

An INSIGHT into the Sugar Beet Genome

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Introduction to genomics (485)
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Outline

- Genome paper
- Interesting facts
- General information about the genome
- Sequencing strategy
- Sequencing method
- Assembly
- Genome outcome
- Question



Genome paper

LETTER

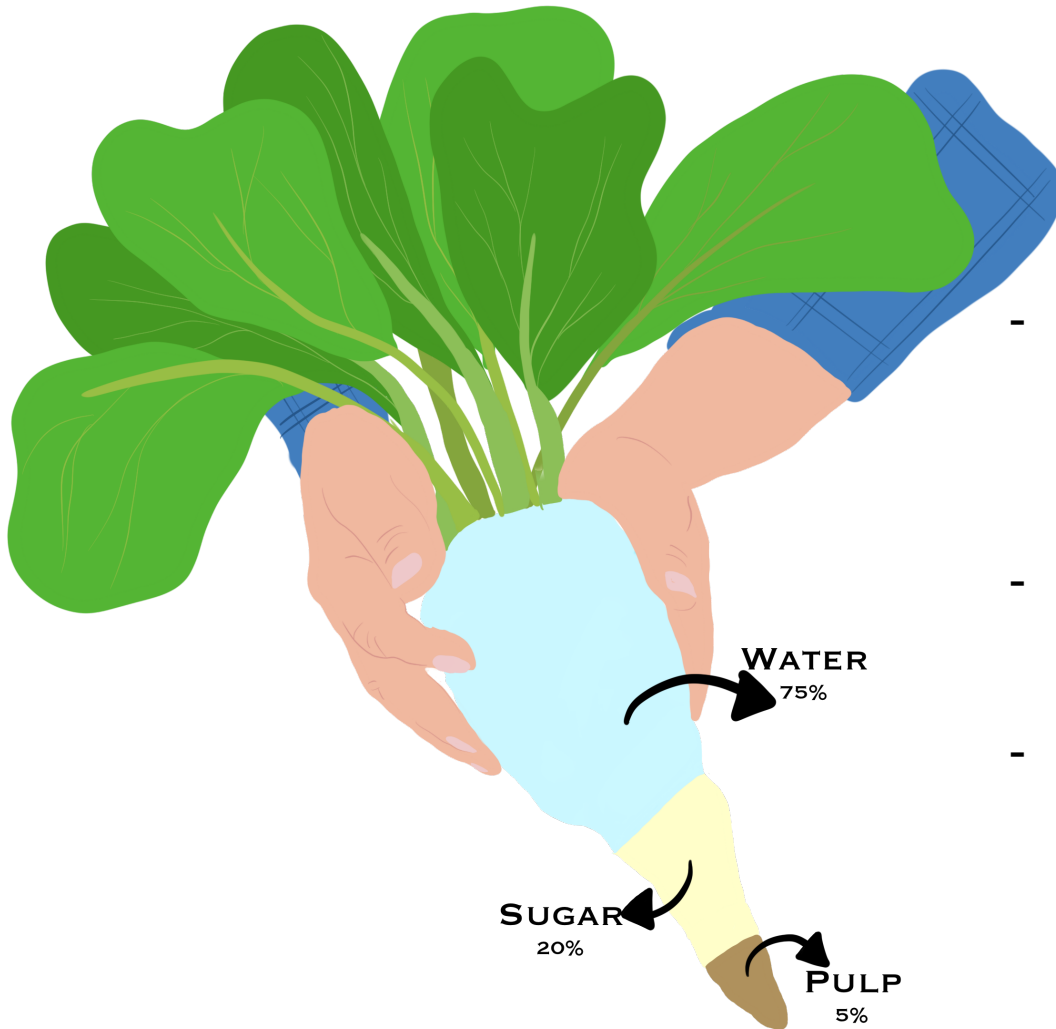
OPEN

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The genome of the recently domesticated crop plant sugar beet (*Beta vulgaris*)

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Interesting facts



- sugar beet is a plant whose root contains a high concentration of sucrose.
- It provides 30% of the world's annual sugar production.
- The root of the beet contains 75% water, about 20% sugar, and 5% pulp.

Interesting facts

- There is some brands that specify in the ingredient that they use either cane or beet.
- If not, then the the product is from either beet , cane or a blend.

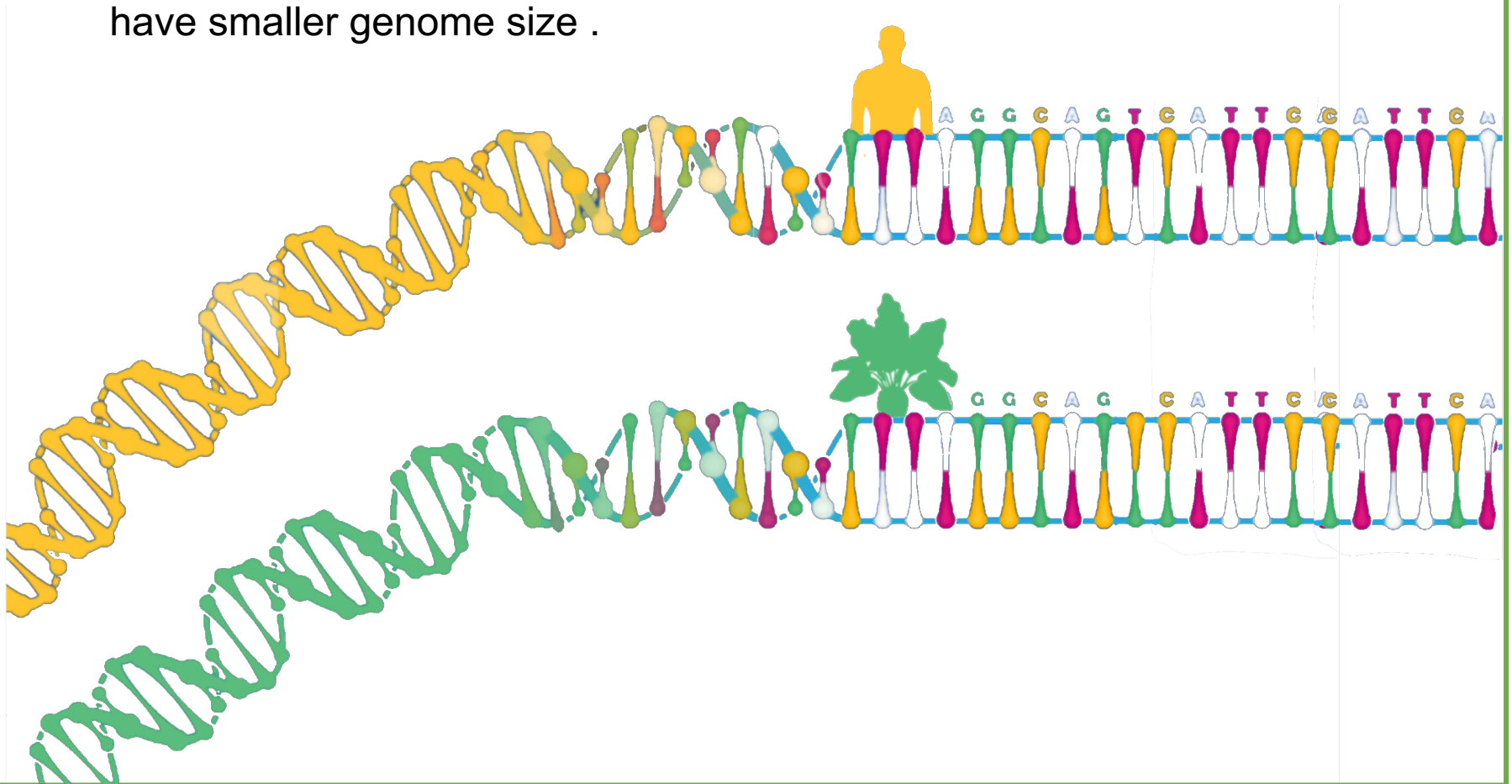


- The taste and sweetness are the same for both sugars for most people.



Interesting facts

- Sugar beet contains more protein coding genes than the human But have smaller genome size .



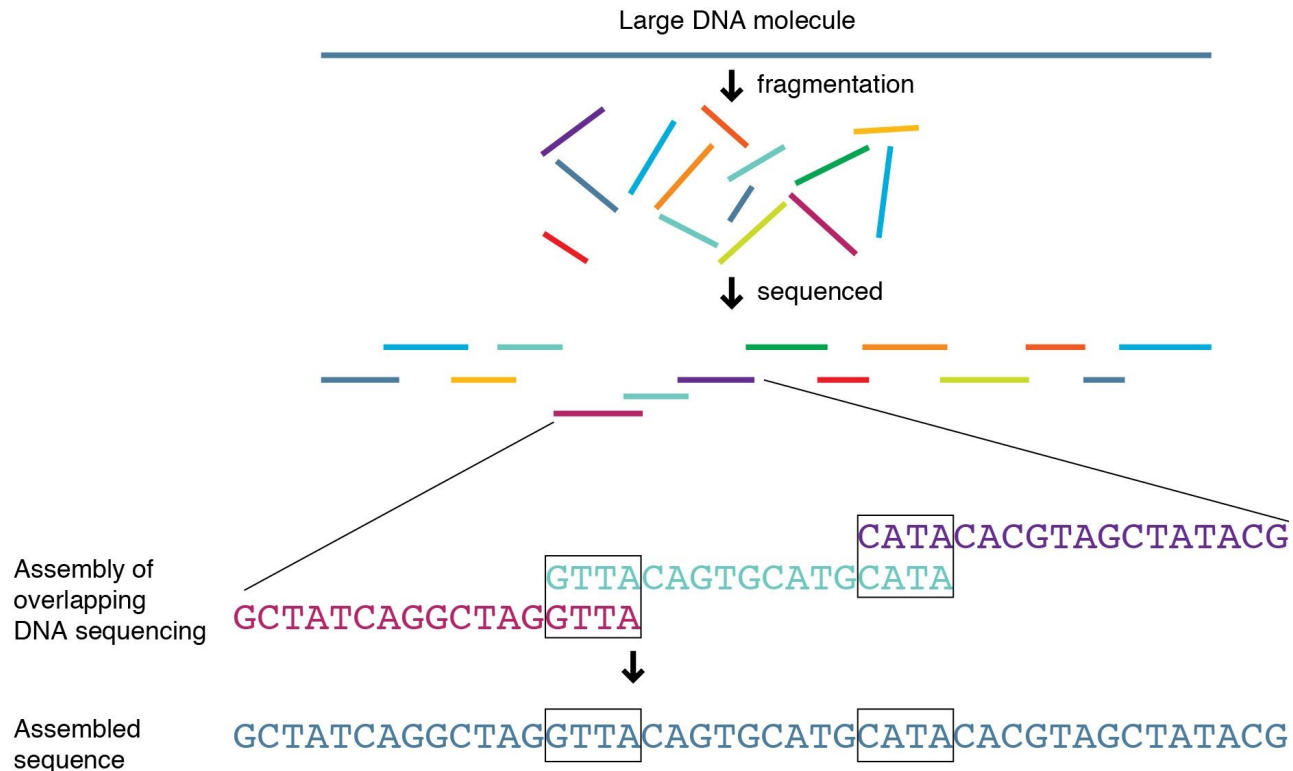
General information about the genome



Genome size	569 Mb
Level of ploidy	Diploid
Chromosome number	18 chromosome (2n)
Protein coding genes	27,421 gene
RNA coding genes	3,005 gene
Centromeric repeats	15.4 Mb
on average 5.2 genes per 100 kb	

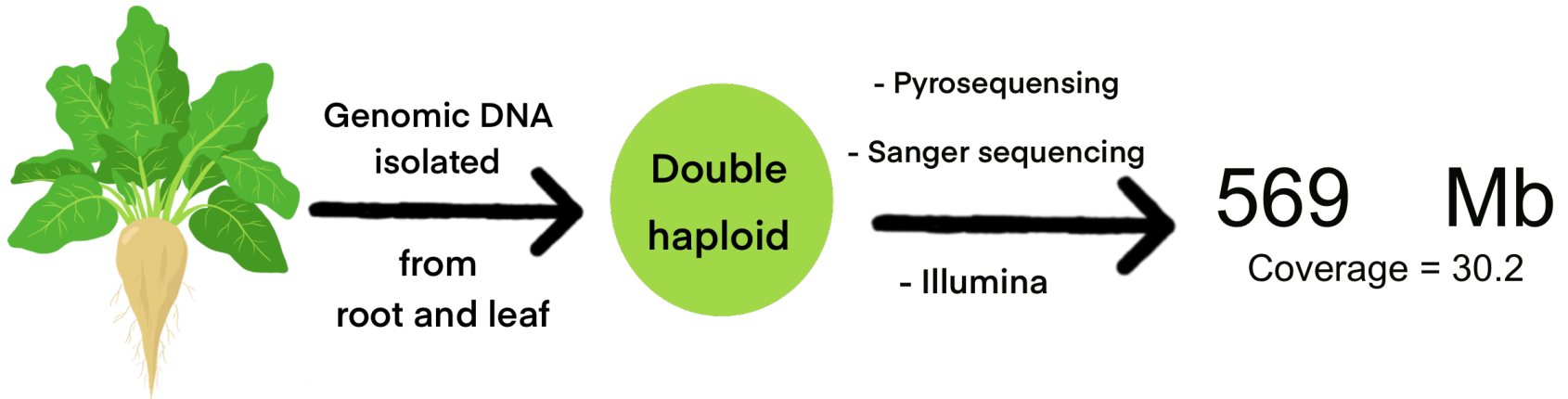
Sequencing strategy

- In this paper they used whole genome sequencing (shotgun sequencing).



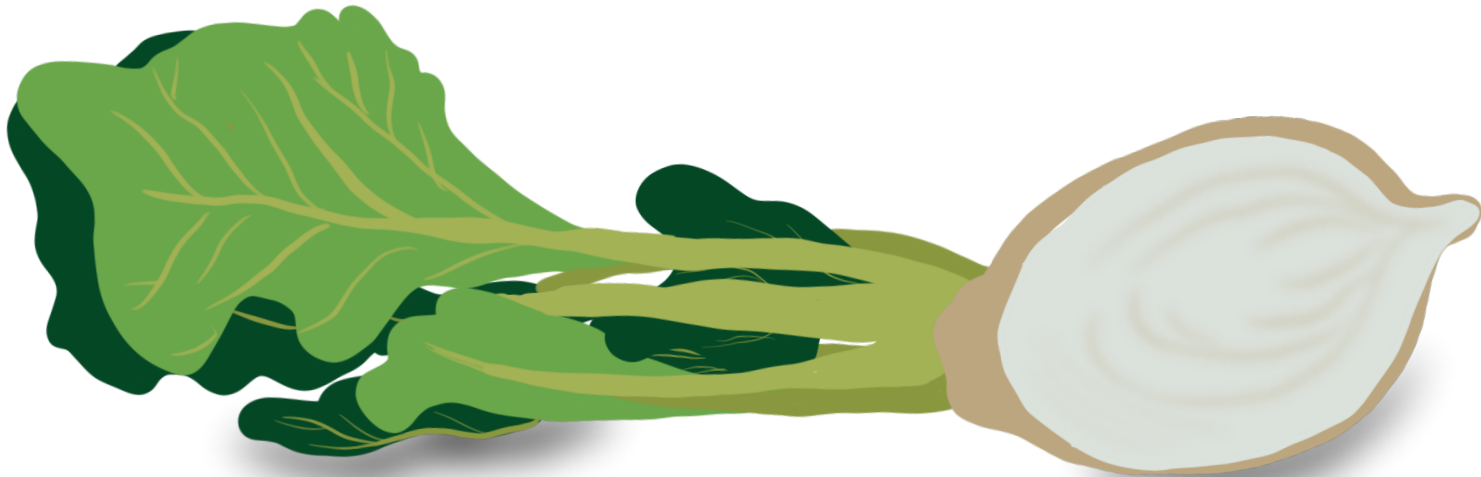
Sequencing method

- They used 3 different sequencing methods:
 - 1- illumina sequencing method
 - 2- pyrosequencing method
 - 3- sanger sequencing method



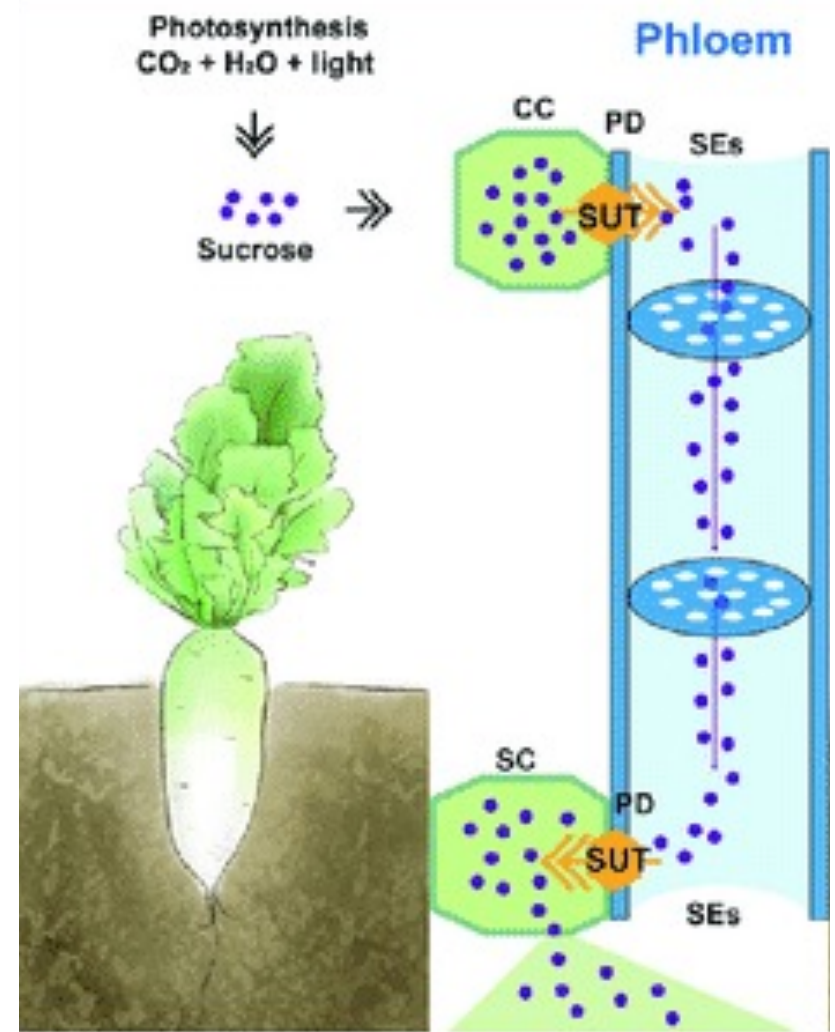
Assembly

- The genome was assembled with SOAPdenovo software.
- They used both single and paired end sequencing technique .
- Contigs with less than 500 bp were removed.
- 2,333 scaffolds and 41,388 unscaffold.
- N50 = 1.7 Mb.



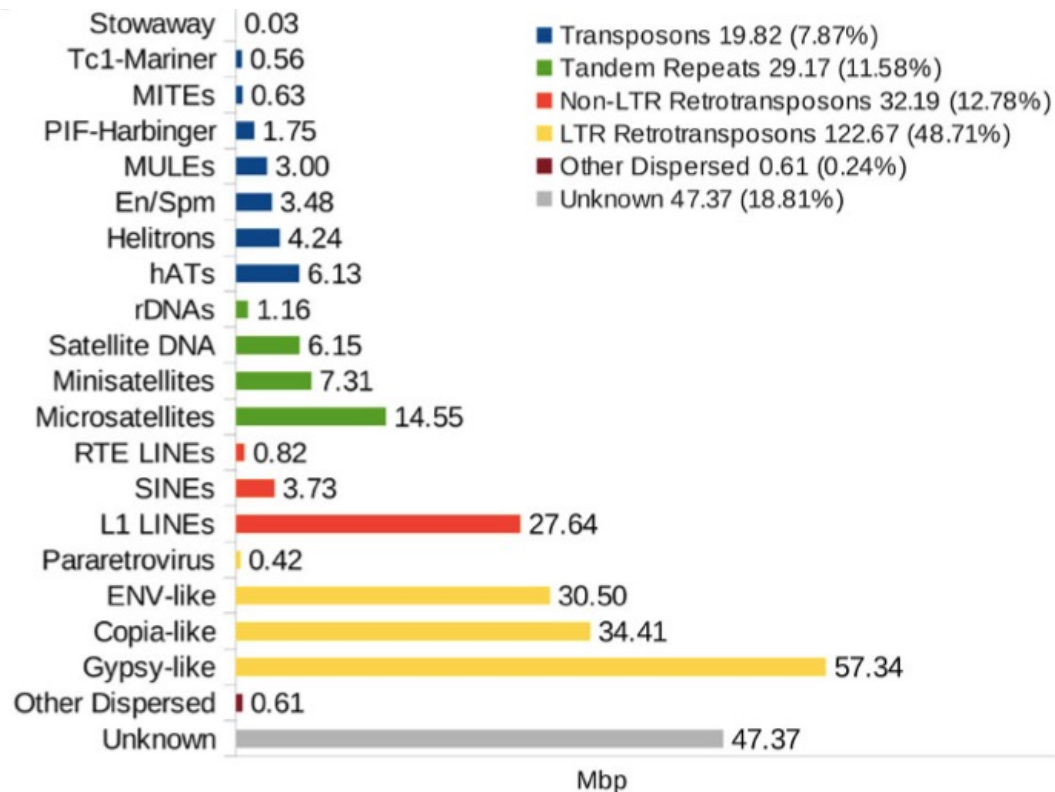
Genome outcome

- They identify four sucrose transporter (SUT).
- Phylogenetic analysis suggested a duplication in the SUT1 gene .
- This duplication shows an evolutionary advantage. That is sugar beet duplicate this gene to increase the transport of sucrose and eventually it is stored in the root.



Genome outcome

- A total of 252 Mb (42.3%) of the genome assembly consist of repetitive DNA, with retrotransposons as the most abundant repeat fraction.



Question

1. what is the type of sugar that is constructed from sugar beet ?

Sucrose

2. What is the most abundant type of repeats was detected in sugar beet?

LTR retrotransposon