Reacidification effects on water chemistry and plankton in a limed lake in Sweden

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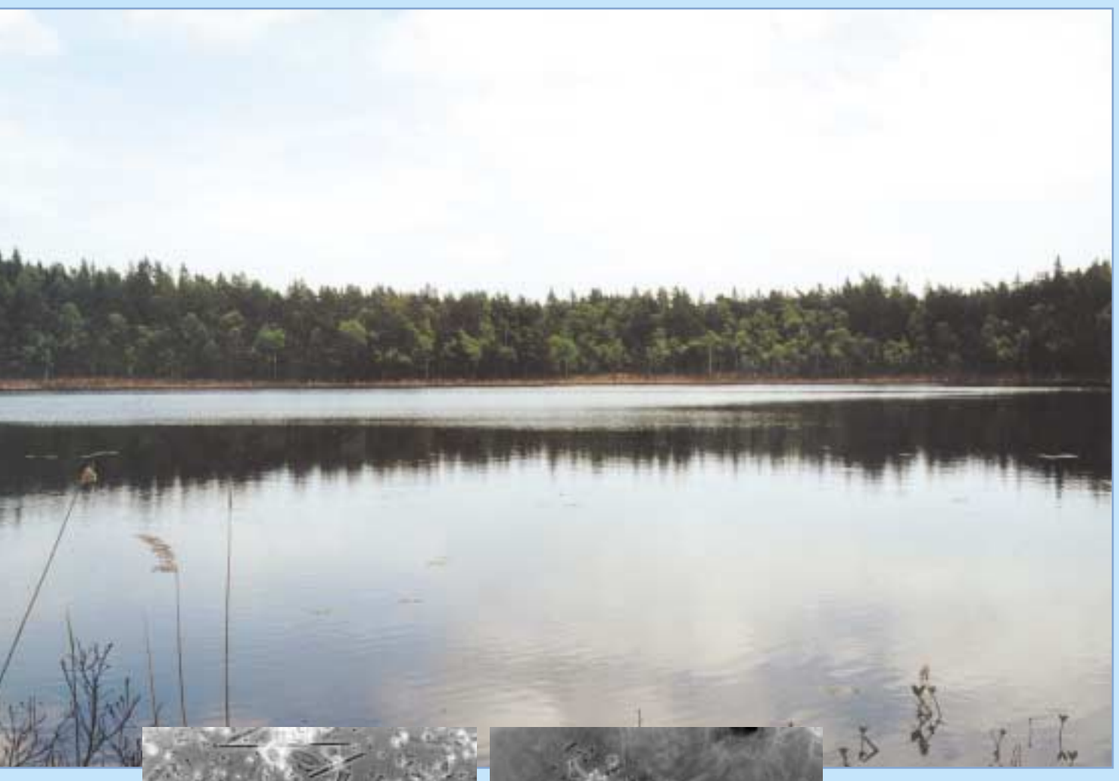

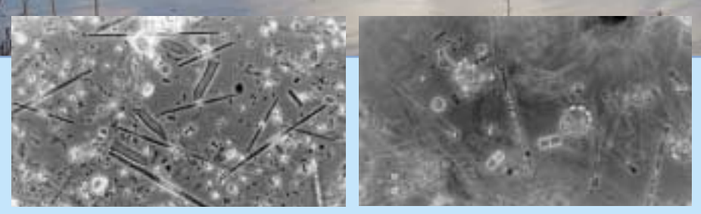

1 ***Objective*** **In order to investigate the ecological effects of reacidification we have followed water chemistry and plankton composition in a lake after terminated liming. As deposition of acidifying sulphur has been reduced during the last decades in Sweden reductions in the present liming programme has been suggested. However terminated liming could result in reacidification in several lakes with today largely unknown ecological consequences.**

2 ## *Material and methods*

The three investigated lakes are situated in Tyresta National park, about 20 km south east of Stockholm. They are small forest lakes with catchments of poorly weathered bedrock and liming treatment started in 1978. Lake Trehörningen was finally treated in 1991, while Lake Långsjön was limed continuously. Lake Årsjön has never been limed.

3 ***Results*** After the terminated liming in Lake Trehörningen, pH (Fig 1), alkalinity and Ca decreased. Metals, known to be influenced by acidification, especially Cd, Mn and total and labile Al, increased (Fig 2) by approximately a factor of 2. These metals did not increase in the reference lakes.

The number of acid sensitive phytoplankton species in Lake Trehörningen decreased as well as the total number of taxa (Fig 3). Among zooplankton the number of cladoceran species decreased (Fig 4), where Holopedium, Diaphanosoma and Daphnia, common during the limed period, became rare. This cannot be explained by the increased acidity but is more likely caused by changed predatory conditions and food supply.

4 ***Conclusions*** **Following the termination of liming in Lake Trehörningen, pH decreased with approximately one unit. As a result, the levels of Cd, Mn and Al (total Al and labile Al) increased. The number of phytoplankton taxa was reduced and there was a marked decrease of zooplankton cladocerans.**

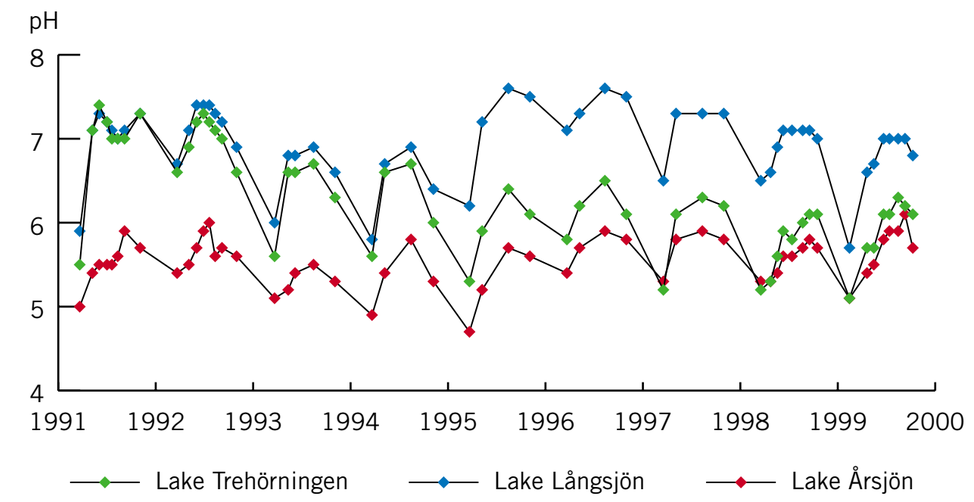

Figure 1. **Variation of pH in Lakes Trehörningen (reacidified), Långsjön (limed) and Årsjön (unlimed), 1991-1999.**

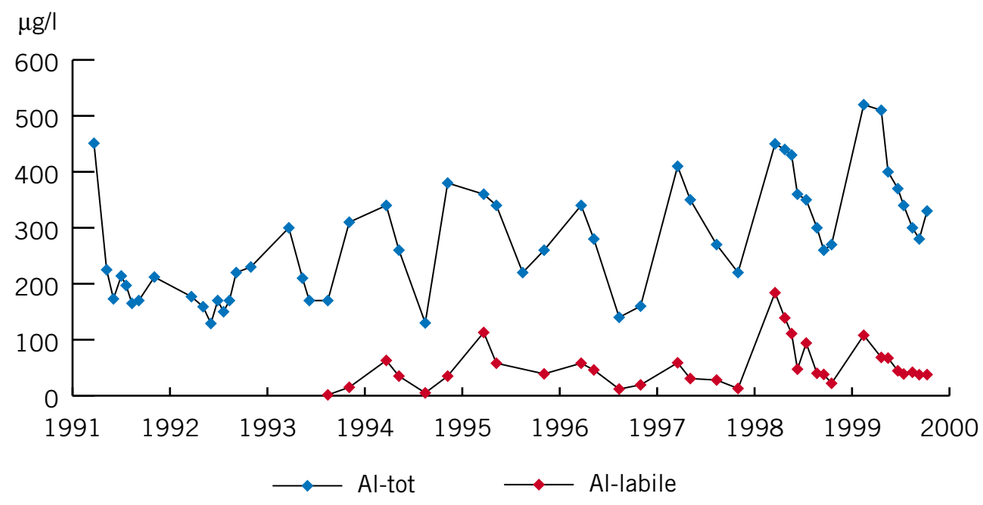

Figure 2. **Concentrations of total Al (Al-tot) and labile Al (Al-labile) in µg L-1 in Lake Trehörningen, 1991-1999.**

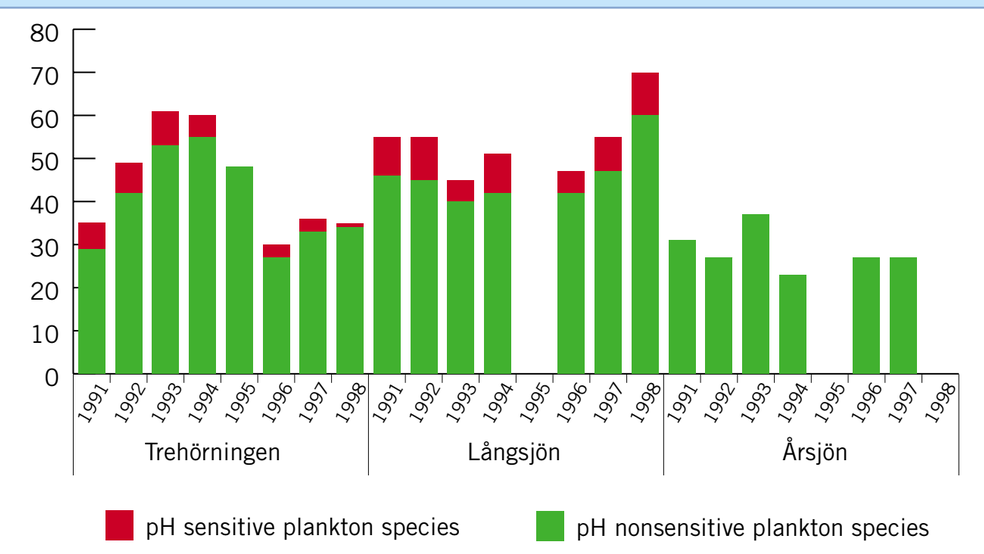

Figure 3. **Total number of phytoplankton taxa in Lakes Trehörningen, Långsjön and Årsjön. Red areas represent acid sensitive taxa.**

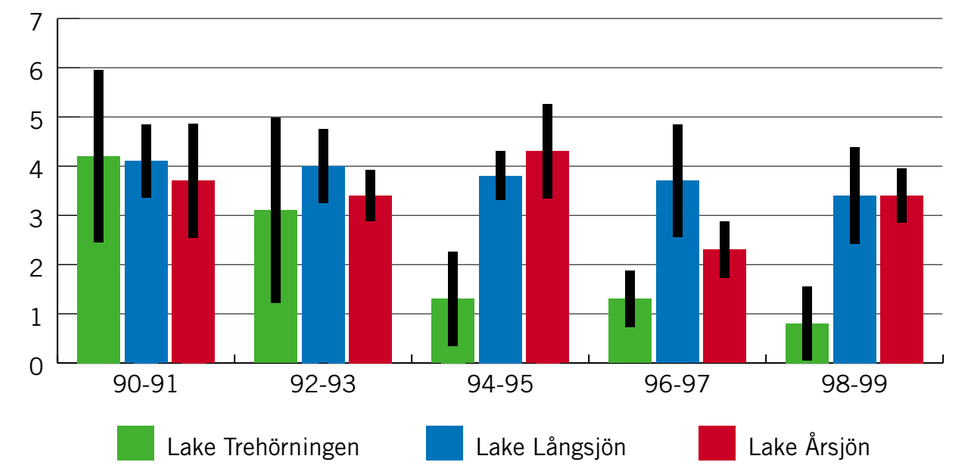

Figure 4. **Mean number of cladoceran species in Lakes Trehörningen, Långsjön and Årsjön.**

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