

# ARTIS MICROPIA

## *Pilobolus*

### Spore cannon

Answers to the questions to the three experiments.



#### Part 1

**Question 1:** How can *Pilobolus* shoot out its spores?

**Answer:** A small vesicle filled with liquid forms below the sporangium of the *Pilobolus*. When the pressure inside the vesicle is high enough, it bursts open and the liquid propels the sporangium outwards with tremendous force.

**Question 2:** The spores can land up to two metres away. Then they end up in the grass. How does the new *Pilobolus* get from the grass back into the horse dung?

**Answer:** When a horse grazes in the pasture, the spores, together with the grass, end up in the horse's stomach. The spores survive the journey through the gastrointestinal tract, thus ending up again in a fresh pile of horse dung.

#### Part 2

**Question 1:** Are there any visible differences? If so, which ones?

**Answer:** *Pilobolus* may be found on horse dung and the dung of other grazing animals. *Pilobolus* does not grow on dog poo.

**Question 2:** Why do you think these differences exist?

**Answer:** The spores can only be found in the dung if the animal has eaten grass with spores on it. Dogs do not eat grass, so there cannot be any *Pilobolus* in their poo.

#### Part 3

**Question 1:** What is the point of *Pilobolus* shooting its spores towards the light?

**Answer:** The spores need to end up in the grass, which will in turn make sure they will be eaten by horses. By shooting the spores towards the light, the *Pilobolus* has a good chance of ending up in an open field.

**Question 2:** Towards which colour of film did *Pilobolus* shoot out the most spores? Why do you think this colour attracts more spores than other colours?

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**Answer:** The blue one has the most spores. This is because blue comes closest to the ultraviolet region of the light spectrum. Other colours of light can be reflected off of objects and are therefore less reliable as a source of light.

## General questions to think about

**Question 1:** How does *Pilobolus* 'see' where the light is?

**Answer:** There are light-sensitive cells at the base of the vesicles. These cells affect the stalk's growth until the sporangium points directly towards the best source of light. At that point, the vesicle is exposed to the same amount of light on all sides.

**Question 2:** Why are the *Pilobolus* spores black?

**Answer:** Not only the *Pilobolus*, but many other kinds of fungi have dark-coloured spores. These darker pigments protect the spores against UV-radiation from the sun. This radiation can damage the DNA in the spores.

**Question 3:** In the experiments, the sporangia got stuck to the lids. Why is it useful for the spores to be sticky?

**Answer:** The stickiness comes from the mucus-like liquid inside the vesicle below the sporangium. With this liquid, the sporangium can easily stick to blades of grass. This raises the odds of the sporangium being eaten by grazing animals. Because otherwise it falls down below the blades of grass onto the ground.

**Question 4:** How do the *Pilobolus* spores survive the trip through the horse's gastrointestinal tract?

**Answer:** Fungi spores have a protective cell wall which is quite tough. The cell wall of *Pilobolus* spores is strong enough to withstand the gastric juices and other dangers posed by the horse's gastrointestinal tract.