

## BLUE MUSSEL LESIONS IN FARMED SALMON

BY K. I. FLESJAA

In the summer of 1988 some Atlantic salmon *Salmo salar* L. farms on the southwest coast of Norway (Boknafjord Basin) experienced acute disease and mortality in smolts recently transferred to seawater. Within one week (10 - 17 July) four fish farms located in three different fjords reported a disease problem starting with panic swimming, headshaking and gasping. After a while the fish became listless and died. On average 10-20% of the stock was lost with most mortalities being amongst the smaller fish. With the exception of an outbreak of vibriosis in one farm, recovery was uneventful. However, on the 18th of August a fifth farm in another location experienced a similar attack.

Dead smolts showed distended opercula, swollen, grey-red gills with scattered grey lumps on/between the primary filaments. In addition, wounds were seen in the angles of the gill arches (Fig.1). The debris covering



Fig. 1. Oral cavity of an Atlantic salmon sea smolt with wounds in the angle of the gill arches.

the lesions made the gill arches stick together thus reducing the waterflow considerably.

Microscopy of smears from gill arch lesions showed algae, bacteria, and a variable number of tiny mussels (Fig. 2).



Fig. 2. Shell in smear from gill arch wound (x 110)

Histologically, oedema/sloughing, scattered telangiatic lamella and laminar clubbing were observed. The grey lumps appeared to be necrotic parts of primary filaments rich in bacterial colonies. In a few cases round or oval bodies assumed to be small shells were seen.

Except for the gill lesions no other pathological changes were observed and attempts to isolate bacteria from the kidneys were unsuccessful.

The small shells were not identified, but it seems reasonable to assume they were the common blue mussel *Mytilus edulis* L. This is the predominant mollusc in Norwegian fjords. A fertile female can spawn millions of eggs during a summer. Spawning starts when water temperature reaches about 10°C, usually in May. However, spawning may be influenced by lunar phases as most roe is liberated shortly after a full moon. 24 h post-fertilization, a free swimming larva, called veliger, has developed. After about 4 weeks it has grown to 0,3 mm and is ready for settling. Most settlings usually take place at the end of June or in the beginning of July, but there is also a peak in the second half of August.

The summer of 1988 was probably a very good season for blue mussel repro-

duction in the region. Fishfarmers complained of sore fingers when hauling nets, sedimentation of "fine sand" in the net washing machines and a lot of fouling mussels on the nets later on. These observations lead to the assumption that fish farms were exposed to swarms of veligers. Only salmon weighing less than 200 g seemed to be affected presumably because of their narrow gill angles and fine gill structures.

The only other previous report of mussel infestation of salmon is that of Bruno (1987) who described a serious problem caused by attachment and embedding of shells in the gill filaments of post-smolt in a Shetland fish farm. This resulted in a chronic disease and an accumulated mortality of 45% over a year. The embedded shells were tentatively identified as common blue mussels.

No attachment or embedding was observed in our cases. However, problems similar to those described by Bruno (1987) have been observed in this area

when smolts infested by the fresh water pearl mussel *Margaritifera margaritifera* L. have been reared in seawater (Vatne, 1987).

#### Summary

Gill lesions in Atlantic salmon smolts attributed to mussel larvae are described. The lesions consisted of debris-covered wounds in the narrow angles of the gill arches and the destruction of scattered primary lamellae. Small shells were detected in smears from the lesions and it was assumed that the lesions resulted from irritation caused by the sharp shells of the mussel larvae. The shells were tentatively identified as the common blue mussel *Mytilus edulis* L. Only post-smolts were affected, but acute disease and death in up to 20% of this group was seen in afflicted farms. The attack lasted less than one week and recovery seemed to be quick and uneventful.

#### References

- Bruno, D. W. (1987). The risk to farmed Atlantic salmon, *Salmo salar* L., from marine mussels growing on net cages. Bull. Eur. Ass. Fish Pathol. 7 (5), 121-123.
- Vatne, D. F. (1987). Pers. comm.

#### Author's address

State Veterinary Laboratory, Sandnes, Box 295, 4301 Sandnes, Norway.