



## Why do vines twine?

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Have you ever noticed that some vines seem to start growing in a wide circle? When vines make contact with a object, like a pole or another plant, the stems continue to grow in a spiral around these supports. Vines need these supports for further growth. Without support, vines would just fall to the ground. Why do vines twine in a circular direction?

There are actually three different kinds of vines: clingers, tendril-climbers, and twiners. Each type of vine attaches to supports differently. None of these vines are parasitic or take their nutrients or water from the supports. All vines have their own roots, from which they absorb the moisture and minerals they need.

Clingers start from new growth. They send out aerial roots called "holdfasts". Clingers like rough-textured surfaces, like walls, trees, and fences. This type of vine can grow around a support or be directed up a wall or tree, as long as the aerial roots can attach themselves for support. The holdfasts can leave marks on walls and can damage wood structures. Examples of clinging vines are English ivy, golden pothos, the trumpet vine.

Twiners are the type of vines where the whole stem wraps around supports. Twining occurs when cells on one side the vine stems grow longer, while there is a shrinkage of cells on the other side of the stems. This distinctive circular growth is called "circumnutate". Plants all possess genetic growth factors, one of which causes quick growth at the stems' tips, called "auxin". The light weight of these tips make them grow up and out in vines, while the older growth farther down the stems are heavier, and pull downward. For twiners, the distance between leaves is longer than for most plants because the longer stem area is what gives vines room to twine. As gravity pulls downward on the vines' lower parts, the upper stem levels tight the vines' grip around its support. Twining vines are genetically programmed to align their curved stems so that they automatically grow into a squeezing force. Twining vines will twist around wire,



*Large philodendron growing up a tree trunk.  
(Photo: C. Firth)*

mailbox posts, trellises, lattices, and arbors. These vines will require support for horizontal growth. Examples of twiners are mandevilla, honeysuckle, and morning glory. Interestingly enough, some twiners grow in a clockwise direction, like the Chinese wisteria. The Japanese wisteria grows in a counter-clockwise direction.

Tendrils have small filaments that grow out from the vines' stems. Tendrils cannot grow around anything that is much wider than wire or plant stakes. Tendril-climbers are the lightest in weight of the three types of vines. Examples of tendril-climbers are passion vine, pole beans, sweet pea, and some types of clematis.

Many of the vine varieties grow well here in Kaua'i. Passion vines, pole beans, honeysuckle, the vanilla vine, the red jade vine, the Kuhio vine, and mandevilla are all vine species found in our State. Some vines are invasive plants here in Hawaii, meaning they cause negative impacts to the environment or to people. The Mexican creeper, blue butterfly pea, Japanese honeysuckle, and the Cat's claw creeper are examples of vines best avoided. These vines often crowd out other plants, they grow easily in poor soil, and they reproduce quickly. Some of the worst invasive vines are ivy gourd, moonflower, and banana poka. Healthier alternatives for Hawaii are the uhi, morning glory, and kiwi. If you are now sure which vines are best to grow in your yard or garden, contact your local County Cooperative Extension agent.



*Canavalia napaliensis*, a “twiner” native to Kaua'i at National Tropical Botanical Garden, NTBG (Photo: C. Firth)

Beyond selecting vines which are adapted to any region of Hawaii's climate, it is important to pick a good site for selected varieties. Some vines like full sun, like honeysuckle. Other vines survive best in partial shade, like morning glories and golden pothos. Vines are often vigorous growers in organically rich soil. If the soil contains a lot of red clay, like many places in Hawaii, it is best to add compost, composted manure, or other organic nutrients before you plant. Vines can be grown in containers, bare-rooted, as small and tender transplants, or from seed. No matter which vines are selected, the right sun exposure, sufficient moisture, and enriched soil will help the vines thrive.

If transplanting mature vines, plant the vines carefully. The hole should be at least twice as wide as the root ball, but only one to two inches deeper under the root ball. When the plants are removed from the original containers, hold them by the root ball, not by the stems. Vine stems are often not

strong enough to hold the plants' weight by themselves. Water the root ball generously, allow the water to drain, then fill in around the root ball with the enriched soil. Vines do well in Hawaii's rainy area. The parts of Hawaii that are hot and windy mean the vines will require lots of added water.

How quickly vines grow affects how much pruning they will need. Unlike many shrubs and trees that do well without ever being thinned or cut back, vines may require regular pruning. This pruning will keep vines healthy, productive, and under control. Especially in Hawaii, because of our warm temperatures year round, vines can grow very large. After all, if vines attach to other plants, the tops of the vines can quickly reach the tops of their supports or host plants and grab the sunshine. In this way, vines can grow many leaves because they do not have to grow their own trunks. By growing so many leaves and using their stems as tubes to carry nutrients and lots of water, vines have their fast growth as an advantage over other, more slowly growing plants. Therefore, vines need their growth limited and directed. Once vines are pruned and shaped, light and air can reach the inner branches and leaves of the vines themselves, as well as reaching any host plants' leaves and stems.

Vines can be very attractive and colorful, they can grow vigorously, and are often drought tolerant. Once vines have been selected that will help promote a sustainable Hawaii and suitable sites are chosen, vines will thrive. Vines can be a welcome addition to any yard or garden.

## **Bibliography**

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