# Annual Luminosity Cycle as a forecast factor in the Deep Prawn Fishery *Aristeus antennatus* (Risso, 1816) from the Catalan Area

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## INTRODUCTION

In order to analyse the prawn school movements and the efficiency of their captures, the authors set up the possibility of considering light factor (directly or undirectly) as the responsible variable of species activity in relation to its catchability. These aspects have been scarcely studied in Crustaceans. Only few references on Norway lobster are available.

The present work tries to relate the CPUE with a specific brightness threshold in terms of wich a seasonal model of capture-depth is established.

## MATERIAL AND METHODS

The fishery data came from the daily captures of trawler that supplied: haul situation, yield (K/h), depth, starting-time and duration of haul. The schedule of the captures were always considered with respect to the official sunrise time (GPM) during the whole year. The calculus of a light factor (Lf) was proceeded, estimating it proportional to the light which theoreticaly reaches the bottom, by the following equation: Lf = Lo exp.(-k.m)
where Lo, is the subsuperficial light factor obtained from the solar declination and the refraction index (1.33 for the Mediterranean). k, is the extinction coeffecient of the light in water (0.026 for the Mediterranean) and m, is the depth in meters.

The light factor was calculated for each day of the year and each depth of capture from an annual table which considers sunrise time prepared for the latitude and longitude of the studied area. From this table different relationships were analysed jointly: maximum yields with haul time, depth, brightness intensity and effect of official time shift during the spring.

## RESULTS

The existence of an optimum schedule for maximum yields can be deduced from the relationship between the mean CPUE and the difference of the haul time with respect to the sunrise and zenith. This maximum was situated between zero and two hours after sunrise and decreases as we move towards midday.

As the year goes on the brightness intensity increases and the hauls take place with higher superficial light for the same schedule, noticing an increase in the earlier yields. This was confirmed when the spring time shift occurs (last Sunday in March) which brings fowards one hour for fishing activity. In consequence when brightness conditions change, a significant difference between the mean captures fished before and after time shift are noticed.

The relationship between the haul depth and the time of first capture presents a high correlation. As the difference between the haul time and the sunrise increase, the depth of the first haul also increases. Major captures correspond to very low brightness values and take place during the first trawls of the day (captures bigger than 15 Kg/h do not exceed a 1.E-6 light factor). Meanwhile for the second haul of the day this magnitude triplicates its value and the corresponding yield is much lower.

## CONCLUSIONS

- In the prawn fishery from the Catalan Mediterranean a maximum CPUE schedule exists during the first two hours after sunrise.

- This can be corroborated when the official time shift occurs during spring, noticing a significant difference between the captures obtained before and after this shift

- We can deduce that an optimum brightness threshold exists which influences the prawn's catchability.

- To maintain this threshold as the solar intensity varies whith the seasonal inclination, a change of the haul depth is needed with an annual cycle.

- From the preceding concepts it can be concluded that a good regulation measure can derive from displacing the fishing schedule only one hour, avoiding the maximum catchability time.

## LITERATURE

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