

Stunning methods for European sea bass Gilthead sea bream

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Harvesting & Killing

E. sea bass &
G. sea bream

Species habitats

Main production methods

Harvesting techniques

Stress response during harvesting

Products quality comparison

Knowledge gaps related with welfare risks

Transition to new requirements

Conclusions



Species habitats

European sea bass

- Carnivorous, tolerates temp 2-32°C and salinity (3‰ - 38‰)
- Marine, brackish, demersal oceanodromous fish. Found in littoral zone, on lagoons and estuaries. Inhabits coastal but mostly shallow waters.
- Spawn small pelagic eggs from December to February

Gilthead sea bream

- Carnivorous, herbivorous species. Tolerates temp 5-34°C and salinity (5‰ - 38‰)
- Benthopelagic species, present in coastal areas. Inhabits sea grass beds, rocky and sandy bottoms
- Protandrous hermaphrodite. Spawn from December to April

Main production methods

Hatcheries

- Land based, pumped or drilled marine water supply. Sections for breeders, larvae, live feed, juveniles
- Control on water quality, water temperature and lighting
- Diseases, mortality, malformations, injuries, slow growth
- Water parameters, stocking density, feed quality, handling practices (i.e. shorting, transport)

Open sea cages

- Floating cages, open flow system for water exchange. Fish transferred at 2g-15g till up to harvest weight
- Artificial feed provided, monitor fish health, morts collection, diving control
- Diseases, mortality, injuries, slow growth, rarely malformations
- Stocking density, handling practices (i.e. shorting, vaccination, harvest), feed quality

Ponds

- Land based earthen or concrete made tanks. Flow through water exchange. Fish transferred at 2g-15g up to harvest weight
- Artificial and natural feed provision, fish health monitoring and mortalities collection
- Diseases, mortality, injuries, oxygen supply, slow growth
- Stocking density, handling (i.e. sorting, vaccination, harvest), feed quality, water parameters

Harvesting techniques

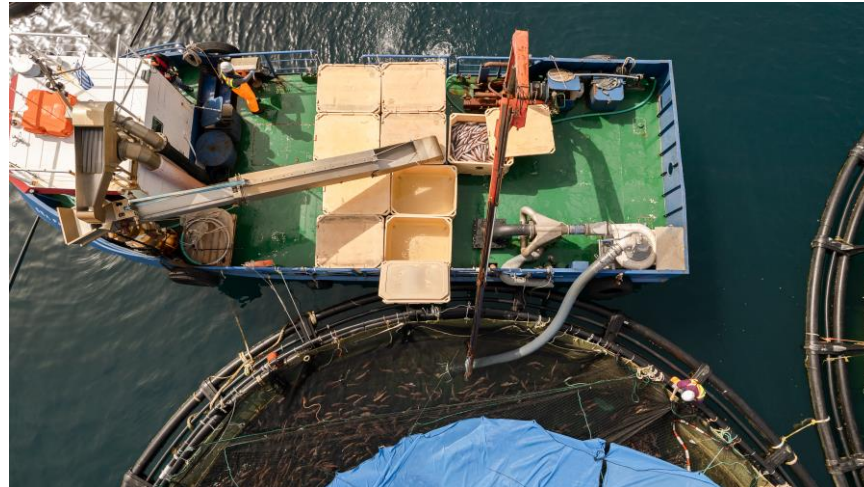
Iced water

- Starvation, crowding, brailing, dewatering, stunning/killing in iced water immersion.



Electric stunning

- Starvation, crowding, pumping, stunning, dewatering, killing in iced water immersion.

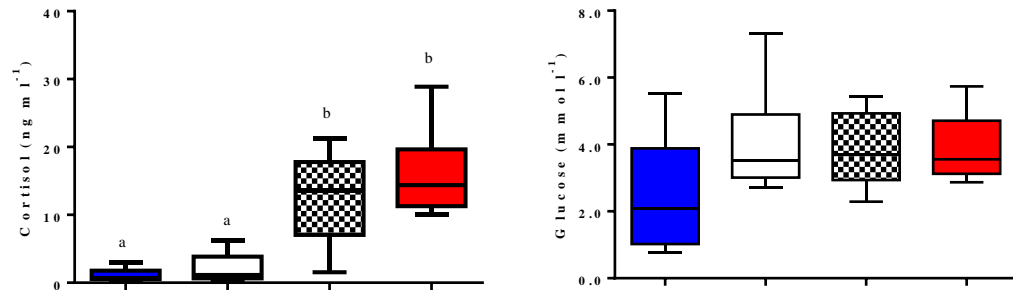


Dry electric stunning

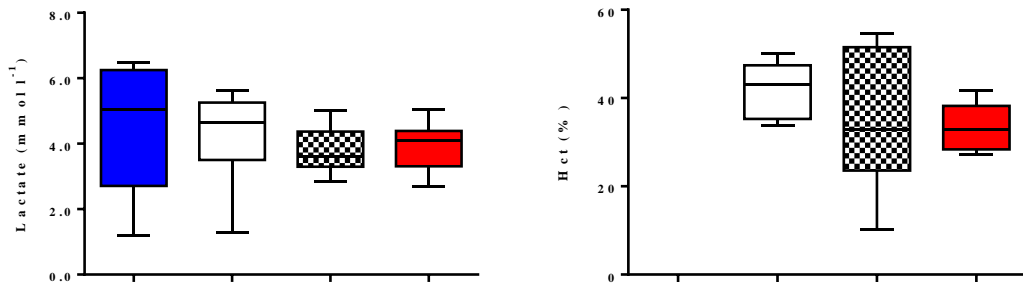
- Starvation, crowding, pumping or brailing, dewatering, stunning, killing in iced water immersion.



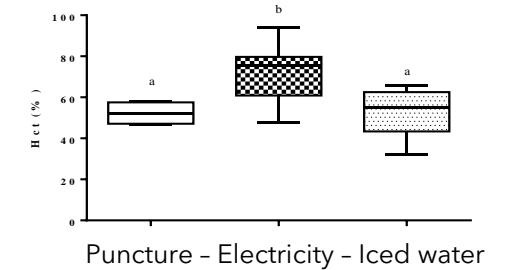
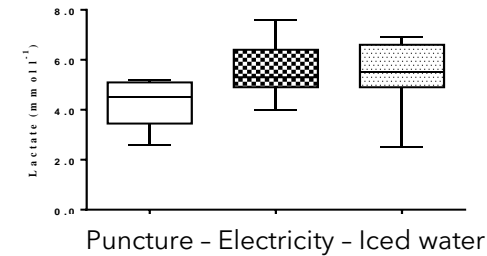
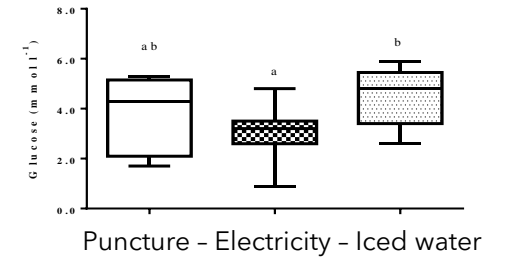
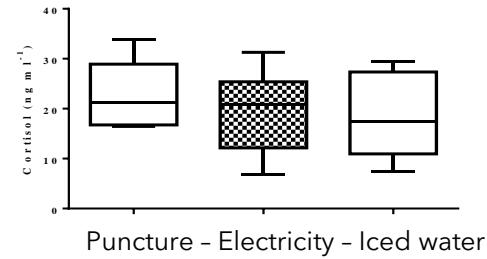
Stress response during harvesting – G. sea bream



■ Hook and line
 Crowding by 50%
 Crowded - Start harvesting
■ Crowded - End harvesting



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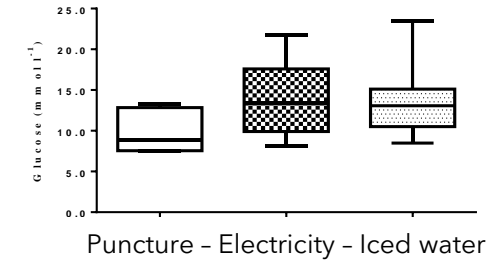
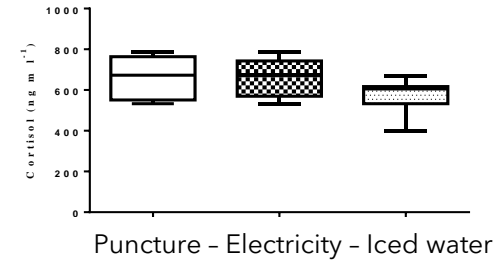
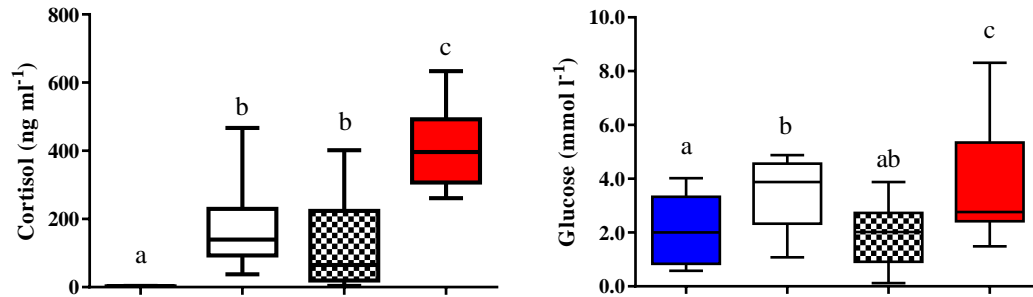


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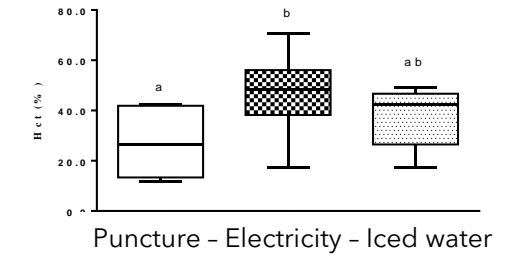
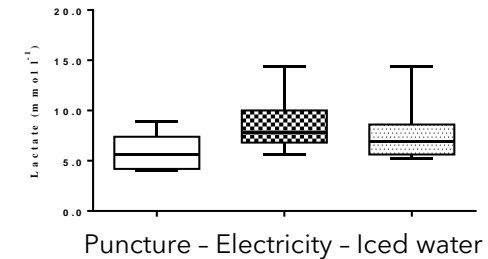
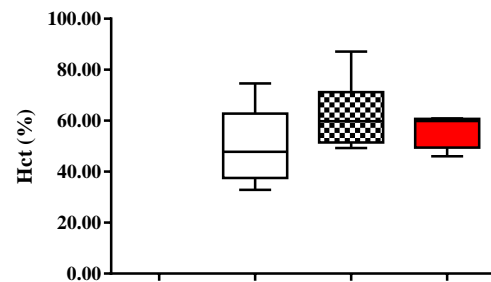
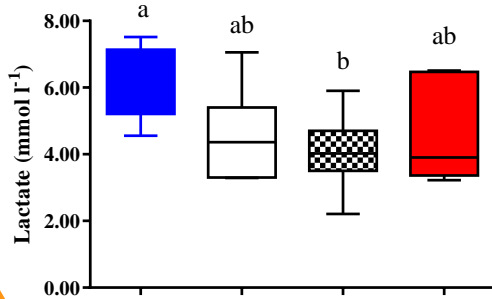
Conclusions

- Stress response initiated during preharvest handling
- There is no difference in stress response between killing methods

Stress response during harvesting – E. sea bass



■ Hook and line
 Crowding by 50%
 Crowded - Start harvesting
■ Crowded - End harvesting



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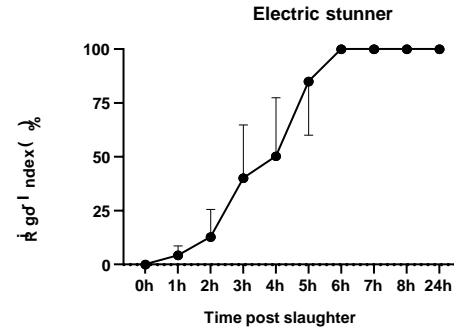
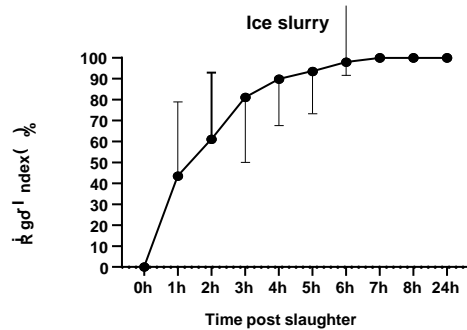
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Conclusions

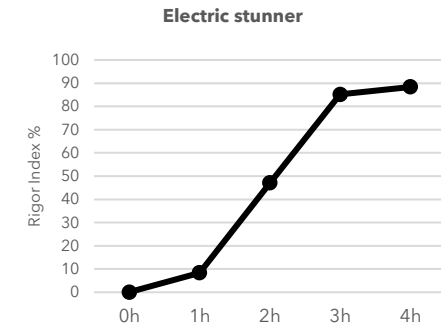
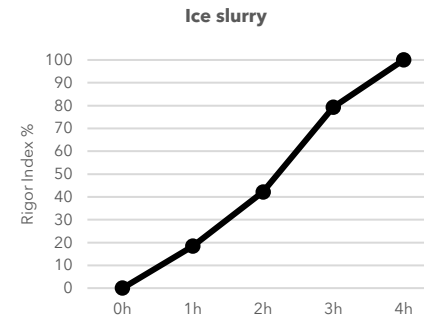
- Stress response initiated during preharvest handling
- There is no difference in stress response between killing methods

Quality comparison – Rigor mortis

Gilthead sea bream



European sea bass



Knowledge gaps

Configuration

1

There are no standards on the configuration of electric parameters
Different set up for different species is needed.

Quality impacts

2

Fish appearance is brighter. Impacts on flesh texture and integrity (gapping) reported. Further research on configuration is needed

Welfare impacts

3

There is no proven improvement on fish welfare indicators, possibly due to knowledge gaps on electric field configuration

Marketing

4

Fish are perishables, Many small volume harvests performed daily. This alter harvest efficiency as many fishing units need to operate in parallel.

Scale impacts

5

There is a big variation on scale of operations. Farms licensed for 300t/y - 2,500t/y need the same amount of investment per harvest unit

Long transition period due to infrastructure constraints

Stunning to be performed in the sea and not at slaughterhouses

Many small size farms scattered along the seashore

There is limited space on harvest units to deploy the machinery needed

CAPEX will be allocated to limited daily harvested biomass

Production (tones / year)	Companies
< 250	27
250 - 500	16
500 - 1,000	10
1,000 - 5,000	9
> 5,000	4

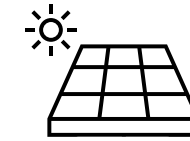
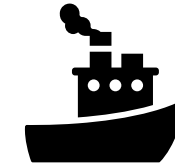
Companies	Farms
66	283

Source: FGM 2021

Farms	Production (tones / year)
26%	< 250
39%	250 - 500
23%	500 - 1,000
12%	1,000 - 5,000
-	> 5,000

Sample of 83 farms out of 283 (30%)

Harvest units



Boat	Floating barge	Harvest trips
	Daily harvest 2t -30t	1-3 per day

Investment in stunning equipment will be allocated per harvest unit and per 12t biomass per harvest

Investments in new equipment will be constrained by:

Licensed biomass of company

Daily capacity of harvest unit

Further investments to adopt harvest units

Conclusions

Fish welfare is strongly related with fish health and product quality

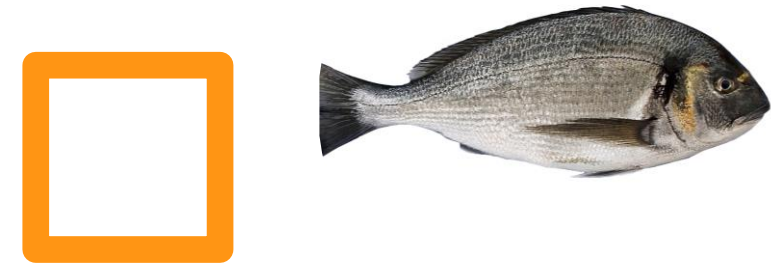
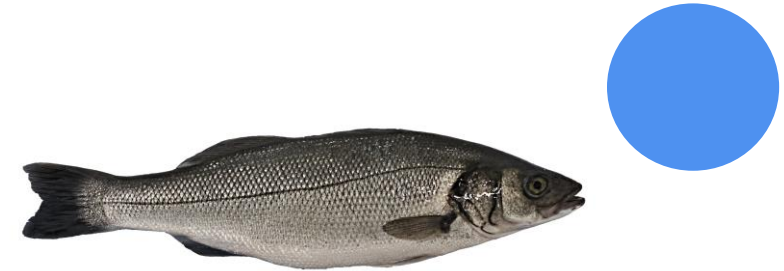
It is of the benefit of the product and of farming activities to achieve high welfare status

The scientific knowledge available is not sufficient to determine that electric stunning improves fish welfare

There are many knowledge gaps on setting specific provisions and for that reason welfare risks are still valid

SBSB stunning performed in sea and technology adaptation must be designed at harvest unit level

R&D of stunning methods has to be financed and following that a long transition period for the SBSB farming sector is needed





Thank you

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