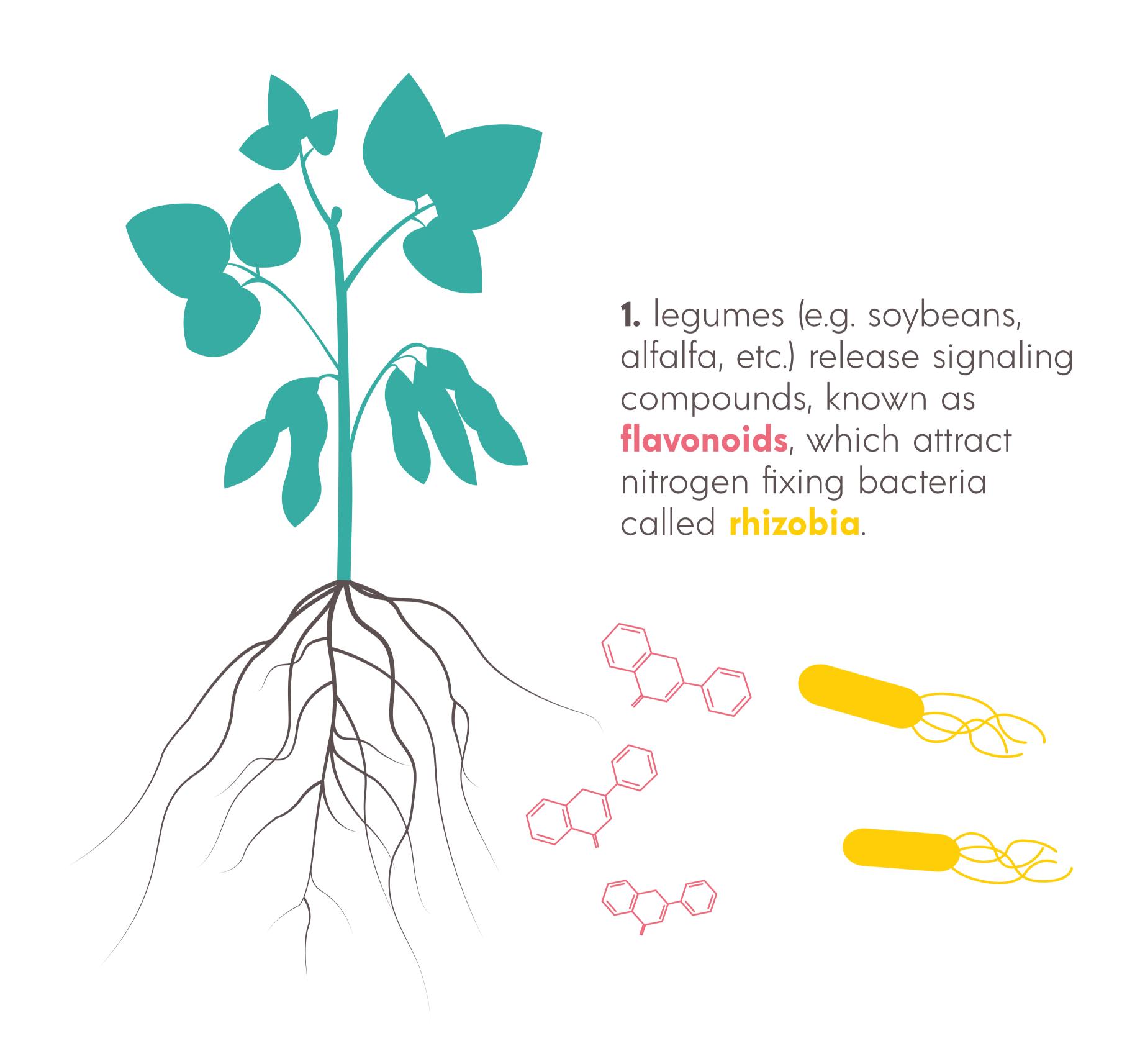
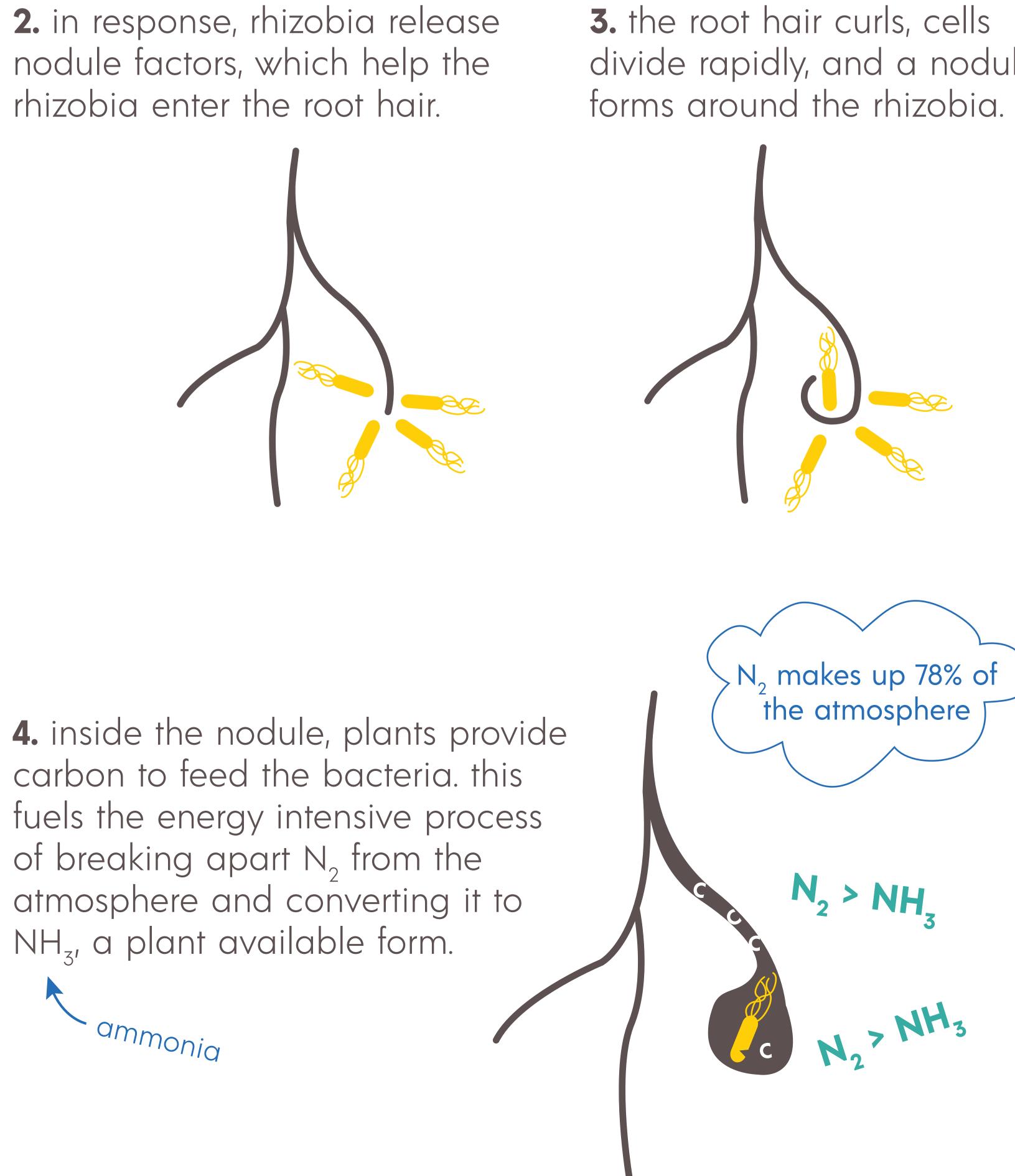


the buzzing internet underfoot allowing plants and microbes to communicate and share resources

plants + bacteria nitrogen fixation

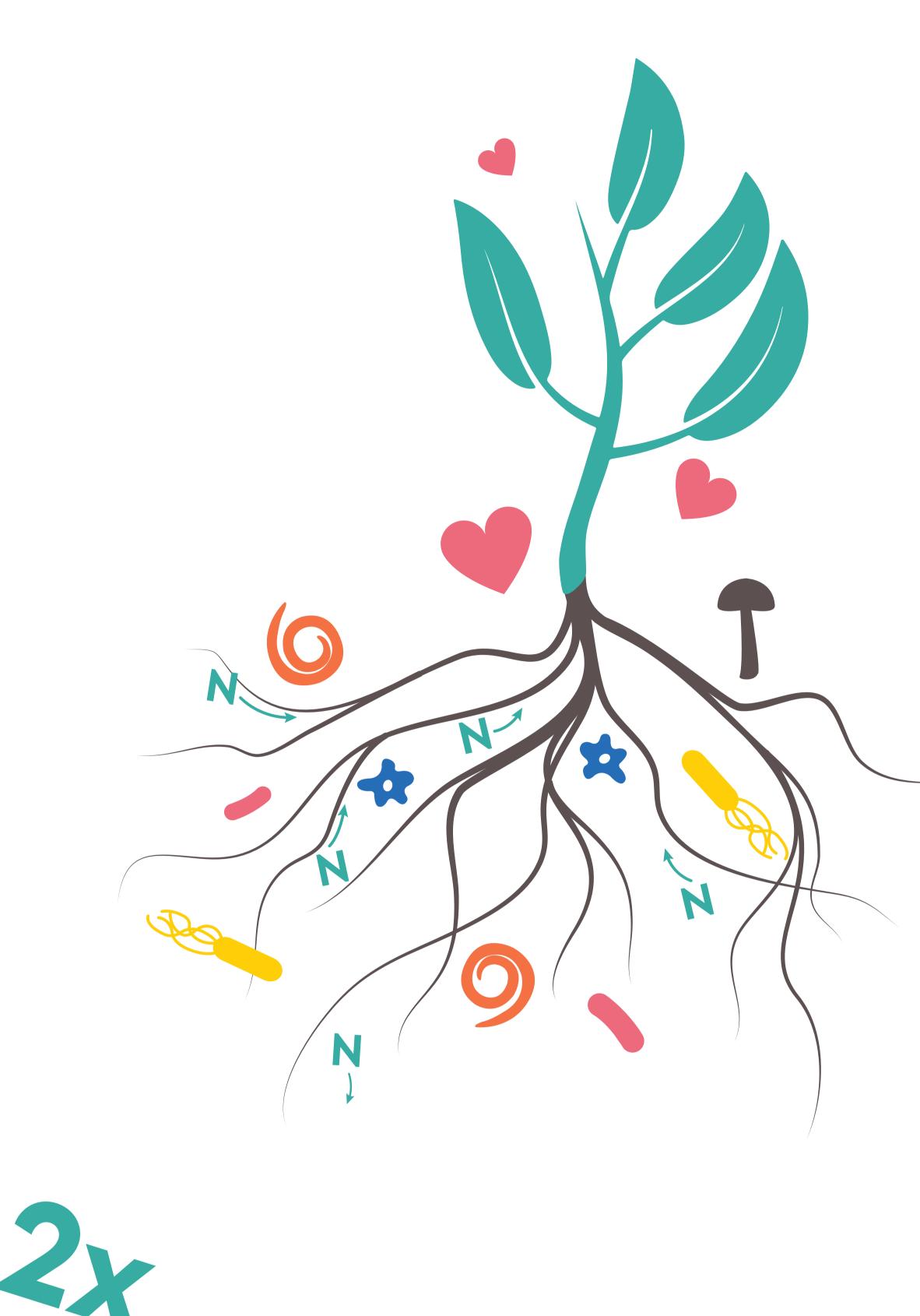


- rhizobia enter the root hair.
- 3. the root hair curls, cells divide rapidly, and a nodule forms around the rhizobia.



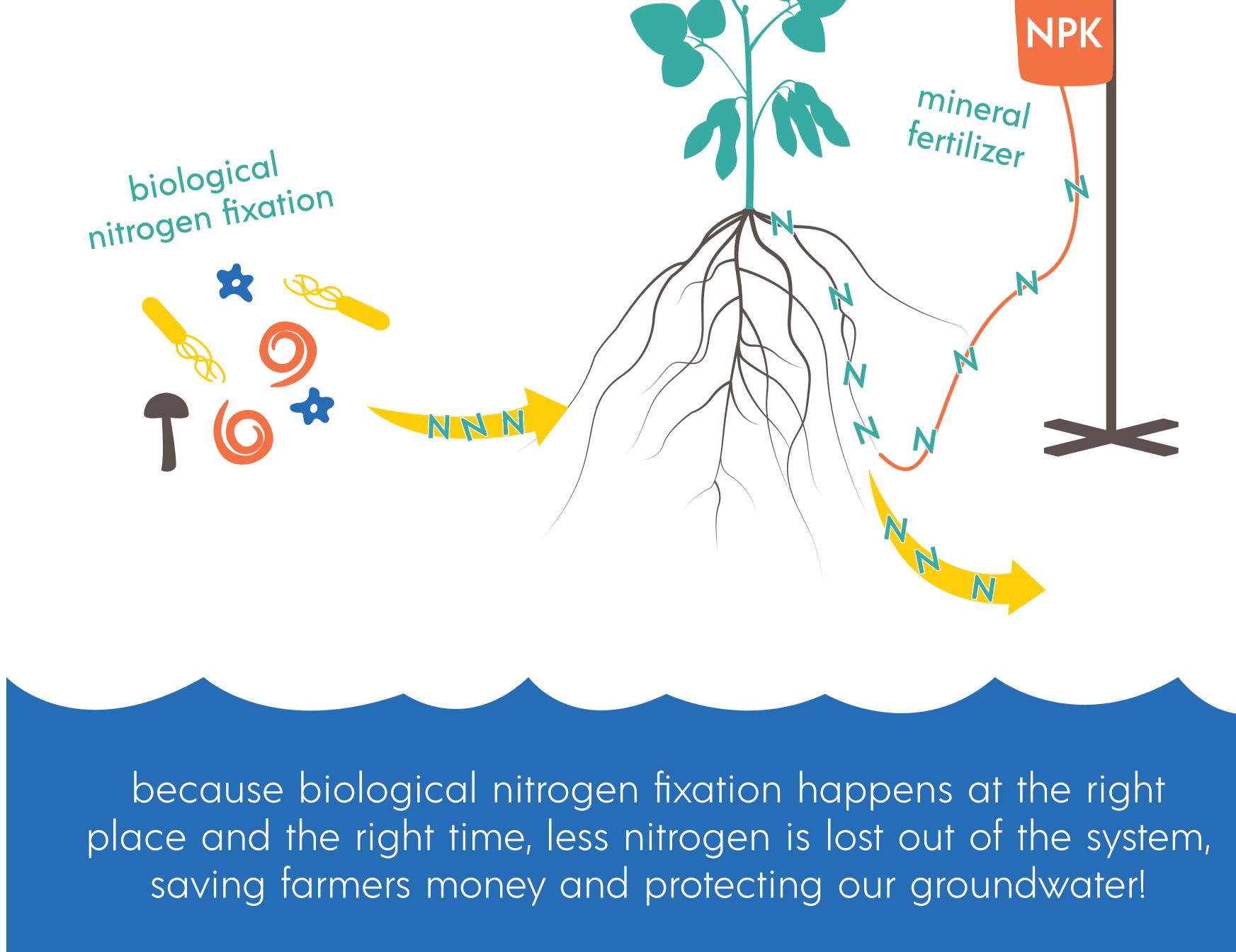
atmosphere and into the soil by microbes underfoot the proteins in the plants and animals we eat are made up of this very nitrogen.

65% of the nitrogen used to grow food is brought out of the



that's twice the amount that humans fix via industrial processes:

100-150 million tons/yr vs 85 million tons/yr

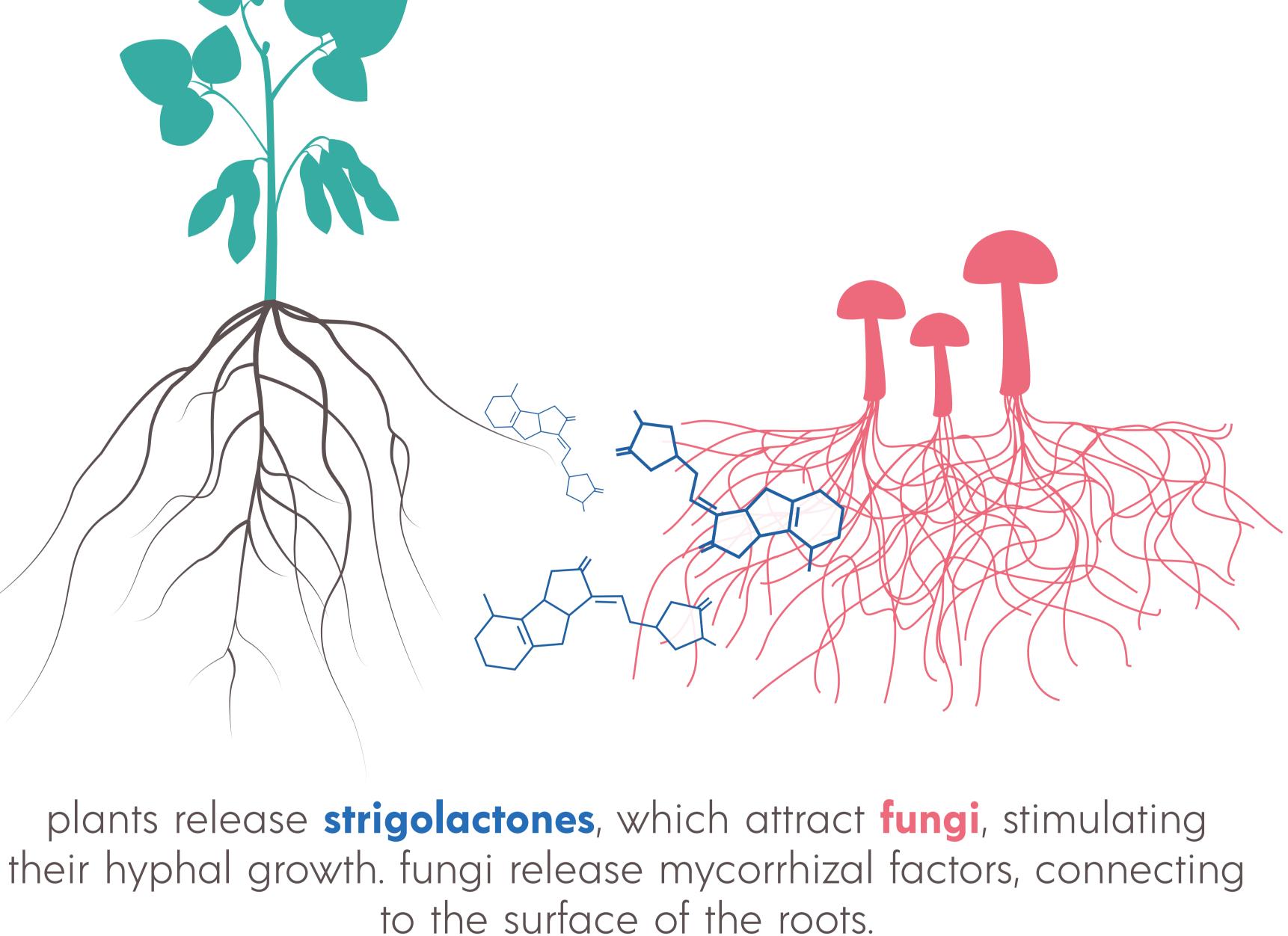


common mycelial networks allow plants to

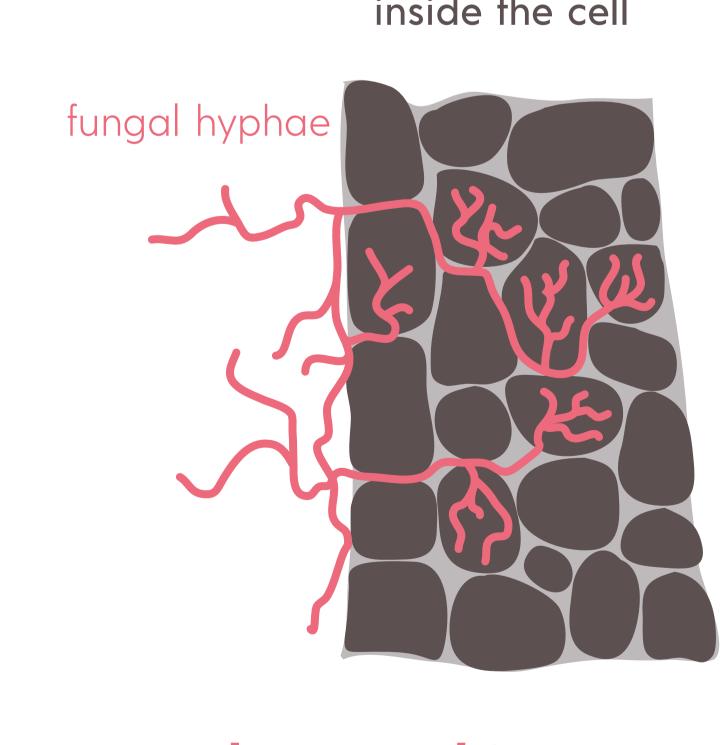
plants + fungi

mycorrhizae

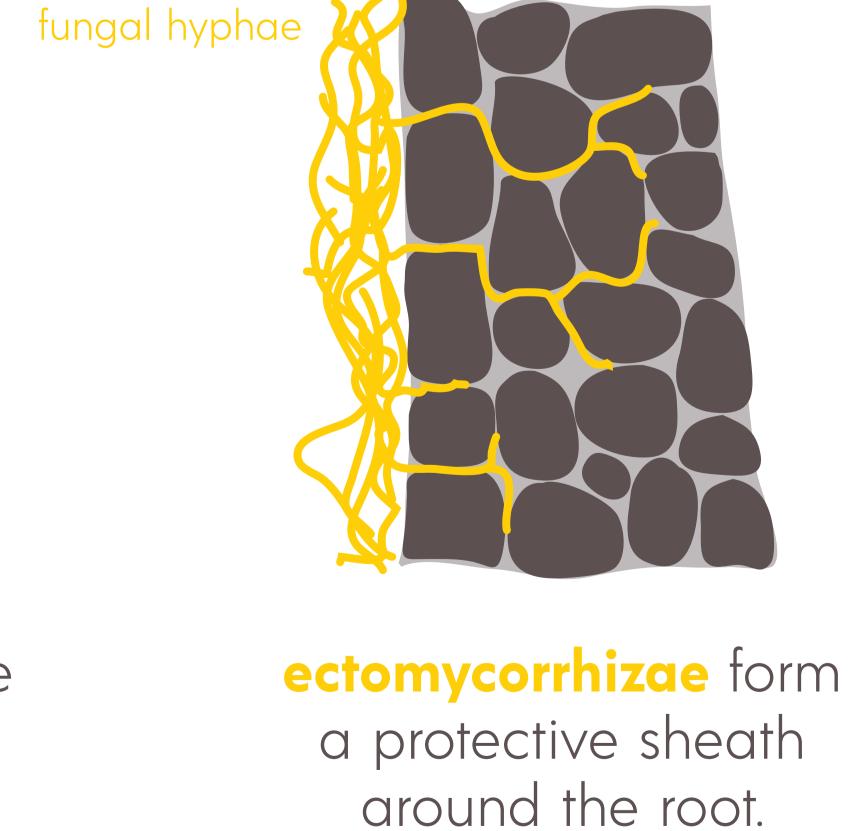
communicate with one another, requesting nutrients when there is a deficiency, warning of a pest when there is an attack, and providing extra protection against disease.



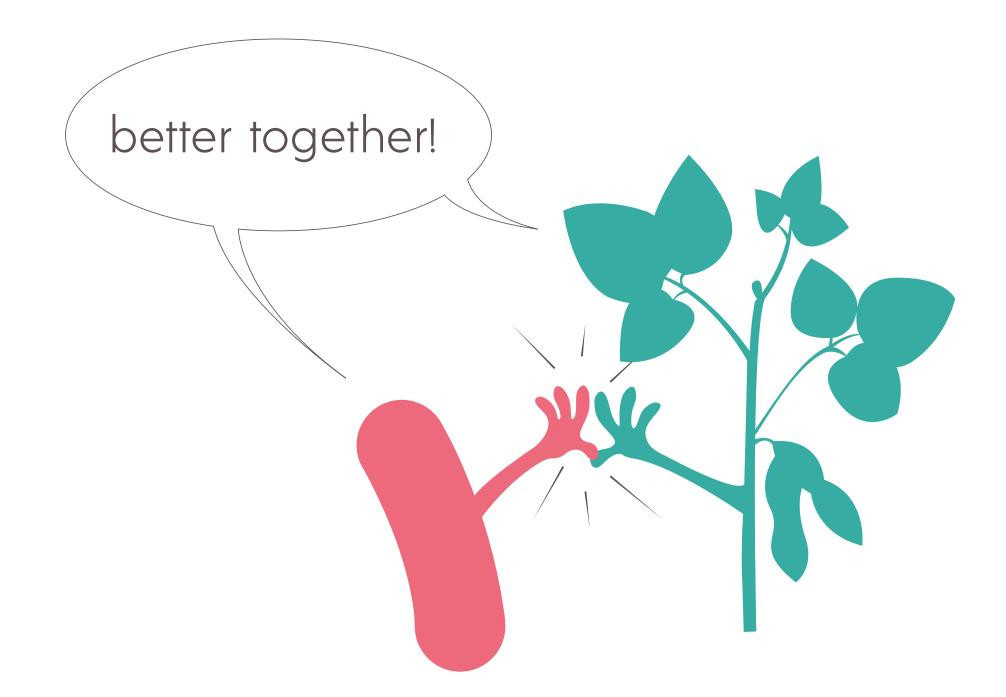




endomycorrhizae penetrate the outermost root cells, germinating spores inside.

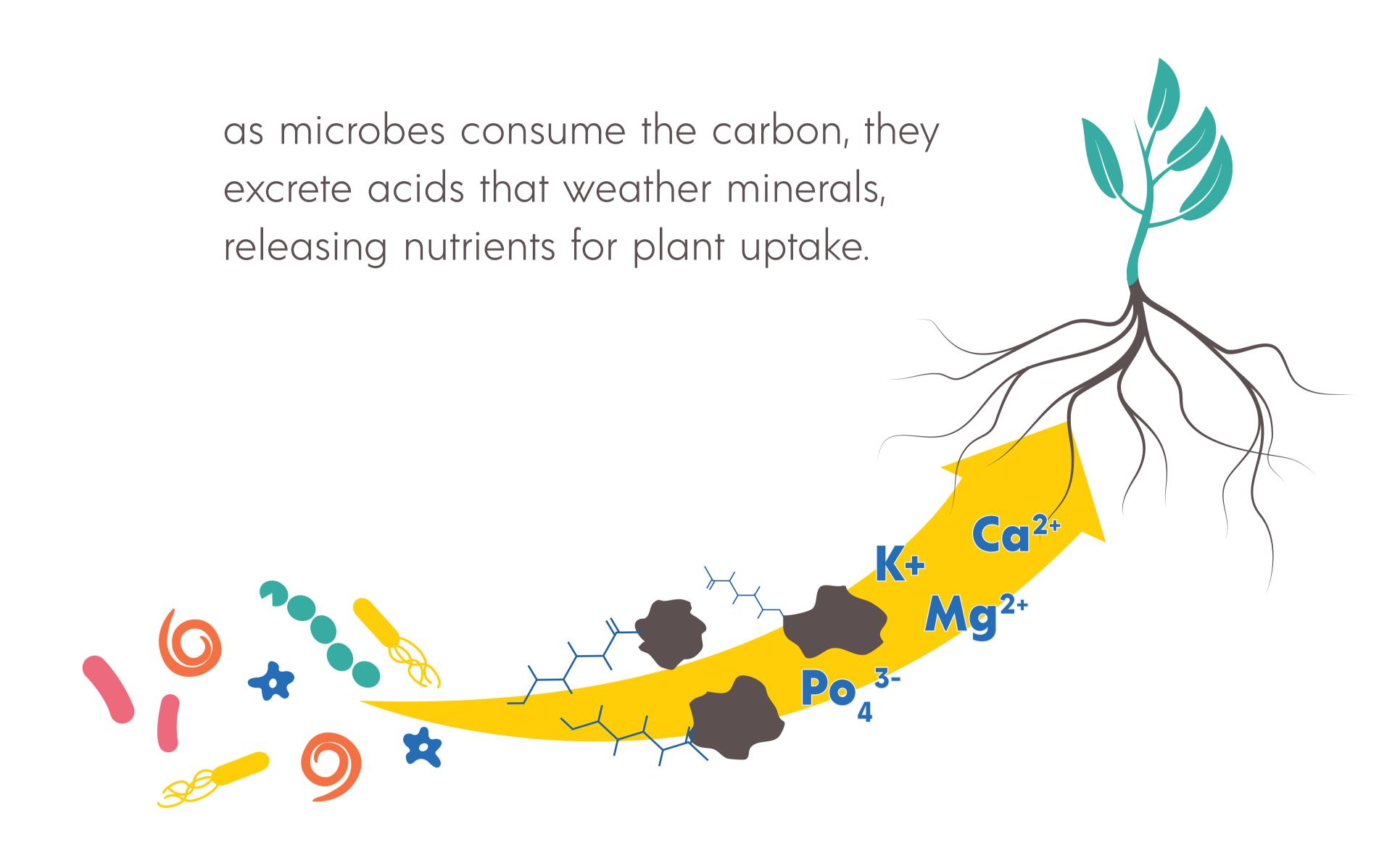


around the root

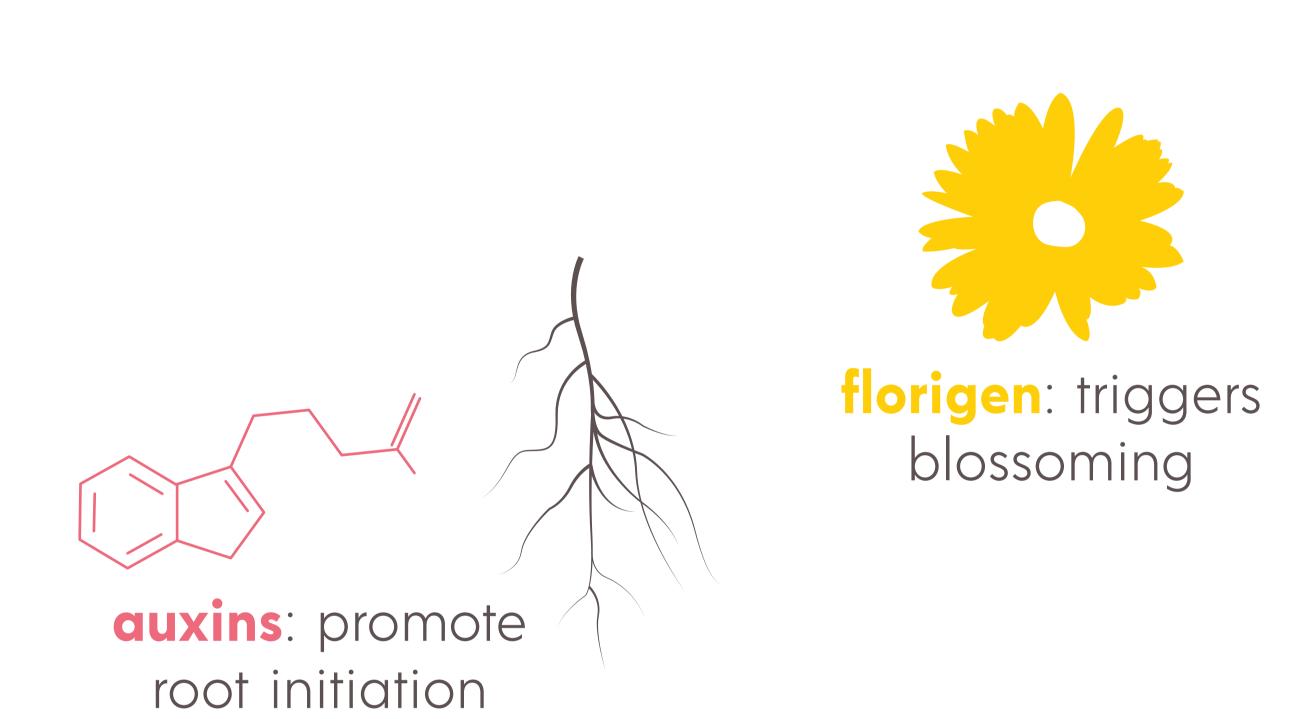


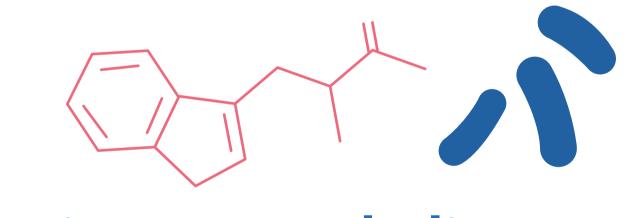
these mutually beneficial relationships, called **symbioses**, have evolved over millions and millions of years.

to attract **symbiotic bacteria and fungi**, plants release **30-60%** of carbon from photosynthesis into the soil



microbes also release signaling compounds and plant growth promoting hormones.





primary metabolites, e.g.
tryptophan: nutrients for
plant-growth promoting bacteria





