SEEDTIME

Beneficial Insects: Build a Garden That Defends Itself

INDEX

Start here: the wasp doing my pest management for me

I walked out to the brassica bed one morning and noticed holes in the collard leaves.

Not huge damage yet.

But enough to know what was going on. Cabbage worms.

Honestly, my first thought was to grab the organic BT spray. Simple. Fast. Done.

But for some reason I waited a couple days before I went after them. (Ok, I didn’t have time, life got in the way, you know how it goes...) And I'm glad I did.

Because the next time I walked out to that bed, I noticed something sitting on one of the cabbage leaves. I took a closer look.

It was a red paper wasp.

And in its mouth was a green cabbage worm 😳

I pulled out my phone and filmed about 30 seconds of it because it was fascinating to watch the little guy chewing the cabbage worm right on the leaf.

If you've never seen this before, it kind of changes the way you think about pest control.

Because that wasp was doing my pest management for me.

Paper wasps hunt caterpillars. Cabbage worms are caterpillars.

The wasps take them back to feed their young, which means every cabbage worm in the garden is basically free protein for the wasp colony.

And here's the part that really matters. If I had sprayed the moment I saw the first holes, I probably would've killed the cabbage worms... but I also would've disrupted the predators that were starting to show up to handle the problem naturally.

That's the move this little guide is built around.

Thing is, there's a whole working defense system flying, crawling, and spinning webs in your garden right now.

Most of us on reflex see damage and reach for a treatment. That’s our first instinct too.

But the cost is real. Most pest sprays, even the organic ones, are broad-spectrum. They don't tell a lady beetle larva apart from an aphid.

You target the aphid, and you also kill the predator that would've eaten hundreds more of them this season.

The pest problem comes back harder next time because the food chain that controls it is gone.

We have beneficials that eat the pests. And we want to make sure that the beneficials stay around, and they won't stay around if they don't have a food supply.

So if we see a few pest insects in there, that's okay. We don't mind that.

A working beneficial-insect strategy is one where you tolerate a small amount of damage so the predators have a reason to live in your garden.

Tolerance is the system, not a workaround.

The beneficials worth recognizing on sight

Here are the ones I most want you to be able to spot when you walk the garden, plus a paper-wasp bonus I had to add after that cabbage-worm story.

1. The lady beetle larva (and the adult)

The adult ladybug is the cute red-and-black polka-dot beetle everyone recognizes. The larva, the stage that does most of the work, looks nothing like the adult.

My friend Joe Lamp'l, who joined us for our Summit one year, put it this way:

"Our beloved ladybugs, as cute as they are, are great at killing aphids.

Well, guess what's greater than that? The larva.

Before it becomes the adult, it doesn't look anything like it. So if you see this, leave it alone. It's your best friend in the garden."

A lady beetle larva looks like a tiny black-and-orange alligator. Bumpy spines along the back. Smaller than your thumbnail.

Often crawling right on the aphid-infested leaf. Most gardeners kill them by accident because they look alarming.

Leave them.

If you're about to spray for aphids and you see a ladybug on the plant, move the ladybug off first. Insecticidal soap will kill the ladybug too.

As my Dad Edwin has put it on one of our viewer Q&As: yes, it will kill the ladybugs as well. So if you see a ladybug, just go move it somewhere else and then spray the aphids.

On the balance side: if the aphid problem isn't huge and you have ladybugs there, you can leave a few aphids for them to eat. That balances out the ecosystem.

On buying ladybugs in a bag from a garden supplier, Joe is pretty direct about it:

"I've not outwardly tried to attract ladybugs, but they certainly show up.

There's really no need to buy them by the bag. They're harvested in their dormant state from the Sierra Nevada Mountains.

They fly away after a meal and disappear.

It's best to focus on biodiversity in your garden, and you will get all the ladybugs you need."

Biodiversity makes them show up. A bag of beetles flies away.

2. The braconid wasp (parasitic wasp)

This is one of the beneficials Dad and I love. Both of us teach the same response.

When you find a hornworm or caterpillar with little white rice-like cocoons stuck to its back, leave it alone.

Those cocoons are the next generation of the wasp that's eating the worm.

Dad likes to introduce it like this. This is your friend, the braconid wasp. It's a small, dark wasp, really tiny.

Here's what it looks like out in the field on a hornworm. There'll be these little white sacks on the back of it. And that means this hornworm has gotten attacked by a parasitic wasp.

When I find one of these, I leave it. If it's not completely destroying our crop, we want that wasp around so we don't have to deal with these later on. The wasp can deal with them for us.

Here's the reason Dad keeps coming back to.

We want to foster the next population of those braconid wasps. We want to give them a food supply.

The hornworm you would've picked off was, on the day you would've picked it off, the food supply for next season's pest control.

The same wasp family hits cabbage worms too. I've watched it happen on my kale. The wasp would come and land on the cabbage worm and suck it out. You might not want to watch it... but if you don't like the cabbage worm, it's a good feeling.

Do these parasitic wasps sting people? Braconid wasps don't sting.

They're small. Black, small enough you'd miss them if you weren't looking. They don't sting people.

Their job is to lay eggs inside the soft-bodied pests that are eating your plants. The wasp larvae then develop inside the pest until they emerge as the next generation of wasps.

3. The paper wasp (the predator wasp)

This is the wasp from the cabbage-worm story I opened with. Different family from the braconid. Bigger.

They DO sting if you mess with them, but they're not aggressive in the garden if you give them their space.

We have a lot of them around our place. I'm honestly not worried about them.

A viewer once filmed a wasp and asked me if it was a braconid. Dad jumped in to clarify the difference. Braconid wasps don't sting, but the ones in that video, the red wasps, were just the normal red wasps, and they can sting.

Adults vary in size and color, brown to reddish-brown or yellow and black striped, with the narrow-waist wasp shape and long legs that often dangle as they fly. They build small open papery nests in sheltered spots around the property.

What they do for you. Paper wasps hunt caterpillars.

They land on the leaf, chew the caterpillar up, and carry it back to the nest as food for their young. Cabbage worms, hornworms, other soft caterpillars... all on the menu.

I've watched one work over a cabbage worm right there on a collard leaf with my phone six inches away.

How we treat them. We just leave them. We don't bother the nest if it's not in a doorway or a high-traffic spot. The kids learn not to swat at them.

Honestly, seeing a paper wasp hunting around your brassicas is usually a really good sign that your garden ecosystem is becoming more balanced.

4. The lacewing

The other natural aphid predator that shows up alongside ladybugs.

Dad and I don't talk about lacewings much, but Joe brought them up at our Summit when we were on the subject of letting nature handle aphid pressure:

"You may say, hey, those aphids really haven't been a problem in the past.

I'm gonna let mother nature come along, let those ladybugs come along.

And the lacewings and some other ones, they'll pick them off, and more often than not, they do, and nothing needs to be done."

Adult lacewings are small flying insects with long net-like wings folded tent-style over the body, and golden eyes. About thumbnail-sized.

There are two color groups, brown and green. Delicate fliers.

The adults feed on nectar from small flowers, which is one more reason you want flowers in your garden.

The larva is the stage that does the work. It's small, cream-and-brown, with large mouthparts you can actually see by eye.

A single larva will eat aphids by the hundred. It also takes small mites and other soft-bodied insects.

Eggs are the field-ID feature most of us can actually spot. They're laid on the end of a tiny hair-like stalk on the underside of leaves. So if you flip a leaf and see a row of dots-on-stalks, that's a lacewing nursery. Leave the leaf.

5. The ground beetle

The predator on the night shift.

Dark, fast-moving beetles that hide during the day under mulch, leaves, and loose bark, and hunt at night. If you lift a board or pull back mulch and a dark fast beetle scurries for cover, that's a ground beetle. Don't crush it.

Dad and I don't talk about ground beetles much. But the habitat they need lines up cleanly with everything else we do. Mulch on the beds. Some debris left in corners over winter. Not tilling the same spot season after season. Those three moves are below. They're working for one more predator alongside everyone else.

Bonus beneficial: garden spiders

Not insects, but they belong on this list.

Garden spiders, especially the orb-weavers that build round webs across tomato trellises and squash arches, eat caterpillars, beetles, flies, leafhoppers, and most flying pests.

They won't bite you. They're not aggressive.

Jonathan Gooding (he's with Green Cover Seed, and he joined us for our Summit Day 3 a while back) made the point as well as anyone I've heard:

"Let the beneficial predators come into your garden. Give them a habitat.

These are two huge garden spiders. Spiders are so important for keeping pests under control.

So we love seeing spiders. The kids come find me and ask me to take a photo if they see one."

What attracts them: structure for webs (trellises, tall plants, fences), and not killing them on sight when you find one.

Pollinators, briefly

Pollinators (honeybees, native bees, butterflies, moths) don't directly kill pests.

They support the ecosystem that keeps the predator side of the food chain healthy.

More pollinators usually means more flower fertilization, more food on the plants, and overlap with the same flower-driven habitat the beneficial predators need.

In regards to flowers, we honestly just follow the basic principles. Cut flowers, or flowers in general, are good habitat for beneficial insects. There can be advantages to growing flowers mixed in with your vegetables. And it's an idea that makes the garden pretty too.

The pollinator-supportive flowers are largely the same flowers that support beneficial predators. You're not picking one or the other. The same border helps both.

How to build a garden beneficials want to live in

Three concrete moves, in priority order.

Move 1: Mix flowering plants in and around the vegetable beds

Most adult beneficials need nectar. A garden that's pure vegetables can't host them. Mix in flowers.

Honestly, what I actually grew in my beds last year was pretty modest.

Marigolds at the ends of beds, especially after we pull spring crops - plus I added some nasturtiums (that got a bit crowded out) and a few other flower varieties.

This year I’m planning to grow a larger variety of flowers including zinnias, strawflowers, snap dragons, and more.

Beyond that, here's the short list of plants that are known to repel certain bugs:

- Marigolds
- Mint (be careful - this can take over - only do this in a contained space)
- Garlic
- Chives

Don't sell yourself a chart of perfect pest-to-flower pairings.

If you want more flowers without micromanaging species, a packaged "beneficial flower mix" is a fine way to get a season-long succession of small flowers. As they bloom, they pull in beneficial insects to help support the ecosystem in your beds.

We don't do tons of companion planting on our own place. We definitely could do more.

Don't leave your vegetable beds without something flowering somewhere nearby.

A row of marigolds at the corners of a couple of beds, plus a few herb plants you let go to flower at the end of their run, is enough to make a real difference.

Move 2: Skip the broad-spectrum sprays where you can

This is the move that costs you most when ignored. Most organic insecticides are non-selective.

We used a pyrethrum spray when we had that really bad squash bug invasion, but we don't like to use it very much because it's a broad-spectrum insecticide, that means it'll kill many different kinds of insects.

Joe Lamp'l made the same point when he was on with us about insecticidal soap:

"They're effective on the right insects, but they're also nondiscriminatory. Broad spectrum, non-selective.

There's no differentiation when they land on a beneficial or a bonafide pest.

A ladybug in its younger stage, even though it's beneficial, is soft bodied. The soap desiccates it and it will die too.

That's why I try not to use anything."

Mosquito sprays carry the same cost. We had a viewer ask if a pro mosquito-spray service was hurting beneficial insects. Dad's verdict: yes. Most likely. It's gonna be hurting beneficials as well as the mosquitoes for sure.

There are organic options that are more selective and here is where we make exceptions. A great example is BT (Bacillus thuringiensis) for caterpillars.

BT only affects caterpillars. It's our go-to organic move when you actually need to treat for hornworms, cabbage worms, or similar.

The main thing you want to look for is, does it have the active ingredient of the BT bacteria. It's very specific just to the worms.

It's not going to be killing the butterflies and other insects that you have in the garden. It just affects caterpillars. So you're not killing your butterflies and your ladybugs and the other beneficials.

When you can avoid spraying entirely, do. Let mother nature come along. The temptation to spray on day two is what can kill the beneficials before they ever arrive.

One more spray-related thing worth knowing that a lot of home gardeners get caught by. Nursery plants sometimes come pre-treated, and the chemistry stays inside the plant for months. Joe walked through it at our Summit:

"When we buy plants at the nursery, oftentimes, flowering plants especially, these plants have been treated with a class of insecticide called neonicotinoids.

They are known for their systemic nature, meaning they draw up the chemical through the roots and through the plant tissue, and they are absorbed by the plants and distributed.

Neonicotinoids have raised significant environmental concerns due to their potential impact on pollinators like bees, beneficial insects, aquatic invertebrates, and even birds."

Ask before you buy flowering nursery starts whether they've been treated with neonicotinoids. Plenty of growers don't use them, so it's worth asking.

Move 3: Leave habitat through the off-season

Beneficials need somewhere to overwinter. A garden that's cleared down to bare soil in October and stays bare until April has nowhere for them to live.

Joe Lamp'l, again from our Summit, had a great line on this:

"We now know how important it is to leave the leaves.

So many overwintering insects and caterpillars and ladybugs and frogs and turtles and amphibious creatures and on and on are overwintering in the leaves.

And forever, we've wanted to clean them up."

He also pointed out the hollow stems on perennials are doing real work. Many native and non-native perennials have hollow stems that solitary bees bore into to overwinter.

Plus, leave the seed heads. They're a vital food source for insects and birds, a major energy source over winter.

Practical moves that follow:

- Leave some plant debris in corners over winter. You don't have to shred and clean everything in fall.
- Leave dead stems standing through winter where you can. Many native bees overwinter inside them.
- Anchor at least one perennial somewhere on the property, so something is holding habitat year over year.
- Mulch with organic material, not rock or weed cloth. The mulched zone is where ground beetles live.

One wild corner per garden helps.

Pest-to-predator pairings (and what to do)

Pest	What handles it	What you do
Aphids	Lady beetle larva, braconid wasps, lacewing larva	Plant flowers nearby (alyssum, dill, fennel, cilantro letting flower, yarrow). Move any visible ladybugs off the plant before spraying. Let nature come along where you can.
Hornworms (and other caterpillars)	Braconid wasps, birds, garden spiders	Don't kill a hornworm with white cocoons on its back. Those cocoons ARE the predator. Use BT (Bacillus thuringiensis) if you must treat.
Cabbage worms	Braconid wasps, paper wasps, birds	Same as hornworms. BT works. Row cover keeps the butterflies off the plants in the first place.
Slugs and snails	Sluggo (iron phosphate, organically certified) is our first response; beer traps as backup	Sluggo is an organically certified product to deal with slugs and snails. For light pressure, hand-pick. Beer traps work as a backup.
Whiteflies	Soap-and-water spray hits them on contact; broader habitat brings small flying beneficials over time	Make a mixture of soap and water with a spray bottle. You have to make contact with the flies. It doesn't work if you just spray on top. Spray the undersides.
Squash bugs	Hand-picking + crushing eggs is the canonical response; beneficial pressure alone usually isn't enough	Check the undersides of squash leaves once or twice a week. Crush the metallic-bronze egg clusters. Pick adults in the morning when they're sluggish.

Pest	What handles it	What you do
Cucumber beetles	Companion strategy: cilantro down the row (Jonathan Gooding's experience on his farm), marigolds at corners. Trap crop: Hubbard squash on field corners works at market scale; smaller-scale gardens can use a sacrificial squash plant. Also, you can use a floating row cover over plants until they flower.	Plant cilantro along the cucumber row early. Keep marigolds at corners. Inspect under the leaves. Spot-treat with soapy water as needed.
Japanese beetle larvae (in the soil)	Beneficial nematodes + Milky Spore (purchased, soil-applied)	Beneficial nematodes and Milky Spore are effective in killing off the larvae. Apply across the yard, not just the garden. Treat the underlying breeding ground, not just the visible adults.

A few pests outpace what beneficials can handle on their own. Squash bugs and cabbage worms in particular usually need help from you. For most others, beneficials can carry moderate pressure if you let them. And the more you encourage the natural diversity and ecosystem to balance - the less pest pressure you'll have over time!

A 30-second daily habit

Walk the garden each morning if you can. Look at the underside of a couple of leaves. Train your eye to recognize what's on your side:

- **Lady beetle larva** (alligator-shaped, black with orange spots, smaller than the adult)
- **Adult lady beetles** (polka-dot)
- **Braconid wasp cocoons** on hornworms or cabbage worms (small white rice-like sacs on the pest's back; those cocoons are the next generation of pest control)

- **A paper wasp hunting your brassicas** (brown-to-reddish-brown or yellow and black (come in all different colors), narrow-waisted, often working a leaf at close range)
- **Lacewing eggs** on the underside of a leaf (dots on hair-like stalks)
- **Garden spiders** and their webs

Michael Kilpatrick joined us one year to walk through ecological pest management. This line is a great takeaway:

"The footsteps of the farmer are the best fertilizer.

On the scale we're at, managing about 18 acres, when I get out there and walk the crops every single day, we are in a better place than if I am spending more money on something else.

It is just getting out there, checking on things, and catching the problems when they first appear."

If you see any of those signs on the leaves you flip, you've got a working ecosystem. Don't disturb it. Don't spray. The defense system is engaged.

If you see none of them and you have a pest problem, the diagnosis is upstream of this little guide.

You're quite often short on flowering habitat, you may have sprayed broadly enough that the predator population hasn't returned yet, or the garden hasn't been growing long enough for the food chain to establish.

The fix is the three habitat moves, given a season (or a few seasons) to work.

The mindset shift

The biggest move isn't a tactic. It's the underlying frame that the garden is an ecosystem, not a sterile production line.

A garden with bugs in it is, when those bugs include the predator side of the food chain, the healthy version.

A garden with no insects at all is quite often a garden where the chemistry has stripped out everyone.

And the next pest outbreak hits harder because there's nothing left to stop it.

A useful number for setting your own tolerance, from Joe at our Summit:

"Plants can handle about 35% damage to their foliage before they even start to be affected.

So if you can exercise tolerance, mother nature has some really great tools that she's going to bring in to take out most of those problems.

But we have to be patient with that."

Dad and my version of the same idea is simpler. A few pest insects in the garden is OK. We don't mind it.

There's a huge difference between panic-spraying every insect you see... and learning how to work with the ecosystem God already designed into the garden.

Plant flowers. Skip the broad-spectrum sprays where you can. Leave some habitat through the off-season. Walk the garden in the morning. The garden does most of the rest.

You get to spend a lot less time reaching for different organic sprays... and a lot more time looking at beautiful flowers and watching paper wasps hunt your brassicas for you 😄

You can grow this.

Be fruitful, and keep growing.

Paul