Liberation of spores in fungi

Fungi are found almost every where in the world because of their spores which are produced in large numbers and have evolved interesting mechanisms for dispersal. Different fungi have evolved different mechanisms for their dispersal of spores.

Most fungi rely on gravity to carry their spores down and into currents which will then carry them away to other places.

I. **Air borne spores:** The most common mode of spore dispersal in fungi is by air currents. The wind dispersed fungi mostly produce dry spores. Different mechanisms for release of such spores into the air are as follows:

   a) The basidiospores are released by forcible ejection of the basidia. The force that ejects the basidiospores comes from the internal pressure built up in the basidia. When the basidiospores mature, the pressure in the basidium shoots the basidiospores between the gills of the mushrooms. The basidiospores are ejected to a small distance but sufficient enough to allow them drop between the gills without getting trapped. Once free of the gills they can be carried by wind due to their light weight, small size and vast numbers.

   b) Coprophilous (dung-loving) fungi have developed a ballistic mechanism for spore dispersal. *Pilobolus* is such a fungus which has a spore bearing structure consisting of a large sporangium mounted on a swollen vesicle which is a part of the sporangium. At maturity the sporangiophore develops a high turn or pressure. The wall that enclose both the sporangium and the vesicle breaks down and suddenly ruptures, squirting its content forward and propelling the sporangium for 2 meters or more. Mucilage released from the base of the sporangium during the process serves to stick the sporangium to any surface on which it lands. Then the spores are released from the sporangium and can spread by air or water.

   c) A different mechanism is observed in *Basidiobolus ranarum.* In this case the sporangium is mounted on a subsporangial vesicle which ruptures at the base squirting the sap backwards and propelling the sporangium forward like a rocket.

   d) *Sphaerobolus stellatus* produces basidiospores in a large ball like structure within a cup shaped fruit body. At maturity, the inner layer of the cup separates from the outer layer and suddenly inverts exposing the spore mass into the air.

   e) In ascomycota most species produces fruit bodies that bear asci containing ascospores. The ascospores are forcibly ejected through the top of the asci due to fluid pressure built inside the ascus. The tip of the asci is blown off and the spores are ejected away from the fruit body due to sudden release of pressure. There are different mechanism for the release of pressure such as opening of. Lid or operculum on reaching the utmost pressure. Once the spores are shot out into air then they will be carried away by wind pressure.

   In puffballs and earthstars, the spores are held in a mass inside a more or less spherical ball. There is a small pore in the wall on the top of the ball. Rain drops or animal contact placing pressure on the top of the ball forces the spores inside to puff out and be carried away by wind currents. In

earthstars, the outer wall splits and opens into a star shape which helps in raising the fruiting body above the litter. It helps the spores to be borne away by wind currents

II. **Water dispersed spores:** Spores dispersed by water are hydrophilic. The spores are characteristically shaped, usually with long appendages or coiled. The spores stay afloat due to surface tension of spores or air pockets in the spores. Some may have flagella also to move short distances.
    a) **Ink cap** are gill fungi in which the gills breakdown as they mature. This results in a dripping black inky fluid containing the spores.
    b) **Bird's nest** fungi produce fruiting bodies which resemble a bird's nest. The fruit bodies contain hard pockets called **peridioles** that bear the spores. Several peridioles remain attached to the inside of the fruiting bodies by means of a slender connection called **funiculus** that remains folded. The length of the funiculus may be 6 to 8 inches and at its base there is a sticky area called **hapteron.** When a rain drop splashes into the nest, the force will eject the peridioles out of the nest up to a distance of 3-4 ft. The force of ejection causes the funiculus to unwind and if the wet and sticky hapteron comes in contact with any object as it flies through air, it will stick and coil around that object. Later the peridioles may degenerate releasing the spores or may be eaten up by animals.

III. **Spore dispersal by insects:** Insect dispersal of spores is seen in a group of fungi commonly referred to as **stinkhorns** due to their unpleasant odour. These fungi produce their spores usually in a liver brown slime at the top of the colourful part of the fruiting body. When the spores are mature and exposed to the external environment, the odour of the spores attract flies that eat up the slime thus dispersing the spores.

    An interesting mechanism of spore dispersal has been observed in *Puccinia monoica* on *Arabis*. This fungus induces the host to produce a pseudo flower which is actually a modification of the leaves. This attracts the insect pollinators which carry the spore of the fungus in the process.

IV. **Spore dispersal by animals:** Spores of some puffballs are dispersed by animals. Foraging animals often consume the peridioles of puffballs which pass through their digestive system without damage and are dispersed in their faecal matter.