## Additional file 1

Three segmentation quality measures described in the way of calculation of pixel counts based on segmentation and segmentation reference masks:

$$Qseg = \frac{S_{plant} \cap R_{plant} + S_{soil} \cap R_{soil}}{R_{plant} + R_{soil}}$$

$$Sr = \frac{S_{plant} \cap R_{plant}}{R_{plant}}$$

$$Es = \frac{S_{plant} \cap R_{soil} + S_{soil} \cap R_{plant}}{R_{plant}}$$

Here, the S and R denote the computer segmented image and reference segmentation image.

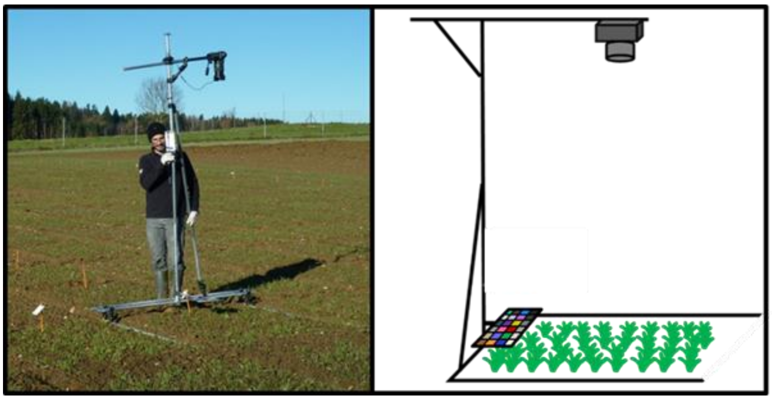


**Fig. S1. Imaging setup for measuring canopy cover using a DSLR camera mounted on a custom-made aluminium frame. The linear distance between the camera and ground is ~2 m.**

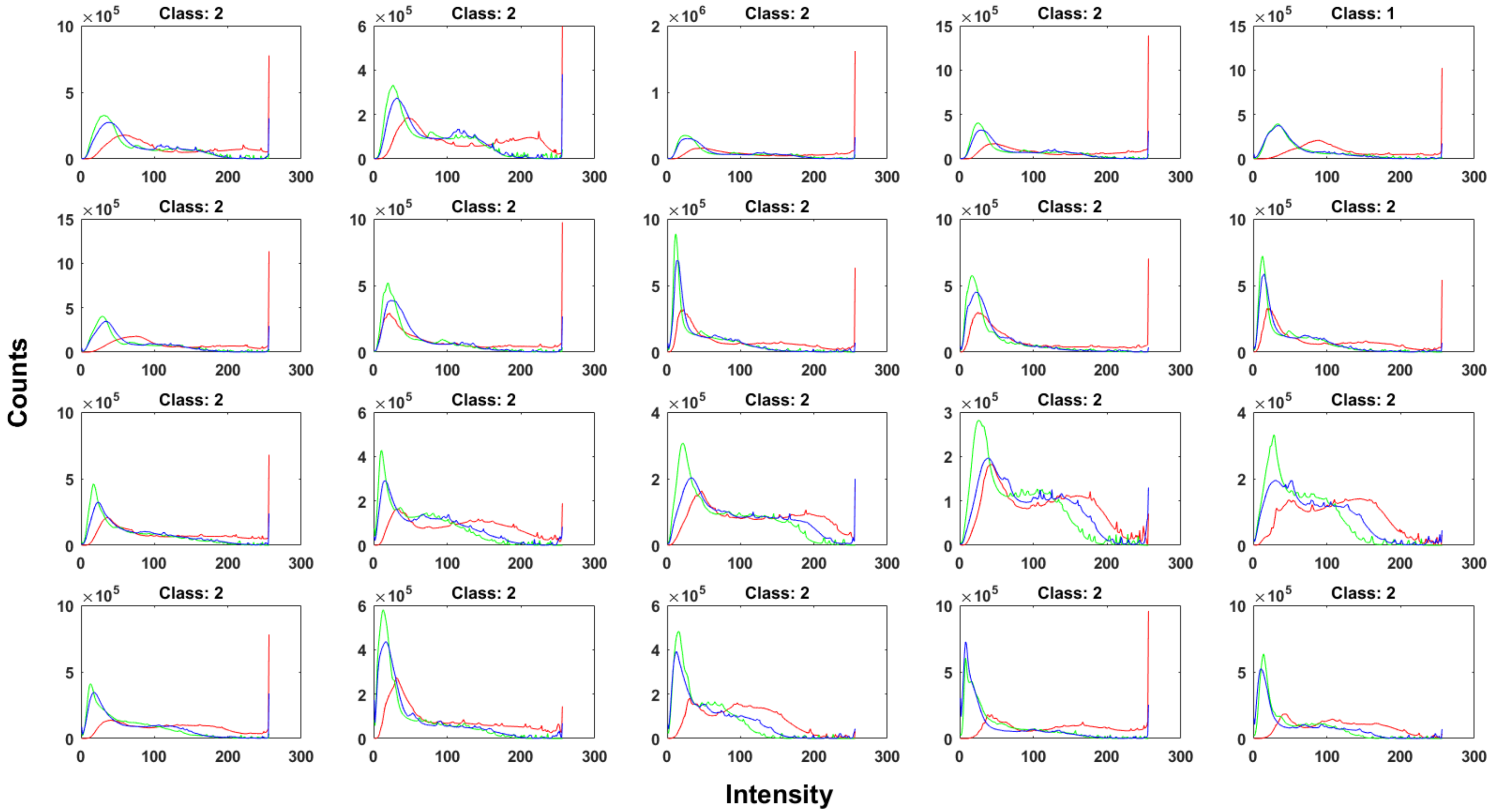



**Fig. S2. SVM-based illumination classification on the new data set of 20 HLC images (Class 2). The model correctly predicted the light conditions for 19 images, with an accuracy of 95%.**

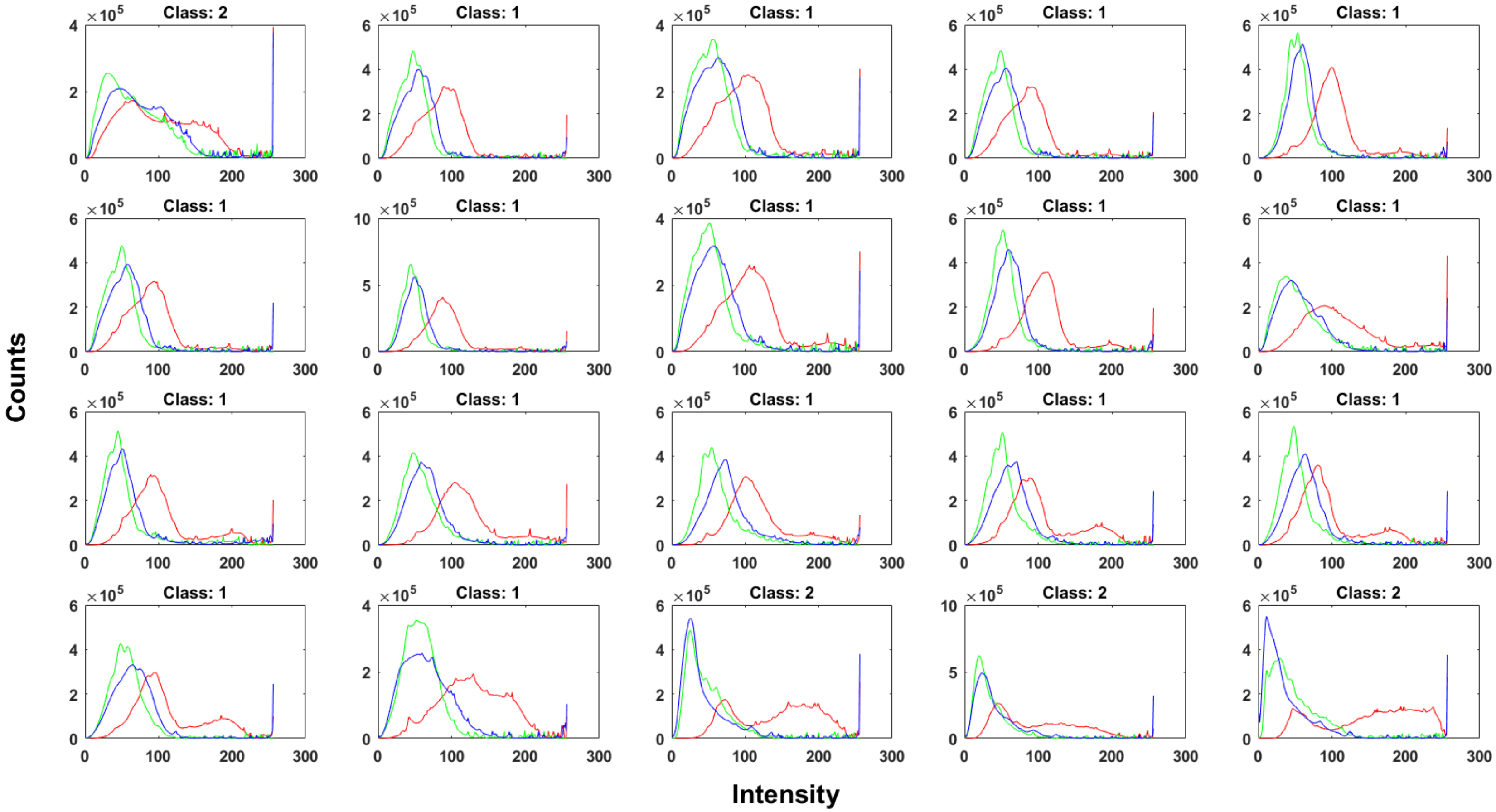



**Fig. S3. SVM-based illumination classification on the new data set of 20 LLC images (Class 1). The model correctly predicted the light conditions for 16 images, with an accuracy of 80%.**

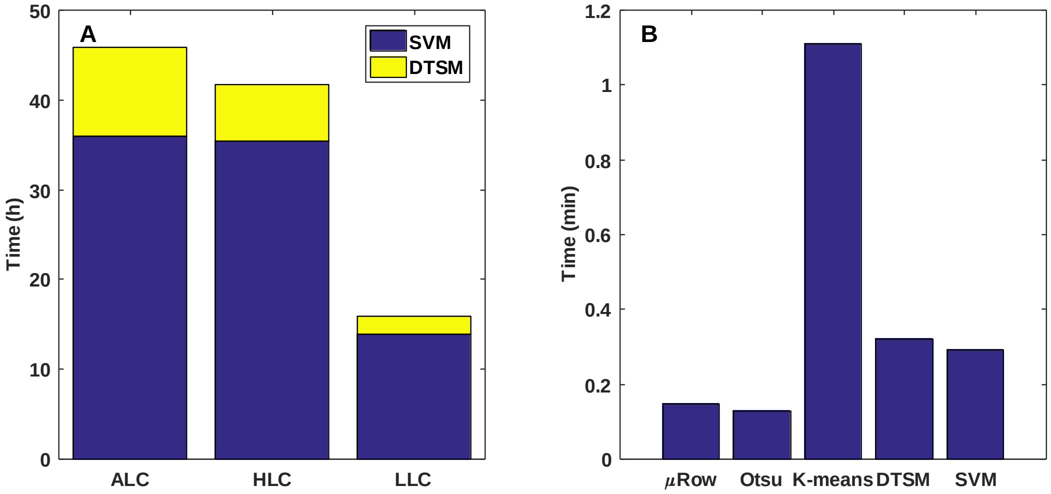



**Fig. S4. Training time (hours) for the three types of models for ALC, HLC and LLC images (A) based on DT and SVM methods, and they were compared with μRow, Otsu and K-means clustering in computing time (minutes) for segmentation of one image (B).**

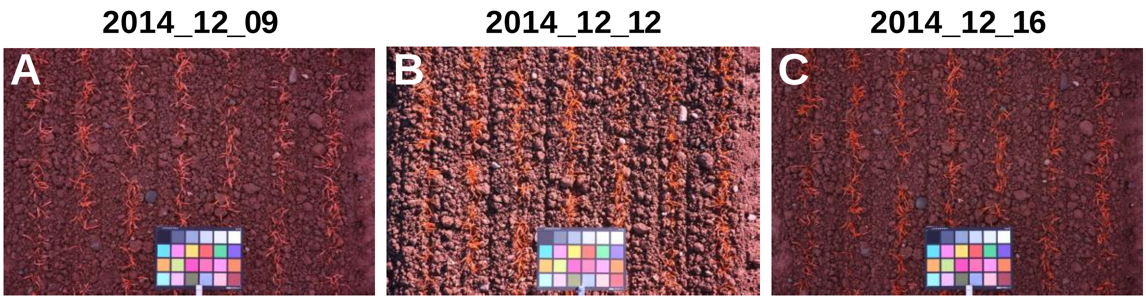
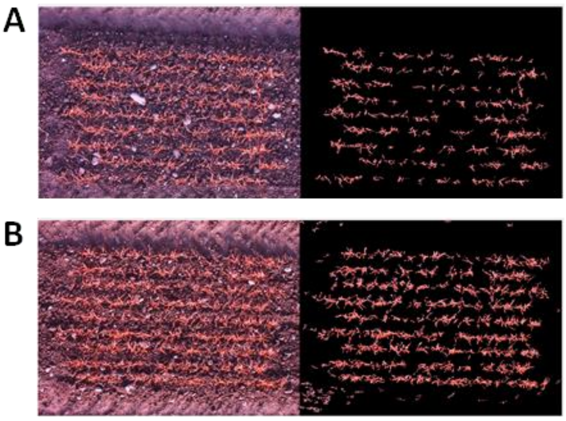



**Fig. S5. Images taken on three different days under different light condtions. The canopy cover extracted from images for the day 2014-12-12 (B) yielded low correlations with the (A) previous and (C) following days.**




C

| Image | CC | Illumination |
|---|---|---|
| A | 0.06 | 1 |
| B | 0.14 | 2 |

**Fig. S6. Image specific flags for illumination conditions could be used as a metadata item and serve as a filter when evaluating the canopy cover results in high throughput field phenotyping.**

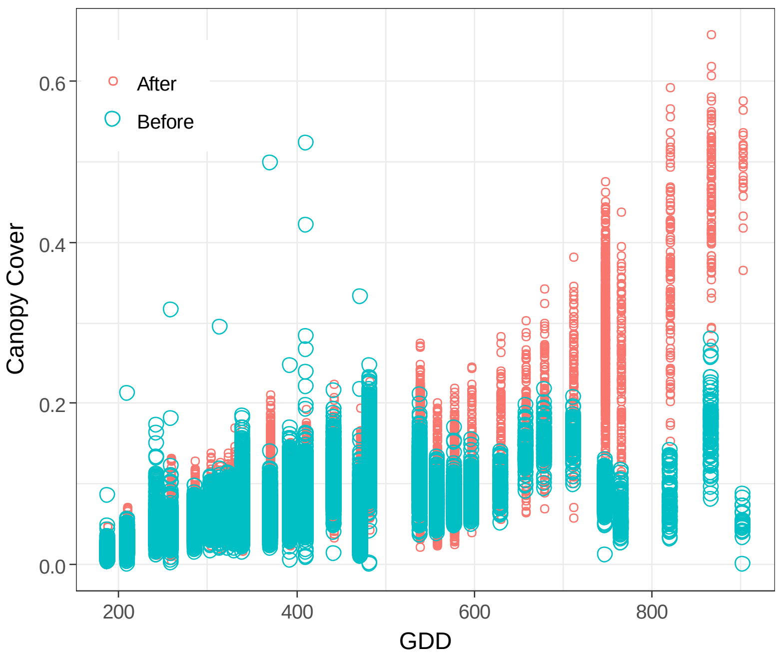



**Fig. S7. Comparison of the segmentation results for canopy cover in relation to growing degree days (GDD) before and after the use of the proposed image analysis pipeline.**