FIRST RESULTS ON THE DIVERSITY OF GILL PARASITES OF SOME CATFISHES HOST SPECIES IN SOUTH-EAST ASIA

Antoine Pariselle [1] and Oman Komarudin [2]

(1) IRD (ex ORSTOM), Catfish Asia Project, Instalasi Penelitian Perikanan Air Tawar, Jalan. Ragunan-Pasar Minggu, P.O. Box 7220/jkspm, Jakarta 12540, Indonesia
and *GAMET, B.P. 5095, 34033 Montpellier Cedex 1, France*
(2) RIFF, Jalan Raya 2, Sukamandi Subang 41256, Java Barat, Indonesia

Abstract

First results on the diversity of monogenetic parasites from Catfishes in south-east Asia are presented.

Fifty five different species belonging to two already know and one new genera were found among which 3 or 4 only were previously described.

The general host parasitic species richness and parasitic specificity are summarised. Implications of these two descriptors at host species and population levels are discussed.

INTRODUCTION

Monogenean gill parasites are known to be probably the most specific parasites toward their fish host (Poulin, 1992), and then may be used as "biological tags" in systematic and phylogenetic studies of hosts. This have been recently demonstrated on Cichlids from West African freshwaters (Pariselle, 1996).

The first step in such study is to described the parasitic species found on the different host species sampled, especially since in tropical area the studies related this topic remain scarce.

We present here the first results on the diversity of catfishes gill parasites in south-east Asia.

MATERIAL AND METHODS

The fish were dissected on site immediately after capture, the left branchial arches, separated by dorsal and ventral section, were frozen in liquid Nitrogen, then preserved in a deep freezer at the laboratory until examination. To verify the specific identity of host fishes, the carcasses were numbered, fixed and preserved in formalin. After thawing, the parasites were detached from the gill, using a strong water current, and transferred individually with a mounted needle directly into a drop of ammonium picrate-glycerine mixture on a slide, according to Malmberg (1957).

The preparation was then covered with a round cover slip and after several hours, necessary for the proper impregnation by the mounting medium, the cover slip was sealed. From these preparations, drawings were made of the sclerotised pieces of the haptor and of the copulatory complex (stained with the ammonium picrate) using a camera lucida.

RESULTS

Eighteen fish species belonging to the genera *Pangasius* Valenciennes, 1840, two from *Helicophagus* Bleeker, 1858, three from *Clarias* Scopoli, 1777, one from *Pseudeutropius* (Schilbeidae) and one from *Laides*, sampled in Vietnam, Thailand and Indonesia, were studied for their monogenean gill parasites (Table 1). Fifty five species of monogenean gill parasites were found, of which 3 or 4 only were already described (see: Lim, 1996).

Only three host species seems to have no

Pangasius bocourti Sauvage, 1880	*Pangasius conchophilus* Roberts & Vidthayanon, 1991	*Pangasius djambal* Bleeker, 1846	*Pangasius humeralis* Roberts, 1989
sp1	sp1	sp9	sp29
sp9	**sp3**	sp23	**sp41**
sp23	**sp4**	sp29	sp42
	sp5	**sp40**	**sp43**
		sp44	

Pangasius hypophthalmus (Sauvage, 1878)	*Pangasius krempfi* Fang & Chaux, 1949	*Pangasius larnaudii* Bocourt, 1866	*Pangasius macronema* Bleeker, 1851
sp1	sp2	sp1	**sp13**
sp6		**sp7**	**sp14**
		sp8	sp15
		sp9	**sp16**
		sp10	**sp17**
		sp11	sp18
		sp12	

Pangasius micronema Bleeker, 1847	*Pangasius nasutus* (Bleeker, 1862)	*Pangasius nieuwenhuisii* (Popta, 1904)	*Pangasius pleurotaenia* Sauvage, 1878
sp30	**sp24**	**sp62**	sp42
sp33	**sp25**		**sp45**
sp34	**sp26**		**sp46**
sp35	**sp27**		
sp36	**sp28**		
sp37			
sp38			
sp39			

Pangasius polyuranodon Bleeker, 1852	*Pangasius sanitwongsei* Smith, 1931	*Pangasius n. sp 1*	*Helicophagus typus* Bleeker, 1858
sp1	sp1	sp1	sp1
sp15	sp9	sp2	sp9
sp18	**sp22**	sp42	sp30
sp19		**sp47**	sp31
sp20		**sp48**	sp32
sp21		**sp49**	

Helicophagus waandersii Bleeker, 1858	*Clarias bathrachus* L.	*Clarias meladerma* Bleeker, 1846	*Clarias nieuofi* Valenciennes, 1840
sp1	spC1	spC1	spC1
sp9	**spC2**		
sp31			
sp32			

Laides sp	*Pseudeutropius sp*
sp51	**sp50**
	n. g.1

Table 1: Monogenetic species from Catfishes in south-east Asia
(parasitic species found on one host only are in bold and underlined)

monogenetic parasites (*P. gigas* Chevey, 1930, *P. lithostoma* Roberts, 1989 and *Pangasius* n. sp 2).

The parasites found on hosts of the genera *Pangasius* and *Helicophagus* (49 species) were all belonging to the genus *Thaparocleidus* Jain, 1952.

On *Pangasius* on the 47 species recovered (of which 44 are specific of this genus), 38 were host specific (in bold and underlined in Table 1), 1 was founded on one host species but also on *Helicophagus*, 4 were found on two host species, 2 on 3 hosts species 1 one four and 1 one 7 host species.

Five parasite species were found on *Helicophagus* catfishes, two of them were genus specific and are shared by the 2 species of *Helicophagus* (sp31 and 32).

The parasites from *Clarias* hosts (two species) belonged to the genus *Quadriacanthus* Paperna, 1961.

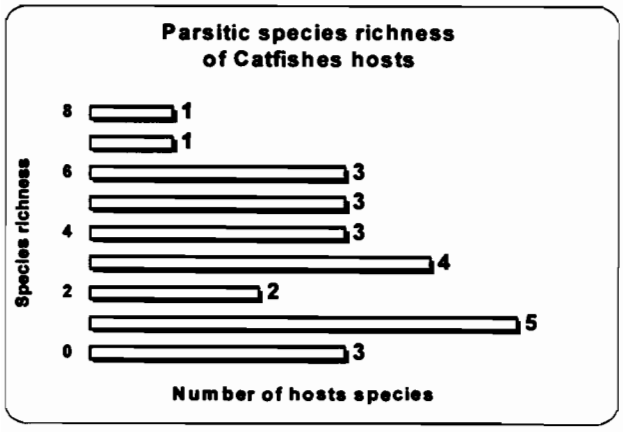
On *Pseudeutropius* and *Laides* there was, on each host, one species of *Thaparocleidus* Monogenea which were both species specific. There were on *Pseudeutropius* two species belonging to a new, and extraordinary genus.

DISCUSSION

I. General scale

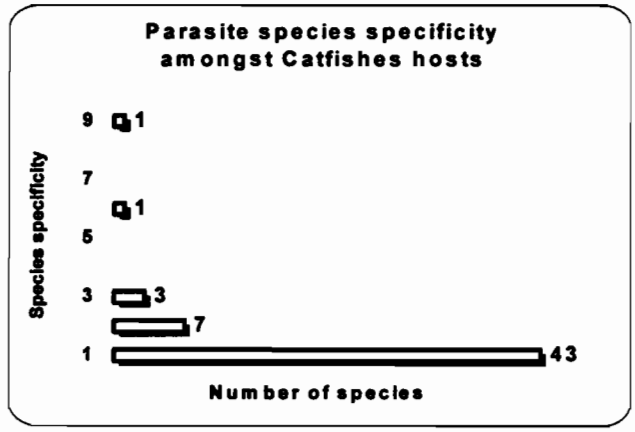
Species richness

For East Asian catfishes, as in other models studied before (West African cyprinids or cichlids, Guégan, 1990, El Gharbi, 1993, Pariselle, 1996), the parasitic species richness amongst the hosts (which is the number of parasite species found on one hosts species) is variable with a random distribution:



Parasite specificity

The parasite species specificity (which is the number of host species on which we may found a parasite species) is also variable: from 1 up to 9. But, as in African fishes, the distribution looks like a negative binomial one:



For these two parameters, the south-east Asian host/parasite system is very similar to other systems all over the world.

II. Host species level

Pangasius sp1 founded in Sumatra, Kalimantan and Vietnam and previously confused with *P. djambal* seems, for the Monogenea to be different from *P. djambal* (no shared parasitic species). So for the parasites (and for the genetic), *Pangasius* sp. 1 is a good species:

Pangasius djambal	***Pangasius* sp. 1**
sp9	sp1
sp23	sp2
sp29	sp42
sp40	sp47
sp44	sp48
	sp49

Phylogenetic studies (see Pouyaud *et al.*, 1999) showed that the genus *Laides* should be placed now within the family Pangasiidae and not in Schilbeidae with the genus *Pseudeutropius*, as noticed in the literature (Kottelat & Whitten, 1993). Then, we have studied the monogenetic fauna from these two genera, to see if parasite confirm or not the genetic results. As showed previously (Table 1) *Laides* and *Pseudeutropius* both have one parasite belonging to the genus *Thaparocleidus*. But *Pseudeutropius* had also two

species from a new genus. This fact led us to think that, as demonstrated by genetic studies, *Pseudeutropius* is farther from *Pangasius* than *Laides*. The new genus is very different from those described on the African species of the family Schilbeidae (five genera), belonging to *Schilbetrema* and *Schilbetrematoides*, only genera parasitic on schilbeid hosts in this continent.

III. Population level

The study of individuals of *Pangasius djambal* coming from different locations shows an "in common" species (sp9), while two (sp40 and sp44) are location specific. As sp9 is also founded on other pangasiid hosts (i. e. *P. bocourti*, *P. sanitwongsei* or *Helicophagus* species) nothing, for the moment could be conclude:

	P. djambal	
Kalimantan	Java	Sumatra
sp9	**sp9**	**sp9**
	sp29	sp23
		sp40
		sp44

On the other hand, on *Pangasius* sp. 1 the parasitic fauna are completely different between Vietnam and Indonesia populations. Within Indonesian populations, all the species found in Sumatra are also present in Kalimantan.:

	Pangasius sp. 1	
Kalimantan	Sumatra	Vietnam
sp42	sp47	sp1
sp47	sp49	sp2
sp48		
sp49		

So, for the parasites, as seen previously, *P. djambal* is different from *Pangasius* sp. 1, but *P.* sp. 1 shows two different populations, that could be due to:

- geographical specificity of the parasites, but sp1 is founded in Sumatra and Kalimantan on other hosts species, and then is not geographically specific,
- difference in the environment: Vietnamese population came from estuarine areas, when Indonesian one came from freshwaters,
- systematic difference between Vietnamese (from one side) and Indonesian populations from the other one, but they are not so different with genetic studies.

As *Pangasius* sp. 1 could be in fact *Pangasius pangasius* and as we don't know the parasitic fauna of this species, the question remains.

CONCLUSION

Even if these first results have to be completed by new samples and by the formal description of the numerous new species and genus; they show that such study on the monogenetic fauna may contribute to the comprehension of hosts phylogeny and represent a useful complement to morphometric and genetic studies for the characterisation of species and populations.

REFERENCES

El Gharbi S. (1993) *Biosystématique, évolution et* biogéographie *dans les interactions hôte-parasite. Le modèle* Barbus *(Cyprinidae)* - Dactylogyrus *(Monogenea)*. PhD Thesis, Université Montpellier II, Montpellier.

Guégan J.F. (1990) *Structure des peuplements parasitaires : le modèle Monogènes de* Cyprinidae *ouest-africains*. PhD Thesis, Université Montpellier II, Montpellier.

Kottelat M. & Whitten A.J. (1993) *Ikan air tawar Indonesia bagian barat dan Sulawesi*. Periplus Editions Limited.

Lim S. (1996) *Thaparocleidus* Jain, 1952, the senior synonym of Silurodiscoides Gussev, 1976 (Monogenea: Ancylodiscoidinae). *Systematic Parasitology*, **35**, 207-215.

Malmberg G. (1957) [On the presence of a *Gyrodactylus* on fishes from Sweden] *Skrifterutgivna av Sodra Sveriges Fiskeriforening*, 19-76.

Pariselle A. (1996) *Diversité, spéciation et évolution des Monogènes de Cichlidae en Afrique de l'Ouest.* PhD Thesis, Université Montpellier II, Montpellier.

Poulin R. (1992) Determinants of host-specificity in parasites of freshwater fishes. *International Journal for Parasitology*, **22**, 753-758.

Pouyaud L., Gustiano R. & Legendre M. (1999) Phylogenetic relationships among Pangasiid catfish species (Siluroidei, Pangasiidae) and new insights on their zoogeography. *Proceedings of the mid-term meeting of the Catfish Asia Project*, this volume.

THE BIOLOGICAL DIVERSITY AND AQUACULTURE OF CLARIID AND PANGASIID CATFISHES IN SOUTH-EAST ASIA

Proceedings of the mid-term workshop of the
"Catfish Asia Project"
Cantho, Vietnam, 11-15 May 1998

Edited by :
Marc LEGENDRE
Antoine PARISELLE

CONTENTS

PATHOLOGY