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THE PHYSIOLOGIC EFFECTS OF FREEZING

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FLORAL DEVELOPMENT IN BIRDSFOOT TREFOIL

(Lotus corniculatus L.)

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ABSTRACT

Although *Lotus corniculatus* L., birdsfoot trefoil, has been gaining in popularity as a desirable legume for use as a forage crop and in land renovation, little has been published on the life history of the plant.

The transition from a vegetative to a flowering apex is initiated by a broadening and lobing of the stem tip; each lobe is the primordium of a flower. A whorl of sepals, one of petals and two of stamens arise in acropetal succession. The fifth and final whorl consists of an elongated carpel primordium. The fully developed corolla is of the normal papilionaceous type, consisting of a standard, two alae and two petals which fuse to form a tubular keel surrounding the anthers and style. Growth of the region basal to the stamens brings about an apparent merging of the proximal ends of nine of the filaments; the tenth, the adaxial member of the fourth floral whorl, remains attached separately to the receptacle. The carpel primordium is transformed to a U shaped trough by the meristematic activity of two adaxial regions of cells; continued development of these two regions and their final merging brings about the formation of a tubular carpel.

The tip of each staminal primordium becomes capitate and then four lobed, thus forming an anther. Each lobe consists of a central region of sporogenous cells bounded by a tapetal layer, two rows of parietal cells and an epidermis. The nucleus of each pollen

mother cell undergoes two successive divisions forming a diad and finally a pollen quartette. Wall formation between the members of the quartette occurs after both nuclear divisions have been completed.

The first indications of the developing ovules occur as two rows of minute papillae along the infolding free edges of the developing carpel. The primordia increase in length as the free edges of the carpel fuse together; the fully developed ovule is of the anatropous type. The megasporocyte originates ashypodermal cell near the tip of the developing primordium; two successive divisions of this cell bring about the formation of a linear tetrad of megaspores. The three micropylar megaspores disintegrate and the chalazal one gives rise to the female gametophyte which consists of an egg nucleus, two synergids, two polar nuclei and three antipodals. The nucellus disappears, leaving the embryo sac in direct contact with the well developed integuments.

VASCULAR ANATOMY OF THE INFLORESCENCE IN *HEUCHERA*

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ABSTRACT

Two anatomical trends are observed in the inflorescences of eleven species of *Heuchera*. These trends are found to be both intraspecific and interspecific. The first trend is characterized by a reduction in the number of vascular bundles supplying the bract. The second trend which is seen to parallel the first, is characterized by the delayed departure of the bract bundles from the stele. The inflorescence of the least advanced species is found to range in the number of vascular traces departing from the stele to the bract, from a pentalacunar supply in the proximal portion to a unilacunar supply in the distal portion; it is distinguished from all the other inflorescence types by the lack of distinct adhesion throughout the inflorescence. The most advanced type is characterized by the presence of adhesion throughout the inflorescence and the presence of only unilacunar bract supplies at the nodes. Between the least advanced type and the most highly advanced type there is found to be a regular gradient both in adhesion between the floral axis and the bract which subtends it and reduction in the number of traces to the bract.