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SEED COLLECTION AND CLEANING

DOUGLAS LEE

Ojai Valley Seeds

P. O. Box 543

Ojai, California 93023

Seed collection and cleaning is an aspect of the nursery trade that is not taught in any college, university, or trade school. It is a skill acquired through apprenticeship or trial and error. Involved in the collection and distribution of seeds for 14 years, I have acquired some practical expertise.

Growers depend upon the seedsman to be a reliable and consistent source for seeds and information. Ability to meet grower needs without fault is our reputation.

Collection Sources. Much of the parent stock for regional outdoor ornamentals is available locally. Locations may be fields, nurseries, parks, schools, street plantings, or residences. Best times for locating plant material are often when the plant is highly conspicuous in bloom. Good record keeping and keen observation enable you to catalog an area on file cards and maps. A hand tape recorder allows hands-free data collection while traveling.

Habitat. Seed source should be appropriate for ultimate growing conditions. Collection locality should conform to the final growing habitat. Seedlings introduced into localities from outside their parental climate may lack adequate vigor and form.

Collection sites for cross-pollinating species must be isolated to avoid unwanted hybridization. Good examples are *Agapanthus* and *Eucalyptus*.

Access. Permission should be obtained prior to collecting from private and public sources. On public grounds, by approaching the appropriate controlling agency having general liability insurance at hand, permission to collect is much more likely to be given. A minimum of \$300,000 coverage is required, with some cities requesting up to one million dollars in coverage. Conditions of collection are that the plant shall not be damaged, its natural beauty impaired, all debris be properly disposed of, and the site be left clean.

When approaching a private source for collection privileges, you have the unique opportunity to serve as a trade liaison. I am asked for care and maintenance information for gardening problems. The homeowner is honored that their tree or shrub may supply the seed for countless progeny.

For some rare, valuable, or prolific seed stands it may be appropriate to offer a gratuity. A gratuity may endear you in the homeowner's eyes and can lead to annual collection privileges.

Preharvest. An early assessment of crop potential is important for major collections. By ascertaining crop status you can schedule collection and insure adequate supply. A nursery grower appreciates early notification of crop failure. With lead time, propagators may seek sources or propagate by other means.

Timing. Best collections are based upon concise timing. Experience within the southern and central California region show that collections can be pinpointed to within several weeks of a norm. Variation in seed ripening may be a result of weather conditions during the weeks prior to seed collection, or early or late flowering.

Determining maturity requires familiarity with the plant. Immature fruit or "green seed" is avoided. The accepted rule is, "the more mature a seed is, the greater its vigor upon germination". Fruit color, texture, and physical condition of the fruit are clues to adequate maturation. An essential cut-test made prior to all collections will verify previous conclusions, or disclose unforeseen problems. With the cut-test, look for fully developed embryos or embryos surrounded by an endosperm of uniform creamy color with a smooth pliable texture. Avoid hollow, miscolored, deformed and insect-infested seeds and fruit.

Harvesting Equipment. Ladders, telescoping poles and pruners, cone hooks, mauls, and hand implements are essential. Hardware cloth screen in $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ in. size is used. Trays, barrels, burlap and poly-woven sacks, tarps of canvas or economical 6 mil black U. V. resistant polyethylene, and safety equipment (climbing harness ropes, street cones, particle masks, hard hats) are the basic requirements.

Techniques for collection and cleaning vary according to three recognized fruit types (1).

Dry Fruits (I). Comprising the majority of seed formations within woody ornamentals, dry fruits are collected prior to seed dispersal. The seed bearing structure or fruit is removed whole from the plant when slightly immature. The fruit is allowed to afterripen prior to seed extraction. Fruit, branchlets, or complete branches are cut to begin the collection. Good pruning ethics are required. After ripening is accomplished by spreading plant material upon tarps in shallow layers to dry in the sun. As the fruit dries, the seeds are released from the enclosing structure. The collection must be frequently pitched and rotated to encourage uniform ripening and to discourage the occurrence of mold and fungi development because of inadequate air circulation. Examples include cones, *Cedrus*, *Pinus*; pods, *Brachychiton*, *Eucalyptus*, *Grevillea*, *Jacaranda*, *Wisteria*; umbels, *Agapanthus*; follicles, *Magnolia*.

Non-Dehiscent Fruits (II). Seeds covered with an adhering fruit or outgrowth are the second group. Mass collections require that fruit be fully mature with dry calm weather a key to a good collection. Fruit is hand-picked, flailed, or shaken upon tarps. Because seeds are light and often depend upon wind for dispersal, windy conditions make collection unfeasible. Examples are samaras, *Acer*, *Fraxinus*, *Liriodendron*; nuts, *Pistacia*, *Quercus*.

Fleshy Fruits (III). Most readily identifiable, the fleshy fruits are seeds surrounded by fleshy pulp or skin. Ripe fruit is hand-picked, knocked, or shaken upon tarps. Debris and leaves are blown from the collection. Fruit should be promptly processed. Heat buildup and fermentation may damage the enclosed seed. This group comprises berries, *Asparagus*, *Eugenia*, *Mahonia*, *Nandina*; drupes, pomes, aggregate fruits; and multiple fruits, *Morus*.

Cleaning facilities. A shop need not be extravagant. Cleaning areas include a drying location with good southern exposure sufficiently large to avoid cross-contamination between collections. Indoors a fanning area to air-blow collections, a wash area for wet-processed seed, a machine cleaning area, and a finish cleaning section are required.

Good hygienic practices are essential. Trays, screens, barrels and implements need to be clean and sanitized. A bleach wash (1:10) is safe, economical, and effective.

Dry Cleaning. Seed types I and II are predominantly cleaned dry. Dry material releases dust and debris in processing. Adequate ventilation and respiratory protection is imperative. Sensitive people with respiratory problems should avoid this process. Because the cumulative effects of these dusts are unknown, all persons should exercise caution. Irritants are found in *Agapanthus*, *Brachychiton*, *Cortaderia*, *Fremontodendron*, *Pennisetum*, *Platanus*, and *Wisteria*.

Following sun-drying the collection is threshed, releasing the seeds from the fruit. Hand threshing requires rubbing the fruit

through wire screens, beating the seed capsules in trays, flailing with poles upon tarps, or pounding in sacks. Seed pods which do not respond to hand threshing and are durable may be machine-processed. Machine threshing is accomplished primarily with a hammermill, although lawnmowers and yard vacuums have proved effective. Attention must be paid to both motor speed and material volume. With too fast an engine speed, seeds become chipped, cracked, or broken; too slow and the process is unproductive. Generally, lower speeds and high volumes are most productive. The key is experience and patience. Commonly used machine-threshed seeds include: *Albizia*, *Carob*, *Cercis*, and *Cistus*.

Threshed seeds may often be finished cleaned by passing the material through an air flow produced by a multispeed fan. Low speed removes dirt, leaves, and dust. High speed removes sticks, pods, and hollow, light seeds. Heavy sound seeds fall directly below the discharge into trays. Finish cleaning is hand picking sticks, rocks, and miscolored seeds.

Air separator machines process threshed seed, producing a clean product requiring little finishing. Threshed material is passed over a scapling screen which removes large debris and sticks. Seed and smaller material passes over additional screens and an air current, removing small particles, dirt, dust, and off-sized seeds, leaving a uniform graded product. Finished seeds may require hand picking to upgrade quality. Operation requires expertise in determining screen shape and size, agitation rate, and material flow. Air separators range in price, capacity, and size, from lab models to grain processors. Hance and Clipper are two popular manufacturers. My preference is the Hance Vac-A-Way, model 3.

Wet Cleaning. Type III seeds are cleaned with water to release the encased seed from the surrounding fruit and pulp. After fanning, fruit is hand rubbed through wire screens or rubber-booted in metal barrels. Maceration is monitored to avoid splitting or crushing fragile seeds such as *Eugenia*, *Eriobotrya*, *Ginkgo*, *Laurus*, and *Raphiolepis*.

Hard-coated seeds are processed through a Dybvig separator, manufactured by Bouldin-Lawson Company. A revolving plate impels fruit within a metal container against a stationary plate, macerating the entire mass. The bottom revolving plate is adjusted to allow pulp and added water to flow out a discharge chute leaving behind the larger, cleaned seed. Seeds are discharged via a sliding side door when the majority of pulp is flushed out. With this method, some seeds, while exhibiting no visible external damage, may have been internally damaged. These bruised seeds may expire in storage, show poor germination and vigor, or exhibit abnormal growth. Numerous palms, *Arbutus*, *Celtis*, *Cornus*, *Photinia*, and *Prunus* may be machined-cleaned.

Floation. Sound seeds are separated from the pulped fruit mass

through floatation. Heavy sound seeds sink and settle in water barrels. Pulp will float or settle above the seeds, and is dipped or poured off. Floatation and strong agitation is continued until water flows clean and clear. Seeds are poured off upon drying screens leaving behind any rocks, sand or dirt, which settled to the bottom. A high pressure water spray completes the process by flushing away any remaining pulp.

Drying. Most wet-processed seeds must be dried of surface and excess moisture to facilitate transport and handling prior to fresh sowing. Sun drying in shallow layers removes surface moisture quickly. Dark-colored seeds dry quickly and require frequent stirring. *Aralia*, *Eriobotrya*, *Eugenia*, *Laurus*, and *Pistacia* should be removed from direct sun following surface drying to avoid cracking and dehiscence of the seed coat. Surface moisture should be dried promptly from *Cordyline* and white oaks because germination occurs readily under warm moist conditions. Safe storage requires seed moisture be sufficiently low to prevent germination, impair heat buildup, retard fungi growth, and restrict insect growth and reproduction.

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