

**Palynology of Baudour Clays Formation  
(Mons Basin, Belgium):  
correlation within the "stratotypic" Wealden  
[Palynologie de la Formation des Argiles de Baudour  
(Bassin de Mons, Belgique):  
corrélation au sein du "Weald stratotypique"]**

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**Abstract:** This article is a palynological study of four clay samples from the dinosaur-bearing Wealden facies at Baudour (Belgium). Their microflora is compared to that found at Bernissart. The palynomorphs of the four samples are of continental origin. The botanical affinities of the palynological taxa are mainly ferns, gymnosperms and freshwater "algae". Also encountered are stratigraphically important angiospermous-like pollen grains (biorecord *Superret-croton*, probable paleotaxon *Superret-subcroton* and biorecord *Retisulc-dentat*); the aperture of the former is questioned ("variant forms").

**Key Words:** Belgium; Wealden facies; Baudour; palynology; angiosperm pollen; dinosaur

**Résumé :** L'analyse palynologique du faciès wealdien à dinosaures de Baudour (Belgique) est exposée et la microflore est comparée à celle de Bernissart. Les palynomorphes des quatre échantillons d'argile sont d'origine continentale. Les affinités botaniques des taxons palynologiques se partagent essentiellement entre les fougères, les gymnospermes et les "algues" d'eau douce. Des grains de pollen d'affinité angiospermiennne possédant une importance stratigraphique ont été également observés (*biorecord Superret-croton*, probables *paleotaxon Superret-subcroton* et *biorecord Retisulc-dentat*) ; la nature de l'ouverture germinative du premier est discutée ("formes variantes").

**Mots-Clefs :** Belgique ; faciès wealdien ; Baudour ; palynologie ; pollen d'angiosperme ; dinosaure

## 1. Introduction

The Wealden facies of the Mons Basin (Belgium) is well-known because of the exceptional fossil found in a coal mine at Bernissart during the years 1878-1881. At depths of 322 and 356 meters at least 29 complete specimens of *Iguanodon* were found, along with many fish, turtles, crocodiles, amphibians, insects and fragments of plants (see MARTIN & BULTYNCK, 1990, for a complete list of references). The palynology of these

sediments has been reported on previously by DELCOURT and SPRUMONT (1955, 1956, 1959a, 1959b) and DELCOURT *et alii* (1963). Recently YANS *et alii* (2005, 2006) and DEJAX *et alii* (in press) analyzed the palynological assemblage of the 322 meter level at Bernissart and focused their study on angiosperm pollen, found for the first time in the Belgian Wealden facies. Bernissart has long been considered as the only site yielding dinosaur bones from a Belgian Wealden facies. Recently, however, a fragment

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of dinosaur bone has been identified in the Wealden facies of the Baudour quarry, located in the Mons Basin near Bernissart. We offer here the first palynological study of the Wealden facies of the Baudour site, and we compare its palynological assemblage with that at Bernissart.

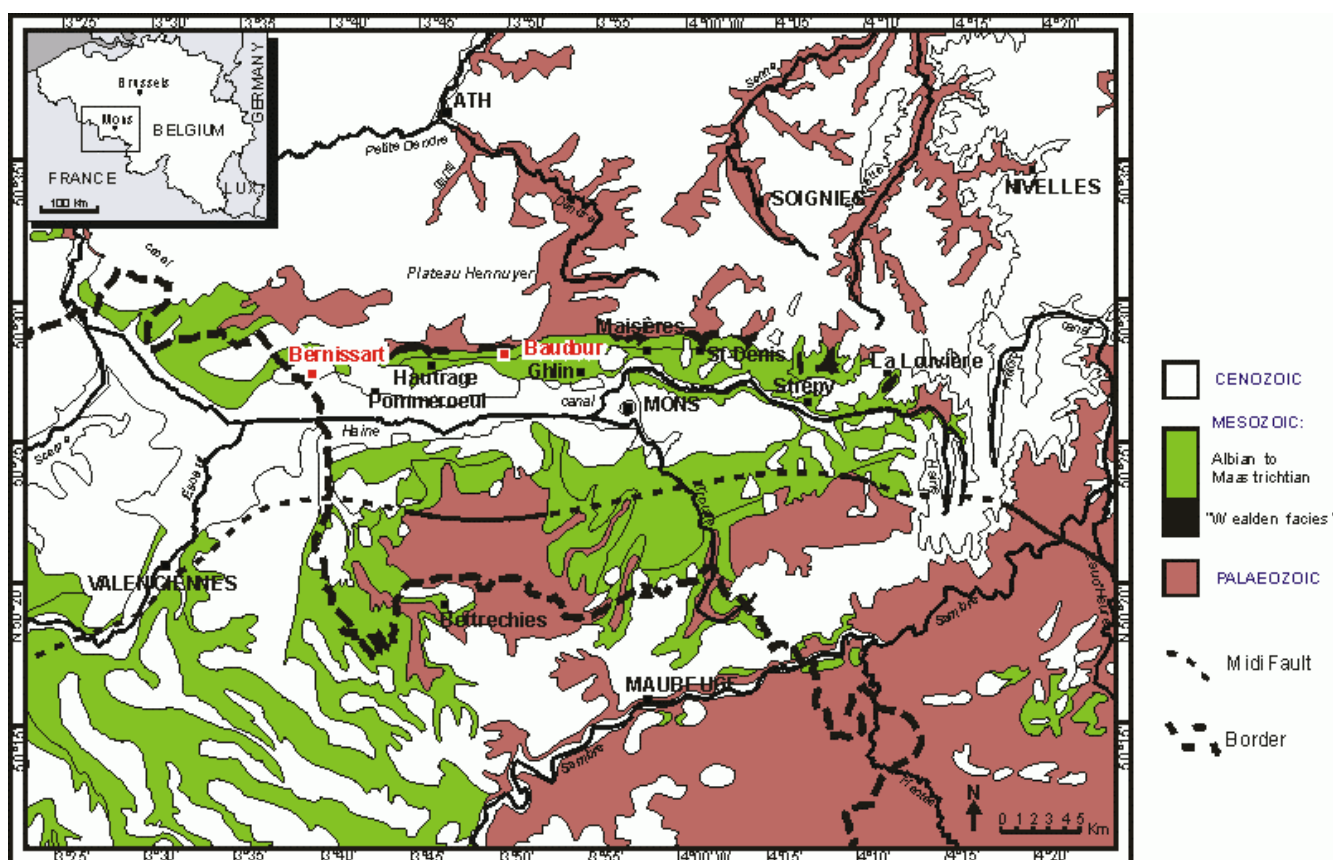
## 2. Geological setting

The Baudour quarry is in the Mons Basin, Belgium (Fig. 1), which can be regarded as the northeastern part of the Paris Basin (see MARLIÈRE, 1970). The sedimentary succession of the Mons Basin begins with the Wealden facies and continues with Middle-Upper Albian, Upper Cretaceous and Cenozoic deposits (MARLIÈRE, 1970). The Wealden facies of Baudour is attributed to the Baudour Clays Formation (ROBASZYNSKI *et alii*, 2001).

## 3. Methods

For the purpose of palynological analysis, we processed four samples of grey clays from the collections of the Royal Belgian Institute of Natural Sciences (Brussels). The treatment involves the destruction of minerals with hydrofluoric acid (70 %), followed by a filtration using a 9 µm-mesh sieve.

The morphological classification and nomenclature of POTONIE and KREMP (1954 and subsequent papers), as improved by DETTMANN (1963), are followed herein. For the purpose in hand, another nomenclature *sensu* HUGHES and collaborators (see complete reference list in HUGHES, 1994) was also used for four taxa, two of which are discussed below.

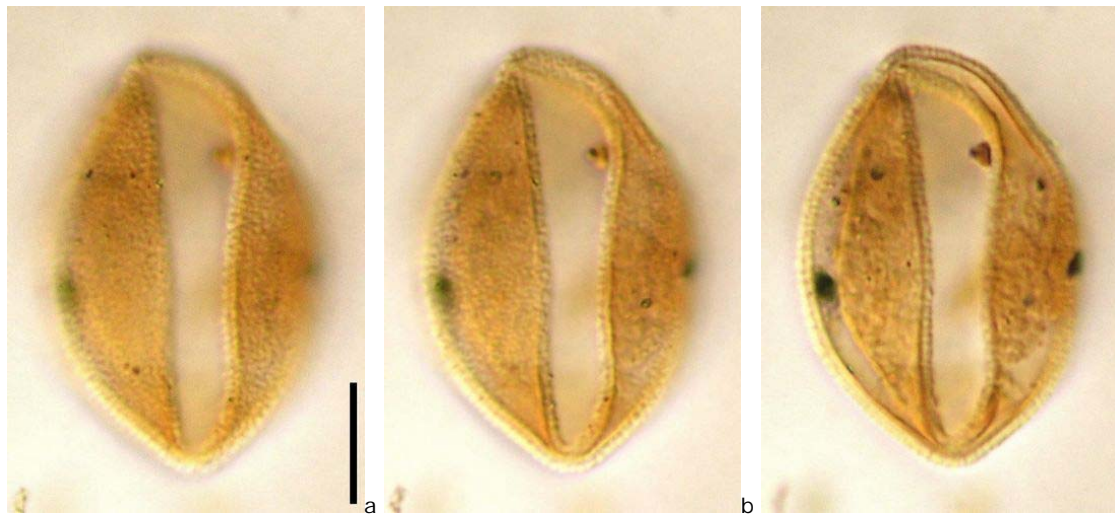


**Figure 1:** Simplified geological map of the Mons Basin. Location of Baudour, Bernissart and of the "pockets" filled with Wealden facies sediments (in black) on the northern border of the basin.

## 4. Palynological content

The palynological assemblage of Baudour quarry is very well preserved, suggesting that 1) most of the mother-plants grew close to the place where the palynomorphs were buried, and 2) diagenesis was minor. This assemblage is entirely continental in origin, quite similar to that at Bernissart, with the exception of differences in the relative abundances of some taxa. Fern spores (e.g. *Cicatricosisporites brevilaesuratus*, *C. hallei*, *Deltoidospora minor*, *Dictyophyllidites harrisii* and *Trilobosporites*

*hannonicus*) and bisaccate pollen grains are a main feature of both assemblages; *Sciadopityaceae* (biorecord *Hauterivian-cactisulc.*, alias *Cerebropollenites* sp.) and ephedroid pollen grains (*Ephedripites montanaensis*) are less numerous, but the angiospermous biorecord *Superret-croton* and its "variant forms" are more abundant than in Bernissart assemblage; freshwater "algae" zygospores (*Schizosporis reticulatus*) are also present.



**Figure 2:** Biorecord Superret-croton, presumed distal face (slide Bau 2A – coordinates G37 - 1a, 2b and 2c: respectively high, less high and middle focus). Scale-bar is 10  $\mu$ m.

### 5. Discussion

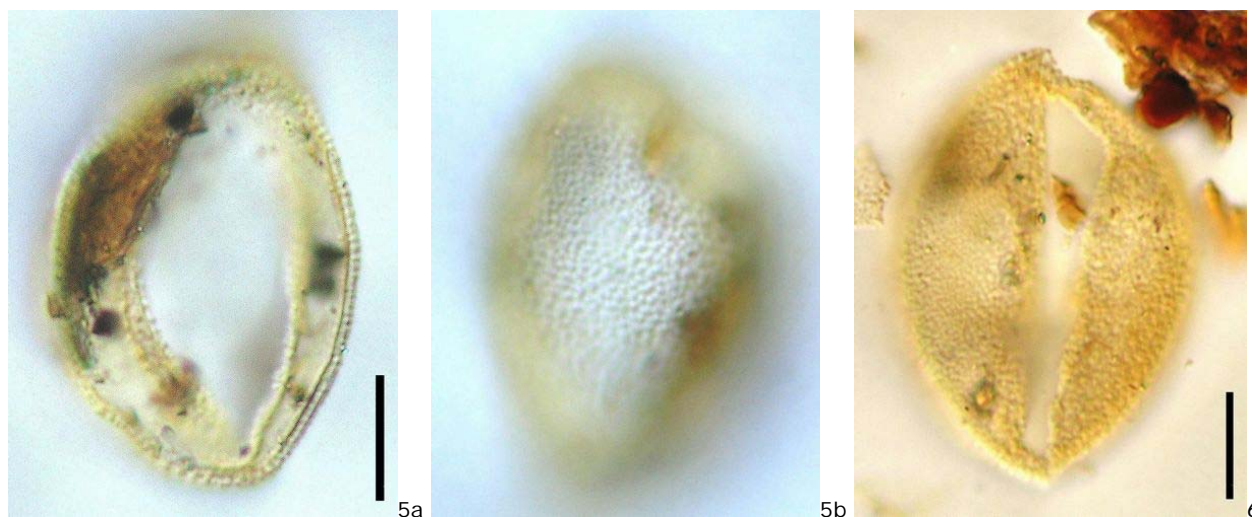
Many previous studies dealt with the palynology of the Wealden facies of northern Europe (DEL COURT & SPRUMONT, 1955, 1956, 1959a, 1959b; HUGHES, 1955, 1976, 1994; COUPER, 1958; LANTZ, 1958; DEL COURT *et alii*, 1963; VON DER BRELIE, 1964; DÖRING, 1964, 1965, 1966; BURGER, 1966; HUGHES & MOODY-STUART, 1967; NORRIS, 1969; KEMP, 1970; HERNGREEN, 1971; BATTEN, 1973; AMEROM *et alii*, 1976; DÖRHÖFER, 1977; HUGHES *et alii*, 1979; HUGHES & McDOUGALL, 1987, 1990, 1994). The palynological assemblage of the Baudour quarry is typically "Wealden" in aspect: many of the palynomorphs identified have been reported elsewhere by DEL COURT and SPRUMONT (1955), DEL COURT *et alii* (1963) and others.



**Figure 3:** Biorecord Superret-croton, presumed distal face (slide Bau 3B – coordinates N44-4). Scale-bar is 10  $\mu$ m.



**Figure 4:** Biorecord Superret-croton (slide Bau 4B – coordinates T27-U27 – 4a, 4b and 4c: respectively high, average and low focus). Scale-bar is 10  $\mu$ m.

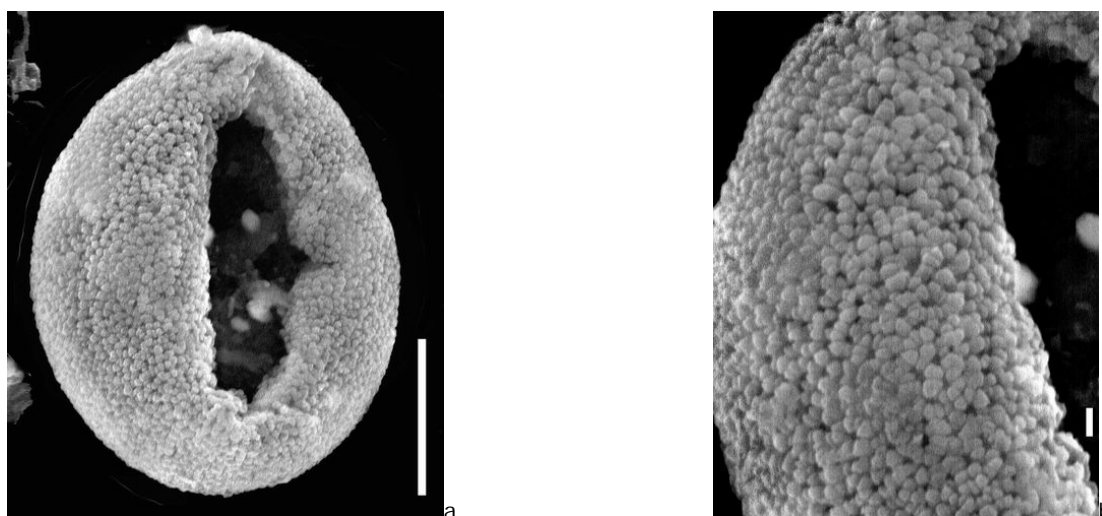


**Figure 5:** Biorecord *Superret-croton* (slide Bau 4B – coordinates D28-2 – 5a and 5b: respectively low and high focus). Scale-bar is 10 µm. **Figure 6:** Biorecord *Superret-croton*, presumed distal face (slide Bau 2B – coordinates Q24-4/Q25-3). Scale-bar is 10 µm.

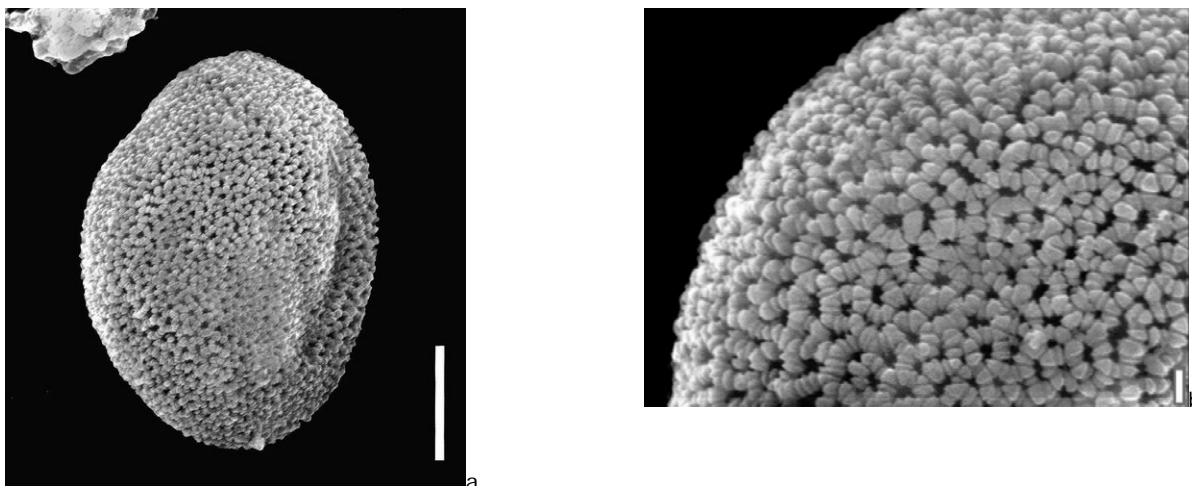
Because the biorecord *Superret-croton*, its "variant forms", the probable paleotaxon *Superret-subcrot* and the probable biorecord *Retisulc-dentat* are discussed below, a reminder of meanings of biorecord and paleotaxon is pertinent. Some palynomorphs have names that do not conform with classic palynological terminology: they are biorecords, *sensu* HUGHES (1976) and HUGHES *et alii* (1979), reiterated by PENNY (1991). Morphological taxa and biorecords are not true Linnean taxa, but parataxa or morphotypes which are *sporae dispersae* with no specific relationship to a mother-plant; in both biorecord and paleotaxon the *forms* are classified in an organizing chart developed in accordance with a descriptive pattern (a biorecord is generally more rigorously defined). A biorecord is considered here as a fundamental reference taxon, equivalent to the taxa defined through the use

of the conventional morphological scheme (HUGHES, 1976, p. 26; HUGHES *et alii*, 1979, p. 515); the word paleotaxon is here used in accordance with HUGHES' (1994) meaning, as qualifying a less rigorously defined taxon.

The goal of these concepts is to designate precisely what is recognized under the microscope, and so to make it useful for stratigraphic purposes; though the philosophies of "palynological language" may appear different on either side of the English Channel - as they concern the Lower Cretaceous - these "languages" have been so useful and so firmly established after several decades that there is no reason to reject one for the other, all the more that both may comply with the procedures of the Linnean Code [see HUGHES (1976, p. 29), who concludes as follows: "*the two can be separate and complementary*"].



**Figure 7:** Biorecord *Superret-croton*, presumed distal face (glass stub 2/1 – 7a and 7b: whole specimen and detail). Scale-bar is 10 µm, except higher SEM magnification (1 µm).



**Figure 8:** Biorecord Superret-*croton*, presumed proximal face (glass stub 2/1 – 8a and 8b: whole specimen and detail). Scale-bar is 10  $\mu$ m, except higher SEM magnification (1  $\mu$ m).

## 6. Stratigraphic implications

These three taxa (biorecord Superret-*croton*, probable paleotaxon Superret-*subcrot* and probable biorecord Retisulc-*dentat*) are of stratigraphic importance in the Baudour palynological assemblage.



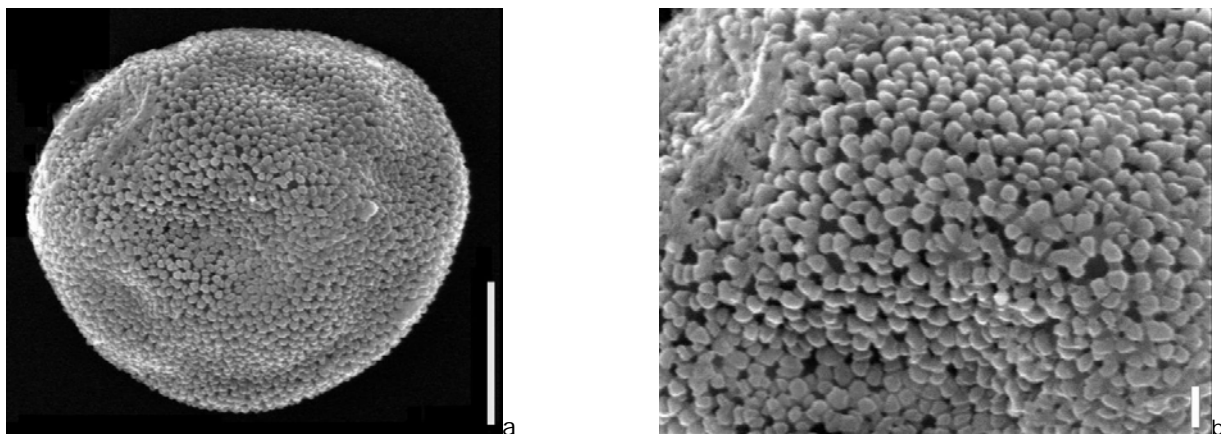
**Figure 9:** Inaperturate "variant form": biorecord Inapert-*croton*, usual wrinkled specimen (slide Bau 4B – coordinates D43-E44). Scale-bar is 10  $\mu$ m.

Biorecord Superret-*croton* (Figs. 2-8) was defined by HUGHES *et alii* (1979). In the "stratotypic" Wealden facies of the Weald and Wessex sub-basins, which is dated by interbeds with ammonites and dinoflagellate cysts (HARDING, 1986, 1990), the stratigraphic distribution of biorecord Superret-*croton* is attributed to MCT (Monosulcate Columellate Tectate) phases 3 to 5, ranging from the middle Barremian to the earliest Aptian (HUGHES, 1994). YANS *et alii* (2004) therefore suggested a

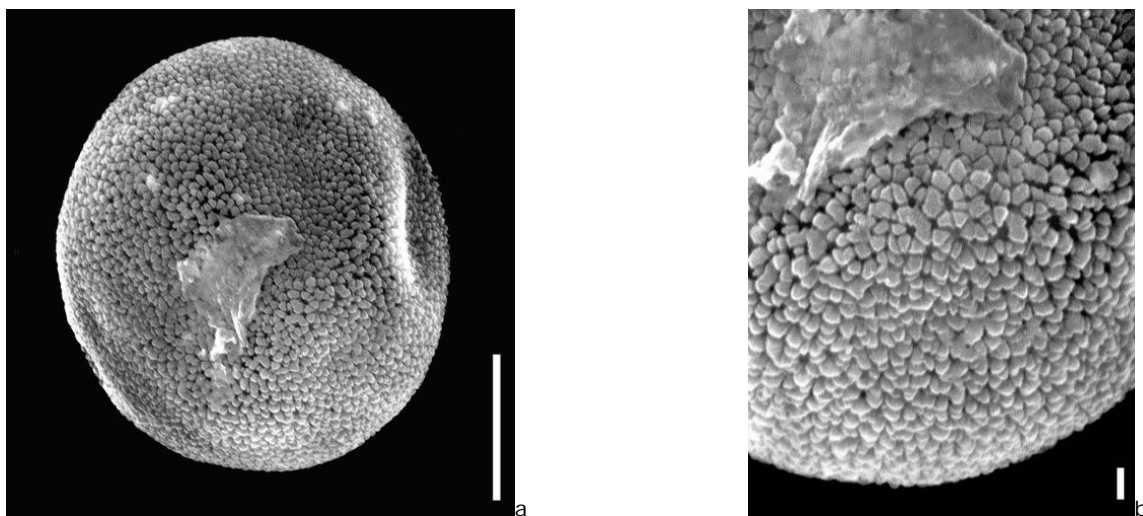
middle Barremian to earliest Aptian age for the sediments of Bernissart (at a depth of 322 m) and the same dating is proposed here for the Baudour Clays Formation. In the description of the species *Stellatopollis hughesii*, from the Upper Barremian (?) of Egypt, PENNY (1986) regarded it equivalent to biorecord Superret-*croton*.

Another peculiar palynomorph, very rare, is the probable paleotaxon Superret-*subcrot* (Fig. 16), which was defined by HUGHES *et alii* [1979, sic: SUPERRET-(CAND)SUBCROT] and reexamined by HUGHES (1994), using a scanning electron microscope. It is difficult to recognize with certainty under light microscopy; however its morphology appears to make it identifiable (shape, size, wall stratification and very small, numerous and closely packed crotonoid sculptural elements which are at the limit of the microscope's resolving power, so it is very difficult to produce convincing photographs). In the English Wealden, paleotaxon Superret-*subcrot* is reported from MCT phase 4, apparently restricted to one locality (Kingsclere borehole at a depth of 474 feet). Nevertheless, its scarcity renders impossible a more refined stratigraphic correlation than that mentioned above.

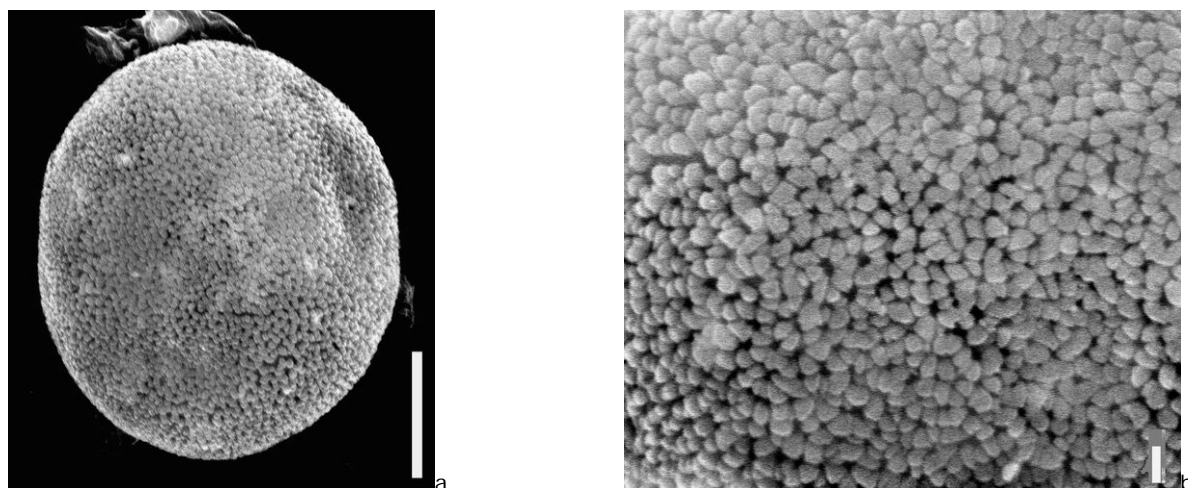
Lastly, another peculiar palynomorph, also very rare, is the probable biorecord Retisulc-*dentat* (Fig. 17), which was defined by HUGHES *et alii* (1979) then again by HUGHES (1994). In the English Wealden, the stratigraphic distribution of biorecord Retisulc-*dentat* (and similar forms) is attributed to MCT phases 2 to 4; its occurrence in the Baudour Clays Formation could be an argument to rule out the MCT phase 5. However, because of its rarity such a conclusion would be rash.



**Figure 10:** Inaperturate "variant form": biorecord *Inapert-croton* (glass stub 2/1 – 10a and 10b: whole specimen and detail). Scale-bar is 10  $\mu\text{m}$ , except higher SEM magnification (1  $\mu\text{m}$ ).



**Figure 11:** Inaperturate "variant form": biorecord *Inapert-croton* (glass stub 2/2 – 11a and 11b: whole specimen and detail). Scale-bar is 10  $\mu\text{m}$ , except higher SEM magnification (1  $\mu\text{m}$ ).



**Figure 12:** Inaperturate "variant form": biorecord *Inapert-croton* (glass stub 2/2 – 12a and 12b: whole specimen and detail). Scale-bar is 10  $\mu\text{m}$ , except higher SEM magnification (1  $\mu\text{m}$ ).

## 7. Botanical affinity of these three guide-forms

HUGHES *et alii* (1979) and HUGHES (1994) highlighted the angiospermid characters of these three reference taxa: essentially they are the tectum structure (continuous reticulum) and the suprategal elements (particularly the crotonoid pattern exhibited by biorecord Superret-*croton* and paleotaxon Superret-*subcroton*). The crotonoid suprategal pattern is known in the following extant families: Euphorbiaceae (ERDTMAN, 1952; PUNT, 1962; ARCHANGELSKY, 1966; YBERT, 1975), Buxaceae and Thymeleaceae (ERDTMAN, 1952; ARCHANGELSKY, 1966), Atherospermataceae (DOYLE *et alii*, 1975) and Liliaceae (ERDTMAN, 1952; ARCHANGELSKY, 1966; MULLER, 1970). Last, the biorecord Retisulc-*dentat* is very similar to pollen grains of the extant Chloranthaceae family (see CHAPMAN, 1987).

## 8. About the aperture of biorecord Superret-*croton* and "variant forms"

After examination of numerous grains (several hundred) from the Baudour quarry samples, the presence of a definite sulcus is now certain, at least in a significant number: biorecord Superret-*croton* is undoubtedly monosulcate (Figs. 2-7). However, other grains with the same overall appearance (similar size and crotonoid pattern) differ with respect to the germinal aperture; these grains are here designed as "variant forms":

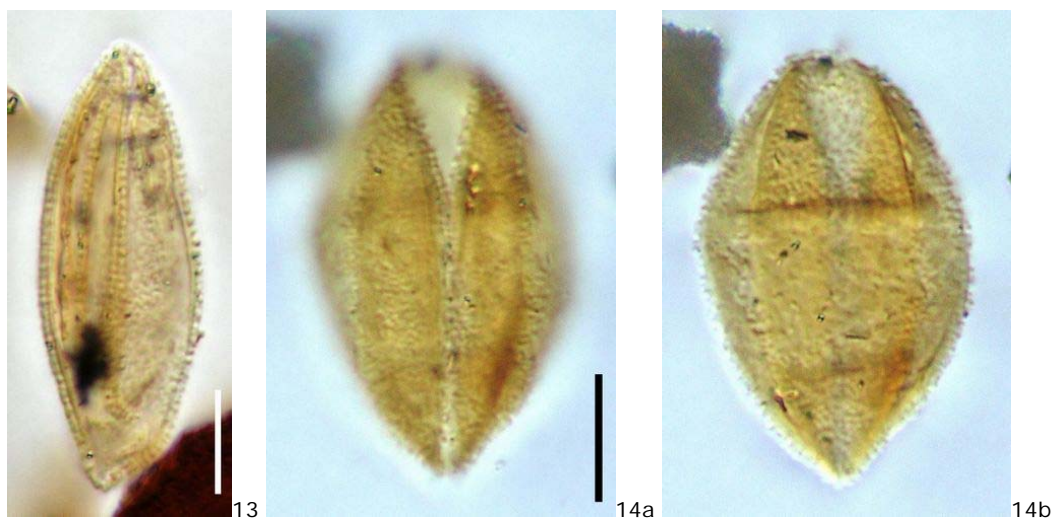
- a large proportion of these grains are undoubtedly inaperturate, their shape being

almost spherical instead of ellipsoidal (Figs. 9-12);

- some very rare grains seem to be tricolpate (Figs. 13-14) or are clearly trichotomosulcate (Fig. 15); these two early "variant forms" herald the diversification of apertures that began in strata of Early Aptian age.

These three "variant forms" may be due to some morphological intra-specific variability (CHAPMAN, 1987), or on the contrary may indicate the existence of different species of mother-plant.

In any event, as the grains are not monosulcate, these three "variant forms" cannot be referred to *Stellatopollis hughesii*, or to the Superret- genusbox (whichever "palynological language" is used). In order to remain logical and to avoid confusion, HUGHES' data-handling system (1976 and subsequent papers) must obviously be applied; these "variant forms" require discrete genusboxes which respectively are: Inapert- [proposed here, in accordance with the recommendations of HUGHES *et alii* (1979)], and Retitri- and Trichoto- (both established by PENNY, 1991). Logically too, trivial names can remain as -*croton*; thus, these "variant forms" belong respectively to these new taxa: biorecord Inapert-*croton*, biorecord (cand) Retitri-*croton* and biorecord (cand) Trichoto-*croton* ["cand" (*for candidate*) between brackets means that too few specimens are available to be acceptable as a full biorecord, after HUGHES *et alii* (1979) and PENNY (1991)].



**Figure 13:** Tricolpate "variant form": biorecord (cand) Retitri-*croton* (slide Bau 2A – coordinates N33-2). Scale-bar is 10 µm. **Figure 14:** Tricolpate "variant form": biorecord (cand) Retitri-*croton* (slide Bau 4B – coordinates F27-1 – 14a and 14b: respectively low and high focus). Scale-bar is 10 µm.



**Figure 15:** Trichotomosulcate "variant form": biorecord (cand) *Trichoto-croton* (slide Bau 2B – coordinates J31/K31 – 15a and 15b: respectively average and low focus). Scale-bar is 10  $\mu$ m.

### 9. Implications about the formation of the Mons Basin

In the Mons Basin, the Wealden facies occur (ROBASZYNSKI *et alii*, 2001):

- in kilometric outcrops (also called "pockets") and in the northern part of this basin as shallow subcrops,
- as the infilling of several sinkholes developed in carbonates and siliciclastic sediments (for example at Bernissart),
- in the east as white sands and sandstones containing lignite and glauconitic material.

Recently YANS *et alii* (2005, 2006) demonstrated that the Wealden facies of the natural pit of Bernissart are of middle Barremian to earliest Aptian in age. A similar age is proposed for the Wealden facies of the "Baudour pocket". If so, subsidence responsible for both the Baudour pocket and the natural pit of Bernissart was contemporaneous and perhaps caused by the same genetic conditions. Deep boreholes drilled in the Mons Basin demonstrated partial and local dissolution of buried anhydrites immediately below the natural pits (DELMER *et alii*, 1982; DELMER, 1989; DUPUIS & VANDYCKE, 1989; ROUCHY *et alii*, 1993). As in other areas, the result of this partial dissolution of deeply buried anhydrites produces local repeated collapse in overlying rocks; this may cause geomorphological depressions or sinkholes at the surface (STANTON, 1966; GUTTIÉREZ, 1996; WARREN, 1999). So natural pits and "pockets" may be the surface expression of deep dissolution.

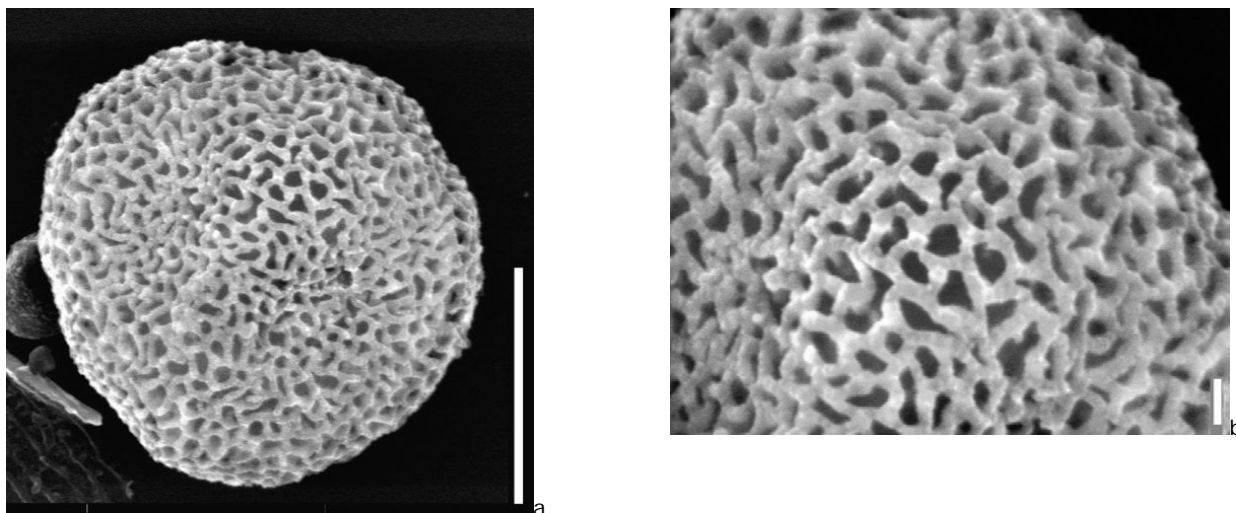
### 10. Conclusions

The palynological content of the dinosaur-bearing Wealden facies of the Baudour Clays Formation is reported for the first time. The palynomorphs are of continental origin. Ferns and gymnosperms are the dominant floristic groups. The occurrence of pollen grains of the angiospermous biorecord *Superret-croton*, probable paleotaxon *Superret-subcrot* and probable biorecord *Retisulc-dentat* [*sensu* HUGHES *et alii* (1979) and HUGHES (1994)] denotes a middle Barremian to earliest Aptian age for these sediments, and so they are confirmed to be of the same age as the Wealden facies sediments in the natural pit of Bernissart. This identity in age suggests that the natural pit of Bernissart and the "pocket" of Baudour are the result of the same mechanisms of subsidence, probably thus demonstrating a genetic relationship between natural pits and relatively large "pockets" in the Mons Basin.



**Figure 16:** Probable paleotaxon *Superret-subcrot* (slide Bau 4B – coordinates L32-L33 – assemblage of two photographs with different foci). Scale-bar is 10  $\mu$ m.





**Figure 17:** Biorecord *Retisulc-dentat*, presumed proximal face (glass stub 2/2 – 17a and 17b: whole specimen and detail). Scale-bar is 10  $\mu\text{m}$ , except higher SEM magnification (1  $\mu\text{m}$ ).

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### Remarks

The slides and glass stubs will be housed in the Institut Royal des Sciences Naturelles (Brussels).

Note about Figs. 2-6, 9 and 13-16: interferential- differential contrast after NOMARSKI, unmodified photographs; the position of the nine illustrated palynomorphs on each slide is given after the "England Finder".

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### Taxa list

The taxa named here follow the morphological scheme instituted by POTONIE and KREMP (1954) and subsequently amplified by several palynologists. Biorecords and subordinate records are included, for in the authors' opinion there is no incompatibility.

## SPORES AND POLLEN GRAINS

- Anteturma Proximegerminantes POTONIÉ, 1970
- Turma Triletes-Azonales (REINSCH, 1881) POTONIÉ et KREMP, 1954
    - Subturma Azonotriletes (LUBER, 1935) DETTMANN, 1963
      - Infraturma Laevigati, Quasilaevigati (BENNIE et KIDSTON, 1886) POTONIÉ, 1956
  - Biretisporites potoniaei* (DELCOURT et SPRUMONT, 1955) DELCOURT, DETTMANN et HUGHES, 1963
  - Deltoidospora australis* (COUPER, 1953) POCOCK, 1970
  - Deltoidospora minor* (COUPER, 1953) POCOCK, 1970
  - Dictyophyllidites harrisii* COUPER, 1958
  - Matonisporites equiexinus* COUPER, 1958
    - Infraturma Apiculati (BENNIE et KIDSTON, 1886) POTONIÉ, 1956
      - Subinfraturma Baculati DYBOVÁ et JACHOWICZ, 1957
  - Pilosisporites trichopapillosus* (THIERGART, 1949) DELCOURT et SPRUMONT, 1955
    - Subinfraturma Granulati, Scabrati DYBOVÁ et JACHOWICZ, 1957
  - Concavissimisporites verrucosus* (DELCOURT et SPRUMONT, 1955) DELCOURT, DETTMANN et HUGHES, 1963
    - Subinfraturma Verrucati DYBOVÁ et JACHOWICZ, 1957
  - Leptolepidites tumulosus* (DÖRING, 1964) SRIVASTAVA, 1975
    - Infraturma Murornati POTONIÉ et KREMP, 1954
  - Cicatricosisporites baconicus* DEAK, 1963
  - Cicatricosisporites brevilaesuratus* (COUPER, 1958) KEMP, 1970
  - Cicatricosisporites hallei* DELCOURT et SPRUMONT, 1955
  - Cicatricosisporites hughesi* DETTMANN, 1963
  - Foveotriletes subtriangularis* (BRENNER, 1963) PADEN PHILIPS et FELIX, 1970
  - Klukisporites foveolatus* POCOCK, 1964
  - Retitriletes austroclavatidites* (COOKSON, 1953) DÖRING, KREMP, MAI et SCHULZ *in* KREMP, 1963
    - Subturma Lagenotriletes POTONIÉ et KREMP, 1954
      - Infraturma Trifoliati, Barbati POTONIÉ, 1970
  - Dijkstraisporites helios* (Dijkstra, 1951) POTONIÉ, 1956
    - Turma Triletes-Zonales (BENNIE et KIDSTON, 1886) POTONIÉ, 1956
      - Subturma Auritotriletes POTONIÉ et KREMP, 1954
        - Infraturma Auriculati (SCHOPF, 1938) DETTMANN, 1963
  - Rouseisporites reticulatus* POCOCK, 1962
  - Trilobosporites apiverrucatus* COUPER, 1958
  - Trilobosporites hannonicus* (DELCOURT et SPRUMONT, 1955) POTONIÉ, 1956
    - Infraturma Appendiciferi POTONIÉ, 1956
  - Appendicisporites erdtmanii* POCOCK, 1965
  - Appendicisporites stylosus* (THIERGART, 1954) DEAK, 1963
    - Infraturma Tricrassati DETTMANN, 1963
  - Camazonosporites insignis* NORRIS, 1967
  - Sestrosporites pseudoalveolatus* (COUPER, 1958) DETTMANN, 1963
    - Subturma Zonotriletes WALTZ, 1935
      - Infraturma Cingulati (POTONIÉ et KLAUS, 1954) DETTMANN, 1963
  - Foraminisporis asymmetricus* (COOKSON et DETTMANN, 1958) DETTMANN, 1963
    - Subinfraturma Euzonati, Coronati POTONIÉ, 1970
  - Aequitriradites spinulosus* (COOKSON et DETTMANN, 1958) COOKSON et DETTMANN, 1961
    - Turma Vestitriletes POTONIÉ, 1970

- Suprasubturma Perinotrilités (ERDTMAN, 1947) DETTMANN, 1963
- Crybelosporites pannuceus* (BRENNER, 1963) SRIVASTAVA, 1975
- Anteturma Variegerminantes POTONIÉ, 1970
- Turma Saccites ERDTMAN, 1947
- Subturma Monosaccites (CHITALEY, 1951) POTONIÉ et KREMP, 1954
- Infraturma Saccizonati BHARADWAJ, 1957
- Applanopsis dampieri* (BALME, 1957) DÖRING, 1961
- Subturma Disaccites COOKSON, 1947
- Parvisaccites radiatus* COUPER, 1958
- Turma Aletes et Kryptoperturates POTONIÉ, 1966
- Subturma Azonoletes (LUBER, 1935) POTONIÉ et KREMP, 1954
- Infraturma Granulonapiti, Retinapiti (COOKSON, 1947) POTONIÉ, 1975
- Araucariacites australis* (COOKSON, 1947) COUPER, 1953
- Biorecord Inapert-*croton* (this study)
- Infraturma Circumpollini (PFLUG, 1953) KLAUS, 1960
- Classopollis* sp.
- Turma Plicates (NAUMOVA, 1939) POTONIÉ, 1960
- Subturma Costates POTONIÉ, 1970
- Infraturma Costati POTONIÉ, 1970
- Ephedripites montanaensis* BRENNER, 1968
- Ephedripites zaklinskaiae* AZÉMA et BOLTENHAGEN, 1974
- Subturma Trichotomocolpates, Trichotomosulcates (ERDTMAN, 1954) POTONIÉ, 1970
- Infraturma Eutrichotomosulcati POTONIÉ, 1970
- Biorecord (cand) Trichoto-*croton* (this study)
- Subturma Monocolpates (Monosulcites) & Zonocolpates POTONIÉ, 1970
- Infraturma Quasilaevigati & Microsculptati POTONIÉ, 1970
- Cycadopites minimus* (COOKSON, 1947) POCCOCK, 1970
- Infraturma Reticulati PONS, 1988
- Biorecord Retisulc-*dentat* (in HUGHES, DREWRY et LAING, 1979)
- Infraturma Sculptati POTONIÉ, 1970
- Biorecord Hauterivian-*cactisulc* (in HUGHES et MCDUGALL, 1987)
- Biorecord Superret-*croton* (in HUGHES, DREWRY et LAING, 1979)
- Paleotaxon Superret-*subcrot* (in HUGHES, DREWRY et LAING, 1979)
- Subturma Tricolpates, Triptyches POTONIÉ, 1970
- Infraturma Heterotricolpati, Praecolpati POTONIÉ, 1970
- Eucommiidites minor* GROOT et PENNY, 1960
- Eucommiidites* sp. in KEMP, 1970
- Infraturma Isotricolpati POTONIÉ, 1970
- Biorecord (cand) Retitri-*croton* (this study)

## VARIA

"Algae" zygospores:

- Ovoidites parvus* (COOKSON et DETTMANN, 1959) NAKOMAN, 1966
- Schizosporis reticulatus* (COOKSON et DETTMANN, 1959) PIERCE, 1976
- Incertae sedis* (perispore scrap ?):
- Dictyothylakos* sp. in SINGH, 1964