

Winter's wake-up call: The science of seed stratification



By Wild Ones Staff

For many native plants, germination doesn't happen the moment a seed is planted. Seeds rest through winter in a state of dormancy, waiting for the seasonal cues that tell them it's safe to grow. One of the most important of those cues is **stratification** — a period of cold or cold and moist conditions that breaks dormancy and sets the stage for spring growth. For many native plants, winter is not a pause; it's the cue to begin again.

Why do seeds need stratification?

Dormancy is a built-in survival mechanism that prevents seeds from sprouting during unfavorable conditions, such as an unseasonably warm spell before frost. [OPN Seed](#) explains: "If a plant drops seed in the spring, the seed goes through summer, fall and winter and wakes up the next spring when it's time to make a new plant. This particular seed follows a natural stratification pattern of warm and dry (summer), followed by cool and moist (fall and winter). Due to varying weather patterns, stratification in nature can vary radically from year to year and increase variability with these processes."

While several types of stratification occur in nature (see below), cold moist stratification is by far the most common type, especially for temperate species in North America. Cold moist conditions address both physical and physiological dormancy. The moisture softens the seed coat (helping water and gases move in) while the cold period alters hormone balances.



A variety of native seeds just waiting to be stratified and planted. Photo by Barbara A. Schmitz

What is seed stratification?

Stratification is a process of exposing seeds to specific combinations of temperature and moisture to simulate natural conditions that seeds would experience in the soil over winter. For many temperate plants, this process is essential to trigger the physiological and biochemical changes required for germination. If you live in a cold climate, you can often simply plant your seeds directly in the ground or in a pot and let nature do its work. Stratification times will vary due to sunlight, soil temperature, hydrology and weather patterns.

To better control timing and improve germination rates, many gardeners stratify their seeds. Even in regions with naturally cold winters, this controlled process allows seeds to be started indoors or outdoors in containers, ensuring they receive the consistent cold, moist period

they need before planting, while also protecting them from birds and other wildlife that might eat or disturb them.

Types of stratification

There are four types of stratification:

Cold Moist: Mimics winter conditions where seeds rest in cool, damp soil. Moisture softens the seed coat and activates internal changes that allow germination once temperatures rise. Can be achieved naturally through fall or winter seeding, or artificially in refrigeration (typically 34–41°F) using a damp medium like sand or vermiculite for several weeks or months. Examples include blue false indigo (*Baptisia australis*), trillium (*Trillium grandiflorum*), New Jersey tea (*Ceanothus americanus*) and wild ginger (*Asarum canadense*).

Cold Dry: Simulates cold, low-moisture storage conditions similar to a seed lying in frozen or dry winter ground. Many prairie grasses and forbs respond well to 30–90 days of cold dry stratification. This can be done by refrigerating seed in a sealed container at ~32–40°F. Examples include little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*) and blue grama (*Bouteloua gracilis*).

Warm Moist: Replicates late-summer conditions when soils are warm and rain begins to fall. Some species require this phase before a cold period, especially those adapted to warm-season climates. Keep seeds in a moist medium around 75–80°F for several weeks. Examples include wild lupine (*Lupinus perennis*), white



Stratification in action

Wild Ones Chesapeake Bay and the USGS Bee Lab

By Marlene Smith

When members of the Wild Ones Chesapeake Bay Chapter joined a winter sowing 2024 workshop at the U.S. Geological Survey's Bee Lab in Laurel, Maryland, they didn't expect it to spark a multi-season propagation project. Under the guidance of Sam Droege and Sydney Shumar, the team has learned to cold-moist stratify native seeds by mixing them with damp sand, carefully labeling them and storing them in a refrigerator to mimic winter's chill. Now, chapter members and local volunteers follow a full-year propagation cycle: stratifying seeds in winter, sowing in spring and transplanting through summer and fall.

In their inaugural 2024 season, chapter volunteers stratified, sowed and grew more than 2,200 native plants representing 35 species. The plants were distributed through community swaps, giveaways and restoration projects in partnership with local partners.

The 2025 season began in early February with a "Stratification-o-rama" event, where volunteers cold-stratified 48 native species using sand and bags stored in the Bee Lab refrigerator.

"Our primary focus is on plants that are little

Below: Wild Ones members Miranda Yourick, left, and Marlene Smith returned to the USGS Bee Lab in April 2025 to sow the chapter's stratified seeds into milk jugs. Right: In May 2024, these seedlings were separated from their seed trays and transplanted to plug trays so they could continue to grow throughout the summer. This represents just a small sample of the more than 2,200 plants of 35 species that chapter grew in its first year.



known, hard to find and/or under-appreciated in the nursery trade," reports chapter president Marlene Smith. "Selections include plants that are native to our local Chesapeake Rolling Coastal Plain ecoregion that have recognized faunal associations. In addition, we have included plants with high pollinator value."

Volunteers returned in early April to sow the stratified seeds into milk jugs. It is a common method chosen to protect seeds from weather fluctuations, wildlife and airborne weed seeds while maintaining stable moisture and temperature conditions. The jugs were then placed outdoors in growing pens once used for whooping crane breeding — a program that helped rescue the species from near extinction.

The chapter's work continued through summer and fall as seedlings emerged and were transplanted into plug trays and pots. The chapter began distributing plants in the fall at local swaps and giveaways, including their 3rd Annual Native Plant Swap at the St. Mary's County Public Library in Leonardtown and their 2nd Annual Make a Difference Day in Anne Arundel County. Hundreds of plants found new homes in public gardens, schoolyards and residential landscapes across

the Chesapeake Bay region. Altogether, the chapter transplanted and grew more than 2,770 native plants of 43 species in 2025.

Story adapted from chapter blogs by Marlene Smith, president of the Wild Ones Chesapeake Bay Chapter.

wild indigo (*Baptisia leucantha*) and prairie larkspur (*Delphinium carolinianum*).

Warm Dry: Mimics the hot, dry period following late-spring dispersal when seeds rest in warm soil. Useful for species that naturally experience summer dormancy before germinating the following season. Seeds

are held in a warm, dry environment (70–85°F) for several weeks to months. Examples include prairie smoke (*Geum triflorum*), spiderwort (*Tradescantia ohiensis*) and pasque flower (*Anemone patens*).

Tip: For the most reliable results, always check species-specific ger-

mination requirements. Many native plant nurseries like Prairie Moon and OPN Seed list recommended stratification times, and regionally focused guides such as Jan Midgley's "Native Plant Propagation" or Neil Diboll's "Propagation of Herbaceous Native Perennials" offer detailed methods.