

Lifespan of white clover (*Trifolium repens* L.) plant organs under northern temperate climatic conditions

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Introduction

In order to understand population dynamics and N cycling in plant communities including white clover, more knowledge about the longevity and turnover of white clover plant organs throughout the year is needed. Our main objective was to determine the longevity of white clover plant organs in harvested and non-harvested stands.

Materials and methods

Growth, death and N dynamics of leaves, stolons and roots of harvested and non-harvested white clover (cv. "Snowy") were studied in a combined plot and root window experiment (Fig. 1) at Apelsvoll Research Centre, S. E. Norway in 2002 and 2003.



Figure 1. The combined plot and root window experiment.

The condition of leaves/petioles, stolons and roots were monitored regularly by visual assessment of the colour of individually tagged leaves/petioles, stolon and root sections on a scale from 1 to 4 (Fig. 2A,B and C)

Results

The longevity of leaves and petioles ranged from 21 to 86 d (mean = 59 d, Fig. 3). About 60% of the leaves produced during the growing season turned over before the autumn. Of the remaining leaves, 70-80% were dead or had disappeared by the subsequent spring. The lifespan of sections of the main stolons ranged from 111 to over 677 d (mean = 411 d, Fig. 3). In particular, stolon sections close to the parent fragment of undisturbed plants were long lived, while sections towards the terminal bud overwintered more poorly and

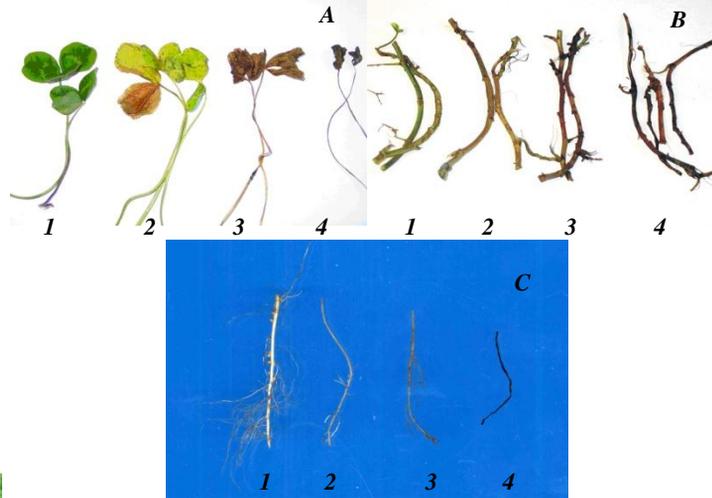


Figure 2. Visually assessed leaf colour (A) on a scale where 1 = green, 2 = yellow, 3 = brown, 4 = very dark brown or not visible (dead); stolon colour (B) on a scale where 1 = green, 2 = browning has begun, 3 = brown, 4 = light brown or dark brown and soft (dead); and root colour (C) on a scale where 1 = white, 2 = browning has begun, 3 = brown and 4 = black or not visible (dead).

had a much shorter lifespan. The longevity of roots was from 27 to 621 d (mean = 290 d, Fig. 3) and was higher for roots appearing in spring and autumn than in summer. Harvesting significantly reduced the longevity of stolons and caused an increased fragmentation of the white clover plant but did not decrease leaf/petiole or root lifespan.

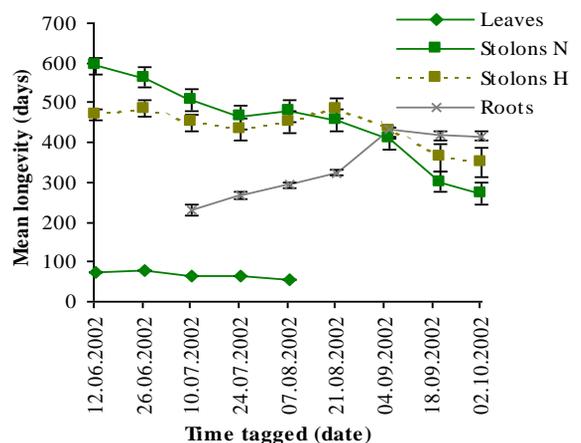


Figure 3. Longevity of white clover leaves, stolons and roots as dependent on time tagged in 2002. Mean of all treatments, except for stolons, where letters N and H indicate means of non-harvested and harvested plants.



Conclusions The leaves were the most dynamic part of white clover plants and substantially more ephemeral than stolons and roots. Stolons and roots were much more winter resistant than leaves, which may constitute a risk of N loss to the environment.