



Highstead Log

Spring News 2001

Small Packages

It is said that good things come in small packages. This is true when it comes to the incredible package we call a seed.

In the Autumn 2000 issue of the *Highstead Log* we discussed fruit, or “the seed-bearing product of a plant” (Donald Wyman in *Wyman’s Gardening Encyclopedia*). Within this package of fruit lies a remarkable smaller package filled with all of the knowledge and potential required to become a full-fledged plant.

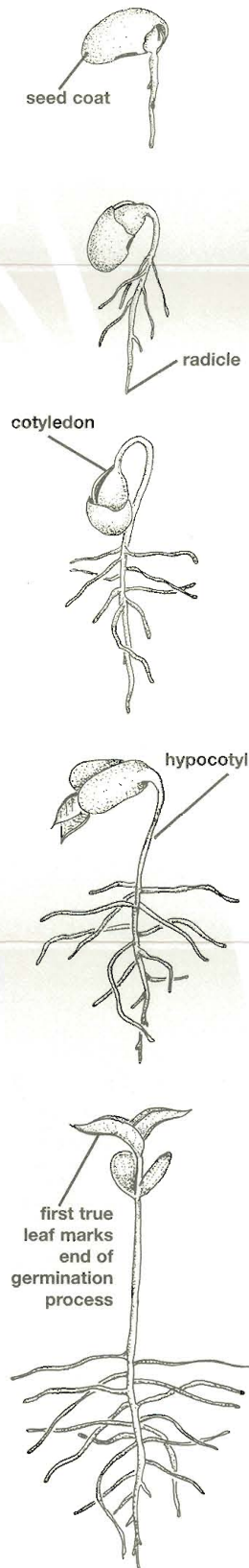
Seed-bearing plants, in and of themselves, are considered more advanced plants than those that reproduce by spore or cell-division. The protective package of a seed allows this potential plant to remain in a dormant state until the correct habitat, conditions and stimuli occur. This patient wait alone is a credible feat, allowing this plant to survive without water or nutrients, sun or warmth, under conditions that would decimate the parent plant. But the question remains; how do we open this package, breaking the dormancy, unleashing the mechanisms within?

Rise and Shine

Dormancy can be broken in a number of ways. Some plants simply need the right conditions for growth; water, warmth and oxygen. Other seeds have such a strong seed coat or *testa*, that more severe stimuli are required such as fire, freezing temperatures, abrasion, and in some cases the acids of digestion!

It is not their needs for growth that are different, but the process by which the *testa* can be penetrated to receive the warmth, moisture and air needed for growth that varies. Just like humans waking from a sleeping state, some arise on their own, some prefer to wake to music, while others need a clanging alarm. Once awake, we all require the same basics to survive.

Unlike humans, who upon awakening need to go to the garden, the cupboard, or the grocery store to refuel, a seed contains the nutrients it needs to sustain growth until it can establish its own internal food factory, gathering external nutrients and producing fuel.



Highstead Arboretum

How Sow?

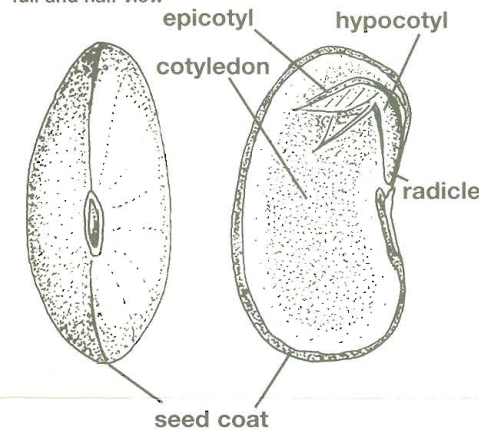
Looking inside the diminutive case of a bean (center illustration), we see it is largely composed of the *cotyledon*, which is the nutrient container (from the Greek *kotyledon* for “cup-like hollow”). The other parts should look somewhat familiar to us as they are embryonic versions of plant parts. The leaf and stem tip, seen above the cotyledon is the *epicotyl*, the stem region is the *hypocotyl*, and the root tip the *radicle*.

The germination process ruptures the *testa*, allowing for a greater flow of water to the seed. The radicle descends into the soil, eventually developing into a root structure, collecting water and minerals while firmly anchoring the plant. The hypocotyl grows in length, lifting the epicotyl and cotyledons. Some cotyledons will be lifted above the soil line (many beans) while others remain out of sight, below the soil line (peas). If

you have ever grown beans in the garden, you have surely noticed the progression that is pictured in the left-hand margin. The changes take place at an accelerated rate during this early growth, quickly using the food that had been carefully stored within the cotyledons. As the plant soon develops leaves and begins the process of photosynthesis, the shrinking cotyledons, now void of nutrients and therefore purpose, eventually wither away.

Look again at the progression of growth. The stem tip is not pushed through the soil surface, but pulled. This is the plants way of protecting the growth tip as it moves through the soil.

parts of a seed full and half view



A Radicle Idea

But, how does the root know to grow downward, and the leaf stem up? The simple answer is the presence or lack of hormones, which allow the root to be drawn by gravity, and allow the stem to grow away from the gravitational pull. Although the position and depth of the seed on or in the ground can have an impact on the success rate of germination and continued growth (ask any bulb planter or lima bean grower), it has little effect on the directional growth of the stem and the root.

Man has certainly created some impressive machinery in the past century, but none capable of such self-sufficiency. We have yet to produce anything as remarkable or well packaged as a seed.

Plant Profiles



The autumn flowering common witch hazel is a sight to behold

Common Witch Hazel

Hamamelis virginiana

Which hazel flowers in fall? Not the Asian witch hazels with the many cultivars available in nurseries, but the common witch hazel, rarely seen in our gardens, but native to the Arboretum.

That there has been limited acceptance of this flowering shrub cannot be because of difficult cultivation requirements. Although common witch hazel prefers rich, well-drained soil and an exposure of light shade and protection from wind, it will grow well in all but the most extreme conditions.

What else provides a burst of fragrant flower after leaf drop in October? The yellow strap-like petals open in mid October when they are still hidden amongst the yellowing foliage. It is after the leaves have fallen that these flowers begin to dazzle as the

bloom continues into November and early December.

The previous year's fruit ripens, and seed is dispersed at the same time as flowering. This mechanical form of seed dispersal was mentioned in the Autumn 2000 issue of the *Highstead Log*. As unique as this process, is the stratification requirements of the witch hazel seed, needing autumn sowing with germination not occurring until the next spring, or more commonly the second spring. The strong seed coat requires a cold treatment, followed by a warm period, and then another cold period to break dormancy. Avoiding false starts during January thaws provides the seed with the most ideal germination season.

Learn more about this, and other overlooked native shrubs, during our Saturday program in May.

Highstead Saturday Walk Programs

Come dressed to walk and plan to stay 1 to 2 hours. Reservations are requested: call ahead for weather-related rescheduling. For further information, call Highstead Arboretum at 203 938 8809, 9am-4pm Mon.-Fri. There is a non-member fee of \$5 per program.

Spring 2001

Forcing the Issue

Saturday, March 10, 10am

Late winter flower shows often amaze and delight us with brilliant and fragrant floral displays. Learn the process and timing requirements to jump start spring with your favorite flowering branch cuttings and bulbs.

A Bark with Some Bite

Saturday, April 14, 10am

Thick- or thin-skinned, learn the composition and function of bark as an integral layer of tissue we can use to identify both native and ornamental trees and shrubs. Color, texture and scent serve both form and function, offering as much to the plant as the observer.

Understory Underdogs

Saturday, May 12, 10am

Many are quick to clear their woodland understory of scrubby brush, never realizing that their backyard had been filled with blueberry, viburnum, and holly. Learn to recognize and identify twelve native shrubs that can add value and diversity to your home landscape.

Sunday Walks

May 6th and June 3rd, 10am, noon, 2pm, 4pm

In conjunction with the Garden Conservancy, Highstead will be offering guided walks this spring. Join us in May for a tour of ericaceous plants or in June for a tour of the *Kalmia*.

Highstead Arboretum

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