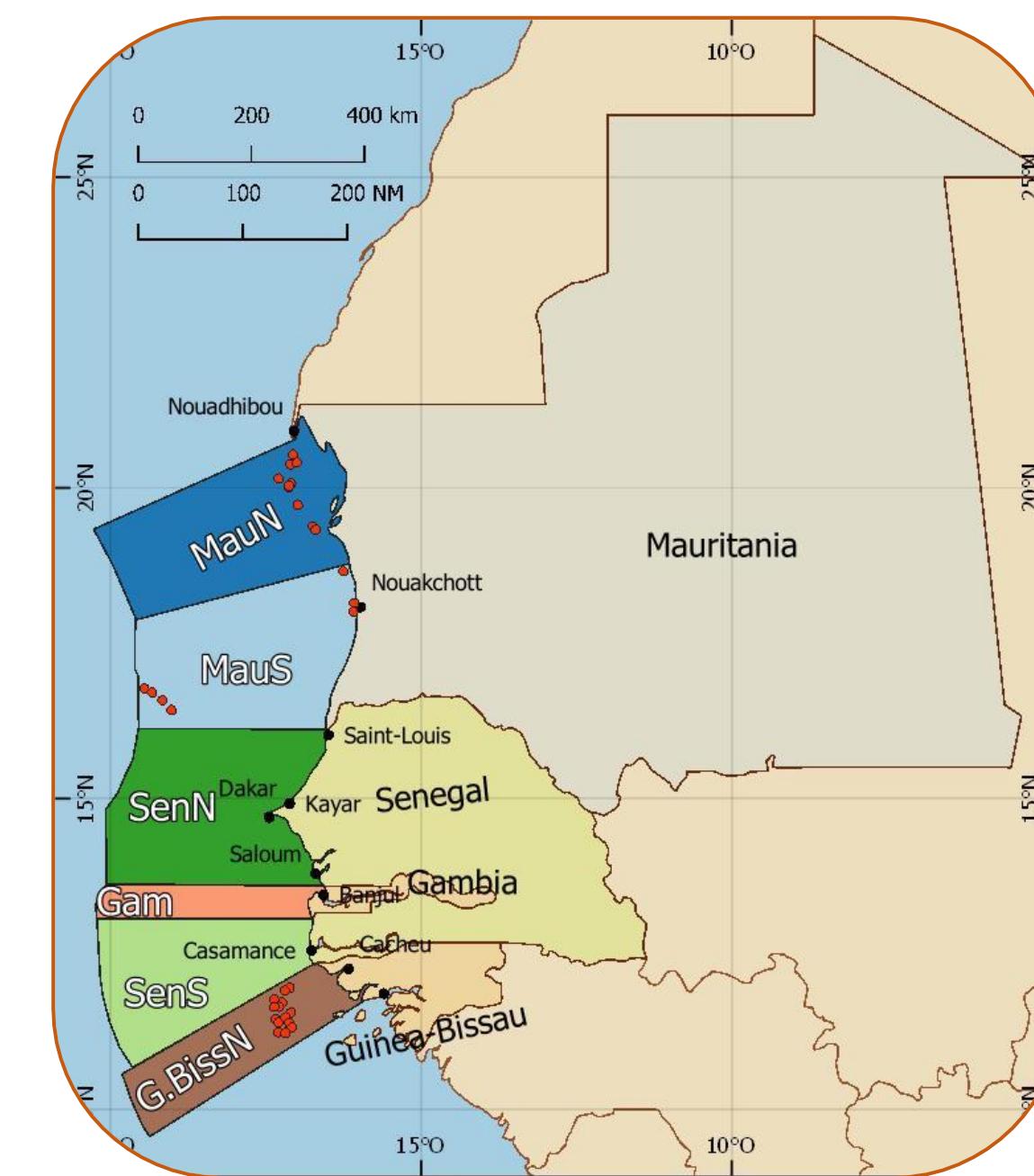


## 1 Introduction

Different units of *P. notialis* are known to occur from Mauritania to Guinea-Bissau: one in the Banc d'Arguin (Mauritania) and another at the mouth of the Senegal River, this last composed of four sub-units associated with the Senegal, Saloum, Gambia and Casamance rivers. However, for practical reasons, CECAF considers only two stock-units in the North WG (Mauritania and Senegal-Gambia) and one single stock for Guinea-Bissau, in the South WG, for assessment purposes.

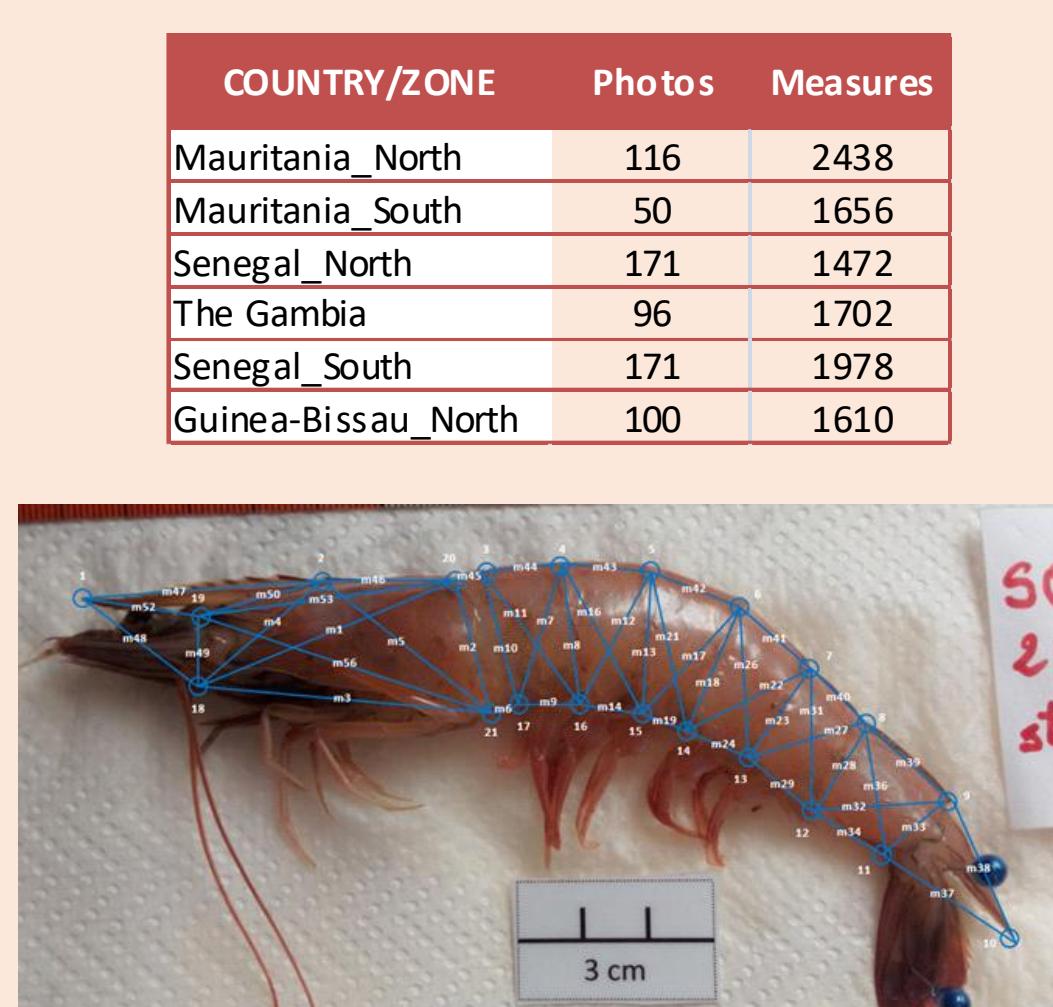


## 2 Methods

Specimens pictures  
(bi-annual)

### Morphometry

GROUP 3: SHRIMPS  
21 landmarks  
46 measurements



Classification and multivariate analysis:  
▪ Principal Component Analysis (PCA)  
▪ Linear Discriminant Analysis (LDA)

Morphometric measurements of the species (pictures) → TRUSS NETWORK

### Life History Traits

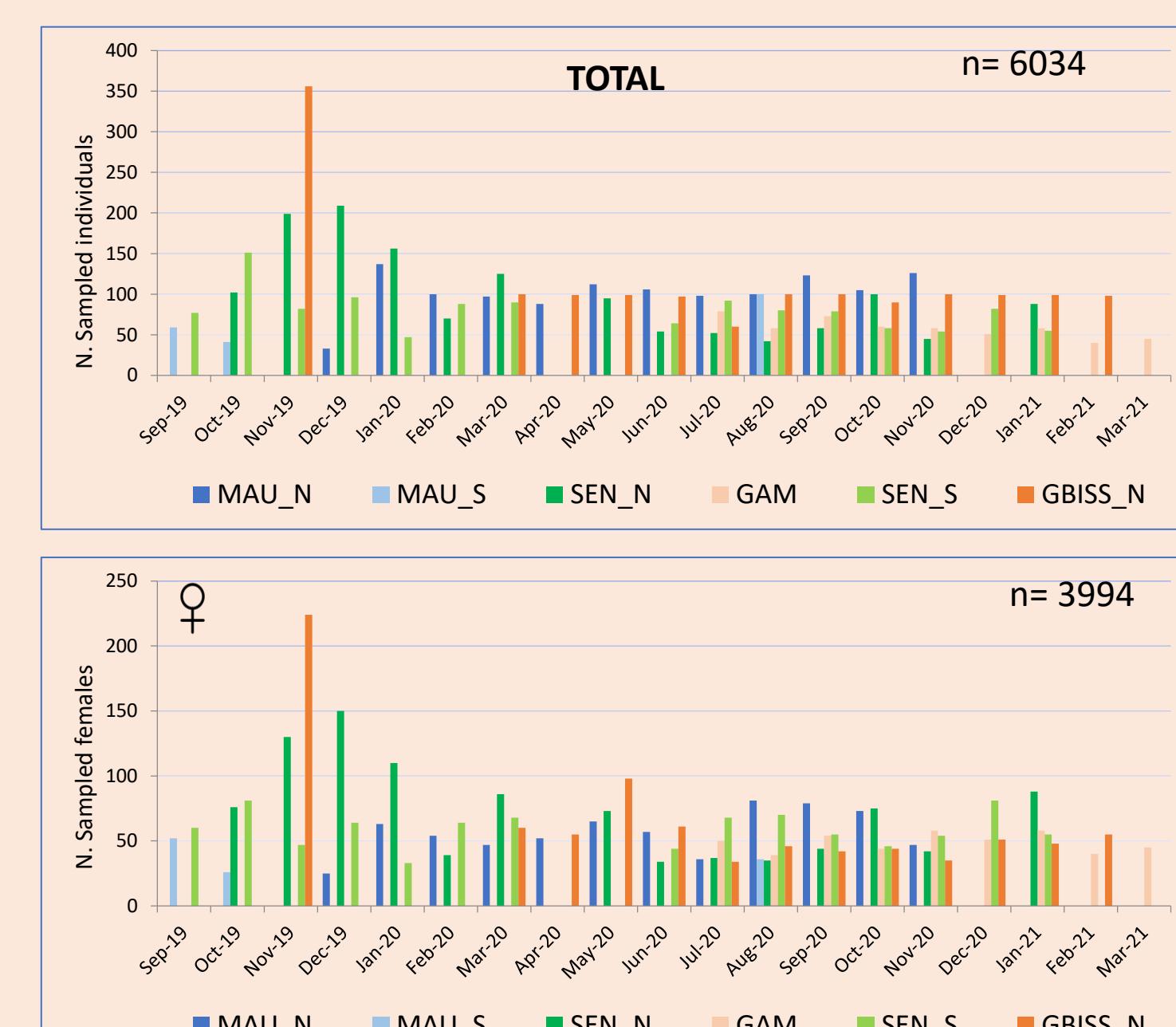
Weight parameters

Reproduction parameters and features

### Statistical analysis by country-zone

Biological samplings  
(monthly)

- Carapace length
- Sex
- Weight
- Gonad weight
- Maturity stage
  - 1-2 (males)
  - 1-4 (females)

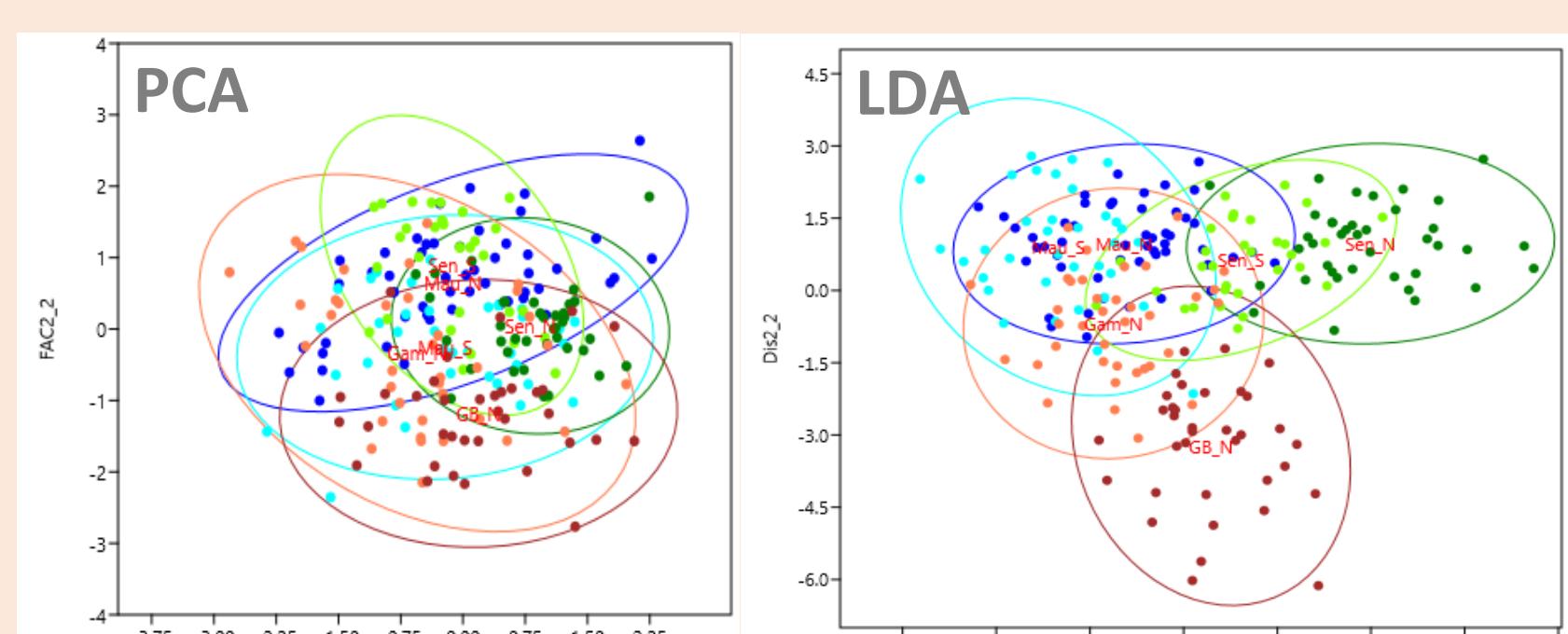


Parameters comparison by:  
▪ ANCOVA (Kruskall-Wallis)  
▪ ANOVA (Mahn-Whitney)/ (Kruskall-Wallis)

## 3 Results

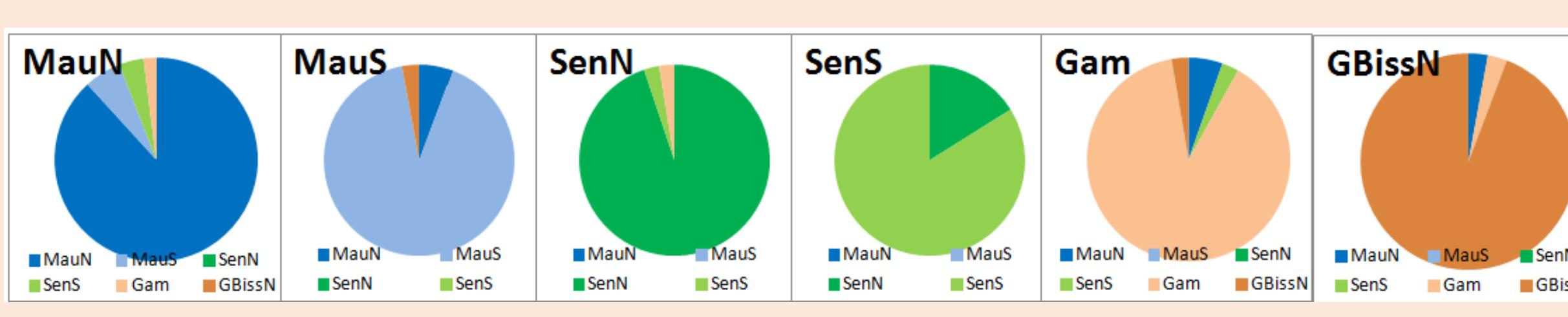
### Morphometry

#### SPECIMEN SHAPE (TRUSS NETWORK)



Country/area	Predicted Group Membership					
	MauN	MauS	SenN	SenS	Gam	GBissN
MauN	45	3	0	2	1	30
Maus	2	33	0	0	1	35
SenN	0	0	37	1	1	0
SenS	0	0	5	26	0	0
Gam	2	0	0	1	33	1
GBissN	1	0	0	1	35	27
Total	57	91.4	0	3.9	2	0
Number	57	91.4	0	3.9	2	0
%	0	0	94.9	2.6	2.6	0
Original	0	0	16.1	83.9	0	0
Gam	5.4	0	0	2.7	89.2	2.7
GBissN	2.9	0	0	0	2.9	94.3
	100					

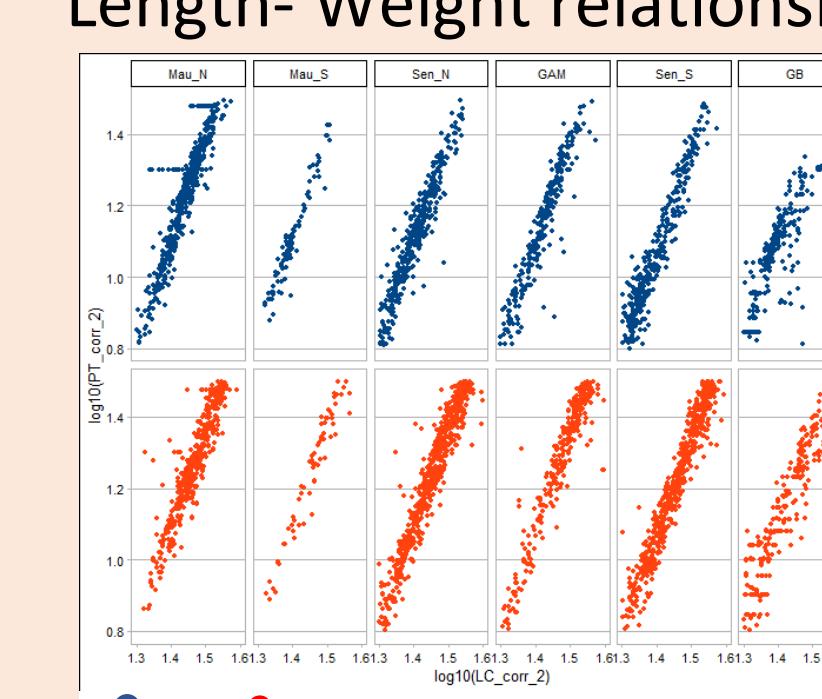
a. 90.6% of original grouped cases correctly classified.



Correct classification from LDA

The correct classification of individuals using specimen shapes is high in all the studied areas. PCA and LDA tests → The individuals in each area could be clearly differentiated from those in other areas.

#### Length-Weight relationship



Country-Zone	Length-Weight relationship		Le Cren's condition factor (k)		
	Slope (b)	SE	median	mean	sd
MAU_N	2.62	0.03	1.07	1.09	0.17
MAU_S	2.66	0.05	1.06	1.05	0.08
SEN_N	2.58	0.02	1.00	1.00	0.13
GAM	2.63	0.03	1.01	1.00	0.12
SEN_S	2.62	0.02	0.96	0.97	0.1
G. BISS	2.23	0.04	1.06	1.02	0.18

No significant differences are observed in weight parameters among the four studied zones.

#### REPRODUCTION

FEMALES	MAU_N	MAU_S	SEN_N	GAM	SEN_S	G.BISS_N
Spawning period	All year	The 3 sampled months	Jan-Jun/Oct-Dec	All sampled months	All year	Nov*
Spawning peaks	Jul/Oct-Dic	Unknown	Mar/Oct-Dec	Feb/Jul-Ago	Feb/Jul-Ago	Nov*
L50_warm season**	34.5	38.0	37.1	38.4	38.1	29.4
cv	0.39	0.03	0.02	0.06	0.02	0.05
N	36	88	148	89	135	280

\*Mature females only sampled in a survey

In general, the species spawns throughout the year, with two main spawning peaks (warm and cold season). Lengths at first maturity (L50) of females are consistent among the Mauritania-Senegal-Gambia zones, but bigger than the usually estimated for this species.

## 4 Conclusions (preliminary)

While data from life history traits have not provided conclusive results so far, the morphometry analysis (body shape-truss network) shows more reliable information for stock identification. Independent populations of *Penaeus notialis* can be considered for Mauritania North, Mauritania South, Senegal North, Gambia, Senegal South and Guinea-Bissau North. A more in-depth analysis of this information is being carried out and these results together with those from genetics (in progress), may be useful for fisheries assessment and management of the species.

These results should be linked to those obtained from the genetic analysis, in order to confirm if the units identified are in fact independent stocks or subpopulations of the same stock.



<sup>1</sup> Instituto Español de Oceanografía (IEO-CSIC), Spain

<sup>2</sup> Centre de Recherches Océanographiques de Dakar-Thiaroye (CRODT), Senegal

<sup>3</sup> Institut Mauritanien de Recherches Océanographiques et de Pêches (IMROP), Mauritania

<sup>4</sup> Fisheries Department, The Gambia

<sup>5</sup> Instituto Nacional de Investigación das Pescas e Oceanografía (INIPO), Guinea-Bissau

<sup>6</sup> Institut Agro Rennes-Angers, France