Weeds Never Die: Longitudinal Incisions of Dandelion Roots Adhere at the Xylem and Not at the Phloem

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Plants have the ability to regenerate tissue after being injured or cut. Previous studies have examined the recovery mechanisms employed in stems and this knowledge has been applied to agricultural techniques, such as grafting. However, very little information is currently available on healing in injured roots. To reveal the root-healing mechanisms employed by plants, the roots of field-grown dandelions were examined. Specifically, the dandelions were incised according to six patterns and then bound with graft tape. After 2 weeks of cultivation at room temperature, root healing was visually observed. When the roots were cut longitudinally in half, the root cuttings adhered at the xylem, but never at the phloem. Similarly, root sections that had been cut in half longitudinally and then bound after the cut section was rotated 180°, also adhered to each other. When the root was cut transversely, either completely or deeply, adhesion did not occur in either the xylem or the phloem. However, a shallow incision allowed adhesion of the phloem. This is the first report of xylem adhesion in plant roots. These findings differed from those of a previous study on incised stems, in which the transverse section adheres but longitudinal one does not, suggesting that the mechanisms of injury recovery in stems and roots may differ markedly. Adhesion of the xylem tissue may contribute to maintaining the structure of roots. These findings may contribute to the development of novel methods for controlling weeds in the future.

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