GOLDIUS ANGUSTICALIX SP. NOV. (TRILOBITA, SCUTELLUIDAE) FROM THE COUVIN FORMATION (MIDDLE DEVONIAN) IN BELGIUM, WITH A PRELIMINARY LIST OF SCUTELLUID SPECIES FROM THE ARDENNES

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(3 figures, 1 plate)

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ABSTRACT Scutelluids are rare trilobites in the Devonian of the Ardennes (Belgium, France). Goldius angusticalyx sp. nov. and Scabriscutellum sp. A are recorded from the Couvin Formation (lower Eifelian) in Nismes, Belgium. An overview is given of its regional distribution in the Eifelian of Goldius de Koninck (= Brontes Goldfuss; Bronteus Goldfuss; Goldfussia Bronn; Calycoscutellum Archinal), Scabriscutellum Richter & Richter, Septimopeltis Přibyl & Vaněk and Scutellum Pusch. Additionally, analogies between the early Eifelian trilobite faunas of Nismes and Üxheim (Germany) are briefly discussed.

KEYWORDS: Trilobita, Scutelluidae, Devonian, Ardennes, Eifel, biostratigraphy.

RESUME. Goldius angusticalyx sp. nov. (Trilobita, Scutelluidae) de la Formation de Couvin (Dévonien moyen) en Belgique, avec une liste préliminaire d’espèces scutelluidées de l’Ardenne. Les trilobites scutelluidés sont rares dans le Dévonien de l’Ardenne (Belgique, France). Goldius angusticalyx sp. nov. et Scabriscutellum sp. A sont décrits dans la Formation de Couvin (Eifélien inférieur) de Nismes. Un aperçu est présenté de la répartition régionale dans l’Eifélien de Goldius de Koninck (= Brontes Goldfuss; Bronteus Goldfuss; Goldfussia Bronn; Calycoscutellum Archinal), Scabriscutellum Richter & Richter, Septimopeltis Přibyl & Vaněk et Scutellum Pusch. En outre, les analogies entre les faunes trilobites contemporaines de Nismes et Üxheim (Allemagne) sont brièvement discutées.

MOTS-CLÉS: Trilobita, Scutelluidae, Dévonien, Ardenne, Eifel, biostratigraphie.

1. Introduction

In the summer of 2006, a fairly rich trilobite fauna (both in species and individuals) was recovered by the authors from early Eifelian limestones in a small quarry near the village of Nismes, Belgium. Among the collected material are two scutelluid species which are assigned to Goldius and Scabriscutellum. The occurrence of Goldius in Middle Devonian strata has long been known (see, e.g., Maillieux, 1907) but records usually went by the name of its type species, Brontes flabellifer Goldfuss, 1839, regardless of their age and morphology. The present note aims to bring up to date some of the obsolete nomenclature of scutelluids from Belgium and is part of a necessary review of the Devonian trilobites in the Ardennes (see Magrean & van Viersen, 2005).

2. Overview of Scutelluidae in the Ardennes

The stratigraphically oldest and sole Early Devonian representatives of Scutelluidae (gen. et sp. indet.) known in the Ardennes come from the Longlier Formation (Pragian to possibly lowermost Emsian) in southeast Belgium, where they occur along with other trilobites of “Bohemian” type (van Viersen & Prescher, 2009). The earliest Middle Devonian members are found along the southern border of the Dinant Synclinorium, more particularly in the early Eifelian parts of the Jemelle and Couvin formations. During the Eifelian, Scutellum seems to be considerably rarer than Scabriscutellum and Goldius while only this last genus persists here at least until the Givetian boundary. Scutelluidae is not known with certainty from middle to upper Givetian strata but reappears in Frasnian bioherms where it is represented by at least two species (see, e.g., Richter & Richter, 1926; Maillieux, 1927; Basse in Basse & Müller, 2004; Basse et al., 2007; van Viersen & Prescher, 2007) which require further investigation.

Updated stratigraphic ranges of Scutelluidae in the Eifelian in the Ardennes (Fig. 1) are available for the first time since the works by Maillieux (see, e.g., Maillieux, 1938) based on examination of museum collections, literature research (only where illustrations or type numbers were provided) and new field data. The following list of taxa is intended as a preliminary basis which allows for stepwise refinement as additional data will be published in the future: Goldius angusticalyx sp. nov. from the Couvin Formation (lower Eifelian) in Nismes; Scutellum
Figure 1. Stratigraphic distributions of scutelluids in the Eifelian of the Ardennes and indication of the Uxheim biota (formations were based on Bulynck & Coen-Aubert, 2000).

Figure 2. Map of the Ardennes indicating some of the trilobite-bearing localities.

### Table 1

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<th>Formations on the southern border of the Dinant Synclinorium (Bulynck &amp; Coen-Aubert, 2000)</th>
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<td>Septimopeltis magnispina</td>
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### 3. Geological context

The described trilobite specimens were recovered from locality “Loc028”, a small quarry on the western outskirts of Nismes (N50°03.720', E4°32.600', according to van Viersen, 2006b), southern border of the Dinant Synclinorium, Belgium (Fig. 2). The outcropping rocks belong to the Fourlier Member of the Couvin Formation (partitus to costatus conodont zones), a biostromal unit...
that is confined to the area between Couvin and Givet (Bultynck & Dejonghe, 2001). The macrofauna is chiefly comprised of tabulate and solitary rugose corals, stromatoporoids, bryozoans, brachiopods, gastropods and trilobites.

The trilobite fauna in Nismes is characterised by frequent Proctinnae (Dohmiella dewildei van Viersen, 2006b) and Otarioninae (Cyphaspis unguloides belgica van Viersen & Prescher, 2007) as well as rare Tropidocoryphinae (Astycoryphe sp., Tropidocoryphe sp.), Trochurinae (Ceratarges cf. cognatas van Viersen, 2006a) and Phacopinae (Phacops? sp.). Scutelluinaceae is represented by the moderately common Goldius angusticalix sp. nov. and the rare Scabriscutellum sp. A (see below). G. angusticalix sp. nov. is of particular interest because it is one of the stratigraphically oldest species of Goldius known and the type material among the best preserved available from lower Eifelian strata in the Ardenno-Rhenish Mountains.

Most of the trilobite material from Nismes encompasses loose sclerites that usually belong to Cyphaspis and Dohmiella and which are occasionally amassed. Complete but always slightly disarticulated exoskeletons have been recorded of Dohmiella (van Viersen, 2006b), Tropidocoryphe (priv. coll. of W. De Winter, Gent) and Goldius (priv. coll. of L. Blontrock, Boezinge). A disarticulated specimen of Goldius angusticalix sp. nov. is recorded in the present note (Pl. 1, Figs F, H, I). Its cephalon is inverted and the entire right half of the exoskeleton as well as the left edges of the pygidium are broken off. This damage and the apparently incompletely disintegrated state of the thoracic ligaments at the time of final burial suggest that the individual was transported over a small distance subsequent to its decease. A monospecific accumulation of a pygidium, an inverted pygidium, a cephalon and several nearby thoracic fragments, is also recorded (Pl. 1, Figs A-C).

The presence of Goldius sclerites under corals and stromatoporoids is occasionally observed in Nismes and other Middle Devonian localities in Belgium. Such cases have been associated in the literature with the life habitats of these trilobites. Pedder & Feist (1998) suggested that the occurrences of especially scutellulid remains under the fringes of flat tabulate or rugose corals in the Emstan of the Montagne Noire indicate that these individuals sought shelter here during ecdysis. Parts of Hypsiariops? sp. of van Viersen (2007), which are locally abundant under stromatoporoids in the Hanonet Formation at Resteigne and which occasionally occur here in the Salterian mode of exuviation (sensu Richter, 1937), attest to an equivalent in phacopid trilobites.

4. Comparison to the Eifel

The trilobite fauna of the Couvin Formation in Nismes bears a striking resemblance to an early Eifelian assemblage from the Kirberg Member of the Nohn Formation inUXheim, Eifel, that was discussed by van Viersen & Prescher (2007). TheUXheim biota (Fig. 1) comprises Dohmiella prescheri van Viersen, 2006b, Cyphaspis unguloides unguloides (Erben, 1953), Tropidocoryphe sp., Ceratarges sp., Phacops imitator Stuyo, 1970, Goldius sagitta (Archinal, 1994), and Scabriscutellum sp. Contrary to the situation in Nismes, phacopines (P. imitator) are common and a second prootne occurs which belongs to Gerastos, whereas Astycoryphe is hitherto absent. The similarities between these faunas underline the potential value of trilobites for Devonian biostratigraphic correlations between the Ardenne and Eifel as was already suggested by Richter (1914, p. 89) and van Viersen et al. (2009, p. 47) for other, middle Eifelian localities. The trilobites from Nismes andUXheim may be patapric species that lived along the same coastal line on the northern margin of the Rhenic Ocean.

5. Systematic palaeontology

The specimens were whitened with magnesium chloride prior to photography and are deposited in the Natuurhistorisch Museum Maastricht (abbreviated NHMM).

Family Scutelluidae Richter & Richter, 1955
Subfamily Scutelluinaceae Richter & Richter, 1955
Genus Goldius de Koninck, 1841

Synonymies. Brontes Goldfuss, 1839, preoccupied according to de Koninck (1841); Bronteus Goldfuss, 1843, junior subjective synonym of Scutellum according to Richter & Richter (1926) and junior objective synonym of Goldius; Goldfussia Bronn, 1848, junior objective synonym of Goldius; Calycoscutellum Archinal, 1994, junior objective synonym of Goldius according to Basse (2007).

Type species. Brontes flabellifer Goldfuss, 1839, from the Middle Devonian of Germany.

Discussion. In 1839 Goldfuss erected Brontes, a fateful naming which in due course gave rise to much confusion in the literature. De Koninck (1841, pp. 5, 6) (this paper has been confused with de Koninck’s 1841-1844 opus on the Carboniferous fossils of Belgium) noticed that Brontes was preoccupied and rightly replaced it with Goldius even though he also assigned Suctellum costatum Pusch, 1833, the type species of Suctellum Pusch, 1833, to it. Dumont & Cantraine in Dumont (1841) briefly commented on de Koninck’s work and made the inadmissible suggestion that the replacement of Brontes is unwarranted because the name had already been adopted by the scientific community and since the original use concerns an insect. Goldfuss (1843, p. 548) subsequently attempted to suppress Goldius by introducing Bronteus but Richter & Richter (1926, p. 116) condemned this action while considering Goldius a junior subjective synonym of Suctellum. Despite this, the use of Bronteus and Goldius in the literature continued in the following decades. According to Jell & Adrain (2003, p. 379), another replacement name Goldfussia was proposed by Bronn.
Goldius angusticalix sp. nov.  
(Pl. 1, Figs A-I)  

\[ \text{Etymology.} \]  
From _angustus_ (Lat.) = narrow, and _calix_ (Lat.) = a chalice, referring to the combined morphology of the pygidial axis and median rib.

**Holotype.** NHMM 2009061a+b, positive and negative moulds of a pygidium (Pl. 1, Fig. A).

**Paratypes.** NHMM 2009062a+b, positive and negative moulds of a partially exfoliated cephalon (Pl. 1, Fig. B); NHMM 2009063a+b, positive and negative moulds of a pygidium (Pl. 1, Fig. C); both situated on the same rock slab as the holotype. NHMM 2009065, librigena (Pl. 1, Fig. G). NHMM 2009064a-d, disarticulated, incomplete specimen (Pl. 1, Figs F, H, I). NHMM 2009066, mostly exfoliated cranidium with librigenal remains (Pl. 1, Figs D, E); NHMM 2009067, negative print of fragmentary pygidium (unfigured); both on the same rock slab. NHMM 2009068, fragmentary pygidium (unfigured). All from type locality and horizon.

**Diagnosis.** Lateral glabellar furrows S3 are firmly impressed. Anterolateral pygidial border is wholly smoothly rounded. Pygidial median rib is broad (tr.) distally, exceedingly narrow proximally, and rudimentary close to the axis. Pygidial pleural ribs are dorsally flattened.

**Type locality and horizon.** Foulerie Member of the Couvin Formation, locality “Loc028”, Nismes, Belgium.

**Discussion.** As has been suggested by van Viersen (2007) and implicitly also by other authors (e.g. Archinal, 1994), species of this genus are often similar enough for descriptions to be restricted to diagnostic features only. Therefore, _Goldius angusticalix_ sp. nov. is only diagnosed and contrasted with other species.

_Goldius sagitta_, to which the new species was previously tentatively assigned, was established upon a type series of specimens of early to middle Eifelian age (Lahn, Nohn and Ahndorf formations) from several localities in the Eifel. The holotype incomplete pygidium from the Nohn Formation at Üxheim was figured by Archinal (1994, Pl. 5, Fig. 29) and accidentally switched by Basse in Basse & Müller (2004) with a paratype in their illustrations (ibid., Pl. 1, Fig. 1, vs. Pl. 1, Fig. 2) (pers. comm. with M. Basse). Feist & Talent (2000, p. 68) already noticed that there is much variation among the paratype pygidia of _G. sagitta_. Judging from Archinal’s illustrations of the paratypes we believe that their assignment to _G. sagitta_ may in fact be precarious. The holotype of _G. sagitta_ shares several features with _G. angusticalis_ sp. nov. such as the indistinct lobation of the pygidal axis and the straightened, proximally broad pleural ribs, yet is distinct in having more vaulted (tr.) pygidal pleural ribs, a median rib that narrows abruptly and closer to the axis, and a markedly curved anterolateral pygidial border (the anterolateral corner is situated lateral to the center (sag.) of the axis as against indeterminately posterior to the axis in _G. angusticalis_ sp. nov.).

The type species of _Goldius_ shows some resemblances to _G. angusticalis_ sp. nov. but is principally different in having a pygidium with wider interpleural furrows, a median rib that disappears well before reaching the axis, and a more angular anterolateral border.

The distally widened pygidal pleural ribs of _G. angusticalis_ sp. nov. are a common feature among late Eifelian to Givetian scutellines including species from the Rhenish Mountains assigned to _Calycoscutellum_ with question by Basse in Basse & Müller (2004) and taxa from England assigned to _Scutellum_ by Selwood (1966).
Conversely, the pygidial median rib of these taxa is usually broad proximally.

Genus Scabriscutellum Richter & Richter, 1956

Type species. Bronteus scaber Goldfuss, 1843, from the Middle Devonian of Germany.

Scabriscutellum sp. A
(Fig. 3)

Material. NHMM 2009082, partially exfoliated fragment of a pygidium from the Foulerie Member of the Couvin Formation, locality “Loc028”, Nismes, Belgium.

Discussion. One fragmentary pygidium of Scabriscutellum was recovered from Nismes, which does not permit a detailed comparison with congeners from the Ardennes and Eifel.

6. Acknowledgements

J. Lippe (Natuurmuseum Nijmegen) allowed AVV to examine trilobite specimens in the van Tuijn collection. L. Blontrock (Boezinge) and W. De Winter (Gent) provided photographs of trilobites in their collections. M. Basse (Bochum) helped to clarify some obsolete nomenclature. Comments on the manuscript by M. Basse and an anonymous referee are greatly appreciated.

7. References


Figure 3. Pygidium of Scabriscutellum sp. A (NHMM 2009082) from the Foulerie Member of the Couvin Formation (lower Eifelian) in Nismes. Scale bar represents 5 mm.


DEJONGHE, L. (eds), Guide to a revised lithostratigraphic scale of Belgium.


PLATE 1

Goldius angusticalis sp. nov. from the Foulerie Member of the Couvin Formation (lower Eifelian) in Nismes.

A. holotype pygidium, NHMM 2009061a.
B. paratype partially exfoliated cephalon, NHMM 2009062a.
C. paratype pygidium, NHMM 2009063a.
D, E. paratype mostly exfoliated cranidium with librigenal remains, NHMM 2009066, in dorsal (D) and oblique anterior (E) views.
F. thorax and pygidium of paratype disarticulated incomplete specimen, NHMM 2009064a, in dorsal view.
G. paratype librigena, NHMM 2009065, in dorsal view.
H, I. left part of cephalon and negative print of thorax of paratype distarticulated incomplete specimen, NHMM 2009064b, in oblique lateral (H) and dorsal (I) views.

Scale bars represent 5 mm. Symbols are α = anteriormost point of preocular suture; gc = genal corner.
Goldius angusticalix sp. nov. from the Couvin Formation (Middle Devonian)