1993 *RAPANA THOMASIANA* STOCK ASSESSMENT AND CATCH PROJECTION ALONG BULGARIAN BLACK SEA COAST

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The carnivorous sea snail *Rapana thomasiana* Grosse (Gastropoda) immigrated in Black Sea during the early forties, from the Japan Sea. Registered for the first time in Novorosiysk Bay in 1946 it spread along the Caucasian coast, Crimea, North-Western Black Sea, Bulgarian coast (1956) and Turkey (1959) (KONSULOVA, 1992). The investigation along Bulgarian Black Sea coast in 1976 established that the mussel (*Mytilus galloprovincialis* Lam.) abundance has undergone about 10 fold reduction, the main reason being the *Rapana* invasion together with the oxygen deficiency at the bottom water layers in the "post blooming" periods. According to the latest investigations from 1984 *Rapana thomasiana* inhabits mainly the shallow zone (up to 20 m depth) and has average shell length of 71.1 mm. The decrease of the predator press with depth results in a progressive restoration of the mussel populations. During last 4 years *Rapana* became an object of commercial exploitation. The threat of overcatch necessitates the accomplishment of stock assessments and catch projections of *Rapana thomasiana*.

According to the 1992 experience from scuba diving catching of the *Rapana*, ten regions for investigation were selected (Table 1).

No	Region Name	Area Km^2	Points
1	Kaliakra	4.56	15
2	Baltchik	101.71	60
3	Aladja	27.66	35
4	Euxinograd	7.77	27
5	Galata	13.21	33
6	Kamtchia	2.07	12
7	Shcorpilovtsi	7.83	26
8	Byala	12.16	20
9	Nesebar	7.44	28
10	Pomorie	30.49	27
	Grand Total	214.90	283

Table 1

The number and the location of the sampling points are chosen so that a representative statistical extract from *Rapana* population is obtained. Stock assessment of *Rapana* is calculated by the square method. The curve of yield per recruitment is estimated by the RICKER's method (1975) :

$$Y/R = F \sum_{tc-=3}^{t\lambda=12} Bt \, [\exp(Gt - Zt) - 1]/(Gt - Zt)$$

The optimum value of F ($F_{0.1}$) is estimated by GULLAND and BOEREMA's method (1973). The results of the stock assessment of *Rapana* are given in Table 2.

No	Region Name	Total Biomass [Tons]	Meat/Total weight ratio [%]
1	Kaliakra	27.50	22.58
2	Baltchik	548.07	18.40
3	Aladja	652.04	20.47
4	Euxinograd	35.35	19.69
5	Galata	45.62	20.73
6	Kamtchia	109.95	20.53
7	Shcorpilovtsi	204.94	20.83
8	Byala	154.01	20.10
9	Nesebar	37.24	17.74
10	Pomorie	593.45	17.80
	Grand Total	2408.16	19.89

Table 2

According to yield per recruitment curve (Y/R) Fopt ($F_{0.1}$) is 0.6. Therefore TAC should be 1035.5 tons. The above mentioned figures are lower than the real ones because of the specific hydrological conditions at the time of the investigations (2-16 June 1993), unusually low water temperature. That is why considerably amount of *Rapana* population was still buried in the ground, because of which it could not be accounted. Having in mind the data about catch development during the previous years, a projection could be given that if the investigations were carried out in July or August the commercial stock and TAC would increase with 3500 and 1505 tons respectively (SLABACOV *et al.*, 1993). Besides, the given assessments concern a restricted area of the Bulgarian Black sea coast. If the uninvestigated, but promising regions with total area of 120 sq.km approximately, are taken into consideration, the assessments would increase with 1574.4 and 677 tons respectively. According to the above considerations total prognosis of *Rapana* stock and TAC along Bulgarian Black sea coast during 1993 would be as follows :

Sources	Commercial stock [Ton]		Allowable catch [ton]	
	Total biomass	Meat biomass	Total	Meat
Observed regions	2408.2	465.4	1035.5	200.1
Not observed regions	1574	313.2	677.0	100.2
Probably buried part of *Rapana* population	3500.0	700.0	1505.0	224.1
Total prognosis	7482.6	1478.6	3217.5	524.4

The commercial stock biomass (individuals with fresh weight above 60 g) and TAC of *Rapana thomasiana* along Bulgarian Black Sea coast during 1993 are about 7482.6 and 3217.5 or 1478.6 and 524.4 tons respectively. The most suitable period of doing such assessments is July.

REFERENCES

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