

THE TYPE SPECIMEN OF *DEBEYA (DEWALQUEA) HALDEMIANA* REDISCOVERED

ADAM T. HALAMSKI

Polish Academy of Sciences, Institute of Paleobiology, Twarda 51/55, 00-818 Warszawa, Poland; e-mail: ath@twarda.pan.pl

JIŘÍ KVAČEK

National Museum, Department of Palaeontology, Václavské nám. 68, 115 79 Praha 1, the Czech Republic;
e-mail: jiri.kvacek@nm.cz



Halamski, A.T., Kvaček, J. (2013): The type specimen of *Debeya (Dewalquea) haldemiana* rediscovered. – Acta Mus. Nat. Pragae, Ser. B, Hist. Nat., 69 (1–2): 83–86. Praha. ISSN 1804-6479

Abstract. The rediscovered specimen MGUWr 7536p, one of the syntypes of *Dewalquea haldemiana*, is described. It is selected as the lectotype of *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013 and of *Debeya (Dewalquea) haldemiana* var. *haldemiana*. It is the most complete and best preserved known specimen of the species. It allows supplementation of previous description of the following characters: brochidodromous secondary venation; acuminate leaflet apices; variation of the petiolule length from 0 (leaflets sessile) to 30 mm; ramified tertiary venation. Other species considered up to now to belong to the same subgenus possess percurrent tertiary venation; a doubt is therefore expressed about the validity of the present circumscription of *Debeya (Dewalquea)*. Additionally, validation of the previously published name *Debeya (Dewalquea) haldemiana* var. *angustifolia* (HOSIUS et VON DER MARCK 1880) HALAMSKI comb. nov. is presented.

■ Angiospermae, *Debeya*, palaeobotany, taxonomy, Campanian, Cretaceous, Westphalia, Germany.

Received May 21, 2013

Issued September, 2013

Introduction

Fossil leaves classified within the informal *Debeya* group (Krassilov et al. 2005) belong to the arboreal elements representing a major component of several Late Cretaceous floras. One of the syntypes (designated herein as the lectotype) of *Dewalquea haldemiana* DEBEY ex SAPORTA et MARION 1873, the type species of the subgenus *Debeya (Dewalquea)* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013, considered as lost (Halamski 2013: 422), has recently been rediscovered in the palaeobotanical collections of the Wrocław University in Poland (formerly Schlesische Friedrich-Wilhelms-Universität zu Breslau). This specimen is more complete and better preserved than earlier recorded material referred to this species by Halamski (2013). A short description of the material is presented below, including discussion of the taxonomic consequences of the features revealed. Morphological terms are standardised after Ellis et al. (2009); taxonomy follows Halamski (2013).

Systematic palaeontology

Subinfradivision **Angiospermae**
BROWN et DOELL ex DOELL 1857

Class **Dicotyledoneae** DE CANDOLLE 1819

Subclass, order, and family incertae sedis

Informal group *Debeya sensu* KRASSILOV,
LEWY, NEVO et SILANTIEVA 2005

Remarks: Halamski (2013) suggested that compound leaves are diagnostic for eudicots, wherefore the *Debeya* group (as emended by him) may be considered to belong to the Eudicotyledoneae (ATH). If this point of view is not followed, the *Debeya* group may be considered in its pristine sense as a heterogeneous form group (JK).

Genus *Debeya* MIQUEL 1853

Type: *Debeya serrata* Miquel 1853, Verhand. Comm. Geol. Besch. Kaart Nederl. 1: 38, pl. 1: 1; Kunrade, Limburg, Netherlands; Maastrichtian.

Subgenus *Debeya (Dewalquea)* (SAPORTA et MARION 1873) HALAMSKI 2013

Type: *Dewalquea haldemiana* DEBEY ex SAPORTA et MARION 1873, Mém. cour. et mém. sav. étr. Ac. sci. lett. b.-ar. Belg. 37: 60, pl. 7, fig. 1; Haldem, Westphalia, Germany; Campanian.

Debeya (Dewalquea) haldemiana (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013

Text-figs 1A–G

1873 *Dewalquea haldemiana* DEBEY ex SAPORTA et MARION (*Araliophyllum haldemianum* DEBEY in litt.) p. 60; pl. 7, figs 1–2.

1880 *Dewalquea haldemiana* DEBEY ex SAPORTA et MARION var. *latifolia* HOSIUS et VON DER MARCK p. 173; pl 35, fig. 114, pl. 34, fig. 115.

- 1880 *Dewalquea haldemiana* DEBEY ex SAPORTA et MARION var. *angustifolia* p. 173; pl 33, figs 116, 117, pl. 34, figs 118-121.
- 1889 *Dewalquea haldemiana* (DEBEY ex SAPORTA et MARION) ROEMER, p. 143, pl. 12, figs 2, 3, 4
- 2013 *Debeya haldemiana* (DEBEY ex SAPORTA et MARION) KNOBLOCH; Halamski p. 422; figs 7B, C, 8C, 9C, D, F, 10C [ubi syn.].

Lectotype designated here: MGUWr 7536p (text-figs 1A–G).

Type locality: Haldem, Westphalia, Germany.

Type horizon: Campanian, Late Cretaceous.

Emended diagnosis. Leaf compound, pedate, petiolate, with 6–7 petiolulate to sessile linear leaflets; primary venation pinnate, secondary venation brochidodromous; leaflet apices acuminate; tertiary venation ramified.

Description. The lectotype shows a compound, pedate, petiolate leaf composed of six leaflets (text-fig. 1A). Petiole 28 mm long and 2.5 mm wide; inflated proximally, 3.7 mm wide. Petiolules very short (text-fig. C), bases of the leaflets decurrent; sometimes blades begin so closely to the insertion point of the petiolule that the leaflet is sessile. Leaflets are linear, the median one 210 mm long, the lateral ones 200 mm long, up to 13 mm wide; margins entire, parallel in the median region; apex acuminate. Venation is pinnate consisting of strong primaries. Secondaries are brochidodromous, subopposite, excurrent, originating at an angle of 40–70°, first running towards the margin, then subparallel to it, at least looping and joining the higher veins at 1/8 of the blade width (text-figs 1E–G); secondary spacing slightly decreasing or increasing distally depending on the leaflet considered. Intersecondaries are absent. Tertiary veins are poorly preserved, apparently forming a ramified pattern.

Discussion

The name *Debeya haldemiana* was first published by Roemer (1889, p. 143), however later authors (e.g. van der Burgh 2008, Halamski 2013) considered Knobloch (1964) as the author of the name.

The specimen MGUWr 7536p was figured by de Saporta and Marion (1873, pl. 7, fig. 1) and therefore represents one of the two syntypes of *Dewalquea haldemiana* SAPORTA et MARION 1873 (the other is apparently missing). The specimen is selected herein as the lectotype of *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013. It was also figured by Hosius and von der Marck (1880, pl. 35, fig. 114), wherefore it is one of the two syntypes (the other has not been traced) of *Debeya (Dewalquea) haldemiana* var. *haldemiana* (i.e. *latifolia* Hosius et von der Marck 1880); it is selected herein as the lectotype thereof. Consequently, *Debeya (Dewalquea) haldemiana* var. *haldemiana* becomes a junior objective synonym of *Debeya (Dewalquea) haldemiana*.

The earlier (Halamski 2013) published name *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) ROEMER var. *angustifolia* (HOSIUS et VON DER MARCK

1880) HALAMSKI comb. nov. [basonym: *Dewalquea haldemiana* var. *angustifolia* HOSIUS et VON DER MARCK 1880, Die Flora der Westfälischen Kreideformation. Palaeontographica 26, p. 173; for types, see Halamski 2013, p. 422] is a junior subjective synonym of *Debeya (Dewalquea) haldemiana*.

The description of the specimen allows supplementation and emending of some existing morphological diagnostic features presented by Halamski (2013). For example, he did not manage to find any complete leaflet (i.e., with apex). Terminal parts of secondary veins, i.e. looping back towards the midvein, are often poorly preserved due to taphonomic processes (Halamski 2013, fig. 9C, D, E). As a consequence, Halamski (2013) described the venation type of the secondaries as eucamptodromous. Similarly, the petiolules may be very short, nearly non-existent (text-figs 1A, C) or up to 30 mm long (Halamski 2013, fig. 9E). Perhaps the most interesting diagnostic feature revealed is the tertiary venation, even if poorly preserved, in the discussed specimen; it is ramified and not percurrent (regularly scalariform) as in *Debeya (Dewalquea) paulinae* HALAMSKI 2013. Intersecondaries are present in *D. paulinae* and absent in *D. haldemiana*. It may therefore be questioned as to whether *D. paulinae* should not be segregated into another subgenus of *Debeya* [in addition to *Debeya (Debeya)* with trifoliolate leaves and *Debeya (Dewalquea)* with penta- to heptafoliolate leaves, as proposed by Halamski (2013)]. This problem, however, cannot be settled on the basis of an imperfectly preserved single specimen.

Conclusions

1. The rediscovered specimen MGUWr 7536p is one of the syntypes of *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013; it is selected herein as the lectotype thereof.
2. The same specimen is selected as the lectotype of *Debeya (Dewalquea) haldemiana* var. *haldemiana* which is a junior objective synonym of *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013. *Debeya (Dewalquea) haldemiana* var. *angustifolia* (HOSIUS et VON DER MARCK 1880) HALAMSKI comb. n. is a junior subjective synonym of *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013.
3. The following diagnostic features of *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013 are newly revealed: secondary venation brochidodromous; leaflet apices acuminate; petiolules of variable length; tertiary venation ramified.
4. The latter character differs from percurrent tertiary venation in other species considered to belong to the same subgenus as *Debeya (Dewalquea) paulinae* HALAMSKI 2013. The validity of the present circumscription of the subgenus *Debeya (Dewalquea)* (Knobloch 1964) Halamski 2013 is therefore subject to doubt.



Text-fig. 1. *Debeya (Dewalquea) haldemiana* (DEBEY ex SAPORTA et MARION 1873) HALAMSKI 2013. Lectotype MGUWr 7536p; Haldem, Westphalia, Germany; Campanian. Scale bars 10 mm. A. General view of the specimen. B. Enlargement of the acuminate apex of a leaflet. C. Enlargement of the basal part with the petiole and the petiolules. D, E, F, G. Enlargements of the venation.

Acknowledgments

The authors gratefully acknowledge the generous help of Dr. Paweł Raczyński, the Curator of the Geological Museum of the Wrocław University, of Anna Setlik, M.Sc., Joanna Białek, M.Sc., and Barbara Szczudło from the staff thereof, as well as Professor Teresa Kuszell, Head of the Laboratory of Palaeobotany at the same University. Two anonymous reviewers are thanked for their comments. The trip of ATH & JK to Wrocław was financed through the grant 2011/03/B/NZ8/02206 of the (Polish) National Science Centre. The study was also supported by the Ministry of Culture of the Czech Republic (DKRVO 2013/05, 00023272).

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