



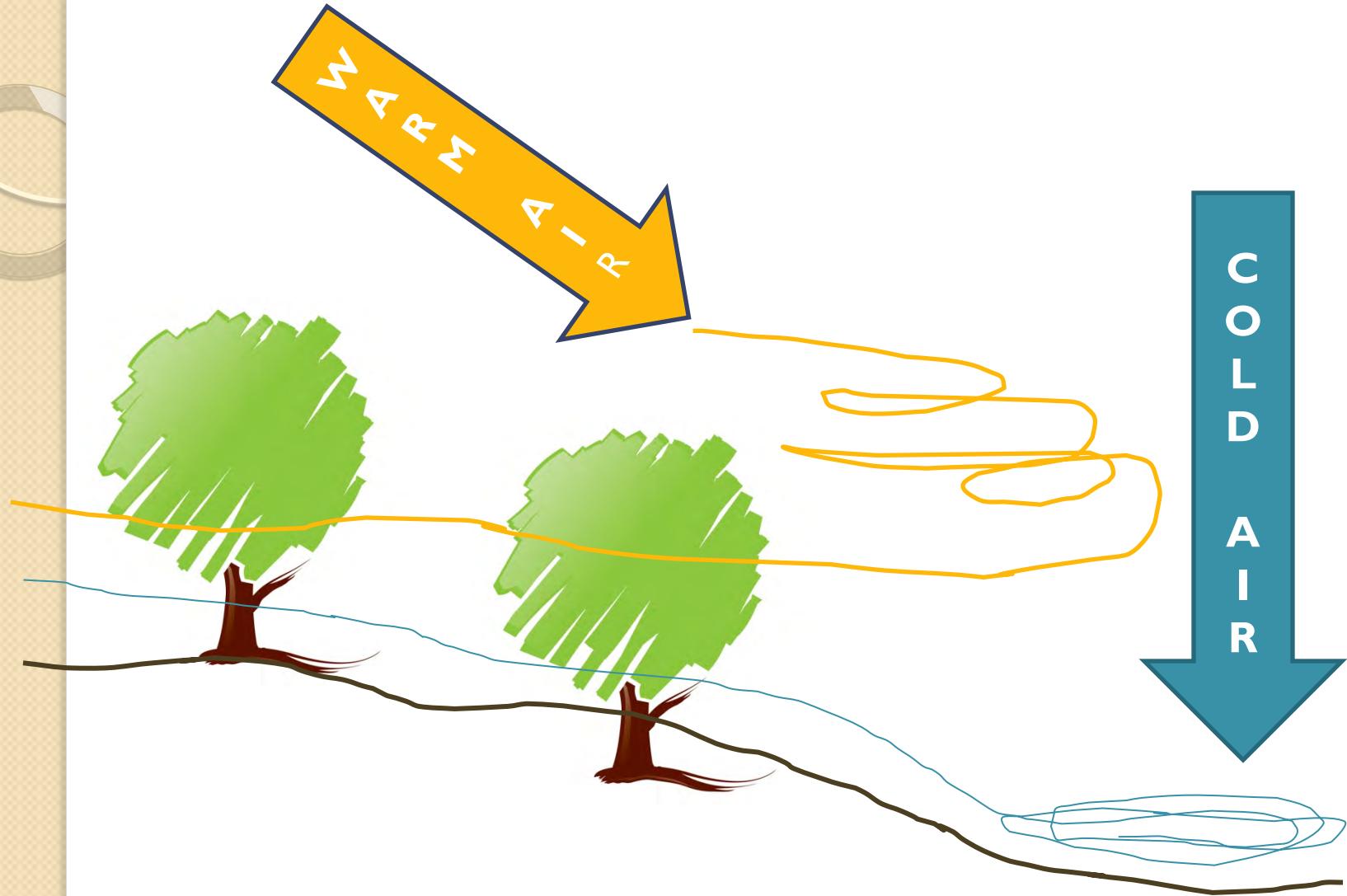
Unit B: Establishing a Fruit Garden

Lesson 2: Selecting and Planting Fruit and Nut Trees

Terms

- Cross pollination
- Cross unfruitful
- Cultivar
- Grafting
- Intersterile
- Nematode
- Pollination
- Pollinizer
- Rootstock
- Self fruitful
- Self pollination
- Self sterile
- Slope
- Topworking

- I. An orchard is only as good as the ground it is planted on.
 - A. When choosing land for an orchard, the ideal site is on rolling or elevated land
 - I. This allows cold air to travel to low spots during cool weather
 - a. Cold air is heavier than warm air and will travel down to lower elevations.
 - 2. Dense woods or high hills and mountains will block cold air as well
 - 3. Sites directly on top of hills or ridges may be too windy or cold during winter.



Lower Elevation

- B. Slope and the direction of the slope is also important when evaluating an orchard site.
 - I. A south facing slope warms up faster in spring, the opposite is true for a north slope.
 - 2. The degree of the slope can affect an orchard site.
 - a. An ideal slope is 4 to 8 percent

i. **Slope** is calculated by taking the height of rise in the land over the distance it rises. Example: in 100 feet the land rises 5 feet. So, $5 \text{ ft}/100 \text{ ft} = 0.05 \times 100$ or a 5 percent slope.



- b. A steep slope makes harvest difficult.
- c. The bottoms of steep slopes are sometimes too fertile.
 - i. Overly fertile soils can lead to excessive tree growth at the expense of fruit production.

- C. As discussed in the previous lesson, soil type and drainage are important to consider
 - I. Most fruit and nut trees require well drained loam that is a minimum of 3-4 feet deep.
 - a. Good drainage should take preference over soil depth.
 - b. The tops of ridges and hills will have shallow soil due to erosion.
 - 2. Fruit trees grow well in soil with a pH of 6.0 to 6.5.
 - a. Higher or lower levels can cause a nutrient deficiency.

II. Once a suitable site has been chosen for an orchard it is necessary to prepare the land.

- A. A soil test should be taken to determine the fertility of the soil
 - I. A local Extension Educator has the resources to conduct a soil test, or, a soil test kit can be purchased and done by the grower.
 - 2. If replacing an old orchard or starting a new one, take the soil sample after removing as many of the roots as possible.

- B. If the land being prepared for orchard was previously pasture, a nematode test should be conducted.
- I. A **nematode** is a tiny worm that damages plants by feeding on the roots. (pictured below)
 2. Local Extension Agents have the resources to conduct nematode tests.





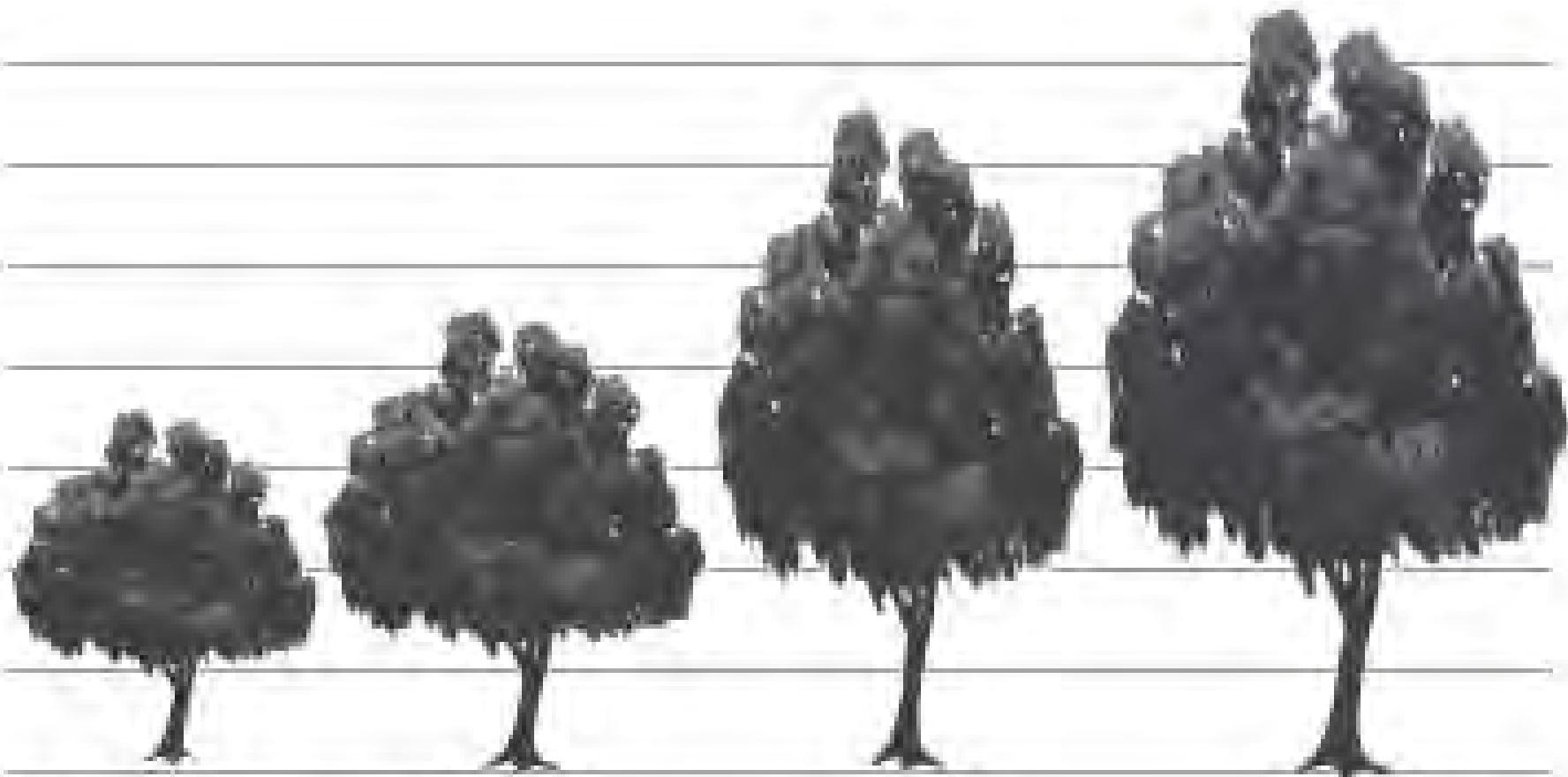
C. After a field crop or pasture has been plowed down take a soil test before doing the final groundwork and leveling.



III. When choosing a fruit or nut tree there are many factors to consider.

A. Size

- I. Fruit and nut trees can grow to be very large and take up a lot of space.**
 - a. Some fruit trees require two different cultivars in order to pollinate and produce fruit.**
 - b. Larger trees will produce more fruit but will also be more difficult to prune and harvest.**
- 2. Different sizes of fruit trees are available**
 - a. Dwarf trees grow 8 to 10 feet tall**
 - b. Semi-dwarf grow 12 to 20 feet tall**
 - c. Standard trees grow upwards of 30 feet**



Malling 9

Malling 7

(MM) 111

Standard

Figure 1. Effect of different dwarfing rootstock on the same apple variety.

B. Cultivar

1. A ***cultivar*** is a plant derived from a wild type and is cultivated for desirable characteristics such as disease resistance or fruit size.
2. There are hundreds of different cultivars of fruits and nuts.
3. A cultivar proven to be dependable under the local growing conditions will be best.

C. Rootstock

- I. Improved fruit trees like dwarf varieties are produced by grafting.
 - a. A **rootstock**, a healthy plant used for the base of grafting a scion, from one cultivar is grafted to the scion of another cultivar giving improved qualities.
 - i. Grafting can improve size, disease resistance and in some fruit species multiple fruit varieties can be produced on one tree.
 - b. The rootstock determines the size of the tree.
 - i. If a root stock of a dwarf variety is grafted to a standard scion, the tree will be a dwarf

D. Pollination

1. **Pollination** is the transfer of grains of pollen from the anthers (male floral part) to the stigma (female floral part) of a flower
2. Every fruit crop and sometimes specific varieties within fruit crops have different pollination requirements.



- a.** **Cross pollination** requires the transfer of pollen between two species or varieties
- b.** **Self pollination** is the transfer of pollen within a single plant or among several plants of the same variety
- c.** **Self sterile** plants which produce very little fruit
- d.** **Self fruitful** plants which produce fruit from their own pollen
- e.** **Cross unfruitful** varieties that will not set fruit when cross pollinated
- f.** **Intersterile** neither of two varieties will fertilize the other

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3. To ensure fruit set, each variety's pollination requirements should be determined before planting.
 4. Different fruit varieties can be grafted onto the same tree as well in a process called **topworking**
 - a. To top-work an apple tree, 6- to 8-inch sections of branches of one apple variety are cleft-grafted onto terminal branches of another variety.

IV. Preparing the land and choosing the proper trees are just as important as the layout of the orchard.

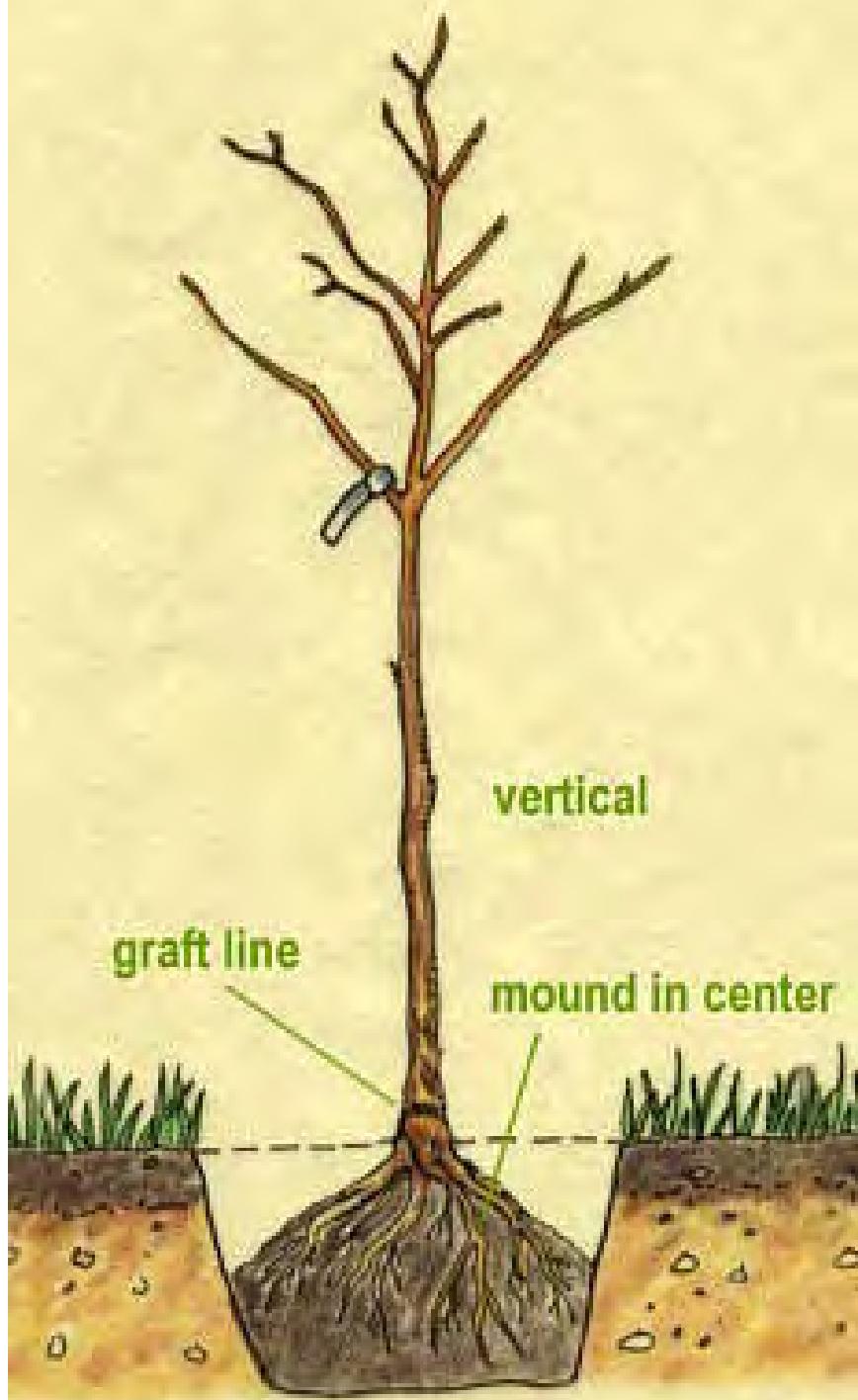
- A. There are many layouts possible for a fruit orchard and the arrangement will sometimes depend upon the variety and amount of trees planted.
 - 1. In commercial orchard operations a common arrangement is one row of **pollinizer** trees (the tree producing the pollen) between four rows of the main variety.
 - 2. Sizes of trees impact spacing and arrangement as well.
 - 3. Semi-dwarf and dwarf pollinizers are placed every fifth tree in a row and staggered from row to row.

- B. The maximum distance between pollinizers and main variety trees is 50 feet.
 - I. Space between trees should be determined by the mature size of the tree.
 - 2. To determine the mature size, ask the grower from which you obtained the trees.
- C. A plan should always be made ahead of time to determine the distances between trees
 - I. Drawing a plan on paper will allow for faster and more efficient planting.
 - 2. Planning ahead of time will give you the ability to dig the holes right away and be ready to plant the trees as soon as they are available.



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- V. Once a plan is made and the trees are available they need to be planted immediately.
- A. Fruit trees may be planted in early spring as soon as the ground temperature is warm enough
 - B. Dig a hole wide and deep enough for the roots to lay comfortably in the hole without the roots wrapping around themselves.

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1. When the roots wrap around themselves and begin growing they will eventually “choke” the tree and cause poor yield or death.
 2. Trim off any broken roots.
 3. If the tree is grafted the graft union should be at least two inches above ground.
 4. If the tree is planted too deep and the graft union is below the soil line, the scion variety will form roots and the tree will become a standard-sized tree.



- C. Once the hole is dug and the tree placed in, only clean soil and water should be placed back in the hole.
 - I. If the soil needs amending, place some peat moss into the hole, but not fertilizer.
 - 2. Too much fertilizer on the small tree can burn the roots or cause excess foliage production.
 - 3. Before completely filling the hole, be sure the tree is straight.

- D. After the tree is planted, gently tamp the soil with your feet and water with 2 to 5 gallons of water.
- E. Once the trees have been planted, they need routine care.
 - I. Practices such as grafting, pruning, and harvesting will be covered in later lessons and are extremely important to tree and orchard health.



Review/Summary

1. What are some factors that influence orchard site selection?
2. What methods are used to prepare the orchard site and soil for planting?
3. What factors should be considered in the selection of fruit, and nut tree cultivars?
4. Describe the process of laying out an orchard.
5. What items should be considered when planting a tree?