

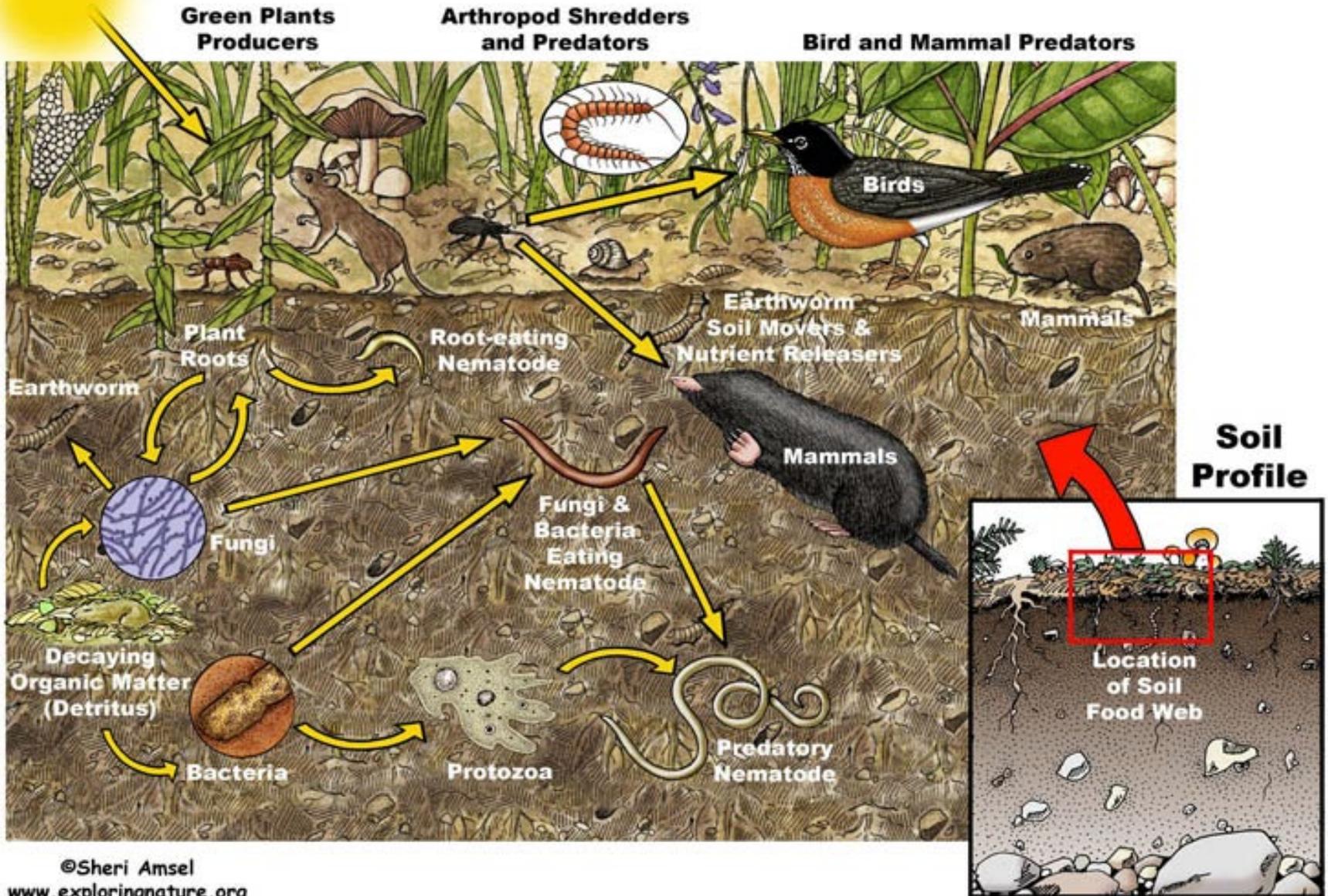
A Gardener's Guide to Compost

Basic Methods and Applications

Compost: Recycler of the Year

- Activates the soil food web
- Builds stable soil structure (aggregate formation)
- Improves water retention & drought resistance
- Reduces erosion
- Improves soil aeration
- Supplies slow-release nutrients to plants
- Enhances soil's ability to hold nutrients (CEC)
 - **Pantry for plant food**
 - **Compost boosts CEC**
- Helps neutralize toxins
- Buffers soil pH
- Neutralizes toxins
- Buffers soil pH

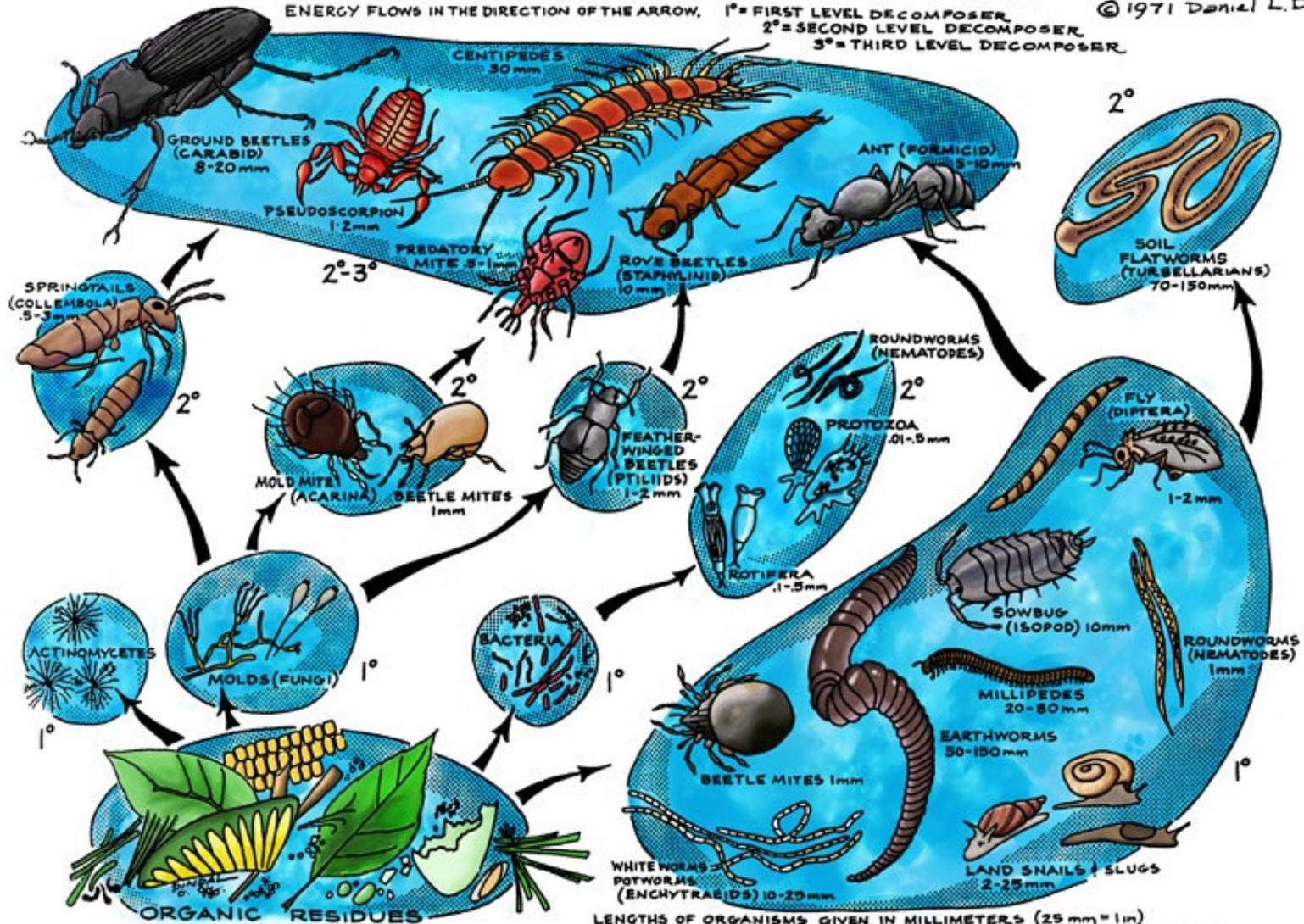
Soil Food Web



FOOD WEB OF THE COMPOST PILE

ENERGY FLOWS IN THE DIRECTION OF THE ARROW. 1° = FIRST LEVEL DECOMPOSER, 2° = SECOND LEVEL DECOMPOSER, 3° = THIRD LEVEL DECOMPOSER.

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LENGTHS OF ORGANISMS GIVEN IN MILLIMETERS (25 mm = 1 in)
 from... Dindal, D.L. 1971. ECOLOGY OF COMPOST.
 SUNY CESF, SYRACUSE, NY. 12 pp.

The Compost Crew

• Micro decomposers

- Bacteria (tiny round/rod shapes)
- Actinomycetes (thread-like bacteria)
- Protozoa (single celled shape)
- Fungi (hyphae, filaments)
- **Nematodes**, Flatworms, Rotifers (worm like)

Tiny Helers

- Mites (tiny spider-like)
- Springtails (mini bunny rabbits)

Macro decomposers

- Earthworms (classic composters)
- Centipedes and Millipedes (many legged)
- Sow Bugs (roly-polies)
- Snails & Slugs (slimy crawlers)
- Beetles (various larvae & adults)
- Ants (workers & decomposers)
- Flies (larvae stage)



Tiny Builders, Strong Soil

- **Sticky secretions bind soil particles**
 - Bacteria and fungi produce polysaccharides & glomalin → act like natural glue
- **Fungal hyphae weave through soil**
 - Thread-like filaments physically hold particles together
- **Decomposition fragments create clumping nuclei**
 - Broken-down plant matter serves as the starting points for aggregates
- **Benefits of aggregates:**
 - Resist erosion and compaction
 - Improve aeration and water retention
 - Enhance nutrient-holding capacity (CEC)

How does soil life create soil structure?

- Bacteria secretions glue clays, silts and sands together into micro-aggregates.
- Micro-aggregates are bound together by fungal hyphae, root hairs and roots.
- Spaces are made by moving arthropods & earthworms, and decaying roots.
- Only when all organisms are present can roots and water move into the soil with ease.

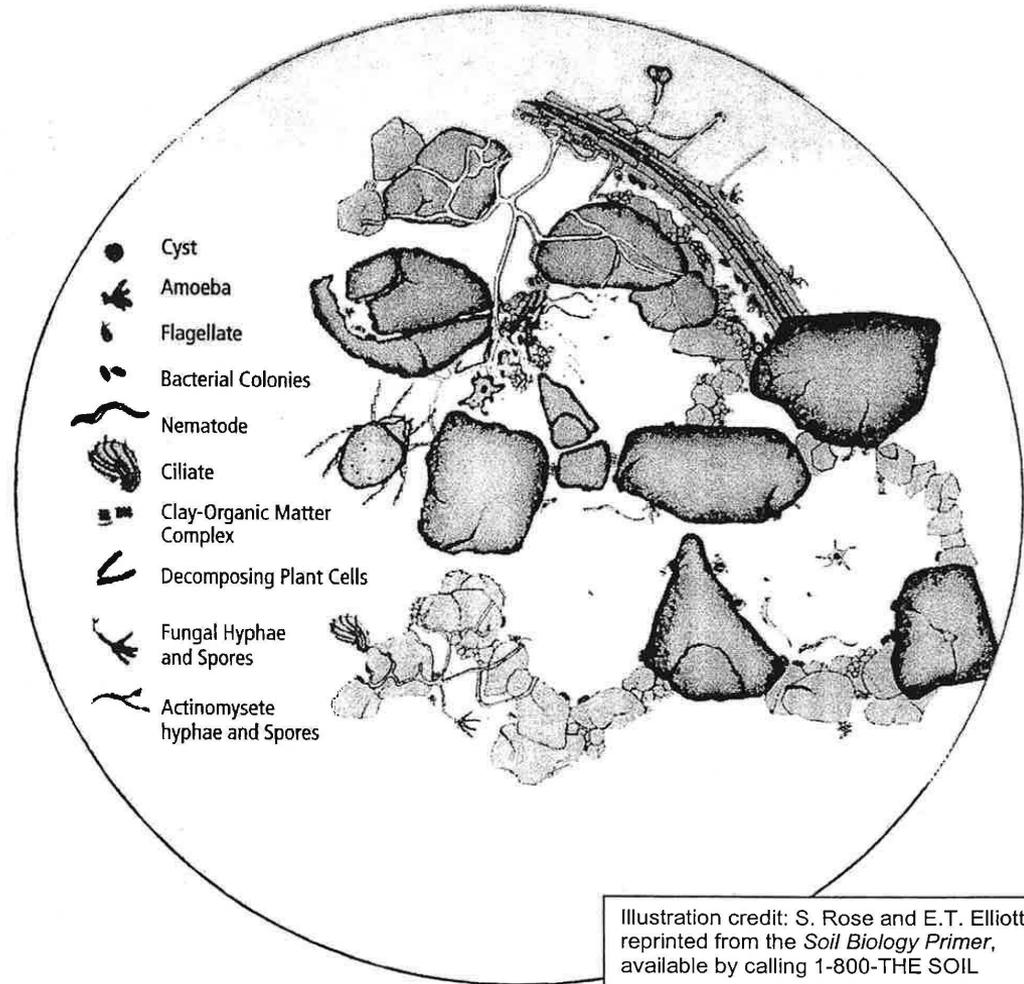


Illustration credit: S. Rose and E.T. Elliott, reprinted from the *Soil Biology Primer*, available by calling 1-800-THE SOIL





Hidden helpers



How to feed a microbe

Carbon, 'Browns'

Energy source

- Cornstalks
- Straw
- Sawdust
- Twigs and woodchips
- Shredded paper and cardboard
- Fallen leaves

Nitrogen, 'Greens'

Protein

- Alfalfa hay
- Apple pomace
- Vegetable waste
- Manures*
- Weeds
- Coffee wastes
- Grass clippings

Materials for Composting

- Carbon = Energy (fuel)
 - Powers microbial respiration
 - Generates heat in the pile
 - More active microbes = more respiration = hotter pile
 - Too much = slow, cool compost
 - Contributes mass to the pile
 - Brown or yellow, dry, coarse, bulky
 - Almost always plant based materials
- Nitrogen = Growth (protein builder)
 - Builds proteins, enzymes, and DNA
 - Supports microbial reproduction
 - Too much = ammonia smell, nitrogen loss
 - Green, succulent, gooey, and dense
 - More often includes animal by-products, like manures

Finding the Right Mix

- Mass
 - *A minimum of 3 feet in each dimension to provide the critical mass necessary for 'hot or active composting'*
- Carbon/Nitrogen Ratio (C:N)

Scientific ratio = weight; home composting = volume

- **Mixing rule by weight 30:1**
 - Correct biological target for microbes
 - Piles heat properly
 - Breaks down efficiently
 - Doesn't smell bad
- **Mixing rule by volume 3:1**
 - Browns = carbon-heavy (60:1 to 500:1 C:N).
 - Greens = nitrogen-rich (10:1 to 20:1 C:N).
 - Mix 2-3 buckets of browns with 1 bucket of greens, lands you close to biological sweet spot of 25-35:1 overall.

Keep it Hot: The Magic Three

- Air (Oxygen)
 - Turn the pile regularly to keep it aerobic
 - Manual turning with pitchfork
 - Perforated pipes to keep air flow
 - Bulky materials like sunflower stalks
- Moisture
 - Keep it damp not soggy
 - “As moist as a wrung-out sponge”
 - Too dry – decomposition slows. Too wet – odors & anaerobic pockets form
- Temperature
 - Ideal range: 60 – 140 degrees F (16-60 degrees C)
 - 131 degrees F (55 degrees C) = Process to Further Reduce Pathogens (PFRP)
 - Monitor with a composting thermometer for hot composting

Hot & Fast vs. Slow & Steady

Cold “Passive” Compost

- Pile is built as materials become available
- Soil food web present, but not as active
- Remains cold most of the time
- Convenient, easy
- No management necessary, “Lazy persons compost”
- Slower, natural timeline for decay process
- Completed in 6 months or more

Hot “Active” Compost

- Intentionally built to scale (cubic yard minimum)
- Phases of soil food web active throughout composting process
- Reaches and maintains multi-day phases of temperatures of 131 degrees Fahrenheit
- More management required
- Sped up decay process
- Finished compost in 4-6 months

Ideal Location for Compost Piles

- Partial shade
 - Avoids baking and drying in summer but provides some solar heating to start the composting action
- Wind protection
 - Prevents moisture loss
- Water source
 - To maintain consistent moisture
- Convenience
 - For loading and unloading of materials, but away from yard activities



Composting Method:

Windrows



Composting Method:

Static Aeration



Composting Method:

Wood and Wire
3-Bin System



Composting Method:

Sheet Mulching
or Comforter
Compost



Inner cone

Food waste

Outer cone

**Composting
Method:**

Food Waste
Digester



**Composting
Method:**

Tumbler



Composting Method:

Pit or Trench
Composting



Composting Method:

Vermicomposting
Worm Bins



Composting Method:

Bokashi Bucket

Curing your compost

An extra step for big impact



- Curing allows materials in the compost pile to finish decomposing at lower temperatures.
- Curing compost for **1-4 months** results in finer breakdown of materials and produces compost that's rich in beneficial fungi.

Signs your compost is ready to use



Pile has
shrunk to $\frac{1}{2}$
its original
volume

Original
organic
materials are
no longer
recognizable

Pile will no
longer
generate a
significant
amount of
heat

Dark,
crumbly
appearance
and earthy
odor

Using Compost

- When?
 - A month or more prior to planting
 - Fall/Spring
- How Much?
 - ½ inch – 3 inches of *finished* compost over growing beds once or twice per year
 - Little chance of burning due to overuse
 - Mix into the top 4 inches of soil
 - If soils are poor mix in deeper, between 12 – 18 inches
- Compost maturity tests
 - Germination test/Bioassay
 - Top dress as mulch, or mix into the soil much earlier before planting (6 months)

Buy Compost Locally

- Skagit Soils
 - 13260 Ball Road, Mt. Vernon.
(360)424-0199.
Load your own, \$17/yard; delivery, \$19.50/yard (minimum 10 yards)
- Sun Land Bark and Topsoils
 - 12469 Reservation Road, Anacortes (360) 293-7188
Sell Cedar Grove Compost, \$33.25/yard
- Town of LaConner Wastewater Facilities
 - 12154 Chilberg Road, LaConner.
Load your own for free any time you want; tractor loaded into your vehicle, \$5 - \$13/yard
- North Hill Resources
 - 651 N Hill Burlington Blvd
Burlington, WA 98233
Sell Cedar Grove Compost, prices vary

Contact

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[www.skagitcounty.net/
compost](http://www.skagitcounty.net/compost)

