Introduction

I was very happy to be given the opportunity to produce this new and improved edition of *Backyard Bounty*. It allowed me to add crops that were not in the first edition, to expand on certain topics—such as the amazing role of soil microorganisms in keeping plants healthy—to update the pest and disease information, and add pests that have recently arrived in the region. I have also included a substantial amount of new material on gardening in the increasingly variable weather we are experiencing as the global climate changes.

Gardening the easy way leaves me time to sit in my favorite chair under the apple tree and enjoy the view.

My original reasons for writing this book haven't changed—in fact, after years of teaching gardening classes, I am more convinced than ever of the need for practical information on how to grow food in the unique climate of the coastal Pacific Northwest. With the right varieties and planting schedules, it is possible to harvest vegetables twelve months of the year and to produce a surprising amount from even the smallest plot. These days, busy people also need information on efficient, low-maintenance ways to fit gardening into their full timetables.

Growing an organic food garden is a practical skill anyone can learn: it doesn't have to involve a lot of work and certainly doesn't require a big investment in special products or equipment. Despite increasing challenges from variable weather and new pests, I hope that this book will show you that it still isn't hard to grow food in your own backyard.

Of course, there are many other compelling reasons to grow your own food: from enjoying the delightful flavor and quality of fresh crops to the indisputable health benefits of eating plenty of fruits and vegetables. Not least, there is the sheer pleasure of working among the plants, picking this and that, observing bees, birds, and other creatures—a wonderful antidote to today's high-speed world.

CHAPTER 1

Our Gardening Climate and How Plants Grow

This chapter covers basic information to help take the guesswork out of growing vegetables and fruit in the Pacific Northwest coastal climate. It starts with an overview of the climate and weather along the coast and how it is being affected by the changing climate. The final section reviews how plants grow, flower, and fruit.

Gardening in the Coastal Climate

What's different about gardening on the Pacific Northwest (PNW) coast? The climate here is generally characterized by mild winters and warm summers. Only rarely has it been too hot in the summer to grow vegetables that do well in cool conditions (such as broccoli, lettuce, and peas), yet it is almost always warm enough to allow warm-season crops to be grown reasonably well in most gardens. This is actually a wonderful place to garden because so many vegetables can be harvested fresh out of the garden *all winter*. Because garden beds can produce food all year, you can grow a surprising amount in a small area—and you don't have to spend the time that gardeners from less "fortunate" climates do preserving food for the winter. (When those gardeners move to the Pacific Northwest, it can take them a while to adjust to the idea that our planting season lasts for six months and our harvesting season lasts all year.) That isn't to say there aren't challenges, however. One is adapting to the increasingly variable weather and higher average temperatures resulting from the changing climate; another is learning how to deal with the new pests and diseases that continue to arrive in the region.

Microclimates on the Coast

Within this generally mild climate, the varied geography of the region—from mountains to seashore—holds many local microclimates. The complexities of West Coast geography mean that the USDA climate zone maps are not much use here. While roughly USDA Zone 8 for much of the lower elevation coast, there are large differences in local microclimates.

These microclimates differ in:

- total rainfall and the timing of rainfall
- amount of local fog, marine clouds, and direct sunshine each year
- average low winter temperatures, frequency of frosts and snowfall
- average warm temperatures in the summer
- amount of shading from trees, buildings, even mountain tops

1.1 What's for dinner in January? Carrots, kale, komatsuna, Brussels sprouts, parsley, and radicchio.

Effects of Elevation

Elevation affects microclimates, but not always in obvious ways. The higher the elevation, the lower the minimum temperatures are in the winter. But higher elevations also get more snow. With an insulating blanket of snow providing cold protection, overwintering plants often have a *better* chance of surviving an Arctic outbreak at *higher* elevations than at sea level. With precipitation falling mostly as rain at lower elevations, the ground is often bare during cold snaps, so plants are less protected.

Higher-elevation gardens (up to 1,000 feet), if they are on open slopes, can sometimes have a longer frost-free growing season than valley gardens because cold air flows down the hillsides and pools in the valleys. On very still nights, even in the winter, the air may be even a few degrees warmer at higher elevations than down in the valley due to temperature inversions. This can be an advantage for higher-elevation tree fruit production because there is less chance that a late frost will kill the blossoms of peaches and other early flowering fruit.

The effect of all this is that two gardens only a short distance apart may have the same average annual temperature but quite different gardening climates. A garden close to the ocean or the Strait of Juan de Fuca will have a cooler summer with more fog than a garden a short distance inland, but the winters won't be as cold. Gardeners may need a greenhouse to ripen tomatoes in an oceanside garden, but winter crops such as broccoli and salad greens will grow beautifully without one.

On top of variations from geography, weather patterns in the coastal region vary over cycles of a few years to a few decades, due to two cyclical atmospheric patterns affecting the Pacific Ocean:

- El Niño–La Niña events: Occurring on cycles of 2 to 7 years, with each phase lasting for 8 to 18 months, these result from complex oscillations of warmer and cooler water and high and low atmospheric pressure in the south Pacific Ocean. The effect differs depending where you are on the continent, but for the Pacific Northwest coast, the El Niño phase usually brings warmer and drier than average winters; the ensuing La Niña phase usually brings cooler and wetter weather.
- The Pacific Decadal Oscillation (PDO): This is a variable 10- to 30-year pattern of alternating cool and warm cycles in Pacific Ocean water temperatures. It appears we are now in a warm cycle. The PDO is not well understood, and the pattern may or may not continue as the changing climate affects ocean currents. When an El Niño phase occurs while the ocean is in a warm cycle of the PDO, temperatures are even higher than usual, as occurred in the extreme El Niño of 2015–2016.

A feature of winters on the south coast of British Columbia and north coast of Washington State is the occasional Arctic outbreak. These blasts of frigid air break out of higher latitudes, bringing periods of much colder than average temperatures. There may only be one or two such outbreaks in a winter, and they usually only last for a few days at a time, but the abrupt drop in temperatures can be very damaging to plants.

Rainfall patterns also vary widely around the region. Gardens in the rainforest microclimates receive far more rain than gardens in the rain shadow of the Olympics or other coastal mountains only a few miles away. (A rain shadow is the dry zone on the opposite side of a mountain range from the prevailing direction of wind and rain; as storms pass, they dump rain on one side of the mountain, leaving little to fall on the other side.)

Know Your Garden

You can keep simple weather records for your own garden with a small investment in a manual minimum–maximum thermometer and a simple rain gauge (or a straight-sided tin can). Wireless digital weather stations are also available if you want to keep more detailed records (be sure to put the temperature sensor for this well away from your house to ensure an accurate reading for the garden). Your records will become more and more useful as the years go by because they will show you the *range* of temperatures and rainfall in your own garden. Keeping notes on sowing and harvest dates and other gardening observations will make the records even more valuable. Lee Valley Tools still sells a hardbound ten-year garden journal with spaces for notes on each date, and there are many apps for gardeners that make it easy to keep electronic records. See reviews in garden magazines and websites for the latest products.

Gardening in a Changing Climate

By now, most people are aware of the increasingly variable weather that is the result of a changing global climate. It isn't your imagination that extreme weather in recent years is making gardening more difficult than it used to be. Information on how to adapt our gardens and methods to meet the challenge of a changing climate is a significant part of the new content I have added to this revised edition of *Backyard Bounty*.

The coastal regions of British Columbia have warmed by around 2°F (1.1°C) over the last century. Climate projections for the 2050s show that average temperatures will likely increase by 3° to 4°F (1.8° to 2°C), compared to 1961–1990 averages. As of 2017, the 15 warmest years ever recorded had occurred in the previous 16 years, with 2016 setting a new global record for the amount temperatures increased in one year. An important factor contributing to higher average temperatures is higher nighttime temperatures, which have been rising steadily.

Average temperatures don't tell the whole story, however, because extreme minimum and maximum temperatures can average out to a normal temperature range. While extremes of heat are becoming more frequent, that doesn't mean that periods of extreme cold are less likely (the prolonged cold of midwinter 2016–2017 was a harsh reminder). A particular concern is that warmer average spring temperatures cause fruit trees to bloom earlier, increasing the risk of damage to the crop from a late frost.

Periods of extreme temperatures are lasting longer because of the weakening polar jet stream, another effect of the warming global climate. With a weaker jet stream, weather systems that should move along across the continent from west to east stall for longer over one region. The result is prolonged periods of extreme heat or Arctic cold or record-breaking rainfall causing severe flooding. As the global atmosphere warms, it holds more energy and more water vapor, which also means an increased potential for stronger windstorms and heavier rainfall. As with temperature, however, the effect is variable. We are seeing shifts in when and where precipitation (mostly rain) occurs, leading to increased flooding in some places and longer droughts in others.

For the PNW coast in the long term, climate modeling shows that we can expect a continuing trend toward warmer average growing seasons, with less rainfall in the summer months. The models show the region can expect about the same amount of precipitation in the winter, but it is likely to fall over a shorter period, in more intense storms. More of it is expected to fall as rain rather than snow at higher elevations. Early drier springs and less snowpack in the mountains means a higher risk of summer water shortages for communities dependent on snowmelt to fill rivers and reservoirs.

While the record-breaking drought and heat of 2015 in the coastal PNW was unprecedented, meteorologists say that it was a preview of what may be an average summer by the middle of the century (and that's only 30 years away). And if that is what an average summer by mid-century might look like, then the variability in weather patterns means some years are likely to be even hotter or drier (or colder or wetter…) than anything we have so far experienced.

Adding to the stress on water resources from a changing climate is the fact that the growing population in the region is also increasing demand for water. Limiting water for gardens is usually one of the first restrictions imposed by water districts when supplies are low. Where once gardeners could irrigate as much as they liked to keep plants growing, water conservation is now an important—even critical—issue for many.

Plants are able to handle variable weather, but the more we know about how plants are affected by weird weather, the better prepared we will be to protect plants from extremes and to design gardens to adapt to these changes.

The Basics of Plant Growth

You might be tempted to skip this bit, but I urge you to read on because so many crop problems that perplex gardeners have to do with growing conditions (weather, nutrients, irrigation) that affect plant growth, flowering, and fruiting. When plants do weird things—such as bursting into flower when they shouldn't—we need to understand why, so we can avoid it in future.

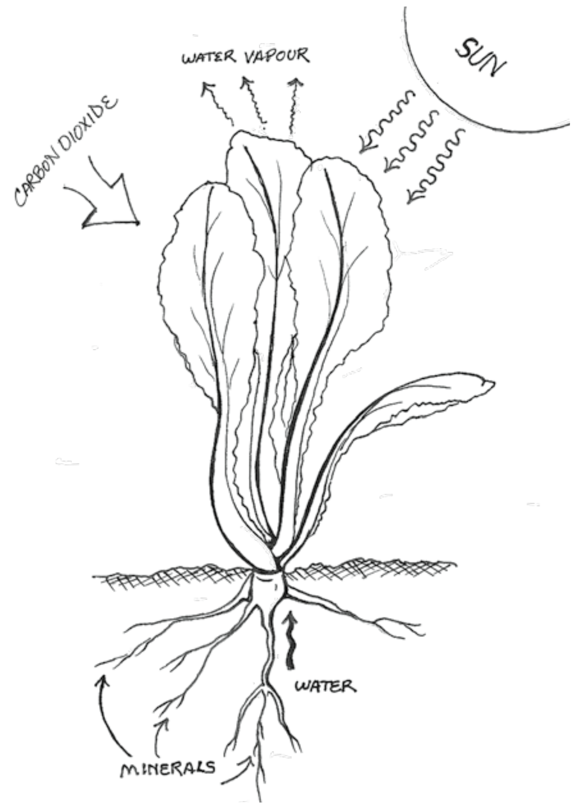
Photosynthesis in plants is a truly amazing process. It allows plants to take energy from sunshine, carbon dioxide from the atmosphere, and water from the soil and make it into sugars. Plants use these sugars as building blocks to make fats, starches, proteins, plant hormones, and other compounds. Through a process called respiration, plant cells burn sugars to get the energy needed for growth and metabolism. If they are making more food than they can use, plants store the surplus sugars and starch in storage organs, such as roots, for later use. Some necessary elements, such as nitrogen, sulfur, calcium, and micronutrients, come from the soil, but surprisingly, most of the weight of the solid material that makes up a plant is actually built out of carbon from the atmosphere, rather than elements from the soil.

Water and nutrients move through a vascular system that reaches to all parts of the plant. Water moving upward from the roots and evaporating from the leaves travels in the xylem vessels. Another set of vessels, called the phloem, carries sap with nutrients and metabolic compounds to other parts. This process, called translocation, moves food internally from a source, such as a photosynthesizing leaf, to a part of the plant that needs it for growth. Surplus food can also be translocated to storage organs, such as roots or fruit. There is one more very interesting place that plants send their sugars and starches: they leak a significant amount of what they make into the soil around their roots. This sounds outlandish, but plants actually benefit a lot by providing food for beneficial soil bacteria and fungi around their roots (more on this interesting relationship in Chapter 3).

Sunlight Is Essential

To make a very complicated story simple: exposure to sunlight is vital. Vegetables and fruits need bright sunlight for as long as possible to produce the building blocks that make leaves, seeds, roots, and fruit. Leafy greens can grow adequately—though slowly—with half a day of direct sun each day, but most plants do much better with eight hours of direct sun in the summer. Gardens in open areas with even longer sun exposure will grow even faster, as they simply have more hours of light to photosynthesize.

The efficiency of photosynthesis depends mostly on light levels, but it also depends on temperature. The best range for photosynthesis is 50° to 85°F (10° to 30°C); photosynthesis stops when it gets too cool (below 40°F or 5°C) and when it gets too hot (above 95°F or 35°C) for most temperate zone plants.



1.2. With energy from the sun, carbon dioxide from the atmosphere, and water and minerals flowing upward from the roots, plant cells produce the building blocks that become leaves, flowers, and seeds.

Plants Are Mostly Water

Water is an essential ingredient for plant growth and survival. Evaporation from the leaves pulls moisture up through the plant, moving water from the roots to the leaves and shoots (called transpiration). This flow carries nutrients from the soil up through the stem to the photosynthesis "factories" on the leaves. When the water reaches the leaves and evaporates, it cools the plant. Cooling is essential to prevent leaf temperatures from rising too high and damaging leaf cells. Almost all of the water (97%) taken up by plants passes into the atmosphere in this process.

Plants must have a film of water around their roots so nutrients from the soil can pass into the cells of the roots. If this film dries out, even temporarily, fine root hairs die. The movement of nutrients from the soil and through the plant ceases and growth stops. Because the leaves also lose their cooling system when evaporation stops, it means that, in hot weather, leaf cells can (rapidly!) overheat in the sun and die. Plants may be so severely stressed or injured that, even if they survive, they may never be as productive as they could have been.

Soil Has a Supporting Role

The soil physically holds up plants and anchors them. It is the source of water and essential major and minor elements needed for photosynthesis and respiration.

A healthy soil contains a complex, interdependent community of organisms that range in size from microscopic bacteria to (relatively) huge earthworms. This vitally important community includes decomposers that digest organic matter and release nutrients in forms that plants can use, fungi that penetrate root hairs and ferry nutrients into root cells, and bacteria that colonize the surface of roots and produce compounds that actively protect plants from pathogens. Soil bacteria are also the main diet of protozoa (single-celled microorganisms), and in turn, protozoa are the main diet of earthworms.

The larger soil inhabitants include insects, mites, nematodes, earthworms, slugs, and snails, crustaceans (e.g., pillbugs), millipedes, and centipedes. While a few of these characters attack plants, our gardens couldn't do without the others because they play so many roles essential to the cycling of nutrients, aerating and mixing the soil, and keeping plants healthy. The soil *surface* is also the hunting ground for predators, such as large purplish-black ground beetles, centipedes, and many kinds of spiders.

Plants Need Nutrients

Crop plants need some elements in larger quantities for growth. These major nutrients are: nitrogen, phosphorous, potassium, calcium, magnesium, and sulfur. The first three elements are main ingredients in fertilizers. Local soils usually also need additions of calcium, sometimes magnesium, but rarely sulphur to grow crop plants.

A second group of nutrients is essential too, but in extremely small amounts. These micronutrients or trace elements include iron, manganese, chlorine, zinc, boron, molybdenum, and copper. The tricky thing about this group is that most are toxic to plants in large amounts or if soil conditions (such as acidic soil) make them too easily available to plants.

Chapter 3 covers nutrients from the soil in greater detail and describes how you can make them available to the roots of plants.

How Plants Grow

Plant growth depends on external factors such as weather, sunlight, and nutrients, as well as on the internal workings of the plants.

Annuals, Biennials, Perennials

Vegetables are mostly either annual (go to seed in the first year of growth) or biennial (go to seed the second year). Many crops (lettuce, radishes, mustard greens, beans, and squash) are annuals wherever they are grown, which means they will flower and produce seeds in the same summer if left in the garden long enough. Practically speaking, however, in the Pacific Northwest most garden vegetables are treated as annuals, which means we harvest crops the same year we sow the seeds.

Crops such as carrots, cabbage, kale, leeks, beets, Swiss chard, and parsley are biennials. Left to their own devices in the garden, they would have a two-year life cycle. From a spring planting, they grow all summer without going to seed. After spending the winter in the garden, they send up a flower stalk the following spring. The seeds ripen, and the plant dies in its second summer. The hardy winter broccoli and winter cauliflowers are also biennials; these are sown in June or July, but don't produce heads until early the following spring. For biennials, the cold chill of winter is the signal that tells them they are beginning their second year.

Some plants that we treat as annuals, such as tomatoes and peppers, are actually *perennials*; in a subtropical climate or heated greenhouse, they could continue to produce flowers and fruits year after year. Tender herbs, such as sweet basil and sweet marjoram, are also perennials, but they are often grown as annuals because they are not hardy enough to survive winter outdoors.

There are a few hardy perennial vegetables, such as artichokes, French sorrel, and asparagus. And of course, all fruit trees, grapes, berries, and rhubarb are hardy perennials in the garden.

Effects of Temperature

Plants grow best when it is warm; when it turns colder, growth slows, then stops altogether. The cut-off point at which growth stops differs among plants. Frost-hardy vegetables continue to grow (very slowly) even in the winter, whenever temperatures rise enough for photosynthesis to continue. Heat lovers, such as corn or melons, however, pack it in and die. Eventually, when the days are shortest and temperatures are cold enough, all plants stop growing.

Perennials, such as fruit trees, have a natural dormancy in winter. They drop their old leaves in the fall and withdraw the sap from their stems so they can survive very cold weather without damage. They won't suddenly start to grow if there is a brief period of warm weather in midwinter because they also need the lengthening days of spring to break the dormant state and stimulate growth. Leafy vegetables, on the other hand, are just resting in the cold; they can take advantage of warm spells in a mild winter to resume growing a bit.

How well plants withstand winter temperatures depends on when, how quickly, and for how long it turns cold. As days get shorter and temperatures gradually drop, plants harden off, becoming used to the cold. If there is unusually cold weather in late November, before plants have hardened off completely, they can be injured by temperatures that wouldn't hurt them in midwinter. In spring, if there has been mild weather for a month and plants start to grow again, a late cold snap can cause far more injury than the same temperatures would have done earlier.

At the other end of the thermometer, as temperatures rise, plants grow faster—but only to a point. When it is too warm (above 82° to 95°F or 28° to 35°C, depending on the crop), plant growth slows or may even stop temporarily. In hot weather, the balance between photosynthesis (making sugars) and respiration (using sugars for energy) gets out of whack—and plants become stressed as their stores of sugars are used up in hot weather faster than they can be replaced. Vegetables lose their sweetness, and flavors become bitter (e.g., lettuce) or bland (e.g., tomatoes).

To avoid a disastrous loss of water when it is too hot, plants have to close the pores (called stomata) on their leaves during the hottest part of the day. This shuts down photosynthesis; plants cannot start making food again until it is cool enough for the pores to open. Closing the stomata also shuts off the plant's cooling system because water is no longer evaporating from leaves. So not only does a prolonged hot spell mean a prolonged inability to make food, but it also leaves the cells of fruit and foliage vulnerable to heat injury (sunscald).

Growth and Flowering

While they are young, vegetable plants should be growing quickly. This period of vegetative growth gives the plants more leaf area (more capacity to photosynthesize) and bigger roots (more access to water and nutrients from the soil). If all goes according to plan, by the time conditions are right for them to produce flowers and fruit, plants will have accumulated enough food reserves to support a good crop.

For vegetables such as lettuce, leafy greens, or root crops, the vegetative growth period should be as long as possible because we harvest the leaves or roots, not the flowers and fruit. For these plants, fertile soil, high levels of nitrogen, and regular watering help prolong their vegetative growth period. For fruiting plants, however, such as squash or tomatoes, a prolonged period of leafy growth isn't desirable, because it delays flowers and fruit production. Such plants would eventually produce a large crop, but in the coastal climate, we usually don't have a long enough growing season to reap the full harvest.

Once a plant switches over to flowering mode, its vegetative growth slows, at least until the fruit is picked. If a squash plant or a very young fruit tree, for

1.3. A tale of two squash: The plant on the left was sown April 6; the plant on the right May 6. Vegetative growth of the older plant was stunted by being held too long in a pot. Now it is flowering, but it is too small to carry a crop.

example, is allowed to carry fruit while the plant is too small, the plant has to divert energy into the fruit, resulting in stunted growth. To avoid this, simply pick off early flowers that form when plants are too small.

Several things can cause plants to flower:

- Day length is a signal to some. At these northern latitudes, spinach, for example, resolutely flowers in response to the long days of June, no matter how early or late it is sown in the spring.
- Temperature is a signal for others. Biennials flower after experiencing the cold of winter; other plants flower in response to the heat of summer.
- Stress from a poor nutrient or water supply, from being root-bound in a small container, or from unseasonably cool weather can cause plants to flower prematurely (see Vernalization section below). This is why it is so important to grow seedlings under good conditions, and to do what you can to avoid stressing them.

1.4. Leeks flowering in response to a cool spell that happened shortly after they were transplanted. Only the largest one has gone to flower, but if they had all been that large, they might all have flowered this summer.

Vernalization (or Why Vegetables Unexpectedly Go to Seed)

Vernalization is a plant's response to low temperatures that results in flowering. After the cold of winter, biennials normally bolt, meaning they send up flowers. But if a seedling is big enough, a spring cold spell can fool it into behaving as if winter has passed, so it grows a flower stalk in its first summer instead of waiting (as it normally would) until the following spring. Crops readily vernalized by cool temperatures in the spring include beets, Swiss chard, cauliflower, cabbage, onions, leeks, celery, and celeriac. Temperatures of 40° to 50°F (5° to 10°C) for one to two weeks, for example, can be enough to cause onions to bolt.

Plants can only be induced to flower if they have grown large enough to have sufficient food reserves to devote to flowering. If the cold period happens while seedlings are still tiny, they won't flower because they are too small. Plants don't have to be very large, however, to respond to cool temperatures. Onion sets larger than a nickel and cabbage or leek transplants with stems the thickness of a pencil are big enough to be induced to flower prematurely by a cool spell. The larger the seedlings are when the cool weather occurs, the more likely it is that they will switch to flowering mode.

Vernalization is a particular problem for coastal gardeners eager to get a jump on the season. In our mild climate, it is often possible to sow seeds of hardy vegetables as early as February. If there is a nice long period of mild weather, these early seedlings grow big enough that a late cold spell (and we always seem to get a late cold spell!) can cause them to flower. You don't see the flower stalks immediately, but the plants get set on a growth path that will result in premature flowers later on.

Vernalization is also a problem if you try to get a head start by starting seeds indoors too early. If you do a good job of growing large healthy transplants and set them out early, it can take as little as a week of cool weather to induce some of them to flower. Our spring weather is so variable that it is more reliable to start seedlings later and plant out small plants that can tolerate a late cold spell without bolting.

Pollination and Fruit Set

For many vegetables, flowers are only important if you want to save seeds. For fruiting plants, however, such as tomatoes, squash, apples, or blueberries, there can only be a crop if the plants flower and the flowers are successfully fertilized.

Pollination occurs when the dust-like pollen from the male parts (stamens) reaches the female parts (pistils) of the flower. The flower is successfully fertilized when the pollen grain sends a pollen tube into the egg cells in the ovary of the female flower. Most vegetables and fruit have flowers with both male and female parts in the same flower. Most are also self-fertile, meaning that pollen from the same flower only has to drop onto the pistil within the flower for fertilization to proceed. Bean and pea flowers, for example, are already pollinated by the time the flowers open.

1.5. Bumble bee working an apple blossom. Bees are called "nature's sparkplugs" because, without them, many plants can't start to produce a crop.

Were Your Squash Flowers Pollinated?

Many disappointed gardeners want to know why their squash plants produce flowers but no fruit. It happens because the flowers were not pollinated. The flowers need bees to pollinate them, but wild bees are scarcer now, and few people keep domestic honeybees in populated areas anymore. Bees are also less active in cool weather, so flowers go unpollinated when it is cool and rainy. The bottom line is that nowadays gardeners need to know how to hand pollinate flowers (for instructions, see the entry for squash in Chapter 10, A to Z Vegetables).

Many species of bees, flies, and other insects have a vital role in pollinating flowers. As they collect nectar and pollen, they move the pollen from one blossom to another. Bumblebees, because of their large size, also vibrate flowers as they work, which causes the pollen to fall onto the pistil inside the flower. People can be another pollinating agent: gardeners can hand pollinate flowers to improve fruit set or to make sure seeds they save are true to the variety.

Some crops, such as squash, cucumbers, and melons, have separate male and female flowers on the same plant. They depend on insects (or people) to carry the pollen from male to female flowers. This is also the case for kiwi fruit, which has male flowers on one plant and female flowers on a separate plant. Corn has separate male and female flowers on the same plant, but it depends on wind to shake the pollen from the male flowers at the top of the plant onto the silks of the ears (female part) lower on the stalks. Other plants pollinated by wind include tomatoes and grapes. The flowers are self-fertile, but they need the wind to shake the pollen onto the pistils within the flowers.

Despite having flowers with both male and female parts, many varieties of fruit can only be successfully fertilized if the pollen comes from flowers of a different variety. This is called cross-pollination, and it complicates your choice of what to

1.6. No pollen equals no squash. The shriveling small zucchinis at the bottom of the picture were not fertilized.

grow in a small garden. Without a suitable variety for cross-pollination, flowers of apples, pears, and many other fruits can't be successfully fertilized. Some crops, such as blueberries, do have self-fertile flowers, but cross-pollination from other varieties helps to increase the amount of fruit set.

When I was a child, no one hand pollinated squash, fruit trees, or other crops. The many species of native bees and other pollinators were out there, so we didn't even think about it. Since then, the loss of native pollinating insects and domestic honeybees has meant that pollination is no longer guaranteed. For how to pollinate fruit flowers, see Chapter 6, Basic Methods for Growing Fruit).

Fruit without Fertilization

Parthenocarpic varieties of plants set fruit whether or not the flowers were successfully fertilized. For example, the early tomato varieties Oregon Spring and Siletz can set fruit when it is too cold for tomato pollen to successfully fertilize the flowers. The unfertilized flowers develop seedless fruit; later, in warm weather, they produce normal fruit.

Long English cucumbers also set fruit without pollination. In fact, greenhouse growers take care to avoid letting the fruit be fertilized. They remove all male flowers and screen bees out of greenhouses because fertilized cucumbers have a bulbous end instead of the long slender shape desired.

What's Next?

I imagine you are wondering whether you really need to know all this and when we are going to get to the hands-on gardening information. I have spent so much time on vernalization and pollination biology because in my experience those are the two main sources of grief for gardeners in this climate. When plants bolt prematurely or flowers go unfertilized, it results in a partial or even complete crop failure—and there is nothing more discouraging after all the work you put into to the garden.

Now, on to planning that garden!