Additional Project Outputs for OREI 2020-51300-32180
Breeding Corn to Enable Organic Seed Production

Journal articles: development of the doubled haploid method for organic plant breeding.

- Gustin, J.L., lFrei, U.K., Baier, J., Armstrong, P., Lübberstedt, T., Settles, A.M. 2020. *Maize haploid classification using Single Kernel Near-Infrared Spectroscopy*. Plant Breeding 139:1103-1112. https://doi.org/10.1111/pbr.12857. *Paywall.*
- Costa Almeida, V., Trentin, H.U., Frei, U.K., Lübberstedt, T. 2020. *Genomic prediction in maternal haploid induction in maize*. The Plant Genome 13:e20014 https://doi.org/10.1002/tpg2.20014. *Open access.*
- De la Fuente, G., Frei, U.K., Trampe, B., Ren, J., Bohn, M.O., Yana, N., Verzegnazzi, A., Murray, S.C., Lübberstedt, T. 2020. *A diallel analysis of a maize donor population response to in vivo maternal haploid induction. II: Spontaneous Haploid Genome Doubling*. Crop Sci. 60: 873-882. https://doi.org/10.1002/csc2.20021. *Paywall.*
- Qu, Y., Wu, P., Ren, J., Liu, Z., Tang, J., Lübberstedt, T., Chen, S., Li, H. (2020) *Mapping of QTL for kernel abortion caused by in vivo haploid induction in maize (Zea mays L.).* PloS One 15: e0228411. https://doi.org/10.1371/journal.pone.0228411. *Open access.*
- Trentin, H.U., Frei, U.K., Lübberstedt, T. 2020. *Maternal haploid inducer development in maize*. Plants 9: 614 https://doi.org/10.3390/plants9050614. *Open access.*
- Ren, J., Boerman, N., Liu, R., Frei, U.K., Trampe, B., Vanous, K., Chen, S., Lübberstedt, T. 2020. *QTL mapping of spontaneous haploid genome doubling*. Plant Sci. 293:110337 https://doi.org/10.1016/j.plantsci.2019.110337. *Paywall.*
- Verzegnazzi, A., Santos, I., Frei, U.K., Krause, M., Campbell, J., Almeida, V., Tonello Zuffo, L., Boerman, N., Lübberstedt, T. 2021. *Major locus for spontaneous haploid genome doubling detected by a case-control GWAS enables efficient doubled haploid line development in exotic maize germplasm*. Theor. Appl. Genet. 134: 1423-1434 https://doi.org/10.1007/s00122-021-03780-8. *Paywall.*
- Trampe, B., Batiru, G., Pereira, A.S., G., Frei, U.K., Lübberstedt, T. 2022. *QTL mapping of inducibility using genotype by sequencing in maize*. Plants 11: 878 https://doi.org/10.3390/plants11070878. *Open access*.
- Trentin, H.U., Batiru, G., Frei, U.K., Dutta, S., Lübberstedt, T. (2022) *Investigating the effect of the interaction of maize inducer and genome backgrounds on haploid induction rates*. Plants 11:1527, https://doi.org/10.3390/plants11121527. *Open access.*
- Trentin, H.U., Yavuz, R., Dermail, A., Frei, U.K., Dutta, S., Lübberstedt, T. 2023. *A comparison between inbred and hybrid maize haploid inducers*. Plants 12:1095 https://doi.org/10.3390/plants12051095. *Open access.*
- Dermail, A., Chankaew, S., Lertrat, K., Suwarno, W.B., Lübberstedt, T., Suriharn, K. 2023. *Combining ability of tropical x temperate maize inducers for haploid induction rate, R1-nj seed set, and agronomic traits.* Frontiers in Plant Science 14:1154905. https://doi.org/10.3389/fpls.2023.1154905. *Open access*.
- Dong, D., Nagasubramanian, K., Wang, R., Frei, U.K., Jubery, T.Z., Lübberstedt, T., Ganapathysubramanian, B. 2023. *Self-supervised corn kernel classification and*

segmentation for embryo identification. Frontiers in Plant Science 14:1108355. https://doi.org/10.3389/fpls.2023.1108355. *Open access.*

- Trentin, H.U., Krause, M., Zunjare, R., Costa Almeida, V., Rotarenco, V., Beavis, W.D., V., Frei, U.K., Lübberstedt, T. 2023. *Genetic basis of maize maternal haploid induction beyond MATRILINEAL and ZmDMP.* Frontiers in Plant Science 14:1218042. https://doi.org/10.3389/fpls.2023.1218042. *Open access.*
- YR Chen, UK Frei, and T Lübberstedt. 2024. *Genomic estimated selection criteria and parental contributions in parent selection increase genetic gain of maternal haploid inducers in maize* Theoretical and Applied Genetics 137 (11), 248. https://doi.org/10.1007/s00122-024-04744-4. *Paywall.*
- YR Chen, T Lübberstedt, and UK Frei. 2024. *Development of doubled haploid inducer lines facilitates selection of superior haploid inducers in maize*. Frontiers in Plant Science 14, 1320660. https://doi.org/10.3389/fpls.2023.1320660. *Open access.*
- Fakude, M., Murithi, A., Frei, U.K., Scott, M Paul, Lubberstedt, Thomas. 2025. *Genome-wide association study of haploid female fertility (HFF) and haploid male fertility (HMF) in BS39-derived doubled haploid maize lines*. Theor Appl Genet 138, 5 (2025). https://doi.org/10.1007/s00122-024-04789-5. *Paywall.*
- Fakude M, Murithi A, Chen Y-R, Yavuz R, Aboobucker SI, Frei UK and Lübberstedt T. 2025. *Dissecting the genetic variation of haploid frailty in maize for enhanced doubled haploid breeding*. Front. Plant Sci. 16:1646128. https://doi.org/10.3389/fpls.2025.1646128. *Open access.*
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Journal articles: gametophytic incompatibility for GMO pollen exclusion.

- Lu, Y., Moran Lauter, A., Makkena, S., Scott, M.P., Evans, M.M. 2020. *Insights into the molecular control of cross-incompatibility in Zea mays*. Plant Reproduction. 33: 117-128. https://link.springer.com/article/10.1007/s00497-020-00394-w. *Paywall.*
- Boerman N.A., Lauter A.N.M., Edwards J.W., Scott M.P. 2021. *Variation in degree of pollen exclusion for ga1-s unilateral cross incompatibility in temperate maize breeding populations*, Agrosystems, Geosciences & Environment, John Wiley & Sons, Ltd. pp. e20220. https://doi.org/10.1002/agg2.20220. *Open access*.
- Bapat, A. R., A. N. Moran Lauter, M. B. Hufford, N. A. Boerman and M. P. Scott. 2023. *The Ga1 locus of the genus Zea is associated with novel genome structures derived from multiple, independent non-homologous recombination events.* G3 Genes|Genomes|Genetics: jkad196. https://doi.org/10.1093/g3journal/jkad196. *Open access.*
- AR Bapat & MP Scott. 2024. *Pectin methylesterase activities in reproductive tissues of maize plants with different haplotypes of the Ga1 and Ga2 cross incompatibility systems* Plant Reproduction 37 (4), 479-488. https://doi.org/10.1007/s00497-024-00502-0. *Open access.*
- Adrienne N Moran Lauter, James B Holland, M Paul Scott. 2025. *Analysis of Ga2 genome structure and activity reveals widespread distribution of functional alleles in*

modern maize germplasm, G3 Genes|Genomes|Genetics, Volume 15, Issue 5, May 2025, https://doi.org/10.1093/g3journal/jkaf035. *Open access.*

Journal articles: development of corn hybrids with improved agronomic performance and grain quality traits for organic systems.

- Sintanaparadee, P., Dermail, A., Lübberstedt, T., Lertrat, K., Chankaew, S., Suriharn, K. 2022. *Seasonal variation of tropical savanna alters agronomic adaptation of Stock 6-derived inducer lines*. Plants 11, 2902. https://doi.org/10.3390/plants11212902. *Open access.*
- Ledesma, A., Aguilar, F.S., Uberti, A., Hufford, M., Edwards, J., Hearne, S., Lübberstedt, T. 2023. *Haplotype sharing and diversity analyses of DH Lines derived from different cycles of the Iowa Stiff Stalk Synthetic Maize Population*. Frontiers in Plant Sci. 14:1226072. https://doi.org/10.3389/fpls.2023.1226072. *Open access.*
- Kinney S, Park T-C, Clubb H, Armstrong P, Lübberstedt T, Scott MP. 2025. *Classification of Waxy Maize Kernels Using Single Kernel Near-Infrared Reflectance Spectroscopy*. Applied Spectroscopy. 2025;79(11):1597-1604. https://doi.org/10.1177/00037028251349556. *Paywall.*
- Park T-C, Silva PC, Lübberstedt T and Scott MP. 2025. *Beyond the genome: the role of functional markers in contemporary plant breeding*. Front. Plant Sci. 16:1637299. https://doi.org/10.3389/fpls.2025.1637299. *Open access.*

Book Chapter:

- Muhammad-Aboobucker, S., Jubery, Z., Frei, U.K., Foster, T., Chen, Y.-R., Ganapathysubramanian, B., Lübberstedt, T. (2022) *Protocols for in vivo doubled haploid (DH) technology in maize breeding: From haploid inducer to haploid genome doubling*. Methods Molecular Biology, Plant Gametogenesis, Methods and Protocols (C. Lambing ed.) 2484: 213-235 https://doi.org/10.1007/978-1-0716-2253-7_16. *Paywall.*

Conference presentations:

Fakude M, Frei UK, Foster TL, Lübberstedt T. Identification of genomic regions associated with the causal QTL of SHGD trait in Ames panel by GWAS. ASA-CSAA-SSSA. 2023.