Discrimination of haploid and diploid maize kernels via multispectral imaging - DTU Orbit (14/12/2018)

Discrimination of haploid and diploid maize kernels via multispectral imaging

The use of doubled haploids (DHs) in maize has become ubiquitous in maize breeding programmes as it allows breeders to go from cross to evaluation in as little as 2 years. Two important aspects of the in vivo DH system used in maize are as follows: (i) the identification of haploid progeny and (ii) doubling of the haploid genome to produce fertile inbred lines. This study is focused on the first step. Currently, identification of maize haploid progeny is performed manually using the R1-nj seed colour marker. This is a labour-intensive and time-consuming process; a method for automated sorting of haploids would increase the efficiency of DH line development. In this study, six inbred lines were crossed with the maternal haploid inducer "RWS/RWK-76" and a sample of seed was sorted manually for each line. Using the VideometerLab 3 system, spectral imaging techniques were applied to discriminate between haploids and hybrids. Using DNA markers to confirm the haploid/diploid state of the tested seed, for the majority of genotypes haploid identification was possible with over 50% accuracy.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Image Analysis & Computer Graphics, Iowa State University, Videometer A/S
Contributors: De La Fuente, G. N., Carstensen, J. M., Adsetts Edberg Hansen, M., Lübberstedt, T.
Pages: 50-60
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Plant Breeding
Volume: 136
Issue number: 1
ISSN (Print): 0179-9541
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.6 SJR 0.714 SNIP 0.772
Web of Science (2017): Impact factor 1.392
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.75 SJR 0.715 SNIP 0.912
Web of Science (2016): Impact factor 1.335
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.71 SJR 0.723 SNIP 0.885
Web of Science (2015): Impact factor 1.502
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 1.45 SJR 0.654 SNIP 0.922
Web of Science (2014): Impact factor 1.598
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 1.46 SJR 0.636 SNIP 0.92
Web of Science (2013): Impact factor 1.338
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 1.43 SJR 0.714 SNIP 0.942
Web of Science (2012): Impact factor 1.175
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 1.48 SJR 0.809 SNIP 1.107
Web of Science (2011): Impact factor 1.596
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.69 SNIP 0.932