

# ANDROSTROBUS MAJOR, A NEW MALE CYCAD CONE FROM THE JURASSIC OF YORKSHIRE (ENGLAND)

JOHANNA H. A. VAN KONIJNENBURG-VAN CITTERT

*Department of Palaeobotany, Botanical Museum and Herbarium, State University, Utrecht (The Netherlands)*

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## SUMMARY

A new *Androstrobus* from the Jurassic of Yorkshire is described and compared with other, earlier identified, *Androstrobus* species.

## INTRODUCTION

*Androstrobus* is a genus established for fossil male cones attributed to the Cycadales. The new species described in this paper does not differ in any essential point from the other *Androstrobus* species. For that reason it is placed in this genus.

The material was collected by Mrs. Dr. M. D. Muir and the author in the summer of 1967 at Hasty Bank (Yorkshire), in the lower third of the outcrop.

## DIAGNOSIS AND DESCRIPTION OF THE NEW SPECIES

*Androstrobus major* n.sp.  
(Fig.1, 2; Plate I, II)

### *Diagnosis*

Cone large; length unknown, width at least 7 cm. Microsporophylls at least 3.5 cm long, in part known wedge-shaped (cuneate), 2 mm wide at the base to 15 mm at the outer end, crowded and mostly overlapping each other; presumed adaxial surface wrinkled; basal 1 cm sterile, rest of abaxial surface thickly covered with microsporangia. Microsporangia approximately 0.5 mm in diameter and 1 mm long, almost circular in transverse section, not obviously grouped. Cuticle of exposed part of microsporophyll 1–2  $\mu$  thick, very brittle and difficult to prepare, showing isodiametric or elongated cells with moderately broad, not prominent lateral walls (no stomata seen).

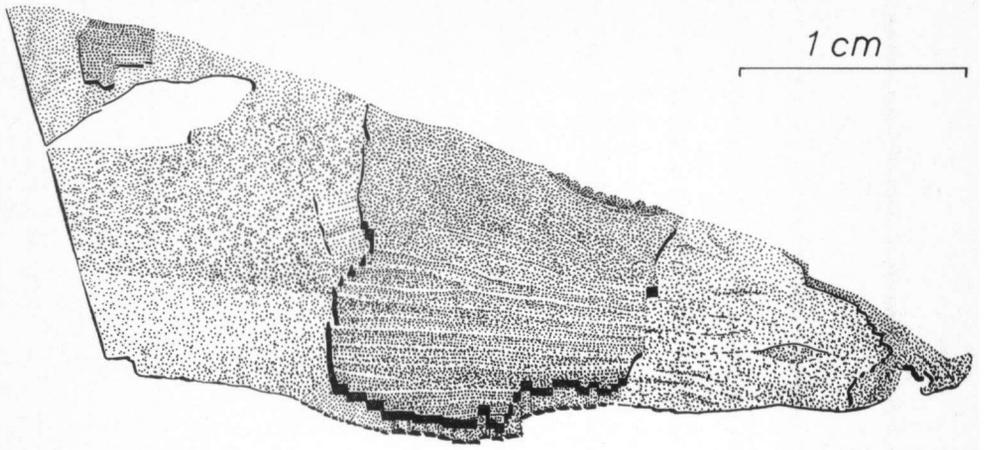


Fig.1. *Androstrobus major* n.sp. holotype, adaxial surface; natural size.

Pollen grains (cf. Plate I) monocolpate (monosulcate); outline elliptical to circular, longest axis  $33 \mu$  (extremes  $29-38 \mu$ ). Colpus (sulcus) extending over about  $7/8$  of the length of the pollen grain, slitlike. Wall (exine) consisting of two layers (nexine and sexine),  $1-1.5 \mu$  thick; nexine (the innermost layer) smooth; sexine (the outermost layer) with two components: the columellae layer and the capita layer; the columellae layer (bacula) almost invisible, supporting the capita layer. Surface pitted; pits shallow cavities  $1 \mu$  in section.

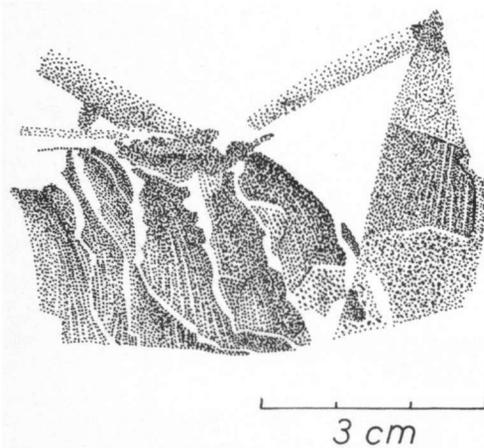
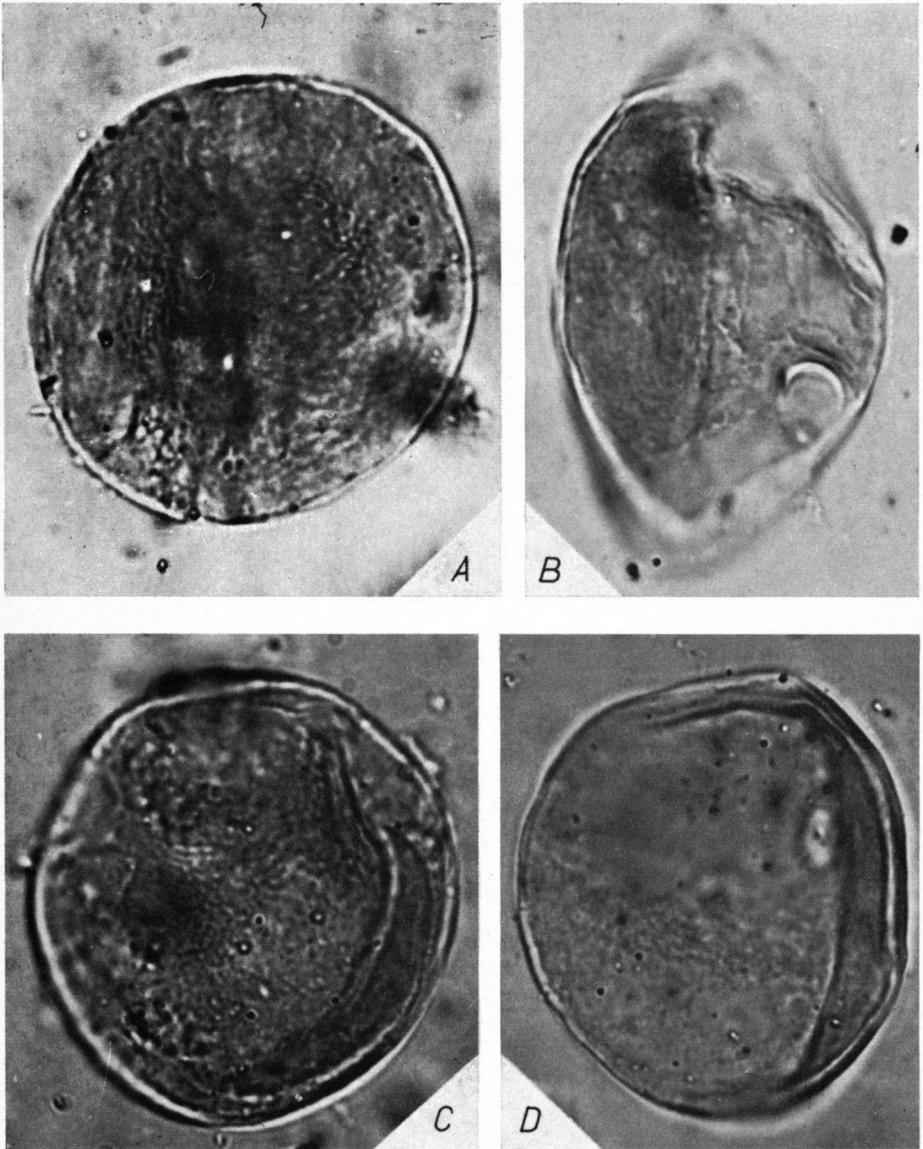


Fig.2. *Androstrobus major* n.sp., lowest microsporophyll of holotype, adaxial surface, but part of the substance has been cleared away to show the microsporangia and the basal sterile part of the abaxial surface; magnification  $\times 3$ .

PLATE I



*Androstrobus major* n.sp.; pollen grains; magnification  $\times 1750$ .

A. Surface (with pits).

B. Colpus (sulcus).

C. Surface and colpus.

D. Wall structure and colpus.

### *Holotype*

The holotype is stored as no. 2964 in the collection of the Department of Palaeobotany of the Botanical Museum and Herbarium, State University, Utrecht (The Netherlands).

### *Description*

Only one specimen is present—the holotype—which is from the Lower Deltaic Beds (Lower Bajocian, Jurassic) of Hasty Bank (Yorkshire, England). It is just over 6 cm high, showing seven microsporophylls. There is some evidence of a cone axis (3–4 mm wide) being present, and it looks as if the lowest microsporophyll is attached to it, but it is not very clear; this axis is, therefore, omitted from the diagnosis. The specimen shows neither the apex nor the base of the cone and we can not say, consequently, anything definite about its shape, nor whether it was stalked or not. It was impossible to make photos of the holotype, because there is almost no contrast between the brown fossil and the dark brown matrix. Several attempts were made to prepare cuticles, but the results were poor—only yielding tiny fragments (Plate II A).

When macerating the microsporangia, they almost immediately fell into pieces; so it is impossible to show an intact microsporangium. A group of pollen grains out of a macerated microsporangium is shown in Plate II B.

### DISCUSSION

*Androstrobus major* stands apart from all other *Androstrobus* species as it is much larger, and the sporophyll has a sterile basal part. Further points of difference with the various species known from Yorkshire are:

(1) *Androstrobus manis* HARRIS, 1941; the microsporophyll is short and broad unlike *A. major* where it is wedge shaped; the adaxial surface has short, longitudinal ridges, in *A. major* it is wrinkled.

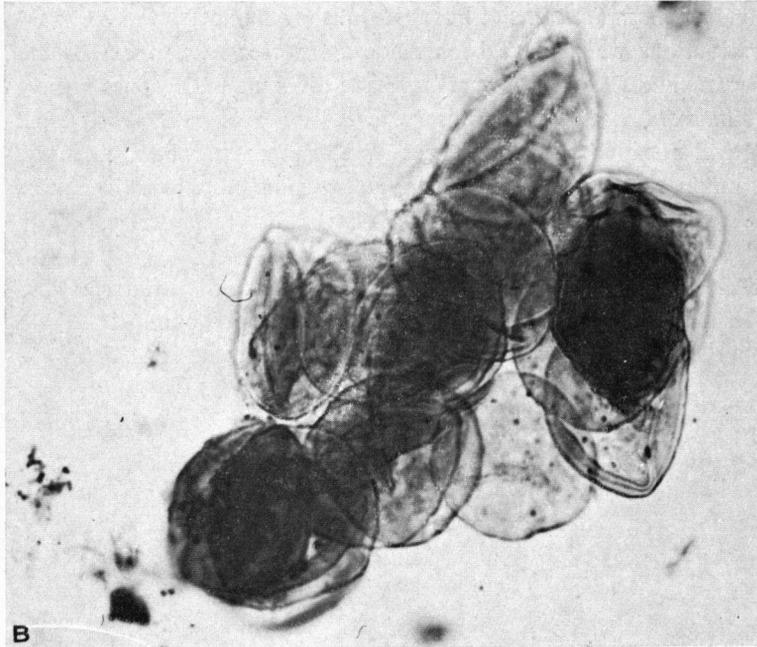
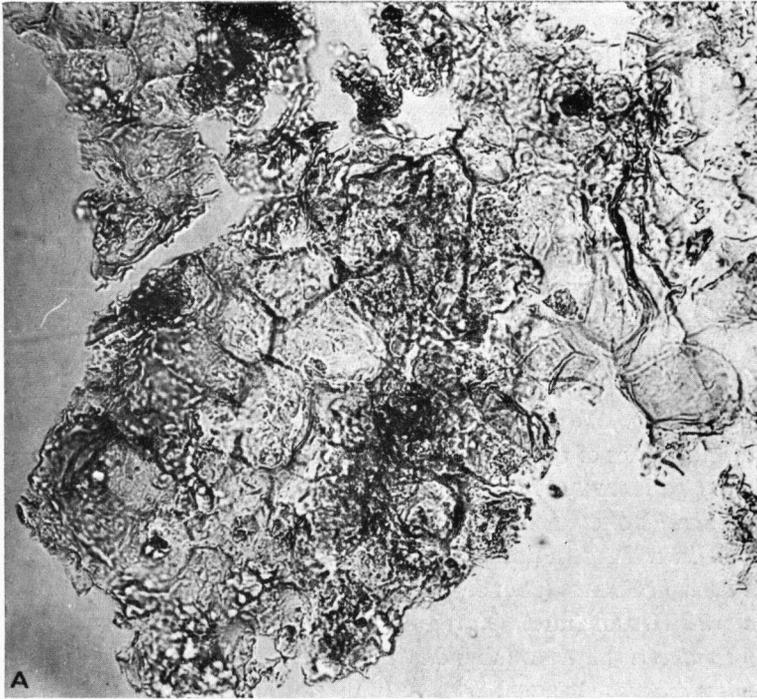
(2) *Androstrobus wonnacotti* HARRIS, 1941; the microsporophylls are wedge shaped but much smaller, scarcely overlapping and do not have a sterile part; the adaxial surface is smooth.

(3) *Androstrobus prisma* THOMAS et HARRIS, 1960; the microsporangia are in groups of 2–3, and prismatic, unlike *A. major* where they are not obviously grouped and are circular in transverse section; the apical 5 mm of the microsporophyll are sterile (the basal 1 cm in *A. major*).

(4) *Androstrobus szei* HARRIS, 1964; the substance of the microsporophyll contains numerous fibres, which are absent in *A. major*.

As for the various species of *Androstrobus* described from other regions than Yorkshire, in only four of them there is some reason to believe that they resemble cycad male cones: *Androstrobus baldwini* (SCHIMPER) DE SAPORTA, 1875

PLATE II



*Androstrobus major* n.sp.

A. Fragment of cuticle of microsporophyll; magnification  $\times 350$ .

B. Group of pollen grains out of a microsporangium; magnification  $\times 750$ .

(the type species), *Androstrobos cycadiformis* ROSELT, 1960, *Androstrobos guerangeri* (BRONGNIART) DE SAPORTA, 1875, and *Androstrobos jamnitschenkoi* STANISLAVSKI, 1957. But *Androstrobos major* does not resemble any of them closely. In the other species described as *Androstrobos* the evidence of it being a male cycad cone is much less clear.

#### *Attribution*

The evidence is not sufficient to suggest the (species of) leaf corresponding to this cone. It is associated on the block with *Pachypteris papillosa* (THOMAS et BOSE) HARRIS, 1964, *Pseudoctenis lanei* THOMAS, 1913, *Sagenopteris colpodes* HARRIS, 1940, and *Sphenobaiera gyron* (manuscript name by T. M. Harris; supposed to be ginkgoalean).

The following species of presumed cycad or pteridosperm affinity are known from Hasty Bank (see HARRIS, 1964):

*Ctenis kaneharai* YOKOYAMA (rather common)

*Pseudoctenis lanei* THOMAS (locally abundant)

*Nilssonina kendalli* HARRIS (abundant through the bed)

*Nilssonina syllis* HARRIS (rare)

*Nilssonina tenuinervis* SEWARD (abundant)

*Ctenozamites cycadea* (BERGER) SCHENK (rare)

*Pachypteris papillosa* (THOMAS et BOSE) HARRIS (abundant)

If the attributions which have been made are correct, *Pseudoctenis lanei*, *Nilssonina tenuinervis* and *Pachypteris papillosa* have different male cones (*Androstrobos prisma*, *Androstrobos wonnacotti* and *Pteroma thomasi* HARRIS, 1964, respectively) and are thus not involved. That leaves *Nilssonina kendalli* and *Ctenis kaneharai* as the commonest leaves. Neither occurs on the same block as *Androstrobos major*, but both occur in the same region of Hasty Bank (the lower 1/3 of the plant bed).

The epidermal cells of *Androstrobos major* do not show the striations which are so characteristic with *Ctenis kaneharai*, so the evidence points mostly to *Nilssonina kendalli* but there the cell outlines are often invisible while in *Androstrobos major* they are conspicuous. The same applies to *Nilssonina syllis*. In *Ctenozamites cycadea* the epidermal cells are rather like those of *Androstrobos major*, but in the latter species there are no trichomes seen, which are rather frequent in *Ctenozamites cycadea*. There is no particular reason, consequently, to link this cone with any of these species, but the following seem possible: *Nilssonina syllis*, *Nilssonina kendalli*, *Ctenozamites cycadea* and *Ctenis kaneharai*.

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