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Short Note

First Record of *Lernaea cyprinacea* (Copepoda: Cyclopoida) on the Allis Shad

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In summer 2002, allis shad infected with *Lernaea cyprinacea* (L.) were detected in the Guadiana River, southwestern Spain. This is the first documented report of *L. cyprinacea* parasitizing allis shad in its natural range.

Key words: *Alosa alosa*, *Lernaea cyprinacea*, ectoparasite, crustacea, freshwater.

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About 110 species of cyclopoid copepods are currently classified in the family Lernaeidae (HO 1998). They are mostly known from females, which are highly modified and parasitic on freshwater fishes. Some are mesoparasites anchoring to their hosts by a transformed cephalothorax, but others are ectoparasites attaching to hosts by means of enlarged, powerful maxillae (HO 1998). There are approximately 40 species described in the genus *Lernaea* Linnnaeus, 1740 (KABATA 1985), the best known of which is *Lernaea cyprinacea* (Linnaeus, 1758) found in North America, Asia, Africa, and Europe (HOFFMAN 1998). *L. cyprinacea* is usually reported as having a wide range of host susceptibility. According to KABATA (1979), over 100 host species have been recorded.

The allis shad *Alosa alosa* (Linnaeus, 1758) is an anadromous clupeid which spawns considerable distances upstream in the main channels of large rivers (HOESTLANDT 1991). It occurs mainly in shallow coastal waters and estuaries, apart from the upstream spawning migration of adults in large rivers, mainly in France, Spain and, Portugal. It is considered a rare species in British and Irish rivers (MAITLAND & HATTON-ELLIS 2002).

As part of an investigation on the distribution of allis shad in the Guadiana River basin (area: 25000 km^2) (Extremadura, Spain), 46 individuals were captured using gillnets at 10 of 24 sampling stations throughout the basin from November 2001 to July 2002. During this study, *L. cyprinacea* was observed on the skin of 2 fish (4.34 % prevalence) captured at one station on the Guadiana River (at 7° 17′ 45” W, 38° 31′ 22” N) on June, 2002. Infection intensity was one parasite per fish, in both cases located in the opercular region. The parasite was not found on the allis shad at any of the remaining nine sampling stations where this fish was captured. In a previous study (PÉREZ-BOTE 2000), high prevalences (30.16 to 89.10 %) and intensities (1.37 to 3.70) were found on three native cyprinids in the Guadiana River. In those species, *L. cyprinacea* were attached mostly to the trunk of the fish and intensity of infection was correlated with the size of the host. The life cycle of *L. cyprinacea* is well documented (GRABDA 1963), and its intensity of infestation is related to water temperature, water velocity, and stream order (BULOW *et al*. 1979). The Guadiana River has an irregular hydrological regime, with severe droughts and floods. Most rainfall occurs between November and March, decreasing throughout the summer which results in some tributaries drying up or becoming a series of isolated pools. The summer of the year 2002 was particularly hot and the quality of the water particularly poor in some stretches of the river (high temperature, low levels of dissolved oxygen, very low water velocity, and high fish densities). These conditions existed at the sampling station where the infected allis shad were captured. The low levels of infestation observed in the allis shad may also be related to the biology of copepodites. Infective *Lernaea* copepodites are

negatively phototactic (MARCOGLIESE 1991), and thus would encounter detritivore fish more frequently than planktivores (such as allis shad) inhabiting the same system. Indeed, in other parasitic copepods it has been observed than infective copepodites spend most of their time near the bottom (WHITFIELD *et al*. 1988; POULONIN *et al*. 1990), whereas allis shad swim in the middle of the water column (BAGLINIÈRE & ELIE 2000).

Parasites belonging to the genus *Lernaea* can have serious deleterious effects on their freshwater fish hosts (KABATA 1985; HOFFMAN 1998). The females attach to the exposed body surfaces of host fish, where they cause acute haemorrhage and ulcers at the site of penetration. Death occurs as a result of blood loss and secondary infections (ROBINSON & AVENAT-OLDEWAGE 1996).

Previous reports of the parasitofauna of allis shad include trematodes, nematodans, monogeneans, cestodes, acanthocephalans, and copepods (PERRIER 1964; ALMAÇA 1988; TAVERNY 1991; QUIGNARD & DOUCHEMENT 1991; SABATIÉ 1993). However, allis shad have not previously been recorded as a host for *L. cyprinacea.* As such this finding represents the first record of *L. cyprinacea* parasitizing allis shad in its natural range.

References

ALMAÇA C. 1988. Fish and their environment in large European river ecosystems: Tejo and Guadiana. Sciences de l´Eau **7**: 3-18.

BAGLINIÈRE J. L., ELIE P. 2000. Les aloses (*Alosa alosa* et *Alosa fallax* spp.). INRA, Paris.

BULOW F. J., WINNINGHAM J. R., HOOPER R. C. 1979. Occurrence of the copepod parasite *Lernaea cyprinacea* in a stream fish population. Trans. Amer. Fish. Soc. **108**: 100-102.

GRABDA J. 1963. Life cycle and morphogenesis of *Lernaea cyprinacea* L. Acta Parasitol. **11**: 169-198.

HO J. S. 1998. Cladistics of the Lernaeidae (Cyclopoida), a major family of freshwater fish parasites. J. Mar. Syst. **15**: 177-183.

HOESTLANDT H. 1991. The Freshwater Fishes of Europe, vol. 2. Clupeidae, Anguillidae. Aula-Verlag, Wiesbaden.

HOFFMAN G. L. 1998. Parasites of North American freshwater fishes. Comstock Publishing Associates, Ithaca.

KABATA Z. 1979. Parasitic Copepoda of the British Fishes. The Ray Society, London.

KABATA Z. 1985. Parasites and diseases of fish cultured in tropics. Taylor & Francis, London.

MAITLAND P. S., HATTON-ELLIS T. W. 2002. Ecology of the allis and twaite shad. Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough.

MARCOGLIESE D. J. 1991. Seasonal occurrence of *Lernaea cyprinacea* on fishes in Belews Lake, North Carolina. J. Parasitol. **77**: 326-327.

PÉREZ-BOTE J. L. 2000. Occurrence of *Lernaea cyprinacea* (Copepoda) on three native cyprinids in the Guadiana River (SW Iberian Peninsula). Res. Rev. Parasitol. **60**: 135-136.

PERRIER R. 1964. La faune de la France Ilustrée. Vers et némathelminthes. Librairie Delagrave, Paris.

POULONIN R., CURTIS M. A., RAU M. E. 1990. Responses of the fish ectoparasite *Salmonicola edwarsii* (Copepoda) to simulation, and their implication for host-finding. Parasitology **100**: 417-421.

QUIGNARD J. P., DOUCHEMENT C. 1991. *Alosa alosa*. (In: The Freshwater Fishes of Europe, vol. 2. Clupeidae, Anguillidae. H. Hoestlandt. Aula-Verlag, Wiesbaden): 89-126.

ROBINSON R., AVENAT-OLDEWAGE A. 1996. Aspects of the morphology of the parasitic copepod *Lernaea cyprinacea* Linnaeus, 1758 and notes on its distribution in Africa. Crustaceana **69**: 610-626.

SABATIÉ R. 1993. Recherches sur l´Écologie et la Biologie des aloses au Maroc (*Alosa alosa* Linné, 1758 et *Alosa fallax* Lacépède, 1803): exploitation et taxonomie des populations atlantiques, bioécologie des aloses de l´Oued Sebou. Ph.D. Thesis, University of Bretagne Occidentale, Brest.

TAVERNY C. 1991. Pęche, biologie, écologie des aloses dans la systčme Gironde-Garonne-Dordogne. Ph.D. Thesis, Université de Bordeaux I.

WHITFIELD P. J., PILCHER M. M., GRANT H. J., RILEY J. 1988. Experimental studies on the development of *Lernaocera branchialis* (Copepoda: Pennellidae): Population processes from egg production to the maturation on the flatfish host. Hydrobiologia **167/168**: 579-586.