

## **Session Q**

### **Interactions between aquaculture and wild stocks: comparative experiences for Atlantic cod and Atlantic salmon**

**Convenors: Edward Trippel (Canada), Terje Svåsand (Norway) and Einar Nielsen (Denmark)**

The growing interest in gadoid culture in the North Atlantic has led to substantial increases in the production of farmed cod. Atlantic cod are present in sea cages in Norway, UK, Iceland, Canada and the U.S., and the potential exists for continued increases in cod production in each of these countries. On the other hand, Atlantic salmon have been reared in sea-cages for many years, and production of farmed salmon now exceeds the harvest of wild fish by more than 200 times. An ICES Theme Session on this topic is important as there is growing interest in fish culture as stocks of wild fish continue to decline, and there is potential for valuable transfer of knowledge between these two areas.

Escaped juveniles and adult fish from cages is well documented for both species, although the main causes may differ. In addition, an interesting form of wild/culture interaction exists for cod which is not present in Atlantic salmon. Cod spawn freely in sea cages with females producing successive batches of eggs over a lengthy spawning period. Genetic analyses of 'wild' larvae have revealed that local cod stocks can become partially comprised of progeny that have parents residing in sea cages. In the case of salmon, however, concerns revolve around the effects of escaped fish entering rivers to spawn with wild fish.

The spread of pathogens from fish farms to wild stocks could also pose a significant challenge to the environment. The scale of this risk is poorly understood in cod, but for salmon the potential effects of sea lice infestations on wild fish, particularly sea trout, has been a major concern for some years.

Interest in this proposed Theme Session is anticipated from a number of perspectives. These include: (i) extent and potential for cod culture in the North Atlantic compared with the growth of salmon culture (ii) broodstock origin in relation to sea cage stocking, (iii) assessment of escapees, (iv) behavioural studies of sea cage fish (e.g. cod spawning in cages – assessment of egg production, viability, escape behaviour, such as chewing, etc.), (v) requirements for baseline information on genetic composition of local stocks and evaluation of evidence of escaped fish, (vi) disease transmission, (vi) methods for containment and recapture techniques, (vii) potential for inter-breeding between wild and cultured fish and (viii) use of methods to induce sterility, and their acceptability by also improving file quality and reducing cage mortalities associated with mating and spawning.

Interactions between wild and cultured Atlantic salmon have been well documented and there have been several dedicated symposia over the last two decades, but there has not previously been a scientific forum to address wild/cultured interactions for cod. This Theme Session will therefore provide a valuable opportunity to share knowledge and experience between these fields. This is particularly timely, as the growth in cod farming is occurring as many wild cod stocks are undergoing serious declines and some are listed as threatened or endangered.

#### **Additional Notes:**

There has been interest in recent years in documenting fisheries-induced evolution in marine fish stocks. Cod culture and its biological interactions adds a new dimension to evaluating genetic changes in natural cod stocks which requires further attention, particularly in regions where non-indigenous broodstock are used as a source of seedstock. Moreover, evaluation of spatial population discrimination of wild cod stocks can be compromised by escaped cod.

ICES has previously supported a symposium on Gadoid Mariculture: Development and Future Challenges which was held in Bergen in 2004; this focused on mariculture development, not wild/culture interactions.

**Edward A. Trippel**, Fisheries and Oceans Canada St. Andrews Biological Station, St Andrews, Canada, e-mail: [TrippelE@mar.dfo-mpo.gc.ca](mailto:TrippelE@mar.dfo-mpo.gc.ca)

**Terje Svåsand**, Institute of Marine Research, Bergen, Norway, e-mail [terje.svaasand@imr.no](mailto:terje.svaasand@imr.no)

**Einar E. Nielsen**, The National Institute of Aquatic Resources Department of Inland Fisheries, Silkeborg, Denmark, e-mail: [een@dfu.min.dk](mailto:een@dfu.min.dk)