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FEDERAL REPUBLIC OF GERMANY

by

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Mariculture Production

Schlewig-Holstein and Niedersachsen

Mussel production along the German North Sea coast declined drastically in 1990. As in other areas, this decline was mainly caused by the reduced seed availability which restricted the grow-out capacity of the various mussel plots along the North Sea coast.

Total landings along the Schleswig-Holstein coast did not exceed 15, 625 tonnes and represented a record low since the early 1980ies. In Niedersachsen, production of blue mussels reached 3,775 tonnes only. Oyster culture suffered heavy winter losses in 1990 and reached an approximate production of about 10to 15 tonnes only.

Trout cage culture continued in brackish water of the Kiel-Fjord at a relatively small scale, using the well-functioning global "Kiel Cage". Output of large trouts (weights ranging between 3.5 and 6.5 kg) did not exceed 20 tonnes.

Hatchery production of turbot continued at the Baltic coast of Schleswig-Holstein. The facility is in operation for several years near the Kiel wastewater treatment plant. In 1990 a total of about 40,000 juvenile fish were produced, most of these were provided to grow-out units in Spain. Additionally, a 10 toone pilot-scale grow-out facility (indors) for turbot was in operation.

A small-scale privat eel farm using recycling technology in slightly brackish water at the North Sea coast produced a few tonnes of stocking

-sized juveniles while the Emden facility continued to use wate heat from a coastal power station. The quantity of market-sized eels produced is unknown. The largest eel farm using recycling technology in freshwater produces at present about 60 tonnes annually.

Mecklenburg-Vorpommern

In 1990 about 480 tonnes of rainbow trout were produced in coastal cages at various sites. About 400 tonnes of this production were portion -sized fish (250-300g) and only 80 tonnes were larger fish (average 2.5 kg). Stocking material for the production of large fish originated from a brackish-water adapted brood stock maintained at the Born hatchery (near Rostock) for more than 17 years (Institute for High Seas Fishery and Fish Processing, Rostock).

Table 1. Trout production (tonnes) in brackish water along the Baltic coast of Mecklenburg-Vorpommern

Year	Private sector	State owned units	in open waters	coastal waters	large trouts (2.5kg) private	state
1973	-	-	-	018	-	-
1974	-	-	-	020	-	-
1975	-	-	-	025	-	-
1976	-	-	-	062	-	-
1977	-	-	-	085	-	-
1978	-	-	-	093	-	-
1979	-	-	-	209	-	-
1980	-	-	-	420	-	-
1981	-	-	-	416	-	-
1982	-	-	-	508	-	-
1983	-	481	10	491	-	-
1984	005	576	20	601	-	-
1985	012	545	12	570	-	-
1986	076	627	24	727	-	-
1987	105	682	03	790	05	-
1988	99	702	13	814	10	15
1989	122	448	-	570	15	20
1990	080	400	-	480	40	40

Because of the rapid changes along the German Baltic coast and because of the inability to report on the development of the mariculture production in this area prior to the unification, the following table is presented to document the history and recent trend in trout production in brackish waters since the early 1970ies.

Research

Schleswig-Holstein and Lower Saxony

Mollusc biology in the Wadden Sea area

A long-term project on the biology and extensive cultivation and fisheries of blue mussel (Mytilus edulis) and cockles (Cerastoderma edule) in the Schleswig-Holstein Wadden Sea is in its third year. It is mainly carried out in the newly established National Park of the Wadden Sea and adjacent areas and is primarily concerned with determining the influence of the commercial fishery and culture practice on the popukation dynamics and distributional changes of natural mussel stocks. Additional studies within this project concentrate on (a) reproductive behaviour and recruitment mechanisms of mussels, and (b) on the influence of turbulance and turbidity on larval development (e.g. settling behaviour) of both cockels and mussels. The latter part of the programme includes experimental studies as well as field observations (including numerous environmental parameters).

Salmonid culture and the environment

Effects of reduced oxygen concentrations (permanently and/or temporarily, reflecting tidal cycles are studied in juvenile salmon exposed to various current speeds (simulating tidal currents). These experiments were part of a larger EC-supported study on environmental conditions at cage farms and their effects on system performance at different locations (Kiel Fjord, Scotland, Ireland, Portugal). The study aims to identify early warning signals (physioligical, morphological, behavioural) that can be related to temporarely reduced oxygen availability. The study compares various combinations of exposure to low oxygen exposure and oxygen recovery periods. The study is continuing.

Effects of fluctuating environmental conditions on growth of trout in Kiel cages

At the Kiel University, the study on the effects of various environmental factors such as temperature, salinity, oxygen concentration, current

speed and direction, and turbidity are studied in small-scale commercial cages placed near the cooling water outflow of the Kiel Fjord power station. The results obtained sofar indicate a high sensitivity to rapid temperature changes, showing cummulative effects with temporary oxygen depletion.

Recycling technology

Work continued on studies of biofilter performance and ozonation effects in eel culture systems. The destruction of various non-degradable organics by ozone as a support system in biofilter performance was studied on a commercial farm. The data are presently analysed.

Mecklenburg-Vorpommern

In Mecklenburg-Vorpommern, interdisciplinary research on the development of a 2-year cycle culture system for a brackish-water adapted strain of rainbow trout was completed. This trout strain, which reproduces in brackish water, has proven to be a benificial source for stocking material in coastal cage culture because of its high resistance to disease.

Further research projects concentrated on improved offshore cage systems for the Baltic, including self-supporting feeding systems (wind generator as energy source) and improved net design for cages exposed to storms and changing currents.