Translocation Encyclopedia Article

Translocation

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In plants, the term translocation refers to the long-distance transport of water, minerals, or food. It is most often used to refer to the transport of food material from one part of the plant to another, or from source to sink. Thus, sugars produced in a source like photosynthesizing cells in a leaf may be moved to sinks like developing fruits and seeds, or growing apical meristems. The sugars may also be moved to storage organs like tubers, corms, or bulbs. Storage organs may subsequently become sources when food is moved to plant meristems for use by growing and dividing cells. Food materials move primarily in conductive tissue called phloem by a mechanism that is not completely understood. The most widely accepted explanation for phloem transport is the mass flow, or pressure flow hypothesis. According to this theory, food material at a source is moved by active transport into phloem sieve tube elements, creating a hypertonic solution that attracts water from adjacent tissues and sets up a flow through the phloem driven by a buildup of hydraulic pressure. When foods reach the sink and are removed from the phloem, the transporting water flows out of the phloem and returns to the sink via the water-conducing xylem transport system.

In genetics, translocation refers to type of interchange of chromosome pieces following breakage, in which segments are transferred between nonhomologous chromosomes. When this exchange occurs without a net loss or gain of genetic material, it is called a balanced, or reciprocal, translocation, and there is no phenotypic change in the individual. When the exchange results in a deletion or duplication of chromosomal material, in gametes or somatic cells, severe phenotypic changes may result.