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Alaska, USA, a geographically remote record of indigenous Diplopoda

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The milliped family Tingupidae (Chordeumatida) on Kodiak Island, Alaska, USA, a geographically remote record of indigenous Diplopoda

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Abstract. With documentation of an unidentifiable adult female and juvenile Tingupidae (Chordeumatida), Kodiak Island, Alaska, becomes the westernmost indigenous diplopod locality in North America including continental islands. The northernmost and most proximate locality, Yakutat, lies ca. 935 mi (1,496 km) to the east-northeast, while Haines, the type locality of *Tingupa tlingitorum* Shear and Shelley, some 1,196 mi (1,914 km) in this direction, is the most proximate familial site. Kodiak is also one of the most remote indigenous milliped localities in the Pacific, the most proximate ones to the west and south, Kamchatka, Russia, and the Hawaiian Islands, United States, being over 3,300 mi (5,280 km) distant. Tingupidae is recorded for the first time from Canada excluding the Queen Charlotte Islands, and geographically remote, ostensibly indigenous records from the North Pacific Ocean and environs are tabulated.

Introduction

The chordeumatidan milliped family Tingupidae, addressed taxonomically by Shear (1972, 1981), Shear and Hubbard (1998), Hoffman (1999), and Shear and Shelley (2007), comprises three genera and 12 species that occur from Haines, Alaska, to southeastern Arizona, southwestern Illinois to northern Arkansas, and eastern West Virginia to northcentral North Carolina. In July 2007, on an expedition sponsored by the National Geographic Society, RMS discovered an unidentifiable female and juvenile on the northern periphery of Kodiak Island, in the Gulf of Alaska, north Pacific Ocean, about 225 mi (360 km) east of the Alaskan Peninsula, that we document here. The female appears to be an adult, and while the genus and species cannot be determined without an adult male, the remoteness of the locality suggests that both may be undescribed. Lindroth and Ball (1969) reported three centipedes from Kodiak but no millipeds, so this constitutes the first record of the Diplopoda from the island. Though insular, it is significant in constituting the westernmost diplopod locality in North America in the broad sense (including “continental islands”), as it lies some 935 mi (1,496 km) west-southwest of Yakutat and vicinity (Fig. 1, arrow), heretofore the western- and northernmost milliped locality, which is occupied by *Litiulus alaskanus* (Cook) (Julida: Parajulidae) and *Scytonotus insulanus* Attems (Polydesmida: Polydesmidae) (Cook 1904, Shelley 1994). The Kodiak site is even farther, ca. 1,196 mi (1,914 km), west-southwest of Haines, the most proximate familial locality, where *Tingupa tlingitorum* Shear and Shelley occurs (Fig. 1), and is one of the most geographically isolated indigenous milliped records in the North Pacific Region.

Accompanied in part by the coauthors and other collaborators, RMS conducted field samplings in southern coastal Alaska and northern British Columbia (BC), Canada, during the summers of 2006-2007, working the area from the Kenai Peninsula and Matanuska Valley to Prince Rupert, BC, and vicinity

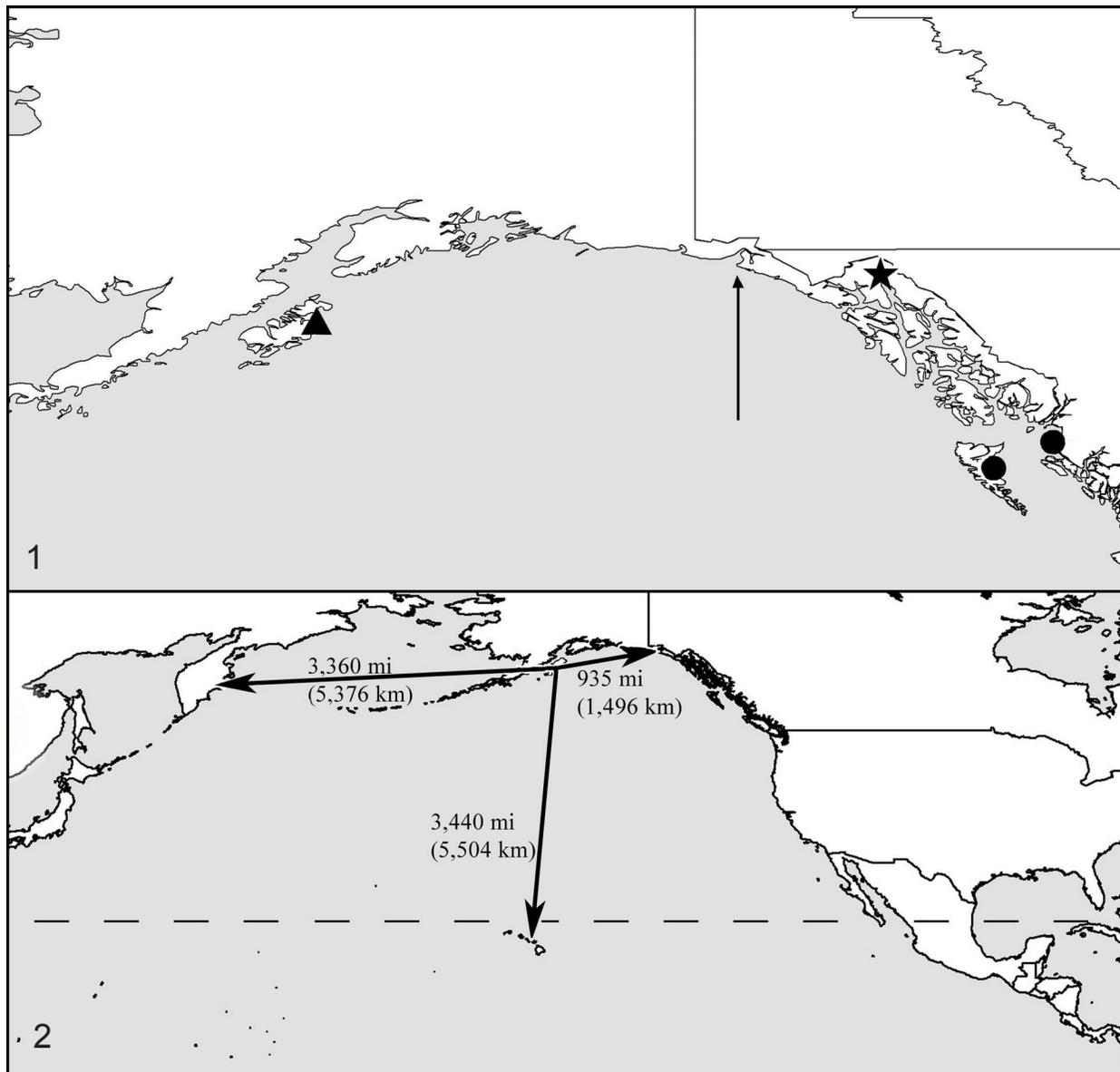


Figure 1-2. Maps. **1)** Occurrences of Tingupidae in far northwestern North America; the arrow denotes the location of Yakutat. Dots, *Tingupa* spp.; star, *T. tlingitorum*; triangle, undetermined genus and species. **2)** Distance of Kodiak Island locality from most proximate milliped records in northern Pacific area, miles and kilometers (in parentheses) shown.

(Shear and Shelley 2007), the warmest and wettest region of far northwestern North America. No millipeds at all, indigenous or introduced, were found in the first two areas, the Chugach National Forest, the vicinities of Cordova and Valdez, or along the Richardson and Glenn Highways (hwy. 4 and 1). The arthropods were found only in the temperate rainforests of the Alaskan Panhandle and Alexander Archipelago from Yakutat southeastward, most of which comprise the Tongass National Forest. As Alaskan millipeds are thus restricted to rainforests and some tourist publications characterize the northern fringe of Kodiak Island thusly, RMS investigated this area in 2007, and while substantially drier than the panhandle and the southern Kenai Peninsula, it still harbored tingupids. Consequently, Kodiak now becomes the westernmost North American milliped locality while Yakutat is still the northernmost, edging out the “Haines Triangle,” BC, caseyid (*Chordeumatida*) record of Shelley et al. (2007). Kodiak is also the northernmost record for an indigenous milliped in the Pacific Ocean or a part thereof; other than

Taxa, authors, and other references	Locality	Most Proximate Cluster Area	Distance and Direction
<i>Nannolene</i> spp. (Spirostreptida: Cambalidae) (Silvestri 1904; Hoffman 1980; Nishida 1994, 2002)	Hawaiian Islands (Kauai, Oahu, Lanai, Molokai, Maui), USA	North America, USA, California, Santa Barbara Co., Point Arguello/ Point Conception	2,691 mi (4,806 km) East-Northeast
<i>Eucarlia riseri</i> (Chamberlin 1945) (Spirobolida: Trigoniulidae)	Saipan, Commonwealth of the Northern Marianna Islands	Asia, Philippine Islands, Samar	1,420 mi (2,272 km) West-Southwest
<i>Apoxenus micronesius</i> Chamberlin (1947) (Polyxenida: Polyxenidae)	Bigatyelang Island, Ailinglapalap Atoll, Republic of the Marshall Islands	Bougainville, Solomon Island Archipelago, Papua New Guinea	1,271 mi (2,034 km) Southwest
<i>Eustrongylosoma insulare</i> (Silvestri 1897)(Polydesmida: Paradoxosomatidae)	Pohnpei (=Ponape), Caroline Islands, Federated States of Micronesia	New Ireland, Bismarck Archipelago, Papua New Guinea	1,047 mi (1,675 km) South-Southwest
Chordeumatida: Tingupidae	Kodiak Island, Alaska, USA	North America, USA, Alaska, Yakutat	935 mi (1,496 km) East-Northeast
<i>Nedyopus boninensis</i> (Verhoeff 1940) (Polydesmida: Paraoxosomatidae) (Hoffman 1980, Chen et al. 2006)	Bonin Islands, Japan	Asia, Japan, Honshu, Chiba Pref.	748 mi (1,197 km) North-Northwest
<i>Nesodesmus insulanus</i> Chamberlin (Polydesmida: Pyrgodesmidae) (Shear and Peck 1987)	Galápagos Islands, Ecuador	South America, Ecuador, Manabi Prov.	748 mi (1,197 km) East
<i>Erythracus amblyodon</i> (Attems 1899), <i>E. macroporus</i> (Takakuwa 1942) (Polydesmida: Platyrhacidae) (Jeekel 2007)	Republic of Palau, Koror Island	Asia, Philippine Islands, Mindanao	523 mi (837 km) West-Northwest

Table 1. Geographically remote, ostensibly indigenous diplopod records in the North Pacific Region (≥ 500 mi [800 km] from either the most proximate continental record or an island where native millipeds cluster).

Yakutat, the closest localities are the Hawaiian Islands, USA, some 3,440 mi (5,504 km) to the south, where *Nannolene* spp. (Spirostreptida: Cambalidae) occur on Kauai, Oahu, Lanai, Molokai, and Maui (Silvestri 1904; Nishida 1994, 2002), and southern Kamchatka, Russia, some 3,360 mi (5,376 km) to the west-southwest, inhabited by *Angarozonium amurense* (Gerstfeldt) (Polyzoniida: Polyzoniidae), *Orinisobates microthylax* Enghoff (Julida: Nemasomatidae), and *Underwoodia kurtschevae* Golovatch (Chordeumatida: Caseyidae) (Fig. 2) (Golovatch 1980; Enghoff 1985; Shelley 1993, 1998; Mikhaljova 1993, 1998, 2001, 2004). Kodiak is also one of the most geographically remote localities for an indigenous millipede in the North Pacific Ocean and environs (Table 1).

In conjunction with this contribution, we also record *Tingupa* from the northern BC mainland, thereby supplementing the Queen Charlotte Island locality (Shear and Shelley 2007) (Fig. 1). Data for all samples are as follows; specimens are deposited in the North Carolina State Museum of Natural Sciences.

USA: Alaska: Kodiak Island Bor., Kodiak I., Ft. Abercrombie, on chips of Sitka Spruce (*Picea sitchensis*), F, juv., 21 July 2007, R. M. Shelley. **New island record for the family, order, and class; westernmost Diplopoda locality in “North America.”**

CANADA: British Columbia: Ridley I., ca. 6.3 mi (10 km) E Prince Rupert, N 54° 13' 17.6", W130° 19' 43.8", 5 juvs., 9 and 18 August 2007, M. F. Medrano, K. Ovaska. **First record of the family and genus from “mainland” Canada and British Columbia.**

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