American Ginseng
GREEN GOLD

REVISED EDITION

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Bright Mountain Books, Inc.
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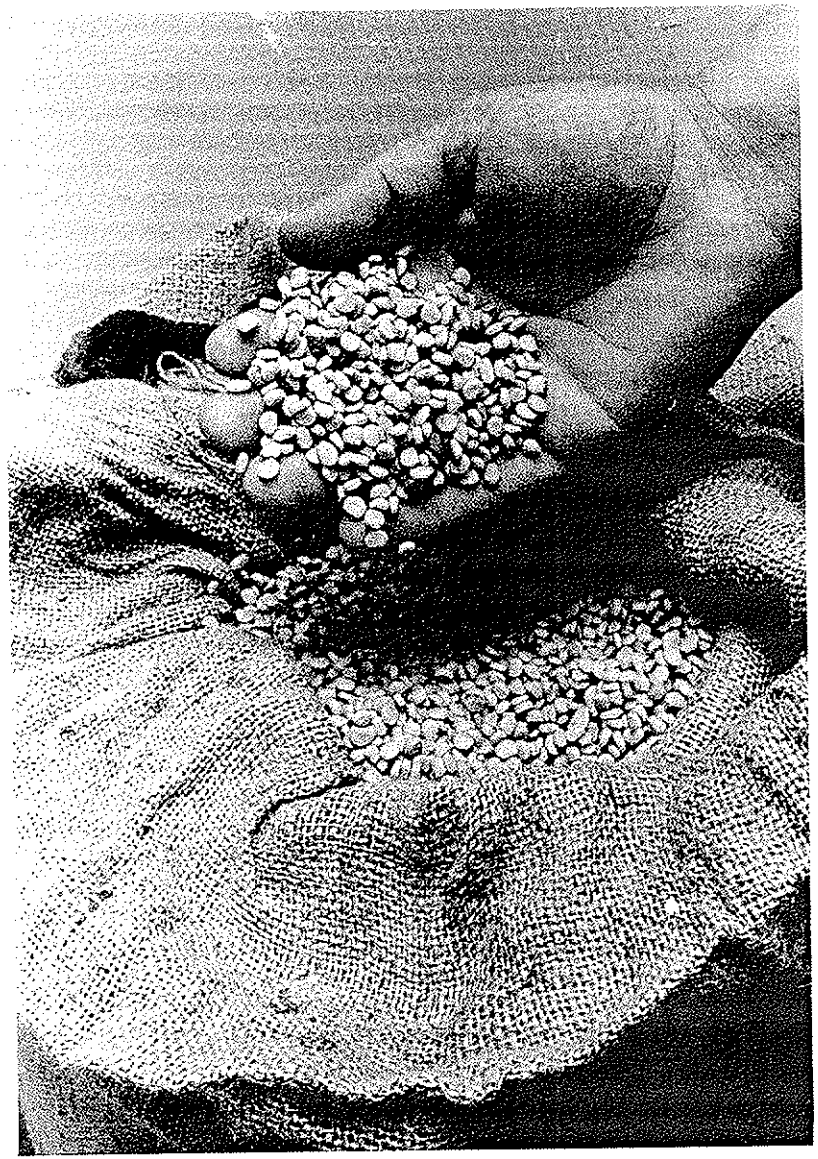


15. De-pulped seeds ready for stratification. *Photo courtesy of Tom Condon.*

Germination Requirements for Seeds (and Roots)

Many attempts have been made to induce ginseng seeds to sprout in just six months. Most efforts have involved simulating nature's year-and-a-half seasonal temperature changes within a six-month, or shorter, period. To the best of my knowledge, while occasional limited success is not uncommon, a method for *consistently* causing green seeds to sprout the first spring has not been developed. Russian horticulturalists have reported, in their journals, success in reducing the dormancy of Asian ginseng seeds to six months by treating fresh seeds with a .05 to .1 percent gibberellic acid solution. I understand that some U.S. growers are now experimenting with gibberellic acid.

In addition to time and temperature changes, I'm convinced that seed germination also is affected by the amount of moisture in the soil during the early spring. Fairly wet, but not soggy, spring weather seems to produce higher germination percentages. When I have brought up seeds from stratification and held them in my refrigerator until the last possible moment before spring planting, I've found that more seeds will sprout in my refrigerator if I keep them quite moist. I don't actually want them to start sprouting until after I sow them, so in the spring I now try to keep any unplanted seeds as dry as I dare without risk of losing them to dehydration.

Dr. John Proctor has found that seeds can survive at least twenty-four hours of exposure to temperatures as low as five degrees fahrenheit if the seeds do not have a high moisture content. This is not true of roots, however; they begin to suffer damage as the temperature drops below 14 degrees fahrenheit (or if subjected to repeated cycles of freezing and thawing). Dr. Tom Konsler has studied the effects of cold temperatures on the germination *rate* of stratified one-year-old seedling *roots*, and I suspect his results are relevant to seeds as well. Dr. Konsler reports that most seedlings will sprout in the spring if they are exposed to at least forty-five days of temperatures at 36 degrees fahrenheit or to at least sixty days at 48 degrees fahrenheit. Without cold stimulation below 49 degrees, the roots did not sprout regardless of exposure time, although they did not deteriorate either. These findings probably explain why ginseng does not grow in subtropical climates and why stratification at room temperatures has been unsuccessful.

Details of the Stratification Process

The common method of stratifying seeds is to mix the seeds with fine sand in a wooden box (see Illustration 16). The wood frame usually is no more than a foot deep and the bottom is covered with a wire or screen mesh to allow good drainage. At least as much sand as seed by volume should be placed in the box in thin, alternating layers, beginning and ending

with sand until the box is completely full. The top to the box is wire or screen mesh to allow moisture to penetrate down through the seeds and sand but to prevent rodents from feeding on the kernels. Buckets (even garbage cans) with holes punched in the tops and bottoms also can be used as storage containers.

The stratification box (or other container) can be placed in an unheated building or basement. This will require periodic attention, since there'll be no rain to provide needed moisture. A fifteen percent moisture level is ideal, but twenty-five percent or more can kill the seeds, so most growers leave things to Mother Nature and bury their stratification box outside in the shade. This sensitivity to the appropriate amount of moisture is an important reason why purchased seed should be planted as soon as possible and all seed either put in stratification immediately or planted.

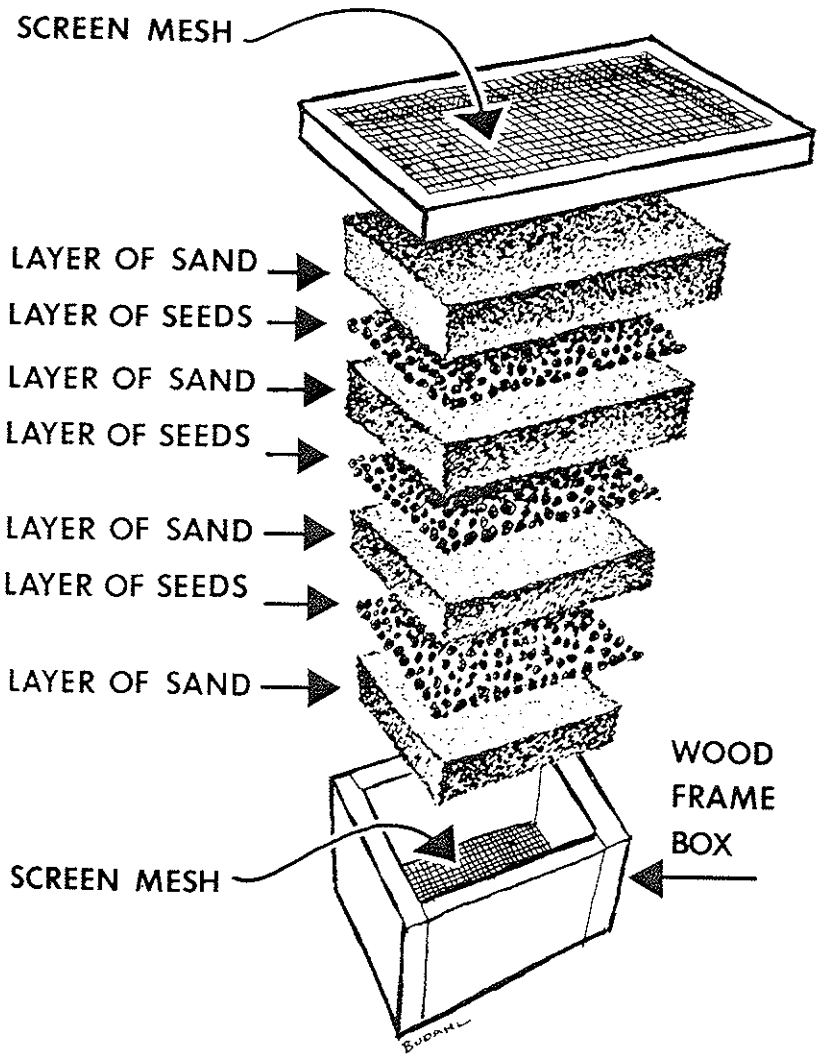
I always select a burial site on a slope where I think (or know) ginseng will grow well, such as near wild 'sang or healthy cultivated beds. A productive, disease-free bed that's recently been dug is an ideal and easy place to dig a pit for your stratification box. (If you're to the point of burying several boxes, it's prudent to place them in different locations in case problems occur.) Dig your hole a few inches deeper than the depth of the box and, if you're into a dense, poorly draining soil at that depth, spread an inch or two of gravel and/or sand before setting in your hoard of seeds.

The top of the box should rest no more than two inches below the soil surface and may protrude a few inches above, as long as it's thoroughly covered with soil and then several inches of mulch. Don't forget to discreetly mark the spot!

It's a good idea, especially for beginners, to inspect the seeds occasionally. Feel the sand for moisture, and cut open a few seeds with a pocket knife. If some are spoiling—that is, if they're soft, mushy, and foul smelling—separate all your seeds from the sand, let them dry out in the shade until their husks begin to lighten in color, then water test them. Most of the bad seeds, having partially liquid kernels that will not fill the husks when dried, will float and can be thrown away. At this point, you may want to treat your seeds with a fungicide before returning them to the stratification box, using fresh sand.

If you check your seeds and find no problems, it's all right to re-bury the box at once. However, it's fairly easy, once the container is excavated, to re-mix the sand and seed—which will aerate the mixture—before reinterment.

Stratified seeds are most vulnerable during extended periods of wet or *extremely* dry weather. During such periods is a good time to inspect your buried treasure. The beginning grower should definitely examine the seeds after the first wet spell in the early spring. On the other hand, since I've



16. Stratification of seeds.

had no history of seed spoilage, I now leave my seeds unattended for the entire stratification period.

When you're ready to plant (or sell), recover the stratification container and separate seeds from sand. I spread the seed/sand mix on a window-screen and hose the sand away through the screen. For small quantities, the bottom of the box itself can serve as mesh filter. If there is some spoilage, water test immediately. If you need to hold seeds for a few days before planting, place them in a cool, shady location and mix them up every few days to aerate and maintain an even level of moisture throughout. Add moisture if the husks begin to lighten in color.

After a year in storage, the seeds will darken, increase slightly in size, and some of them will split—that is, the dark husk will crack slightly so that the white kernel is visible. Cracked seeds are a good sign that storage conditions were suitable and that the seeds are viable. It is common, however, for many seeds to remain intact until early spring, and a very few will not crack and germinate until their third spring.

Chemical Treatment of Seeds

A few growers treat their seeds with chemicals to protect them from disease before, during, and immediately after stratification. Other growers believe treatment can reduce germination rates. I suggest you don't consider using any chemicals on your seeds unless you find that some of them are going bad. Spoilage can be the result of improper stratification or a poorly chosen burial site, but fungus diseases have been found in properly stored seeds.

To protect seeds from fungi, large growers sometimes mix one ounce of formaldehyde per gallon of water and soak their seeds for twenty minutes before and/or during stratification. If undertaken, this soaking should also serve as water testing because soaking seeds repeatedly is not a healthy practice.

After seeds are brought up from stratification to plant, it is a fairly common practice to treat them with formaldehyde or some other fungicide not only to prevent contaminating beds with disease-carrying seeds but also to prevent good seeds from being attacked by fungi between planting and emergence. Fungicide treatments in use in addition to formaldehyde include: soaking for fifteen minutes in a zero point twenty-five percent solution of potassium permanganate; soaking for ten minutes in one part bleach to nine parts water followed by rinsing with clear water; soaking for fifteen minutes in one tablespoon of Captan to one gallon of water without rinsing; and dusting air-dried seeds with Benlate—three ounces to twenty-five pounds of seeds—immediately before planting.

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Digging and Cashing in Your Green Gold

Many farmers develop an appreciation, even an affection for their crop. This is especially true of ginseng farmers, because they spend many years and exercise a great deal of care before they finally are able to dig their green gold. When I harvest a particularly nice root, the greedy part of me says: "That's worth at least fifty cents. Throw it in the bucket and grab the next one!" Another aspect of my personality wants to hold the root a moment, admire its nature, and take satisfaction in what I've grown. Digging ginseng roots is hard work that puts you on your hands and knees grubbing in the dirt, but it's also an enjoyable, exciting time—especially that first harvest.

Digging

Growing conditions determine the size of roots as well as their age, so it's difficult to state exactly how old beds must be before they're ready to harvest. Artificial-shade growers usually are able to dig highly marketable roots after only four years; woods-cultivated growers generally harvest after five or six years; and wild-simulated growers after anywhere from six to ten years. Once plants get big enough to produce large clusters of berries each year, the growth rate of the roots slows down; therefore, most 'sang farmers choose to avoid risk and to dig their green gold as soon as it reaches maturity. A grower can decide to delay digging for a year or two to gather additional seed harvests; also, larger, older roots can bring a slightly higher per-pound price. On the other hand, if disease or flood or some other serious problem threatens the survival of the bed, roots can be dug early and sold at a lower per-pound price. A batch of woods-cultivated roots averaging less than a quarter ounce apiece (fresh weight)