New record of monogeneans (Platyhelminthes: Monogenea) infecting some marine fishes from the Peruvian coastal zone

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Abstract
A parasitological survey searching monogeneans infesting marine fish was carried out during June 2018 and January 2020 from the coastal zone of Puerto Pizarro, Tumbes (northern Peru) and from the coastal zone of Chorrillos, Lima (central Peru). The gills, skin, nasal cavities, or branchial gill-cover of seven species were sampled. Ten monogenean species assigned to six families and nine genera were identified. The monogeneans Callorhynchochotyle callorhynchi (Manter, 1955); Capsula bipartisatum (Goto, 1894) Price, 1938; Euryhaliotrema sagmatum Kritsky & Boeger, 2002; Listrocephalos kearni Bullard, Payne & Braswell, 2004; Magniexcipula lamothere Bravo-Hollis, 1981; Nasicola klawei (Stunkard, 1962) Yamaguti, 1968; and Pseudorhabdosynochus anulus Violante-Gonzalez & Rojas-Herrera, 2011 are registered for the first time in Peru. While Capsula gregalis (Wagner & Carter, 1967) Chisholm & Whittington, 2007; Heterocotyle margaritae Chero, Crubes, Sáez, Santos & Luque, 2020; and Monocotyle luquei Chero, Crubes, Iannacone, Sanchez, Minaya, Sáez & Alvariño, 2016 have been previously registered in Peruvian waters, however, the region of Tumbes (northern Peru) represent a new locality record for these species.

Keywords:
Capsalidae; fish parasites; Hexabothriidae; Microcotylidae; Pacific Ocean.

Palabras clave:
Capsalidae; Hexabothriidae; Microcotylidae; Océano Pacífico; Parásitos de peces.

Introduction
Currently, 244 monogenean species have been described or reported infecting marine fish in South America. Of these, 96 species occur in Peru (Luque et al. 2016a, 2016b). Peru has a rich fauna of marine fish with approximately 1070 species, including Chondrichthyans and teleosts, distributed in 549 genera, 194 families and 39 orders (Chi-
richigno & Cornejo 2001). However, approximately 9% of Peruvian marine fish have any parasitological study in monogeneans (Luque et al. 2016b). Thus, the current knowledge of the diversity of these fish parasites in Peru is still underestimated and many monogenean species, especially on poorly studied fish hosts, could be discovered (Cruces et al. 2020).

In this study, we inform about the monogenean records from fishes collected from coastal zone of Puerto Pizarro, norther Peru, and Chorrillos, central Peru, contributing to geographical distribution knowledge of 10 monogenean parasite species infecting marine fishes of the South American Pacific.

Material and methods

Fish were collected between June 2018 and January 2020 from the coastal zone of Puerto Pizarro, Tumbes region (3°29'S, 80°24'W) (northern Peru) and from the coastal zone of Chorrillos, Lima region (12°09'S, 77°01'W) (central Peru), using gillnets and were dissected immediately after capture. Fish were identified according to Chirichigno and Vélez (1998).

Monogeneans were removed from gill filaments, skin, nasal cavities, or internal face of branchial gill-covers and transferred temporarily to dishes containing sea water. The monogeneans were fixed in 4% formaldehyde, under light cover glass pressure, stained with Semichon’s carmine or Gomori’s trichrome, dehydrated using a graded ethanol series, cleared with clove oil and mounted on glass slides using Canada balsam. Other specimens were mounted in Gray and Wess medium (Humason 1979) for the study of sclerotized structures. Specimens were analysed and measured using a compound Olympus™ BX51 light photomicroscope equipped with Nomarski Differential Interference Contrast (DIC) optics and drawings were made with the aid of a drawing tube. Unless otherwise stated, measurements are in micrometers, representing straight-line distances between extreme points of the structures measured and are expressed as the range followed by the mean and number (n) of specimens measured in parentheses. Body length represents the length of the body proper including the haptor.

The terms prevalence and mean intensity were used according to Bush et al. (1997). Vouchers of all helminth species were deposited in the Helminthological Collection of the Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos (MUSM), Lima, Peru.

Results

We analysed 194 specimens of monogeneans recovered from 92 specimens of seven marine fish species. Detailed of morphological analysis made it possible to identify ten species belonging to nine genera and six families. The family and species of the monogeneans found in the present study, as well as measurements (only for species considered new records for Peru); taxonomic summaries containing the host, locality, site of infection, accession number of deposited specimens, and taxonomic comments for each monogenean species are presented below.

Taxonomy

Class Monogenea Van Beneden, 1858
Subclass Monopisthocotylea Van Beneden, 1858
Family Capsalidae Baird, 1853

Capsala biparasiticum (Goto, 1894) Price, 1938

Figure 1

Measurements: Body 7.65–10.45 (9.05; n = 2) mm long, maximum width 3.90–4.29 (4.09; n = 2) mm. Sucker-like attachment organs 1.11-1.24 (1.17; n = 2) mm long, 0.89–1.01 (0.95; n = 2) mm wide. Pharynx 726–852 (789; n = 2) long, 896–968 (932; n = 2) wide. Haptor 2.68–3.29 (2.98; n = 2) mm long, 2.78–3.39 (3.09; n = 2) mm wide. Testes 150–164 (157; n = 2) long, 87–93 (90; n = 2) wide. Cirrus sac 793–962 (878; n = 2) long, 177–194 (186; n = 2) wide. Ovaly 726–849 (788; n = 2) long, 878–915 (897; n = 2) wide.

Host: Thunnus albacares (Bonnaterre, 1788) (Perciformes: Scombridae), yellow-fin tuna.

Site in Host: Nasal cavity.

Locality: Puerto Pizarro, Tumbes Region, Peru (3°29'S 80°24'W).

Voucher specimens deposited: 2 (MUSM 4720a-b).

Remarks: Capsala biparasiticum (Goto, 1894) Price, 1938 was initially described by Goto (1894) as Tristoma biparasitica Goto, 1894, collected from Thunnus albacores in Japan, later was transferred to the genus Caballerocotyla by Price (1938). Caballerocotyla biparasitica was transferred to genus Capsala Bosc, 1811 by Chisholm and Whittington (2007) based in the presence of a single row of multicuspid sclerites located on the dorsal edge of the body, a common genital pore that opens midway between the midline and the lateral margin of the body and a uterus that joins the MCO at approximately the posterior 1/3 point. Two other species of Caballerocotyla, C. abidjani Bussieras & Baudin-Laurencin, 1970 and C. neothunni Yamaguti, 1968, both from T. albacores, were transferred to genus Capsala and considered synonymous of C. biparasiticum by having the aforementioned characteristics (see Chisholm & Whittington 2007). Capsala biparasiticum was previously registered infecting the gills or oral cavity of T. albacores, T. maccoyii (Castelnau, 1872) and T. obesus (Lowe, 1839) in Japan, Gulf of Mexico, Hawaii, and Brazil. This is the first recorde of C. biparasiticum in Peru.

Capsala gregalis (Wagner & Carter, 1967) Chisholm & Whittington, 2007

Figure 2

Host: Sarda chilensis (Cuvier, 1832) (Perciformes: Scombridae), Eastern Pacific bonito.
Site in Host: Gill filaments.

Locality: Coastal zone of Puerto Pizarro, Tumbes Region, Peru (3°29’S 80°24’W).

Voucher specimens deposited: 5 (MUSM 4721a-e).

Remarks: Capsala gregalis (Wagner & Carter, 1967) Chisholm & Whittington, 2007 was originally described by Wagner and Carter (1967) as Caballerocotyla gregalis based on specimens collected from Sarda chiliensis (Girard, 1858) in the North American Pacific Ocean of the United States. This species was characterized mainly by lacking dorso-marginal body sclerites (see Wagner & Carter, 1967). However, Chisholm and Whittington (2007) examined the type specimens of Ca. gregalis and noticed the presence of a single row of small unicuspid dorso-marginal body sclerites. They transferred Ca. gregalis to the genus Capsala. A capsalid species, Ca. australis Oliva, 1986 was described from the gills of S. chilensis in Chile. This species was also reported from the same host in the north of Peru. This species differs from its congeners mainly in terms of the vas deferens, which have a convoluted proximal portion occupying the space between the ootype and ovary (Bullard et al. 2004). Our finding of L. kearni parasitizing H. dipterurus on the coast of Peru extend the geographic distribution of the species from the original.

Locality: Gulf of California, Mexico in the Pacific Ocean.

Nasicola klawei (Stunkard, 1962) Yamaguti, 1968

Figure 4

Measurements: Body oval, 10–14.4 (13.1; n = 10) mm long, 9.2–12.92 (11.46; n = 10) mm in maximum width; dorsolateral margin of body with two irregular rows of sclerites: outer row with 214–399 (305; n = 5) large spines and inner row with 35–52 (40; n = 5) small spines. Haptor circular, 7.325–3.78 (3.57; n = 10) mm in diameter, with one central and seven peripheral loculi; marginal membrane delicate; accessory sclerites small, 27–43 (37; n = 5) long, with short and bifid shaft. Sucker-like attachment organs 450–725 (608; n = 10) long, 375–750 (639; n = 10) wide. Pharynx 1.05–1.63 (1.39; n = 9) mm long; anterior region 1.05–1.50 (1.29; n = 10) mm wide; posterior region 0.85–1.18 (1.09; n = 10) mm wide. Cirrus sac 700–900 (784; n = 7) long. Testes 29 in number, 120–230 (176; n = 35) long. Gland of Goto 22 in number; 210–550 (316; n = 34) long. Ovary 0.85–1.60 (1.34; n = 9) mm long, 0.870–1.65 (1.33; n = 9) mm wide.

Host: Thunnus albacares (Bonnaterre, 1788) (Perciformes: Scombridae), yellow-fin tuna.

Site in Host: Nasal cavity.

Locality: Coastal zone of Puerto Pizarro, Tumbes Region, Peru (3°29’S 80°24’W).

Voucher specimens deposited: 13 (MUSM 4722a-m).

Remarks: This species was initially described as a member of the genus Caballerocotyla by Stunkard (1962) based in specimens collected from nasal cavity of T. albacares in the Pacific Ocean. Later, Yamaguti (1968) transferred Ca. klawei to genus Nasicola Yamaguti, 1968, as N. klawei (Stunkard, 1962) Yamaguti, 1968. Currently, three valid species of Nasicola are recognized, namely N. brasiliensis Kohn, Baptista-Farias, dos Santos & Gibson, 2004; N. hogansi Wheeler & Beverly-Burton, 1987, and N. klawei, all of them described or reported from tunas in the Atlantic.
tic and Pacific Oceans (Lopes et al. 2016). Nasicola klawei was redescribed by Kohn et al. (2004) and has been reported infecting the nasal cavity of T. albacaeres in México and Brazil (Bullard et al. 2011, Justo & Kohn 2015, Kohn et al. 2004) and T. obesus in Hawai (Wheelery & Beverley-Burton 1987). Morphometric characteristics of the specimens studied in the present work corresponds to the previous data obtained by Lamote (1997) and Kohn et al. (2004) for N. klawei, but the size of body appears to be bigger. Nasicola klawei is considered a new record for Peru.

**FAMILY DACTYLOGYRIDAE**

*Euryhaliotrema sagmatum* Kritsky & Boeger, 2002

**Measurements:** Body elongate, 764 long; greatest width 255 usually at level of testis. Pharynx 78 in greatest width. Haptor 99 long; 61 wide. Ventral anchor 25 long, base 19 wide. Dorsal anchor 20 long, base 17 wide. Ventral bar 30 long, Dorsal bar 36 long. Hook 12 long. MCO 89 long. Accessory piece 47 long. Testis 125 long, 68 wide. Ovary 152 long, 46 wide.

**Host:** Umbrina xanti Gill, 1862 (Perciformes: Sciaenidae), polla drum.

**Site in Host:** Gill filaments.

**Locality:** Coastal zone of Puerto Pizarro, Tumbes Region, Peru (3°29’S 80°24’W).

**Voucher specimens deposited:** 1 (MUSM 4724).

**Remarks:** A single specimen of *Euryhaliotrema sagmatum* provided by Kritsky and Boeger (2002) did not reveal any differences. *Euryhaliotrema sagmatum* has also been registered infecting the gill of *U. xanti* in México and Panama (Mendoza-Franco et al. 2011). This is the first record of *E. sagmatum* in the Peruvian coast.

**FAMILY MONOCOTYLIDAE**

*Heterocotyle margaritae* Chero, Cruces, Sáez, Santos & Luque, 2020

**Figure 5**

**Host:** Hypanus dipterurus (Jordan and Gilbert, 1880) (Myliobatiformes: Dasyatidae), diamond stingray.

**Site in Host:** Gill filaments.

**Locality:** Coastal zone of Puerto Pizarro, Tumbes Region, Peru (3°29’S 80°24’W).

**Voucher specimens deposited:** 3 (MUSM 4725a-c).

**Remarks:** This species was recently described parasitizing *H. dipterurus* from Chorrillos, Lima Region (central Peru) (Chero et al. 2020). *Heterocotyle margaritae* is typified by its male copulatory organ, which is funnel-shaped, spatulate distally with lateral folds and by its club-shaped accessory piece (Chero et al. 2020). In addition, this species is characterized by having a haptor with one central and eight peripheral loculi, 1/2/3 sinuous ridge arrangement and a vagina sclerotized. These findings extend the distribution to a new locality in northern Peru.

*Monocotyle luquei* Chero, Cruces, Iannacone, Sanchez, Minaya, Sáez & Alvariño, 2016

**Figure 6**

**Host:** Hypanus dipterurus (Jordan and Gilbert, 1880) (Myliobatiformes: Dasyatidae), diamond stingray.

**Site in Host:** Gill filaments.

**Locality:** Coastal zone of Chorrillos, Lima Region, Peru (12°09’S, 77°01’W); Coastal zone of Puerto Pizarro, Tumbes Region, Peru (3°29’S 80°24’W).

**Voucher specimens deposited:** 3 (MUSM 4726a-c).

**Remarks:** This species is characterized by having a male copulatory organ with 1-2 distal loops; a haptor with one central and eight peripheral loculi with haptoral sclerites of four types (bicuspid, tricuspid, quadrangular and conical), Sanchez, Minaya, Sáez & Alvariño, 2016 was described on *H. dipterurus* from Chorrillos, Lima (central Peru) (Chero et al. 2016). Morphometric characteristics of the specimens studied in the present work corresponds to the previous data obtained by Chero et al. (2016) for *M. luquei*. This species is characterized by having a male copulatory organ with 1-2 distal loops; a haptor with one central and eight peripheral loculi with haptoral sclerites of four types (bicuspid, tricuspid, quau-
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**Subclass Polyopisthocotylea Van Beneden, 1858**
**Family Hexabothriidae Price, 1942**

**Callorhynchocotyle callorhynchi** (Manter, 1955)
Boeger, Kritsky & Pereira, 1989

Figure 7

**Measurements:** Body elongate, 5.75–11.25 (8.16; n = 9) mm long, 0.55–1.30 (0.98; n = 9) mm wide at level of ovary. Oral sucker subterminal, 250–380 (297; n = 7) long, 300–430 (354; n = 7) wide. Pharynx medial, 75–93 (85; n = 7) long, 70–98 (84; n = 7) wide. Haptoral sucker asymmetrical, 1.10–2.63 (1.61; n = 7) mm long, 1.50–3.01 (2.34; n = 7) mm wide. Haptoral sucker sclerite 1 and 1', 290–440 (365; n = 8) in maximum length, 40–50 (41; n = 8) wide; haptoral sucker sclerite 2 and 2', 330–500 (398; n = 9) in maximum length, 40–70 (53; n = 9) wide. Appendix unarmed (= having anchors), 270–500 (341; n = 8) long, 270–500 (341; n = 7) wide. Anchors (= hamuli) 50–63 (59; n = 9) long, 8–28 (16; n = 6) wide.

**Host:** Callorhinchus callorhynchi (Linnaeus, 1758) (Chimaeriformes: Callorhinidae), plownose chimaera or elephant-fish.

**Site in Host:** Gill filaments.

**Locality:** Coastal zone of Chorrillos, Lima Region, Peru (12°09'S, 77°01'W).

**Voucher specimens deposited:** 9 (MUSM 4727a-i).

**Remarks:** Callorhynchocotyle was proposed by Suriano and Incorvaia (1982) to accommodate Callorhynchocotyle marplatensis Suriano and Incorvaia, 1982 using specimens collected from the gills of the American elephantfish, Callorhinchus callorhynchi (Linnaeus, 1758) in Argentina (Atlantic Ocean) (Boeger et al. 1989, Boeger & Kritsky 1989, Suriano & Incorvaia 1982, Vaughan & Christison 2012). To date, five valid species of Callorhynchocotyle are recognized, namely C. amatoi Boeger, Kritsky & Pereira, 1989; C. callorhynchi (Manter, 1955); C. hydrolagi Beverley-Burton, Chisholm & Last, 1990; C. marplatensis and C. sagamiensis Kitamura, Ogawa, Taniu & Kitamura, 2006 (Vaughan & Christison 2012), all of them described from chimaerid and callorhinchid fish in the Atlantic and Pacific Oceans (Kitamura et al. 2006, Vaughan & Christison 2012). Callorhynchocotyle callorhynchi was initially described as Squalonchocotyle callorhynchi by Manter (1955) from the cape elephantfish, C. capensis Duméril, 1865 and the ghost shark, C. miliii Bory de Saint-Vincent, 1823 in South Africa and New Zealand, respectively. Later, Dillon and Hargis (1968) transferred S. callorhynchi to genus Erpocotyle. Subsequently, Boeger et al. (1989) redescribed and transferred E. callorhynchi within the genus Callorhynchocotyle, based on the absence of a glandular region of the cirrus, presence of a bulbus distal cirrus, a dorsal instead of terminal haptoral appendix and a terminal glandulomuscular portion of vagina. The specimens studied here are in accordance with the description given by Vaughan and Christison (2012) and Poddubnaya et al. (2015) for C. Callorhynchocotyle. The taxonomic characters of C. callorhynchi were performed by Manter (1955), Boeger et al. (1989), Beverley-Burton and Chisholm (1990) and Vaughan and Christison (2012), revealing the presence of a papillate surface in the lumen of the haptoral suckers. However, Poddubnaya et al. (2015) show for first time the presence of spines and not papillae on the inner surface of the suckers of C. callorhynchi. In South America, C. callorhynchocotyle has been registered on the gill filaments of C. callorhynchi off the coast of Chile and Falkland-Patagonian Region (Cohen et al. 2013). In Peru, only C. marplatensis has been registered on the gill filaments of C. callorhynchi (Luque et al. 2016). Callorhynchocotyle callorhynchi is a new record to the Peruvian Pacific Ocean. The record of C. callorhynchi in the coast of Peru is not a surprise because the geographical distribution of the fish host includes the Pacific and Atlantic coast of South America.

**Family Microcotylidae Price, 1942**

**Magniexcipula lamothei** Bravo-Hollis, 1981

**Measurements:** Body fusiform, 2.27–5.70 (4.17; n = 10) mm long, 0.29–0.58 (0.46; n = 10) mm in maximum width. Clamp measurements: anterior most clamps 51–59 (55; n = 3) long; medial clamps 48–50 (49; n = 3) long; terminal clamps 38–50 (42; n = 5) long, Buccal suckers seaptate, 35–77 (57; n = 9) long, 49–90 (65; n = 8) wide. Pharynx 27–39 (34; n = 10) long, 33–36 (35; n = 10) wide. Testes 17–18 in number: Genital atrium unarmed, distant 307–457 (361; n = 9) from anterior end. Cirrus armed with two sclerotized rods and numerous small sigmoid spines; rods 78–88 (856; n = 9) long. Vitelline follicles 307–457 (361; n = 8) from anterior end. Vaginal pore 306–442 (406; n = 4) from anterior end. Egg 157–220 (195; n = 3) long, 62–80 (70; n = 3) wide, with single long filament at abopercular pole.

**Host:** Calamus brachysomus (Lockington, 1880) (Pericorinidae: Sparidae), Pacific porgy.

**Site of infection:** Gill filaments.

**Locality:** Coastal zone of Puerto Pizarro, Tumbes Region, Peru (3°29'S 80°24'W).

**Voucher specimens deposited:** 6 voucher specimens (MUSM 4728a-f).

**Remarks:** Magniexcipula is a monotypic genus and was erected by Bravo-Hollis (1981) to accommodate a microcotyloid species, Magniexcipula lamothei Bravo-Hollis, 1981, from the gills of the Pacific porgy, Calamus brachysomus (Lockington, 1880) (Pericorinidae: Sparidae) in Mexico. This genus is characterized by having a well-developed vitelline-seminal receptacle and by the great complexity of the copulatory organ and genital atrium.
Morphometrical comparison of the present specimens with the original description of *M. lamothei* provided by Bravo-Hollis (1981) did not reveal any differences. *Magniexcipula lamothei* has also been registered infecting the gill filaments of the spotted head sargo, *Genyatremus doli* (Günther, 1864) (Perciformes: Haemulidae) in Mexico (Mendoza-Garfias & Pérez-Ponce de León 1998). This is the first record of *M. lamothei* in the Peruvian coast. The presence of *M. lamothei* in the South American Pacific might be a result from the geographical distribution of the host (*C. brachysomus*), who is distributed from the coast of the Southern California (USA) to Peru.

Figure 1–7. Monogeneans infecting some marine fishes from Peruvian coastal zone. 1. *Capsala biparasiticum* (Goto, 1894) Price, 1938 from *Thunnus albacares*. 2. *Capsala gregalis* (Wagner & Carter, 1967) Chisholm & Whittington, 2007 from *Sarda chilensis*. 3. *Listrocephalos kearni* Bullard, Payne & Braswell, 2004 from *Hypanus dipterurus*. 4. *Nasicola klawei* (Stunkard, 1962) Yamaguti, 1968 from *Thunnus albacares*. 5. *Heterocotyle margaritae* Chero, Cruces, Sáez, Santos & Luque, 2020 from *Hypanus dipterurus*. 6. *Monocotyle luquei* Chero, Cruces, Iannacone, Sanchez, Minaya, Sáez & Alvarino, 2016 from *Hypanus dipterurus*. 7. *Callorhynchocotyle callorhynchi* (Manter, 1955) Boeger, Kritsky & Pereira, 1989 from *Callorhinus callorhynchos*.

Discussion

In the present study, we identified ten monogenean species, assigned to six families (Capsalidae, Dactylogyridae, Diplectanidae, Hexabothriidae, Microcotylidae and Monocotylidae) and nine genera (*Callorhynchocotyle*, *Capsala*, *Euryhalietrema*, *Heterocotyle*, *Listrocephalos*, *Magniexcipula*, *Monocotyle*, *Nasicola* and *Pseudorhabdosynochus*), on marine fish belonging to six families (Callorhinchidae, Dasyatidae, Sciaenidae, Scombridae, Serranidae and Sparidae) from Peru. The monogeneans *C. callorhynchi*, *C. biparasiticum*, *E. sagmatum*, *L. kearni*, *M. lamothei*, *N. klawei* and *P. annulus* are registered for the first time in Peru. While *C. gregalis*, *H. margaritae* and *M. luquei* have been previously registered in Peruvian waters, however, the region of Tumbes (northern Peru) represents a new locality record for these species.

Luque et al. (2016) listed six species representing four genera of monogeneans from three marine chondrichthyan species in Peru, a *Callorhynchocotyle* species (Hexabothriidae) from *C. callorhynchos*, two *Rhinobatichocotyle* species (Hexabothriidae) from *Pseudobatos planiceps* Garman, 1880 (Rhinopristiformes: Rhino-
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Batidae), a Loimos species (Loimoidae) from Mustelus dorsalis Gill, 1864 (Triakidae) and two Anoplocotyloloïdes species (Monocotylidae) from P. planiceps. Currently, the number of species of monogeneans that infect these fishes in Peru has increased to 10 (Chero et al. 2016, 2018a, 2018b, 2019), with Heterocotyle margaritae Chero, Crucès, Sáez, Santos & Luque, 2020 (Monocotylidae) being the last species to be described (Chero et al. 2020). The two species C. callorrhynchi and L. kearni, registered here increases the number of monogeneans that infect marine chondrichthyan to 12, which are relatively poorly studied fish hosts. Since the chondrichthyan fauna of Peru is rich and consists of 115 species (66 sharks; 43 batoids; 6 chimaeras), it is possible that many monogeneans are not registered in Peru.

The Hexabothriidae Price, 1942 (Monogenea) include species that infect the buccal cavity, gill arches or respiratory surfaces of chondrichthyan fishes (sharks, stingrays and chimaeras) (Chero et al. 2018a, 2019). These species are characterized by having a haptor with three pairs of sucker complexes, each of which are armed with a large, hooked sclerites; and by having a haptoral appendix, which bears a pair of small suckers at its distal end (Boeger & Kritsky 1989, Chero et al. 2019). Three hexabothrid species have been described or recorded infecting the gills of marine elasmobranchs in Peru: Ca. marplatensis; Hypanocotyle bullardi Chero, Crucès, Sáez, Camargo, Santos & Luque, 2018 and Rhinobatanchoctyle pacifica Oliva & Luque, 1995. An additional species, Rhinobatanchoctyle cyclovaginatus Doran, 1953 was also reported infecting the gills of P. planiceps in Peru (Tantaleán et al. 1998). However, according to Chero et al. (2019) this was an identification error. The species of Callorhynchocotyle registered here increases the number of hexabothrid species to four.

Regard to capsalids, four species have been registered infecting the gills of five marine fish in Peru: C. gregalis from S. chilensis, Encytodblae antofagastensis Sepúlveda, González & Oliva, 2014 from Anisotreuma scapularis (Tscheidui, 1896) (Haemulidae); E. caelarosi Tantaleán, 1974 Paralanchrus peruanus (Steindacher, 1875) (Sciaenidae) and Sciaena delicosa (Tscheidui, 1846) (Sciaenidae); Macroplhylida antarctica (Hughes, 1928) (Sciaenidae): Macroplhylida antarctica (Hughes, 1928) were described from Chelidactylus varigatus Valencienne, 1833 (Cheilodactylidae) (Luque et al. 2016). Listrocephalus kearni is the first capsalid monogenean registered from a marine chondrichthyan in Peru.

At present, eight microcotylid species have been registered in Peru, seven of them infecting the gills of marine perciforms (Luque et al. 2016). This is the first record of a microcotylid species infecting spard fish from Peru.

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Rol de los autores / Authors Roles:
EGH, IC, GMZ, CLC and JDC have collected the specimens. ACA, CLC, JDC and JLL analyzed the specimens. ACA and JDC wrote the paper. EGH, IC, GMZ, CLC, JDC and JLL reviewed and approved the manuscript.

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