
The oldest lagonomegopid spider, a new species in Lower Cretaceous amber from Álava, Spain

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ABSTRACT

The new species *Burlagonomegops alavensis* (Araneae: Lagonomegopidae) is described from Lower Cretaceous (Aptian) amber from Álava (Basque Country), Spain. This is the first fossil spider to be described from this deposit and extends the known geological range of this family by approximately 15–20 Ma, from the previously oldest described lagonomegopid in Burmese amber. Given the broad geographic range of this family in the Cretaceous and their absence in Tertiary fossil resins, the global extinction of this family is enigmatic. In contrast to other spider families, it may be that the end-Cretaceous extinction event did have an effect on this strictly fossil family.

KEYWORDS | Arachnida. Araneae. Lagonomegopidae. Palaeontology. Taxonomy.

INTRODUCTION

The enigmatic spider family Lagonomegopidae was first described by Eskov and Wunderlich (1995) from two specimens in Upper Cretaceous Siberian amber from the Taimyr Peninsula (type species = *Lagonomegops sukatchevae* ESKOV and WUNDERLICH, 1995). The family was placed in the superfamily Palpimanoidea (sensu Forster and Platnick, 1984) based on the presence of peg teeth, the absence of teeth on the cheliceral promargin, the trichobothrial pattern and the spineless legs. Penney (2004) described *Grandoculus chemahawinensis* PENNEY, 2004 from Canadian amber and Penney (2005) erected the name *Lagonomegops americanus* PENNEY, 2005 for a specimen from New Jersey amber, previously described as *Lagonomegops* sp. indet. by Penney (2002). Penney (2005) also erected the new genus and species *Burlagonomegops eskovi* PENNEY, 2005 for two new specimens preserved in amber from Myanmar (Burma). Wunderlich (2004) provided the same figures and descriptions of the specimens originally described by Eskov and Wunderlich (1995). For a

more comprehensive review of this strictly fossil family see Penney (2005).

Recently, Martínez-Delclòs et al. (1999) reported the presence of fossil inclusions in Lower Cretaceous amber from Peñacerrada, Sierra de Cantabria (Álava, Basque Country), northern Spain (Fig. 1). A number of arthropods from this deposit have been described e.g., Diptera (Szadziewski and Arillo, 1998, 2003; Arillo and Mostovski, 1999; Waters and Arillo, 1999; Arillo and Nel, 2000; Blagoderov and Arillo, 2002), Psocoptera (Baz and Ortuño, 2000, 2001a and b), Acari (Arillo and Subías, 2000, 2002).

A thorough review of the chemistry, geology and fossil inclusions of this deposit was provided by Alonso et al. (2000). The amber is of araucariacean origin and was dated as upper Aptian–middle Albian, but more recently this dating has been refined to 115–121 Ma (Aptian) by Larrasoana et al. (2003) based on magnetostratigraphic data and the qualitative and quantitative palynological data of Barrón et al. (2001). As such, this is one of the oldest inclusion-bearing ambers and is

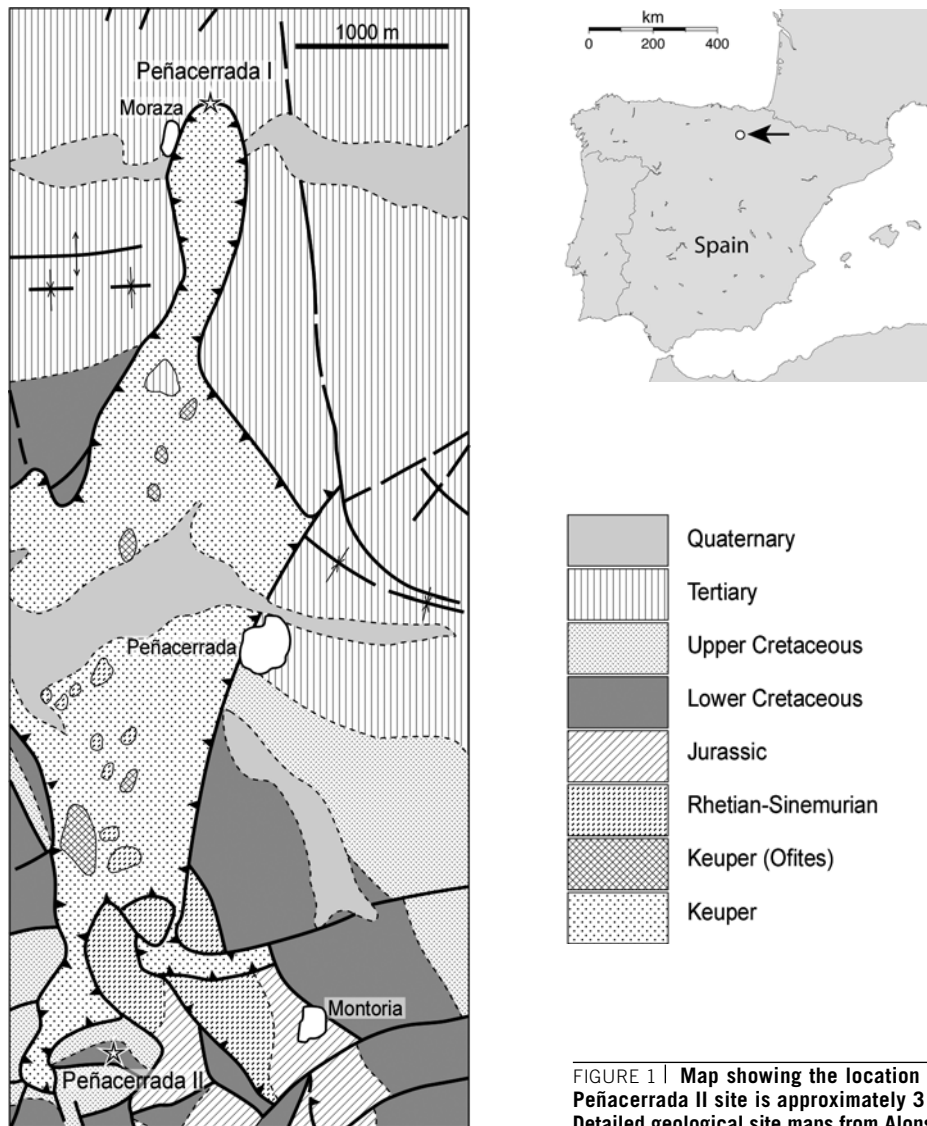


FIGURE 1 | Map showing the location of the amber deposit. The Peñacerrada II site is approximately 3 km south of Peñacerrada. Detailed geological site maps from Alonso et al. (2000).

thus of extreme importance to palaeoarthropodologists. Recent reports on the geology of this amber deposit include Martínez-Torres et al. (2003) (stratigraphy and tectonics), Arostegui and Sangüesa (2003) (mineralogy and diagenesis), Suárez Ruiz (2003) (petrography) and Sangüesa and Arostegui (2003) (subsidence and thermic models). Alonso et al. (2000) reported Araneae as representing 2.5% of the overall fossil fauna, but no spiders have hitherto been formally described from this deposit. This paper describes the first fossil spider from Álava amber, which represents a new species in the extinct family Lagonomegopidae.

MATERIAL AND METHODS

The spider is preserved in a thin (< 2 mm) polished piece of amber, which has been embedded in a clear, synthetic resin block (17 x 14 x 5 mm) according to the method of Corral et al. (1999). The fossil forms part of a permanent dis-

play, at the Museo de Ciencias Naturales de Álava, Vitoria, Spain. The specimen was temporarily removed from the display and studied under incident and transmitted light using a Leica M420 stereomicroscope and photographs were provided by the museum staff. Unfortunately facilities were not available for taking accurate measurements of podomeres.

SYSTEMATIC PALAEONTOLOGY

Order: Araneae CLERCK, 1757

Suborder: Opisthothelae POCKOCK, 1892

Infraorder: Araneomorphae SMITH, 1902

Family: Lagonomegopidae ESKOV and WUNDERLICH, 1995

GENUS *Burlagonomegops* PENNEY, 2005

Type species: *Burlagonomegops eskovi* PENNEY, 2005 by monotypy.

Original diagnosis: *Burlagonomegops* differs from the other genera in this family by having the carapace distinctly longer than wide and in possessing tarsal trichobothria.

***Burlagonomegops alavensis* n. sp.**

Figure 2

2000 Araneae indet., Alonso et al., fig. 9.5

2003 Araneae indet., Alonso, fig. 14 (copy Alonso et al., 2000: fig. 9.5)

Diagnosis: The large number of trichobothria, particularly those on the tibiae distinguishes *B. alavensis* n. sp. from the type and only other known species.

Description: Juvenile. Body length approximately 3.0 mm taking into account the damaged abdomen, which gives it the appearance of being longer. Carapace distinctly longer than wide, with numerous short setae, sides rounded in the thoracic region, lacking a fovea, cephalic region with a slightly procurved anterior edge (Fig. 2). The only eyes visible are two large eyes, situated in flank positions anteriorly (Fig. 2); air bubbles may be obscuring any other eyes present (the complete eye arrangement in lagonomegopids is not clear at present). The specimen is poorly visible in ventral view other than for details of the chelicerae, which are longer than wide, have an unmodified fang and possess five distinct peg teeth along the inner margin. Opisthosoma longer than broad, oval, covered with short setae. The dorsal surface has been ground away and the shape has been distorted along a flaw in the amber (Fig. 2B). In the living animal, the opisthosoma probably terminated at the level of the spinnerets in Fig. 2B.

Leg formula unknown because the specimen is not preserved in a manner conducive to making accurate measurements, nor were measuring facilities available. All segments are setose but without true spines. Although leg 3 appears shorter than the others in Fig. 2, this cannot be confirmed and this impression is due to the manner in which they are positioned. Observed trichobothrial pattern as in Fig. 2B; all tarsi and metatarsi with long distal trichobothria and numerous trichobothria present on tibiae 2 and 3, increasing in length distally. Tarsi with three claws, unpaired claw tiny and paired claws with at least three proximal teeth, accessory setae absent. Pedipalp unmodified and without a terminal claw.

Type specimen: MCNA 8635 (CRLV 03); holotype juvenile in Cretaceous Álava amber, Peñacerrada II amber site (sensu Alonso et al., 2000), held in the Museo de Ciencias Naturales de Álava, Vitoria, Spain. The only known specimen.

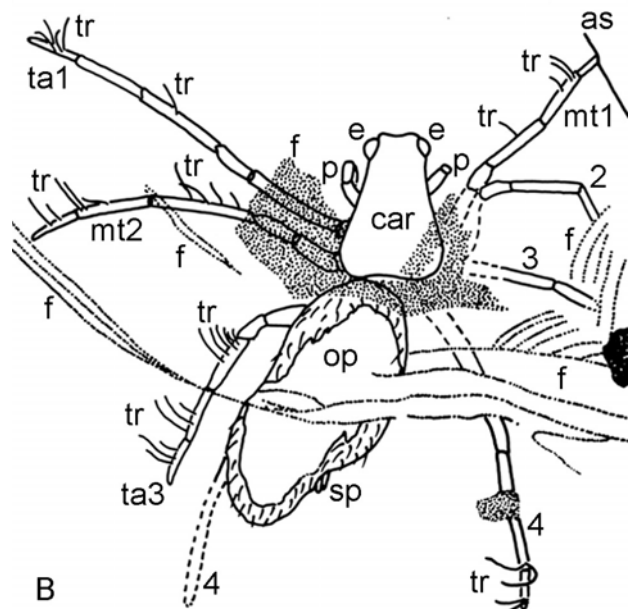
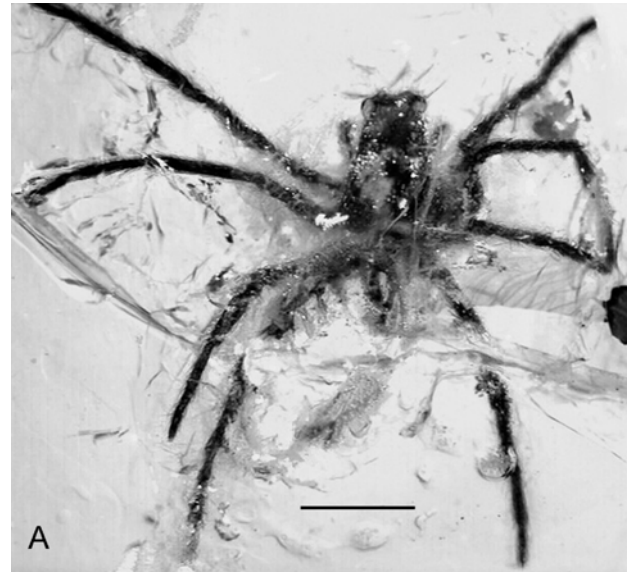


FIGURE 2 | *Burlagonomegops alavensis* n. sp. holotype in Cretaceous Spanish amber (MCNA 8635 [CRLV 03]). Dorsal view. A) photograph. B) drawing. Scale bar = 1.0 mm. Abbreviations: 1–4: legs 1–4; as: amber surface; car: carapace; e: eye; f: flaw in the amber; mt: metatarsus; op: opisthosoma; p: pedipalp; sp: spinnerets; ta: tarsus; tr: trichobothria(um).

Etymology: The specific epithet “alavensis” refers to Álava, the Spanish province of the type locality.

DISCUSSION

This is the first spider to be described from Lower Cretaceous Spanish amber and complements our knowledge of Spanish non-amber, Cretaceous fossil spiders from Sierra de Montsec (Selden, 1990; Selden and Penney, 2003) and Las Hoyas (Selden and Penney,

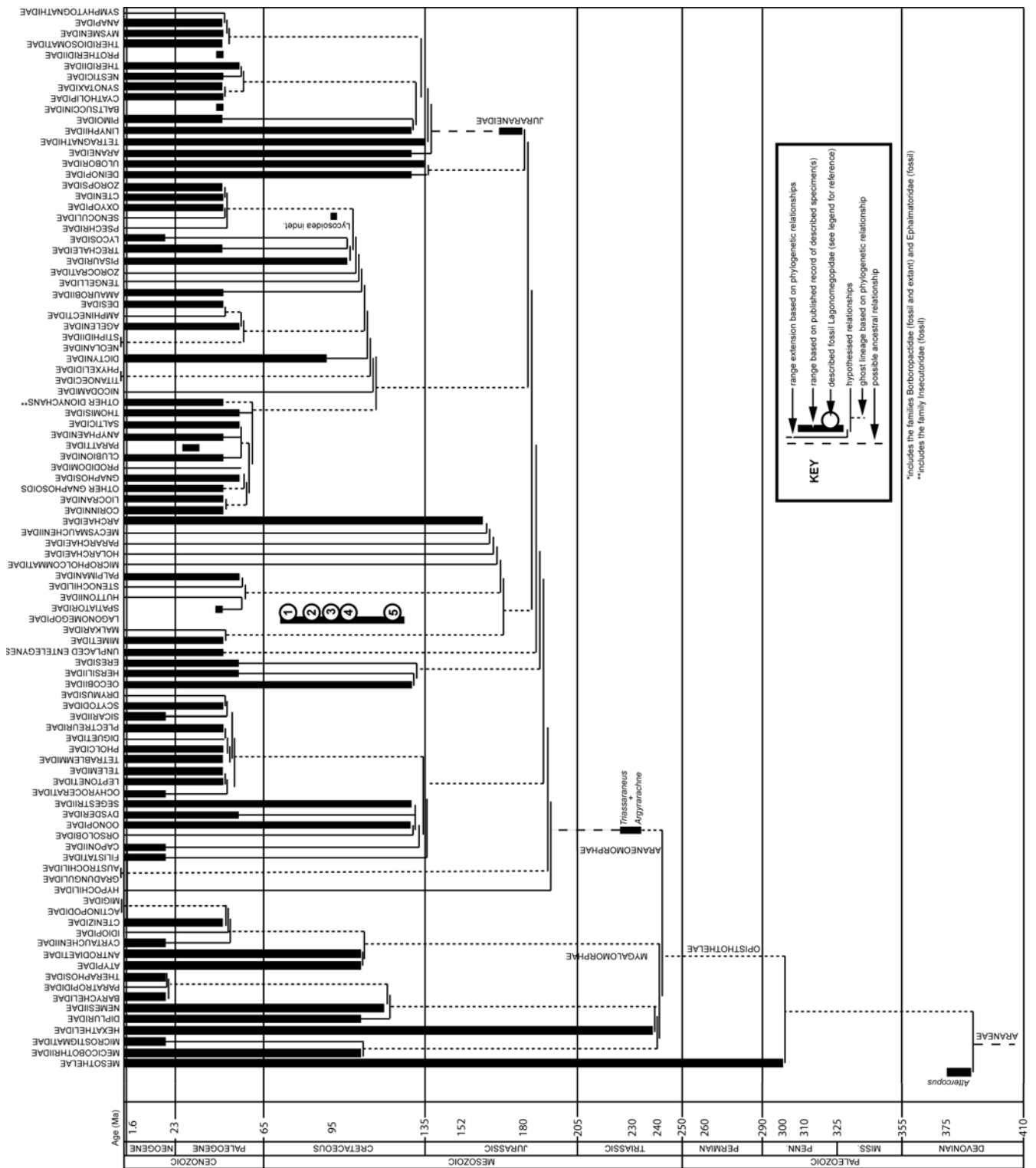


FIGURE 3 | Evolutionary tree of Araneae (updated from Penney et al., 2003), highlighting described fossil Lagonomegopidae in relation to the end-Cretaceous (K/T) extinction event. 1: Canadian amber (Penney, 2004); 2: Siberian amber (Eskov and Wunderlich, 1995); 3: New Jersey amber (Penney, 2002); 4: Burmese amber (Penney, 2005); 5: Spanish amber (this paper).

2003). Unfortunately all lagonomegopids identified to date are immature (Penney, 2005), as is common with amber preserved spiders. As the genitalia are unknown for this family the current taxonomy is based on somatic characters. The specimen conforms to the diagnosis of *Burlagonomegops* as currently delimited, which differs from the other genera in this family by having the carapace distinctly longer than wide and in possessing tarsal trichobothria (Penney, 2005). The new species differs from the only known other species by possessing more trichobothria, including on the tibiae; the latter are absent in *B. eskovi*. The discovery of Lagonomegopidae in Lower Cretaceous Spanish amber adds a new locality and extends the known geological age of this family by approximately 15–20 Ma from the previously oldest record in Burmese amber (Penney, 2005) (Fig. 3). *B. alavensis* n. sp. further confirms Lagonomegopidae as a common component of Cretaceous amber faunas and raises the question of why the family became extinct.

It was suggested by Eskov and Wunderlich (1995) that undiscovered extant species may exist in the southern hemisphere, but this is considered unlikely because of their frequent occurrence in Cretaceous ambers and their absence in Tertiary fossil resins. Given the broad geographic range of this family in the Cretaceous, their global disappearance as evidenced from their absence in Tertiary ambers and a lack of extant species is enigmatic. It may be that the end-Cretaceous extinction event did have an effect, either directly or indirectly on this spider family, in contrast to the majority of other spider families (Penney et al., 2003) (Fig. 3). However, there may be other explanations e.g., the feeding habits of lagonomegopids are unknown, although given their large eyes, they were presumably visual hunters rather than web spinners. If they were specialist feeders and their prey became extinct, then it is not unreasonable to expect the extinction of Lagonomegopidae also. However, this is speculative and it is highly unlikely that it will ever be possible to test this hypothesis. Alternatively, climatic changes may have caused their demise.

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