sondierungen in einem Uferprofil des Byhleguhrer Sees, Kr. Lübben, mit einem Siedlungshorizont des römischen Kaiserzeit. – Ausgrabungen und Funde **36**: 71-74.

KLOSS, K. (1991b): Beitrag zur Vegetationsgeschichte und Moorgenese in einem Dünengebiet bei Uhyst, Kr. Hoyerswerda. – Veröffentlichungen des Museums für Ur- und Frühgeschichte Potsdam **25**: 75-77.

KLOSS, K. (1993): Pollenanalytische Untersuchungen an zwei kaiserzeitlichen Brunnen von Phöben, Lkr. Potsdam. – Veröffentlichungen des Brandenburgischen Landesmuseums für Ur- und Frühgeschichte **27**: 105-111.

KLOSS, K. (1994): Das Pollendiagramm vom Schlangenpfuhl in Eberswalde, Kr. Barnim. Vegetations- und Siedlungsgeschichte am Südrand des Urstromstals - Materialvorlage. – Veröffentlichungen des Brandenburgischen Landesmuseums für Ur- und Frühgeschichte **28**: 99-104.

LANGE, E. (1973a): Pollenanalytische Untersuchungen in Ragow, Kr. Calau – Ein Beitrag zur landwirtschaftlichen Produktion im frühen Mittelalter. – Zeitschrift für Archäologie **7**: 86-93.

LANGE, E. (1973b): Pollenanalytische Untersuchungen in Tornow und Presenchen. – In: HERMANN, J. (ed.): Die germanischen und slawischen Siedlungen und das mittelalterlichen Dorf von Tornow/Krs. Calau. Berlin (Akademie Verlag).

LANGE, E. (1986): Pollenanalytische Untersuchungen von Burggrabensedimenten aus der nordwestlichen Niederlausitz – Ein Beitrag zu methodischen Fragen der Auswertung von Pollendiagramme und zur slawischen Landwirtschaft. – In: BEHRE, K.-E. (1986): Anthropogenic indicators in pollen diagrams: 153-166. Rotterdam (A.A. Balkema).

LANGE, E. & LIEBTRAU, U. (1973): Die weichselglaziale und holozäne Talentwicklung im südlichen Jungmoränengebiet der DDR – morphogenetisch-stratigraphische und pollenanalytische Untersuchungen im Friedländer Tal bei Beeskow. – Wissenschaftliches Zeitschrift der Humboldt-Universität Berlin, Mathematisch-Naturwissenschaftliche Reihe **22**: 671-676.

LANGE, E., ILLIG, H., ILLIG, J. & WETZEL, G. (1978): Beiträge zur Vegetations- und Siedlungsgeschichte der nordwestlichen Niederlausitz. – Abhandlungen und Berichte des Naturkundemuseums Görlitz **52**: 3-80.

LITT, T. & STEBICH, M. (1999): Bio- and chronostratigraphy of the Lateglacial in the Eifel region, Germany. – Quaternary International **61**: 5-16.

MÜLLER, H.M. (1971): Untersuchungen zur holozänen Vegetationsentwicklung südlich von Berlin. – Petermanns Geographischen Mitteilungen **115**: 37-45.

REIMER, H. (1992): Der slawische Burgwall in Repten, Kreis Calau. – Niederlausitzer Studien **24/25**: 76-82.

STACKEBRANDT, W., EHMKE, G. & MANHENKE, V. (eds.) (1997): Atlas zur Geologie von Brandenburg im Maßstab 1:1.000.000. – Kleinmachnow (Landesamt für Geowissenschaften und Rohstoffe Brandenburg).

USINGER, H. (1998): Pollenanalytische Datierung spätpaläolitischer Fundschichten bei Ahrenshöft, Kr. Nordfriesland. – Archäologische Nachrichten aus Schleswig-Holstein: Mitteilungen der Archäologischen Gesellschaft Schleswig-Holstein e.V. und des Archäologischen Landesamtes Schleswig-Holstein **8**, **1997**: 50-73.