

FUNGI IN THE URBAN GARDEN?

Fungi are extremely diverse and numerous, and constitute one of the most important biological groups on our planet, and one of the most ancient. They are found on every continent, yet are poorly understood by the general population. Fungi are not plants, not even closely related to them, for they share a common ancestor with animals. Fungi, unlike plants, have no cellulose in their cell walls, but they do have *chitin*, like some animals, whereas plants do not. They represent an early offshoot of the genetic line that gave rise to the many animal groups we are familiar with. Their vital role in cycles of growth and decay makes them indispensable in creating a healthy, natural garden. Fungi don't just decompose leaf litter and dead wood to create a fertile soil layer. They also have a symbiotic relationship with plant roots (called the mycorrhizal relationship) that enhances significantly the plant's uptake of phosphorus, nitrogen, zinc, and water. In the garden this means considerably more vigorous and productive growth, provided you give fungi a chance to establish.

The most familiar sign of fungal growth is fruiting bodies that are variously known colloquially as mushrooms or toadstools, but mycologists use only the former term for them all. Only three groups form these, the *Ascomycota*, the *Basidiomycota*, and the truffle genus *Endogone*. Fungi do not have chlorophyll like plants, and cannot make their own food by photosynthesis, so they can only live off ready-made organic nutrients. Mushrooms generate and release *spores*, by sexual reproduction, and these are the basis of the next generation. Other types of fungi produce spores asexually, the best known being those that cause food spoilage. Spores do not resemble plant seeds, because the former have neither embryo nor cellular food reserves. Many spores are just single cells, or have only a few cells. Usually they are wind-blown, and to germinate they must fall on nutrient, having none of their own.

The 'body' of a fungus is normally hidden inside decaying plant parts, and consists of bundles of minute hair-like filaments, which are long, cylindrical cells, called *hyphae*. In nutrient these branch and develop into a cobweb-like structure called a *mycelium*, which snakes through the plant material as nutrients are extracted from it. Hyphae exude enzymes that catalyse the breakdown of the nutrient into smaller molecules that the hyphae consume. The hyphae grow into thicker hyphal strings, that collectively make up the mycelia. If two mycelia consort together in a quasi-sexual union a fruiting body, a mushroom, is produced.

Lichens are a very attractive feature of a natural garden, and each is a symbiotic pairing of a fungus and a photosynthetic partner, usually a green alga or a cyanobacterium. The fungus component of every lichen is different, but not so the partner.

Organisms near the beginnings of food chains need simple organic food, which is provided by the decomposition of tissues from larger organisms, animals and plants, that have died. In gardens the primary process is the decomposition of dead plant material by fungi, whose hyphae invade the plant structure, feed off it, and in so doing break the cellulose and lignin down. Slime moulds, bacteria, slugs, snails, springtails, beetle larvae, millipedes, and other invertebrates also play a part, as do earthworms in the later stages of decay. This saprotrophic process is aerobic, and in a compost heap it is accelerated by the heat generated within.

To get the maximum benefit of the recycling of nutrients in your garden, giving you the maximum fertility without the need for fertilizer chemicals, you need good populations of the organisms mentioned above, which you will have in a natural garden. Decay rates vary considerably. Deciduous leaves and non-woody stems take up to a year to fully decay. A fern like bracken can take up to 3 years, and pine needles up to 7 years. Logs may take several decades. The decay time is shortened if the wood is wet or moist.

Some fungi are species- or family-specific, others less fussy. Our native Scots Pine, for example, has two specific species, one growing on the cones, the other on fallen needles. General wood-decay fungi are mostly of 3 types: brown-rot fungi (formerly called dry-rot fungi), which break down hemicellulose and cellulose in the wood structure; soft-rot fungi, which break down cellulose; and white-rot fungi, which break down lignin, or lignin and cellulose.

The fastest, most completely decaying twigs and branches will be from your native plants, whose attendant fungi are most abundant. Do not, therefore, clear any of these twigs and branches away. Let them rot where they fall, or put them in aerated piles. Moisten in hot, dry weather. Don't dig in your rotted wood; let the soil creatures disperse it naturally. What spores you don't have will blow in on the wind. Alien species will take far longer to decay as their specific fungi are not present in this country. The more native plants you have the quicker will be the recycling times to give you the most highly fertile soil.

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