

Distribution and ecological notes on *Dynoides* (Isopoda: Sphaeromatidae) in the Mexican Pacific

María del Carmen Espinosa-Pérez and Michel E. Hendrickx

Laboratorio de Invertebrados Bentónicos, Instituto de Ciencias del Mar y Limnología, Unidad Académica Mazatlán, UNAM. A. P. 811 Mazatlán, Sinaloa, 82000, México. Fax 52 69 82 61 33; e-mail: carmene@ola.icmyl.unam.mx and michel@mar.icmyl.unam.mx

Received 26-VI-2001. Corrected 05-II-2002. Accepted 10-IV-2002.

Abstract: Two species of the genus *Dynoides* Barnard, 1914 (*D. crenulatus* Carvacho and Haasmann, 1984; *D. saldanai* Carvacho and Haasmann, 1984) not reported since their description were rediscovered during an intensive sampling program in the intertidal and shallow subtidal of the Mexican Pacific. Both species are abundant in the area and inhabit among the algae *Jania adherens* Lamouroux, 1816, *Amphiroa misakiensis* Yendo, 1902, *Chaetomorpha linum* Kützing, 1845, and *Hypnea pannosa* Agardh, 1847 from Nayarit to Oaxaca.

Key words: Isopoda, *Dynoides*, Mexican Pacific, distribution, fecundity.

Since it was created by Barnard (1914), several species have been added to the genus *Dynoides*. Harrison and Ellis (1991) considered only four species, overlooking the contribution of Carvacho and Haasmann (1984) who described two new species for the state of Oaxaca and first recorded the genus for the entire American Pacific. They also overlooked seven additional species described between 1980 and 1991. In addition to these species, another member of this genus was described in 1997 and one species was transferred to *Dynoides*. Li (2000) described another species from Hong Kong, transferred all species of *Clianella* to *Dynoides* and considered that 18 species of the genus are known to date, overlooking *D. conchicola* (Nishimura, 1976) from Japan. The 19 species presently included in *Dynoides* are: *D. serratisinus* Barnard, 1914 [South Africa]; *D. elegans* (Boone, 1923) [California]; *D. barnardi* Baker, 1928 [Australia]; *D. dentisinus* Shen, 1929 [Japan, Korea, China Sea]; *D. amblysinus* Pillai, 1954 [India]; *D. castroi* Loyola and Silva, 1960 [Brazil]; *D. conchicola* (Nishimura, 1976)

[Japan]; *D. brevispina* Bruce, 1980 [Japan]; *D. viridis* Bruce, 1982 [Australia]; *D. crenulatus* Carvacho and Haasmann, 1984 [Mexican Pacific]; *D. saldanai* Carvacho and Haasmann, 1984 [Mexican Pacific]; *D. spinipodus* Kwon and Kim, 1986 [Korea]; *D. brevicornis* Kussakin and Malyutina, 1987 [Eastern Russia]; *D. longisinus* Kwon, 1990 [Korea]; *D. hoonsooi* Kwon, 1990 [Korea]; *D. indicus* Mueller, 1991 [Sri Lanka]; *D. harrisoni* Kussakin and Malyutina, 1993 [China Sea]; *D. artocanalis* Nunomura, 1997 [Japan]; and *D. daguilarensis* Li, 2000 [Hong Kong]. Kensley and Schotte (2001) cite all these species, except *D. castroi* and *D. brevicornis* (see Loyola and Silva 1960, Kussakin and Malyutina 1987) and the species of *Clianella* transferred by Li (2000).

Despite of its evident abundance along the Pacific coast of Mexico, it took 70 years after *Dynoides* was described to record a species of this genus in the area. Indeed, *D. crenulatus* and *D. saldanai* were collected in 1982 from Puerto Escondido (15° 52.0' N - 97° 07.0' W), Oaxaca, Mexico, and described two years

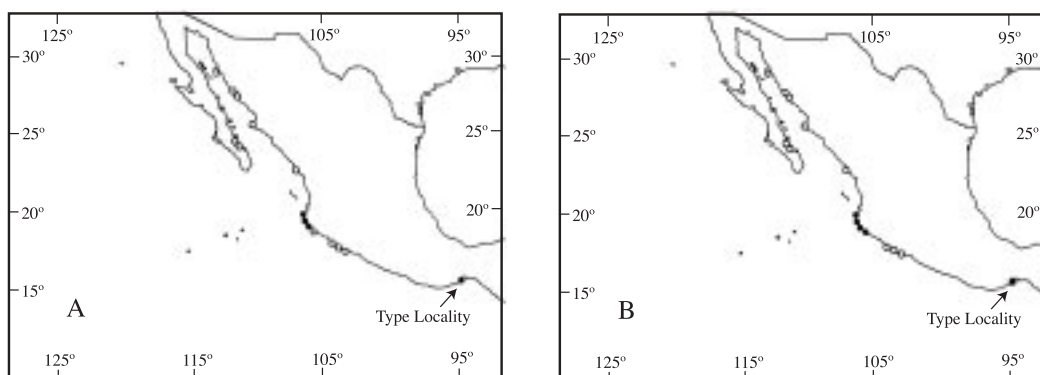


Fig. 1. Sampling localities of genus *Dynoides* along the Pacific coast of Mexico. A) *D. crenulatus*; B) *D. saldanai* (open circle, no specimens found; solid circle, specimens found).

after. Up to date, they have been reported only for their type locality.

During an intensive sampling program (13 localities) of intertidal and shallow water isopods along the Pacific coast of Mexico, *D. crenulatus* and *D. saldanai* were rediscovered in several localities, often abundantly.

MATERIALS AND METHODS

Specimens were all obtained from a series of samples in the intertidal and shallow subtidal (1996 and 1997) in the coastal area comprised between Los Algodones Bay ($27^{\circ} 58.6' N - 111^{\circ} 07.7' W$), north of Guaymas Bay, Sonora, and San Juan de Alima ($18^{\circ}36.1' N - 103^{\circ} 42.1' W$), in the northern part of Michoacan, Mexico (Fig. 1).

Collecting was done by hand, among algae, under rocks and in rock crevices and along sandy beaches. Scuba diving was used in shallow water. Water temperature (field thermometer) and position (portable GPS) were registered in every collecting site. Specimens of algae were preserved and kept for identification. Fecundity of the two species of *Dynoides* was estimated in terms of egg numbers related to total body length. The material collected was deposited in the invertebrates reference collection of the Unidad Académica Mazatlán, Instituto de Ciencias del Mar y Limnología, UNAM (EMU-).

Abbreviations used in this paper are: St., sampling station; IT, intertidal zone; TL, total length; NS, specimen not sexed; NM, specimen not measured; M, male; F, female; OF, ovigerous female; EMU-, Reference Collection of Invertebrates, Unidad Académica Mazatlan, UNAM, followed by catalog number.

RESULTS

Dynoides Barnard, 1914

Dynoides crenulatus Carvacho and Haasmann, 1984

Dynoides crenulatus Carvacho and Haasmann, 1984: 23-27, Figs. 5 - 6.

Examined material: Punta Raza ($21^{\circ} 02.6' N - 105^{\circ} 19.4' W$), Nayarit, 11/IV/1996, IT, 6 M (TL 2.6 - 3.6 mm), 18 F (TL 1.9 - 3.3 mm), 2 OF (TL 3.3 mm) and 22 additional specimens (NS, NM) (EMU-4407). Same locality, 11/IV/1996, IT, 2 M (TL 4.1 mm), 2 F (TL 2.4 mm), manual (EMU-4638). Same locality, 11/IV/1996, IT, 5 M (TL 3.1 - 4.4 mm), 20 F (TL 2.4 - 3.2 mm), 3 OF (TL 2.9 - 3.4 mm) and 33 additional specimens (NS, NM) (EMU-4687). Los Arcos ($20^{\circ} 32.5' N - 105^{\circ} 18.4' W$), Jalisco, 12/IV/1996, IT, 9 M (TL 3.2 - 4.4 mm), 14 F (TL 2.6 - 3.3 mm), 2 OF (TL 3.8 mm) and 23 additional specimens

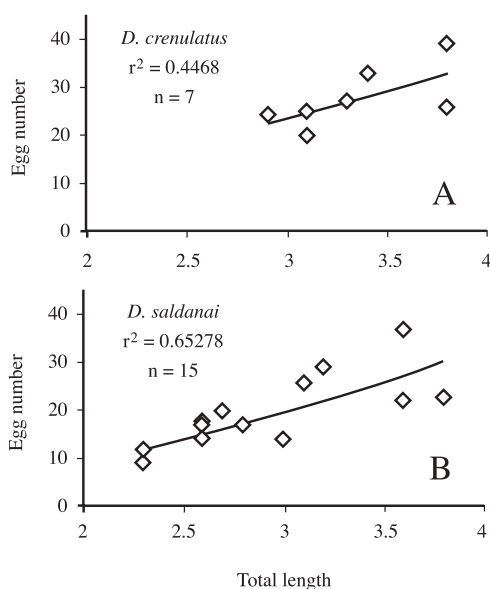


Fig. 2. Relation between total body length and number of eggs for A) *Dynoides crenulatus* and B) *Dynoides saldanai*.

(NS, NM) (EMU-4639). Bahía Tenacatita (19° 15.9' N - 104° 47.9' W), Jalisco, 4/XI/1996, IT, 2 M (TL 3.1 - 3.5 mm), 2 F (TL 3.2 mm), 1 OF (TL 3.1 mm) and 3 additional specimens (NS, NM) (EMU-4736).

Previously known localities: Puerto Escondido, Oaxaca, Mexico (type locality).

Geographic distribution: From Punta Raza, Nayarit (SE Gulf of California) to Puerto Escondido, Oaxaca, Mexico. Although similar habitats were sampled in ten additional localities, no specimens of *D. crenulatus* were found (Fig. 1A).

Habitat: Lower midintertidal zone, among algae and cirripeds on rocky beaches exposed to waves (Carvacho and Haasmann 1984). Material examined was collected in the rocky intertidal, associated to the algae *Jania adherens*, *Amphiroa misakiensis*, *Chaetomorpha linum* and *Hypnea pannosa*; water temperature varied from 25.5 to 29.0°C.

Size and fecundity: Maximum size (TL) is 4.75 mm for males and 4.0 mm for females (Carvacho and Haasmann 1984). Material examined contains males of 2.6 to 4.4 mm,

females of 1.9 to 3.3 mm, and ovigerous females of 2.9 to 3.8 mm (TL). The analysis of fecundity indicates an increase of egg number (from 24 to 39 eggs) with total body length (Fig. 2A).

Dynoides saldanai
Carvacho and Haasmann, 1984

Dynoides saldanai Carvacho and Haasmann, 1984: 27-31, Figs. 6 - 8.

Examined material: Punta Raza (21° 02.6' N - 105° 19.4' W), Nayarit, 11/IV/1996, IT, 5 M (TL 2.5 - 3.5 mm), 16 F (TL 2.4 - 3.4 mm) and 3 OF (TL 2.8 - 3.1 mm) (EMU-4686). Same locality, 11/IV/1996, IT, 19 M (TL 2.8 - 4.8 mm), 110 F (TL 1.2 - 3.8 mm), 39 OF (TL 2.3 - 3.5 mm) (EMU-4668). Same locality, 11/IV/1996, IT, 2 M (TL 4.6 - 5.0 mm), 119 F (TL 1.2 - 3.5 mm), 5 OF (TL 2.8 - 3.8 mm) and 43 additional specimens (NS, NM) (EMU-4669). Same locality, 11/IV/1996, IT, 10 M (TL 3.4 - 4.7 mm), 100 F (TL 1.3 - 4.0 mm), 16 OF (TL 2.6 - 3.4 mm) and 22 additional specimens (NS, NM) (EMU-4670). Same locality, 11/IV/1996, 3 m, 1 M (TL 2.9 mm), skin diving (EMU-4671). Same locality, 11/IV/1996, IT, 1 M (TL 5.6 mm) and 13 additional specimens (NS, NM) (EMU-4732). Same locality, 11/IV/1996, IT, 6 M (TL 2.8 - 4.3 mm), 15 F (TL 1.9 - 2.8 mm) and 6 additional specimens (NS, NM) (EMU-4733). Sayulita (20° 52.3' N - 105° 28.0' W), Nayarit, 10/IV/1996, 3 m, 1 F (TL 1.6 mm), skin diving (EMU-4672). Same locality, 10/IV/1996, 3 m, 1 F (TL 3.1 mm) (EMU-4673). Los Arcos (20° 32.5' N - 105° 18.4' W), Jalisco, 12/IV/1996, IT, 5 M (TL 2.5 - 3.5 mm), 31 F (TL 2.4 - 3.4 mm), 1 OF (TL 2.8 - 3.1 mm) and 26 additional specimens (NS, NM) (EMU-4674). Manzanillo Bay, El Arrecife (19° 06.0' N - 104° 24.1' W), Colima, 6/XI/1996, 3 m, 37 M (TL 3.1 - 4.0 mm), 39 F (TL 2.4 - 2.9 mm) and 78 additional specimens (NS, NM), skin diving (EMU-4729A). Same locality, 6/XI/1996, 3 m, 14 M (TL 2.1 - 3.8 mm), 34 F (TL 2.3 - 3.7 mm), 3 OF

(TL 2.6 - 2.9 mm) and 50 additional specimens (NS, NM), skin diving (EMU-4729B). Same locality, 6/XI/1996, 3 m, 27 M (TL 2.3 - 4.1 mm), 56 F (TL 2.2 - 3.5 mm) and 85 additional specimens (NS, NM), skin diving (EMU-4730). Same locality, 6/XI/1996, 3 m, 4 M (TL 3.4 - 4.6 mm), 47 F (TL 1.9 - 2.9 mm) and 55 additional specimens (NS, NM), skin diving (EMU-4731A). Same locality, 6/XI/1996, 3 m, 7 M (TL 3.2 - 4.7 mm), 99 F (TL 2.5 - 4.3 mm) and 50 additional specimens (NS, NM), skin diving (EMU-4731B). San Juan de Alima (18° 36.1' N - 103° 42.1' W), Michoacan, 5/XI/1996, IT, 1 M (TL 3.4 mm), 7 F (TL 2.2 - 3.1 mm) and 5 additional specimens (NS, NM) (EMU-4734A). Same locality, 5/XI/1996, IT, 1 M (TL 3.7 mm), 14 F (TL 2.2 - 3.4 mm) and 12 additional specimens (NS, NM) (EMU-4734B). Same locality, 5/XI/1996, IT, 4 M (TL 3.4 - 4.6 mm), 18 F (TL 2.5 - 3.8 mm) and 15 additional specimens (NS, NM) (EMU-4735A). Same locality, 5/XI/1996, IT, 3 M (TL 3.2 - 3.8 mm), 19 F (TL 2.4 - 3.4 mm), 2 OF (TL 2.8 - 3.2 mm) and 6 additional specimens (NS, NM) (EMU-4735B).

Previously known localities: Masunte Beach (type locality) and Puerto Escondido, Oaxaca, Mexico.

Geographic distribution: From Punta Raza, Nayarit (SE Gulf of California) to Puerto Escondido, Oaxaca, Mexico. No specimens of *D. saldanai* were found in the other nine sampling localities (Fig. 1B).

Habitat: Lower midintertidal zone, among algae on rocky beaches exposed to waves (Carvacho and Haasmann 1984). Material examined was collected in the rocky intertidal to a depth of 3 m, associated to the algae *J. adherens*, *A. misakiensis*, *C. linum* and *H. pannosa*; water temperature varied from 25.0 to 29.0°C.

Size and fecundity: Male holotype, 4.45 mm (TL); female allotype, 3.0 mm (TL) (Carvacho and Haasmann 1984). Material examined contains males of 2.1 to 4.8 mm, females of 1.2 to 4.3 mm, and ovigerous females of 2.3 to 3.5 mm (TL). The analysis of fecundity, in terms of number of eggs (from

nine to 37 eggs), indicates an increase of egg number with total body length (Fig. 2B).

ACKNOWLEDGMENTS

The authors are grateful to the CONABIO (Comisión Nacional para el Estudio y Uso de la Biodiversidad, México) for supporting our study on the isopod fauna of the Pacific coast of Mexico (Project CONABIO H-170). We thank the people who participate in this study: José Salgado-Barragán, Marcelo García Guerrero and Manuel Ayon Parente during field work, and Germán Ramírez Reséndiz with computer programs.

RESUMEN

Durante un programa intensivo de muestreo en la zona intermareal y submareal somera del Pacífico mexicano se redescubrieron dos especies del género *Dynoides* Barnard, 1914 (*D. crenulatus* Carvacho y Haasmann, 1984; *D. saldanai* Carvacho y Haasmann, 1984), no registradas desde su descripción. Ambas especies son abundantes en el área y habitan entre las algas *Jania adherens* Lamouroux, 1816, *Amphiroa misakiensis* Yendo, 1902, *Chaetomorpha linum* Kützting, 1845 e *Hypnea pannosa* Agardh, 1847 desde Nayarit hasta Oaxaca.

REFERENCES

- Barnard, K.H. 1914. Contributions to the crustacean fauna of South Africa. 3. Additions to the marine Isopoda, with notes on some previously incompletely known species. Ann. S. Afr. Mus. 10: 325-442.
- Carvacho, A. & Y. Haasmann. 1984. Isópodos litorales de Oaxaca, Pacífico mexicano. Cah. Biol. Mar. 25: 15-32.
- Harrison, K. & J.P. Ellis. 1991. The genera of the Sphaeromatidae (Crustacea: Isopoda): A key and distribution list. Invertebr. Taxon. 5: 915-952.
- Kussakin, O.G. & M.V. Malyutina. 1987. Morskije ravnogie rakoobraznye (Crustacea, Isopoda) litorali Zaliva Petra Velikogo, p. 47-67. In V.V. Gul'bin (ed.). Issledovaniya litorali Dal'nevostochnogo morskoga zapovednika i sopredel'nykh raionov. DVO AN SSR, Vladivostok.
- Li, L. 2000. A new species of *Dynoides* (Crustacea: Isopoda: Sphaeromatidae) from the Cape d'Aguiar

Marine Reserve, Hong Kong. Rec. Aus. Mus. 52:
137-149.

Loyola & J. de. Silva. 1960. Sphaeromatidae do litoral
Brasileiro (Isopoda - Crustacea). Bol. Univ. Parana,
Zool. 4: 1-182.

INTERNET REFERENCES

Kensley, B. & M. Schotte. 2001. World list of marine,
freshwater and terrestrial isopods crustaceans.
(<http://www.nmnh.si.edu/iz/isopod>).