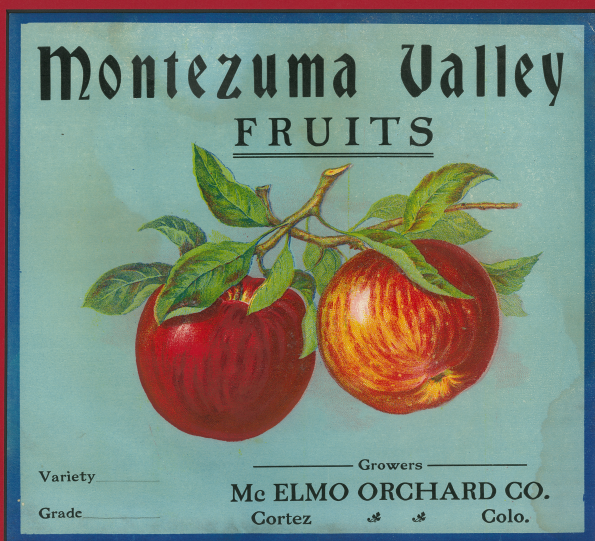


MONTEZUMA ORCHARD RESTORATION PROJECT

Heritage Orchard Owner

H A N D B O O K



MADE POSSIBLE BY A USDA SPECIALTY CROP BLOCK
GRANT PROGRAM OF COLORADO AWARD TO MORP



Montezuma Orchard

Restoration Project (MORP) is a

non-profit working to preserve Colorado's fruit growing heritage and restore an orchard culture and economy to the southwestern region. In our work, we have learned that the stories connected to the orchards are just as important as the rare genetics they contain. Many of the people who grew up around these old trees are still here to share their knowledge. Together, these trees and the descendants of early fruit-growing pioneers, create a living history for us to hold on to. The great work and generous spirit of our early pioneers will not pass forgotten if MORP is successful. To that end, we work to inspire YOU and a whole new generation of active orchard owners, fruit enthusiasts, cider makers, and the like; not just here in our backyard, but across Colorado and beyond. MORP strives to share our knowledge and lessons learned just as our fruit pioneers did some 100 years ago. With support of the 2015 USDA Specialty Crop Grant awarded to MORP for state of Colorado we have:

- ◆ Grafted 3257 heritage apple trees to sell to fruit growers and donate to non-profits, schools, communities and institutions planting conservation orchards
- ◆ Conducted yearly grafting, pruning, & fruit-ID workshops, and classes on Colorado orchard history
- ◆ Collaborated with Montezuma School to Farm Program to establish seven school orchards accompanied with heritage orchard curricula
- ◆ Submitted 489 historic apple leaf samples to USDA-ARS for DNA identification

What is a **Heritage Orchard**

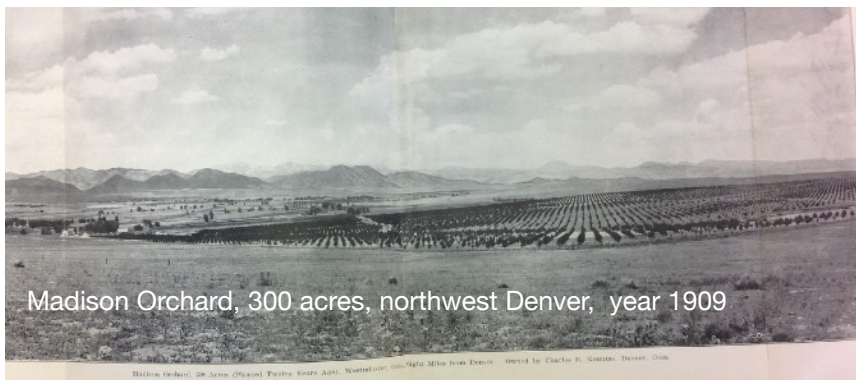
A heritage orchard is either a young orchard planted with heirloom fruits or an old, historic orchard. Heirloom fruits are varieties that have been passed down for several generations due to prized characteristics such as flavor, use, and ability to thrive in a particular region; a historic orchard is 50 years old or older. Many times a historic orchard site only has a few remaining old trees, or even none at all, but can be restored by replanting heirlooms and varieties that historically grew on site.

- ◆ **Do you have an old orchard you are wanting to restore?**
- ◆ **Do you want to plant a new orchard of old varieties?**
- ◆ **Are you crazy about heritage fruits and a lover of history?**

Then this is the perfect handbook for you; and for fruit enthusiasts in general. These pages are apple-centric due to the enormous genetic diversity of the species, longevity of apple trees, and their wide spread introduction into Colorado over 100 years ago. In other words, vintage apple trees of many kinds are what Montezuma Orchard Restoration Project (MORP) most often finds still growing in our landscape. Many of the concepts in this reference can be applied to growing other fruits that thrive in Colorado such as pears, plums, cherries, peaches, and apricots.



Colorado is Old **Orchard Country**



In the early 1860's Colorado fruit growing pioneer "Uncle" Jesse Frazer brought a bundle of fruit trees on his ox-pulled wagon from Missouri, settling in what is now Florence, CO. Frazer established the first successful commercial orchard and plant nursery in the state. He is remembered today for discovering and naming the renowned Colorado Orange apple. **Early fruit growers** were told that orchards would not grow at Colorado's high elevations. Defying convention, they experimented aggressively planting cherries, pears, peaches, plums, apricots, and hundreds of varieties of apples at a time that now represents the height of North America's fruit diversity. They sought a premium on quality, employing techniques of their trade: breeding, grafting, harvesting, and marketing. **Rewarded for their efforts**, by 1900, homestead and commercial orchards were well established across Colorado - from the Front Range foothills to the Arkansas Valley, across the mountains to the Grand Valley and into the remote Southwest - all regions winning premiums for their crops. Apples dominated Colorado's early orchards, but by the end of the 1920's the national trend had turned to the "shiny red apple"; orchardists were told to grow no more than three kinds. **Yet, remnants** of this early time of diversity remain in Colorado's landscape - primarily apples - growing in subdivision backyards, sections of hay fields, abandoned homesteads, and open spaces. The trees are hidden or right in plain site; sometimes forgotten, and other times revered by the families who always remembered.

Old Colorado Apples



MORP is researching what apples historically grew in Colorado to create an Old Colorado Apples list. By searching historical books, reports and records, we have so far documented 436 varieties of apples that were planted in Colorado prior to 1930. Many of the apples on this list we find still growing in our landscape on trees up to 100 years old or older. Others, nearly 50% of the list, are now considered lost/extinct. This great diversity disappeared not because these varieties did not grow well here, rather because many were simply not shiny red apples representing the standard of the time. We work to return as many of these varieties as we can to Colorado orchards. To be successful, we will need you to plant diversity in **YOUR** orchards — as was tradition a century ago.

Dr. Sandsten of the Colorado Agricultural College's experimental station surveyed every orchard district in the state from 1917-1922. He not only documented what fruit varieties were growing in Colorado, but inventoried quantities grown in commercial orchards at that time, down to the age and condition of the orchards.

[Links to the Sandsten surveys at our website.](#)

The Colorado Apples list is available at www.montezumaorchard.org. Here are a few details:

- ◆ 64 varieties, 15%, are Common—10 or more mail order sources carry them; these varieties are NOT commonly found in nurseries, but can be found with specialty nurseries and collectors.
- ◆ 55 varieties, 13%, are Rare—4 to 9 mail order sources carry them.
- ◆ 108 varieties, 25%, are Endangered—1 to 3 mail order sources; we work to get our hands on these apples and increase their numbers **before they end up on the lost list.**
- ◆ 205 varieties or 47% are Lost—considered Extinct; MORP seeks these varieties in CO remnant orchards.

In our work to survey and identify varieties in Colorado's historic orchards we have retraced many of Sandsten's footsteps likely putting many of the same trees he documented back on the map. DNA results from apple leaf samples collected by MORP match to 34% of the named varieties listed on the 1922 surveys confirming the endangered diversity still found in our landscape.



MORP DNA Results [Full results at our website!](#)

VARIETY	RARITY
American Summer Pearmain	rare
Apple of Commerce - possible	endangered
Autumn Strawberry	endangered
Baldwin	common
Beitgheimer	endangered
Ben Davis	common
Chenango Strawberry	common
Cortland	common
Crimson Beauty	rare
Delicious - Original	common
Duchess of Oldenburg	common
Early Harvest - possible	common
Early Strawberry	rare
Esopus Spitzenburg	common
Famuse/Snow	common
Golden Delicious	common
Gravenstein	common
Grimes Golden	common
Hibernal	endangered
Ingram	rare
Jefferis	common
Jonathan	common
King David	common
Kinnards Choice	rare
MacIntosh Red	common
Maiden Blush	common
Missouri Pippin	endangered
Newtown Pippin/Albemarle	common
Northern Spy	common
Northwest Greening	common
Orange Pippin/Cox	common
Paragon/Black Twig	endangered
Primate	rare
Ralls	common
Red Astrachan	common
Rome	common
Saint Lawrence	rare
Senator/Oliver	rare
Smith Cider	rare
Sops of Wine - possible	common
Stayman Winesap	common
Summer Rambo - possible	common

Listed on this page are 58 historic varieties that matched leaf samples collected by MORP and submitted for analysis to the USDA-ARS National Laboratory for Genetic Resource Preservation. Results show that many more named cultivars were found, but the lab does not have their match in their data set so are listed as unknown. Details:

- ◆ 58 named cultivars (shown here)
- ◆ 34 unknown cultivar matches to other samples - likely named cultivars
- ◆ 103 unique unknown cultivars - some are likely seedlings. However, MORP took care to collect from grafted - not seedling trees - so many of these unique unknowns are also likely named historic cultivars not listed in the ARS dataset
- ◆ 195 cultivars in total out of 489 MORP samples

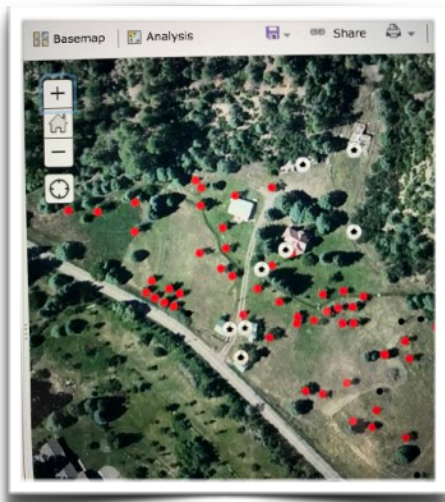
Sweet Bough	common
Tetofsky - possible	rare
Thunderbolt/Hoover	rare
Tolman Sweet	common
Virginia Crab/Hewe's	common
Wagener	common
Wealthy	common
White Winter Pearmain	common
Whitney Crab	common
Winesap	common
Winter Banana	common
Wolf River	common
Yellow Bellflower	common
Yellow Transparent	common
York	common

Mapping away in old Orchard Country

Montezuma Orchard Restoration Project maps historic orchards using GIS methods backed up by old fashioned, hand drawn grid maps. Work of this kind, albeit without GPS, has not been approached since Sandsten's surveys in 1922. In addition to old trees we map associated historical features such as homestead houses and cellars, and tools of the trade like presses, boxes, and ladders. Ideally, even before mapping work begins, MORP creates an orchard narrative to include contact information, general condition of the orchard, and most importantly interview notes with the orchard owner capturing as much historical information connected to the orchard site as possible.

Memories of orchard owners and their families have become as important to us as the rare genetics; together they create a powerful story. All this information is collected on paper and entered into the MORP Orchard Database along with GPS points, field notes, historical research, and photographs. MORP is still deep in the data collection phase, but it is on our minds how to best share this information (with permission from orchard owners) with both the public and fellow fruit explorers. To date we have compiled a list of 250 historic orchard sites to visit. Of these, MORP has mapped and documented 111 historic orchard sites containing over 4000 apple trees 80 to 135 years old; approx. 800 other heritage fruit trees; and over 100 historic features. So many old trees; so little time. Time is of the essence. **If you are a fellow fruit explorer** please see MORP's website for detailed information

on our mapping and database workflow under the tab called Preservation through Documentation.



MORP fellow fruit exploring groups in Colorado are **Apple Core Project** in Norwood, **Widespread Malus** in Boulder, and **Heritage Fruit Tree Project** in Basalt. We hope you are as heritage-fruit-crazy as we all are!

Document your Old Orchard

If you have an old orchard or even just one historic tree, please contact us so we can add your orchard to MORP's growing list of historic orchard sites to map and document. Our list is growing and it may take us some time to actually survey your trees, so please be patient with us.

To keep focused, we constantly remind ourselves of what is saved versus what was lost.

You can help MORP by knowing and documenting your orchard. Here are a few tips:

1) Report your orchard by sending an email to morp@montezumaorchard.org

2) Get to know your orchard by documenting all that you know or learn about it, including associated history. Check our website for an orchard documentation form.

3) Sketch the layout, giving each tree an ID number that you attach to all notes, photos, maps, and grafts. Use a grid map like the one shown to the right (also available on MORP's website). The grid continues on the back-side for larger orchards.

4) Learn to graft.

5) Graft from your old trees and plant the new trees on site.

6) Keep in touch with us to share your knowledge.

Orchard #	(mark north on map)														Orchard 3 digit abbreviation	Date
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
A																
B																
C																
D																
E																
F																
G																
H																
I																
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K																
L																
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To make a hand-drawn grid map, mark N-S-E-W and prominent features on your map. Use a compass if you're unsure. Sketch county road, driveway, stream, barn, etc. **If you are** mapping a large orchard or a scattered remnant orchard recheck your points by going back and forth between known points. It is easier to correct a map while it is being made rather than later on when it is being used for reference. After you have finished with your map re-walk the orchard and see if you can consistently find your location on the map. With your quality map you can now further document, graft, and systematically learn your orchard. Contact MORP if you would like to map your orchard using GPS technology and web based maps.

Apple Identification

The question we hear more often than any other is, “What kind of apple is this?” With 100-year old apples, it can be hard to know, as few aspects of apple culture

Photo Credits: JAK KAW Press



are as bedeviling as apple identification. Two apples of the same variety can look quite different, and two apples that look alike can be different. Besides costly and inaccessible DNA fingerprinting, the gold standard in apple ID is to ask a person that grew up with the tree to name the apple. Alas, with historic trees that can range from difficult to impossible. **Wise old-timers** will tell you that the only way to get to know

an apple is to make a lot of tracks around the tree. Become familiar not only with the apple, but with the tree's bark, leaves and shape. Taste fruit repeatedly season after season. The subtle complexities of flavor, texture, and appearance will imprint upon your senses and begin building a basis for comparison. Learn which varieties grew historically in your area. Research state and county fair lists, horticultural reports and newspapers. A tree's age can be determined through orchard assessment, interviewing knowledgeable people and reviewing property abstracts. **Apples can be grouped** into simple terms: **Form or Shape** is the most consistent feature of the fruit: round, oblate, oblong, conical; **Uses:** dessert, culinary, juice, cider; **Season:** summer, fall, winter, and **Flavor Profile:** acid, sub-acid, sweet, bitter, sharp, etc. Practically speaking, knowing an apple's use, season and flavor is all one needs, until we learn its historical name. **Regarding the technical** aspects of fruit ID, MORP has relied on important historical works on the subject such as: **The Fruit Manual** by Robert Hogg, **Apples of New York** by S. A. Beach and **Hardy Fruits** by Edward Bunyard. And finally, the long awaited seven-volume set, **The Illustrated History of Apples in the United States and Canada** by Dan Bussey and edited by Kent Whealy, has hit the press, available at www.jakkawpress.com. This is the most important work on apples that has come out in over one hundred years; now sure to be the go-to-resource for fruit explorers far-and-wide. **See our website** for more information on fruit identification techniques.

Heritage Orchard Culture pages 9-14

Orchard Placement: Our fruit-growing pioneers knew how to select the perfect orchard site. If you have an old orchard the placement is likely favorable with good soil drainage and on a slope where cool air drains away, and slightly below ridge line protected from cold, north winter winds. If planting a new orchard choose a similar location.

Good Fencing & Tree

Protection: In the old days deer fence was not a necessity; today it is essential. Adding electrical wire is also recommended if bears are an issue. All young trees need tree guards to protect from rodents especially in the winter. It is common for folks to run livestock in their old orchards. To not cause damage use rotational management practices and do not overgraze. Place watering troughs away from trees to keep ground from being trampled down around tree roots. MORP's observation is llamas will turn your old orchard into standing dead trees.

Proper Irrigation: This was a new skill learned by our area's first orchardists arriving from humid lands and has become the most important foundational skill in Colorado orchards. The goal is to soak the ground slowly, down and out into the soil profile; water deeply and not again until the top few inches of the soil profile begins to dry. The frequency and duration of your watering is dependent on your site and soil conditions, short and long term weather patterns, and the age and condition of your orchard. "Doing is knowing"; pay attention to the end result needed as you acquire knowledge. Whether you use drip, soaker, or flood methods keep the water on the ground to conserve water and to keep moisture out of the canopy to avoid diseases and pests of humidity that are otherwise not an issue in the arid west. MORP has observed historic orchards die from drought when irrigation methods were changed from historical flood to sprinkler resulting in not enough water getting down and out into the soil profile.



IRRIGATING AN APPLE ORCHARD IN THE ANIMAS VALLEY, OWNED BY T. A. KERR, DURANGO, COLORADO, 1900. THE ORCHARD WAS PART OF THE DENVER & RIO GRANDE RAILROAD. Photograph by George L. Beane.

Apple Rootstocks & Spacing: To know how much land you need to fence and irrigate when planting new trees it is important to understand tree spacing and density needs for the selected rootstock. Traditionally, our heritage orchards were planted grafted onto *Malus domestica* rootstocks which are grown from an apple seed. These are the towering giants of our past that truly grow to create an ecosystem of their own living for generations. To save our past for the future MORP most frequently chooses to graft onto seedling rootstocks as well as on semi-dwarf M111 as a compromise for people with smaller spaces. MORP offers heritage apple trees for sale on all the following **Rootstock Types:**

**STANDARD/
SEEDLING**

- large free-standing trees, 10 years to production, 10-30 bushels/tree at maturity, 25 feet or greater spacing (~70 trees/acre), cold & drought hardy, stately, room in between for hay, row crops while getting established. Long life span of 100 years or more. Examples *Malus domestica* and Antonovka



Well pruned 1930 era tree on seedling rootstock
photo courtesy: T Lazy T Orchard

SEMI-DWARF - 60-85% size of standard; free-standing, space 12-15 feet apart (~150-250 trees/acre); produce in about 5-8 years. Almost as hardy as standard rootstocks but not as long lived. Examples M111 and M7

DWARF - up to 50% of standard, need costly support/trellising, plant densely as close as 2-8 feet apart, 2-3 years to production, common for large commercial orchards (~500-2000 trees/acre); Intensive input costs; tear out and replacement rate every 10-15 years

Pruning: Our area's oldest orchards were pruned to an open-bowl, low-headed tree. The trunk rises only a couple feet above the ground before branching begins, with the center being kept open. This pruning style allows for good air flow and sunlight into the canopy contributing to tree health and highly colored, tasty fruit. **Beginning** the job of pruning can be a daunting task especially if hundreds of old, unmanaged trees stand before you. Whether your orchard is small or large, young or new, semi-feral or actively managed, MORP recommends you incorporate the skill of pruning into your regular routine. As progress is made your orchard becomes more healthy and productive. **Before you begin,** attend a pruning workshop to get hands-on practice making good, safe cuts. Also be sure to have quality, well-sharpened tools that are appropriate for the task on hand. This makes the job safer, easier, and better on the trees. DO practice safety and avoid pitfalls such as operating a chainsaw while on a ladder. As a rule, prune away no more than 25% of live wood in any given season with peaches being the exception where you can LEAVE 25%! Summer pruning (July/August) keeps a tree smaller in size; dormant winter pruning (late November-March) causes vigor. Over-pruning will cause fast, weak growth susceptible to pests and disease. When old trees are pruned for the first time in a long time they will require more water due to spurred growth, plan accordingly.

Here are a few **basic tips** to get you started that can be done to any fruit variety in the summer or winter pruning season. To avoid spreading disease never prune in warm, wet weather. The overall goal is to bring down the height, open the center, and bring in the length of limbs:

- 1) Clean your tools with a 10% bleach solution when going from one tree to the next, and after each cut to diseased wood.
- 2) Snip off all suckers coming from the original rootstock below graft line.
- 3) Prune away any diseased branches.
- 4) Cut out dead wood unless a certain dead branch adds character to a historic tree such as a bird home or aged, weathered wood.
- 5) Prune out branches growing inward.
- 6) Take out branches that are growing straight up such as water sprouts.
- 7) Prune branches that cross or interfere with a favored limb, or try to poke you in the eye
- 8) Make your thinning cuts about 1/4" outside the "collar" the ring that forms around the base of any branch; and right next to the bud when making a heading cut; cut as close to the collar or bud as you can without cutting into it; doing otherwise results in a butcher cut causing the end of the branch to die off.
- 9) Top/shape a young tree "whip" at about 24-36" from the ground.



1931 pruning workshop - a tradition continued by MORP today. Join us.

Orchard Diseases: Early orchardists to Colorado quickly learned, drought, drying winds, sun scald, and weather extremes are the feared orchard enemies in our region when compared to pests and disease. A healthy environment created from sound cultural practices, especially concerning pruning and irrigation, is the best preventative cure for disease and pest pressures. **Fire blight** is a bacterial disease affecting apples and pears. Feared by orchardists in warm, humid climates, fire blight can destroy an entire tree and even orchard right before your eyes. This occurs when conditions are moist, temperatures are above 70 degrees, and blossoms are open. In the arid west historic trees have lived infected with fire blight for over 100 years. In our dry climate normally the disease at worst kills off individual limbs, and can be managed by pruning. Young trees and trees on dwarf rootstocks are most susceptible and are often culled from the orchard when the disease enters the main trunk. Fire blight can be otherwise managed by pruning off diseased side branches in the cold dry days of winter, and by keeping the tree well watered during the heat of summer. Proper pruning is important as fire blight can enter a poor cut, and “giving a tree too big of a haircut” causes rapid succulent growth susceptible to pests and disease. **Rust** is a virus that can affect the leaves of apples and pears. It is easily transferred to and from junipers, but rarely causes serious harm to orchard trees in our dry region. It is important to keep irrigation water on the ground through drip or flood and not up in the tree canopy with sprinklers. As it heats up and dries out in the summer rust tends to go away.

Scab, a fungal disease, also spreads in humid conditions effecting first the leaves and then the fruit of apples and pears covering the fruit with “ugly” brown, cracked skin, similar looking to russet-skin that is natural in some varieties. Traditionally, commercial orchardists control for scab. However, in heritage home orchards the disease is sometimes an acceptable or desired trait. Many cider makers appreciate scabbed fruit because it is believed to have higher sugar content and adds “character” to the cider. This holds true for the physiological disease called **watercore** which is often seen in apples when they are irregularly watered, among other factors, causing the interior flesh to be water soaked. Affected fruits will not hold up on a grocery shelf and might be tossed out by wary consumers. However, many orchardists love watercored apples picked straight from the tree as they are the sweetest and are great in cider if you press the apples before they rot.

Stone fruits such as peach, plum, cherry and apricot trees are nearly always infected with **cytospora canker**, a viral bacterium that is evidenced by an orange ooze on damaged parts of the tree. It spreads in the air and in the irrigation water, and is most prevalent in drought stressed and non-pruned trees. If you are fortunate to purchase a tree not already infected it likely will be. Keeping your orchard in overall health will minimize the effects of canker which are reduced crop yield and decreased life span. Commercial peach and cherry orchards in the Grand Valley especially seek to find a cure for the disease to maximize yields and profits. For the most part, canker is not a concern for well-managed home and diversified orchards. Do not remove stone fruits due to canker, or you will have none. Instead, prune off worst affected limbs and irrigate properly.

Codling moths result in the ubiquitous worm in the apple and are the biggest barrier to producing apples to meet the standards of the fresh market here in the west. Commercial orchardists following either traditional or organic methods have to spray chemicals often to get their fruit to market. This is more practically done in actively managed orchards that have been pruned regularly. Pest control in our older orchards is challenging due to the size of the trees, and lack of pruning. For these old giants a beneficial insect, trichogramma wasp shows promise. About a third of the size of a mosquito these tiny predators feed on codling moth eggs. The goal with all pest control is to reduce the numbers of the pest in as safe and cost effective of a manner as possible so that the quality of fruit is increased. The perfect fruit can be sold to

natural grocers at a premium, slightly blemished fruit can be sold at farmers markets, and slightly wormy apples can go to hard cider makers for a few cents a pound often with the cider makers providing the labor for the harvest. By getting the fruit out of the orchard and into a market the pest pressure is reduced for the following year. A few tips to reduce codling moth pressure:

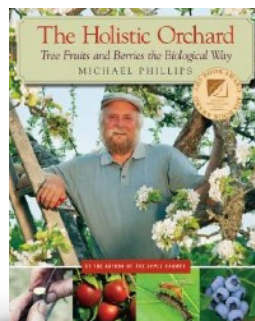
- 1) Wrap corrugated cardboard or burlap around the tree trunks several feet up before the first hatch which occurs in late May and before each subsequent hatch in July and Sept. Monitor and dispose of cardboard when you see moth eggs.
- 2) Thin baby fruit before larvae lays eggs in the space where two apples touch.
- 3) Dispose of drops daily to keep larvae from overwintering.
- 4) Spray young fruitlets with refined kaolin clay which repels the moths. Several applications are needed initially then repeated several more times every several weeks or more if it rains.
- 5) Grow a diversity of cover crops, native grasses, and wildflowers in your orchard to attract beneficials.



Aphids (including wooly aphids) found on apple trees can usually be ignored under good orchard culture. MORP has seen leaves burned and sometimes trees killed by overspraying - even when organic approved products like pyrethrin, neem oil or horticultural oil were used. It's best to first wash aphids away with high pressure water (some are in the roots so you're only decreasing their numbers). If you must spray, just spot spray at the times in the pest life cycle that will be most effective. Every few years or so Colorado is hit with a **cyclical pest** such as

grasshopper plagues, **earwigs** gone crazy when normally not a pest, and **pear slug/sawfly** outbreaks during extended wet seasons. Just when you think you and your orchard are done for, the problem goes away. In such cases, good cultural practices are key to getting through the event as well as making a call to your "good bug" hotline. You may always contact **MORP** and your local **extension agent**, and know that we often contact **M & R Durango Insectary** at www.goodbug.com, and you can too! M & R manufactures **NoloBait** a natural grasshopper control that should be applied several times a year or more to be prepared for the hoppers when they come. Refined **kaolin clay** repels insects of all kinds and can be found at local nurseries or online.

Also, check out **Beneficial Insectary** www.insectary.com to order lacewing larvae, ladybugs, nematodes, and trichogramma wasps.



Create a **healthy orchard ecosystem** by attracting **beneficials** like ladybugs, praying mantis, lacewing, parasitic wasps, and many more to live in your orchard to keep unwanted pests in check. Plant cover crops, drought tolerant grasses, and wildflowers, and allow to go to seed in places by mowing in strips versus creating a lawn look. This will attract good bugs and pollinators like bees and butterflies. Rotate poultry, sheep, and pigs (if trees are established) through your orchard to reduce bad bugs, mow grass, and add fertilizer. Rotate animals wisely or weeds and damage to trees will be a problem. Great resources for inspiration and practical knowledge are Michael Phillip's books **The Holistic Orchard** and **The Apple Grower**.

Attend a MORP Event or Workshop

MORP presents two annual events for purchasing heritage apple trees. Mark your calendars:

Heritage Apple Tree Sale on the third SAT in June

Orchard Social and Harvest Festival on the second SAT in October

In between events you may schedule a special visit to the MORP nursery when you buy 10 trees or more. Choose from a diversity of prized, heritage varieties hand-grafted and naturally grown by MORP. See our website for current availability. Trees are \$50; MORP members receive discounts. Sign up for the MORP newsletter at our website to know of grafting, budding, pruning, fruit ID, and other workshops.

Tree sale proceeds benefit the establishment of school, community, and public orchards by giving MORP the opportunity to grow and donate heritage apple trees across Colorado. Contact us if you think your organization may qualify for donated trees. The orchard site must be a public or community space with good wildlife fence, water, and labor to care for the trees. MORP selects the tree varieties for the site; you pick them up!

Did you know? MORP members:

Receive \$10 off each tree purchased.

Qualify for an additional bulk tree discount (buy 30 or more trees and get \$20 off each tree).

Receive special members-only invites to tree sales and discounts on workshops.

Thank you for being a member!

Learn to BUD To conserve your favorite heritage stone fruits such as peaches, cherries, apricots, and plums they are most commonly budded, not grafted, in late summer when the bark begins to "slip" easily separating from the tree. Budding is done directly onto rootstock that is already growing in pots or in the ground. One method is to remove a "chip" or small piece of wood from your rootstock and insert into it a single bud of the desired variety wrapping it with paraffin tape. Though budding is a simple skill, Colorado's dry winds and erratic temps. make aftercare extra challenging. Apples and pears are best grafted in Colorado.



Learn to Graft

The most important step you can take to preserve a historic orchard is to re-plant and/or reintroduce the genetics. This leads you to the important skill of clonal propagation known as grafting. **Apples are not true-to-type from seed**, but rather are a unique combination of both its parents (like people). To recreate an exact copy of an apple tree it must be grafted by using a piece of its scion. Scion is a dormant shoot, preferably first-year growth, cut from the desired apple tree. In the winter while the trees and rootstock are dormant, scion is spliced onto a chosen rootstock at what is called a graft union.

Cambium—live tissue between the bark and wood of the tree—of the rootstock and scion fuse together at the graft union to form a new tree. The graft union gets banded and covered with wax to callous and heal while the young graft is tucked in a cool dark place. When the buds begin to swell, the graft is planted to leaf and root out. The resulting tree bears the fruit from which the scion came and the physical characteristics of the rootstock: size, yield, hardiness, adaptability, and disease resistance.

Though there are many styles of grafting, MORP teaches the Whip and Tongue method due to the strength of the union - an especially important consideration when conserving rare genetics. MORP uses a method modified from the drawing shown above from **A J Downings 1849 book The Fruits and Fruit Trees of America**. Today, many grafting videos are available online, and should be accompanied by attending a workshop as this is a hands-on skill.

Tips: 1) scion can be collected months before use; wrapped in moist paper towels in plastic bags; stored at fridge temp., but away from fruit, 2) order your rootstock early in the fall or before as specialty nurseries sell out fast, 3) Lawyer Nursery, CopenHaven Farms, and Willamette Nursery are good places to purchase rootstocks. Rootstocks are also sold at MORP grafting workshops.

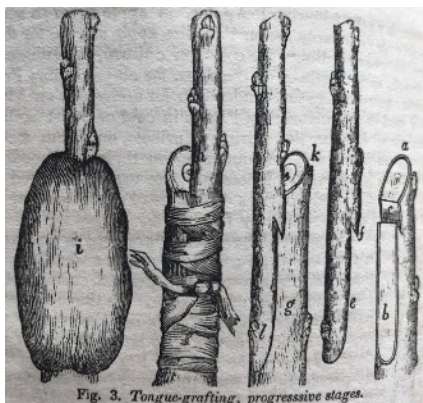


Fig. 3. Tongue-grafting, progressive stages.

Graft Aftercare

- 1) Use plastic totes to keep moisture in and critters out.
- 2) Lay well-labeled grafts on side; cover roots with damp paper towels or potting soil.
- 3) Store at 35-45 F for about a month away from sunlight to callous. Store away from fruit as out-gassing will kill your grafts.
- 4) Check several times a week. Spritz roots with water to keep moist, but not molding (crack lid as necessary).
- 5) At first sign of bud break pot in quality potting soil in protected, semi-shaded greenhouse environment.
- 6) Remove growth below graft line to increase vigor to scion.
- 7) Water deep, but not again until top of soil begins to dry. Be careful not to rot roots or get leaves wet.
- 8) Plant successful grafts in ground that first spring or fall (no later than the second spring unless you re-pot to larger containers).

Please Plant Me Properly



How to overwinter your baby grafts:

As soon as your grafts have put on at least several inches of growth AND the danger of a late spring frost is past you may plant them in the ground following the advice at the right. If you need to overwinter them in a pot keep them in an unheated greenhouse if possible. Be sure to provide good air flow on sunny, winter days. You may also keep them outside against a north or east wall and away from the drip line. Protect pots by surrounding with bales of straw or something similar. Be sure the pots are well watered going into winter. Getting the watering right is more challenging in a pot so check often. Do not dry out; do not over - water and rot roots.

MORP PLANTING ADVICE:

- Trees are happiest in the ground, not in a pot, so **plant immediately** for best success.
- Select a site with good soil drainage and good air flow. Avoid cold sinks.
- Space standard apple trees 25 feet or more apart; semi dwarf 12-15 feet; dwarf 8 feet or less
- Dig hole 2-3 times wider than the rootball and just deep enough to allow graft union to be several inches above soil line to keep traits of rootstock. In the case of seedling rootstock you may bury graft. Old timers did so for a stronger tree.
- Do not add hot compost, manure, or fertilizer to planting hole. Back fill with native soil mixed with one third *composted* compost or *quality* potting soil. Water in and tap down air pockets. Mulch with 1-2" of compost per year; do not over do it.
- Protect your tree from deer, rodents, bear, and other mechanical damage. **Good fence** is essential. Paint lower south trunk with plain white latex paint diluted with water to protect from sun scald. If you use tree stakes, trunk guards, limb spacers, ID tags, etc., reposition **EVERY** year.
- **Proper watering is key**; not too much and not too little; just the right amount at just the right time. Easy to say, but takes experience to learn as the answer depends on the weather and site conditions, age and condition of tree, season and dormancy, and other factors. Rule of thumb: **water slowly and deeply to get water down and out into soil profile**. Repeat process when just the top of the soil just begins to dry. Flood or drip irrigation is best; sprinklers cause disease and sunburn, and often do not water deep enough. Water deeply and frequently to get a tree established; even during **dry winter** months; very hard to water too much in **heat of the summer!**

Rebuilding our Orchard Economy

Colorado's remnant historic orchards and associated history tell a story and provide genetics to market heritage fruit and grow an orchard economy. Re-establishing this economy will entail solving barriers to production including labor, storage, processing, infrastructure and transportation; and most importantly inspiring a new generation of active orchard owners.

Whereas, for generations the market demand was for the shiny red apple, the trend today is for local, heritage, and diversity. Today, there is an unmet demand for Colorado grown heritage apples for both the fresh and juice markets. Every apple in Colorado could find a market if picked off the tree (See [Montezuma Valley Apple Market](#) study at MORP website). MORP conducted a successful mobile cider press pilot in 2016 that showed an unmet demand for juice made from Colorado apples to provide to Colorado cider makers. **Challenges** such as the risk of repeated frosts also show what we know to be true—not every season will be a fruitful one, but many are to come, as they have for over one hundred years. As a non-profit MORP will continue to work to ensure markets for Montezuma Valley Apples during times of abundance. The ability to turn our area's apples into juice rather than ground-fall is inspiring orchard owners to view their old orchards as assets not burdens; this is fueling orchard restoration and establishment. The shortage of active heritage orchard owners is the biggest barrier to returning an orchard economy to the historic orchard districts of Colorado. We invite you to join MORP in this good work.



MORP volunteers, orchard owners, and cider makers join forces to pick a historic orchard. See Rocky Mountain Cider Association for cider makers near you.

Heritage orchards should be viewed with the patience of time as a gift that we have received and a commitment we can pass forward. In all of agriculture, orchards stand unique in their ability to transcend generations, to continue to give and produce crops even a century after they were planted. As you work in your heritage orchard and reap its bounty and suffer its challenges, remember the long-term benefit you are providing for yourself and your community. You are part of a long and proud heritage of growing orchards in Colorado. Through your labor and vision you are passing this gift forward.



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Please join us in keeping Colorado "Orchard Country". Your financial support will help MORP reach its vision of southwestern Colorado being renowned for an orchard culture and economy based on the legendary quality and diversity of Montezuma Valley Fruits.

Become a member of MORP by making a tax-deductible annual contribution of \$30 or more or a sustaining monthly contribution of \$10 or more. Please make checks payable to MORP. Mail to POB 1556, Cortez, CO 81321 or contribute and/or become a sustaining member online.

We are grateful, Addie, Jude, and the MORP Board of Directors

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