

NEW AGNOSTINA (TRILOBITA) FROM THE LLANVIRN (ORDOVICIAN) OF SPAIN

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ABSTRACT

The agnostids from the Lower Llanvirn shales of the Southern Central-Iberian Zone (Mounts of Toledo, Villuercas and Almadén district) are described. Seven localities are new for Ordovician agnostids and two are revised. Three new species, belonging to the genera *Geragnostella* and *Geragnostus*, are described: *Geragnostella gilcidae* n. sp., *Geragnostus hispanicus* n. sp. and *Geragnostus ninhursagae* n. sp. The new names *Geragnostus pilleti* nom. nov. and *Geragnostus abdullaevi* nom. nov. are proposed to rename, respectively, the species *G. howelli* PILLET, 1978 and *G. elongatus* ABDULLAEV, 1972, regarded herein as junior objective homonyms of other previously defined species.

KEY WORDS: Trilobita, Agnostina, Metagnostidae, systematics, new species, Ordovician, Lower Llanvirn, Central-Iberian Zone, Spain.

RESUMEN

Se estudian los trilobites agnóstidos procedentes de nueve localidades, siete de ellas nuevas para estas faunas, situadas en las pizarras del Llanvirn inferior de la parte meridional de la Zona Centroibérica (Montes de Toledo, Villuercas y región de Almadén). Se determina la presencia de los géneros *Geragnostella* y *Geragnostus*, y se describen tres nuevas especies: *Geragnostella gilcidae* n. sp., *Geragnostus hispanicus* n. sp. y *Geragnostus ninhursagae* n. sp. Se proponen también los nuevos nombres *Geragnostus pilleti* nom. nov. y *Geragnostus abdullaevi* nom. nov. para designar, respectivamente, las especies *G. howelli* PILLET, 1978, y *G. elongatus* ABDULLAEV, 1972, consideradas ambas homónimos objetivos primarios de otras especies definidas con anterioridad.

PALABRAS CLAVE: Trilobita, Agnostina, Metagnostidae, sistemática, nuevas especies, Ordovícico, Llanvirn inferior, Zona Centroibérica, España.

Introduction

Agnostids constitute a minority component of the Spanish Ordovician trilobite associations, occurring at the moment only in the Lower Ordovician shales. Representatives of this order have been reported from rocks of Tremadoc epoch in the NE. of Spain (Aragonian branch of the Iberian Cordillera) (Josopait, 1970, 1972; Schmitz, 1971; Wolf, 1980; Hammann *et al.*, 1982) and of Llanvirn age in the Central-Iberian Zone of the Hesperian Massif (Gil Cid, 1972, 1976; Julivert & Truyols, 1974). None of the aforementioned authors provided neither agnostids descriptions nor figures, except for a pygidium of *Geragnostus* sp. figured by Gil Cid (1972: pl. 1, fig. 5).

The agnostids described herein were collected in siltstones belonging to the basal part of the "Shales with *Neseure-*

tus" unit (*sensu* Hammann *et al.*, 1982: profile 28). These levels have been dated as Lower Llanvirn by means of graptolites, trilobites and brachiopods (Gutiérrez Marco *et al.*, *in litt.*). *Geragnostus* sp. and *Trinodus* sp. were reported from the same stratigraphical position; the former from the Navas de Estena syncline (Gil Cid, 1972, 1976) and the latter from the Guadarranque syncline (Julivert & Truyols, 1974). Here both localities are revised, together with seven new localities in which Ordovician agnostids are reported for the first time.

Fossil localities

The outcrops are located in the southern part of the Central-Iberian Zone, within several remarkable hercynian struc-

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tures as are the Navas de Estena syncline (localities NE III, NE Va, SP II, SP IV, SP IVa), Algodor-Milagro syncline (locality VPA), Guadarranque syncline (localities PSV Ia, Na II) and Almadén synclinorium (locality CHI I), the first two belonging to the Mounts of Toledo, the third to the Villuercas region and the last one to the Almadén district (cf. fig. 1). The precise location of these outcrops is the following:

- NE III: 5.600 m. in N 138° SE direction, measured from the centre of Navas de Estena (Ciudad Real).
- NE Va: 820 m. in N 354° NNE direction, measured from the centre of Navas de Estena (Ciudad Real).

Systematic descriptions

Terminology largely follows Harrington, Moore and Stubblefield (*in* Treatise on Invertebrate Paleontology, 1959), and for specific morphological features of agnostids we have employed the terms summarized in Pek (1977) and Robison (1982). Classification above the generic level follows Fortey (1980).

The symbols designating the dimensions of the specimens are as follows: *Lp*, length of the pygidium (sag.); *Lr*, length of the pygidial rachis from the articulating furrow to the

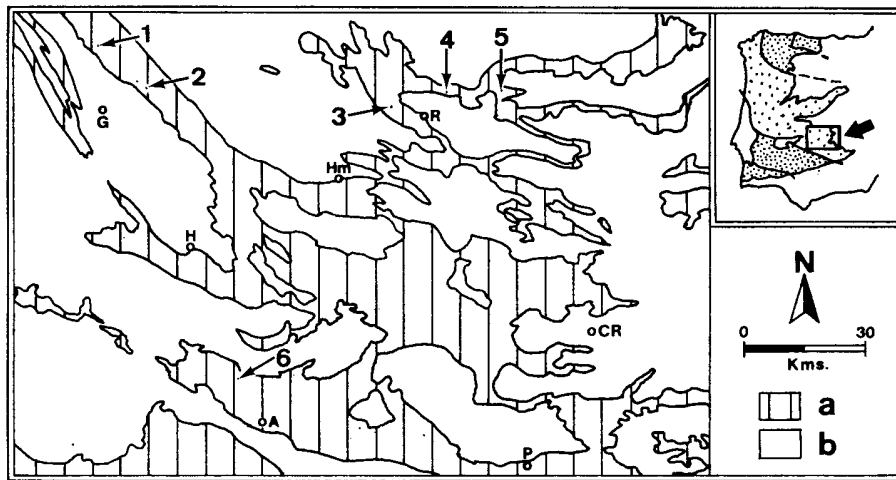


Fig. 1.—Geographical location of the fossil localities in the southern part of the Central-Iberian Zone. a, Ordovician-Devonian rocks (main Hercynian structures); b, other sediments (Precambrian-Cambrian; Tertiary-Quaternary). The localities of Lower Llanvirn age surveyed are numbered from 1 to 6: 1, Navatrasiera (Na II); 2, Puerto de San Vicente (PSV Ia); 3, Navas de Estena (NE III, NE Va); 4, San Pablo de los Montes (SP II, SP IV, SP IVa); 5, Ventas con Peña Aguilera (VPA); 6, Chillón (CHI I). A, Almadén; CR, Ciudad Real; G, Guadalupe; H, Herrera del Duque; Hm, Horcajo de los Montes; R, Retuerta de Bullaque; P, Puertollano.

- SP II: San Pablo de los Montes (Toledo), locality indicated by San José Lancha (1969) and Gil Cid (1976).
- SP IV: Small outcrop of shales at 3.800 m. in the SSW. of the geographical center of San Pablo de los Montes (Toledo).
- SP IVa: 3.375 m. in N 176° E direction, measured from the Cerillón vertex (1.374 m.), SE. of San Pablo de los Montes, on the left bank of the Avellanar stream.
- VPA: Ventas con Peña Aguilera (Toledo), Acebrón stream, 1925 m. east of Km. 66.500 of the C-403 Road (Torrijos-Piedrabuena).
- PSV Ia: On the Puerto de San Vicente-Alía Road, 540 m. to the W. of Km. 151 (formerly Km. 101) (= locality Na VII of Hammann, 1974).
- Na II: On the Guadarranque-Navatrasiera Road (around Km. 28), 300 m. north and under the serpentine, just above the Armorican Quartzite (Hammann, 1974).
- CHI I: 8.910 m. from Chillón (Ciudad Real), in the N 165° E direction.

posterior margin (sag.); *Wp*, width of the pygidium at the anterior margin (tr.).

The material is deposited in the Department of Palaeontology of the Complutense University (Madrid), within the I. Rábano collection.

Family METAGNOSTIDAE JAEKEL, 1909

(= Arthrorhachidae RAYMOND, 1913; Trionodidae HOWELL, 1935; Geragnostidae HOWELL, 1935)

Subfamily METAGNOSTINAE JAEKEL, 1909

Genus *Geragnostella* KOBAYASHI, 1939

Type species: Agnostus Tullbergi NOVÁK, 1833, from the Šárka Formation (Llanvirn), Bohemia (Czechoslovakia).

Geragnostella gilcidae n. sp.

(Pl. 1, figs. 2, 6, 8, 9)

v. 1972 *Geragnostus* sp. - Gil Cid, pl. 1, fig. 5

Derivation of name: After Dr. Dolores Gil Cid, who was the first to come across the Spanish Ordovician agnostids.

Holotype: Pygidium (NE III 1061-internal mould), figured on pl. 1, fig. 8.

Type locality and horizon: Navas de Estena (Ciudad Real), locality NE III; dark siltstones and mudstones in the basal part of the «Estena shales»; Lower Llanvirn.

Material: 7 cephalae (VPA 1064, NE III 1062-1063, NE Va 1080, cf. *gilcidae*-, SP IV 1058, PSV Ia 1065 - cf. *gilcidae*-, Na II 1081 - cf. *gilcidae*-) and 3 pygidia (SP II 1079), SP IVa 1059, Na II 1082 - cf. *gilcidae*-).

Diagnosis: Cephalon semi-elliptical in outline, subequal in length (sag.) and posterior width (tr.). Glabella non segmented, tapering forward; median node behind midpoint of glabella. Basal lobes small, subtrigonal. Acrolobe widening posteriorly. Marginal rim relatively broad. Pygidium semi-elliptical; pygidial rachis occupying (sag.) 3/4 of total length. Median node ending at furrow separating second ring from terminal piece. Secondary median node located at the end of terminal piece.

Dimensions of the holotype (in mm.): Lp, 4.80; Lr, 3.95; Wp, 5.30.

Remarks: Among the material of *Geragnostella gilcidae* n. sp. there is a young holaspid pygidium (sagittal length: 1.2 mm.) which differs from mature pygidia by a non segmented rachis, with well defined dorsal furrows limiting sharply the terminal piece, and a broader posterolateral rim.

Geragnostella gilcidae resembles the type species *G. tullbergi* (NOVÁK), but differs from it by its narrower cephalic and pygidial rim (cf. Pek, 1977: pl. 2, fig. 2) and the narrower (sag.) postrachial area.

Occurrence: Lower Llanvirn, «Shales with *Nesuretus*», Mounts of Toledo and Villuercas region, Central Spain.

Genus *Geragnostus* HOWELL, 1935

Type species: *Agnostus Sidenbladhi* LINNARSSON, 1869, from the Ceratopyge Limestone (Zone 4) of Mossebo at Hunneberg in Västergötland (Sweden).

Remarks: Capera *et al.* (1978, p. 86) suggested that the French species *Geragnostus mediterraneus* HOWELL, 1935 was conspecific with *G. splendens* (HOLUB, 1912), from the Klabava Formation (Arenig) of Bohemia. After a detailed study of both species, we conclude that there are some differences between them to justify the recognition of two separate species.

On the other hand, we point out that *Geragnostus howelli* PILLET (*in* Capera *et al.*, 1978) is a junior objective homonym of Troedsson's (1937) *G. howelli*. Therefore, we propose here a new name for the later described French species, *Geragnostus pilleti* nom. nov., from the Arenig of the Montagne Noire (S. of France). The same is true of *Geragnostus elongatus* ABDULLAEV, 1972, which is also a junior objective homonym of *G. elongatus* CHIEN, 1961, from the Lower Ordovician of China and regarded by Fortey (1980) as belonging to *Micragnostus* HOWELL, 1935. *G. abdullaevi* nom. nov. is proposed to rename the species from the Ordovician of Uzbekistan (USSR).

Geragnostus hispanicus n. sp.

(Pl. 1, figs. 1, 5, 7)

? 1980 *Geragnostus* sp. - Henry, Pl. 1, fig. 2.

Derivation of name: After Hispania, the Roman name of Spain.

Holotype: Pygidium (CHI I 1068 - internal mould), figured on pl. 1, fig. 7.

Type locality and horizon: Chillón (Ciudad Real), locality CHI I; shales with fossiliferous nodules in the lower part of the «Alisedas shales»; Lower Llanvirn.

Material: 2 pygidia (CHI I 1066, CHI I 1069).

Diagnosis: Pygidium almost quadrangular, with entire border. Rachis trilobated, occupying sagittally 2/3 of total length. Median node bipartite, extending to posterior part of second ring; low on the first ring and raised on the second. Dorsal furrows well defined posterolaterally. Terminal piece oval, with a small secondary median node at the sagittal tip. Marginal rim broad, well defined by a deep border furrow.

Dimensions of the holotype (in mm.): Lp, 3.60; Lr, 2.60; Wp, 3.90.

Discussion: *Geragnostus hispanicus* n. sp. is very similar to the species *G. occitanus* HOWELL, 1935, from the Lower Arenig of the Montagne Noire, but

differs from it by the outline of the lateral segments of the first ring, more oval (sag.) in *G. hispanicus*, and by the better definition of the lateral furrows of the pygidial rachis. *G. mediterraneus* HOWELL, 1935, from the Lower Arenig of the Montagne Noire, has a shorter (sag.) terminal piece and a less defined border furrow. *G. semipolitus* DEAN, 1973, from the Upper Arenig of Turkey, shows a different outline of the median node, a longer (sag.) pygidial rachis, as well as a weaker border furrow. *G. atavus* MERGL, 1984, reported in the Bohemian Upper Tremadoc, possesses lateral pygidial spines, whereas *G. hispanicus* shows an entire border. Lastly, the herein described new species, *G. ninhursagae* n. sp., also of Lower Llanvirn age, differs mainly by the semi-elliptical outline of the pygidium and the entire median node.

Occurrence: Lower Llanvirn, «Shales with *Neseuretus*», Almadén district, Central-southwestern Spain.

Geragnostus ninhursagae n. sp.

(Pl. 1, fig. 4)

Derivation of name: After the goddess Ninhursag, mother of the ancient Sumerian gods.

Holotype: Pygidium (NE III 1077 - internal mould), figured on pl. 1, fig. 4.

Type locality and horizon: Navas de Estena (Ciudad Real), locality NE III; dark siltstones and mudstones in the basal part of the «Estena shales»; Lower Llanvirn.

Diagnosis: Pygidium semi-elliptical in outline, lacking lateral spines. Marginal rim broad; border furrow deep. Acrolobe shows constant width (tr. and sag.). Rachis occupying nearly 1/3 of pygidial length (sag.); rachial rings slightly oblique posterolaterally and with an entire median node; terminal piece ovoid to semicircular, with a tiny secondary median node at its sagittal typ.

Dimensions of the holotype (in mm.): Lp, 3.40; Lr, 2.20; Wp, 3.15.

Discussion: *Geragnostus ninhursagae* n. sp. resembles *G. mediterraneus* HOWELL, from which it differs by possessing less oblique rachial rings, a less vaulted and different shaped terminal piece and a broader marginal rim. The differences with *G. hispanicus* n. sp. have already been quoted above.

Occurrence: Lower Llanvirn, «Shales with *Neseuretus*», Mounts of Toledo, Central Spain.

Geragnostus? sp., cf. *G. occitanus* HOWELL, 1935
(Pl. 1, fig. 3)

Remarks: The material consists of the counterpart of a fragmentary pygidium (CHI I 1067), which is likened to the species reported in the Lower Arenig of the Montagne Noire, *G. occitanus* HOWELL, but due to the scarcity of material, a more detailed comparison with this species has not been possible.

Occurrence: Lower Llanvirn, «Shales with *Neseuretus*», Almadén district, Central-southwestern Spain.

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PLATE 1

Figs. 1, 5, 7: *Geragnostus hispanicus* n. sp.

Fig. 1: Pygidium CHI I 1066, internal mould ($\times 10$).

Fig. 5: Pygidium CHI I 1069, latex cast of external mould ($\times 10$).

Fig. 7: Holotype, pygidium CHI I 1068, internal mould ($\times 10$).

Fig. 3: *Geragnostus?* sp., cf. *G. occitanus* HOWELL, 1935

Pygidium CHI I 1067, internal mould ($\times 10$).

Fig. 4: *Geragnostus ninhursagae* n. sp.

Holotype, pygidium NE III 1077, internal mould, together with some valves of the ostracod *Gracquina hispanica* (BORN, 1918) ($\times 10$).

Figs. 2, 6, 8, 9: *Geragnostella gilcidae* n. sp.

Fig. 2: Pygidium SP IVa 1059, internal mould ($\times 6$).

Fig. 6: Cephalon NE III 1063, internal mould ($\times 10$).

Fig. 8: Holotype, pygidium NE III 1061, internal mould ($\times 10$).

Fig. 9: Pygidium SPII 1079, internal mould ($\times 10$), figured by GIL CRD, 1972: pl. 1, fig. 5.

Photographs by I. Pek. Whitened with ammonium chloride.
Photographs have not been retouched.

