

A chromaticity-based technique for estimation of above-ground plant biomass.

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This paper presents a new and simple technique to derive quantitative estimates of green or dry biomass using colour information from digital pictures. This pixel-counting technique is based on the association of particular plant material with a representative region on a two-dimensional colour space, and applies to cases of non-overlapping canopies. The efficacy of the method is demonstrated using sets of samples obtained from both field and laboratory studies. It is shown that application of the proposed approach results in a highly linear relationship between pixel count and foliar area for both green and non-green material [$r = 0.99$ ($p < 0.001$)]. Analysis of images from a short-grass steppe shows a high correlation between pixel count and measured values of green biomass [$r = 0.95$ ($p < 0.001$)]. The method outlined here allows for a substantial improvement in the speed of sample evaluation to estimate biomass both in the field and in the laboratory. It also provides a non-destructive alternative to monitor plant cover and biomass in open canopies