



2019 Canadian Paleontology Conference  
Abstracts



August 23-24, 2019

# Canadian Paleontology Conference Proceedings No. 16



GEOLOGICAL  
ASSOCIATION OF CANADA  
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GÉOLOGIQUE DU CANADA



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**TORONTO**  
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## Crinoid Creepy Crawlies: Trilobites Interacting with Crinoids

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Recent discoveries in the Upper Ordovician (Katian) (Grondines Member, Neuville Formation) of the Québec City area include an abundant and diverse echinoderm fauna. Among these finds is a group of seven samples, collected in situ on a single rock layer, preserving complete *Iocrinus trentonensis* crowns (with short stem sections) that have mostly complete odontopleurid trilobites of the species *Meadowtownella trentonensis* present in their arms or near/on the anal sac.

We are tempted to support the hypothesis that the *Meadowtownella* present on these crinoids would either "cherry pick" food particles directly from the arms or feed on faecal materials from the anal sacs, possibly interacting in a commensal relationship. Crinoids disarticulate very rapidly after death, so the complete preservation of *Iocrinus* crowns suggests they were buried rapidly. With the short-attached columns and complete arms, these crinoids are undoubtedly part of a distal storm deposit in which the columns were broken in the wave surge of a storm. The crinoids were transported a short distance rapidly (many of the crinoids are current aligned), where they were buried permanently under post-storm settling of lime muds.

Consequently, it is unlikely that the trilobites were scavenging a dislodged crinoid. Instead, it is more probable that the trilobites were in the crinoid arms at the time of burial. The diminutive size of these odontopleurid trilobites coupled with the relatively large size of food particles collected by *Iocrinus* could have enabled this commensal interaction. If this hypothesis is true, this unique association represents the first recorded biotic interactions between trilobites and living crinoids.

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# Crinoid Creepy Crawlies: trilobites interacting with crinoids

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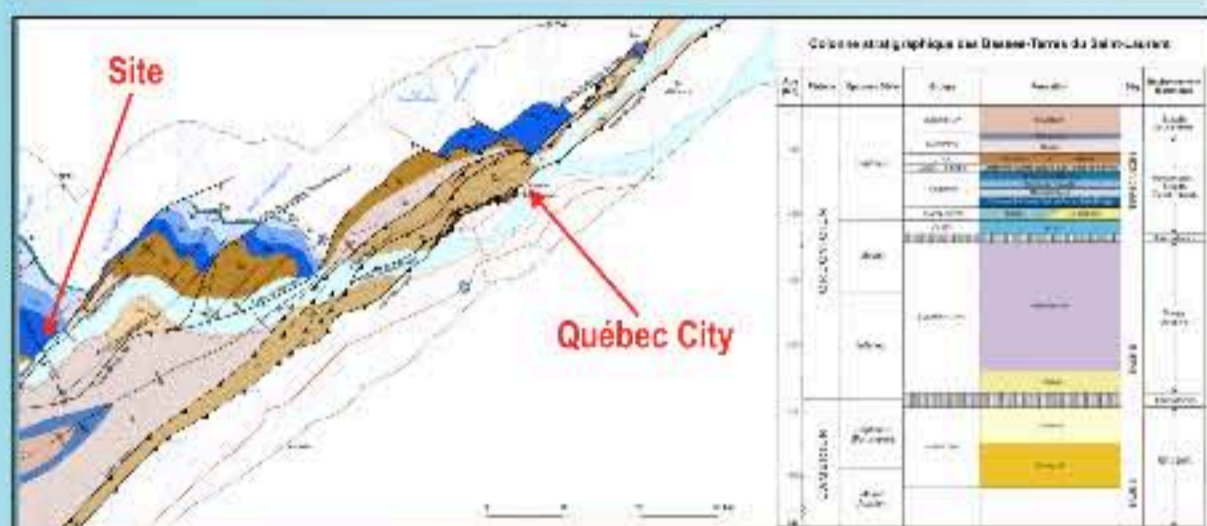
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## Introduction

Rare examples of crinoid/trilobite associations were found in 2012 in the St. Lawrence Lowlands of Québec, Canada. Specimens were collected in situ on a single limestone bedding surface, within a  $\pm 2$  meter interval, outcropping along the St. Lawrence River shoreline, East of Québec City, Canada.

Limestone beds are Upper Ordovician (Katian), Grondines Member, Neuville Formation, Trenton Group. Seven samples show complete crowns of the crinoid *Iocrinus trentonensis* (with short stem sections) that have mostly complete trilobites of the species *Meadowtownella trentonensis* present in their arms or near/on the anal sac.

## Location and stratigraphy



## Field collecting



Outcrops along the St. Lawrence River, Québec, Canada. Rock samples containing crinoid/trilobite associations come from Bed #2.



In situ complete crown and short stem of *Iocrinus trentonensis* showing directional flow.



Two crinoid crowns found in situ, *Iocrinus trentonensis* and *Ectenocrinus simplex*, showing directional flow.



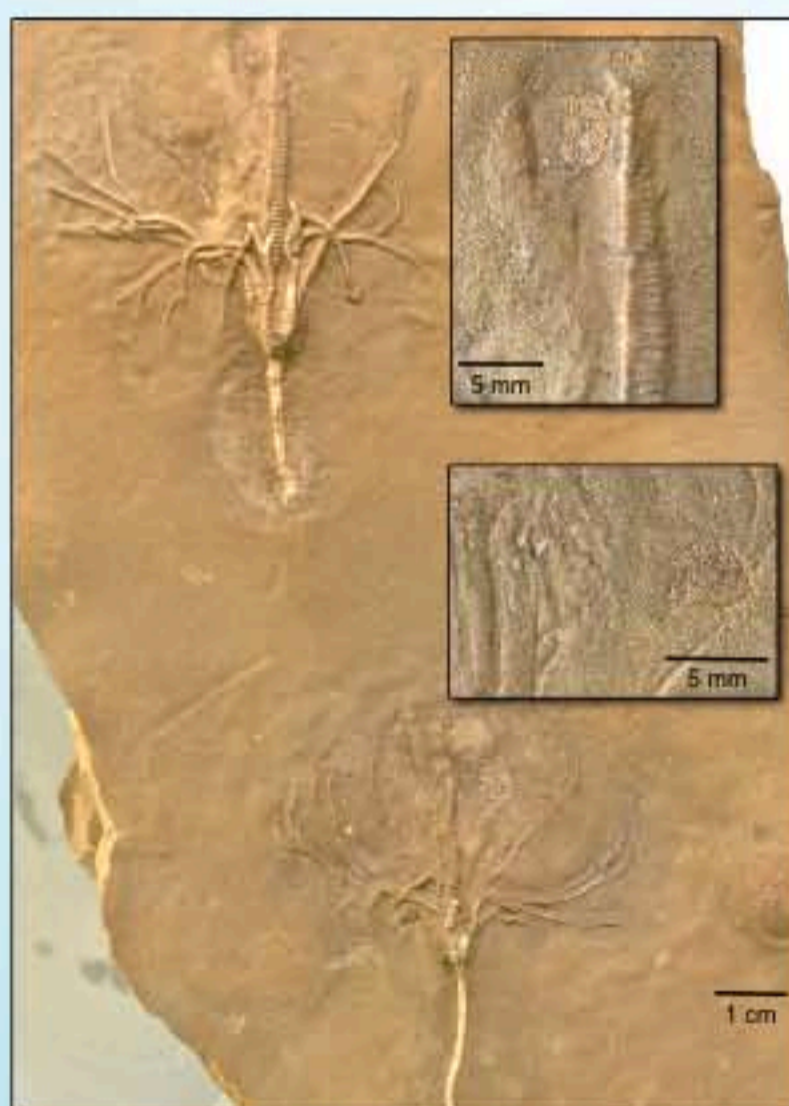
In situ internal mold of Orthoceratid cephalopod showing directional flow.

## Material

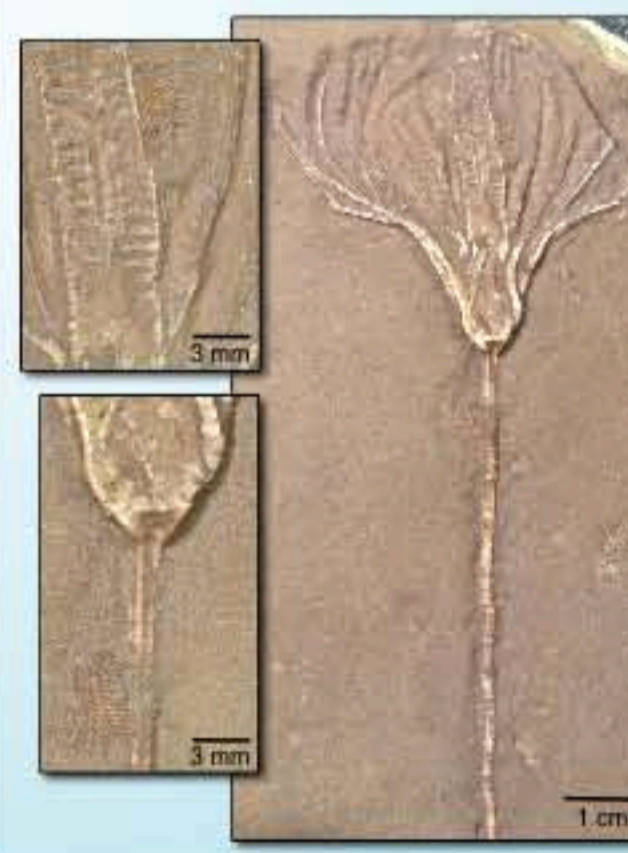


A single trilobite located in the lower part of the arms of the crinoid. Specimen MPEP557.1

A single trilobite located on the distal part of the anal sac of the upper crinoid. Specimen MPEP557.2



Two crinoids each supporting a single trilobite. The upper crinoid has a trilobite located near the tip of the anal sac, the lower crinoid has a trilobite located in the arms. Specimen MPEP557.5



Two trilobites found on a crinoid, one located near the proximal part of the stem and the other under the anal sac. Specimen MPEP641.33

## Some numbers

Trilobite present on anal sac	Trilobite present in arms	<i>Meadowtownella</i> trilobite on stem	<i>Meadowtownella</i> not located on <i>Iocrinus</i>	<i>Iocrinus</i> devoid of trilobites	<i>Ectenocrinus simplex</i>	<i>Cincinnatiacrinus varibrachialis</i>	<i>Syringocrinus paradoxicus</i>	Conularid, Bryozoans, Brachiopods, Cephalopods, Trilobites parts
1	1	1	7	11	17	5	20	1 or several

## Faunal list

Conularida	- <i>Conularia trentonensis</i>
Bryozoa	- Branching form, Dome shape
Brachiopoda	- <i>Platystrophia</i> sp.
Cephalopoda	- Orthocone
Trilobita	- <i>Meadowtownella</i>
	- <i>Isotelus</i> sp.
	- <i>Hypodicranotus</i> sp.
Crinoidea	- <i>Iocrinus trentonensis</i>
	- <i>Ectenocrinus simplex</i>
	- <i>Cincinnatiacrinus varibrachialis</i>
Soluta	- <i>Syringocrinus paradoxicus</i>

## Discussion

- Complete preservation of *Iocrinus* crowns favor rapid burial.
- With the short attached columns and complete arms, these crinoids are undoubtedly part of a distal storm deposit in which the columns were broken in the wave surge of a storm.
- Crinoids were transported a short distance rapidly (many of the crinoids are aligned by currents), where they were buried permanently under post-storm settling of lime muds.
- It is unlikely that the trilobites were scavenging a dislodged and buried crinoid.
- It is more probable that the trilobites were in the crinoid arms at the time of burial.
- The diminutive size of these odontopleurid trilobites coupled with the relatively large size of food particles collected by *Iocrinus* could have enabled this commensal interaction.
- Although the ecology of modern Pontonine shrimps with their echinoderm hosts remains poorly known, safe shelter and scrapping off food particles from host is observed in most cases.

## Conclusion

We favor the hypothesis in which the *Meadowtownella* had a commensal relationship with *Iocrinus*. *Meadowtownella* lived within the *Iocrinus* arms and presumably either "cherry pick" food particles directly from the ambulacra or fed on faecal material from the anal sac. The *Meadowtownella-Iocrinus* association may be similar to the commensal relationship of extant crinoids and pontonine shrimp (crinoid shrimp).

## References

- BROWER, J. C. 2007. The application of filtration theory to food gathering in Ordovician crinoids. *Journal of Paleontology*, 81: 1284-1300.
- CLARK, T.H. & GLOBENSKY, Y. 1975. Grondines area, geological Report. Ministère des richesses naturelles, RG-154.
- HORKA, I. 2016. Evolution, ecology and systematics of symbiotic shrimps (Crustacea: Decapoda: Caridea). PHD Thesis, Charles University, Dept. of Ecology, Prague.
- THERIAULT, R. 2014. Géologie des basses-terres du Saint-Laurent. Ministère de l'énergie et des ressources naturelles, DV 2014-05.



An almost complete example of *Meadowtownella* found not located near or on a *Iocrinus*. Specimen MPEP641.62