Improving Sustainable Agriculture Through Computer Generated Leaf Angle Measurements

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Sustainable agriculture is growing more and more important. Land use is limited and researchers must find ways to grow more crops with less space. Crop leaf angle can have a large effect on the number of plants the can be grown in a given space. Plants with more erect leaf angles can be grown closer together and still receive enough sunlight for proper photosynthesis and improved crop yield. For this reason, it is important for researchers to find plant genotypes and phenotypes with more erect leaf angles. This makes it necessary to have accurate methods for measuring leaf angles when studying plants in the lab. Hand measurements are subject to human error, but computer methods must be accurate and easily accessible. This project grew six genotypes of corn plants to compare leaf angles and recommend genotypes for further research that will have more erect angles and can possibly improve crop yield. The angles were measured manually and by computer and R squared values were used to see how closely correlated the manual and computer measurements were. Measurements for the 2nd and 3rd leaf angles were taken and both leaf angles showed positive relationships with the 3rd angle having a higher R squared score. This is likely due to the ease of measuring a more open angle both manually and with the computer. The results of this project suggest that when using the computer to measure leaf angles, the 3rd leaf angle may be the best angle to use. Two out of the six corn genotypes grown showed significantly more erect leaf angles and those genotypes have been recommended for further research to identify corn genotypes that may be best when planted closer together in more crowded environments.

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