

SPREADING OF INTRODUCED MONOGENEANS *PSEUDODACTYLOGYRUS ANGUILLAE* AND *P. BINI* AMONG EEL POPULATIONS IN THE CZECH REPUBLIC

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Pseudodactylogyrus anguillae (Yin et Sproston, 1948) and *P. bini* (Kikuchi, 1929), pathogenic gill parasites of eels, were originally known only from countries of the Far East (Japan, China), parasitizing there the Japanese eel, *Anguilla japonica* Temminck et Schlegel, and the introduced European eel, *A. anguilla* (L.) (Kikuchi H. 1929: Ann. Zool. Jap. 12: 175–188; Yin W. Y., Sproston N. G. 1948: Sinensis 19: 57–85; Ogawa K., Egusa S. 1976: Bull. Jpn. Soc. Sci. Fish. 42: 395–404; Imada R., Muroga K. 1977: Bull. Jpn. Soc. Sci. Fish. 43: 1397–1401; Chung H. Y., Lin I. H., Kou G. H. 1984: COA Fish. Ser. No. 10, Fish Dis. Res. 6: 24–33; Chan B., Wu B. 1984: Acta Zool. Sinica 30: 173–180). Gusev (Gusev A. V. 1965: Tr. Zool. Inst., USSR Acad. Sci., Leningrad, 35: 119–125 [In Russian.]) reported both species as well from *Anguilla reinhardtii* Strd. from Australia.

Only some twenty years ago, both these parasites were introduced into Europe. Golovin (Golovin P. P. 1977: In: Investigation of Monogenoidea in the USSR, Zool Inst. USSR Acad. Sci., Leningrad, pp. 144–150 [In Russian.]) was the first to record them from eels from Russia, whereas Molnár (Molnár K. 1983: Z. Binnenfischerei der DDR 30: 341–345; 1984: Acta Vet. Hung. 32: 153–157) reported them for the first time from *Anguilla anguilla* from Central Europe (Hungary). Almost at the same time, *P. anguillae* appeared in European eels in France (Lambert A., Le Brun N., Pariselle A. 1985: Ann. Parasitol. Hum. Comp. 60: 91–92; Le Brun N., Lambert A., Justine J. L. 1986: Ann. Parasitol. Hum. Comp.

61: 237–284). Both these parasite species started to spread quickly over the countries of Western and Central Europe, becoming there, sometimes, even the cause of dying of cultured eels. They were recorded from Denmark (Mellegaard S., Dalsgaard I. 1986: Proc. 2nd Inter. Coll. Pathol. Mar. Aquacult., Porto, p. 113; Buchmann K., Kfie M., Prento P. 1987: Parasitol. Res. 73: 523–537; Kfie M. 1988: Ophelia 29: 93–118; Buchmann K., Mellegaard S., Kfie M. 1987: Dis. Aquat. Org. 3: 51–57), Germany (Reimer L. 1987: Wis. Z. Hochschule Güstrow 25: 157–166), Sweden (Malmberg G. 1989: Proc. 14th Scand. Symp. Parasitol. Abo, p. 46), England (Kennedy C. R., Fitch D. J. 1990: J. Fish Biol. 36: 117–131; Nie P., Kennedy C. R. 1991: J. Fish Biol. 39: 897–900), Portugal (Saraiva A., Chubb J. C. 1989: Bull. Eur. Ass. Fish Pathol. 9: 88; Saraiva A. 1995: Bull. Eur. Ass. Fish Pathol. 15: 81), and Spain (Sanchez I., Zapatero L. M., Salcedo M. T., Carrascal M. 1992: Res. Rev. Parasitol. 52: 61–62); recently they have been reported also from Poland (Dzika E., Własow T., Gomulka P. 1995: Acta Parasitol. 40: 165–167) and Austria (Gelnar M., Scholz T., Matějusová I., Konečný R. 1996: Ann. Naturhist. Mus. Wien – in press). *Pseudodactylogyrus anguillae* has recently been recorded as well from the American eel, *Anguilla rostrata* (LeSueur), from Canada (Cone D. K., Marcogliese D. J. 1995: J. Fish Biol. 47: 177–178).

On the territory of the present Czech Republic, the helminth parasites of eels, *Anguilla anguilla*, was the object of studies of many authors for more than a century (e.g., John J.

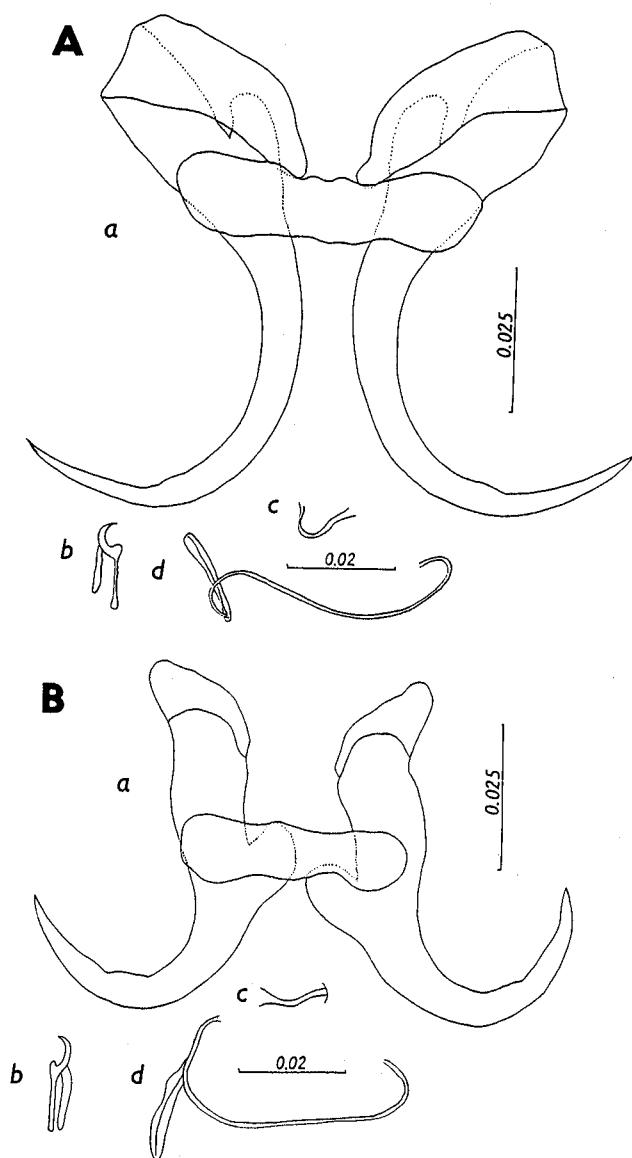


Fig. 1. A – Sclerites of *Pseudodactylogyrus anguillae* (Yin et Sproston, 1948); B – sclerites of *P. bini* (Kikuchi, 1929). a – anchors and connecting bar; b – marginal hook; c – vagina; d – copulatory apparatus. Scale bars in mm.

1877: Vesmír 6: 18–21, 54–57, 67–69, 91–94, 116–118; Šrámek A. 1901: Arch. naturw. Landesdurchforschung Böhmens 11: 94–118; Volf F., Smišek J. 1955: Sbor. ČSAZV 28: 395–410; Dyk V., Lucký Z. 1956: Přírodov. sbor. Ostrav. kraje 4: 571–580; Vojtková L. 1959: Publ. Fac. Sci. Univ. Brno, No. 401, pp. 97–123; Ergens R. 1961: Čs. parazitol. 8: 137–150; Moravec F. 1971: Acta Sci. Nat. Brno 5: 1–49; 1985: Folia Parasitol. 32: 113–125), but no monogeneans were recorded from this fish species, except for an accidental finding of a single specimen of *Gyrodactylus lucii* Kulakovskaya, 1951 (identified by Dr. R. Ergens) reported by Moravec (1985: op. cit.). Also examinations of additional nearly 400 eels from different localities of the present Czech

Republic, carried out at the Institute of Parasitology, Czechoslovak Academy of Sciences, in Prague by Ergens and Moravec (unpublished) between 1958–1985 did not reveal the presence of monogeneans.

Members of the genus *Pseudodactylogyrus* Gusev, 1965 were first recorded from the Czech Republic by Ergens (unpublished) in October 1989, who found both *P. anguillae* and *P. bini* to be abundant gill parasites of small eels (body length 7–18 cm) from a warm-water aquaculture at Tisová, North Bohemia.

Broad investigations into the metazoan parasites of eels (312 eels were examined), carried out by the present authors in different localities in 1994 and 1995, showed that both *P. anguillae* and *P. bini* were widespread in cultured eels and wild eel populations in the Czech Republic. Only *P. anguillae* was recorded from one Moravian locality belonging to the Danube River basin (a small water reservoir Fryšták: prevalence 40 %, intensity 3–65 specimens per eel), whereas both *P. anguillae* and *P. bini* were found in Bohemian localities belonging to the Elbe River drainage system: In one of them (Ploučnice R. near Česká Lípa), only *P. bini* was recorded from eels (prevalence 90 %, intensity 85–1451), while only *P. anguillae* was present in three other localities (Sázava R. near Ledec n. S. – prevalence 54 %, intensity 1–12; Želivka water reservoir on the Želivka R. – 30 %, 1–6; and Metuje R. near Náchod – 80 %, 1–9); both monogenean species occurred contemporarily in the following five western, southern and northern Bohemian localities: Úhlavka R. near Stříbro (*P. anguillae*: prevalence 71 %; *P. bini*: 71 %; intensity of both together 3–61); Ohře R. near Postoloprty (*P. anguillae*: 23 %, 1–2; *P. bini*: 29 %, 2–10); Lužnice R. near Tábor (*P. anguillae*: 20 %; *P. bini*: 10 %, intensity of both together 2–93); Orlík water reservoir on the Vltava R. and its tributary Otava R. near Štědrá (75 %; *P. bini*: 78 %; intensity of both together 1–368); and Břehyně Brook (Mácha Lake fishpond system) near Doksy (*P. anguillae*: 42 %; *P. bini*: 87 %; intensity of both together 1–147). It should be remarked that 132 eels were examined from the last named locality by Moravec (1985: op. cit.) between 1965–1982, but no *Pseudodactylogyrus* spp. were found on them; it confirms that these monogenean parasites were introduced into this locality only within the last 13 years.

Both species of *Pseudodactylogyrus* differ one from another distinctly mainly in sclerites of their opisthaptors (Fig. 1). Our measurements of the main morphological features are in agreement with those provided by Dzika et al. (1995: op. cit.), Ogawa and Egusa (1976: op. cit.) and Sanchez et al. (1992: op. cit.).

A rapid spreading of *Pseudodactylogyrus anguillae* and *P. bini* among eel populations in Europe is mainly due to a direct development (without intermediate hosts) of these parasites and insufficient preventive measures during eel transfers.

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