

Redescription of *Skrjabinodon medinae* (García-Calvente, 1948) (Nematoda: Pharyngodonidae) from the cloaca of *Podarcis pityusensis* (Bosca, 1883) (Sauria: Lacertidae) of the Balearic Islands (Spain)

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Abstract

Pharyngodon medinae García-Calvente, 1948 (Nematoda: Pharyngodonidae) is redescribed from *Podarcis pityusensis* (Bosca, 1883) (Sauria: Lacertidae) of the Balearic Islands (Spain) and confirmed as a member of the genus *Skrjabinodon* Inglis, 1968. A systematic review of *S. medinae* and closely related species is also given. *Parathelandros canariensis* is referred to *Skrjabinodon* as a new combination and *Parathelandros* Magzoub *et al.*, 1980 is dismissed as a junior homonym of *Parathelandros* Baylis, 1930.

Introduction

During the course of a national research programme into the ecoparasitology of reptiles from insular ecosystems, a detailed study of the species *Skrjabinodon medinae* (García-Calvente, 1948) (Nematoda: Pharyngodonidae), from the cloaca of some lizards of the Balearic Islands (Spain), was carried out.

This species was described by García-Calvente (1948) as *Pharyngodon medinae*. Baylis (1930) erected the genus *Parathelandros* to include the species of *Pharyngodon sensu lato* whose males lacked caudal alae and pedunculate papillae, and Read & Amrein (1953) referred *P. medinae* to this genus. This view was accepted by Dollfus (1961), but Gupta (1959) disagreed. Inglis (1968) reconsidered the taxonomic status of all the species then referred to *Parathelandros* Baylis, 1930 and established that only those described from Australian amphibians were congeneric and should be retained in *Parathelandros*. Magzoub *et*

al. (1980) erected a new genus *Parathelandros* which must be considered a junior homonym of *Parathelandros* Baylis, 1930. According to Inglis (1968), the remaining species previously referred to *Parathelandros* show significant differences from the species of *Parathelandros sensu* Inglis (1968), and he erected the new genus *Skrjabinodon*, with the type-species *S. mabuyae* (Sandground, 1936), for the former. Subsequently, several species of *Skrjabinodon* have been described (see Angel & Mawson, 1968; Mawson, 1971; Barus & Coy-Otero, 1974), and some species previously included in *Parathelandros* have been moved to *Skrjabinodon* (see Barus & Coy-Otero, 1974). Finally, Specian & Ubelaker (1974) referred *Pharyngodon* (= *Parathelandros*) *medinae* to *Skrjabinodon*, as *S. medinae*, because it lacks caudal alae and possesses a single pair of sessile pre-cloacal papillae. Subsequently, the species has usually been cited as *S. medinae* (see Roca, 1985a; Roca *et al.*, 1986, 1989; Izquierdo, 1987; García-Adell & Roca, 1988; Roca & Ferragut, 1989).

Nevertheless, some authors still use the name *Parathelandros medinae* (see Solera-Puertas *et al.*, 1985; Bejerano-Gutiérrez *et al.*, 1987) and some (Astasio *et al.*, 1981) have even proposed to refer the species to the genus *Parapharyngodon* Chatterji, 1933.

Materials and methods

Living nematodes from the cloaca of *Podarcis pityusensis* were washed in saline solution, fixed in hot 70% ethanol, preserved in 70% ethanol, mounted on slides in lactophenol and studied under the microscope. Measurements, based on 20 males and 10 females, are given in micrometres.

We also had the opportunity to examine some material from *Podarcis hispanica* (Steindachner, 1870) and *Podarcis muralis* (Laurenti, 1768) (Sauria: Lacertidae) in the collection of Department of Animal Biology, University of Valencia, Spain, previously studied by Roca *et al.* (1986) and García-Adell & Roca (1988).

Skrjabinodon medinae (García-Calvente, 1948) Specian & Ubelaker, 1974 (Fig. 1)

Type-host: *Podarcis muralis*, cloaca.

Other hosts: *Podarcis pityusensis* (Boscá, 1883) (new host); *Podarcis hispanica* (Steindachner, 1870); *Podarcis muralis* (Laurenti, 1768) (Sauria: Lacertidae), cloaca.

Type-locality: Pinos Puente (Granada, Spain).

Other localities: Pityusic Islands, Balearic Islands, Spain; Iberian Peninsula.

Material studied: 20 males and 10 gravid females. Voucher specimens deposited in The Natural History Museum, London, (Reg. no. 1990. 4863–4864) and Department of Animal Biology, University of Valencia (no. 880615109F).

Description

Male. Body length 936–1,696 (mean 1,224) μm , maximum width, excluding lateral wings, 72–152

(112) μm . Length of oesophagus (excluding bulb) 130–208 (173) μm , width 20–28 (24) μm ; bulb 40–66 (53) μm long, 42–66 (56) μm wide. Nerve-ring and excretory pore located at 48–89 (67) μm and 268–472 (338) μm respectively from the cephalic end (Fig. 1D). Lateral alae found only on males begin at 36–64 (46) μm from cephalic extremity (Fig. 1D) and extend posteriorly to 236–406 (306) μm from posterior extremity, reaching a maximum width of 8–14 (10) μm . Cloaca 160–290 (221) μm from caudal extremity. Tail lacks caudal alae. There are 4 pairs of sessile caudal papillae (Fig. 1E): one pre-cloacal pair, 2 post-cloacal pairs and 4th pair lying at base of terminal spike. Very small genital cone present which is devoid of papillae. Spicule well sclerotised, 54–80 (67) μm long (Fig. 1F). Tail 154–270 (200) μm long, smooth, conical with long terminal spike.

Female. Length 3,200–6,100 (4,762) μm , maximum width 280–460 (393) μm . Oral aperture surrounded by 3 lips. Two amphids on lips; no labial papillae observed (Fig. 1A). Length of oesophagus (excluding bulb) 296–340 (321) μm , width 36–48 (40) μm ; bulb 100–132 (115) μm long, 112–132 (126) μm wide. Nerve-ring and excretory pore located at 89–120 (99) μm and 368–568 (466) μm respectively from the cephalic extremity. Lateral alae absent. Vulva opens posterior to oesophageal bulb, just posterior to excretory pore, 440–640 (525) μm from anterior extremity (Fig. 1C). Vagina muscular, directed posteriorly, 288–720 (535) μm long. Ovaries lie posterior to vulva. Anus opens 688–1,280 (923) μm from tip of tail. Tail 488–688 (626) μm long, filiform, armed with 3–7 (5) cuticular spines. Eggs slightly asymmetrical (one side more flattened), measuring 116–131 \times 40–44 (122 \times 42) μm .

Discussion

According to Petter & Quentin (1976), in the oxyuroid family Pharyngodonidae Travassos, 1919, the presence or the absence of caudal alae in the males, in conjunction with other characteristics, such as a sclerotised tri-valvulate oesophageal

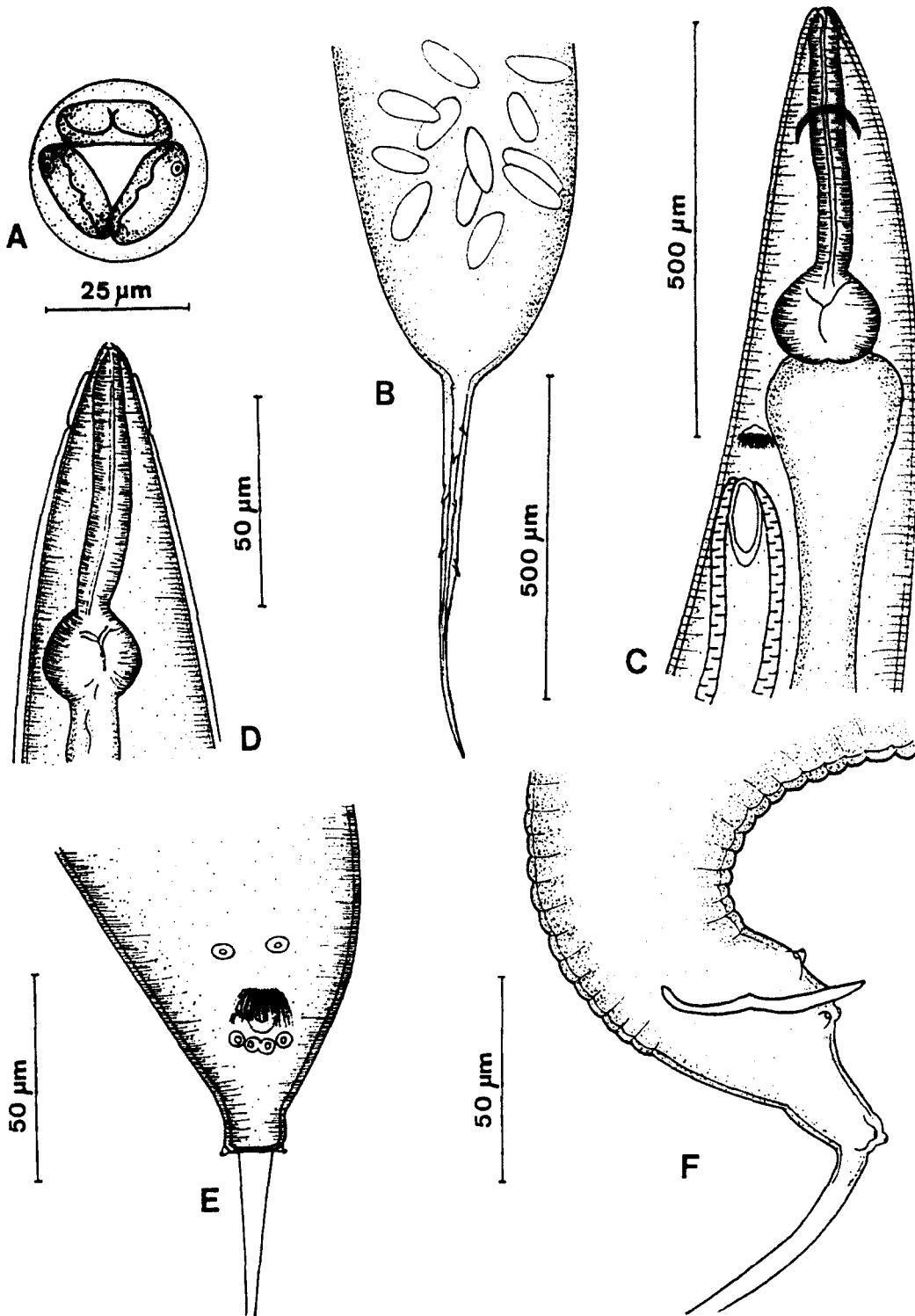


Fig. 1. *Skrjabinodon medinae* from *Podarcis pityusensis*. A. ♀ cephalic end, *en face*; B. ♀ caudal end, dorsal view; C. ♀ anterior part of body, ventro-lateral view; D. ♂ anterior part of body, ventral view; E. ♂ caudal end, ventral view; F. ♂ caudal end, lateral view.

bulb and the position of the vulva, permit four genera to be distinguished: *Pharyngodon* Diesing, 1861, *Spauligodon* Skrjabin, Schikhobalova & Lagodovskaja, 1960, *Skrjabinodon* Inglis, 1968 and *Parathelandros* Baylis, 1930. García-Calvente (1948) described *Pharyngodon medinae* and indicated that the male had caudal alae, a feature difficult to see in lateral view (García-Calvente, 1948). However, Specian & Ubelaker (1974) and Roca (1985a) noted that this species lacks caudal alae; as indicated above, our material concurs. Thus we need only consider the genera *Skrjabinodon* and *Parathelandros* which lack such alae. According to Inglis (1968), the males of both genera are easily differentiated. In *Parathelandros* spp. the cloacal region is raised as a distinct cone on which there are two pairs of papillae and they have a pair of rosette papillae on the tail which frequently arise from a common base. In *Skrjabinodon* spp. the genital cone is narrow and does not bear the cloacal papillae, and the post-cloacal papillae are not rosette-shaped. Petter & Quentin (1976) accepted both genera on the basis of the same features, noting that in *Skrjabinodon* spp. the papillae are sessile and often reduced. All our specimens of *S. medinae* (from *Podarcis pityusensis*, *P. hispanica* and *P. muralis*) have a very reduced genital cone, the cloacal papillae sessile and none of the papillae are rosette-shaped. So the species must be included in the genus *Skrjabinodon*, as proposed by Specian & Ubelaker (1974).

Although García-Calvente (1948), Roca (1985a) and Solera-Puertas *et al.* (1987) described the males of *S. medinae* with three pairs of caudal papillae, the study of our material in ventral view shows that four pairs of sessile papillae are present (see Fig. 1E). As a result, although Inglis stated that the males of *Skrjabinodon* spp. have three pairs of caudal papillae, this is not true for all species, since *Parathelandros scelopori* (= *Skrjabinodon scelopori*) (Caballero, 1938) also has four pairs and *Pharyngodon apapillosus* (= *Skrjabinodon apapillosus*) (Koo, 1938) was described as having none (see Caballero, 1938; Koo, 1938).

Recently Solera-Puertas *et al.* (1987) described *Parathelandros canariensis* from *Chalcides viri-*

danus Boulenger, 1887 (Sauria: Scincidae) with a reduced genital cone, sessile cloacal papillae and the last pair of papillae without a common base. As a result, we propose a new combination for this species, *Skrjabinodon canariensis*.

The species most closely related to *S. medinae* are *S. mascomai* Roca, 1985 and *S. canariensis* (Solera *et al.*, 1987) n. comb. The main differences between *S. medinae* and *S. mascomai* noted by Roca (1985b) are: the males of *S. medinae* are smaller in total length but have a longer tail; the tail of the females has 7–9 cuticular spines; and the eggs are smaller, lacking polar plugs. *S. canariensis* differs from *S. medinae* in the presence of a post-cloacal lobe and the possession of three rather than four pairs of caudal papillae.

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References

- Angel, L.M. & Mawson, P.M. (1968) Helminths from some lizards mostly from South Australia. *Transactions of the Royal Society of South Australia*, **92**, 59–72.
- Astasio-Arbiza, P., Zapatero-Ramos, L.M. & Castaño-Fernández, C. (1981) Helminthofauna de los Lacértidos Ibéricos. *II Conferencia Mediterránea de Parasitología. Granada. Resúmenes de la Comunicaciones*, p. 7.
- Barus, B. & Coy-Oteró, A. (1974) Nematodes of the genera *Spauligodon*, *Skrjabinodon* and *Pharyngodon* (Oxyuridae) parasitizing Cuban lizards. *Vestník Československé Společnosti Zoologické*, **1**, 1–12.
- Baylis, H.A. (1930) Some Heterakidae and Oxyuridae (Nematoda) from Queensland. *Annals and Magazine of Natural History*, ser. 10, **5**, 354–366.
- Bejerano-Gutiérrez, S., Carvajal-Gallardo, M. & Oliver-Sánchez, M. (1987) Estudio helmintológico de *Gallotia galloti palmae* Boettger y Muller, 1891 de la isla de La Palma (Islas Canarias). *V Congreso Nacional de Parasitología*.

- Salamanca. Resúmenes de las Comunicaciones*, pp. 187–188.
- Caballero, E. (1938) Nematodes parasites des reptiles du Mexique. *Annales de Parasitologie Humaine et Comparée*, **16**, 327–333.
- Dollfus, R.Ph. (1961) Station expérimentale de parasitologie de Richelieu (Indre-et-Loire). Contribution a la faune parasitaire regionale. *Annales de Parasitologie Humaine et comparée*, **36**, 174–325.
- García-Adell, G. & Roca, V. (1988) Helmintofauna de lacértidos de los Pirineos Centrales Ibéricos. *Revista Ibérica de Parasitología*, **48**, 257–267.
- García-Calvente, I. (1948) Revisión del género *Pharyngodon* y descripción de especies nuevas. *Revista Ibérica de Parasitología*, **8**, 367–410.
- Gupta, S.P. (1959) Nematode parasites of vertebrates of East of Pakistan. I. Oxyuridae from lizards (*Gekko* and *Hemidactylus*). *Canadian Journal of Zoology*, **37**, 469–475.
- Inglis, W.G. (1968) Nematodes parasitic in western Australian frogs. *Bulletin of the British Museum (Natural History)* [Zoology], **16**, 163–183.
- Izquierdo, S. (1987) *Contribución al conocimiento de los helmintos parásitos de herpetos de la provincia de Alicante*. Tesis de Licenciatura, Fac. Biológicas, Universidad de Valencia, 242 pp.
- Koo, S.Y. (1938) A new species of *Pharyngodon* (Nematoda: Oxyuridae) from canton lizard, *Gekko gekko*, with remarks on the evolution of the group. *Lingnan Science Journal*, **17**, 395–400.
- Magzoub, M., Kasim, A.A. & Shawa, Y. (1980) A new cestode species of the genus *Oochoristica* Lhe, 1898 and a new nematode species of a new genus *Parathelandros* from Dabb lizard, *Uromastix aegyptia*. *Journal College of Science, University of Riyadh*, **11**, 111–118.
- Mawson, P.M. (1971) Pearson Island Expedition 1969. 8. Helminths. *Transactions of the Royal Society of South Australia*, **95**, 169–183.
- Petter, A.J. & Quentin, J.C. (1976) Keys to genera of the Oxyuroidea. In: Anderson, R.C., Chabaud, A.G. & Wilcott, S. (Eds) *CIH keys to the nematode parasites of vertebrates*. Farnham Royal, Bucks: Commonwealth Agricultural Bureaux, **4**, 1–30.
- Read, C.P. & Amrein, Y.U. (1953) North American nematodes of the genus *Pharyngodon* Diesing (Oxyuridae). *Journal of Parasitology*, **39**, 365–370.
- Roca, V. (1985a) *Contribución al conocimiento de la helmintofauna de los Lacértidos y Geckónidos del piso termomediterráneo del Levante ibérico*. Tesis Doctoral, Fac. Biológicas, Universidad de Valencia. 486 pp.
- Roca, V. (1985b) *Skrjabinodon mascomai* n. sp. (Nematoda: Pharyngodonidae), parasite of *Tarentola mauritanica* (Linnaeus, 1758) Gray, 1845 (Reptilia: Geckonidae) in Valencia (Spain). *Rivista di Parassitologia*, **46**, 27–31.
- Roca, V. & Ferragut, M.V. (1989) Helmintofauna del lagarto verdinegro, *Lacerta schreiberi* Bedriaga, 1878 (Reptilia: Lacertidae) del Sistema Central (España). *Revista Ibérica de Parasitología*, **49**, 291–300.
- Roca, V., López-Balaguer, E. & Hornero, M.J. (1989) Helmintofauna de *Podarcis hispanica* (Steindachner, 1870) y *Podarcis bocagei* (Seoane, 1884) (Reptilia: Lacertidae) en el cuadrante noroccidental de la Península Ibérica. *Revista Ibérica de Parasitología*, **49**, 127–135.
- Roca, V., Lluch, J. & Navarro, P. (1986) Contribución al conocimiento de la helmintofauna de los herpetos ibéricos. I. Parásitos de Lacertidae: *Lacerta lepida* Daudin, 1802 y *Podarcis hispanica* (Steindachner, 1870). *Revista Ibérica de Parasitología*, **46**, 129–136.
- Solera-Puertas, A., Castaño-Fernández, C. & Gonzalez-Santiago, P.M. (1985) Estudio helmintológico de escúridos de la isla de Tenerife. *IV Congreso Nacional de Parasitología. Tenerife. Resúmenes de las Comunicaciones*, p. 53.
- Solera-Puertas, M.A., Zapatero-Ramos, L.M., Castaño-Fernández, C. & Carrera-Moro, M.P. (1987) *Parathelandros canariensis* n. sp. (Nematoda: Pharyngodonidae) parásito de *Chalcides viridanus* Boulenger, 1887 (Reptilia: Scincidae). *Revista Ibérica de Parasitología*, **47**, 57–63.
- Specian, R.D. & Ubelaker, J.E. (1974) Two new species of *Pharyngodon* Diesing, 1861 (Nematoda: Oxyuridae) from lizards in West Texas. *Proceedings of the Helminthological Society of Washington*, **41**, 46–51.