

Wheat Proteogenomics Research

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Wheat Proteogenomics Research

- **Background**
- Analysis strategy
- Results
- Value of wheat proteome atlas research

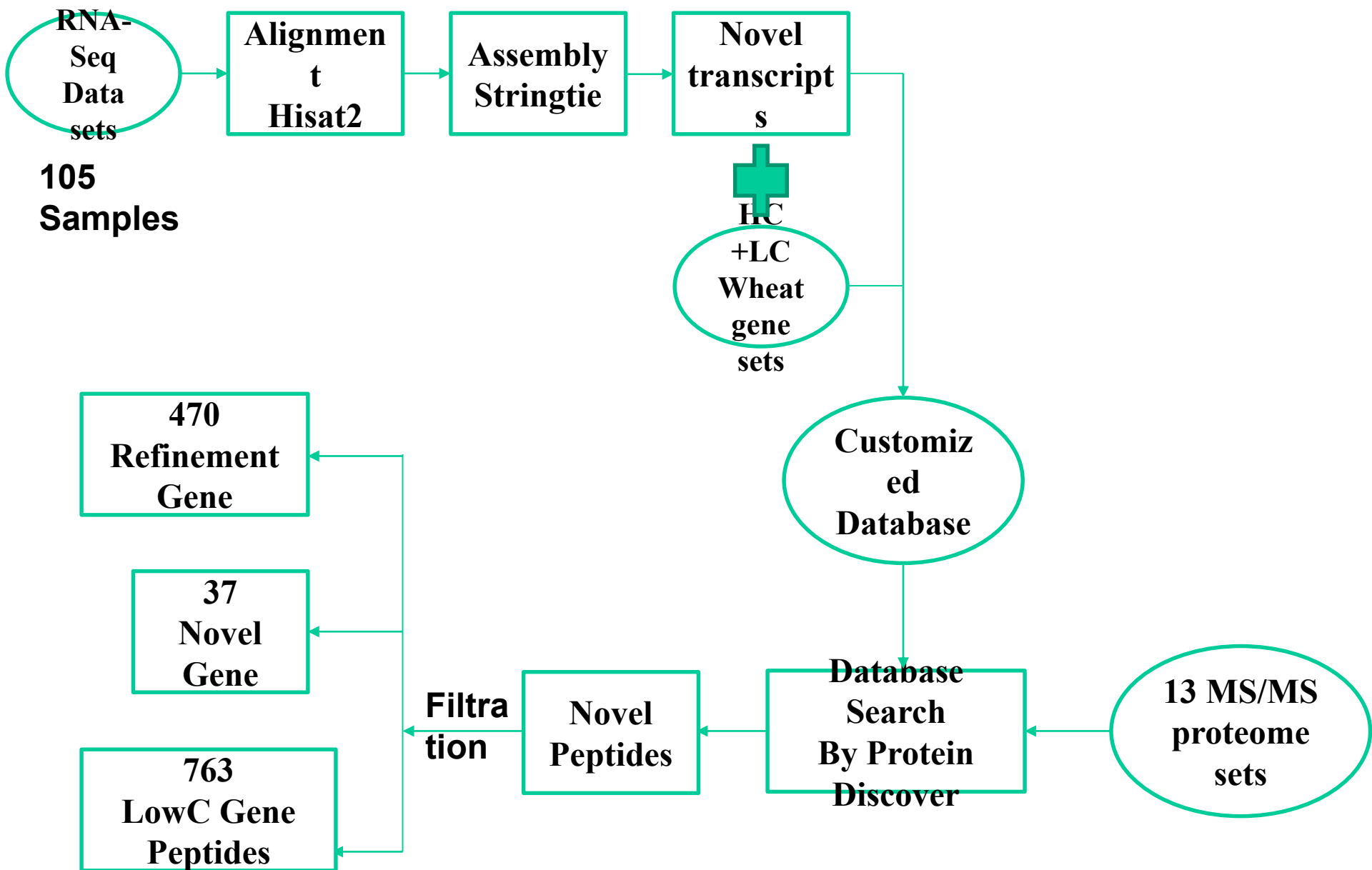
Background

- The process of annotating all the genes is a challenging and ongoing process, even for model plants, such as rice, maize.
- The version 1.1 wheat genome annotation (including HC and LC genes) needs further confirmation, refinement and new discovery
- The proteogenomics method can provide a new refinement dimension different from traditional genome annotation
- Wheat A, B, D-homology proteins expression
- Wheat tissue and period-specific proteins difference comparison

Wheat Proteome Atlas Research

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Analysis strategy



Wheat Proteogenomics Research

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Results

- **Summary of wheat genome annotation refinement**
- Novel gene (new gene loci) detection
- Known gene (high confidence gene) refinement
- Low confidence gene confirmation
- Wheat proteome detection in leaf and root

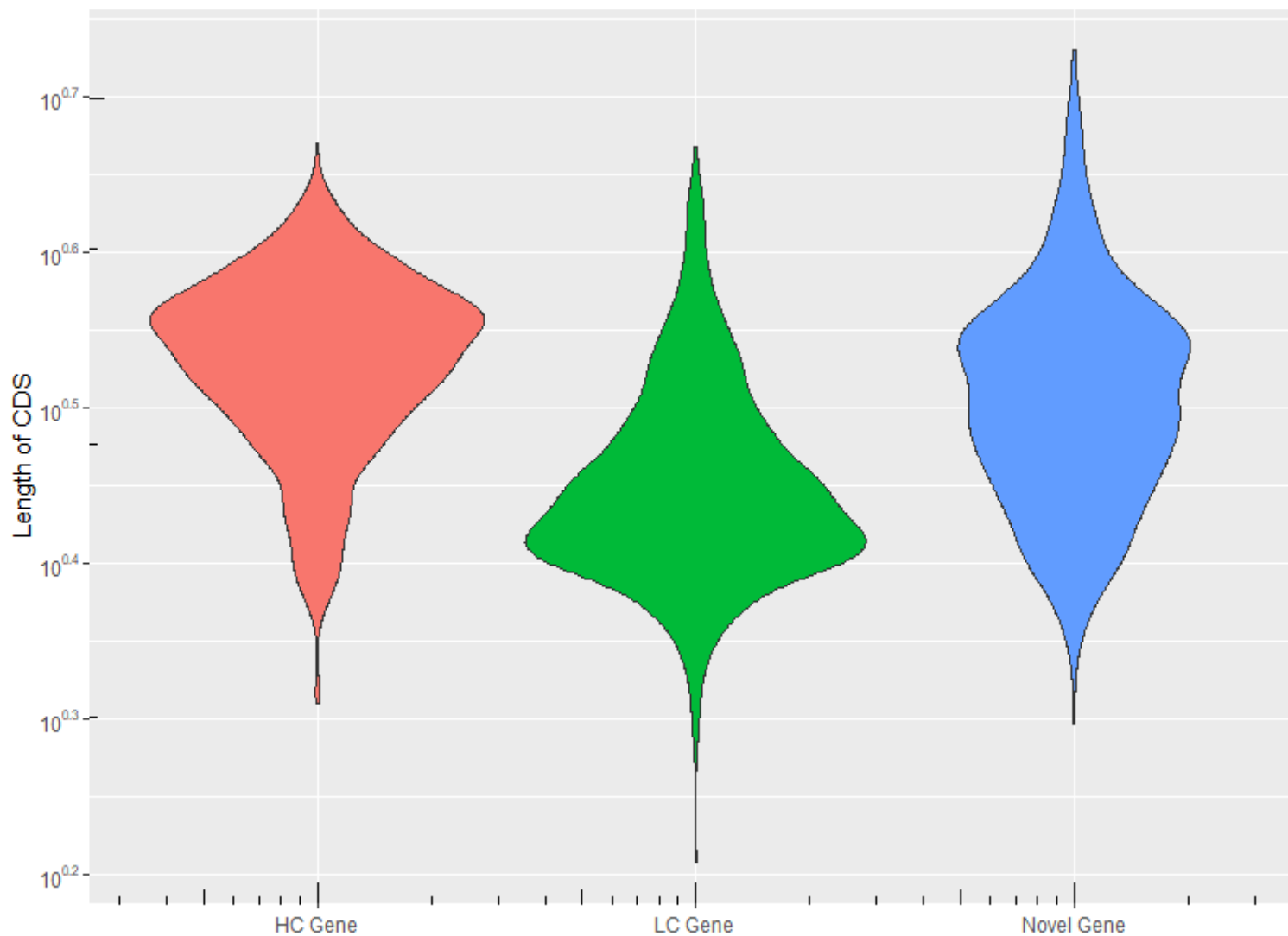
Summary of wheat genome annotation refinement

Refinement type	Gene number
Novel gene (new gene loci) detection	37
Known gene (high confidence gene) refinement	470
Low confidence gene confirmation	763

The pI and MW distribution between new and known (HC) genes are similar



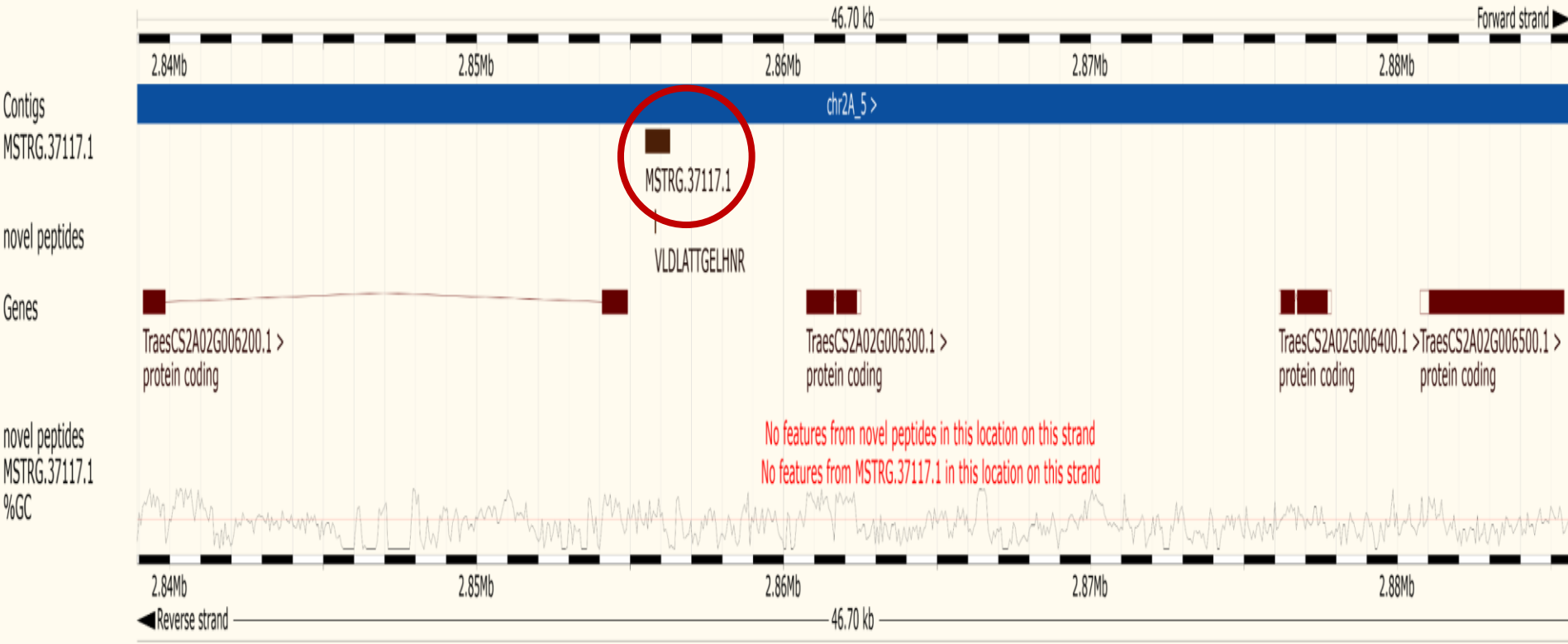
The CDS length distribution among new, known (HC) and LC genes are different



Results

- Summary of wheat genome annotation refinement
- **Novel gene (new gene loci) detection**
- Known gene (high confidence gene) refinement
- Low confidence gene confirmation
- Wheat proteome detection in leaf and root

Example of Novel Gene Loci detection



Gene Legend

Protein Coding

■ protein coding

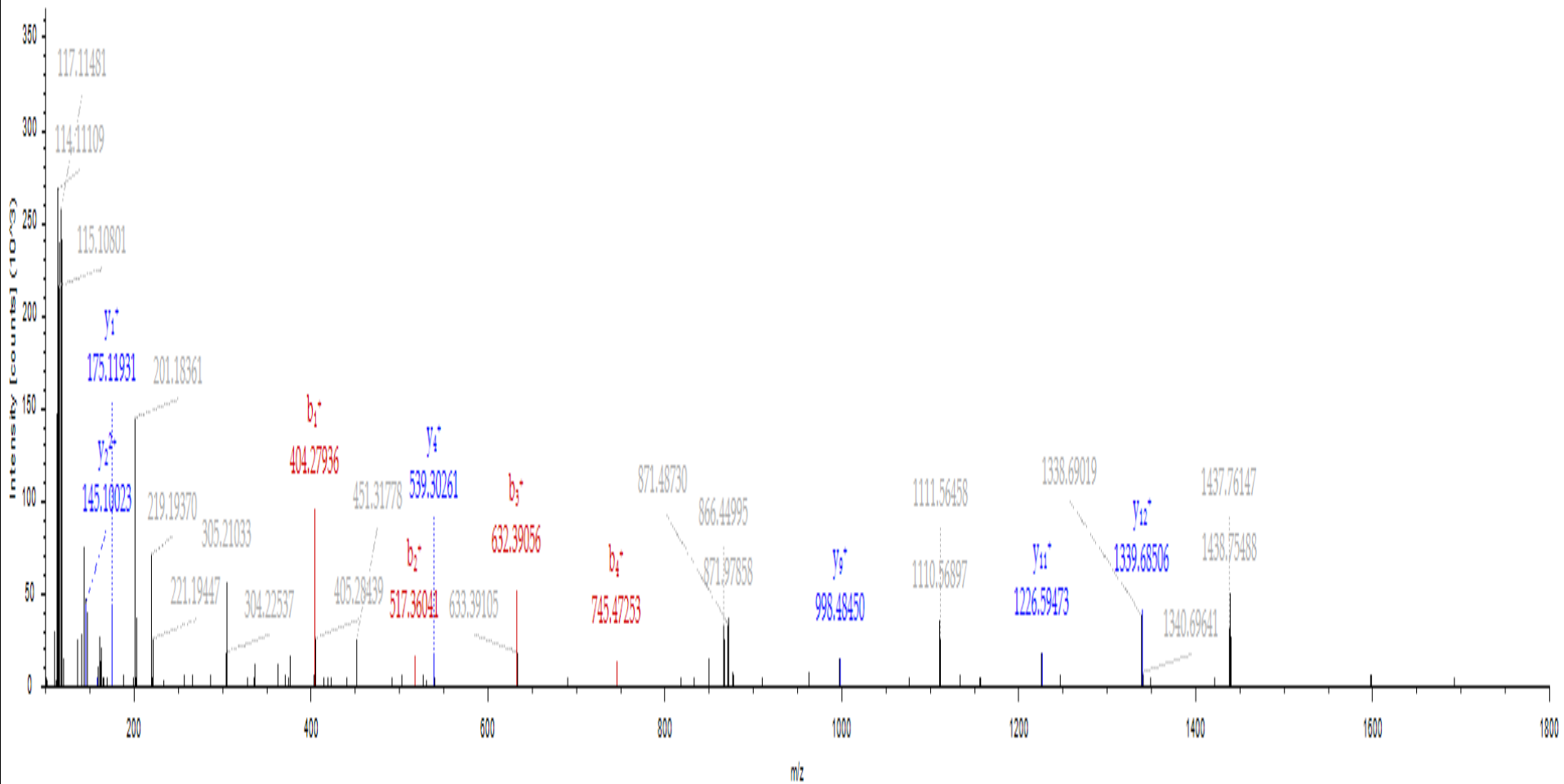
There are currently 61 tracks turned off.

Ensembl Plants *Triticum aestivum* version 97.4 (IWGSC) Chromosome 2A: 2,838,936 - 2,885,634

MS/MS data of novel gene loci

P15227_F5.raw #12629 RT: 30.8573 min

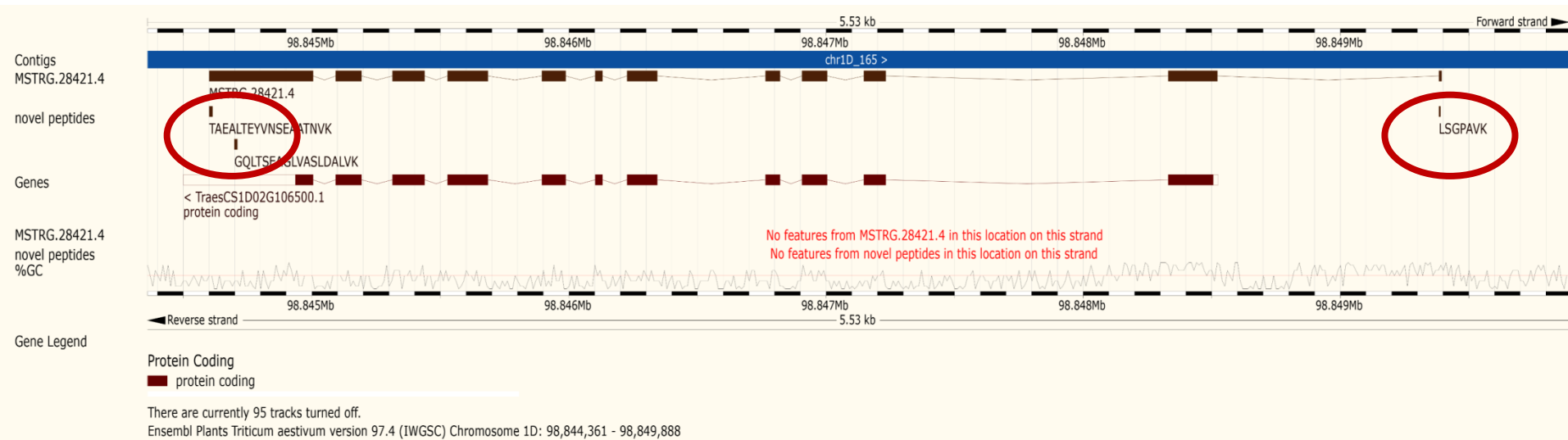
FTMS, 871.9839@hd30.00, z=+2, Mono m/z=871.98389 Da, MH+=1742.9680 Da, Match Tol=0.02 Da



Results

- Summary of wheat genome annotation refinement
- Novel gene (new gene loci) detection
- **Known gene (high confidence gene) refinement**
- Low confidence gene confirmation
- Wheat proteome detection in leaf and root

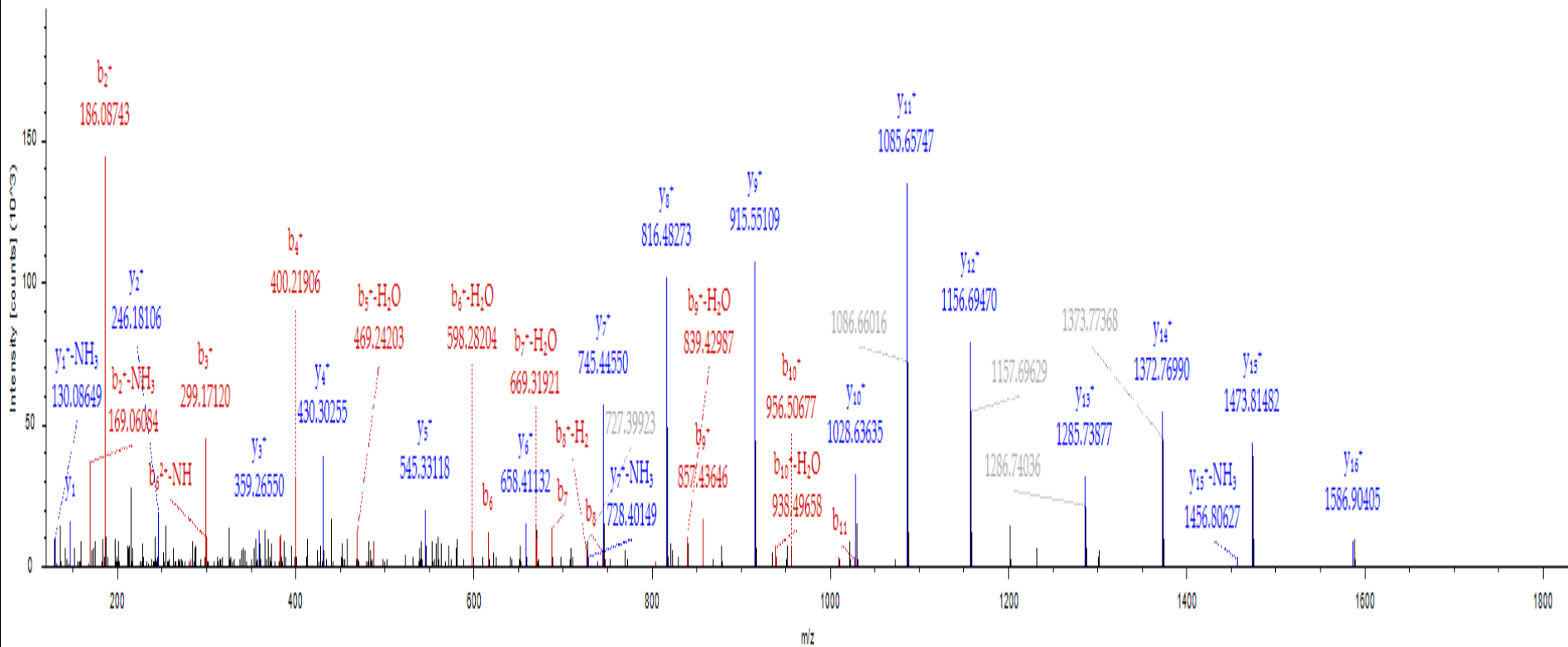
Example of known gene refinement



MS/MS data of known gene refinement

20161019_12_xan_1_FOOTS.raw #30189 RT: 80.8083 min

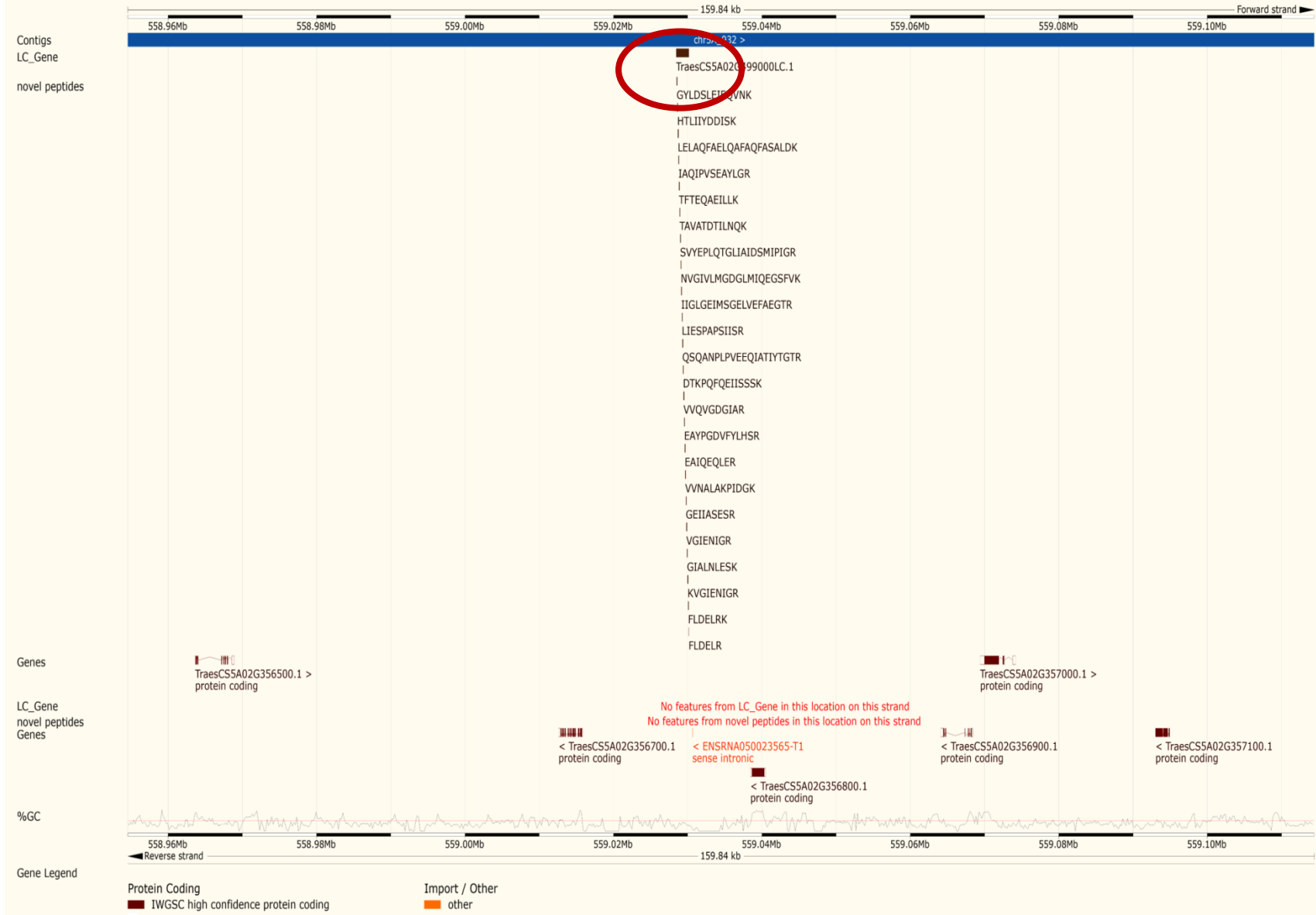
FTMS, 886.4964@hcd25.00, z=+2, Mono m/z=886.49600 Da, MH+=1771.98271 Da, Match Tol=0.02 Da



Results

- Summary of wheat genome annotation refinement
- Novel gene (new gene loci) detection
- Known gene (high confidence gene) refinement
- **Low confidence gene confirmation**
- Wheat proteome detection in leaf and root

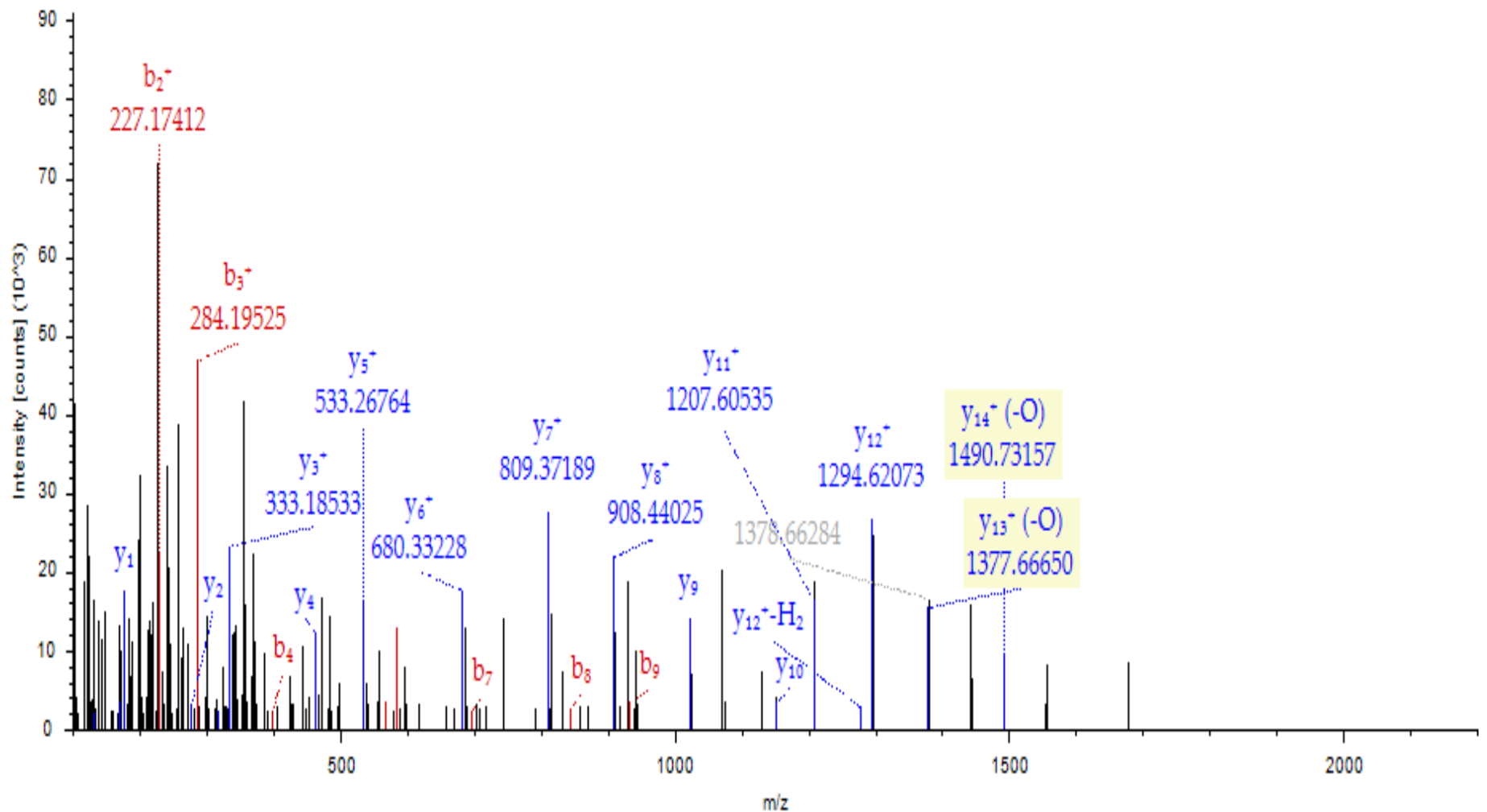
Exampel of wheat LC gene confirmation



MS/MS data of wheat LC gene example

P17227_B_B10_2.raw #60214 RT: 108.5762 min

FTMS, 1069.5497@hod27.00, z=+2, Mono m/z=1069.05579 Da, MH+=2137.10430 Da, Match Tol.=0.02 Da



Results

- Summary of wheat genome annotation refinement
- Novel gene (new gene loci) detection
- Known gene (high confidence gene) refinement
- Low confidence gene confirmation
- **Wheat proteome detection in leaf and root**

Wheat proteome identification in leaf and root

	Leaf	root
Identified protein group (1% FDR)	6,579	7,466
Identified peptides	28,829	32,959

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- **Value of wheat proteome atlas research**

Value of wheat proteome atlas research

- **Wheat genome annotation refinement from proteome dimension:** including novel gene detection, known gene refinement, low confidence gene confirmation
- **Wheat alternative splicing gene confirmation**
- **A comprehensive wheat proteome atlas** , especially for A, B, D-homology proteins expression
- **Wheat tissue and period-specific proteins difference comparison**
- **Wheat proteins function analysis** based on proteome expression clustering analysis

- **We propose to carry out proteogenomics analysis with v.2 assembly and annotation for further confirmation and improvement.**
- **In addition, we propose to carry out wheat (Chinese Spring) proteome atlas research. We would like to see this as a collaborative effort of the consortium.**

A wide-angle photograph of a lush, golden wheat field stretching towards a horizon line. The sky is a vibrant blue with scattered white clouds. In the upper left corner, a faint rainbow is visible. The word "Thanks" is centered in the middle of the image in a green, sans-serif font.

Thanks