

The Use of Digital Camera Imagery to Assess Cool- and Warm-Season Grass Ratios in Pastures

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INTRODUCTION

- Anecdotal evidence suggests that warm-season (C4) grasses are moving north
- Sampling by hand to determine the ratio of C3 to C4 species present is labor intensive and time consuming
- Remote sensing has been used successfully in other crops for monitoring various agronomic attributes
- Remote sensing may be a rapid and efficient way of monitoring long-term shifts of C3 and C4 grasses in pastures

OBJECTIVE

To determine the accuracy of digital photography to estimate warm season grass percentages in perennial pastures.

MATERIALS & METHODS

- Conducted at UK Research and Education Center located near Princeton, KY
- Random Complete Block with three reps
- Each paddock was approximately 0.8ha
- Wheat was planted in fall 2019
- Strips were sprayed out using non-selective herbicide to create a brown/green (Fig.1)
- Treatments included 25, 50, and 75% of live (green) wheat (Table 1)
- Images (30/paddock) were captured using a Nikon D-750 digital camera attached to an extending pole approximately 3 m high
- Camera images were collected on two dates
- Each photo was analyzed for green canopy using Canopeo (OSU, Stillwater, OK)
- Canopeo results were averaged to provide an overall estimate for the paddock
- Canopeo results were compared to known values using linear regression (SigmaPlot 14.0, Systat, San Jose, CA)

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RESULTS



Figure 1. Brown and green canopy was determined using Canopeo software. This image was estimated to be 38.26 % green canopy.

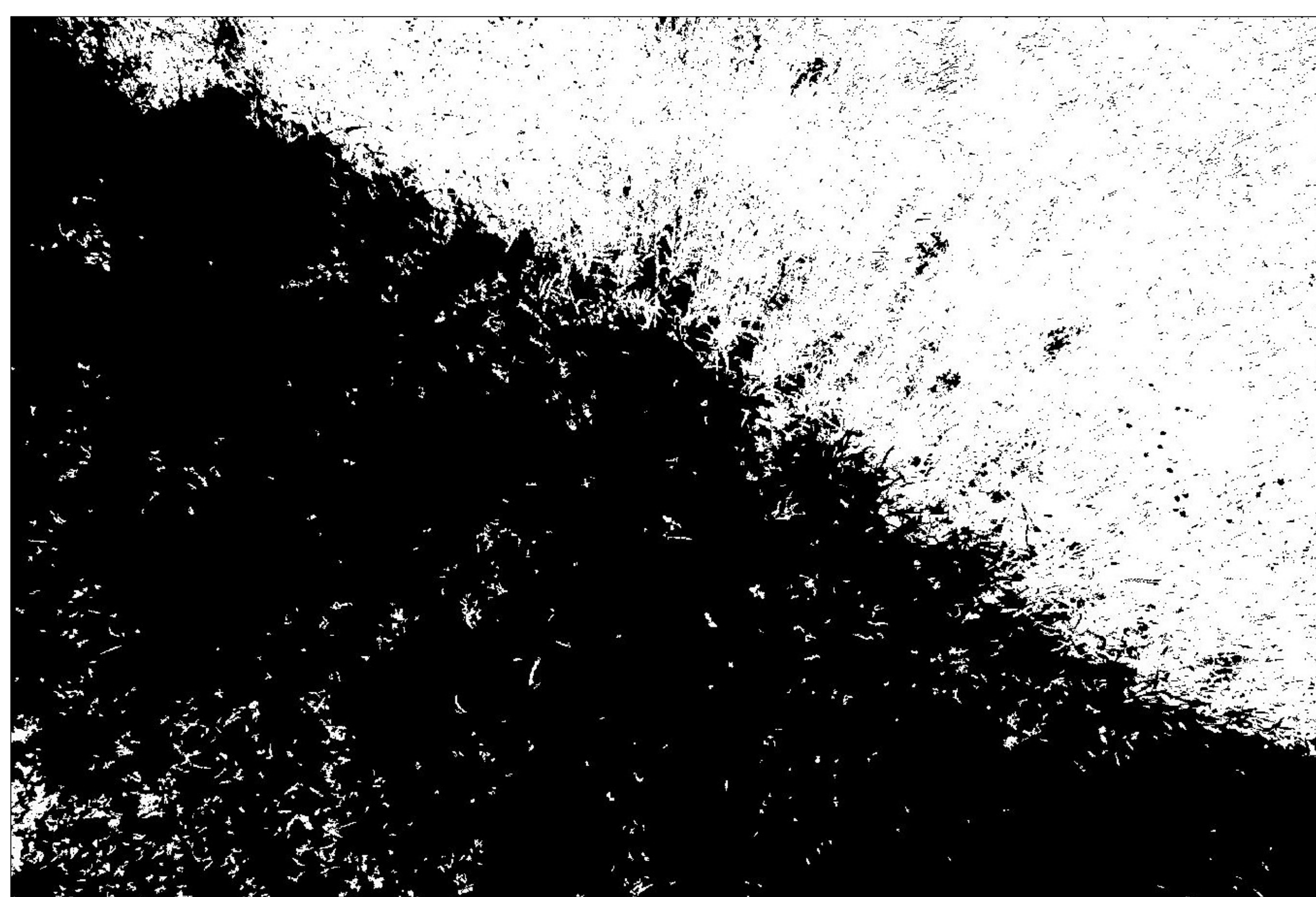


Figure 2. Canopeo output file showing green pixels as white, and brown pixels as black.

Table 1. Average green canopy cover estimated from 30 digital images using Canopeo (OSU, Stillwater, OK).

Green Canopy	Canopeo Estimated Green Canopy	
	15-May-20	21-May-20
25%	25%	33%
50%	44%	51%
75%	61%	63%

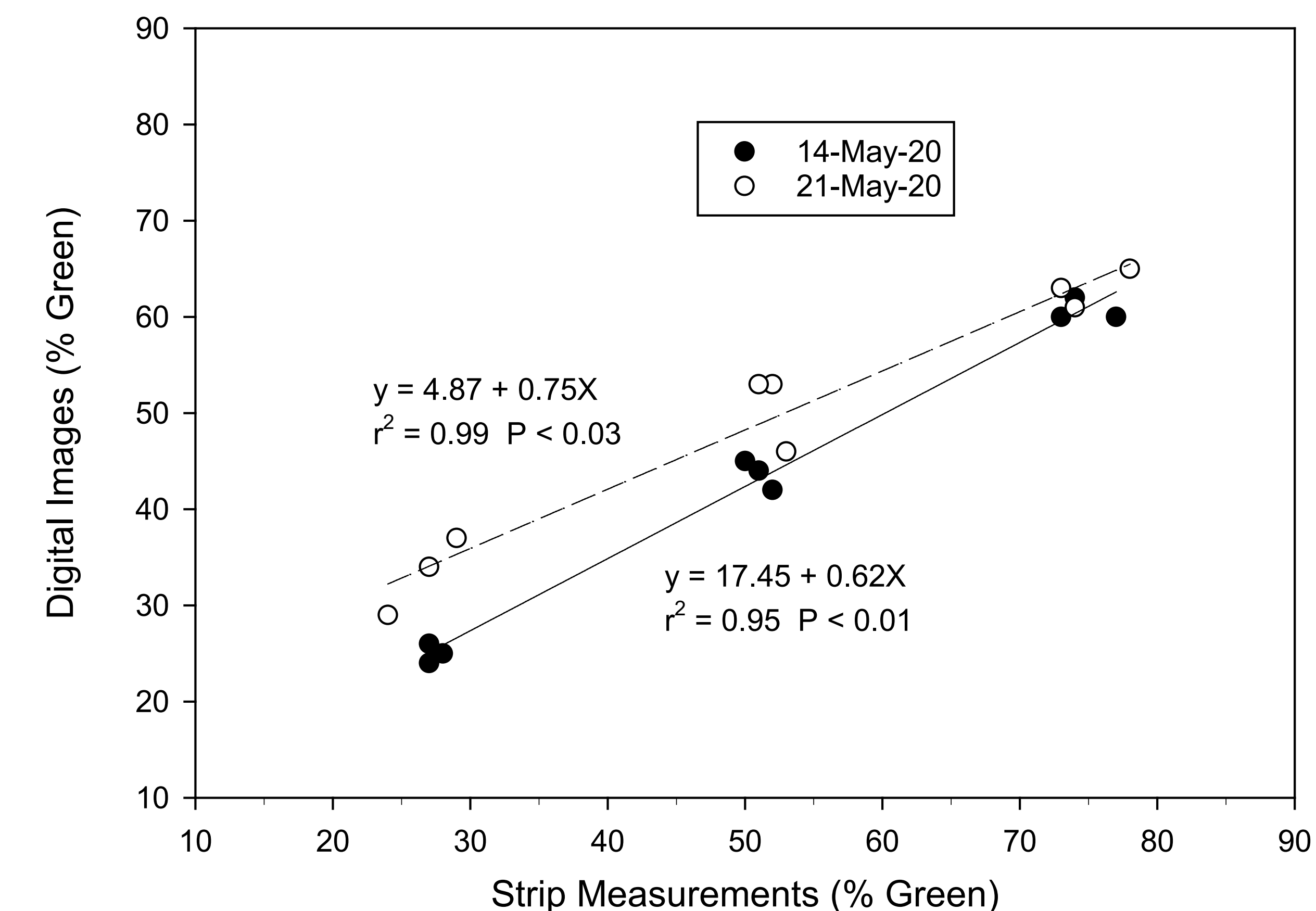


Figure 3. Comparison of direct measure and digital imagery for estimation of green canopy.

SUMMARY

- A strong relationship between digital imagery and direct measurement of the strips existed for both dates
- Digital imagery under predicted the green canopy for both sampling dates
- Under prediction may have been due to sample size or weed presence (colored seed heads or flowers that registered as a non-green)
- Prediction values were higher on the second trial date and may be due to increased presence of winter annual weeds
- This study will be repeated in spring 2021



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