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Quinnat salmon (*Oncorhynchus tshawytscha*) spawning in the Rangitikei River

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Abstract The occurrence of adult quinnat salmon (*Oncorhynchus tshawytscha* (Walbaum)) in the Rangitikei River, North Island, New Zealand, has been confirmed on several occasions since 1922, but juvenile salmon have not previously been recorded. In late February 1981 a 79-mm-fork-length smolt was caught in a stranded side channel 180 km upstream from the mouth. This suggests that quinnat salmon can spawn successfully in this river.

Keywords quinnat salmon; *Oncorhynchus tshawytscha*; Salmoniformes; spawning; Rangitikei River; spawning grounds; spawning migrations; smolt; geographical distribution.

The Rangitikei River (Fig. 1) is one of the few rivers in the North Island in which quinnat salmon have been recorded. It has been suspected that they may also spawn in this river, (Wellington Acclimatisation Society 1957), but this had not been previously verified. A 4 kg quinnat salmon, the identity of which was confirmed by L. F. Ayson (Marine Department: Inspector of Fisheries), was caught in the Rangitikei River in 1922, and several had been caught "some couple of seasons" before (Feilding and District Acclimatisation Society 1922). There were no further reports of quinnat salmon in the river until 1933, when several specimens were found stranded on shingle beaches at Rewa (66 km from

the sea) (Feilding and District Acclimatisation Society 1933). Various unconfirmed reports of salmon sightings appeared in the Wellington and Feilding and District acclimatisation societies' annual reports from 1933 to 1941.

The next record was on 7 February 1970, when an angler caught a fish (fork length (FL) 700 mm, 3.86 kg) 78 km upstream from the sea. Though it had been mounted as a "sea-run rainbow trout" its true identity was established from the mounted specimen by one of the authors (Hicks).

In mid-May 1980 a partly decomposed quinnat salmon (FL 850 mm) was found in the Rangitikei River, 25 km upstream from the sea. Scale analysis showed that it was a 3-year-old fish that had gone to sea shortly after leaving the gravel in which it had been spawned (Watson 1980). A further quinnat salmon, a male (FL 670 mm, 2.62 kg), was caught by an angler in mid-May 1982, 57 km upstream from the sea. Using scales and otoliths, it was determined by the methods described by Flain (1982) that this was a 3-year-old fish that had spent the first year of its life in freshwater. As quinnat salmon had not been reported to spawn in the North Island, all these fish were presumed to have originated from either the South Island rivers that contain the principal runs, or from the salmon farm at Takaka which has released fish since 1976 (Fig. 1).

There is now, however, some evidence for the successful spawning of quinnat salmon in the North Island, as a single 79 mm FL smolt was found in the Rangitikei River in late February 1981. The smolt was caught with several hundred brown trout fingerlings when 2 stranded side channels 180 km upstream from the river mouth were fished during routine electric fishing of the Rangitikei between April 1979 and February 1981. The smolt was the only salmon caught. During the same field trip in which the smolt and brown trout fingerlings were caught, rainbow trout fingerlings were also taken in a nearby tributary. All the fish were between 60 mm and 125 mm FL, and were examined closely.

Though the salmon smolt was superficially different from the 2 trout species, with a more slender caudal peduncle and a silvery sheen, 3 diagnostic characteristics were used to establish its identity. Quinnat salmon have the leading edge of the anal fin shorter than the fin base, between 15 and 20 anal fin rays, and between 135 and 218 pyloric caeca; the trout species have an anal fin with

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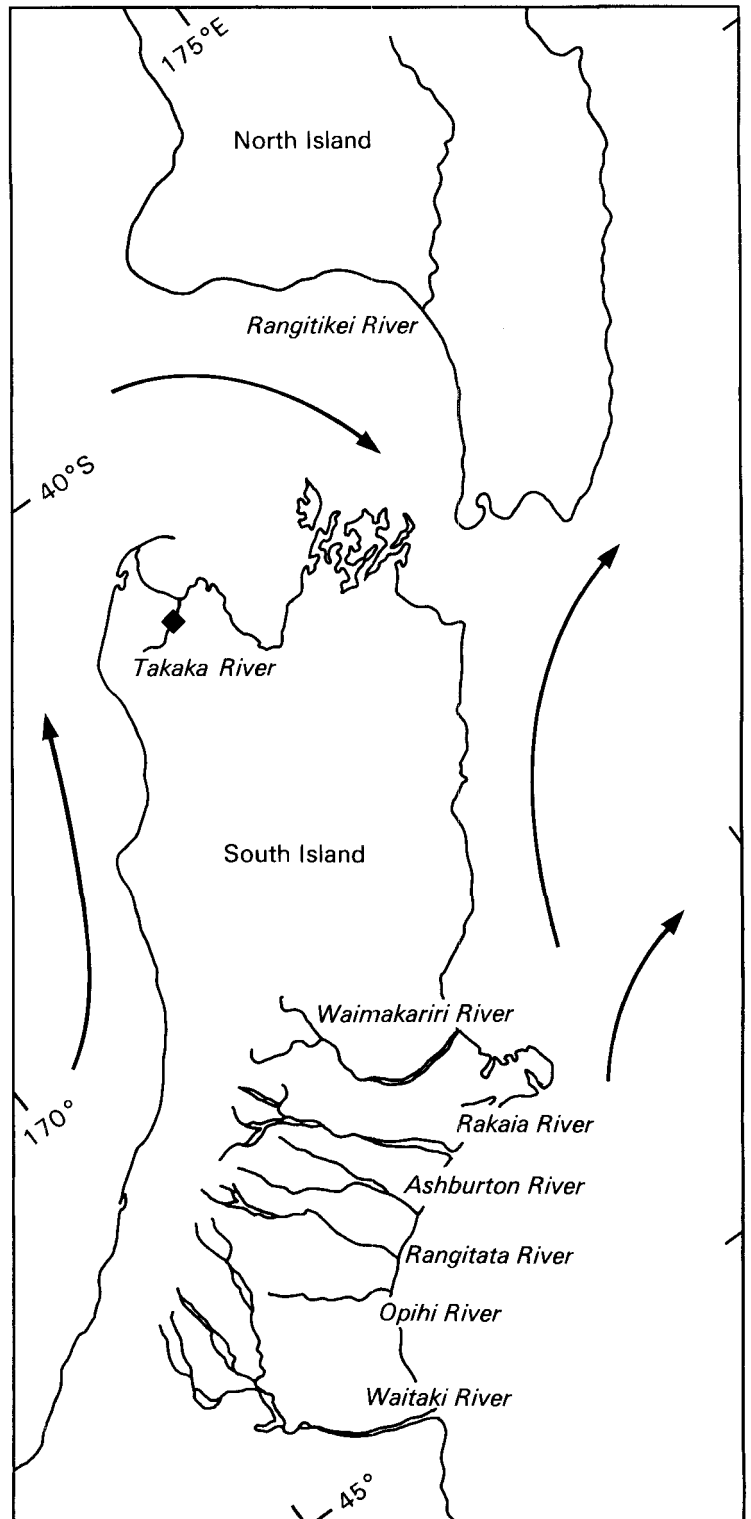


Fig. 1 Location of the Rangitikei River, South Island rivers that contain the major quinnat salmon runs, and the Takaka salmon farm (◆). Surface currents (indicated by arrows) after Patchell (1981).

the leading edge longer than the base, between 8 and 12 anal fin rays, and between 17 and 80 pyloric caeca (McDowall 1978).

The smolt had an anal fin with the leading edge shorter than the base and with 17 rays, and 159 pyloric caeca. Anal fin ray counts in trout fingerlings from the Rangitikei River ranged from 9 to 11 (median 10) in 13 brown trout, and from 12 to 13 (median 12) in 8 rainbow trout. These are within their reported ranges and distinctly different from the quinnat salmon smolt.

The gill raker count on the first gill arch of the smolt was 21 including rudimentaries. This falls within the range of 16–26 given for quinnat salmon in the salmonid key in McDowall (1978, page 92), but not within the range of 23–27 given in his species description (McDowall 1978, page 107). Despite this, the fish is without doubt a quinnat salmon, and is now lodged with the New Zealand National Museum (catalogue number NMNZ P. 12683).

Quinnat salmon are anadromous, so successful establishment of a run depends on the suitability of the river system into which they are released and the conditions in the ocean into which they move and live for 2–4 years. The discovery of a quinnat salmon smolt in the Rangitikei River shows that the conditions necessary for the freshwater phase are fulfilled there at least some of the time. The river rises in the ranges of the Central North Island Plateau, and the Feilding and District Acclimatisation Society (1922) recorded the suitability of the river for quinnat salmon "on account of its being snow fed". This is true for part of the winter.

That no significant run appears to have become established in the Rangitikei River so far is possibly attributable to adverse oceanic conditions in the Taranaki Bight. The Takaka salmon farm has experienced poor returns, which could also be caused by oceanic conditions. Alternatively the low

return rates to the farm may be an artifact of the farming technique, as poorly imprinted fish will give a poor return rate though they may survive well at sea.

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