USDA Cereal Crops Research Unit
Madison, WI

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- 1933 New cultivars with improved agronomics but of unknown malting quality
- **1938 USDA hired 1st scientist dedicated to malting barley quality research**

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- 1938 ARS hired 1st scientist dedicated to research on malting barley quality
- **1948 Barley Malt Laboratory constructed**

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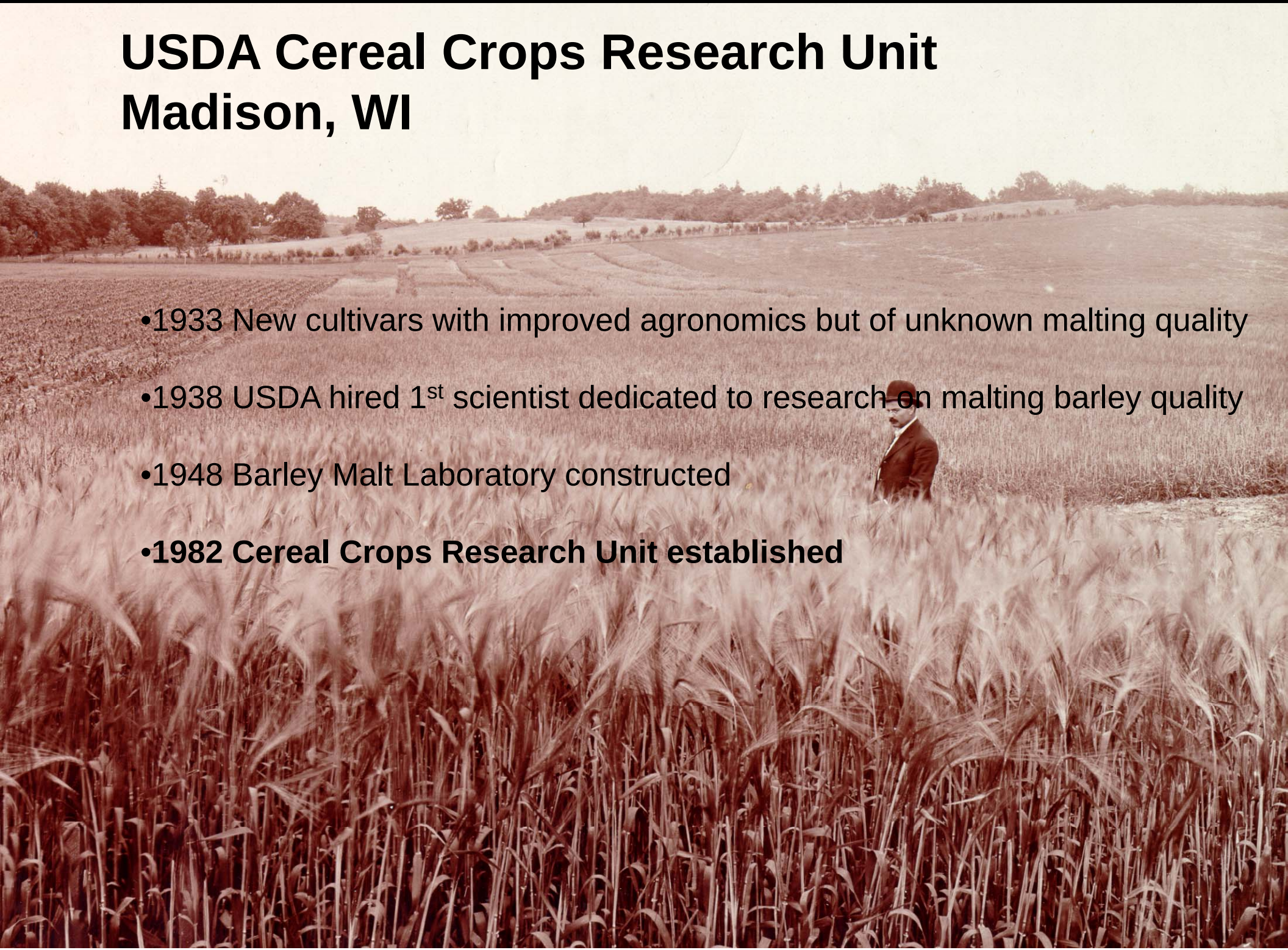

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- **1982 Cereal Crops Research Unit established**

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***Mission*:**
To identify and characterize biological and chemical mechanisms in barley and oats that affect cereal quality leading to enhanced germplasm

To evaluate barley and oat germplasm for critical quality traits

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•Improve malting barley quality through developing improved selection criteria and quality analysis of breeding lines
Al Budde, Mark Schmitt

•Increasing barley's genetic resistance to SCAB (Fusarium)
Ron Skadsen

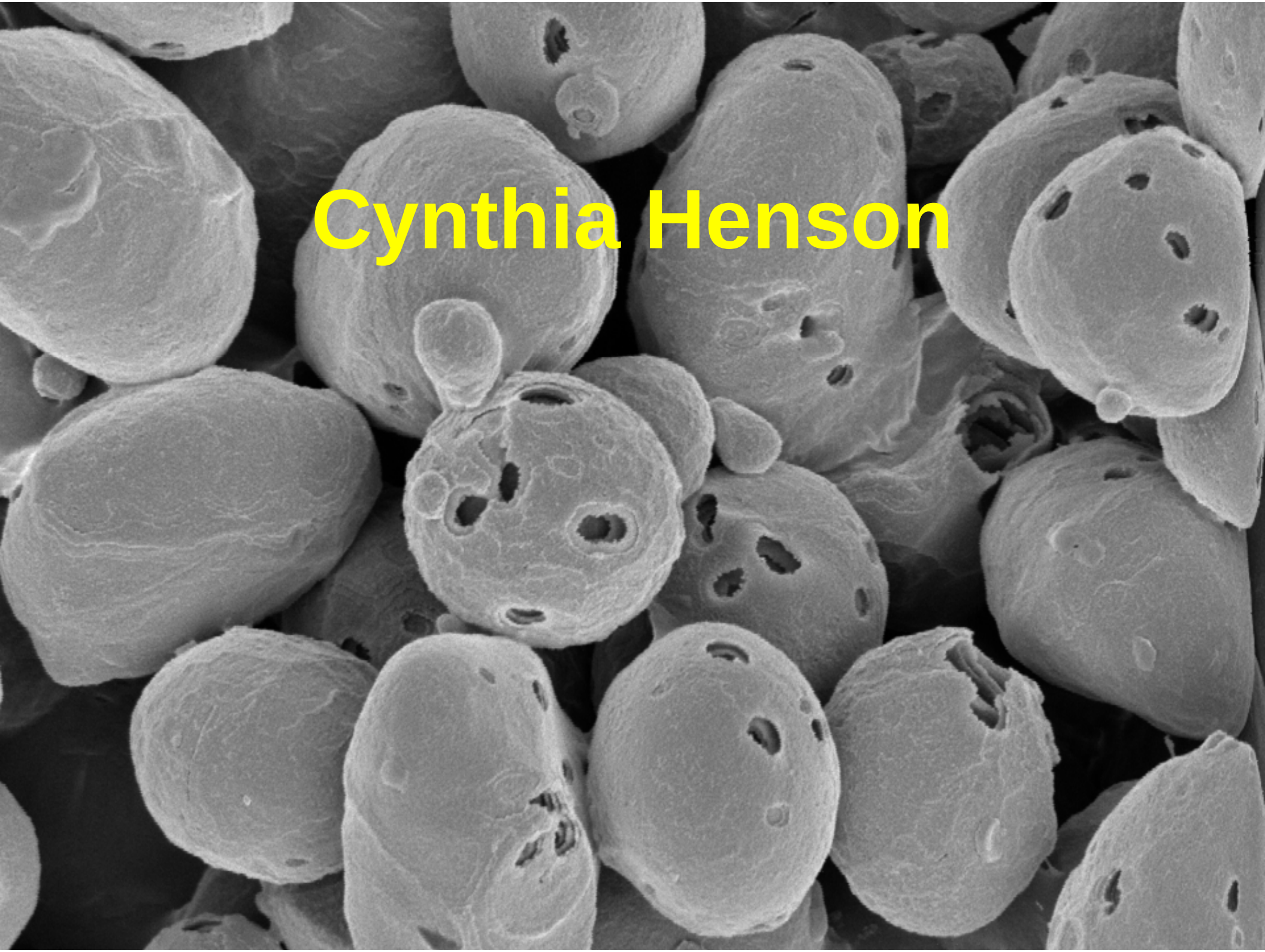
•Improving nutritional value of barley and oats
Mitch Wise

•Improving efficiency of fermentable sugar production in malting barley
Cynthia Henson

Cereal Crops Research Unit

502 Walnut St.
Madison, WI

The End


Cynthia Henson

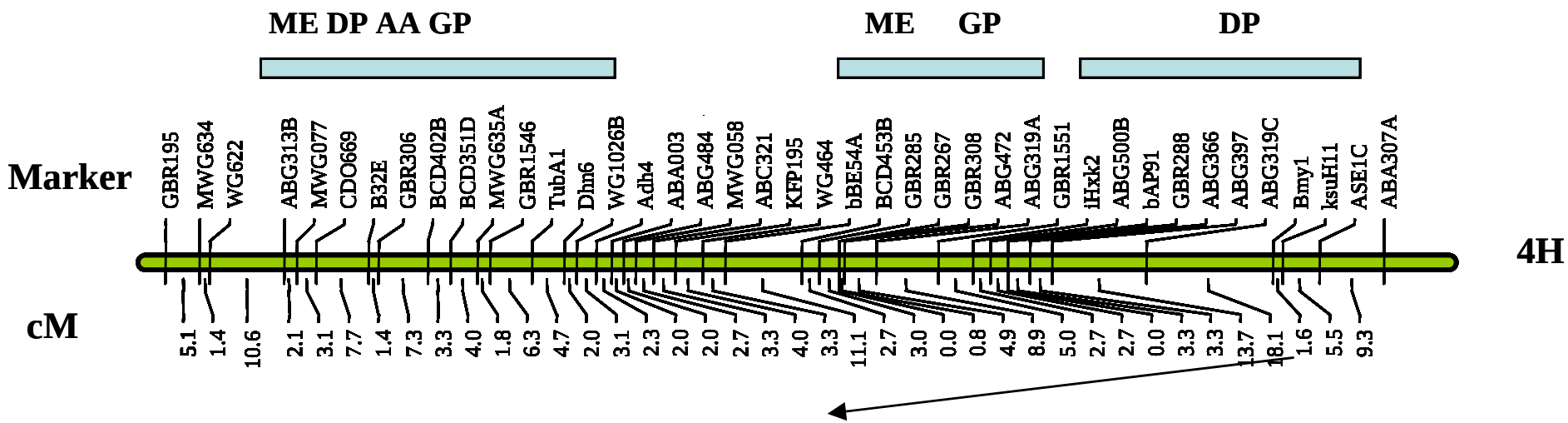
Objectives:

- Increase fermentable sugar production by finding or creating better enzymes

- Identify and characterize novel genes encoding carbohydrases and characterize the gene products

- Develop chemical signatures diagnostic of elite malts with the best brew house performance (highest RDF)

Characterizing and Using Genetic Diversity



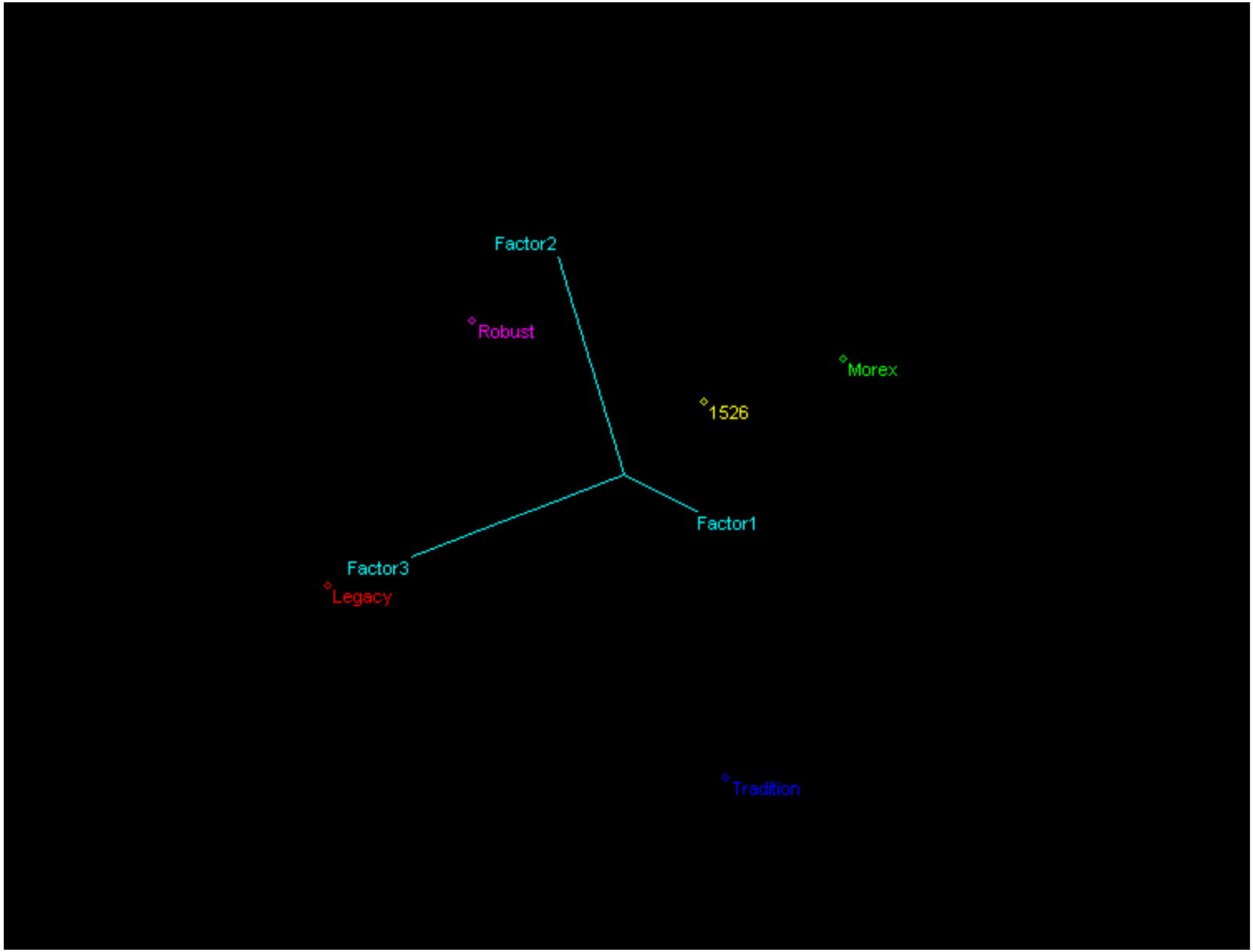
Bmy1 DNA sequence, amino acid sequence and enzyme effectiveness

```
                          343
Steptoe     CGGGACGTCGGCACGCGTGATCCCGACATTTTC
Morex       CGGGACGTCGGCACGTGTGATCCCGACATTTTC

                          115
Steptoe                 RDVGTRDPDIF
Morex                   RDVGTCDPDIF

                          +67%
Steptoe     ***********************************
Morex       **********
```

enzyme effectiveness

Metabolic Profiling of Malting Barley

GC-MS and Multivariate Analysis



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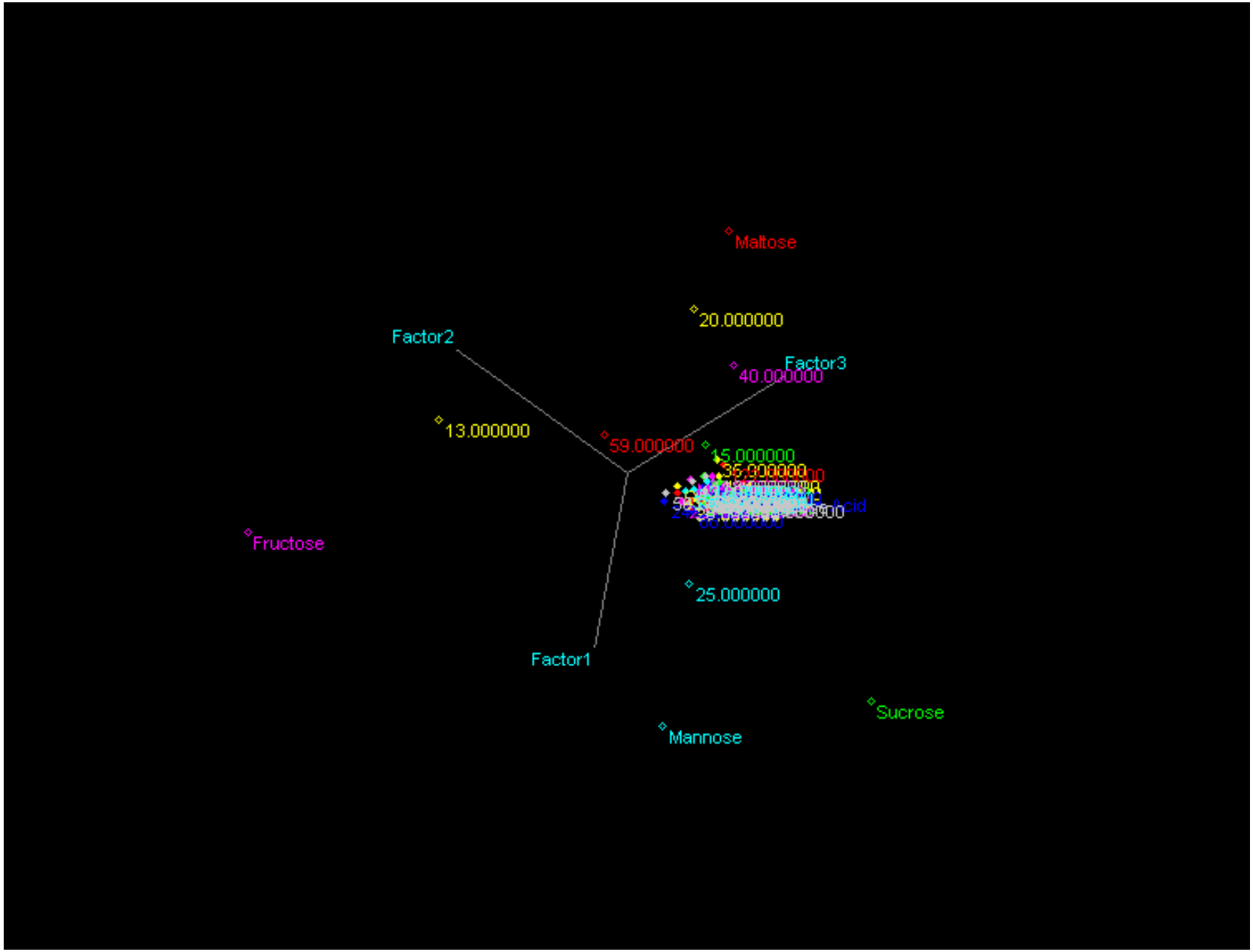
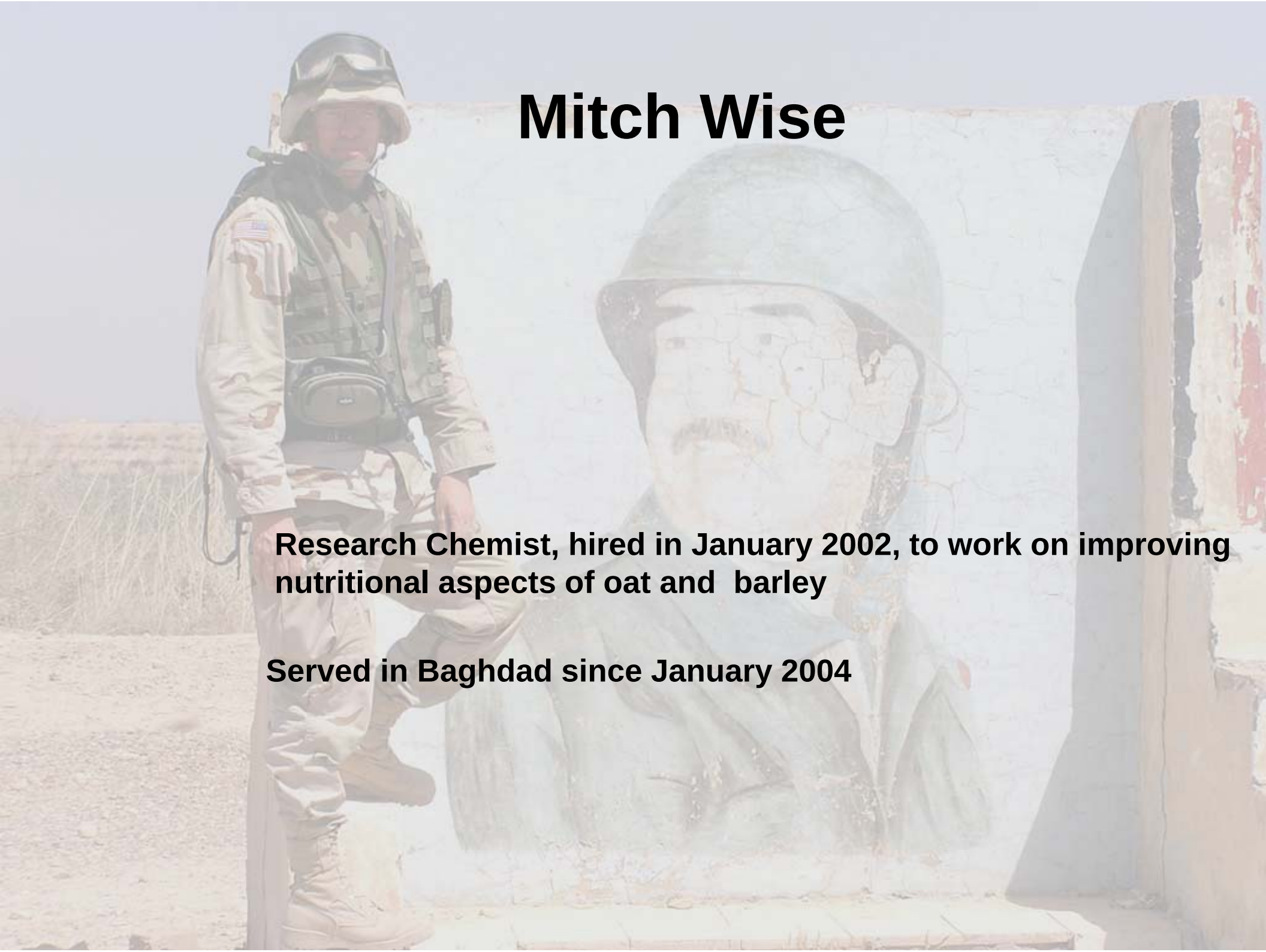


Mitch Wise



Research Chemist, hired in January 2002, to work on improving nutritional aspects of oat and barley

Served in Baghdad since January 2004

Cutting Edge Research

- Studying signaling pathways that elicit biosynthesis of avenanthramides in oat

- Large scale synthesis of avenanthramides for studying the metabolism of and the nutritional aspects of these antioxidants, specifically their roles in reducing stress related oxidative damage and the development of atherosclerosis

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