

## Relationship between morphological and genetic trees of marine chironomid species

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**Abstract** Relationships between morphological and genetic trees of marine chironomid species were investigated. The species included in this study were *Clunio*, *Semiocladius*, *Telmatogenon*, *Thalassosmittia*, *Smittia*, and *Cricotopus*. The morphological trees were constructed based on 11 morphological characters. The genetic trees were constructed based on the COI 1D DNA sequences. The results showed that the morphological and genetic trees were generally congruent, but there were some discrepancies. For example, *Clunio* and *Semiocladius* were sister taxa in the morphological tree, but they were not sister taxa in the genetic tree. This suggests that the morphological characters used in this study may not be sufficient to resolve the relationships between these species.

**Key words:** chironomid, morphological tree, genetic tree, COI 1D DNA, marine chironomid

### INTRODUCTION

Chironomidae is one of the most diverse and abundant groups of insects in the world (Auerbach et al., 1995). There are about 10000 species of chironomids in the world (Petersen, 1986). Plescia (1982) divided the Chironomidae into three suborders: *Clunio*, *Telmatogenon*, and *Pontomyia* (Hirakawa et al., 1975, 1976; Sugimaru et al., 1982). Hirakawa et al. (1975) proposed a classification system for the suborder *Clunio* based on morphological characters. In this study, we investigated the relationships between marine chironomid species based on morphological and genetic trees. The species included in this study were *Clunio*, *Semiocladius*, *Thalassosmittia*, *Telmatogenon*, *Smittia*, and *Cricotopus*. The morphological trees were constructed based on 11 morphological characters. The genetic trees were constructed based on the COI 1D DNA sequences. The results showed that the morphological and genetic trees were generally congruent, but there were some discrepancies.

### MATERIALS AND METHODS

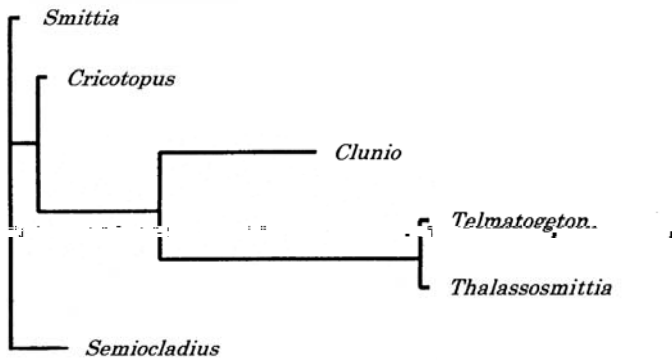
#### 1. Sampling

All specimens were collected from the same location (Hiroshima Bay) during the period from April to June 2004 to 2006. The specimens were preserved in 70% ethanol and stored at -80°C until analyzed.



### 2. Genetic relationship (Fig. 1)

T 3 ; 1 51 5 Smittia, 5 Semiocladus 1 4 .  
 T 5 , 5 1 5 Cricotopus 1 1 51 51 , 1 3 .  
 Telmatogeton, 5 T 1 1 , Thalassosmittia, 5  
 Ot , 5 51 .

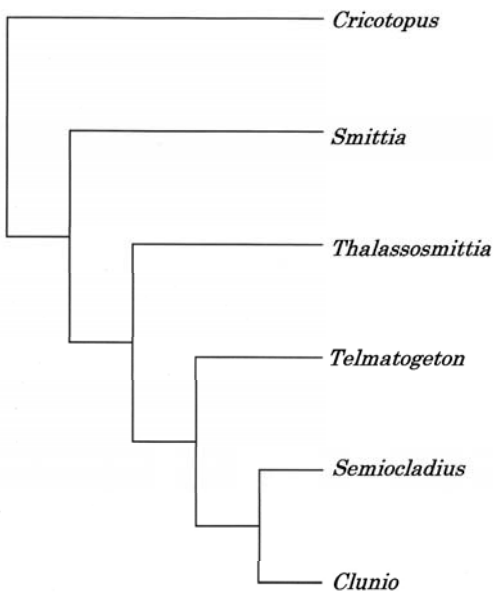


#### 0.1 substitution

F . 1 . G 1 1 5 4 , Clunio, Semiocladus,  
 TelmatogetonS 332

### 3. Morphological relationship (Fig. 2)

Semiocladus Clunio 5 51 . Telmatogeton Thalassosmittia 1  
 51 1 5 5 . Smittia 1 1 51 4 . Cricotopus 1 1  
 51 11 51 .



### DISCUSSION

A 6, *Smittia* (K., 1993). *Cricotopus* *C. sylvestris*, *C. trifasciatus*, *C. tricinctus*, *Clunio*, *Semiocladius*, *Telmatogeton*, *Thalassosmittia*. I, *Smittia*, *Cricotopus*, *Clunio*, *Telmatogeton*, *Thalassosmittia*, *Cricotopus*. T, *Clunio*, *Telmatogeton*, *Thalassosmittia*, *Semiocladius*. O, *Smittia*, *Semiocladius*, *Clunio*, *Telmatogeton*, *Thalassosmittia*. (W., 1989), *Semiocladius*, *Clunio*, *Telmatogeton*, *Thalassosmittia*. T, *Clunio*, *Telmatogeton*, *Thalassosmittia*. B, *Telmatogeton*, *Thalassosmittia*. T, T.

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## 海産ユスリカ種の形態学的系統樹と遺伝学的系統樹の関係

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**要旨** 海産4属, *Clunio*, *Semiocladius*, *Telmatogeton* および *Thalassosmittia* と陸生の *Smittia*, 淡水性の *Cricotopus* 属のエリユスリカ亜科と近縁亜科の形態学的系統樹と遺伝学的系統樹の関係を調べた。遺伝学的系統樹では3系統, すなわち *Smittia*, *Semiocladius* と *Clunio* を含む他の4属に分かれた。さらに, *Telmatogeton* と *Thalassosmittia* は別亜科にも拘わらず小さなクラスターを形成した。形態学的系統樹では *Semiocladius* と *Clunio* は小さなクラスターを形成したが, *Telmatogeton* と *Thalassosmittia* はこれらだけではクラスターを形成しなかった。*Cricotopus* は最後に大きなクラスターに加わった。これらの結果は, *Clunio*, *Telmatogeton* と *Thalassosmittia* は淡水種の祖先から派生したこと, そして形態学的形質の中にかくらかの平行進化が存在することを示唆する。

**キーワード**: 海産ユスリカ, エリユスリカ亜科, 雄成虫, 遺伝子系統樹, 形態系統樹