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## **RELATIONSHIP BETWEEN PHYSICAL AND GENETIC DISTANCES IN SUGAR BEET CHROMOSOMES**

**Rapports entre distances physiques et génétiques des chromosomes chez la  
betterave sucrière / Beziehung zwischen physischen und genetischen  
Distanzen bei Zuckerrübenchromosomen**

### **ABSTRACT**

The order of genes or markers along chromosomes can be determined in two main ways. The most traditional is the study of genetic linkage - two genes that are located close to one another on a chromosome will be inherited together more often than with genes that are more distantly "linked" to them on the same chromosome. This allows the construction of genetic linkage maps, based on recombination frequency, often given in centiMorgans (cM).

The availability of genome sequence information provides a second measure of linkage - physical distance in millions of base pairs (Mbp). Careful analyses show that there is no clear linear relationship between these measures of distance, although gene order is, of course, maintained. In general, centromeric regions have lower recombination levels (and hence more MBp per cM) than interstitial regions.

We will present the results of our analyses, based on extensive linkage mapping of a variety of types of genetic marker, and comparisons with their physical positions in the genetically anchored SESVanderHave genome assembly, in relation to gene density, repeat content, and location relative to cytological features (rRNA, centromeres, telomeres etc). Comparative sequencing of a set of sugar beet lines also provides data on the amount and types of polymorphism in different regions of the genome.

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