

Title Postharvest handling and carbohydrate partitioning during growth and cold storage in herbaceous perennials

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Abstract

The purpose of this research was to investigate the distribution of carbohydrates in herbaceous plants before lifting, to determine changes in carbohydrate composition during cold storage and its relationship with survival after storage, and to evaluate bareroot responses to handling practices.

Storage length and temperature in *Aconitum*, *Phlox* and *Geranium* had little effect on fresh and dry weight of shoots, crowns and roots. *Aconitum* had better survival when stored at 0°C and *Phlox* at 1.5°C. The percentage of fresh weight loss in *Aconitum* increased as storage temperature and length increased. In *Aconitum*, *Geranium* and *Phlox*, carbohydrates decreased in crowns and roots stored at 5°C. Regrowth vigor of *Aconitum* and *Phlox* decreased with 12 weeks and 5°C, but *Geranium* was not affected.

The biomass and carbohydrates in shoots, crowns and roots were measured during the growing season to determine the best date for harvest. Root length increased through November in 2005, but remained with almost no change during the same period in 2006 due to an early planting. For all varieties fresh and dry weight increased from September to November. In *Geranium*, *Helleborus* and *Phlox* had more sucrose and starch in November and December, suggesting they can be harvested after November 15.

Relative to harvest date, survival increased in *Phlox* when the plants were lifted in October rather than in December, but *Lavatera* survival increased when lifted after October. Harvest date had no effect on *Helleborus*. In drying and rehydration, a pre-plant soak increased survival and vigor in *Phlox*, but had no effect on *Echinacea* 'Magnus', *Helleborus* 'Tricastin' and *Papaver* 'Fornsett Summer'. In 2006, a 24 hour drying period decreased survival in most species and in some species, the decrease in survival percentage was associated with desiccation and mold incidence. In temperature and storage, most species grew better when stored at -0.5°C as compared with 0 or +2°C.