Difference Between Radicle and Plumule

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Key Difference - Radicle vs Plumule

All seeds contain embryos. Seed embryo creates a new plant after germination. Therefore the embryo is protected inside the seed by a hard covering called testa. The seed begins to grow when the right conditions are found such as moisture, warmth, sunlight, nutrient-rich soil etc. There are two main components of a plant; shoot and root. Stem, leaves and roots develop from different parts of the seed embryo. The radicle is the first part that emerges from the seed during the germination through the micropyle (seed pore). It makes the roots of the new plant. Plumule emerges after the radicle and makes the stem of the new seedling. Cotyledons form the first leaves of the seedling. The **key difference** between radicle and plumule is that **radicle is the root forming part of the seed embryo while plume is the stem forming part of the seed embryo.** The cotyledons of the seed embryo hold the radicle and the plume.

What is Radicle?

The radicle is the embryonic root of the plant. It is a part of the seedling that comes first from the seed during the germination. It comes out from the seed through the micropyle. Radicle grows downwards into the soil. A root cap protects the tip of the radicle. It absorbs water and nutrients and supplies to the leaves for starting photosynthesis. Embryonic stem or the hypocotyl is found above the radicle.

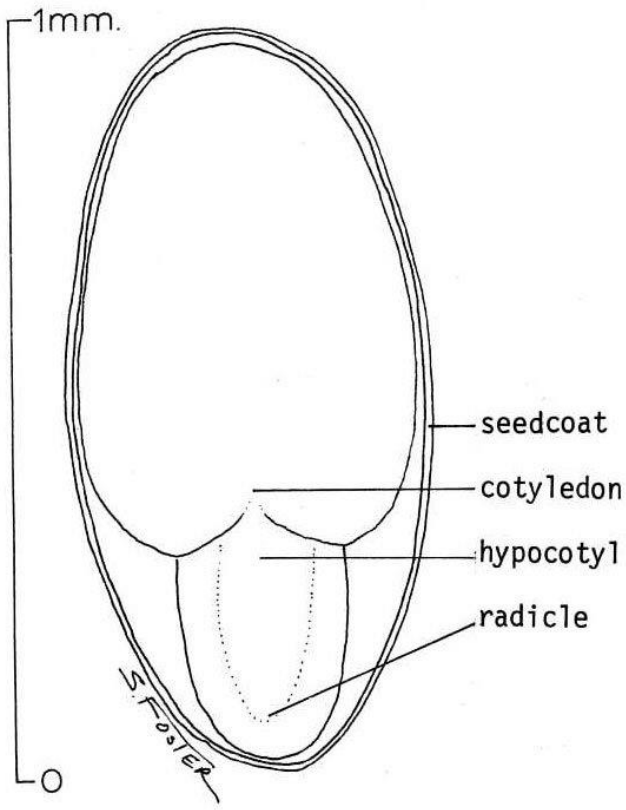

Figure 01: Radicle

Radicle emerges from the seed as a short white structure. It is the first root of the new plant. The radicle is negatively phototrophic and positively geographic. And also it is positively hydrotrophic. It is the first part that functions in new plant development.

What is Plumule?

Plumule is the part of seed embryo that develops into the shoot after germination. It makes mainly the stem of the plant, and it bears immature leaves. This part performs the photosynthesis and makes new food for the growth and development of the new plant. Pumule is positively phototrophic hence, it grows towards the sunlight. Sunlight is essential for the photosynthesis of the new shoot.

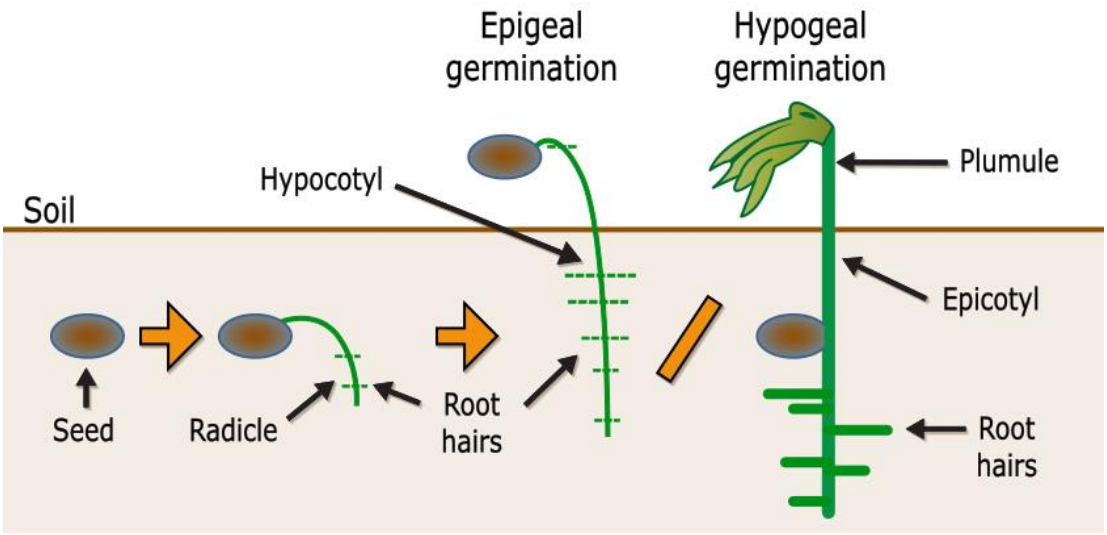

Figure 02: Plumule

Radicle and the plumule are joined by the cotyledons of the embryo. Plumule is located above the cotyledons. In epigeal germination, plumule grows above the soil surface together with the cotyledons.

What are the Similarities Between Radicle and Plumule?

- Radicle and plumule are two main parts of a seed embryo.
- Both are important for the new plant development.
- Both parts are diploid in chromosome number.
- Both parts are joined to the cotyledons.

What is the Difference Between Radicle and Plumule?

Radicle vs Plumule	
The radicle is the embryonic root of the plant.	Plumule is the embryonic shoot of the plant.
Growing Direction	
Radicle grows downwards into the soil.	Plumule grows upwards into the air.
Appearing From the Seed	

The radicle is the first part of the seedling emerging from the seed during the germination.	Plumule grows after the radicle.
Developing Into	
Radicle makes the root of the plant.	Plumule makes the shoot of the plant.
Phototrophic	
Radicle is negatively phototrophic.	Plumule is positively phototrophic.
Hypertrophic	
Radicle is positively hydrotrophic.	Plumule is negatively hydrotrophic.
Colour	
Radicle is whitish.	Plumule is less whitish.
Geotrophic	
Radicle is positively geotropic	Plumule is negatively geotropic

Summary - Radicle vs Plumule

After the fertilization of a sperm cell and an egg cell, a zygote is formed. The zygote divides by mitosis and forms an embryo. The embryo is protected inside the seed and when seed germination, it develops into a new plant. The embryo contains several parts that forms different parts of the growing seedling. When the proper conditions are met, the seed begins to germinate. The embryo is nourished with nutrients, and it is starting to become a new plant. The first part which emerges from the seed through seed pore is known as radicle. The radicle is the first root of the seedling. Radicle converts into roots and absorbs water and nutrients to supply for the other parts. Secondly, a structure called plume emerges. Plumule is the embryonic part that forms the stem of the plant. Cotyledons convert into first leaves of the plant. This is the difference between radicle and plumule.

Reference:

1.“Germination.” Wikipedia, Wikimedia Foundation, 13 Jan. 2018. Available here
2.“Seed and Seedling Biology.” Penn State Extension. Available here

Image Courtesy:

1.'Salix scouleriana.seed' (Public Domain) via Commons Wikimedia
2.'Germination-en'By Germination.svg, (CC BY-SA 3.0) via Commons Wikimedia

How to Cite this Article?

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