White Clover Incorporation at High Nitrogen Levels: Results from a 3 Year Study

Guy, C.1,2, Hennessy, D.1, Gilliland, T.J.2,3, Coughlan, F.1, McClearn, B.1,2., Dineen, M.1 and McCarthy, B.1

1Teagasc, Animal and Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork, Ireland;
2The Institute for Global Food Security, Queen’s University Belfast, Belfast, N. Ireland;
3Agri-food and Biosciences Institute, Large Park, Hillsborough, BT26 5DR, N. Ireland.

ABSTRACT

High nitrogen (N) fertiliser levels and high stocking rates have been shown to favour optimum herbage dry matter (DM) production in grass-only systems. Conversely, grass-clover (Trifolium repens L.) swards are commonly suited to production systems at low N fertiliser levels (< 150 kg N/ha) and low stocking rates (< 2 livestock units [LU]/ha). However the use of N fertiliser on grass-clover swards has generally increased during the last few decades, particularly in more intensively managed swards under dairy farming. Increasing inorganic N decreases sward white clover content in grass-clover swards, and increasing stocking rate on grass-clover swards can result in damage to white clover plants. However, under high N levels, a high stocking rate can also potentially minimize the negative effects of increased grass growth on white clover contents. The objective of this study was to investigate the persistency of white clover in an intensive animal grazing system, under high N fertiliser (250 kg N/ha) and at a high stocking rate (2.75 LU/ha) over a 3-year period (2014-2016). The study was a 2 × 2 factorial design, consisting of two perennial ryegrass ploidies (diploid, tetraploid) and two white clover treatments (grass-clover, grass-only). Four sward treatments (diploid-only, tetraploid-only, diploid + clover, tetraploid + clover) were evaluated over a full grazing season at a system scale. Sward measurements were taken at each grazing occasion for three years.
Over the three years, grass-clover swards produced an additional 1,468 kg DM/ha when compared with grass-only swards. Sward white clover content decreased from 36% in 2014 to 24% in 2016, leading to a decrease in contribution to cumulative herbage DM production.