Construction of a "Cool Frame" for the Propagation of Native Azaleas

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Modification of outdoor temperature and humidity is necessary for the propagation of native azalea cuttings. Maintaining an optimum temperature of 72°F for cuttings taken in summer is difficult without using a mechanical cooling device. If existing micro-climates are utilized, good propagation success rates can be accomplished.

Using micro-climates as a modifier for controlling temperature can reduce the need for costly electricity and save energy. The construction of a "cool frame" can produce desired temperatures, increase propagation success rates and save on energy costs. A "cool frame" differs from a cold frame in its ability to produce lower temperatures instead of higher temperatures.

The best location for a "cool frame" is the north side of several large deciduous trees that create a cool micro-climate with their overhead canopy. Lower limbs of the trees should be trimmed to at least 15 feet from the ground to allow maximum diffuse light to filter through without allowing any direct sunlight to hit the ground. If there are no large trees, artificial shade can be created by using wood laths to block the intense summer sun. Double sets of laths are secured to opposite sides of pressure treated posts as verticals on three sides of the "cool frame" after it is excavated. The northern exposure is left open for access and to admit diffuse light inside. A plywood roof or two laths spaced six inches apart overhead will form a small lath house. It is important that laths are used as much as possible to prevent heat from building up. The orientation of the "cool frame" in a north to south direction allows an even distribution of light to reach the cuttings.

Locating the "cool frame" on a high elevation will prevent the inflow of water during heavy rains. The dimensions are optional, but 3' x 6' should be large enough. If more space is needed, additional units can be built. Excavate the soil at both ends to a depth of about 27 inches for plastic buckets to be inserted (explained later). The center area only needs to be excavated to a depth of 15 inches. A tiller can be used to help loosen the subsoil and an axe will be needed to remove roots. If cinder blocks are to be used to form the sub-surface walls, the area needs to be excavated nine inches more on all sides.

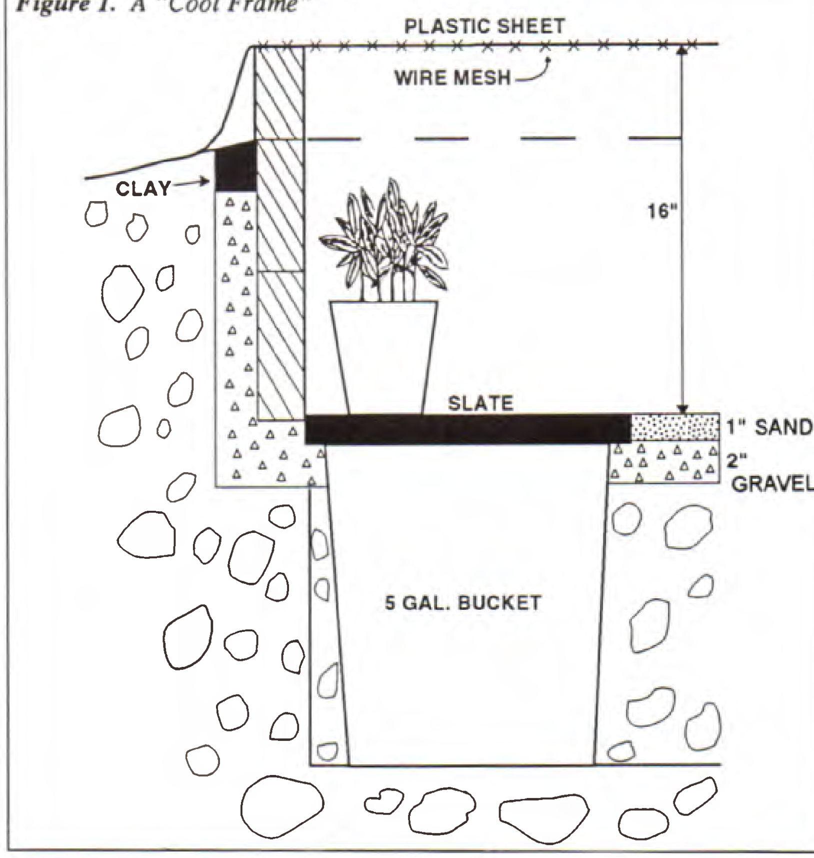
Place two five-gallon plastic buckets at both ends and firmly backfill the soil to within three inches from the top of the buckets. The buckets are used as a cooling device when water is added. Gravel is placed two inches deep on the 15-inch deep bottom, and one inch of sand is added on the gravel layer for a smooth finished bed. Pressure treated 2" x 6" lumber or large cinder blocks can be used to form the walls that enclose the one foot deep sub-surface area. To prevent the frames from warping, nail 10-inch vertical sections of 2" x 4"'s to the exterior of the frames. Backfill the frames with sand or gravel and place a two-inch layer of clay over the backfill to the top of the frames.

If cinder blocks are used, the interior spaces of the blocks can be filled with gravel and topped with a two-inch layer of clay. This will form cool air pockets that will keep the walls cool. Gravel can be backfilled to the outside of the cinder blocks, and a three-inch layer of clay is brought up to the top edge of the cinder blocks. A one-half inch layer of sand over the exposed clay keeps the area from becoming muddy.

Fill the buckets with water that is cooler than the sub-soil up to the very top. Place 14" x 14" pieces of flat slate stones or trays on top of the buckets. Cool water is sprinkled over the sandy base to add moisture and settle the sand.

A top frame of 2" x 4"s that are pressure treated is securely nailed together to match the inside edge of the

Figure 1. A "Cool Frame"



lower frames or walls. The four-inch side of the 2" x 4"'s makes the vertical side of the frame. Then 2" x 4" heavy wire mesh is nailed across the wood frame. Keep the wire mesh pulled tightly as it is nailed onto the top of the frame. Nails are driven one-half into the wood and then bent over to secure the wire in place. Any excess wire is cut off or bent over the edge of the frame.

The top frame is placed on the sub-surface frame or walls. Four-mil clear plastic is placed over the top of the frame. Allow the plastic to extend two feet on all sides of the frame. Do not nail or staple the plastic to the wood frame. Secure the plastic sheet with extra pieces of lumber or stones. Make sure that there are no holes in the plastic. Repairs can be made with pieces of duct tape. A thermometer can be placed in the south end of the "cool frame". If it is too warm, extra laths can be added for additional shade. The "cool frame" should only be opened at sunrise or when outside conditions closely match the micro-climate inside, to prevent the cuttings from drying out.

Although keeping the interior of a "cool frame" near the optimum temperature of 72°F will be difficult on hot days, the use of shade, cooling air from the sub-soil and water, and 100% humidity will modify the temperature to achieve successful propagation.

Rooted cuttings of azaleas can over-winter in the "cool frame". Cover the frame with plastic or tarps when sub-freezing temperatures are expected and remove the tarps when the weather is above freezing. Plywood can be placed on the cover for additional insulation. Remember to check for utility lines before digging, always use non-chlorinated water and look for pests that may be attracted to the cool moist environment.

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Growing Evergreen Azaleas in the Great Plains

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Obtaining good survival and dependable flowering with evergreen azaleas in the Plains States is at best difficult and thought by some to be impossible. A few limitations include among other things: (1) high soil pH, (2) low-temperature injury to flower buds, and (3) winter desiccation in the dry, continental climate. Although success with rhododendrons has been reported in Oklahoma (zone 7) in such well known areas as Honor Heights Park in Muskogee and even further north in Tulsa, very little has been reported from areas with more drastic weather fluctuations such as in Kansas. Since 1974 trials have been conducted at the Horticulture Research Center at Wichita, Kansas (zone 6) to screen evergreen azaleas for hardiness to the harsh, arid climate and soil conditions of a prairie state.

Soil preparation, best begun the previous fall, usually consists of incorporating sphagnum peat moss (about one-third by volume) plus one to two pounds of sulfur (depending on initial pH) per 100 square feet to bring the pH down near 5.5. Even so, with irrigation water containing high calcium content, the pH often returns to near neutral requiring additional sulfur top dressings. Following planting, beds are mulched with either pecan hulls, pine bark, or more recently re-cycled (ground up) Christmas trees, all very acidifying, organic materials.

Initial screening included many species and groups of azaleas such as Kurume, Gable, Girard, Glenn Dale, Kaempferi, Shammarello and Schroeder hybrids. Surprisingly, several selections proved tolerant to temperature which dropped to -18°F in December, 1989. In addition to experiments on hardiness, trials have been conducted on soil modification, propagation, nutrition, and landscape exposure. Hardiest cultivars included many Gable hybrids such as 'Boudoir', 'Caroline Gable', 'Herbert', 'Karens' and 'Purple Splendor' as well as 'Pride's Pink' and other introductions by the late Orlando Pride. Moderately hardy were 'Holland', 'Girard's Roberta' and 'James Gable' (Table 1).

Winter shade has been very beneficial in protecting evergreens from the desiccating effects of sun on the foliage. The azaleas seem to cope more readily with constant cold rather than the fluctuating temperature effects of freezing and thawing which occur in winter sun which dehydrates the foliage. Consequently, the best exposure has been the north side of our office building, north side of pine trees (which also benefits azaleas by the shedding of pine needles), or for that matter the north side of anything tall enough to cast a long shadow. To demonstrate the effects of exposure on survival and flowering, 16 azalea cultivars were planted on the northeast and northwest sides of structures designed especially to represent a residential dwelling with typical landscape exposures. Soil was prepared with sphagnum peat and sulfur as indicated earlier. Plants were established between 1989 and 1991 and evaluated during 1992, 1993, and 1994. Since no previous work dealt with hot summer sun effects during mid- to late-afternoon and due to limited numbers available, a few cultivars were planted only in the northwest exposure. Low temperatures only