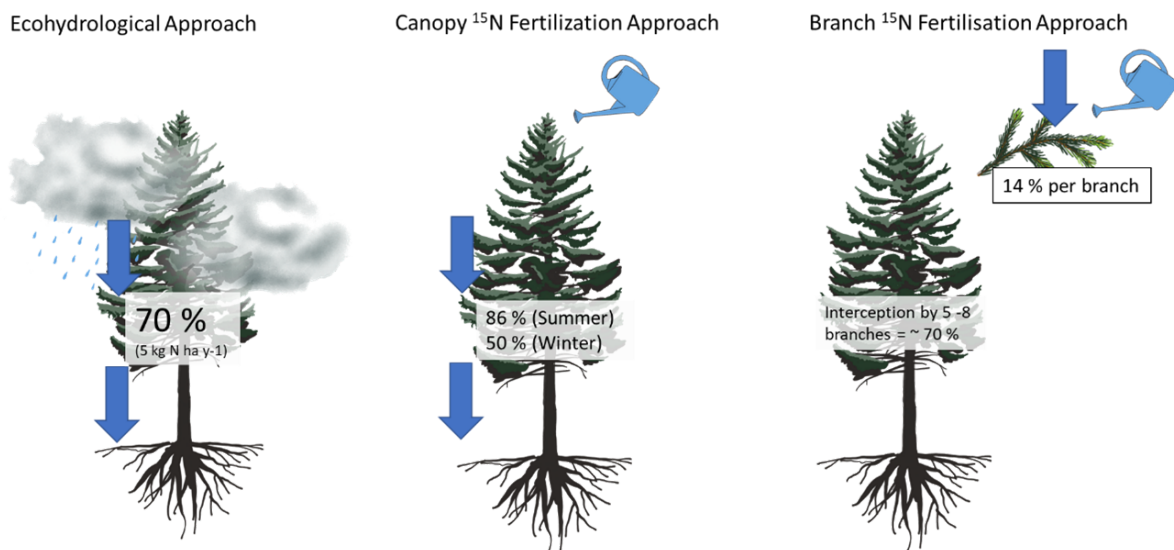


FOREST CANOPY NITROGEN UPTAKE CAN SUPPLY ENTIRE FOLIAR DEMAND

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Canopy Nitrogen Uptake



Our three methods for assessing canopy nitrogen uptake. All three methods produced an estimate of around 70 % of N deposition being assimilated by the forest canopy.

Nitrogen (N) pollution produced by human activity is known to be altering the function of ecosystems worldwide. This nitrogen is transported by atmospheric processes and sometimes deposited onto ecosystems far from the source of pollution. One of the potential ways that this extra nitrogen affects forests is by providing additional N for tree nutrition. As N deposition passes through tree canopies before it reaches the soil, some researchers have found that either leaves or twigs in canopies can take up some of this N, but estimates of how much N can be taken up differ between studies that use different methods to assess this N uptake.

In this paper we contrast three different methods at the same site 1) by an 'ecohydrological' approach, monitoring N in rainfall above and below the canopy, 2) by applying a fertilizer over the canopy and measuring how much was recovered and 3) by applying a fertilizer to specific branches and measuring how much was taken up by the branch. We show that by working under realistic conditions and not overwhelming the capacity of the forest canopy to assimilate N, these methods can produce the same result (Figure 1). We also show that at our study site, a Scottish Sitka spruce plantation, N uptake across the canopy may be enough to support the entire crop of new leaves grown every year.