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THE CONODONT *TRAPEZOGNATHUS DIPRION* (LINDSTRÖM) IN THE ACOITE FORMATION, EASTERN CORDILLERA, NORTHWESTERN ARGENTINA.



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THIS work is developed in NW Argentina framed in the geological province of the Eastern Cordillera, characterized by a set of siliciclastic outcrops mainly related to the Cambrian and Ordovician periods. The main purpose of this study focuses on the vertical distribution of the conodont *Trapezognathus diprion* (Lindström) recorded from the uppermost part of the Acoite Formation (Lower Ordovician), outcropping in three key areas where this formation was described: La Ciénaga, Espinazo del Diablo and Los Colorados (Fig. 1).

STRATIGRAPHY

The Acoite Formation was defined by Harrington (in Harrington and Leanza, 1957). It represents the upper part of Santa Victoria Group. In general, this formation is composed of black shale and green shale with interbedded bioturbated fine-grained sandstone that becomes progressively thicker and more frequent toward the top (Astini and Waisfeld, 1993). This formation has a thickness of approximately 3000 meters in its type section.

La Ciénaga section is located about 8 km from Purmamarca (Fig. 1). Harrington (in Harrington and Leanza, 1957) defined the "Cieneguillas Shales" which are equivalent to the Acoite Formation. This section has limestone beds at the top (last 50 meters) and these strata are known as "Sepulturas Limestones". This member is composed of quartz sandstone beds rich in carbonate cement interbedded with dark gray shale and thin levels of fine sandstone (Fig. 2).

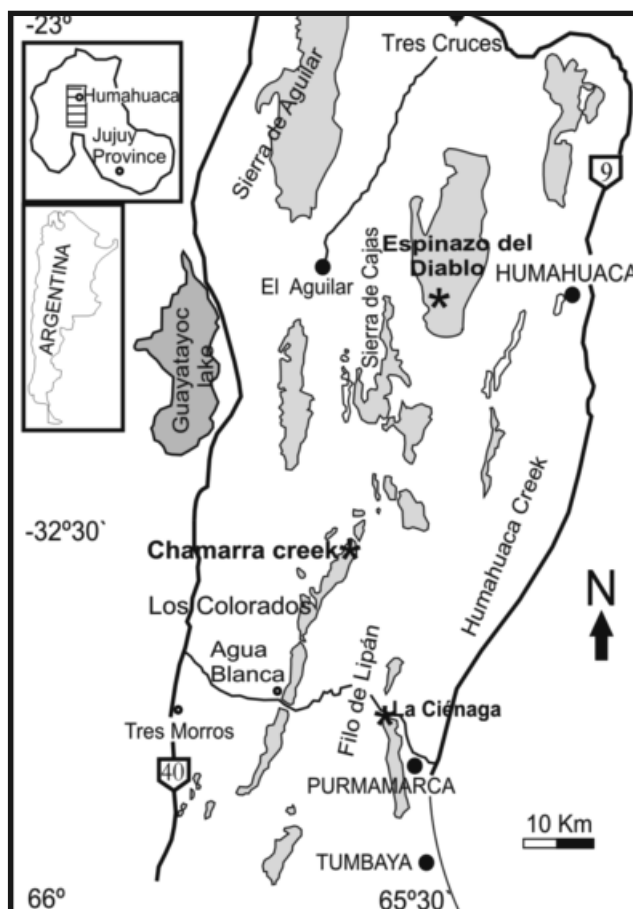


Figure 1. Location map with the localities of study: La Ciénaga, Espinazo del Diablo and Chamarra Creek, Eastern Cordillera, Northwest Argentina (Jujuy province). The Ordovician outcrops are indicated in grey.

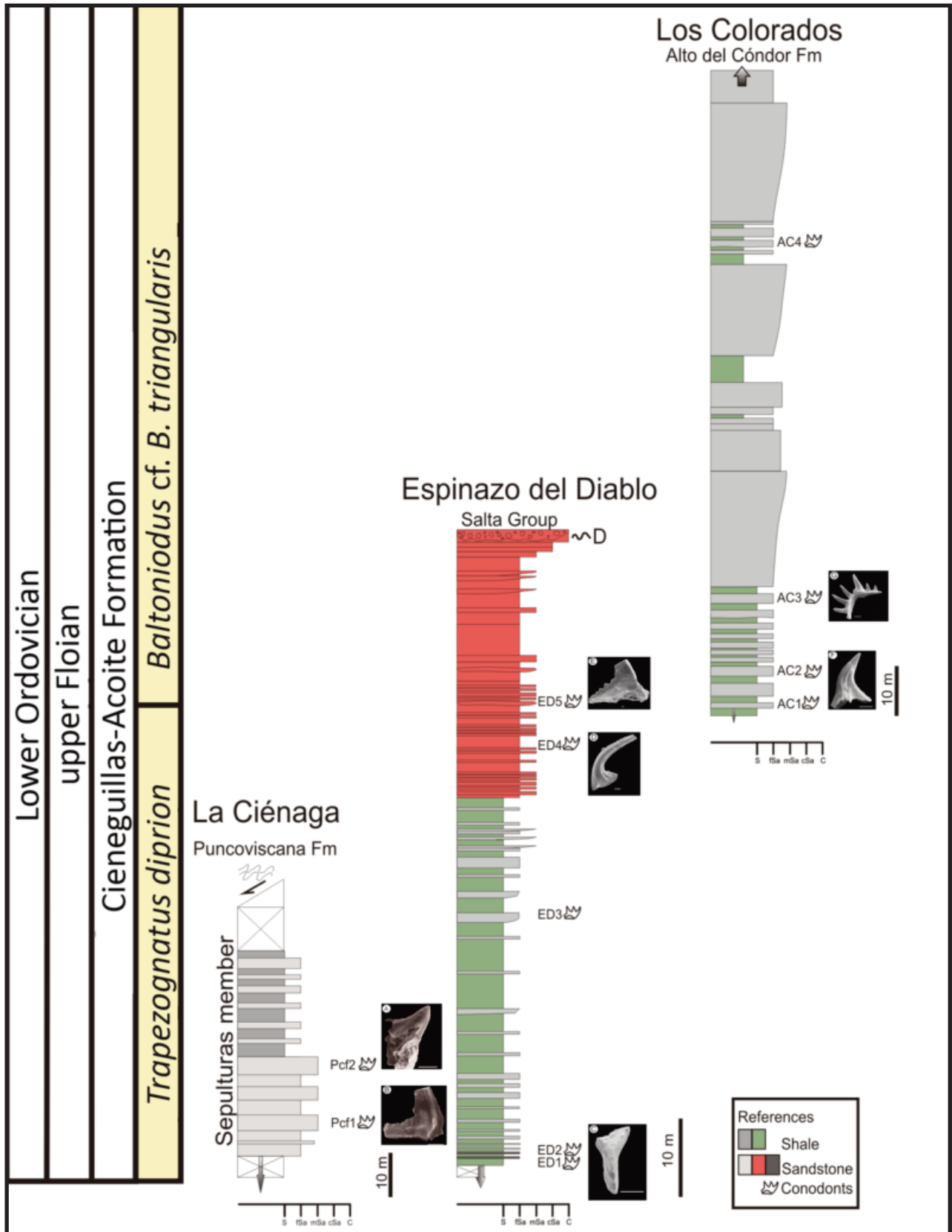


Figure 2. Stratigraphical sections of the study areas showing the biostratigraphical correlation between them. Each section with sampled beds and some pictures of conodonts association. **A, C**- *Trapezognathus diprion* (Lindström); **B**- *Oepikodus intermedius* Serplagli; **D**- *Drepanoistodus costatus* Abaimova; **E, F**- *Baltoniodus cf. B. triangularis* Lindström; **G**- *Erraticodon patu* Cooper.

The Espinazo del Diablo outcrops are on the western flank of the Espinazo del Diablo hill (Fig. 1) in the Humahuaca Department approximately 3 km from El Aguilar Mine. Aceñolaza (1966) described the "Sepulturas Formation" between the Acoite Formation and the slightly angular erosion unconformity beneath the Cretaceous outcrops of the Salta Group. After Carlorosi (2011) the "Sepulturas Formation" constitutes the uppermost part of the Acoite Fm. This formation is composed of green shale and dark greenish gray sandstone which develops few beds of dark gray sandstone with abundant carbonate cement. The succession has sandstone beds that are intensely bioturbated on the top, while the base exhibits coquinas of fragmented brachiopod shells (Fig. 2).

The Ordovician outcrops of Los Colorados (Fig. 1) are located in the western part of the Eastern Cordillera, about 30 kilometers NW of Purmamarca. The Acoite Formation is well exposed in the Chamarra Creek. The basal part has been described by Astini *et al.* (2004) as a heterolithic sequence of alternating green shale and gray sandstone (Fig. 2).

CONODONTS AND BIOSTRATIGRAPHICAL CORRELATION

La Ciénaga section: the samples were collected from the Sepulturas member of the Acoite/Cieneguillas Formation. The conodont association (already mentioned in Aceñolaza *et al.*, 2008) is composed of *Drepanoistodus costatus* Abaimova,

Gothodus costulatus Lindström, *Oepikodus intermedius* Serpagli, *Trapezognathus diprion* (Lindström), *Drepanoistodus* sp. A and *Oistodus* sp.

Espinazo del Diablo section: as mentioned previously in Carlorosi (2011) the conodont association is composed of *Baltoniodus* cf. *B. triangularis* Lindström, *Drepanodus arcuatus* Pander, *Drepanoistodus basiovalis* Sergeeva, *Drepanoistodus forceps* Lindström, *Drepanoistodus costatus*, *Gothodus costulatus*, *Trapezognathus diprion*, *Drepanoistodus* sp. A, *Oistodus* sp. and *Triangulodus?* sp.

Chamarra section (Los Colorados): *Baltoniodus* cf. *B. triangularis*, *Drepanoistodus basiovalis*, *Drepanoistodus costatus*, *Gothodus costulatus*, *Erraticodon patu* Cooper, *Trapezognathus diprion*, *Drepanoistodus* sp. A and *Triangulodus* sp.

An analysis of the conodont association from these sections allows recording the *Trapezognathus diprion* Zone in La Ciénaga and Espinazo del Diablo and the *Baltoniodus* cf. *B. triangularis* Zone in the very top of *Espinazo* del Diablo and the Chamarra Creek sections; thus, the top of the Acoite Formation is uppermost Floian in age.

The records of the *T. diprion* Zone and the succeeding *B. cf. B. triangularis* Zone in the upper part of Acoite Formation (Figs. 2, 3) confirms the wide distribution of the *T. diprion* Zone in the Andean basin. On the other hand, the *B. cf. B. triangularis* Zone is proposed for first time in Argentina (Fig. 3) and Gondwana.

System	Series		Stages		Baltic Conodonts zones & subzones	S. China Conod. zones & subzones	NW Argentina Conodonts
	Global	Britain	N. Amer.	China			
Ordovician	Lower	Arenigian	Ibexian	Floian	Baltic Conodonts zones & subzones	S. China Conod. zones & subzones	NW Argentina Conodonts
	Ca 2	Dapingian	Dawanian	<i>T. diprion</i>	<i>Trapezognathus diprion</i>	<i>Trapezognathus diprion</i>	
							Ca 3
	Global	Britain	N. Amer.	China	Bagnoli & Stouge (1997)	Huanghuachang Li <i>et al.</i> (2010)	
							Middle
	Bendig.	Ca 1	Yushanian	<i>Baltoniodus triangularis</i>	<i>Baltoniodus triangularis</i>	<i>Baltoniodus triangularis</i>	
Ca 2							Dapingian
	Ca 3	Whitheroian	Middle				
Global							Britain

Figure 3. Lower–Middle Ordovician biostratigraphical chart comparing conodont biozones from Baltica, South China and Northwestern Argentina.

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