Do marine survival and dispersal differ between wild and hatchery reared brown trout?

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In the North Sea region, brown trout spawn in freshwater and migrate to coastal waters for feeding. In many streams the anadromous part of the population has declined and stocking is the main enhancement method.

The experimental fish

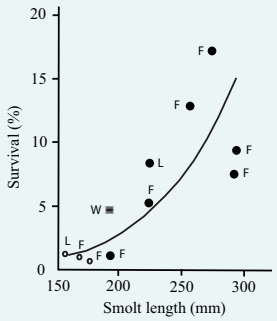
1 and 2 year-old smolts from five Scandinavian watercourses (hatchery-reared transplanted), hatchery-reared (local) and wild smolts of the River Imsa were Carlin tagged.

The release river

The hatchery fish were released in the River Imsa, south-western Norway, 150 m above the outlet, downstream the trap, in spring at the same time as the wild smolts migrated to sea.

Survival (fig. 1)

Mean survival increased with smolt size and age. Estimated survival-rates of two-year olds (black dots) were ≥ 5% and of one-year olds (open rings) ca. 1%. The survival was higher of wild (W) and local hatchery-reared trout (L) than similar sized foreign (F) conspecifics. Thus, wild and local hatchery-reared trout survived better than foreign fish, and survival increased with size at release.



Hypotheses

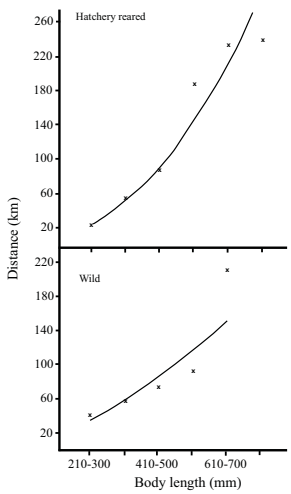
(1)Wild trout smolts survive better than hatchery-reared transplanted and local, and large smolts better than smaller ones.

(2)Large trout migrated longer than smaller ones

(3)The homing tendency is strongest for wild and local, hatchery-reared brown trout and decreased with distance to the home river of the transplanted populations.

Dispersal

Most wild trout were recaptured in coastal waters close to the home river. 55% were capture between 1-30 km from the River Imsa. Mean migratory distance increased with body length **(fig. 2)**, as larger fish were recaptured farther from the river mouth than smaller ones.
Individual trout of the most distant origins were recaptured as far away as 1800, 1375 and 1100 km from the River Imsa. In the sea, most fish migrate northward with the coastal current. 80% of the recaptures were from location north of the River Imsa.



Straying (fig. 3)

Wild trout (W) strayed less to other rivers than hatchery reared trout. Mean estimated straying rates were 1.6% in wild and 7% in hatchery-reared trout. The distance from the River Imsa to the origin of the foreign populations (F) increases from left to right on the fig. 3. 50% or more of the strays from each populations entered rivers less than 30 km away from the River Imsa. One hatchery reared fish entered a river as far away as 312 km from the River Imsa. Thus, local fish strayed the least, but there was no direct relationship between straying-rate and distance between home river and release river.