



## SCIENCE UPDATE

# European sea bass (*Dicentrarchus labrax*) exploited around Welsh waters - preliminary results: December 2013

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## Premise

The data collection of the exploited stock of bass around Wales is totally dependent on the participation of the key stakeholders (commercial and recreational fishers and fish merchants). A good picture of the state of the stock is only possible through a deep involvement of the fishing sector, otherwise no significant results will ever be achieved (see table below).

Please get involved by contacting Giulia Cambiè ([g.cambie@bangor.ac.uk](mailto:g.cambie@bangor.ac.uk), tel: 01248 382615)

Current aims	Participation	Results achieved	Comments
Size distribution of bass caught in North Wales (commercial fishery)	<u>Scarce participation of commercial fishers</u> Good participation of fish merchants	The first results are reported below	More involvement of commercial fishers is required
Size distribution of bass caught in Mid Wales (commercial fishery)	<u>No participation of commercial fishers</u> Scarce participation of fish merchants	No results	The involvement of fishers and fish merchants is required
Size distribution of bass caught in South Wales (commercial fishery)	<u>Scarce participation of commercial fishers</u> Good participation of fish merchants	The first results are reported below	More involvement of commercial fishers is required
Size distribution of bass caught by recreational fishers	<u>Scarce participation of recreational fishers</u>	No representative results are available	More involvement of recreational fishers is required
Male: female ratio + maturity stage (North Wales)	<u>Scarce participation of commercial fishers</u> Good participation of fish merchants	The first results are reported below	More involvement of commercial fishers is required
Male: female ratio + maturity stage (Mid Wales)	<u>No participation of commercial fishers</u> Scarce participation of fish merchants	No results	The involvement of fishers and fish merchants is required
Male: female ratio + maturity stage (South Wales)	<u>Scarce participation of commercial fishers</u> Good participation of fish merchants	The first results are reported below but have a high degree of uncertainty	More involvement of commercial fishers is required

## 1. Size distribution

A total of 1304 bass were sampled between May and November 2013, 280 from commercial fishermen ( $n = 6$ ), 49 from recreational fishermen ( $n = 4$ ) and 975 from the fish processing industry ( $n = 7$ ) (Figure 1). The fish processing industry has been the most important data source in terms of number of fish provided and they can be considered as representative of the commercial bass fishery. In fact, the trend in the size distribution of the fish provided by the processing industry is similar to that of the fish provided by the commercial fishermen. To date, we have not been able to collect sufficient data from the recreational fishermen to have a representative picture of the actual size distribution of their captures.

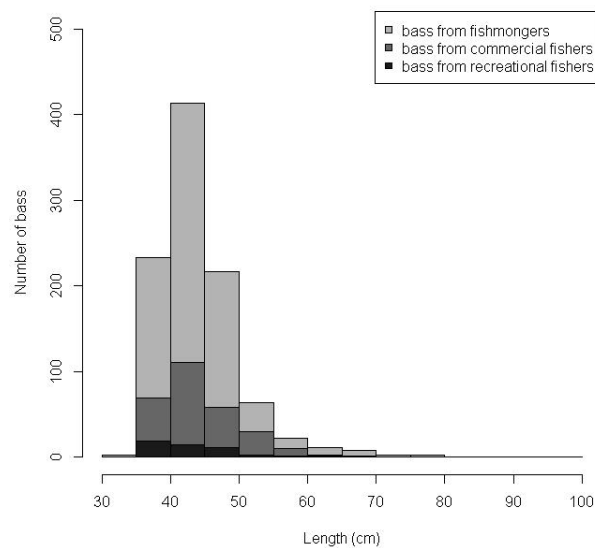


Figure 1. Length frequency distribution of the bass caught by data source.

Length-weight relationships ( $\text{Weight} = a * \text{Length}^b$ ) have been estimated from 1205 fish; 827 from South, 371 from North and 7 from Mid Wales respectively (Figure 2). Differences in the parameters ( $a$  and  $b$ ) between North ( $a = 0.02499$ ,  $b = 2.785$ ) and South Wales ( $a = 0.01823$ ,  $b = 2.852$ ) have been detected. However, the differences in the parameters  $a$  and  $b$  of the length-weight equations between North and South Wales could be related to the different sample size and not to a real difference in growth patterns.

Considering all records together, the parameters  $a$  and  $b$  ( $a = 0.01926$  and  $b = 2.843$ ) are slightly different with respect to those of the bass stocks from the East and West English Channel ( $a = 0.01240$ ,  $b = 2.953$ ) and from the Bay of Biscay ( $a = 0.01230$ ,  $b = 2.955$ ) ([www.fishbase.com](http://www.fishbase.com)).

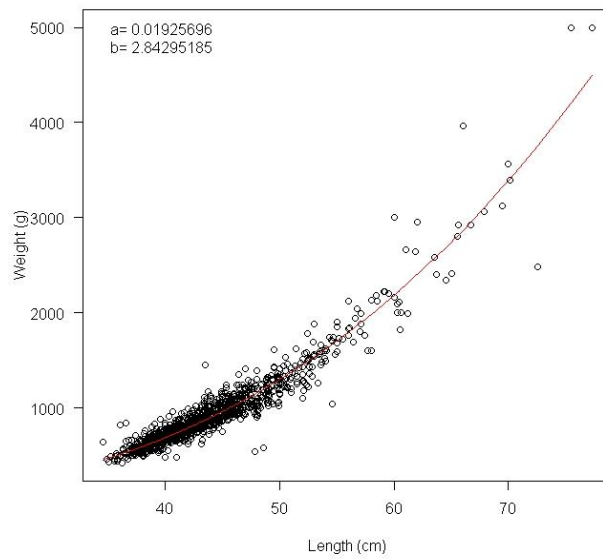


Figure 2. Length-weight relationship for the bass recorded between May and November 2013 (n = 1205).

Differences in the average body size of the bass caught between North ( $42.81 \text{ cm} \pm 5.58 \text{ SD}$ ) and South ( $44.58 \text{ cm} \pm 5.61 \text{ SD}$ ) Wales have been detected (Mann-Whitney U test,  $p < 0.001$ ) (Figure 3). Although this effect could be related to the different Minimum Landing Size between North (MLS = 36 cm) and South (MLS = 37.5 cm) Wales, the effect of other variables such as the month/season, the fishing method and the habitat (coastal areas/estuaries/offshore) cannot be discounted and need to be explored by using appropriate statistical models.

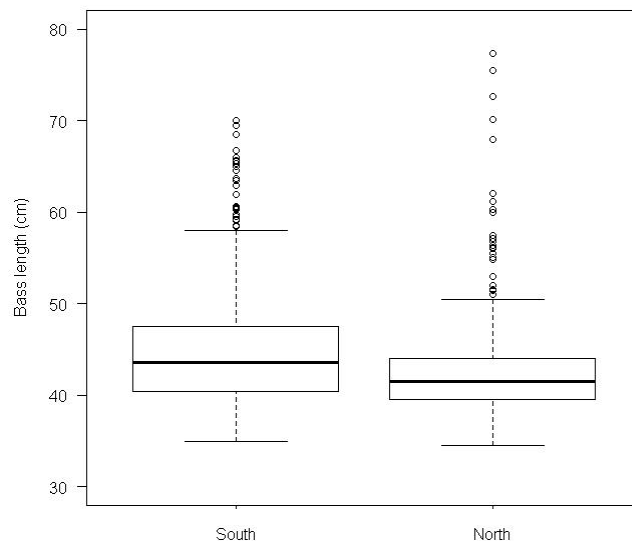


Figure 3. Box plots showing the distribution of the body size of the bass caught in North and South Wales

The fishing method is an important variable in determining the size distribution of the bass caught. In particular our data show a significant difference in the size distribution between gillnets and line (rod and line and longline) for the fish caught in North Wales (t-test,  $p < 0.001$ ) with the net fishery catching larger fish than the line fishery (Figure 4).

However, in South Wales no differences in the size distribution of the bass caught have been detected between the two gear groups (net and line) (Figure 4).

Gill nets appear to be a size-selective gear with a similar size class of the bass caught between North (average size: 43.7 cm) and South Wales (average size: 44.1 cm). On the contrary, the size class of the bass caught with line in South (average size: 44.08 cm) is higher than in North (average size: 41.41 cm) Wales. This different pattern in the size distribution of the bass caught with a line between North and South Wales could be related to the higher MLS in South Wales, which would determine a higher size class in the landings with respect to the North. However more data need to be collected to better address this topic, as the different size of the bass caught with line and nets could also be related to the differences in the season of the gear use (mainly spring-summer for line and autumn-winter for nets).

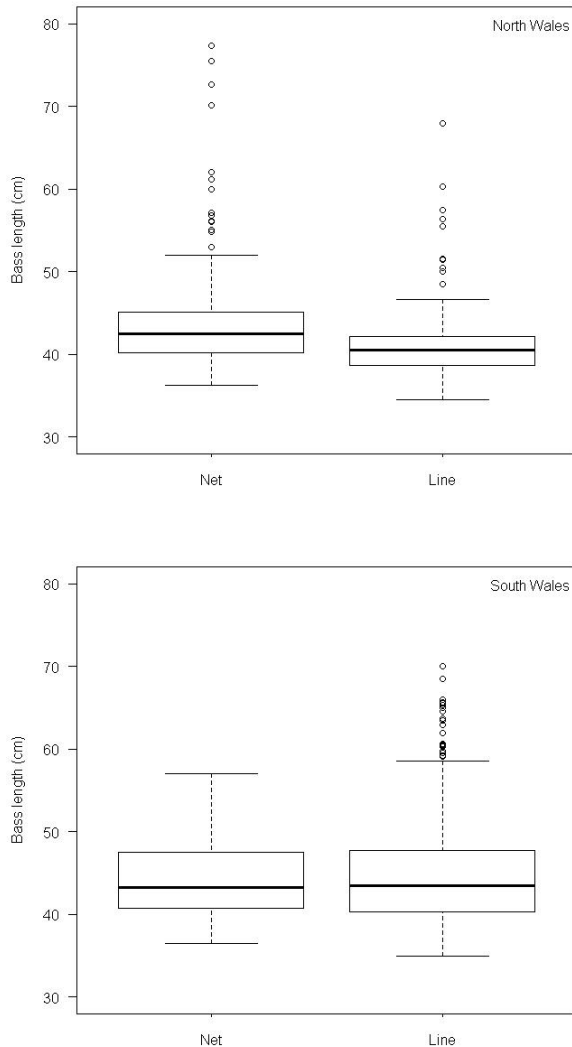


Figure 4. Box plots showing the distribution of the body size of the bass caught by fishing gear

## 2. Male/female ratio and maturity stage

A total of 390 fish were sexed, 315 from North Wales and 75 from South Wales. The male/female ratio by area (North and South) is shown in Figure 5. Although these preliminary results show that in South Wales the captures were mainly composed of males (67% of males vs. 33% of females), more data need to be collected to have a robust and representative picture of the exploited stock in that area.

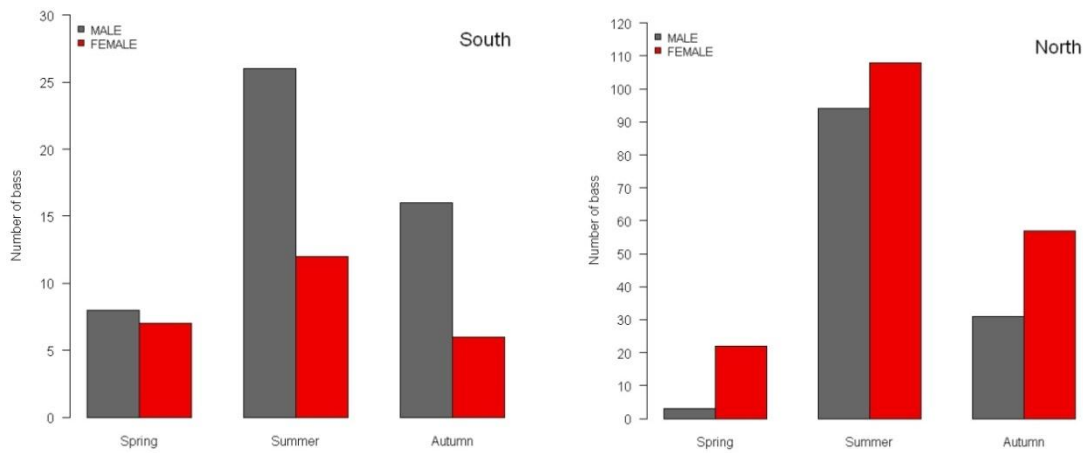


Figure 5. Male/female ratio of the exploited bass stock by season in South (left) and North (right) Wales.

The maturity stage of the bass caught by month (Figure 6) is consistent with the life cycle described in Pawson and Pickett (1996). Ripe females appeared only in May and June. Spent fish (stage VII) tended to remain in this condition for several weeks after spawning was completed. During summer and autumn, stage III for females and II for males were predominant.

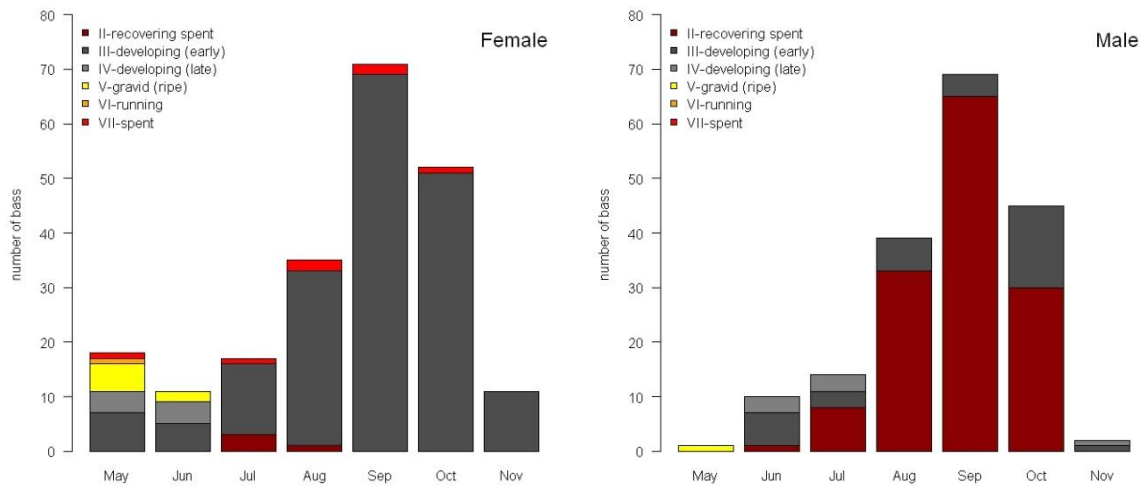


Figure 6. Maturity stage by month of female (left) and male (right) bass exploited in Welsh waters.

According to Pawson and Pickett (1996), females are considered mature from stage V (gravid-ripe). A total of 17 females were found mature, 6 at stage V (gravid-ripe), 1 at stage VI (running), 6 at stage VII (spent) and 4 at stage II (recovering spent). The average size of the mature females was 51.1 cm ( $\pm 11.4$  SD). Unlike Pawson and Pickett (1996), two females (12%) were observed to become ripe to spawn at lengths  $<42$  cm. Although this value is not representative due to the small sample size, the

possible decrease of the size at first maturity needs to be investigated with special attention. For this reason it is essential to collect more data during winter, as it represents the spawning season for the species and thus the only period of the year when data on ripe specimens can be collected.

Considering the male/female ratio in North (M = 41%, F = 59%) and South Wales (M = 67%, F = 33%) and the related size distribution, 44% (North Wales) and 45% (South Wales) of the females caught were < 42 cm.

### 3. Nursery areas and recruitment index

A total of 10 sites (coastal areas and estuaries) were sampled from July to October 2013 with a micromesh seine net (4 mm mesh size). The sampling sites were distributed around the Welsh coast: 4 in North Wales (Conwy Estuary, Foryd Bay (Caernarfon Bay), Malltraeth Sands and Porthmadog), 4 in Mid Wales (Fairbourne, Tywyn, Aberdovey (2 sites)) and 2 in South Wales (Swansea Bay and Loughor). For each site the catch species composition was defined (Figure 9) and, where bass were present, the recruitment index of 0-group bass was estimated.

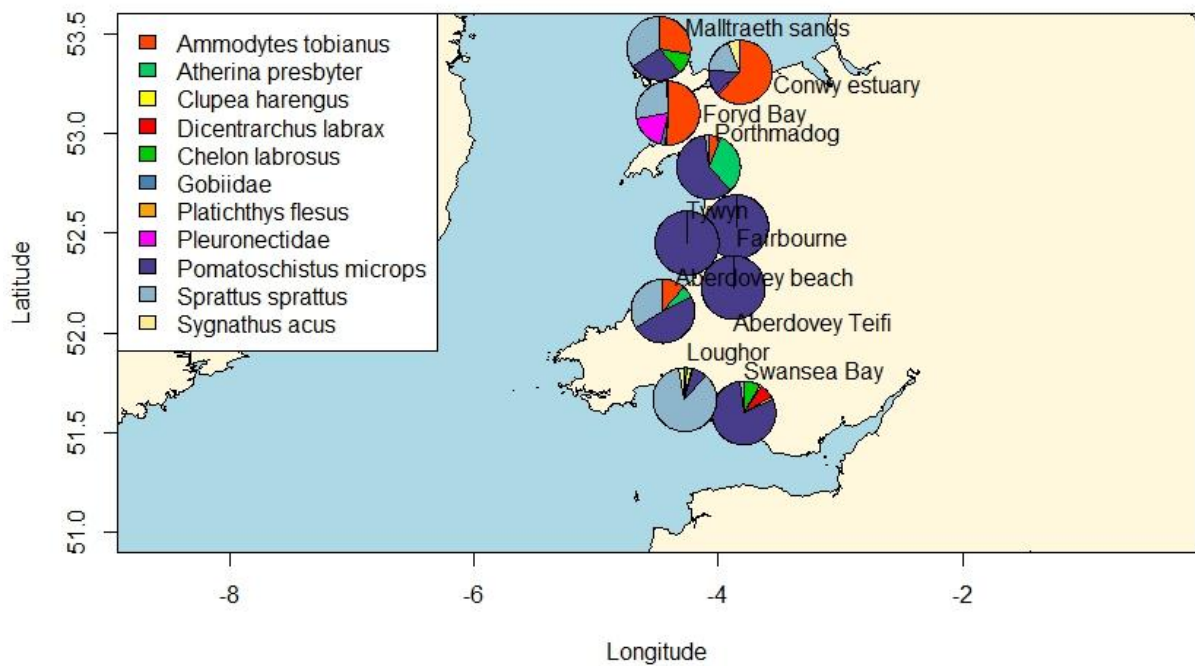


Figure 9. Catch species composition (by number) per sampling site.

A total of 57 samplings with seine nets were undertaken. A total of 966 individuals from 11 different species were also measured. 0-group bass were detected in small quantities only in South Wales and in Aberdovey estuary (Table 1).

Sampling Site	n. of netting operations	n. of 0-group bass	Recruitment index (bass/100 m <sup>2</sup> )
Conwy Estuary	3	0	0
Foryd Bay	4	0	0
Malltraeth Sands	2	0	0
Porthmadog	4	0	0
Fairbourne	4	0	0
Tywyn	3	0	0
Aberdovey (Teifi)	3	0	0
Aberdovey (beach)	9	1	0.079
Loughor	11	9	0.273
Swansea Bay-Blackpill	14	42	2.432

#### 4. Forthcoming results

- The analysis of the bass scales for ageing the fish and processing them for the stable isotopes analysis started this month and first results of the age structure of the exploited stock will be presented by April 2014.

- 50 economic interviews have been carried out and the economic indicators will be presented by March-April 2014.

#### References

Pawson, M. G., and Pickett, G. D. 1996. The annual pattern of condition and maturity in bass (*Dicentrarchus labrax* L) in waters around the UK. *Journal of the Marine Biological Association of the UK*, 76: 107–126.