Plant Response to Pruning Cuts

Lee Reich

Pruning causes anguish in many gardeners. As a result many of them approach the job with too much timidity, wincing with pain at each cut; or else they go to the other extreme. No wonder, given all that's been written about the pruning needs of specific plants or groups of plants. In fact, though, all plants respond to pruning in qualitatively the same manner. Once we understand just how the stems of plants respond to being cut—whether they are mighty oaks or midget marigolds—we can better (and more confidently) prune.

The Effects of Pruning: General vs. Local

Pruning stems dwarfs plants. Leaves produce food for a plant, and the stems are one place where plants squirrel it away for later use. Cut away a stem, and you leave the plant with less food.

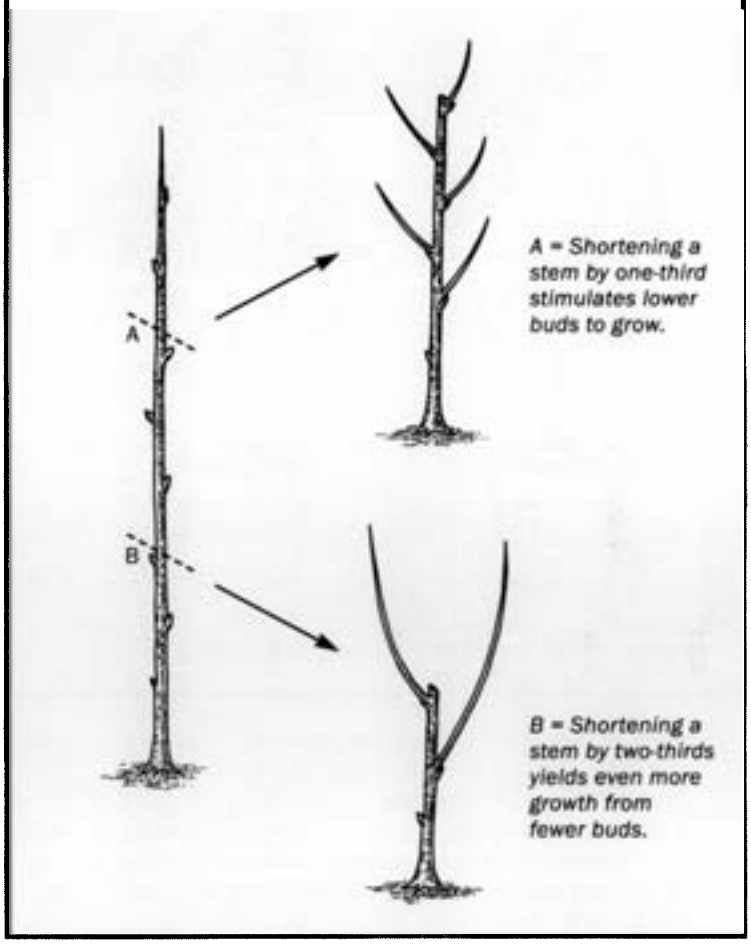
Many gardeners might argue with my assertion that pruning dwarfs plants. Who hasn't drastically cut back a tree or branch in late winter, only to watch new shoots grow with great vigor when compared to their more sedate, unpruned counterparts? And the more severely the tree or branch was cut back, the more energetic the response of the remaining buds.

But pruning has not stimulated growth; it has caused "local stimulation," that is, stimulation of the buds just below the point where pruning occurred. If you were to add the weight of the pruned stems to the weight of new growth that the tree would have made had it not been pruned, you would find the total to be significantly greater than the actual weight of new growth on the pruned tree.

In addition to dwarfing the plant, pruning will cause local effects, including changes in plant form as well as in the quantity of fruits and flowers. Often we may be willing to accept some amount of undesired dwarfing just because we want to prune for these local effects. By understanding how a plant responds to cuts, the gardener can achieve the desired result whether or not a general dwarfing of

the plant is one of the aims. Pruning a stem can strengthen it, induce flower buds, and/or cause branching, but the effect depends on both the degree and timing of your cut.

Response to Two Degrees of Heading Cuts



Effect of the Degree of Cutting

Plants do show some differences when their stems are pruned, but the differences are quantitative rather than qualitative, so general rules are useful. For example, picture a young shoot, less than a year old, be it the main stem of a tomato plant or an apple tree. Unpruned, the stem will continue to grow from its tip, and side branches may or may not grow out farther down along the stem.

The number and the vigor of side branches depends on the vigor of the plant. Those on a tomato plant, for example, may be numerous and strong enough to match or overtake the length of the main stem. On the apple tree, though, side branches might push out only a few inches of new growth.

Pinching

For the least pruning possible on any stem, pinch off the growing point of a shoot with your thumbnail. This causes growth to falter briefly but has another effect as well. The tip of any stem releases a hormone called auxin that moves down the stem, inhibiting the growth of lower buds. Remove the stem tip and you stop the flow of auxin, awakening lateral buds that were dormant and inducing existing side shoots to grow more vigorously. Pinching is useful generally for slowing stem growth—to direct the energies of a tomato plant in late summer to ripening fruits, for example. It also encourages branching, as, for instance, on a potted avocado tree whose single, lanky stem looks ungainly.

Heading

A stem can also be shortened more drastically using pruning shears or a knife. This is called a heading cut, and the plant's response depends on the degree of heading. If you cut a young stem back by a third, buds that might have stayed dormant on the remaining part of the stem will now be prompted to grow more enthusiastically than if the stem had been left alone. Shorten that same stem by two-thirds and the resulting new growth will be even more vigorous. (Remember: all this stimulation applies only to the cut stem; the plant as a whole is dwarfed by pruning.) Those buds nearest a heading cut are the ones that make the most vigorous, upright shoots; lower down, buds will push out growth that is less vigorous and comes out at wider angles to the cut branch.

Several general rules can predict the stem's reaction to heading. The more vigorous a young

Effect of Pinching

Pinching out the tip of a stem encourages branching.

stem before it is headed back, the more vigorous the response to such pruning. Also, the more vertical the orientation of a stem, the greater its vigor. And a heading cut into one-year-old wood elicits a more vigorous response than does a cut into older wood. Too many gardeners carelessly hack back their plants in an effort to get rid of unwanted growth, then bemoan the dense and vigorous regrowth from the heading cuts. In the right situation, however, a heading cut can be very useful. There are times when vigorous new growth is needed: to strengthen the trunk of a young tree; to create new bearing wood for fruits or flowers; for a decorative effect; to invigorate a frail stem. A heading cut is also the best pruning technique when branching is wanted, such as on a newly planted tree that has only a single upright stem.

Thinning

What happens if instead of cutting off only part of a stem, you remove it completely, or cut it back to a larger branch? This type of pruning is called a thinning cut, and the plant's response is: nothing, near the cut. Or, at most, very little. (But remaining shoots on the plant will grow more than they would have otherwise.)

So use thinning cuts to remove unwanted growth, such as in the center of a tree or shrub where growth is too dense, and reserve heading cuts for situations where you want lush regrowth or branching.

The Time of Year

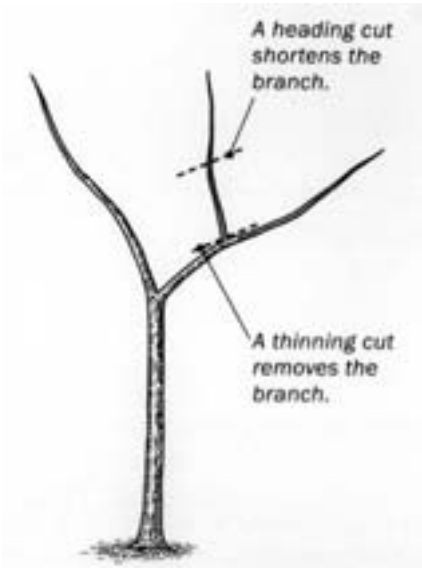
"Prune when the knife is sharp," goes the old saying. Not true. (But don't ever prune if the knife is *not* sharp.) A plant's response to pruning depends not only on how much you cut off a stem but also on when you do it. In temperate climates, as each growing season draws to a close, trees, shrubs, and vines lay away a certain amount of food in their above- and belowground parts. This food keeps plants alive through winter, when they cannot use sunlight to make food because of cold temperatures or, in the case of deciduous plants, because they lack leaves. The stored food also fuels the growth of the following season's new shoots and leaves, which eventually, as they mature, start manufacturing their own food and pumping the excess back into the plant for use in the coming winter.

Pruning a dormant stem removes buds that would have grown into shoots or flowers. Because food reserves within the plant are then reapportioned among fewer buds, the shoots from the remaining buds grow with increased vigor.

As the growing season progresses, a plant's response to pruning changes. Shoot growth of woody plants generally grinds to a halt well before leaves fall in autumn. In fact, growth commonly ceases by midsummer, so the later in the growing season that you prune, the less inclined a woody plant is to regrow, at least during the year of pruning.

Traditional theory holds that summer pruning is more dwarfing than dormant pruning, but recent research puts this theory on shaky

Heading vs. Thinning Cuts



footing. True, if you shorten a stem while it is dormant—in February, for example—buds that remain will begin to grow into shoots by March and April, whereas cutting back a shoot in mid-summer might result in no regrowth. Ah, but what about next spring? That's when, according to this recent research, the summer-pruned shoot will respond. Plants have an amazing capacity to act however they please no matter what we do to them.

What are the practical implications of this? First of all, if you want to stimulate bud growth, prune a stem when it is dormant. Summer, on the other hand, is the time to remove a stem to let light in among the branches (to color up ripening apples or peaches, for example), or to remove a vigorous stem that is in the wrong place. Upright watersprouts, for example, are less likely to regrow if snapped off before they become woody at their bases. Summer pruning can sometimes prompt the formation of flowerbuds rather than new shoots—just what you want for solidly clothing the limbs of a pear espalier with fruits or the branches of a wisteria vine with flowers.

The response to summer pruning also depends on the condition of the plant and on the weather. A weak plant may be killed by summer pruning. A late-summer wet spell, especially if it follows weeks of dry weather, may awaken buds that without pruning would have remained dormant until the following spring. And these responses interact with the plant's response to various degrees of pruning.

You also must consider the effect on the plant's health when deciding when to prune. Although immediate regrowth rarely occurs after late-summer or autumn pruning, cells next to the cut come alive to close off the wound. Active cells are liable to be injured by cold weather—a good reason to avoid pruning in late summer or autumn except in climates with mild winters, or with plants that are very hardy to cold. Dormant pruning just before growth begins leaves a wound exposed for the minimum length of time before healing begins. Some plants—peach and its relatives, for example—are so susceptible to infections at wounds that they are best pruned while in blossom. On the other hand, the correct time to prune a diseased or damaged branch is anytime you notice it.

Also consider yourself (and your own welfare) when timing your pruning. Depending on the number of plants you have to prune, as well as other commitments, you may not be able to prune all your plants at each one's optimum moment. I prune my gooseberries in autumn (they never suffer winter damage), my apples just after the most bitter winter cold has reliably passed, and my plums (a peach relative) while they are blossoming.

Plants such as maples, birches, grapes, and kiwis bleed sap profusely if pruned just as their buds are swelling in spring. The way to avoid this is to prune either in winter, when the plants are fully dormant, or in late spring, after growth is underway. The sap loss actually does no harm to the plants, so you need not rush or delay pruning for your plant's health, but rather for your own peace of mind.

Lee Reich, PhD, is the author of *Weedless Gardening, Uncommon Fruits Worthy of Attention, A Northeast Gardener's Year,* and *Growing Fruit in Your Backyard* This article was adapted from *The Pruning Book,* published by Taunton Press.