

A NEW SPECIES OF THE DIPLOPOD *AMYNILYSPES* (ONISCOMORPHA) FROM THE STEPHANIAN LAGERSTÄTTE OF MONTCEAU-LES-MINES, FRANCE

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INTRODUCTION

SPINOUS ONISCOMORPH millipedes are rare faunal components of the upper Palaeozoic (Shear, 1997). *Amynilyspes* (type species *A. wortheni* Scudder, 1882; OD) is an Upper Carboniferous spinous oniscomorph (pill millipede) which was first described from the Middle Pennsylvanian (Westphalian D equivalent) Fossil-Lagerstätte of Mazon Creek. Later Fritsch (1899) described two species (*A. typicus* and *A. crescens*) from the Westphalian D Gaskohle of Nýřany in Bohemia. More recently *A. typicus* was recorded from the Stephanian B of the Saarland (Förster, 1973), then from the Stephanian B of the Blanzey-Montceau-les-Mines Basin (Langiaux and Sotty, 1977; Poplin, 1994). Although myriapods were already known to occur in the Montceau-les-Mines Lagerstätte (Langiaux and Sotty, 1976; Rolfe et al., 1982; Poplin and Heyler, 1994) the presence of *Amynilyspes* at Montceau-les-Mines was first published in a regional publication (“La Physiophile” Langiaux and Sotty, 1976, 1977), and it has passed almost unnoticed.

Representatives of the genus *Amynilyspes* are a minor faunal component of Upper Carboniferous faunal assemblages. Hannibal and Feldmann (1981) published a revision of the oniscomorph millipedes from the Carboniferous of North America, including the type specimen of *Amynilyspes wortheni* Scudder, 1882 and newly collected specimens. Specimens of the genus *Amynilyspes* subsequently have been illustrated and discussed in various works (Hannibal, 1984, 1997; Shear, 1997). At Mazon Creek Hannibal and Feldmann (1981) listed 10 specimens of *A. wortheni*, plus an undetermined number of specimens in private collections. The percentages of the whole millipede fauna (excluding arthropleurids) are 0.1 percent in the Braidwood (nonmarine, freshwater) biofacies and 0.014 percent in the Essex (marine) environment (Baird and Anderson, 1997). A survey of fossil millipedes in the collections of the Field Museum of Natural History by one of us (JTH) in 1997 showed that oniscomorphs (mainly *Amynilyspes*) comprise about 11 percent (24 specimens) of the collection of fossil millipedes, excluding arthropleurids, from Mazon Creek. A single specimen of *A. typicus* was reported from the Saarland (Germany) by Förster (1973). At Montceau-les-Mines only five specimens of *Amynilyspes* have been found up to now out of 23,250 sideritic concretions that have yielded animal remains (coprolites excluded). The percentage of the entire millipede faunal component varies between 0.24 percent in the Saint-Louis opencast pit, and 2.33 percent in the Sainte-Hélène opencast pit (Sotty in Chabard and Poplin, 1999). Unfortunately one of the two specimens from the Sainte-Hélène and Blanzey opencast pits briefly described and illustrated by Langiaux and Sotty (1977) has been lost. The five specimens of *Amynilyspes* presently known from Montceau-les-Mines (as of 04.27.1999, Sotty, personal commun.) represent 3.5 percent of the millipede fauna, excluding arthropleurids.

The geological background and palaeoenvironmental setting of the Montceau-les-Mines Fossil Lagerstätte have been recently discussed (Racheboeuf et al., 2002); it was that of an intramontane basin in which the sideritic fossiliferous concretions appear to

have formed in a lacustrine/deltaic complex (streams flowing into lakes). The Stephanian deposits crop out on both sides of the Blanzey-Le Creusot-Bert Stephanian to Permian graben in the northeast part of the Massif Central (central France). Concretion-bearing layers, which yielded the majority of the fossil material available to date, are intercalated between the coal seams of the Blanzey-Montceau Basin which have been extensively exploited since the nineteenth century; they were well exposed in the Saint-Louis, Saint-François and Sainte-Hélène opencast pits. The Saint-Louis and Sainte-Hélène opencast pits yielded respectively three specimens and one specimen of *Amynilyspes*. The precise age of the concretion-bearing layers within the Stephanian remains uncertain, but a Stephanian B–C age is provisionally retained (Racheboeuf et al., 2002).

At Mazon Creek, Hannibal and Feldmann (1981, p. 732) considered that “oniscomorphs were terrestrial organisms, and their occurrence in the more marine faunal associations [Essex] can be ascribed to fluvial transportation.” Such a conclusion fits with the preliminary conclusions drawn from the assemblage and preservation of the Montceau-les-Mines fauna (Racheboeuf et al., 2002): oniscomorphs were terrestrial organisms.

The occurrence of representatives of the genus *Amynilyspes* in the Montceau-les-Mines fauna supports the tropical distribution of pill millipedes during the Upper Carboniferous (Hannibal and Feldmann, 1981; Hannibal, 1984). In North America, *A. wortheni* occurs in the Westphalian D equivalent Mazon Creek fauna of Illinois. In Europe, *A. typicus* and *A. crescens* occur in the Westphalian D Gaskohle of Nýřany in Bohemia, Czech Republic (Fritsch, 1899). *Amynilyspes typicus* also occurs in the Stephanian B of the Saarland, Germany (Förster, 1973). We have also been able to confirm the occurrence of *Amynilyspes* in the Westphalian B of the West Midlands, England (Table 1). The species has also been noted as occurring in the Westphalian D of Ohio (Hook and Baird, 1993) and, questionably, in the Carboniferous of Nova Scotia (Scudder, 1895). We have not confirmed the identity of the Ohio or Nova Scotia material. According to the Late Carboniferous (Westphalian) reconstruction by Scotese and McKerron (1990, fig. 19, p. 15), all these occurrences—including Montceau-les-Mines—were tropical, within about 10 degrees north and south of the equator (Fig. 1). The distribution of fossil oniscomorphs is not surprising as modern diplopods are common in tropical environments characterized by high rainfall (Coleman and Crossley, 1996, p. 88).

SYSTEMATIC PALEONTOLOGY

Class DIPLOPODA Blainville in Gervais, 1844
Superorder ONISCOMORPHA Pocock, 1887

Diagnosis.—Small to large-sized millipedes with 11 to 14 terga. Collum small; second tergum (shield) laterally expanded; pygidium rounded. Pleura free.

Discussion.—This superorder encompasses short millipedes, all of which have the ability to roll into a ball. Three orders are included in this superorder: Glomerida, Sphaerotheriida, and