International Council for the
Exploration of the Sea

C. M. 1971/ K:5
Shellfish and Benthos Committee

The Standing Stock of Mussels Mytilus edulis per Culture Raft in the 'Flensburger Förde'

by
R. Meixner *)

The edible mussel Mytilus edulis at the North Sea coast of Schleswig-Holstein/Germany normally attains a minimum size (shell length: 4 cm) in the summer of its second year, at the Baltic coast of Schleswig-Holstein within three years. In the central and eastern Baltic mussel growth becomes more and more reduced. In physiological literature the decreasing salinity is supposed to have a major importance.

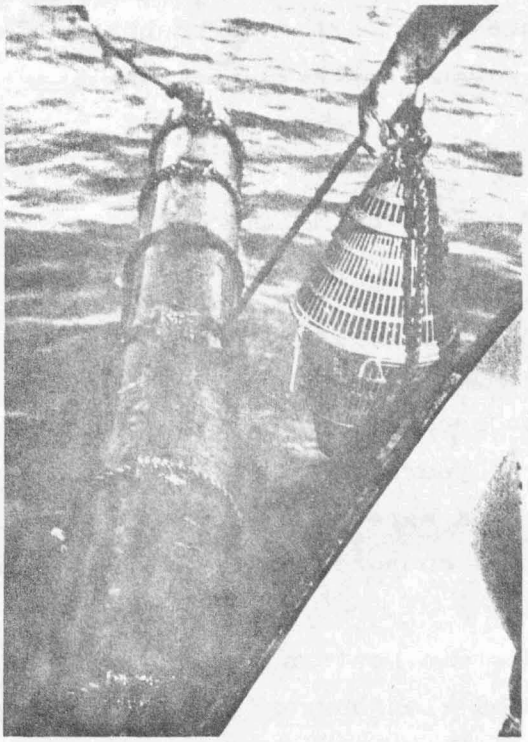
At the Schleswig-Holstein western Baltic coast mussel fishery is more or less limited to the Flensburger Förde. The annual harvest fluctuates around 100 - 1,000 tons. More eastward there is no commercial mussel fishery.

In our first attempts of adapting the raft culture technique to the Flensburger Förde it was proved that the slow growth of bottom living mussels does not correspond to the much faster growth of raft cultured mussels (MEIXNER, 1971). Our growth data correspond more or less with the results of BØHLE (1970). Off Langballigau raft cultured mussels grew as fast as those of the German North Sea coast and could be harvested in their second year. In the Flensburger Förde at least the salinity (15 - 17‰~~p.p.m.~~) probably is not responsible for the slow growth of bottom living M. edulis.

The rafts (length: 2.5 m) were built of polyethylene (Hostalen) pipes 225 mm in diameter. Plastic baskets (capacity 8 kg mussels) were attached to the rafts (Fig. 1).

*) Dr. R. Meixner, Institut für Küsten- und Binnenfischerei,
2 Hamburg 50, Palmaille 9, Germany

Fig.1: Plastic basket (length: 60 cm, diameter: 25 cm) stocked by 4 kg mussels (1.0 - 4.9 cm) attached to a polyethylene (Hostalen) culture raft by a polypropylene rope



The culture rafts were moored 200 m off the shore at a depth of 4 - 5 m in a sheltered area of the Flensburger Förde near Langballigau.

Table 1: Cooked meat of M. edulis (length: 4.5 - 6.4 cm) in g. Samples from the bottom (Ochseninseln) and from a culture raft (Langballigau), Flensburger Förde, 1970, Oct. 29

cooked meat (mean)	shell length (cm)				
	4.75	5.25	5.75	6.25	weight of shells (mean)
bottom	2.4	3.4	4.4	5.0 g	6.4 g
number	20	27	29	18	
raft	3.5	4.5	5.8	6.5 g	5.0 g
number	64	40	5	1	

The results shown in Table 1 are in close agreement with BOJE (1965), who investigated the dependance of growth of M. edulis upon food conditions in the Kieler Förde/W. Baltic: "... mussels show quick growth connected with low shell-weights and high meat-weights, if there is much food in the water ..., if conditions of food are poor, slow growth occurs with high shell-weights and low meat-weights ...".

Table 2: The standing stock of M. edulis (age group: 0-I, length: 1.0 - 4.9 cm) per culture raft at various depths and equal (Raft A) respectively different stocking rates (Raft B)

	Raft A			Raft B		
depth (m)	baskets x load (in kg)	standing stock July 29 / Aug.26 (kg)	increase (%)	baskets x load (in kg)	standing stock July 29/ Aug.26 (kg)	increase (%)
1.0	6 x 4	24 30.3	26.2	6 x 1	6 / 10.6	76.6
1.5	6 x 4	24 31.5	31.2	6 x 4	24 / 32.0	33.3
2.0	6 x 4	24 29.9	24.5	6 x 2	12 / 18.4	53.3
	net production:	19.7	27.4		19.0	45.2

Having stocked unsorted yearling raft cultured mussels into plastic baskets at a rate of 4 kg (Raft A), the baskets were suspended from floating rafts into different depths (1.0 m, 1.5 m and 2.0 m) 1971, July 29. After a four weeks period it was evident that the deepest hanging mussels had the lowest production of new biomass.

At rafts of type B different loads per basket (1 kg, 4 kg and 2 kg) were studied. We found that mussels gained weight most quickly at a small stocking rate.

Table 3: The standing stock of M. edulis (age group: 0-1, length: 1.0 - 5.9 cm) suspended from a culture raft in different plastic baskets. Water flow through baskets II and III is reduced to 1/3 of I

		Raft C		
depth (m)	baskets x load (in kg)	standing stock July 29 (kg)	Aug.26 (kg)	increase (%)
1.0 I	6 x 4	24	32.2	34.2
1.5 II	6 x 4	24	28.4	18.3
2.0 III	6 x 4	24	25.9	8.0
	net production:		14.5	20.1

The production of biomass in baskets II and III (reduced water passage) is the lowest observed in our experiments. The weight increase of baskets (I) placed at 1.0 m is greater than with those at Raft A. This indicates to us: baskets I had a possible gain by the reduced filtering capacity of the deeper hanging baskets.

SUMMARY

Our data appear to stress that in the Flensburger Förde optimum growth conditions for mussels are provided in the upper layers of water column only.

REFERENCES

BØHLE, B. 1970 : Forsøk med dyrking av blåskjell (Mytilus edulis L.) ved overføring av yngel til nettingstrømper. (Experiments with cultivation of mussels by transplanting spat to net bags). Fiskets Gang, 56: 267-271

BOJE, R. 1965 : Die Bedeutung von Nahrungsfaktoren für das Wachstum von Mytilus edulis L. in der Kieler Förde und im Nord-Ostsee-Kanal. Kieler Meeresforsch., 21: 81-100

MEIXNER, R. 1971 : Wachstum und Ertrag von Mytilus edulis by Floßkultur in der Flensburger Förde. Arch.Fisch.Wiss., 22: 41-50