**Abstract**

Series of fifteen laboratory flame spread experiments were done on Calluna Vulgaris (also known as heather) vegetation, which commonly found in British Highlands and North-Western European coastal heathlands. The goal of the experiments were to evaluate the effect of fuel moisture content and fuel load on fire behaviour. In addition, impact of fuel layers in Calluna vegetation (fine dead, fine green and moss layers) with respect to their fuel moisture contents and fuel loads were observed. The FMC of the vegetation in experiments were varied between 10-32% for Calluna fine fuels and 12-79% for moss layer. Rate of spread, mass consumption, heat release rate, mass loss rate and local heat flux measurements were done and results were compared with the literature values, when available. An inverse relationship between fuel moisture content and fire intensity were observed for the measured values, while there were positive relationship between fuel load and fire intensity. Effect of moss layer on fire behaviour were clearly observed in rate of spread and heat release rate measurements, both in wet and dry moss layer cases and explanations were made.