



**MINOUW**

# Case study results

## 3.5 – Trammel nets in Tuscany, Italy

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## SUMMARY

The caramote prawn fishery is very important for some small-scale fishing fleets in Tuscany. Unfortunately, catch of target species is often associated with important quantities of unwanted catches (crabs and other benthic invertebrates); this often generates high discards and damages to gears, with consequent environmental impacts and associated costs for fishermen. Experimental fishing trials with standard (control) and modified trammel nets, equipped with a “selvedge” (or guarding net) on the lower part, were conducted to assess the possible reduction in discards. Fifteen trials were carried out using the three nets simultaneously. Catches were identified, measured and categorized and the statistical differences tested. Our experiments showed that the addition of ‘selvedge’ net to traditional trammel nets can reduce bycatch (and so discard) by up to 75%. Selvedge fitted to trammel nets is an effective solution to decrease discards and unwanted catches. The economic loss due to the slightly reduced catch of commercial species is offset by decreased sorting time and labor costs, in the immediate short term.

## CASE STUDY RESULTS

### Type of intervention

To install a “Selvedge” or “guarding net” (mono-panel strip) on the bottom side of trammel nets commonly used to catch the caramote prawn, *Penaeus kerathurus*.

### Aim of the experiment

The aim is to improve the net selectivity, decreasing the impact on unwanted catch (mainly benthic invertebrates), as well as increase the profitability of the fishery (reducing catch sorting time and the damages incurred on the nets).

### Main activities carried out

The caramote prawn fishery is very important for some small-scale fishing fleets in Tuscany (FAO-GFCM GSA 9). Unfortunately, catch of target species is often associated with important quantities of unwanted catches (crabs and other benthic invertebrates); this often generates high discards and damages to gears, with consequent environmental impacts and associated costs for fishermen.

In the period July 2015-May 2016, a preparatory work was realized; meetings with fishermen and other stakeholders have been held to present the objectives and work plan of the case study. Fishermen suggestions provided useful technical indications for constructing the experimental nets:

- A professional standard trammel net commonly used to exploit caramote prawn (STN);
- Two experimental trammel nets provided with two types of “selvedge” strip, placed at the bottom of the standard trammel net, just above the lead line: 20 cm (SE20) and 30 cm (SE30) height, respectively.

From June to July 2016, fifteen experimental fishing trials were performed using a professional vessel belonging to the small-scale fishery fleet of Viareggio. In each experimental trial, four net sheets of 100 m of each type of trammel net (STN, SE20, SE30) were used. The twelve sheets were tied in a single gang leaving an escaping area of about 1.5 m between adjacent nets to avoid any guiding effect. The impact evaluation was oriented to both the target species and the other captured organisms. The experimental protocol consisted in comparing capture efficiency and selectivity of a control trammel net and two different types of “selvedge” device, a mono-panel strip placed at the bottom of the trammel net, aimed at reducing the presence of benthic species. Standard trammel net catches were compared to those by the two types of experimental trammel nets (one with a high guarding net, 30 cm, and one with a low guarding net, 20 cm). Sampling with the three types of trammel nets occurred during the prawn fishing period (precisely June-July 2016), along the coastal area of Viareggio.

The catches with the three different nets were characterized from both a qualitative (specific identification) and a quantitative (biomass and number of individuals) point of view. For the main target species, the demographic structure (individual size) was recorded. Generalized Additive Models (GAM) (Hastie and Tibshirani, 1990) were used in order to fit log-transformed catch data and test the effects of the different types of net on the catchability of targeted species and discards. A cost-benefit evaluation of the usability of these trammel nets in a professional fisheries context was performed. Interviews with the local fishermen involved in the caramote prawn fishery were performed to collect socio-economic information in order to characterize the performance of this fishery and to evaluate the effects of the introduction of the selvedge technical device.

#### References

Hastie T.J., Tibshirani R.J. 1990. Generalized additive models. Monogr. Stat. Appl. Probability 43, Chapman & Hall, Boca Raton. 335 pp.

### **Main results**

Results indicate that the “selvedge” device can contribute to reduce discards (e.g. crabs and other benthic species, and fish without commercial interest) up to 75% compared to a standard trammel net.

At the same time, catch rates of target species are higher with the STN than the trammel nets equipped with 20 and 30 cm “selvedge” device (SE20 and SE30); Decreased sorting time, labour costs, and wear of the net compensate the economic loss due to lower catches of target species using the “selvedge” device.

### **Discussion of the results**

Although discarding is known as a major problem in trawl fishing, also the set net fisheries, especially on certain types of bottoms, can capture large amounts of organisms belonging to the non-commercial species.

The presence of large amounts of discards, principally made by crabs (*Liocarcinus vernalis*), gastropods, echinoderms, is a recurrent phenomenon in trammel net fisheries, such as the one targeting caramote prawn. This aspect is often a limiting factor for these fisheries, which normally are very profitable: the “unwanted” catches substantially lengthen the working time for sorting the catch and cleaning the nets,

and cause premature deterioration of fishing gear.

To overcome this problem, the fishermen are using a modified trammel net provided with the “selvedge” in its lower part. Previous studies have demonstrated that discards are lower in the nets provided with the “selvedge”.

In this context, the present case study was planned with the aim of evaluating the effects of different technical devices placed in a trammel net to reduce the unwanted catches.

The final aim of this case study is to propose a modified version of trammel nets also for other kind of fisheries, especially if performed in zones or periods where the presence of non-commercial species is particularly high. At the same time, a trammel net with reduced environmental impact could be suggested for the fisheries carried out in sensitive habitats or nearby marine protected areas.

The results of the experimental trials revealed that the use of a modified trammel net equipped with a selvedge device can significantly reduce the amount of discards (mostly represented by benthic species, such as crabs, gastropods, etc.) in the trammel net fishery targeting caramote prawn. The proposed modification is relatively inexpensive (the cost of the modified trammel net is more or less the same as the standard trammel net). However, it reduces the total commercial catch of the vessel. Nonetheless, it is expected that the economic loss can be offset by decreased sorting time and labour costs, in the immediate short term.

### **How practical is it for a fisherman to implement this improvement, technically and financially?**

The addition of ‘selvedge’ or ‘guarding net’ to trammel nets is a relatively inexpensive and straightforward modification.

### **Is there sufficient evidence to support wider adoption of the method/technology?**

Our experiments have shown that the addition of selvedge to trammel nets can have a significant impact, and should be considered for wider adoption in fisheries where it is likely to be effective.

## **CONCLUSION**

The selvedge of guarding net fitted to the footrope of standard trammel nets is an effective solution to decrease overall discards, as well as unwanted catches of benthic invertebrates. This device is also effective in reducing the labour costs associated to sorting and net cleaning, as well as reducing the costs due to the net reparation.

## **ADDITIONAL RELEVANT RESOURCES OR LINKS**

EU Common Fisheries Policy (CFP) Reform: [https://ec.europa.eu/fisheries/cfp\\_en](https://ec.europa.eu/fisheries/cfp_en)

International Guidelines on Bycatch Management and Reduction of Discards:

<http://www.fao.org/fishery/nems/40157/en>

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