

## New and known species of *Dactylogyrus* Diesing, 1850 (Monogenea, Dactylogyridae) from Iranian freshwater cyprinid fishes

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### Abstract

Three new *Dactylogyrus* species, *D. rectotrabus* n. sp. and *D. acinacus* n. sp. from *Garra rufa* plus *D. carassobarbi* n. sp. from *Carassobarbus luteus* are described from River Dez (Persian Gulf Basin) of Iran. Three known species, *D. haplogonus* from *Rutilus frisii kutum*, *D. chalcalburni* from *Alburnus alburnus* and *Alburnoides bipunctatus*, and *D. pavlovskyi* from *Barbus sharpeyi* are recorded from the Rivers Sefid (Caspian Basin), Zayandeh (Central Iran) and Dez (Tigris-Euphrates Basin), respectively. Comments on the monogenean fauna of Iranian freshwater fishes are presented.

### Introduction

From the zoogeographical point of view, the monogenean fauna of Iranian fishes commands special interest. Watersheds in Iran belong to at least three different faunal regions. Rivers in northern Iran are inhabited by typical Ponto-Caspian fish species, the monogenean fauna of which is well studied in the neighbouring CIS (Soviet) territories (Gussev, 1985). Rivers in central Iran drain their water into salt lakes and, in addition to endemic fish species, fishes of the Palaearctic region predominate. Data on the monogeneans of these two water systems have been reported only recently (Jalali & Molnár, 1990a,b). The Tigris-Euphrates (Mesopotamian) Region has a special

character. The River Tigris and its tributaries are populated mainly by endemic fishes (Berg, 1949; Coad, 1979). As monogeneans are known to have a relatively strict host specificity, the large number of endemic fishes suggests the existence of several new monogenean species. The first information on monogeneans of fish from this region was given by Bychowsky (1949), who described four new species from the River Karkheh. Subsequently, Iraqi authors (Ali *et al.*, 1986, 1987a,b) also reported the occurrence of some monogeneans from natural water and pond-farm fishes, but failed to give a detailed identification of the species found. In a forthcoming paper (Gussev *et al.*, 1993) it is intended to describe some new species and give a detailed analysis of monogeneans of the Mesopotamian faunal region. Hitherto, no data are available on monogeneans of fishes in south-east

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Iran, the fauna of which is greatly influenced by that of the Sino-Indian region.

In this paper three new *Dactylogyrus* species are described, and the occurrence of three known species of the genus is recorded.

### Materials and methods

The monogeneans were collected from fishes of three Iranian fauna regions: (1) The Ponto-Caspian Region: the River Sefid, draining into the Caspian Sea; (2) Central Iran: the River Zayandeh, emptying into undrained salt lakes; (3) The Tigris-Euphrates Basin: the River Dez, a tributary of the River Karun.

Monogeneans were collected from the gills of the fishes under a stereomicroscope at a magnification of  $\times 40$ – $100$ . They were picked off alive from gill scrapings using a pipette, placed under a coverslip and fixed either in ammonium picrate solution (Fernanda *et al.*, 1972) or in glycerine jelly (Gussev, 1983). Measurements were taken and drawings made using a light microscope with a drawing attachment. The terminology and measurements are in accordance with Gussev (1983). All measurements are given in micrometres.

The monogenean material of this study was collected by B. Jalali. Part of this collection is already published (Jalali & Molnár 1990a,b). The present work includes those dactylogyrids from the collection which initially appeared to be undescribed species or which proved difficult to identify.

### Results

Four *Dactylogyrus* spp, three of them previously undescribed, were found on fishes collected from rivers of the Tigris-Euphrates Basin. *Dactylogyrus* spp. found on fishes from the River Sefid and the River Zayandeh proved to be the known species, *D. haplogonus* Bychowsky, 1933 and *D. chalcalburni* Dogiel & Bychowsky, 1934, respectively. All species found were located on the gills.

### *Dactylogyrus rectotrabus* n. sp. (Fig. 1)

*Type-locality*: River Dez, Tigris-Euphrates Basin, Iran.

*Type-host*: *Garra rufa* Heckel, 1843.

*Specimen studied*: 1.

*Type-material*: Holotype deposited in the monogenean collection of the Zoological Department, Hungarian Natural History Museum, Budapest.

### Description

Small worms with 4 eye-spots. Body length 400, width 85. Marginal hooks with handle well separated from its pivot, with rounded, projected heel of blade; total length 15–22. Anchors thin with long, straight inner root and very short outer root. Anchor length 36; shaft 24; inner root 15; outer root  $< 1$ ; point c. 10. Single (dorsal) bar almost straight with rounded, enlarged ends, measuring  $2 \times 18$ . Copulatory organ with vesicle-like base of tube, 8 in diameter. Copulatory tube reflexes abruptly and continues as a straight, attenuated tube; length from reflex to extremity 60; diameter after reflex 2–2.5, at extremity  $< 1$ . Accessory piece ribbon-like, arising from base of tube and running parallel with tube; end of accessory piece enlarged, possessing short, posteriorly directed straight process and a thin, curved rod-like anterior process. Vagina sclerotised; comprising short tube with disc-like plates at each end; length 7, diameter of tube 2.

*Etymology*: The species is named after the shape of its dorsal bar.

### Comments

This species might be related to the wegeneri-group (Gussev, 1985), a morphological group of species from the Palaearctic, but differs in the shape of the accessory piece of the copulatory organ, the presence of a sclerotised vagina, and a gradual transition between the shaft of the anchors and the tip.

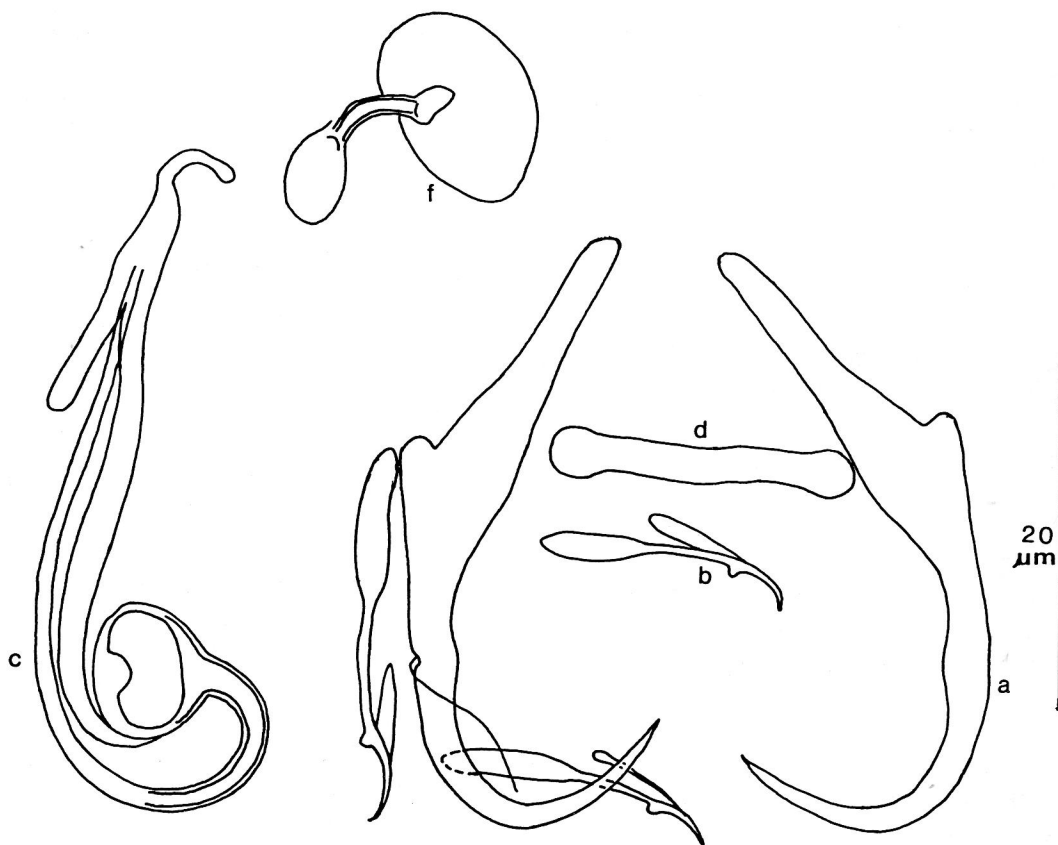


Fig. 1. *Dactylogyrus rectotrabus* n. sp. Sclerotised organs. Abbreviations: a, anchors; b, marginal hooks; c, copulatory organ; d, dorsal bar; e, ventral bar; f, vagina; c<sub>1</sub>, base of copulatory organ.

***Dactylogyrus acinacus* n. sp.** (Fig. 2)

*Type-locality*: River Dez, Tigris-Euphrates Basin, Iran.

*Type-host*: *Garra rufa* Heckel, 1843.

*Specimens studied*: 2.

*Type-material*: Type-specimens deposited in the monogenean collection of the Zoological Department, Hungarian Natural History Museum, Budapest.

*Description*

Small worms with 4 eye-spots. Body length 450, width 90. Marginal hooks with handle well separated from its pivot, with well-projected heel of blade. Length of the hooks 18–22. Anchors of wunderi-type with long inner root and shaft which graduates into point. Length of anchors 32–36;

shaft 23–26; inner root 15–16; outer root 3–3.5; point 9–10. Dorsal bar curved slightly posteriorly in middle, with enlarged extremities; size of dorsal bar 3 × 19–21. Ventral bar absent. Copulatory organ sickle-shaped; total length 23–28, with curved tube; base vesicular, enlarged, with short tongue-like process. Length of tube following curve 35–40; diameter at base 6–8, elsewhere 1.5–2. Accessory piece arising from base of tube, with claw-like distal end and anteriorly directed protrusion. Sclerotised vagina comprises short, curved tube, 10 long.

*Comments*

With regard to its copulatory organ, *D. acinacus* n. sp. resembles *D. rectotrabus* n. sp., but differs from this species in the shape of its anchors and the structure of the vagina.



Fig. 2. *Dactylogyrus acinacus* n. sp. Sclerotised organs. Abbreviations: see Fig. 1.

***Dactylogyrus carassobarbi* n. sp. (Fig. 3)**

*Type-locality*: River Dez, Tigris-Euphrates Basin, Iran.

*Type-host*: *Carassobarbus luteus* Heckel, 1843.

*Specimens studied*: 4.

*Type-material*: Holotypes deposited in the collection of the Zoological Department, Hungarian Natural History Museum, Budapest.

*Description*

Medium-sized worms with 4 eye-spots. Body length 600–1,350, width 81–200. Marginal hooks long with indistinct border between handle and stout pivot, with rounded, slightly projecting heel of blade; length of marginal hooks 28–32 (1st pair), 48 (4th pair). Anchors of varicorhini-type (Gussev, 1985), with constriction at base of point; length 48–56; shaft 40–42; inner root 18–22; outer root 4–8.5; point 11–13. Dorsal bar of varicorhini-type, with central cavity;  $7.5\text{--}10 \times 31.5\text{--}38$ . Ventral bar a transverse, comparatively thick plate;  $2.5\text{--}3.5 \times 23\text{--}30$ . Copulatory organ of typical varicorhini-type, with tube coiled in spiral of 1.5 turns and claw-like accessory piece. Total length of cop-

ulatory organ 32–36, diameter at base of tube 7, medially 3 and distally 1. Total length of coiled tube up to 80.

*Comments*

*D. carassobarbi* n. sp. differs from other species of the varicorhini-group because of the short point and long inner roots of the anchors (the point is 2.5 times shorter than the root, while in other species this ratio is 1.5 or less). This species most closely resembles, in the structure of the copulatory organ, *D. bocagei* Alvarez-Pellitero, Simon-Vicente & Gonzales-Lanza, 1981.

Three other *Dactylogyrus* species were found which were identified as previously described species, although small differences in measurements were determined and additional hosts were recorded.

***Dactylogyrus pavlovskyi* Bychowsky, 1949 (Fig. 4)**

*Host*: *Barbus sharpeyi* Gunther, 1874.

*Locality*: River Dez, Tigris-Euphrates Basin, Iran.

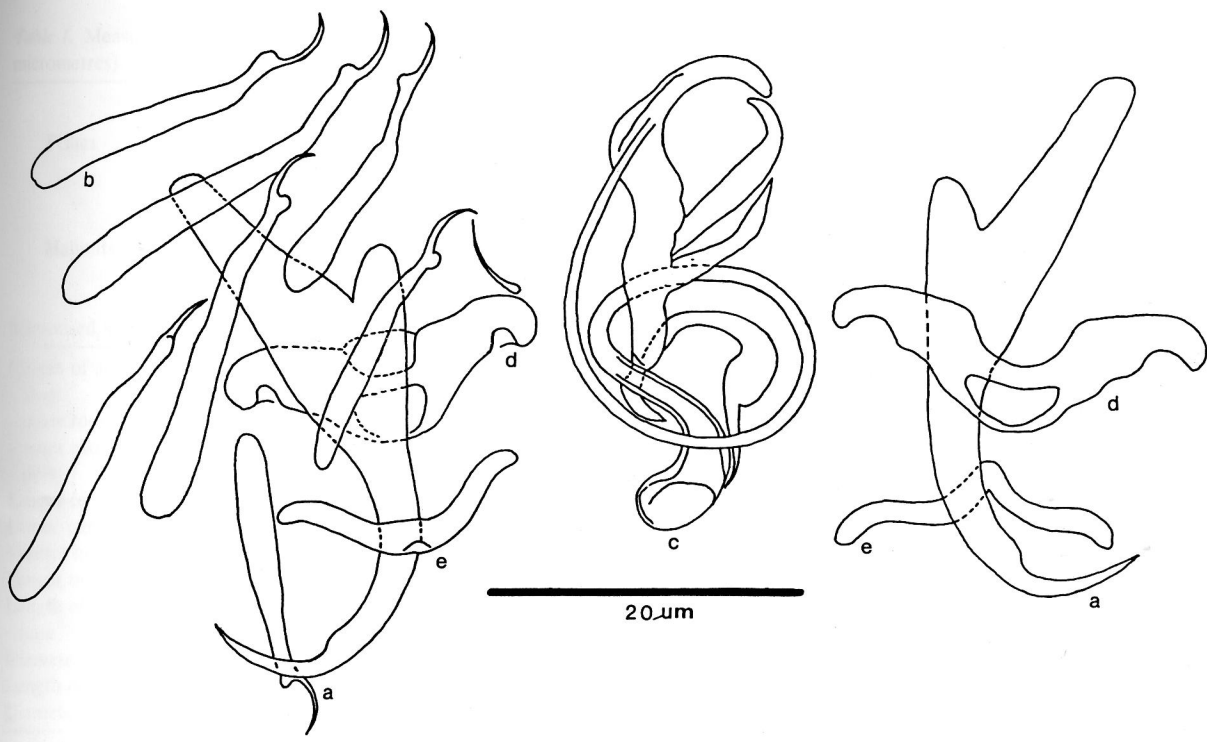


Fig. 3. *Dactylogyrus carassobarbi* n. sp. Sclerotised organs. Abbreviations: see Fig. 1.

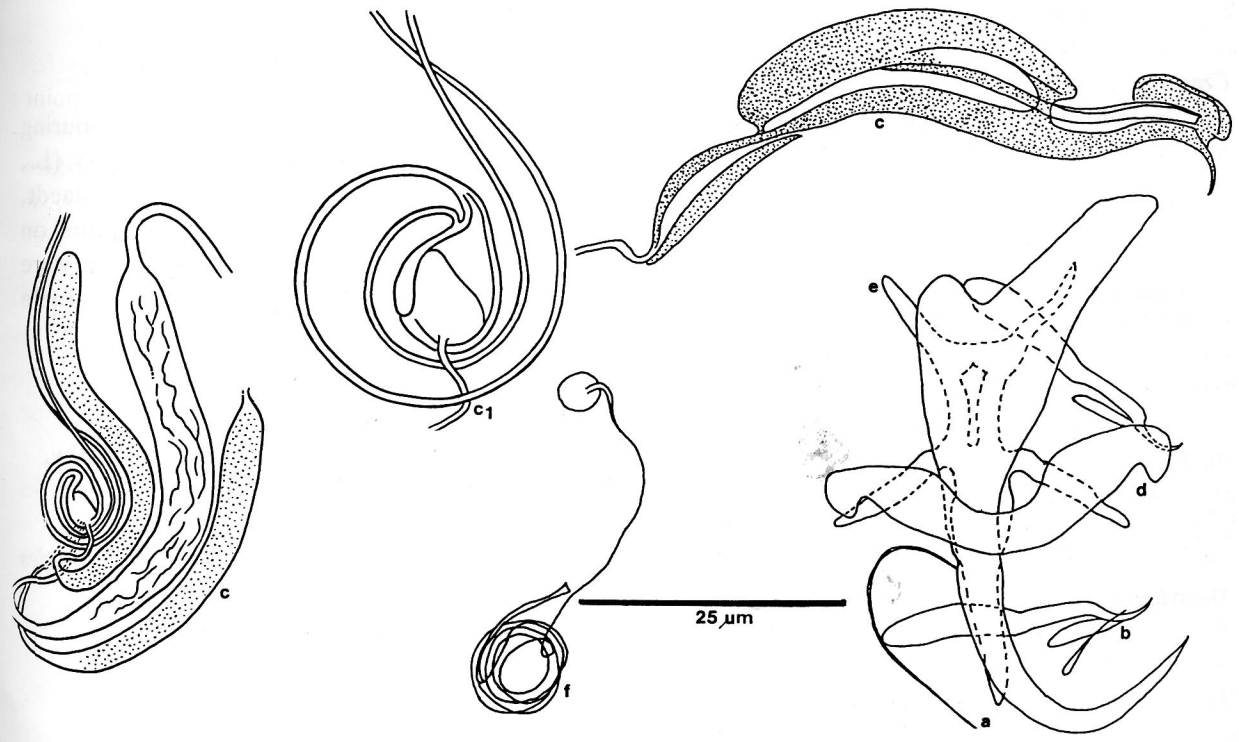


Fig. 4. *Dactylogyrus pavlovskiyi*. Sclerotised organs. Abbreviations: see Fig. 1.

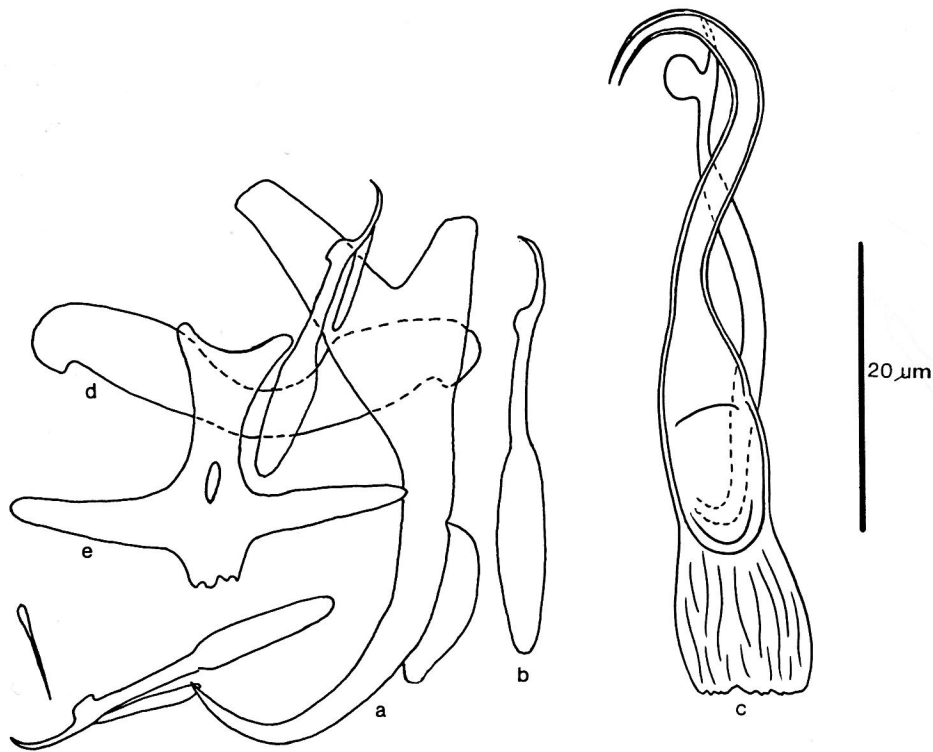


Fig. 5. *Dactylogyrus haplogonus*. Sclerotised organs. Abbreviations: see Fig. 1.

Specimens studied: 2.

*Comments*

The morphological characteristics of our specimens of *D. pavlovskyi* show good agreement with specimens of this species redescribed by Gussev et al. (1993) from *B. grypus* and *B. sharpeyi*. In a well-flattened specimen, however, some morphological features were found to have a close resemblance to *D. auriculatus* (Nordmann, 1832). For example, the copulatory organ of *D. pavlovskyi* possesses a long, filament-like tube similar to that of *D. auriculatus*. In our material alongside the base of the copulatory organ sausage-like prostatic reservoirs were found, indicating the presence of an elongate receptaculum seminis.

***Dactylogyrus haplogonus* Bychowsky, 1933** (Fig. 5)

*Host:* *Rutilus frisii kutum* Kamenskii, 1901.  
*Locality:* River Sefid, which opens into the Caspian Sea, Ponto-Caspian Region, Iran.

Specimens studied: 4.

*Comments*

*D. haplogonus* is also found in the neighbouring CIS (Soviet) territories on *Vimba vimba* (L., 1758) and *Chalcalburnus calcoides* (Güldenstaedt, 1772). In Iran, however, the species was found on a new host, and its sclerotised structures were smaller than in specimens from *V. vimba* (Table I).

***Dactylogyrus chalcalburni* Dogiel & Bychowsky, 1934** (Fig. 6)

*Host:* *Alburnus alburnus* (L., 1758), *Alburnoides bipunctatus* (Bloch, 1772).  
*Locality:* River Zayandeh, Central Iran.  
*Specimens studied:* 4.

*Comments*

Our specimens were smaller than those described

Table 1. Measurements of sclerotized structures of *Dactylogyrus haplogonus* and *D. chalcalburni* collected in different habitats (in micrometres).

	<i>Dactylogyrus haplogonus</i>		<i>Dactylogyrus chalcalburni</i>	
	<i>Vimba vimba</i> <i>Chalcalburnus</i> <i>chalcoides</i>	<i>Rutilus frisii kutum</i>	<i>Chalcalburnus</i> <i>chalcoides</i> <i>Alburnoides</i> <i>bipunctatus</i>	<i>Alburnus alburnus</i> <i>Alburnoides</i> <i>bipunctatus</i>
Fishes				
Habitats	Delta of River Volga Lake Aral	River Sefid	Lake Aral	River Zayandeh
Sclerotised structures				
Length of anchor	41-50	35-40	32-38	28-33
- shaft	38-41	27-32	26-30	26-28
- inner root	11-14	10-11	10-12	7-8
- outer root	3-7	5-6	4-5	3-4.5
- point	9-10	6-7	10	7-8
Length of marginal hooks	24-37	22-28	16-26	16-25
Dorsal bar	4-7 × 31-39	3-5 × 27-31	2.5-3 × 31	2-4 × 22-23
Ventral bar	18-27 × 29-32	15-18 × 25-27	13-17 × 21-26	16-17 × 19-20
Length of copulatory organ	45-83	45-47	40-47	27-30
Length of tube	45-60	47	57	52-57
- base	18-22 × 8	17 × 7	11-13 × 6-7	13 × 8-9
Diameter of tube close to base	6	4	2	1-1.5
Length of vagina	-	-	25	17-20
Diameter of vagina	-	-	2	2



Fig. 6. *Dactylogyrus chalcalburni*: Sclerotised organs. Abbreviations: see Fig. 1.

from *Chalcalburnus* and *Alburnus* in the Aral Sea (Table I).

### Discussion

The results presented here and data reported in other papers (Jalali & Molnár, 1990a,b; Gussev *et al.*, 1993) show that the monogenean fauna of fishes in the three Iranian zoogeographical regions is different. Fish collected from the River Sefid in the Ponto-Caspian Region were parasitized by typical Palaearctic species common in Europe and northern Asia. Monogeneans from the River Zayandeh in Central Iran also appear to be related to those of the Ponto-Caspian Region, despite the fact that this river empties its water to a salt lake. Fishes of the Mesopotamian region, including those from the River Dez in the Tigris-Euphrates Basin, however, have a distinctive monogenean fauna. Endemic cyprinid fishes in this region all appear to harbour more or less specific and hitherto undescribed *Dactylogyrus* species, three of which are described in the present paper.

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