

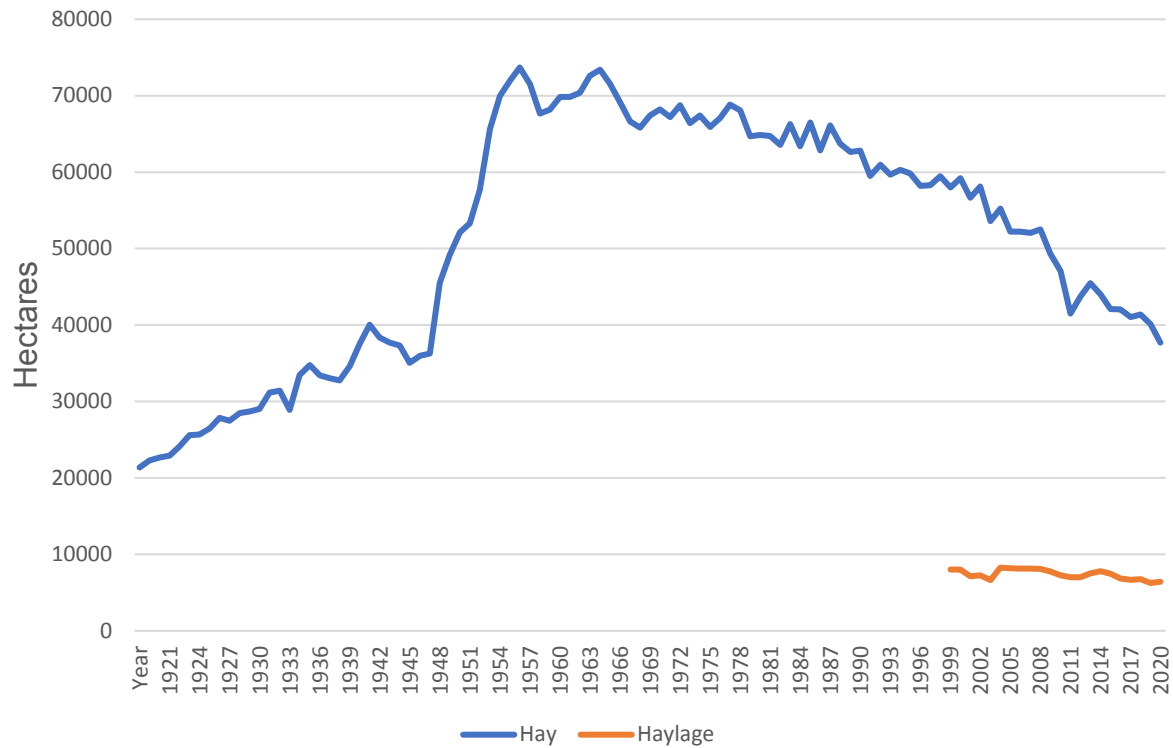
A wide-angle photograph of a lush green alfalfa field stretching to the horizon. The sky is bright blue with scattered white cumulus clouds. In the distance, a range of low mountains or hills is visible under a hazy atmosphere. The overall scene is bright and clear, suggesting a sunny day.

# NEW HORIZONS IN ALFALFA IMPROVEMENT

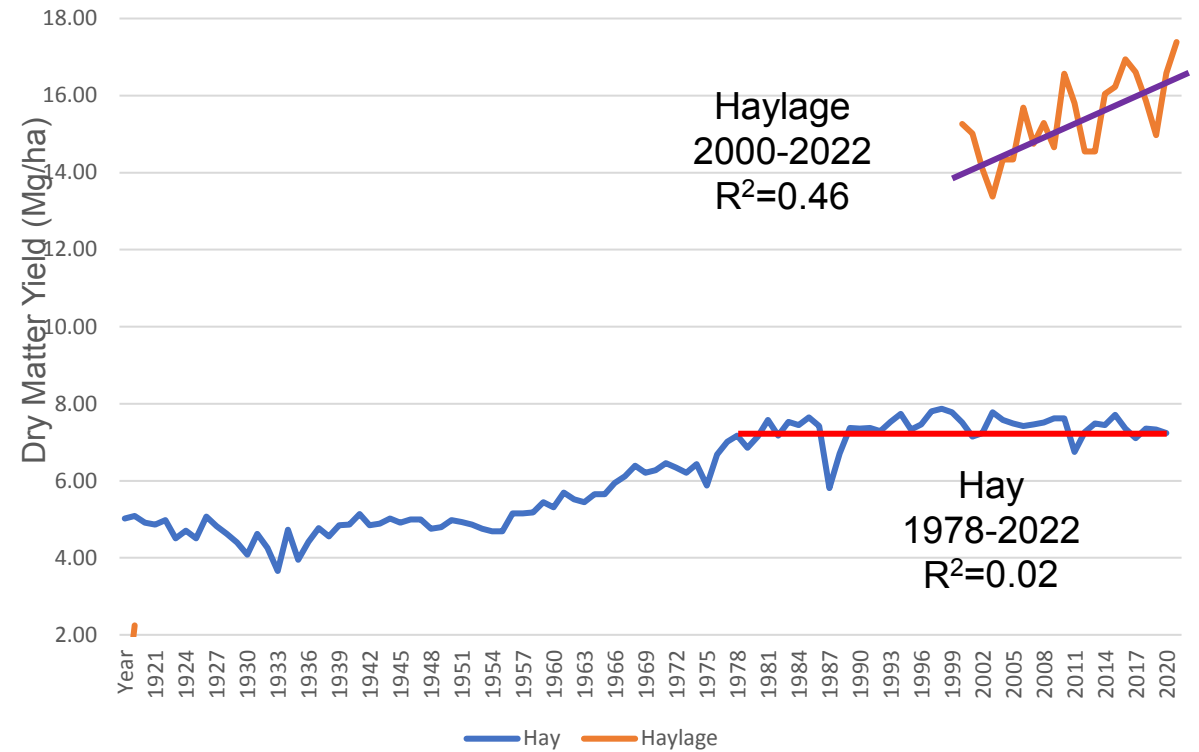
E. Charles Brummer, University of California, Davis

# THE CURRENT ALFALFA HORIZON

## USA Alfalfa Harvested



## USA Average Yield per Hectare



# WHAT DO WE NEED?

INCREASE YIELD  
IMPROVE PERSISTENCE  
DECREASE HARVESTS PER YEAR  
MAINTAIN PROTEIN CONCENTRATION  
IMPROVE FIBER DIGESTIBILITY



# ADVANCES IN GENOMICS

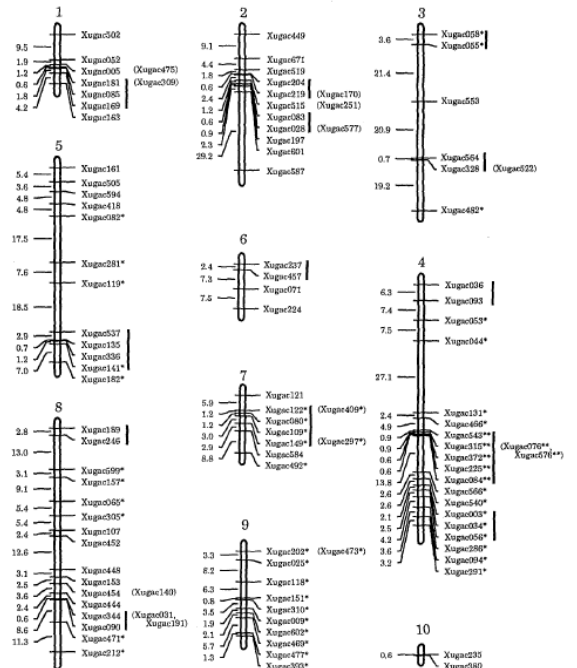
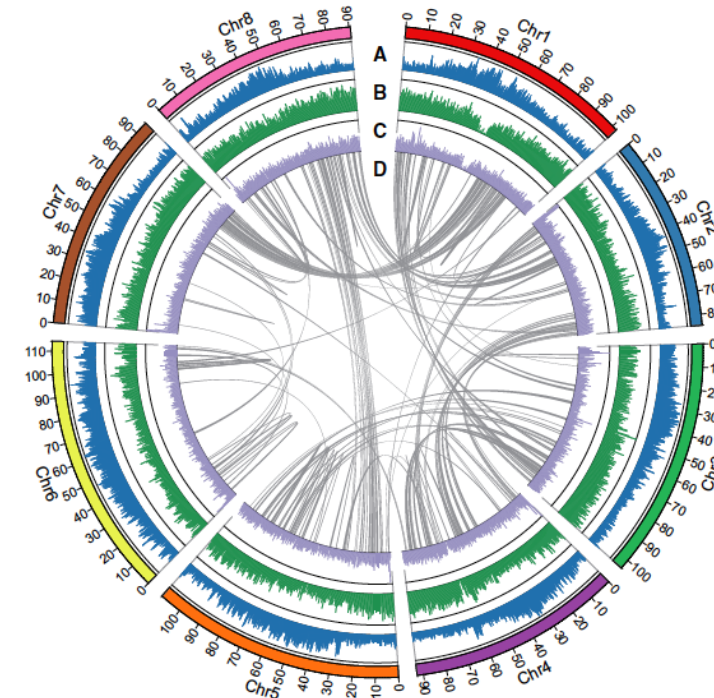


Fig. 1. RFLP map of diploid alfalfa. All markers are cDNA markers. Map distances in centimorgans (cM) are shown.



Published: April 1993

## Development of an RFLP map in diploid alfalfa

E. Charles Brummer, Joseph H. Bouton & Gary Kochert

*Theoretical and Applied Genetics* 86, 329–332 (1993) | [Cite this article](#)

Original Articles | Published: April 1993

## Construction of a basic genetic map for alfalfa using RFLP, RAPD, isozyme and morphological markers

György B. Kiss, Gyula Csanádi, Katalin Kálmán, Péter Kaló & László Ökrész

*Molecular and General Genetics MGG* 238, 129–137 (1993) | [Cite this article](#)

## The Chromosome-Level Genome Sequence of the Autotetraploid Alfalfa and Resequencing of Core Germplasm Provide Genomic Resources for Alfalfa Research

Chen Shen<sup>1,4</sup>, Huilong Du<sup>2,3,4</sup>, Zhuo Chen<sup>2,3,4</sup>, Hongwei Lu<sup>2,3,4</sup>, Fugui Zhu<sup>1</sup>, Hong Chen<sup>1</sup>, Xiangzhao Meng<sup>1</sup>, Qianwen Liu<sup>1</sup>, Peng Liu<sup>1</sup>, Lihua Zheng<sup>1</sup>, Xiuyu Li<sup>2,3,4</sup>, Jiangli Dong<sup>1,4,8</sup>, Chengzhi Liang<sup>2,3,4,8</sup>, Tao Wang<sup>1</sup>

### Molecular Plant

Volume 13, Issue 9, 7 September 2020, Pages 1250–1261

## A chromosome-scale genome assembly of a diploid alfalfa, the progenitor of autotetraploid alfalfa

Ao Li, Ai Liu, Xin Du, Jin-Yuan Chen, Mou Yin, Hong-Yin Hu, Nawal Shrestha,

Sheng-Dan Wu, Hai-Qing Wang, Quan-Wen Dou ... [Show more](#)

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*Horticulture Research*, Volume 7, 2020, 194, <https://doi.org/10.1038/s41438-020-00417-7>

Article | [Open Access](#) | Published: 19 May 2020

## Allele-aware chromosome-level genome assembly and efficient transgene-free genome editing for the autotetraploid cultivated alfalfa

Haitao Chen, Yan Zeng, Yongzhi Yang, Lingli Huang, Bolin Tang, He Zhang, Fei Hao, Wei Liu, Youhan Li,

Yanbin Liu, Xiaoshuang Zhang, Ru Zhang, Yesheng Zhang, Yongxin Li, Kun Wang, Hua He, Zhongkai

Wang, Guangyi Fan, Hui Yang, Aike Bao, Zhanhuan Shang, Jianghua Chen, Wen Wang & Qiang

Qiu

*Nature Communications* 11, Article number: 2494 (2020) | [Cite this article](#)

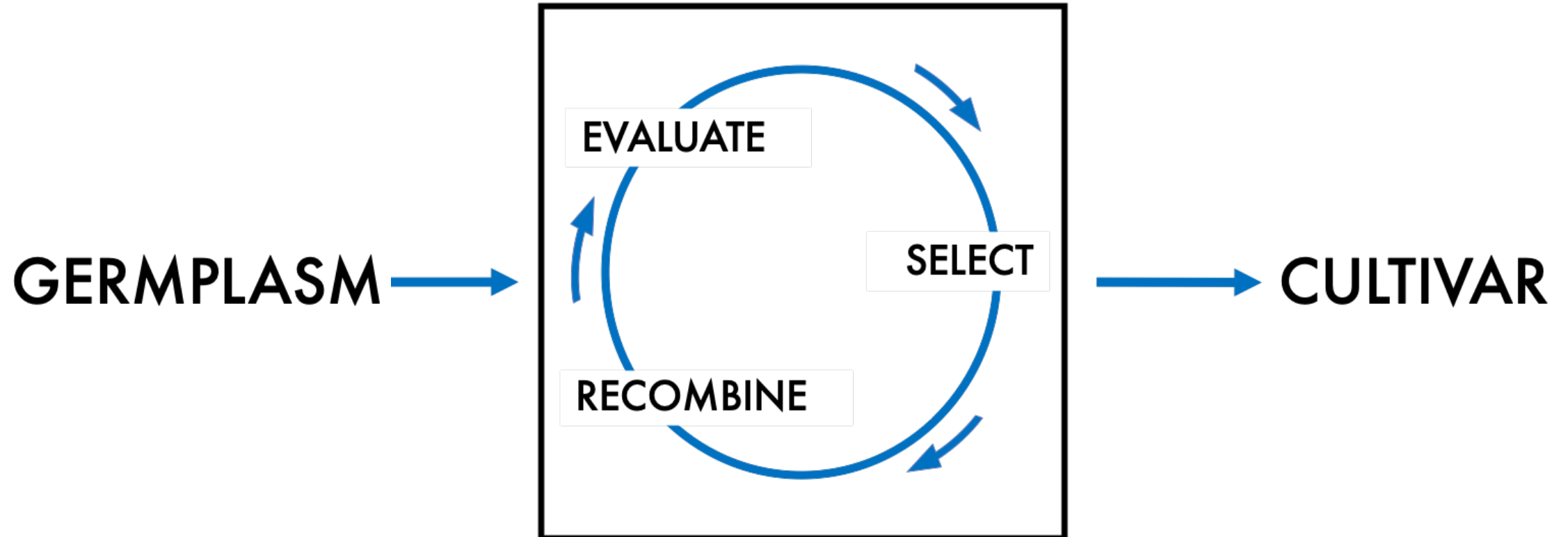
## Genome Assembly of Alfalfa Cultivar Zhongmu-4 and Identification of SNPs Associated with Agronomic Traits

Ruicai Long<sup>1,\*</sup>, Fan Zhang<sup>1,2,\*</sup>, Zhiwu Zhang<sup>2</sup>, Mingna Li<sup>1</sup>, Lin Chen<sup>1</sup>, Xue Wang<sup>1</sup>, Wenwen Liu<sup>1</sup>, Tiejun Zhang<sup>3</sup>, Longxi Yu<sup>4</sup>, Fei He<sup>1</sup>, Xueqian Jiang<sup>1</sup>, Xijiang Yang<sup>1</sup>, Changfu Yang<sup>1</sup>, Zhen Wang<sup>1,4,8</sup>, Junmei Kang<sup>1,4,8</sup>, Qingchuan Yang<sup>1,4,8</sup>

Genomics, Proteomics & Bioinformatics

Volume 20, Issue 1, February 2022, Pages 14–28

# ACCELERATING BREEDING CYCLES



# CAN GENOMIC PREDICTION DRIVE YIELD GAIN?

GERMPLASM



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**Genomic Prediction of Biomass Yield in Two Selection Cycles of a Tetraploid Alfalfa Breeding Population**

Xuehui Li, Yanling Wei, Ananta Acharya, Julie L. Hansen, Jamie L. Crawford, Donald R. Vians, Réal Michaud, Annie Claessens, E. Charles Brummer

First published: 01 July 2015 | <https://doi.org/10.3835/plantgenome2014.12.0090> | Citations: 57

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Research article | Open Access | Published: 01 December 2015

**Accuracy of genomic selection for alfalfa biomass yield in different reference populations**

Paolo Annicchiarico, Nelson Nazzicari, Xuehui Li, Yanling Wei, Luciano Pecetti & E. Charles Brummer

*BMC Genomics* 16, Article number: 1020 (2015) | [Cite this article](#)

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**Strategies to Increase Prediction Accuracy in Genomic Selection of Complex Traits in Alfalfa (*Medicago sativa* L.)**

by Cesar A. Medina, Harpreet Kaur, Ian Ray and Long-Xi Yu

*Critica* 2021, 70(12), 3372; <https://doi.org/10.3390/critica10123372>

Received: 19 October 2021 / Revised: 19 November 2021 / Accepted: 24 November 2021 / Published: 30 November 2021

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**Genomic prediction for canopy height and dry matter yield in alfalfa using family bulks**

Mario Henrique Murad Leite Andrade, Janam P. Acharya, Juliana Benevenuto, Ivone de Bem Oliveira, Yolanda Lopez, Patricio Munoz, Marcio F. R. Resende Jr., Esteban F. Rios

First published: 11 July 2022 | <https://doi.org/10.1002/tpg2.20235> | Citations: 1



CULTIVAR

# REIMAGINING THE ALFALFA PLANT





# WHICH GENES WHERE WHEN HOW

GENOMICS AND BIOTECHNOLOGY  
+  
CROP MODELING  
+  
CROP PHYSIOLOGY  
+  
CROP MANAGEMENT



# SHOULD WE BE THINKING ABOUT DIPLOID ALFALFA?

## Reinventing Potato as a Diploid Inbred Line–Based Crop

Shelley H. Jansky,\* Amy O. Charkowski, David S. Douches, Gabe Gusmini, Craig Richael, Paul C. Bethke, David M. Spooner, Richard G. Novy, Hielke De Jong, Walter S. De Jong, John B. Bamberg, A. L. Thompson, Benoit Bizimungu, David G. Holm, Chuck R. Brown, Kathleen G. Haynes, Vidyasagar R. Sathuvalli, Richard E. Veilleux, J. Creighton Miller, Jr., Jim M. Bradeen, and Jiming Jiang





NEW HORIZONS IN ALFALFA IMPROVEMENT

LET'S GET TO WORK.

# Grassland Research

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Volume 1 Issue 1 March 2022

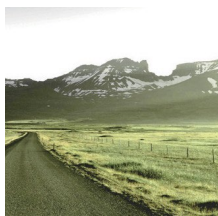
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