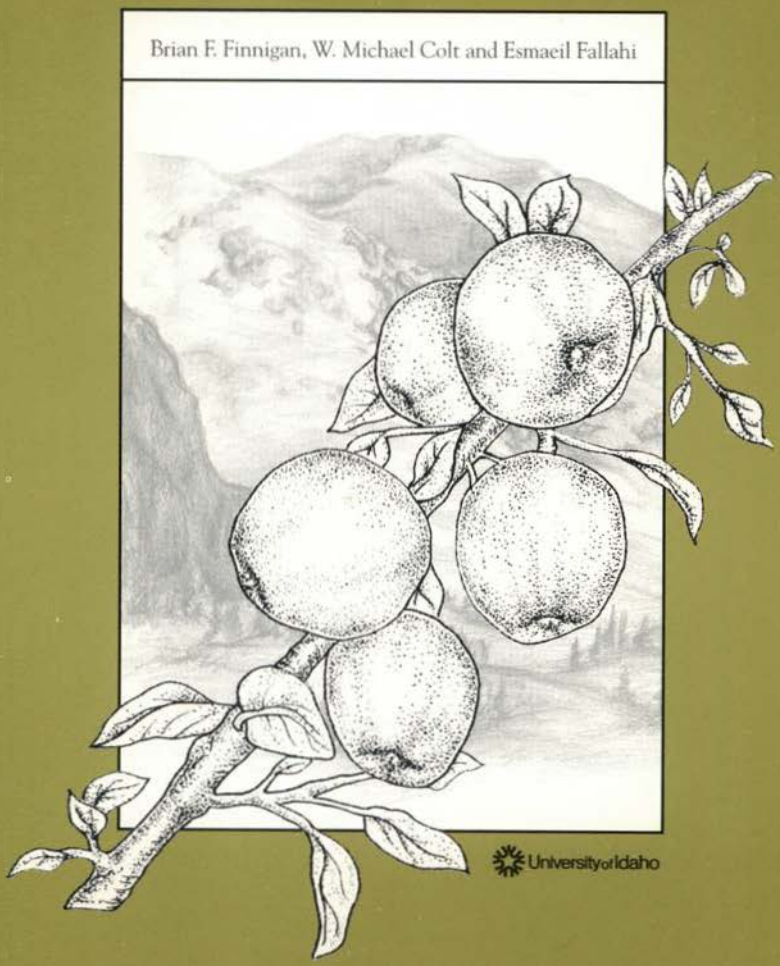
Brian F. Finnigan, W. Michael Colt and Esmaeil Fallahi




# GROWING APPLES

## for Local Markets in Cold Climates

## Contents



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## AN EXCELLENT OPPORTUNITY

Apples are the most popular and versatile tree fruit in the United States with an annual fresh consumption of about 20 pounds per person. Demand for locally grown produce is increasing, and good apple producers and marketers should be able to develop profitable local enterprises. Small-scale apple producers in particular have excellent opportunities to grow cultivars not readily available in supermarkets, which usually buy from large commercial growers and brokers.

Potential growers must first learn how to produce quality fruit. Success will depend largely on choosing favorable establishment sites, correct cultivars, and proper rootstocks; paying attention to cultural management; and employing good marketing practices.

Several apple orchards in southeastern Idaho were lost or damaged severely in the past 15 years due to very cold winter temperatures, which affected nonhardy cultivars and rootstocks. However, apple cultivars are available that produce quality fruit for local consumption and mature in all but our harshest short-season areas. Idaho has a number of successful growers in harsh climatic areas outside the traditional commercial apple-growing districts.

Several new orchards designed especially for local markets have been established recently in Idaho's colder regions. These use various apple cultivars and training and irrigation systems with differing degrees of success.

The points that follow are basic to the successful establishment of a good operation. Consider all of them, as well as additional information from other sources.

## SITE CONSIDERATIONS

### Site

Sites for apple production should have unobstructed cold air drainage with at least 2 to 4 percent slopes to reduce frost hazard. Sites with more than 10 to 12 percent slopes should be avoided as they cause problems in equipment use. Consider small canyons and sites along rivers and streams where air drainage is good.

Investigate areas for frost pockets especially in higher elevation areas above 2,500 feet where air temperatures cool more quickly (figure 1). It is advisable to have an experienced commercial grower or horticulturist familiar with orchard layout to check sites for potential problems.

Sites for apple production should have unobstructed cold air drainage with at least 2 to 4 percent slopes.

### Soils

Apple trees prefer soils that are deep, well drained, and relatively free of calcareous salts (white soils). Orchards exist on soils with high calcium levels and pH values greater than 7.5; however, lime-induced iron chlorosis is a problem. Even though most roots are in the top 2 feet of soil, deeper soils permitting rooting down to about 4 feet are beneficial for anchorage and moisture.

### Windbreaks

On windy sites windbreaks can reduce fruit damage, facilitate spraying, help prevent limb damage and distortion, and reduce moisture loss. Windbreak trees should be spaced 3 or 4 feet apart in rows spaced 500 feet apart, or 10 times the anticipated height of the windbreak trees.

Windbreak trees on slopes should have the lower limbs below 4 or 5 feet removed to prevent a frost pocket from forming when cold air is trapped as it moves down the slope. A poorly designed windbreak system can cause excessive shading and reduce fruit color and productivity. The first windbreak row should be at least 20 feet from the first apple row. Trees popular for windbreaks include Lombardy poplar, hybrid poplar, Siberian elm, and Austrian pine.

### Frost protection

As blossom buds begin to swell in the spring, they become susceptible to cold temperatures. The more the buds develop, the less cold they will take. (See *Critical Temperatures for Blossom Buds: Apples*, listed in the further readings section.) Heating systems burning oil, propane, or wood pellets may have a place in heating small areas. Overhead sprinkler systems can protect down to 22°F if sufficient water is available. Large fans with gasoline engines or electric motors are used in many orchards but are expensive to operate and require approximately $1,000 per acre in investment costs. These systems help protect buds and blossoms when pockets of cold air settle in an orchard but are much less effective against cold air masses in cold fronts.

## WHAT APPLE CULTIVARS TO GROW

Table 1 lists cultivars adapted to cold, short-season areas. These cultivars have matured successfully in southeastern Idaho, Michigan, or Minnesota and have survived winter temperatures of at least -40°F.

The cultivars commonly grown in southwestern Idaho, Oregon, and Washington are Braeburn, Fuji, Gala, Golden Delicious, Granny Smith, Red Delicious, Rome, and Winesap. These cultivars generally perform poorly in colder, short-season areas of Idaho. Before trying new cultivars in your area it is best to check with the extension educator at the UI Cooperative Extension System office in your county.

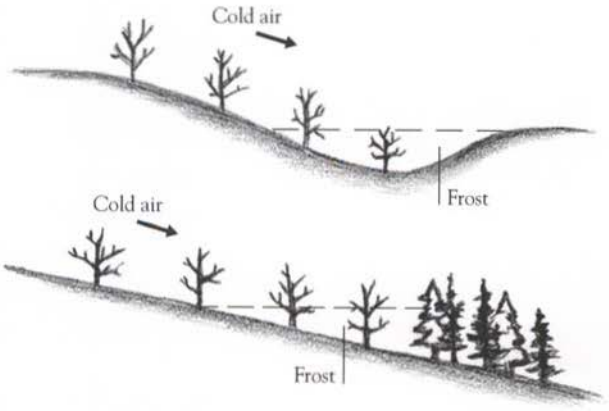



**Figure 1.**
Cold air will flow to the lowest point and will accumulate where drainage is obstructed.

**Table 1.**
Apple cultivars adapted to cold, short-season areas.

| Cultivar[1] | Basic color | Disease resistance | Estimated harvest |
|---|---|---|---|
| Cortland | red | | late September |
| Earligold | yellow | moderate for fire blight | August |
| Regent | red | rust | October |
| Haralred | red | fire blight | late September |
| Haralson | red striped | rust, moderate for fire blight | late September |
| Hazen | red | fire blight | September |
| Honeycrisp | red over yellow | | late September |
| Honeygold | yellow | | October |
| Liberty | red | scab, rust, fire blight, mildew | October |
| Lodi | yellow | scab | July |
| Mantet | red | | late July |
| McIntosh | red | | September |
| Paulared | red | | October |
| Redwell | red | | October |
| Spartan | red | fire blight, scab, mildew | October |
| State Fair | red striped | | August |
| Summerred | red | | August |
| Sweet Sixteen | red striped | fire blight, scab | September |
| Wealthy | red striped | fire blight, scab, rust | September |
| Yellow Transparent | yellow | scab | July |

[1]See "Apple Cultivars for Eastern Idaho," available from the author, for more detailed descriptions of the cultivars listed above.

## ROOTSTOCKS

The rootstock forms the roots and the part of the tree stem below the graft union. For eastern Idaho at the present, there is limited information available for comparing rootstocks. On colder sites, and on all Idaho sites above 4,500 feet in elevation, mulch all rootstocks to prevent root injury from low winter soil temperatures.

### M9

Producing trees about 30 to 40 percent of full size, M9 is extremely popular in western commercial areas. It has brittle roots, is not well adapted to sandy soils, and any commercial plantings in colder areas should be trellised and mulched.

| Usage/notes |
| --- |
| fresh, cooking, cider, tart |
| fresh, cooking, high quality |
| fresh, cooking, stores well |
| fresh, cooking, cider |
| fresh, cider, tart |
| fresh, cooking, firm, mild |
| fresh, crisp, stores well |
| fresh, cooking, sweet |
| all-purpose, stores well |
| cooking, fair quality |
| fresh, high quality |
| fresh, cooking, tart |
| all-purpose, good quality |
| fresh, cooking, mild |
| all purpose, good quality |
| fresh, high quality for a summer apple |
| fresh, makes pink sauce |
| fresh, cooking, excellent quality |
| all-purpose, good quality |
| cooking, poor-fair quality |

**Budagovski 9 or Bud 9**

This is a new rootstock with about the same dwarfing effect as M9 but much hardier and more adapted to colder production areas. Bud 9 availability is currently limited because of demand, but it is preferred for high production plantings in colder areas. Staking or wire support is required.

**M26**

Less vigorous than M7 and widely used in modern high-density orchards, M26 makes a tree 40 to 55 percent of full size, depending on soil type and depth. It is highly productive. Spur-type cultivars and trees grown on sandy soils are easily stunted. Extremely sensitive to drought, M26 rootstock should be irrigated frequently to ensure water to shallow roots. Plant trees 8 to 10 feet apart. Staking or wire support is required.

**M7**

M7 (virus-free selections M7a or M7 EMLA are preferred) produces trees 60 to 70 percent of full size. Not as vigorous as standard-size rootstock, it is relatively hardy and highly resistant to collar rot. M7a is tolerant of drought conditions but is easily stunted, has a tendency to lean, particularly on windy sites, and prefers heavier soils. M7 is very sensitive to management and highly productive. Plant trees 10 to 15 feet apart in the row (between tree spacing) or 10 feet apart with spur-type cultivars. M7 requires staking on windy sites.

**MM111, MM106**

These produce trees 75 to 85 percent of full-size. Trees on these rootstocks with grafted hardy cultivars have survived in eastern Idaho. Availability of these rootstocks may be limited, and our current experience with them is less than with the rootstocks discussed above. MM106 is very susceptible to collar rot and damage from early fall freezes.

**Antanovka**

This is a popular winter hardy rootstock for commercial plantings. An apple of Russian origin famous for its hardiness to -50°F, Antanovka has a deep root system and does not sucker. Trees are about 90 percent of full size on a seedling rootstock.

**Seedling (Domestic Apple, also called Standard)**

Seedling is well known for general compatibility, ease of budding and grafting, and vigorous growth. Seed collected from cannery waste produce seedlings that are the most adaptable, most vigorous, and the most capable of withstanding neglect or poor soil conditions. Seedlings that are used as rootstocks produce vigorous, rugged, standard, full-size trees. Seedling gives excellent anchorage and few suckers. Seedling is adaptable to a wide range of growing conditions and tolerates wet, dry, poor soil. Today it is used primarily in combinations with spur-type varieties for a smaller tree.

Seedling rootstocks produce trees that are slower to come into bearing than ones on size-controlling rootstocks, and are not as hardy as Antanovka or Budagovski. Trees on seedling rootstocks also have great variations in size. These factors, as well as the large size of the trees, are reasons for not using seedling rootstocks in modern orchards. Also, yields are greatly increased in high-density orchards, pest control is easier on small trees, and harvest costs are less.

## TREE SPACING

Tree spacing depends on the tree apple cultivar-rootstock combination, soil, and management practices. Table 2 shows numbers of trees at various spacings and the bushels per tree needed to obtain a production goal of 1,000 bushels per acre.

Order trees a year before planting and have them delivered in early spring.

**Table 2.**

Tree spacing, densities, and yields to obtain 1,000 bushels per acre.

| Between tree x between row spacing (feet) | Tree density (trees/acre) | Yield (bushels/tree) | Rootstocks |
|---|---|---|---|
| 5 x 15 | 581 | 1.7 | M9, Bud9, M26 |
| 6 x 18 | 403 | 2.5 | M9, Bud9, M26, M7 |
| 8 x 18 | 302 | 3.4 | M6, Bud9, M7 |
| 10 x 18 | 242 | 4.2 | M7, MM111, M106 |
| 12 x 20 | 182 | 5.4 | M7, MM111, Standard |

## PURCHASING AND PLANTING TREES

Order trees a year before planting and have them delivered in early spring. Trees should be undamaged, not moldy, straight, and about 4 to 6 feet tall ($^{7}/_{16}$- to $^{3}/_{4}$-inch caliper). Smaller trees are often stunted and never do well. Obtain trees certified to be true to their name and free of known viruses and other diseases. Larger trees that are branched (feathered) are more expensive but may come into production one year earlier.

Quantities of well-grown nursery trees of the desired cultivars and rootstocks usually need to be ordered at least a year or two ahead. Trees are about $5 to $8 each purchased in bundle quantities plus shipping and handling. Planting costs run $1 to $3 per tree.

Early planting is essential for good tree growth. Optimum growth occurs if trees are planted one month before bloom, about early April. Root growth begins at this time when the soil temperature is about 42°F. The next flush of root growth occurs after terminal bud set in late July or August and continues until ground freeze.

Planting holes for each tree should be as large or larger than the natural spread of the bare roots, typically 20 to 30 inches wide and 14 to 20 inches deep. An auger is very useful for drilling holes for large numbers of trees; however, care must be taken not to dig the hole too deep or the tree may settle below the graft union. The graft union should be 2 to 4 inches above the ground.

Make sure that the hole is moist, not wet, and dug only a few hours before planting to prevent soil drying. Avoid digging in wet soils to keep from slicking and compacting the soil, which inhibit root growth.

Use care in protecting the roots of bare-rooted trees from drying winds and cold. Trees are best kept in a water barrel for 2 to 24 hours before planting. This also helps to rehydrate the roots. Trim long or broken roots before planting.

Install the irrigation system before planting or be sure trees are well watered immediately after planting. Irrigation moistens and settles the soil around the roots. Irrigate trees within 24 hours after planting by applying about 2 gallons of water to each tree. Take care to prevent trees from settling with the graft union below ground since roots formed from the portion grafted or budded above the rootstock (scion) will not have the same characteristics as the intended rootstock.

After planting, protect tree trunks from sunscald by painting up to the first branch or 24 to 28 inches with interior white latex paint diluted 1 part paint to 3 parts water.

**Fertilizing at planting**

At planting many soils are deficient in phosphate. To each hole, add about 1 cup of 10 percent phosphate as bone meal or 0-45-0. Mix it well with soil to avoid direct contact with the roots. Never add fertilizers containing nitrogen or potassium to the planting hole.

After planting most Idaho soils do not require nitrogen (N) fertilizer the first growing season. If the soil is extremely low in N or very sandy, some fertilizer may be needed. In this case, apply 2 to 3 ounces per tree of a fertilizer containing 15 to 30 percent nitrogen. Never apply nitrogen fertilizer after mid-June to a tree of any age because this may stimulate growth late in the season, delaying dormancy and increasing the possibility of winter injury. (For fertilization practices after the first growing season see *Homeowner's Guide To Fruit Tree Fertilization.*)

**Table 3.**
Comparison of central leader and vertical axis training systems.

| Characteristic | Central leader | Vertical axis |
|---|---|---|
| Tree height (feet) | 12-14 | 10-14 |
| In-row spacing (feet) | 8-10 | 5-6 |
| Between-row spacing (feet) | 15-18 | 13-15 |
| Trees per acre | 250-400 | 500-700 |
| Rootstocks | M7, MM111, MM106 | M9, Bud9, M26, M7 |
| Support | None or individual stakes | Individual stakes or trellis |

## TREE TRAINING SYSTEMS AND PRUNING

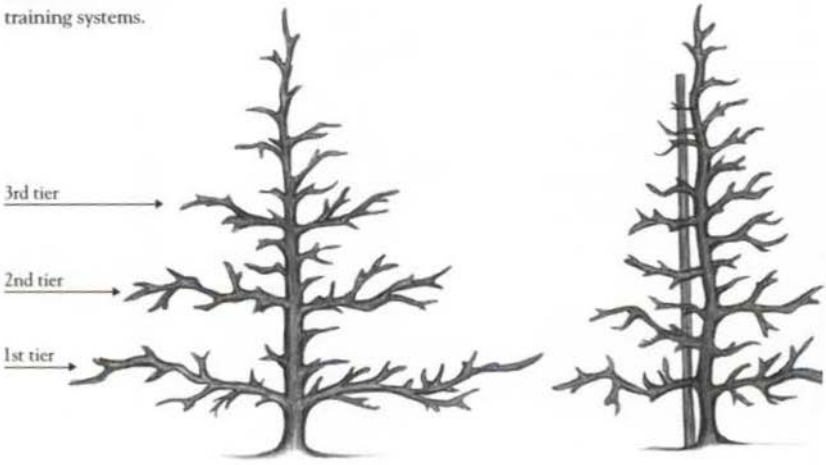
Most orchards are planted using a central leader system or a high-density vertical axis system (figure 2, table 3). The first three years of training are very important for tree development. The following principles apply to the central leader system in general and can be used for most cultivars. The vertical axis system is similar except trees are smaller and tiers of scaffold branches are not formed. Rather, main fruit-bearing branches are evenly distributed in a pyramid-shaped tree.

Training has three goals:

1. Develop a strong central trunk with 9 to 13 main scaffold branches, well separated in two to three tiers. Some branches will be removed as the tree approaches maturity.
2. Develop branches with wide crotch angles (45° to 60°) and many evenly spaced fruiting laterals of varying lengths.
3. Develop, as soon as possible, a tree with an open, pyramidal form capable of supporting a crop of apples.

**Figure 2.**

A comparison of the central leader and vertical axis training systems.

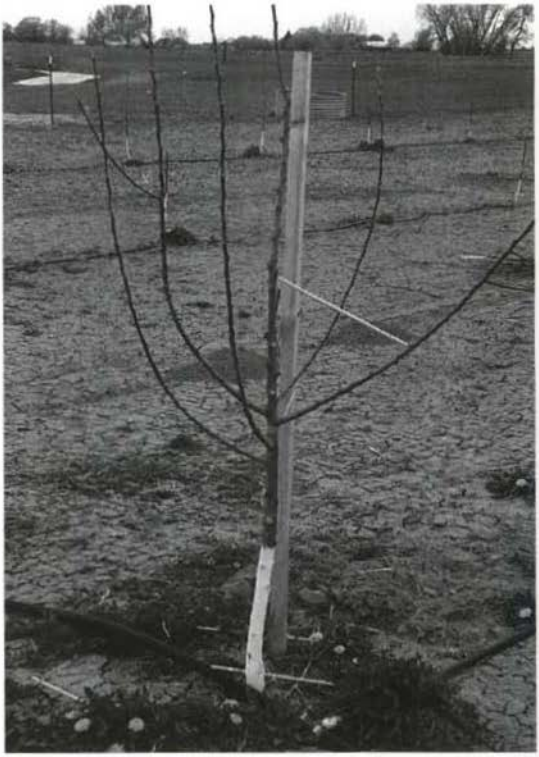


**Second growing season pruning**

1. Remove all but one vigorous terminal shoot from each scaffold branch.
2. Spread branches with narrow angles as described above or use 1x1 inch wooden spacers with sharpened nails on both ends for larger or stronger limbs (figure 7).

**Second dormant season pruning**

1. From the side branches that have developed above the first scaffold, select two or three additional scaffold branches on the leader. These will form the second tier, or scaffold. Again these should be wide angled and spaced vertically about 4 to 6 inches apart.
2. Remove all but one upright shoot to maintain a central leader.
3. The scaffold branches selected at the first dormant pruning will now have branches. Save these and the short twigs and spurs that develop on the inside of the tree and remove those that compete with the scaffold branches.



**Third dormant season pruning**

This is a repeat of the previous year's pruning. A third tier of scaffold branches is selected above the second tier. The leader is maintained, as are short twigs and spurs for fruiting.You can learn more detail about pruning, as well as other training options, by contacting the UI Cooperative Extension System office in your county and by referring to the publications listed under "Further Readings."

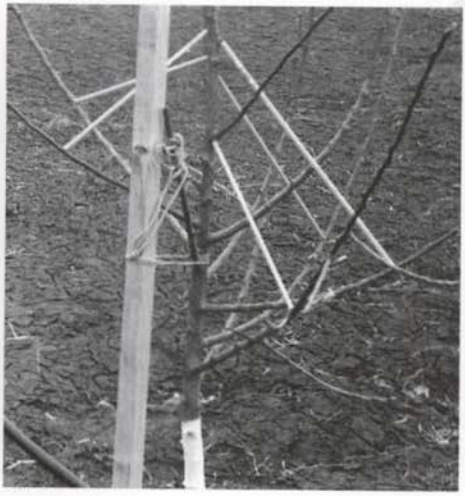


**Figure 7.**
Limb spreaders improve crotch angles, reduce limb competition with the central leader, strengthen limb attachment, and increase flower bud formation. Here 1/2-inch dowels serve as spreaders.

## WATER MANAGEMENT

Irrigation is a must for quality fruit and good yields in parts of Idaho that do not have adequate rainfall. The irrigation frequency and desired moisture level at each foot of depth changes with tree age and ground cover. It also changes with the season, water-holding capacity of the soil, and wind factors. Young trees, for example, are easily moisture stressed, which stops new growth.

In general, orchards need about 20 to 30 inches of water total per season, which requires irrigation in most areas. In northern Idaho and areas of high rainfall, irrigation may not be required. Check soil moisture frequently and do not allow the available soil moisture (ASM) to drop below 50 percent. Evapotranspiration rates can exceed 0.35 inch per day depending on temperature, humidity, and solar and wind conditions, which means as much as 2 to 3 inches of water per week may have to applied in summer months.

A well-designed, permanent irrigation system is best. While the investment cost is greater for a permanent system, the penalty for a poor system can be costly reduced tree growth. A sprinkler system is better adapted to lighter, sandy soils. Mini sprinklers with low pressure and volume are being used very successfully and give better water distribution on some soils than drip systems. They also allow for the growing of cover crops in the row center.

**Figure 8.**
A well laid out young orchard with good ground cover.

## GROUND COVER MANAGEMENT

Weed control is essential to properly develop young trees. A combination of cultivation and herbicides can keep weeds away from sensitive young trees. Clean cultivation 4 to 6 feet around tree trunks is recommended (figure 8). Avoid cultivation deeper than 2 or 3 inches to prevent root damage.

Herbicides are generally not recommended in the first year. Use trunk guards during spraying if herbicides are necessary. Herbicides can damage young trees with tender bark.

A ground cover between rows reduces soil compaction, keeps dust down, and helps cool the orchard in the summer. Grass sod cover crops are best.

Creeping red fescue has been the most universally successful grass cover. It has a shallow root system, which is less competitive with tree roots, and it takes shade better than most grasses. Other grasses to consider are bluegrass, fescues, and perennial ryegrass. Ground covers of annual small grains may be required the first 2 years in order to hold the soil before permanent grass is seeded. Do not use clovers or other blooming ground covers because they compete with the apples for bee pollination. Cover crops will require mowing, fertilization, and, in most areas, irrigation water.

## POLLINIZERS

Most small orchards for local market production will consist of multiple cultivars, which reduces the need for planting special pollinizers. Time of blooming can be quite different for different cultivars, however. Be sure to provide good bloom overlap.

Solid blocks of a single cultivar, strain, and rootstock are preferred for ease of management. Crabapple cultivars are being used successfully for pollination in large, single cultivar blocks.

Interplant pollinizers every 60 feet of row or closer. These trees can be trained to a pillar shape to reduce the space they take up in the row.

Bees are needed for pollination. In young trees 3 to 4 years old, place two bee hives per acre. Trees 5 to 7 years old may require only one hive. When trees are in full bearing, one-half hive per acre is adequate because a higher percentage of the bees from each hive will stay in the orchard during bloom.

Move bees in just as bloom is beginning. Choose spots protected from wind. Always protect bees from toxic sprays by removing hives during spraying or avoid spraying during the pollination period.

## THINNING THE FRUIT

Apple trees will generally set more fruit than they are capable of successfully carrying to maturity or develop to commercial sizes. Removing excess fruit helps improve the color and size of the remaining apples. Failure to remove excess fruit decreases the formation of flower buds for the following year, which decreases the subsequent year's crop potential and leads to biennial bearing.

The earlier thinning is completed, the more effective it will be. Most of the buds for next year's flowers are initiated during a 4- to 6- week period after full bloom. In commercial apple production areas chemical thinning is practiced routinely. It is an option for the small producer but requires additional knowledge and experience.

To thin by hand, leave one apple per cluster and space the remaining apples about 4 to 6 inches apart. Remove the fruit from the stem without damaging the spur or other apples on the spur. Hold the stem between thumb and forefinger and push the fruit from the stem with the other fingers (figure 9).

**Figure 9.**
To thin fruit, hold the stem between thumb and forefinger and push the fruit from the stem with the other fingers.

## FRUITING

Young orchards will often produce some fruit the third or fourth season depending on the rootstock, cultivar, initial branching, and training system. Crops in the fifth year can range from 200 to 500 bushels per acre in high-density systems, enough to cover growing costs. By the sixth or seventh season, the high-density orchard should produce 600 to 900 bushels per acre. Yields depend on cultivar, number of trees per acre, pruning, and training. Yields in many nontraditional and short-season areas are yet to be determined under commercial management systems.

## PEST MANAGEMENT

Producers of quality fruit must be aware of several insect pests and diseases that may require control measures every year.

Complete pest management programs are available in other publications. What follows here is a list of the most common pests and the need for control measures.

**Insects**

CODLING MOTH (worm in the apple)—Control needed every year or severe fruit loss will occur.

LEAF ROLLERS—Usually controlled by codling moth sprays; however, in some years sprays before bloom may be needed.

APHIDS—Spray as needed. Dormant oil sprays kill overwintering eggs.

SPIDER MITES—Spray as needed. Dormant sprays help reduce populations.

APPLE MAGGOT—Very serious in northern Idaho. Spray as needed during the summer.

**Diseases**

POWDERY MILDEW—Can be severe some years on some cultivars.

FIRE BLIGHT—Can be severe some years and difficult to control.

SCAB—Varies with cultivar and location. If growing in scab prone areas (areas of high rainfall), select resistant cultivars (table 1).

## PREVENTING WINTER INJURY

Planting hardy cultivars reduces losses from winter injury. The Malling rootstocks (M7, M26, etc.) generally will be injured when root temperatures drop to about 20°F. The roots of hardy rootstocks such as Antanovka can withstand temperatures as low as 14°F without injury.

To prevent injury it is advisable to mulch at least for the winter (November to March) with straw or wood chips 4 to 6 inches deep from trunk to dripline. Mulching may not be needed in some regions such as northern Idaho, the Lewiston area, and southwestern Idaho where soils do not freeze as deep as in southeastern Idaho. If you use mulches, be aware of the increased potential for mouse damage. Thorough watering before the ground freezes is important in preventing winter injury in all areas.

To prevent injury it is advisable to mulch at least for the winter with straw or wood chips 4 to 6 inches deep from trunk to dripline.

**Figure 10.**
Hardware cloth mouse guards should be 20 to 30 inches high and extend into the soil 2 to 4 inches.

## PREVENTING MOUSE (VOLE) DAMAGE

Young trees must be protected from damage by meadow voles or mice. These rodents can girdle the trunk by eating the tender new bark and the cambium layer underneath, effectively preventing translocation of nutrients and killing the tree. The best protection is a cylinder of hardware cloth 4 to 8 inches in diameter and 20 to 30 inches high. The cylinder should encircle the trunk and extend into the soil 2 to 4 inches. One-eighth- to 1/4-inch mesh is necessary to exclude mice (figure 10). Poison baits may be used in addition to screens.

## HARVESTING

Picking fruit at the optimum time is important for best quality but may be hard to do without experience with specific cultivars. Fruit picked too soon does not store well and never develops full flavor. Fruit picked too late also does not store well and is susceptible to dropping, water core, and frost damage.

Harvest maturity indicators include apple firmness and sugar content. For small producers, simply tasting the fruit and noting when the starches change to sugars is a good way to determine when to pick.

When picking apples it is important to avoid bruising, breaking the skin, or exposing the fruit to extreme heat or cold. Leave the stem attached to the apple by removing the apple from the spur by pushing upward while rotating the fruit. On some long-stemmed cultivars, it may be necessary to place the index finger firmly at the point of attachment of the stem and spur to prevent the spur from breaking. Apples with the stem attached keep longer and avoid rot where the stem attaches.

Apples for local markets can be picked directly into bushel boxes and sold "field run" or sorted to general size and quality. Remove misshapen, small, and off-colored fruits for cider or sell them as culls. Discard wormy, bird-damaged, or insect-damaged fruit.

## STORAGE

Many apple cultivars will keep for 1 to 3 months under cold storage. Without proper storage some will last only days or a few weeks. Diseased, bruised, or insect-damaged apples should be sorted, stored separately, and used first or discarded. Do not mix windfalls with fresh-picked fruit because windfalls give off more ethylene gas, which hastens the ripening process and decreases quality.

Apples will store longer if they are cooled immediately after harvest. Most cultivars such as Delicious, Haralson, Honeycrisp, Jonathan, and Wealthy store best at 30° to 32°F. McIntosh cultivars and McIntosh types are stored best at 36° to 38°F. Humidity in the 80 to 85 percent range is important for long storage periods.

Some small-scale producers are forming cooperatives for storing a few thousand bushels of fruit in a single facility that can maintain proper conditions. Storing quality fruit in perforated plastic bags can help apples keep longer and facilitate marketing.

## MARKETING

Successful marketing of your fruit depends on having quality fruit, good planning, and accurate knowledge of your potential consumers. Here are some points that will help:

1. Raise three to five different cultivars that mature at different times such as August, September, and October.
2. Have both yellow and red cultivars.
3. Include one or two cultivars that store for 2 to 3 months.
4. Sort apples by quality and color. Be sure customers know the quality they are buying. There is a market for culls or poor-quality fruit, but these must be kept separate from high-quality fruit.
5. Vary container sizes from 1 bushel baskets to 5- to 10-pound plastic bags. Include 1/2- and 1/3-bushel containers.
6. Develop a customer list and inform them about your crop. Take pre-harvest orders.
7. Emphasize return sales.

Other good marketing and advertising information is available in publications listed in the further readings section.

## SUMMARY

Be aware of potential markets and be able to market your product through several means. Cultivars normally available and familiar to the public may not be the best choices. A quality product is essential. Quality fruit production comes first by knowing the characteristics of your cultivars and the climate extremes where you expect to grow them. The orchard will be in production for 10 or more years and must be able to survive occasional severe cold weather episodes without being killed or injured.

A number of insects and diseases can severely lower fruit quality and damage tree structure. Know the potential for these problems and the control measures available.

Intensive training systems now used in fruit-growing districts are well suited for small-acre production. However, producers must be trained in them and expect to gain experience before taking full advantage of them.Proper handling of fruit during harvest and in storage is critical for quality fruit production. New producers should visit established orchards and facilities to become familiar with necessary modern techniques.

All good producers continually attend workshops and educational programs provided by the Cooperative Extension System, industry, and various organizations. Modern fruit production is dynamic, particularly in the areas of new cultivars, training systems, pest control, and marketing. We encourage everyone interested in fruit production to continually avail themselves of these ongoing programs.

## FURTHER READINGS

PUBLICATIONS FROM THE UNIVERSITY OF IDAHO

Agricultural Publications
University of Idaho
Moscow, ID 83844-2240
Fax (208) 885-4648
For information, call (208) 885-7982
http://info.ag.uidaho.edu

Apple Scab. CIS 690, Order #176, 25¢

Grafting and Budding Plants to Propagate, Topwork, Repair. PNW 496, Order #988, $2.50

Homeowner's Guide to Fruit Tree Fertilization. CIS 866, Order #310, 35¢

Identifying Domestic Markets: Indirect Marketing of Produce. CIS 98, Order#425, 50¢

Insect Control for Apple and Pears in the Home Orchard. CIS 603, Order #132, $1.00

Marketing Your Produce Directly to Consumers. EXT 741, Order #620, $1.50

Meadow Mouse Control in Tree Fruit Orchards. PNW 154, Order #745, 25¢

1999 PNW Plant Disease Control Handbook. Order #1088, $25 (revised annually)

1999 PNW Insect Control Handbook. Order #1087, $25 (revised annually)

Pruning Apple Trees in Commercial Orchards. PNW 404, Order #918, $1.00

Specialty Farming in Idaho: Is It for Me? EXT 743, Order #622, $1.00

Specialty Farming in Idaho: Selecting a Site. EXT 744, Order #623, $1.00

Training and Pruning Your Home Orchard. PNW 404, Order #915, $1.00

Weed Control in Tree Fruits. CIS 692, Order #178, 25¢

Why Home Fruit Trees Die. CIS 776, Order #231, 25¢

OTHER PUBLICATIONS

Critical Temperatures for Blossom Buds: Apples. Washington State University EB0913, $1.00. Order from Bulletins Office: 800-723-1763.

Growing Fruit in the Upper Midwest by Don Gordon,
University of Minnesota Press, Minneapolis.

Don't let a short growing season and long, cold winter keep you from growing apples commercially! Hardy apple varieties and rootstocks are now widely available. Markets for these apples are promising, as consumers increasingly hanker for tasty, locally grown produce and unusual apple varieties.

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- A list of hardy, short-season apple varieties and their culinary attributes
- The basics of training and pruning
- Ways to keep your orchard healthy over winter
- Management practices that work
- Marketing tips
- Sources of additional information, and more

Home orchardists will want this information, too!

Author Brian Finnigan, extension educator in Bingham County, shares the insights he has gained in 20 years of advising and learning from successful apple growers in the harsh, high-elevation environment of southeastern Idaho. Authors Michael Colt, a tree fruit horticulturist, and Esmaeil Fallahi, a tree fruit physiologist, lead extension programs and conduct research at the UI Parma Research & Extension Center.

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Issued in furtherance of cooperative Extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, LeRoy D. Luft, Director of Cooperative Extension System, University of Idaho, Moscow, Idaho 83844. The University of Idaho provides equal opportunity in education and employment on the basis of race, color, religion, national origin, gender, age, disability, or status as a Vietnam-era veteran, as required by state and federal laws.

BUL 820 Published February 2000 $2.50