PRELIMINARY RESULTS ON THE MORPHOLOGICAL CHARACTERISATION OF NATURAL POPULATIONS AND CULTURED STRAINS OF CLARIAS SPECIES (SILURIFORMES, CLARIIDAE) FROM VIETNAM

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Abstract

A morphometric analysis of wild and cultured Clarias specimens originating from Vietnam indicated the presence of three species: C. batrachus, C. macrocephalus and C. gariepinus. The latter is an African species that has been introduced for fish culture purposes. The status of a fourth species, C. fuscus, previously reported from the northern part of the country, could not be clarified yet as no material could be examined. This is the subject of forthcoming research.

INTRODUCTION

Three Clarias species have been reported in literature as naturally occurring in Vietnam: C. batrachus (Linnaeus, 1758), C. macrocephalus Günther, 1864 and C. fuscus (Lacépède, 1803) (Ha-Dinh-Duc, 1982). The former two species are widespread, while the latter has only been reported from the North of the country. A fourth species, C. gariepinus (Burchell, 1822) naturally occurs in Africa and has been introduced to Vietnam for fish culture purposes, in particular hybridisation with C. macrocephalus. Identification of these species in the field is sometimes problematic and there is some doubt on the correctness of their specific identification.

As part of an overall systematic revision of the south-east Asian Clarias species, this paper presents preliminary results of the morphometric analysis of Clarias specimens collected in Vietnam.

MATERIAL AND METHODS

Hundred and eight specimens originating from Vietnam have been examined. They were tentatively identified when collected and included the following species: Clarias batrachus, C. macrocephalus and C. gariepinus and the hybrid between C. gariepinus x C. macrocephalus. All specimens of C. batrachus (N=34) and C. macrocephalus (N=35) were collected from the wild. For each species, about half of them were bought at Can Tho market and the others at Thu Duc and Binh Chanh markets (Ho Chi Minh City area). The C. gariepinus (N=24) and hybrid (N=15) specimens were obtained respectively from three different fish farms. In total 73 fish were correctly preserved and were used for a detailed morphometric analysis. The material is deposited in the collection of the Musée Royal de l’Afrique Centrale, Tervuren, Belgium. The four syntypes of Clarias macrocephalus housed in the collections of the British Museum (Natural History) London, have also been examined.

On each specimen 30 point-to-point measurements were taken using dial calliper. Measurements follow Teugels (1986). They include (Figure 1): 1) Total length (TL); 2) Standard length (SL); 3) Maximum body depth (MBD); 4) Caudal peduncle depth (CPD); 5) Head length (HL); 6) Head width (HW); 7) Snout Length (SNL); 8) Interorbital distance (IOW); 9) Eye diameter (ED); 10) Nasal barbel length (NBL); 11) Maxillary barbel length (MBL); 12) Inner mandibular barbel length (IMBL); 13) Outer mandibular barbel length (OMBL); 14) Occipital
RESULTS

A comparison between natural populations originating from the Can Tho and Ho Chi Minh City areas for both *Clarias batrachus* and *C. macrocephalus* did not enable to distinguish them. Therefore, all specimens of each species were subsequently considered as one group for further analysis.

It should be noted however that in a PCA of all the *C. macrocephalus* specimens examined, the
type material, originally described from Thailand, was, at least in part, distantly set from the other specimens. Two of the types are small-sized (168-174 mm Standard Length) and have a reduced (18) number of gill rakers on the first branchial arch, while the others are large-sized (266-267 mm SL) and show 32-33 gill rakers on the first arch. The former has a pointed occipital process while in the latter it is extremely rounded. Comparison between the type material and equally sized specimens indicated that the small-sized *C. macrocephalus* types differ significantly. Therefore it is most likely that the type material of *C. macrocephalus* in fact includes two different species. Ongoing research on *Clarias* specimens from Thailand, the type locality of *C. macrocephalus* will clarify this.

Figure 2 illustrates the plot of a PCA for 23 log-transformed metric variables (excluding total length, standard length, nasal, maxillary, inner and outer mandibular barbel length and caudal fin length) for all specimens examined of *C. batrachus* and *C. macrocephalus*.

All specimens of *C. batrachus* are situated on the negative part of the second factor while all but three (only one if the aberrant type specimens are excluded) *C. macrocephalus* are located on the positive part of the second factor. The second factor is merely defined by (in decreasing importance) the length of the occipital process, the distance between the occipital process and the dorsal fin origin and the length of the frontal fontanel. These characters easily enable to distinguish both species (Fig. 3).

Figure 4 illustrates the number of gill rakers in function of the standard length for the different *Clarias* species found in Vietnam as well as for the hybrid between *C. gariepinus* x *C. macrocephalus*. *Clarias gariepinus* is distinguished from all the others by its numerous gill rakers. The hybrid *C. gariepinus* x *C. macrocephalus* has an intermediate number of gill rakers between that of the two parental species. *Clarias batrachus* has the lowest gill raker number.

Figure 3: Most striking external morphological differences between *Clarias batrachus* and *C. macrocephalus*. 1. Frontal fontanel shape; 2. Occipital process shape; 3. Distance between occipital process and dorsal fin origin; 4. Inner pectoral spine serrations.

Figure 4: Number of gill rakers on the first branchial arch in function of the standard length (mm) for the different *Clarias* species from Vietnam and the hybrid between *C. gariepinus* x *C. macrocephalus*.
Figure 5 shows the plot of a PCA for 23 log-transformed metric variables (excluding total length, standard length, nasal, maxillary, inner and outer mandibular barbel length and caudal fin length) for all specimens examined from Vietnam.

*Clarias batrachus* and *C. macrocephalus* are distantly set (cf. supra). *Clarias gariepinus* and *C. macrocephalus* partly overlap and their hybrids are superposed with the two parental species. Note that there is hardly any overlap between *C. gariepinus* and *C. batrachus*, two species for which the artificial hybridisation was unsuccessful.

**DISCUSSION**

The results obtained so far are still preliminary and incomplete. No specimens of *Clarias fuscus* have been examined so far, but a shipment is expected in the near future. A recently sent collection has not been examined so far.

Nevertheless the results show interesting data. The type material of *Clarias macrocephalus* apparently includes two species. The two small specimens do not correspond to the currently accepted definition of this species (rounded occipital process; relatively high number of gill rakers; ...).

The real status of these specimens is presently being examined.

No morphometrical differences have been observed between natural populations of both *Clarias batrachus* and *C. macrocephalus* from the two locations studied in the South of Vietnam. No striking differences were found between *C. gariepinus* cultured in Vietnam and *C. gariepinus* naturally occurring in Africa. Finally, the hybrid between *C. gariepinus* x *C. macrocephalus* shows an external morphology which is intermediate between that of the parental species.

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## CONTENTS

### FOREWORD

**Page**

1

### CONTENTS

**Page**

3

### CONTEXTS AND RESEARCH GOALS

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legendre M. The Catfish Asia project: backgrounds, aims and prospects.</td>
<td>7</td>
</tr>
<tr>
<td>Lazard J. Interest of basic and applied research on Pangasius spp. for aquaculture in the Mekong Delta: situation and prospects.</td>
<td>15</td>
</tr>
<tr>
<td>Sadili D. Marketing of pangasiid catfishes in Java and Sumatra, Indonesia.</td>
<td>21</td>
</tr>
</tbody>
</table>

### BIOLOGICAL DIVERSITY

**CHARACTERISATION OF SPECIES, POPULATIONS AND STRAINS**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teugels G.G., Legendre M. &amp; Hung L.T. Preliminary results on the morphological characterisation of natural populations and cultured strains of <em>Clarias</em> species (Siluriformes, Clariidae) from Vietnam.</td>
<td>27</td>
</tr>
<tr>
<td>Teugels G.G., Gustiano R., Diego R., Legendre M. &amp; Sudarto. Preliminary results on the morphological characterisation of natural populations and cultured strains of <em>Clarias</em> species (Siluriformes, Clariidae) from Indonesia.</td>
<td>31</td>
</tr>
<tr>
<td>Pariselle A. &amp; Komarudin O. First results on the diversity of gill parasites of some catfishes host species in South East Asia.</td>
<td>37</td>
</tr>
<tr>
<td>Pouyaud L., Hadie W. &amp; Sudarto. Genetic diversity among <em>Clarias batrachus</em> (Siluriformes, Clariidae) populations from the Indochina Peninsula and Indonesia Archipelago.</td>
<td>43</td>
</tr>
<tr>
<td>Pouyaud L., Gustiano R. &amp; Legendre M. Phylogenetic relationships among pangasiid catfish species (Siluriformes, Pangasiidae).</td>
<td>49</td>
</tr>
<tr>
<td>Volckaert F., Hellemans B. &amp; Pouyaud L. Preliminary data on genetic variation in the genus <em>Clarias</em> and <em>Pangasius</em> on the basis of DNA microsatellite loci.</td>
<td>57</td>
</tr>
</tbody>
</table>

### BIO-ECOLOGY

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thuong N.V., Hung H.P., Dung D.T. &amp; Kha L.A. Preliminary data on species composition and distribution of pangasiid catfishes (Siluriformes, Pangasiidae) in the lower Mekong River basin.</td>
<td>61</td>
</tr>
</tbody>
</table>

### DIVERSIFICATION AND OPTIMISATION IN AQUACULTURE PRODUCTION

**REPRODUCTION**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cacot P. Description of the sexual cycle related to the environment and set up of the artificial propagation in <em>Pangasius bocourti</em> (Sauvage, 1880) and <em>Pangasius hypophthalmus</em> (Sauvage, 1878), reared in floating cages and in ponds in the Mekong delta.</td>
<td>71</td>
</tr>
<tr>
<td>Legendre M., Subadgja J. &amp; Slembrouck J. Absence of marked seasonal variations in sexual maturity of <em>Pangasius hypophthalmus</em> brooders held in ponds at the Sukamandi station (Java, Indonesia).</td>
<td>91</td>
</tr>
<tr>
<td>Legendre M., Slembrouck J. &amp; Subadgja J. First results on growth and artificial propagation of <em>Pangasius djambal</em> in Indonesia.</td>
<td>97</td>
</tr>
</tbody>
</table>
Xuan L.N. & Liem P.T. Preliminary results on the induced spawning of two catfish species, *Pangasius conchophilus* and *Pangasius* sp1, in the Mekong delta.----------------------------- 103

Kristanto A.H., Subadgja J., Slembrouck J. & Legendre M. Effects of egg incubation techniques on hatching rates, hatching kinetics and survival of larvae in the Asian catfish *Pangasius hypophthalmus* (Siluriformes, Pangasiidae).----------------------------- 107

Campet M., Cacot P., Lazard J., Dan T.Q., Muon D.T. & Liem P.T. Egg quality of an Asian catfish of the Mekong River (*Pangasius hypophthalmus*) during the process of maturation induced by hCG injections.------------------------------------------ 113

Legendre M., Slembrouck J., Subadgja J. & Kristanto A.H. Effects of varying latency period on the in vivo survival of ova after Ovaprim- and hCG-induced ovulation in the Asian catfish *Pangasius hypophthalmus* (Siluriformes, Pangasiidae).------------------------- 119

**Larval Biology and Rearing**


Slembrouck J., Hung L.T., Subadgja J. & Legendre M. Effects of prey quality, feeding level, prey accessibility and aeration on growth and survival of *Pangasius hypophthalmus* larvae (Siluriformes, Pangasiidae).-------------------------- 137

Subadgja J., Slembrouck J., Hung L.T. & Legendre M. Analysis of precocious mortality of *Pangasius hypophthalmus* larvae (Siluriformes, Pangasiidae) during the larval rearing and proposition of appropriate treatments.--------------------------------------------------------------- 147

**Nutrition, Feeding and Growth**

Hung L.T., Tuan N. A., Phu N.V. & Lazard J. Effects of frequency and period of feeding on growth and feed utilisation on *Pangasius bocourti* in two Mekong catfishes, *Pangasius bocourti* (Sauvage, 1880) and *Pangasius hypophthalmus* (Sauvage, 1878).------------------------------------------ 157

Hung L.T., Lazard J., Tu H.T. & Moreau Y. Protein and energy utilisation in two Mekong catfishes, *Pangasius bocourti* and *Pangasius hypophthalmus*.------------------------------------------ 167

Phuong N.T. & Hien T.T.T. Effects of feeding level on the growth and feed conversion efficiency of *Pangasius bocourti* fingerlings.------------------------------------------------------------------ 175

Phuong N.T., Thi M.V. & Hang B.T.B. The use of plant protein (soybean meal) as a replacement of animal protein (fish meal and blood meal) in practical diets for fingerlings of *Pangasius bocourti*.------------------------------------------ 179

Liem P.T. & Tu H.T. Rearing of *Pangasius bocourti* fry (Siluriformes, Pangasiidae) fed different diets in concrete tanks.------------------------------------------------------------------ 187

**Hybrids Evaluation**

Kiem N.V. & Liem P.T. Some biological characteristics of *Clarias batrachus* and Preliminary results of the hybridisation between *Clarias batrachus* x *Clarias gariepinus*.----------------------------- 191


Minh L.T. Preliminary results on the relationship between growing stage and body composition in *Clarias macrocephalus, Clarias gariepinus* and their hybrid (*C. macrocephalus* female x *C. gariepinus* male).-------------------------- 211
PATHOLOGY

Komarudin O. Preliminary observations on the infection of the gills of cultivated *Pangasius hypophthalmus* by Monogenea.--------------------------------------------- 217

Supriyadi H., Komarudin O. & Slembrouck J. Preliminary study of the source of *Aeromonas hydrophila* infection on *Pangasius hypophthalmus* larvae.--------------------------------------- 219

Dung T.T. & Ngoc N.T.N. Preliminary results of the study of parasitic and red spot diseases on high economical valuable catfish species in the Mekong Delta.------------------------ 223